Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Southwestern Region / Carson National Forest MB-R3-02-11 September 2021

Land Management Plan

Carson National Forest

Rio Arriba, Taos, Mora, and Colfax Counties, New Mexico

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Land Management Plan

Carson National Forest

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Commonly Used Acronyms and Abbreviations

BLM	Bureau of Land Management
CFR	Code of Federal Regulations
DBH	diameter at breast height
e.g.	for example, from the Latin phrase *exempli gratia*
FS	Forest Service
FSH	Forest Service Handbook
i.e.	that is, namely, or in other words, from the Latin phrase *id est*
MMCF	million cubic feet
MMBF	million board feet
NEPA	National Environmental Policy Act
NF	national forest
NFS	National Forest System
NM	New Mexico
NMDGF	New Mexico Department of Game and Fish
PTSQ	projected timber sale quantity
PWSQ	projected wood sale quantity
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service

Note: The glossary includes other acronyms commonly used by the Forest Service.

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Chapter 1. Introduction

Plan Area

The Carson National Forest (or "the Carson") is one of five national forests in New Mexico. It covers 1,486,372 acres in Rio Arriba, Taos, Mora, and Colfax Counties. The Carson is divided into six ranger districts—Camino Real, Canjilon, El Rito, Jicarilla, Tres Piedras, and Questa. East of the Rio Grande Gorge, the Questa and Camino Real Ranger Districts span the Sangre de Cristo Mountains (referred to as the "east side"). West of the Rio Grande, the Tres Piedras, El Rito, and Canjilon Ranger Districts cover the slopes of the San Juan Mountains (referred to as the "west side"). To the far west, Jicarilla Ranger District sits on the eastern edge of the San Juan Basin, with rugged buttes, steep canyons, and prominent mesas. The Carson shares boundaries with the Rio Grande National Forest in Colorado; Santa Fe National Forest; Taos Pueblo; Jicarilla Apache Nation; Southern Ute Tribe; Picuris Pueblo; U.S. Department of Interior; Bureau of Land Management (BLM), the towns of Red River, Questa, Taos, Taos Ski Valley, Peñasco, Tres Piedras, El Rito, Canjilon; and private lands. This land management plan covers all the National Forest System (NFS) lands within the Carson National Forest boundary.[1]

Figure 1. Vicinity map of the Carson National Forest

[1] Any statements of factual information included in background information, introductions, or explanatory narratives are supported by references cited in the Assessment or planning record.

Geographic Context

The Carson National Forest lies across the Sangre de Cristo (east side) and Tusas Mountains (west side), which extend north into Colorado and south onto the Santa Fe National Forest. Their high elevations fill two major rivers, the Rio Grande and Rio Chama, and are vital water sources to both small local communities and larger urban areas downstream. The Carson manages resources that are important regionally and nationally, from the rare high alpine environments around the highest peak in New Mexico, to the broad meadows and bristlecone pine forests of Valle Vidal, to the natural gas-producing woodlands of the San Juan Basin, to fuelwood, timber, and other forest products that local communities rely on.

National Forest System (NFS) lands managed by the Carson make up about 37 and 23 percent of Taos and Rio Arriba Counties, respectively, and the majority of these two counties are under management of Federal agencies or federally recognized tribes. Taos, Rio Arriba, Mora, and Colfax Counties benefit from having the NFS lands close by for activities such as recreation, wood product harvesting, oil and gas production, and livestock grazing. Forest Service management supports the continued relationship between the Carson National Forest and the communities in these counties, while its economic influence reaches beyond those nearby communities and into San Juan County in New Mexico and Conejos and Costilla Counties in Colorado.

Historical Context

For much of the span of human history, American Indians were the only people to occupy and use the lands that comprise the Carson. Their use of the forest and the surrounding area began with the earliest human occupation of the Western Hemisphere and continues 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 earliest inhabitants were small bands of nomadic hunters and gatherers that roamed the Southwest beginning approximately 13,000 years ago. This hunting and gathering lifeway was the sole human socioeconomic model until approximately 2,000 years ago when a sedentary, agriculturally based socioeconomic model began to supplement, and in some cases, supplant the hunter-gatherer cultures in the area. The contemporary Pueblo people in northern New Mexico developed their modern ethnic identities and relationship to the land during the past 2,000 years. Taos Pueblo is considered to be one of the oldest continuously inhabited communities in the United States, dating back almost 1,000 years.

The first Spanish visitors came to the Taos area as early as 1540, and settled along the Rio Grande and its tributaries. In 1598, missionaries at Taos Pueblo established the first permanent Spanish presence in the valleys, and by the early 1600s, a few Spanish-speaking pobladores (settlers) were living in fortified ranches or settlements of one or more households along streams and rivers. The communities constructed the first acequias (irrigation ditches) to transport water from rivers and streams to irrigate fields. The expansion of Spanish settlements was nurtured by water management, and water resources remain fundamental to the human and social fabric of northern New Mexico. Many Spanish-era acequias are still in use and water rights are held tightly and highly valued, socially if not monetarily. “Agua es vida” or “water is life” is a common phrase in northern New Mexico.

In the 1600s, New Mexico experienced a series of severe, devastating droughts and bitterly cold winters that caused widespread hardship and famine for both Native Americans and Spanish settlers. The cold, drought, and subsequent diminished food supply, combined with the catastrophic impact of European epidemic diseases, culminated in 1680, with the violent expulsion of the Spanish from New Mexico. The Pueblo Revolt was a province-wide rebellion organized and initiated by an Ohkay Owingeh (San Juan

Pueblo) religious leader named Popé who had been in hiding from the Spanish at Taos Pueblo. For over 12 years, the Spanish were kept out of the northern Rio Grande Valley, but by 1693, Governor Diego de Vargas had reoccupied the capitol at Santa Fe.

From the late-1600s to mid-1800s, 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. In New Mexico, land grants-mercedes were issued to encourage settlement and reward patrons of the Spanish government. In the 1800s, Spanish communities, including land grants-mercedes, began to prosper, and the population increased. As farmers and sheepherders moved into these areas, many churches and small villages were created. Mexico gained its independence from Spain in 1821, and New Mexico became a part of the Mexican Republic. Soon after, Mexico sanctioned a trade route (Santa Fe Trail) with the also recently independent United States. For the first time, the area started to move away from a barter economy, as many residents became active and successful in the burgeoning international trade. The Santa Fe Trail also encouraged a large influx of American, Canadian, and other non-Hispanic traders and trappers enticed by the growing fur trade. Fur trapping protected valuable and limited domesticated livestock in New Mexico by eradicating predators including Mexican wolves, Mexican grizzly bears, and mainland grizzly bears.

Throughout the early part of the 19th century, western expansion of the United States increased the level of American influence over the Southwest. Following disputes over the United States' annexation of Texas, the U.S. military invaded Mexico in 1845, and seized New Mexico by force. The conflict was resolved with the 1848 Treaty of Guadalupe-Hidalgo, which established New Mexico as a territory of the United States.

In the years following the Treaty of Guadalupe-Hidalgo (1848), New Mexico was a U.S. Territory and remained a territory until it attained statehood in 1912. Between 1848 and 1912, and especially from the 1880s to early 1900s, lands, including land grant common lands, came under control of a variety of incoming U.S. citizens and companies from across the country, or into the public domain and eventually was managed under the National Forest System. The lands that would later become Forest Service-managed lands in northern New Mexico were at one time mostly land grant common lands, but collectively became public lands through a variety of historical events, developments, and/or processes.

Sporadic prospecting in the Sangre de Cristo Mountains occurred during the 1850s, but after the Civil War, prospectors flooded the area. The desire to develop gold interests in the Moreno Valley and inner mountains led to the removal of the Jicarilla Apache and Mouache Ute to the Cimarron Indian Agency in the 1860s, and to reservations by 1890. There are scattered patented mining claim inholdings of private land across the Questa, Camino Real, and Tres Piedras Ranger Districts that have been worked periodically since the late 1800s.

Beginning in the mid-1800s, large commercial sheep ranching took advantage of the expanded American market and growing demand for meat from miners across the Southwest, straining what the land could support to maximize economic gain. In the 1850s, hundreds of thousands of head were driven from New Mexico to California. Breeding with American wool-producing varieties made New Mexican sheep profitable for wool as well as mutton, and sheep numbers in New Mexico rose by more than threefold between 1870 and the mid-1880s.

Railroads began to push into what is now the Carson by 1880, and train logging became a powerful economic driver in northern New Mexico for the next 40 years. Timber harvested from the Carson was used throughout the American West to support rapidly expanding railroads, as well as mining operations. Extensive logging cleared all the largest pine, fir, and spruce trees from many accessible areas. This

period also marked the beginning of a shift from sheep to more profitable cattle, which reached peak numbers in the early 1890s. By 1900, there were 3.5 million sheep valued at $7.6 million, and only 843,000 cattle, but with a value topping $16 million. The cattle and sheep boom and the environmental damage they caused is one of many reasons that led Congress to establish and regulate Federal reserves across the American West.

With the arrival of the railroads, a new economic enterprise—tourism—arose throughout New Mexico, with remarkable infrastructure that provided lodging, dining, and tours to the rapidly expanding middle class. The American Southwest became the readily accessible new exotic, with its stunning landscapes and terrains, breathtaking vistas, remarkable American Indian and Hispanic cultures, and a truly original American Art.

Since the early 1900s, oil and gas exploration and development have been an integral part of the local economy and livelihood of residents in the San Juan Basin. Natural gas development began on the Jicarilla Ranger District, located on the eastern edge of the San Juan Basin, in the mid-1900s.

After World War II, increasing national affluence, mobility, and leisure time fueled a growing demand for outdoor recreation. The first ski area on the Carson was the Agua Piedra Ski Club, which ran a rope tow between 1940 and 1952. Sipapu Ski Area installed the first lift just down Rio Pueblo Canyon in 1952, Taos Ski Valley opened in 1955, and Red River Ski Area in 1959. The growth of year-round outdoor recreation of multiple types has continued, with most visitation on the Carson now being for some form of recreation. There is growing demand for mountain biking, motorized recreation, and hunting. Today, the Carson's greatest local economic impact by far is through recreational tourism.

The Taos Forest Reserve was established in November 1906, 15 years after the passage of the Forest Reserve Act of 1891. When it was established, the Taos Forest Reserve, was under the administration of the Secretary of Agriculture, which was charged with the administration of the Forest Reserves by the Transfer Act of February 1, 1905. In March 1907, with the passage of the Receipt Act, it became the Taos National Forest. In July 1908, the Taos National Forest, together with land from part of the Jemez National Forest was congressionally designated the Carson National Forest with a total land area of 966,000 acres. Since then, Congress has designated additional lands as a part of the Carson National Forest, resulting in a current total land area of 1,486,372 acres.

Distinctive Roles and Contributions

Every forest in the National Forest System has a distinctive role and contributes to the surrounding local area and larger region. The rich history and cultural uniqueness of northern New Mexico help frame the roles and contributions the Carson National Forest provides to the local area and region. The Carson is predominately a community forest. There are numerous small unincorporated communities within the national forest boundaries, as well as several adjacent small incorporated towns and villages. Historically, the communities around the Carson have relied upon the many resources and uses the forest provides for food, shelter, water, and economic support for their families. Most of these traditional communities and families continue to depend on the national forest for economic opportunity and vitality. During the development of this land management plan, a forest user described the importance of the Carson by stating, "The Forest is what makes the community a community." It is this attachment to the landscape and cultural uniqueness of those who settled in the area that provide the background for the roles and contributions of the Carson.

The natural resources that the Carson manages have provided for families and communities in northern New Mexico for millennia, including before the establishment of the national forest. The Carson

contributes resources and uses that are important to federally recognized tribes and pueblos, land grant communities, acequia communities, traditional Hispanic communities, and many contemporary residents, all with historic, cultural, and social connections to the Carson. As people have moved into the area, they have settled along the flanks of the mountains, in the valleys, near travel routes, rivers, and streams. But, it is the mountains—with their majestic beauty and dominance over the landscape; their trees, water, wildlife, and plants for food—that have drawn individuals and families to settle the land and establish communities. The mountains and their natural assets provide the basis for the traditional customs and practices, which contribute to the cultural life and social institutions important to the people who live here. These include fuelwood for heating and cooking, timber, latillas and vigas, opportunities for hunting and fishing, forage for livestock grazing, medicinal plants and herbs, piñon nuts, family recreation opportunities, and water for acequias, livestock, and domestic drinking water. There are also sacred sites important to federally recognized tribes and pueblos located on the Carson.

The Carson comprises some of the most productive and important watersheds in the region and provides an important component for biological diversity in the landscape of the southwestern United States. Over 1,000 species of plants and animals occur on the Carson. The Carson's high plateaus and rugged mountains are major sources of snowpack and stream runoff, contributing over 40 percent of the waters that flow into the Rio Grande from northern New Mexico and southern Colorado. The Carson National Forest manages varied landscapes, vegetation, and wildlife that provide unique combinations of resources and recreation opportunities, attracting a wide spectrum of forest visitors. The State of New Mexico has designated many streams and lakes in the Carson's wildernesses and Valle Vidal as outstanding national resource waters.

The Carson's high elevations support environments that are rare in New Mexico and in the region. Alpine and tundra, bristlecone pine, and montane and subalpine grasslands are all uncommon in the surrounding landscape. High alpine environments are particularly unique, and though well protected, they are also vulnerable. Riparian corridors and aspen groves are also limited in extent, but they attract visitors and provide disproportionately important habitat.

The Carson is home to large mammals, such as mule deer, elk, bighorn sheep, pronghorn, mountain lion, and black bear, as well as many smaller species. Diverse wildlife provides enjoyment and aesthetic value for photographers, bird watchers, nature lovers, hikers, campers, and hunters. Game species support traditional ways of life, hunting, fishing, trapping, and employment for outfitters and guides. The Carson National Forest manages two active wild horse territories, as well as critical habitat for the southwestern willow flycatcher and the Mexican spotted owl.

In the winter, the Carson's plateaus and mountains provide skiing, snowboarding, snowmobiling, and snowshoeing opportunities in developed and undeveloped settings. The rest of the year, they attract hikers, mountain bikers, campers, and other recreationists from various parts of New Mexico and other states. The Carson National Forest manages over 110,000 acres of designated wilderness, three national recreation trails, one national historic trail, and a portion of the Continental Divide National Scenic Trail. Most visitors to the Carson come for some form of recreation, making tourism the single largest contributor to the local economy for surrounding communities. Residents and tourists also visit for relaxation, spiritual ceremony, rejuvenation, and to gather resources. Many area residents have jobs or businesses that directly or indirectly depend on tourism. Natural gas production on the Jicarilla Ranger District also provides many employment opportunities, as well as significant revenue to the State of New Mexico and the Federal Government in the form of royalties.

NFS lands balance the short- and long-term needs of people and nature through collaboration, promoting socioeconomic and ecological vitality, delivering world-class science and technology, and connecting

people to the land and one another. They offer opportunities for education and developing scientific understanding. The Carson National Forest has an important role in promoting the value of public lands and the importance of sustaining the symbiotic interaction among ecological integrity, the ability of society to produce and consume or otherwise benefit from goods and services, and the ability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another in vibrant communities.

Purpose of the Plan

Every national forest managed by the Forest Service is required to have a land management plan (also referred to as "the plan" in this document) that is consistent with the National Forest Management Act of 1976[2] and other laws. The National Forest Management Act directs that plans be revised on a 10- to 15-year cycle. Thirty years have passed since the Regional Forester approved the original Carson National Forest Plan in September 1986 (USDA FS Carson 1986). Since then, the 1986 plan has been amended 16 times. Scientific information, circumstances, agency and public understanding, as well as economic, social, and ecological conditions have changed or evolved over the past 30 years, and, as a result, management emphasis has shifted from outputs to outcomes. Land management plans are one of three levels of planning and decision-making that guide how NFS lands are managed.

The first and broadest level of planning occurs at the national level through the United States Department of Agriculture Forest Service Strategic Plan, a 5-year plan that allows public transparency of the agency's goals, objectives, and accomplishments. The second level of planning occurs on National Forest System administrative units through land management plans. The third level of planning includes the development of on-the-ground projects and activities, which are designed to make progress toward the desired conditions and objectives of the plan. These projects and activities must be consistent with the plan.

The plan guides the national forest in fulfilling its stewardship responsibilities to best meet the current and future needs of the American people. This plan provides forest-specific guidance and information for project and activity decision-making over the plan period, generally considered to be 10 to 15 years. It provides the vision, strategy, and constraints that guide integrated resource management, provide for ecological sustainability, and contribute to social and economic sustainability on the Carson and the broader landscape.

The plan does not compel any agency action or guarantee specific outcomes. It does not prioritize projects or activities. The Carson National Forest's priorities fit within the framework set forth in the land management plan but evolve and are reassessed continually by Forest Service leadership, in collaboration with the public. Within the constraints of this plan, management adapts to better achieve the vision the plan lays out. Decision-making is informed by feedback from monitoring that actively tests assumptions, tracks relevant conditions over time, and measures management effectiveness.

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

[2] See 16 United States Code U.S.C.) § 1604 - National Forest System Land and Resource Management Plans. The current version contains all Congressional amendments since 1976.

management plans. This plan is the result of a revision process conducted in accordance with the 2012 National Forest System Land Management Planning Rule (36 CFR § 219) and its 2015 planning directives (FSH 1909.12).

Need for Changing the 1986 Plan

Today, there is a better understanding of ecological conditions and trends than in 1986, when the land management plan was issued, including the recognition that vegetation conditions (i.e., structure, composition, and function) are divergent from reference conditions; forest conditions indicate a substantial departure from the natural fire regime; and plant and animal species need further consideration in the planning process. In addition, emerging issues, such as nonnative invasive plants and climate change are not addressed by the 1986 plan. The needs to change the Carson's 1986 land management plan can be summarized into three general topics:

- Terrestrial ecosystems and habitat
- Watersheds and water
- Multiple uses and human influences

Terrestrial Ecosystems and Habitat

Ecological conditions have changed since the plan was issued in 1986, including a better understanding of divergence of vegetation conditions (i.e., structure, composition, and function) from reference conditions; forest conditions indicate a substantial departure from the natural fire regime; and plant and animal species need further consideration in the planning process. In addition, the 1986 plan does not address emerging issues, such as nonnative invasive plants and climate change. The following are the needs to change the Carson's 1986 land management plan:

1. Develop desired conditions regarding forest, woodland, and shrubland structure, composition, and function, as well as objectives, standards, and guidelines, to promote restoration and achievement of desired conditions; support resiliency and sustainability; and minimize risks to ecosystem integrity.
2. Provide plan direction to promote restoration and maintenance of grass productivity—particularly native bunchgrass species—and limit woody species encroachment and invasive plant establishment, in both grasslands and non-grasslands.
3. Update plan direction to enhance aspen health and resilience through managing regeneration (i.e., the use of wildland fire or other disturbances) and existing aspen stands.
4. Add plan direction to support integrated pest (invasive plant and animal) management.
5. Update plan direction to allow for an integrated resource approach to prescribed fire activity, as well as the flexibility for restoration and maintenance of ecosystems.
6. Update plan direction to guide the use of wildland fire (management of wildfire and prescribed fire) in fire-adapted ecosystems, while addressing public safety and health concerns, especially in the wildland-urban interface.
7. Update plan direction to promote the recovery and conservation of federally recognized species, maintenance of viable populations of the species of conservation concern, and maintenance of common and abundant species within the plan area.
8. Provide plan direction to address sustainability of habitat(s) for plant and animal species important to federally recognized tribes and traditional communities.

9. Incorporate plan direction to manage toward terrestrial, riparian, and aquatic habitat connectivity for species movement across the landscape.
10. Update plan direction to enhance wildlife habitat for species that need diverse forest habitats (i.e., interior, edge, young, and old forest), by using an assortment of management approaches, including timber harvest, thinning, prescribed burning, and other vegetation management methods.
11. Update plan direction to promote the maintenance and restoration of soil condition and function (i.e., soil hydrology, soil stability, nutrient cycling), particularly in lower elevation systems. Plan management approaches should focus on reducing the amount of exposed soil by restoring and maintaining sufficient vegetative cover, including downed woody material.
12. Incorporate plan direction that identifies adaptive management strategies and ecological desired conditions that are resilient to change.

Watersheds and Water

The Carson comprises some of the most productive and important watersheds in New Mexico. The high plateaus and rugged mountains are major sources of snowpack and stream runoff, contributing to over 40 percent of the waters that flow into the Rio Grande from northern New Mexico and southern Colorado. The land-based cultures that exist today in northern New Mexico have relied on the water that comes off the Carson for many generations. In addition, the 1986 plan does not address emerging issues, such as decline of riparian vegetation and climate change. The needs to change the Carson's 1986 land management plan associated with water and watershed condition are as follows:

1. Provide plan direction to promote watershed health and function and restore and maintain ecological integrity of vegetation communities.
2. Identify plan direction to guide the restoration of watersheds.
3. Add desired watershed conditions to maintain water quality and quantity, as well as enhance retention.
4. Incorporate plan direction to enhance water resources (e.g., groundwater, springs, wetlands, riparian areas, perennial waters) and their interconnections.
5. Provide plan direction to promote the protection, restoration, and maintenance of appropriate composition and amount of riparian vegetation.
6. Update plan direction to support the management of riparian areas around all lakes, perennial and intermittent streams, and wetlands.
7. Add plan direction to address the protection, restoration, and maintenance of wetland condition and function.
8. Update plan direction to sustain watersheds for multiple uses (e.g., wildlife habitat, livestock grazing, recreation use, and mining) and water supplies for downstream users.
9. Add plan direction to allow for improving aquatic passage in streams where it has been compromised. Plan direction should also promote the restoration and expansion of the range of native aquatic species and connectivity of fragmented populations.

Multiple Uses and Human Influences

The Carson is primarily a community forest, with numerous, small unincorporated communities within the Carson's boundaries, as well as several adjacent, small incorporated towns and villages. The Carson

contributes resources and uses that are important to federally recognized tribes and pueblos, land grant communities, acequias, traditional Hispanic communities, and many contemporary residents—all with historic, cultural, and social connections to the national forest. Most of these traditional communities and families continue to look to the Carson for economic opportunity and vitality but are also at risk from uncharacteristic wildfire. Most visitors to the Carson come for some form of recreation, making tourism the single largest contributor to the local economy for surrounding communities. Many area residents have jobs or businesses that directly or indirectly depend on tourism. The 1986 plan inadequately addresses important issues like recognizing livestock grazing and fuelwood gathering as important uses to be continued on the Carson and managing for a sustainable recreation program that will be able to adapt to changes in demand, available resources, and opportunities. The needs to change the Carson's 1986 land management plan associated with multiple uses and human influences are as follows:

1. Recognize in the plan the Carson's continued contribution to the social and economic benefits desired by local communities, families, and visitors and the need to sustain these contributions. Update the plan to provide the services and products that local and visiting forest users want and need.
2. Identify in the plan how important and integrated relationships with local communities and groups are in the management of the Carson.
3. Update plan direction to recognize American Indian traditional cultural properties and sacred sites and places, and other traditional cultural properties.
4. Provide plan direction to address management of historic and contemporary cultural and traditional uses, including both economic and non-economic uses for federally recognized tribes and for traditional communities (i.e., rural historic communities).
5. Recognize in the plan the legally mandated trust responsibilities to federally recognized tribes.
6. Update plan direction to ensure privacy for federally recognized tribes engaged in cultural and ceremonial activities.
7. Incorporate plan direction to support sustainable rangelands for livestock grazing.
8. Provide plan direction to incorporate adaptive management in the livestock grazing program, to move toward ecosystem-based desired conditions.
9. Provide plan direction to promote the Carson's ability to remain relevant and responsive to changing recreation user demands, while also being economically feasible and adaptable.
10. Provide plan direction for the management of commercial and noncommercial use of forest products.
11. Add plan direction for the Continental Divide National Scenic Trail.
12. Provide plan direction to address the maintenance of routes not open to public motor vehicle use (not on the motor vehicle use map) in watersheds identified as impaired or at-risk.
13. Update plan direction to identify and prioritize alternative methods and opportunities for repairing and maintaining existing infrastructure.
14. Update plan direction to authorize towers, facilities, and alternative infrastructure within communication sites, while giving due consideration to the value and importance of these areas by federally recognized tribes.

Content of a Forest Plan

Plan Organization

Chapter 1. Introduction describes the planning area and its context, the purpose of the plan, the need for changing the plan, the plan framework, project consistency with the plan, plan implementation, and transitioning from the 1986 plan to this plan.

Chapter 2. Forestwide Plan Components includes forestwide desired conditions, objectives, standards, and guidelines and is split into two sections: "Ecological Sustainability and Diversity of Plant and Animal Communities" and "Social, Cultural, and Economic Sustainability and Multiple Use" (goods and services). Standards and guidelines are typically located in the relevant activity section of the plan, but when standards or guidelines pertain to multiple activities, they are in the applicable resource section.

Chapter 3. Designated Areas and Management Areas Plan Components contains management direction applicable to specific areas in addition to or different than forestwide management. This chapter is divided into two sections: designated areas and management areas. Designated areas are mostly 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.

Management areas are used to describe how plan components apply to specific parcels of NFS land. A management area represents a management emphasis for an area or several similar areas on the landscape. Forestwide plan components apply, unless there is overriding management direction for a designated area or management area.

Chapter 4. Plan Monitoring Program outlines the monitoring and evaluation of plan implementation to evaluate 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.

Plan Components

The land management plan must include plan components. Plan components (plan decisions) guide future project and activity decision-making and include desired conditions, objectives, standards, guidelines, suitability of lands, and goals. Plan components should (1) provide a strategic and practical framework for managing the Carson; (2) be applicable to the resources and issues of the Carson; and (3) reflect the Carson's distinctive roles and contributions. 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 do not need to reiterate existing law, regulation, or policy. Except for desired conditions, other plan components are not necessarily in every resource section, management area, or designated area. An interdisciplinary team refined the final form and organization of the land management plan to be understandable, useable, and integrated. The six plan components are described as:

Desired Conditions describe the aspirational vision for the Carson National Forest. 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 allowing 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 land management 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 Carson 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 needs to change and make progress toward desired conditions. They also provide metrics for evaluating accomplishments. Objectives are based on reasonably foreseeable budgets (36 CFR 219.7(e)(1)(ii)). It is important to recognize that objectives were developed considering historic and expected budget allocations as well as professional experience with implementing various resource programs and activities. It is possible that annual management accomplishments could either exceed or not meet a target based upon several factors, including budget and staffing increases or decreases, increased or decreased planning efficiencies, increased or decreased partner contribution, and unanticipated resource constraints.

Standards are technical design constraints that must be followed when an action is being taken to make progress toward desired conditions. Standards differ from guidelines in that standards do not allow for any deviation without a plan amendment.

Guidelines are required technical design criteria or constraints on project and activity decision-making that help make progress toward desired conditions. A guideline allows for departure from its 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 decision document 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 lands within a 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 those lands that are not suitable for timber production and this plan identifies such lands. Suitability of other resources is handled via the standards and guidelines applied to those resources.

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.

Management, Geographic, Designated Areas

Every plan must have management areas or geographic areas or both. The plan may identify designated or recommended designated areas as management areas or geographic areas (36 CFR § 219.7(d)). These areas are assigned sets of plan components such as desired conditions, suitable uses, and in some areas either standards or guidelines or both. Management or geographic area desired conditions describe what the Forest wants to achieve in specific areas that are not necessarily covered by forestwide desired conditions. Although all resources have been considered, the only desired conditions specified for a management or geographic area are those that are not adequately addressed by forestwide desired conditions.

Designated areas are identified and managed to maintain their 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, inventoried roadless areas, 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).

Forest Plan Codes

Plan components are assigned plan codes, which are alphanumeric identifiers, to ease referencing of management direction in the plan. See table 1 for the acronyms used in the plan codes. Plan codes include:

- Level of direction (FW = Forestwide, DA = Designated Area, or MA = Management Area);
- Resource (e.g., VEG = All Vegetation or WFP = Wildlife, Fish, and Plants);
- Type of direction (DC = desired condition, O = objective, S = standard, and G = guideline); and
- A unique number (in numerical order starting with 1).

For example, the unique code for forestwide (FW) Air Resources (AIR) Desired Condition (DC) number 1 is FW-AIR-DC-1.

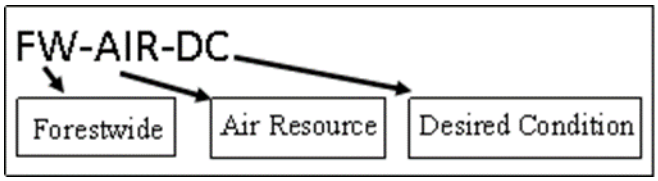

Figure 2. Example of plan code

Plan codes with multiple resource identifiers indicate that the resources are nested. Management must integrate plan components from all resources identified in the code. For example, the plan code FW-WSW-RMZ-STM-O integrates forestwide plan components found within the Streams (STM) resource, plus all the plan components within Riparian Management Zones (RMZ) resource and Watershed and Water (WSW) resource (figure 3).

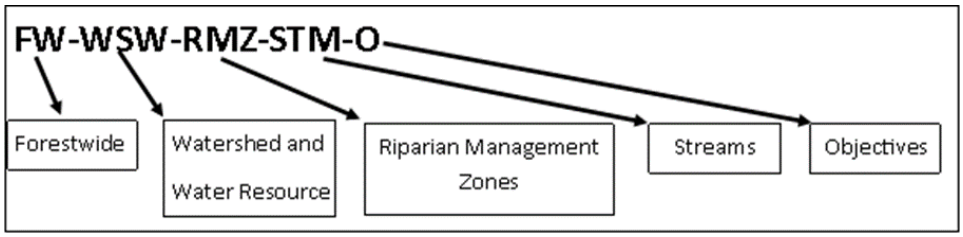

Figure 3. Example of nested plan code

All plan components are listed below section headings that include an acronym in parentheses (see table 1 for a description of the plan code acronyms). In addition, plan components are displayed within text boxes. Any text not associated with a plan code is background material, explanations, or a description of management approaches.

Table 1. Acronyms used in plan codes

Code	Resource or Term	Code	Resource of Term
AIR	Air Resources	NTRL	National Scenic, Historic, and Recreational Trails
ALP	Alpine and Tundra	O	Objective
ASP	Aspen	PART	Partnerships
BOT	Botanical Areas	PJO	Piñon-Juniper Woodland
BP	Bristlecone Pine	PJS	Piñon-Juniper Sagebrush
CAM	Caves and Abandoned Mines	PPF	Ponderosa Pine Forest
CDNST	Continental Divide National Scenic Trail	REC	Recreation
CR	Cultural Resources	RHC	Rural Historic Communities
CRF	Cliffs and Rocky Features	RMZ	Riparian Management Zones
DA	Designated Areas	RWMA	Recommended Wilderness Management Area
DC	Desired Condition	S	Standard
DEVRES	Developed Winter and Summer Resorts	SAGE	Sagebrush
EWSR	Eligible Wild and Scenic Rivers	SAMA	San Antonio Management Area
FAC	Facilities Infrastructure	SCEN	Scenery
FFP	Forestry and Forest Products	SFF	Spruce-Fir Forest
FIRE	Wildland Fire Management	SL	Soil Resources
FRT	Federally Recognized Tribes	SNS	Springs and Seeps
FSR	Forest and Shrub Riparian	STM	Streams
FW	Forestwide	SU	Special Uses
G	Guideline	TFA	Transportation and Forest Access
GMMA	Grassland Maintenance Management Area	VEG	Vegetation
GRZ	Livestock Grazing	VFSYU	Vallecitos Federal Sustained Yield Unit
IRA	Inventoried Roadless Area	VVMA	Valle Vidal Management Area
JICMA	Jicarilla Natural Gas Management Area	WB	Waterbodies
LAND	Lands	WFP	Wildlife, Fish, and Plants
MA	Management Area	WHT	Wild Horse Territories
MCD	Mixed Conifer, with Frequent Fire	WILD	Existing Wilderness
MCW	Mixed Conifer, with Aspen	WR	Wetland Riparian
MM	Minerals and Mining	WSW	Watersheds and Water
MSG	Montane Subalpine Grassland	WSR	Existing Wild and Scenic Rivers
NIS	Nonnative Invasive Species	ZOO	Zoological Areas
NSBW	National Scenic Byway		

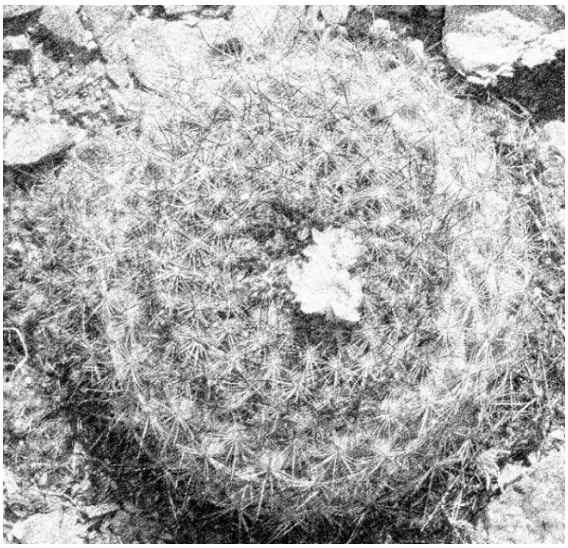

Photo credit: George Long

Other Required Plan Content

Distinctive Roles and Contributions of the Carson National Forest (Chapter 1): Describes the Carson National Forest's distinctive contributions to the local area, region, and nation, and the roles for which the Carson is best suited, considering the agency's mission and capabilities.

Priority Watersheds (Chapter 2 in the Watershed and Water (WSW) Section): Priority watersheds have been identified using the Forest Service national Watershed Condition Framework as areas where plan objectives for restoration focus on maintaining or improving watershed condition. These priorities may change over the life of the land management plan to concentrate restoration in other areas.

Plan Monitoring (Chapter 4): 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 B): Possible actions are the types of projects that the Carson may use in the next 3 to 5 years to move toward achieving desired conditions and objectives.

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

Optional Content

A land management plan may also include optional content, such as background information, explanatory narrative, general management principles, management approaches[3], management challenges, performance history, performance risks, contextual information, or referenced material. Optional content

[3] 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 and/or objectives could be met, convey a sense of priority among objectives, or indicate possible future course of change to a program.

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.

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

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 land management 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 land management 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 land management plan implementation will change over time, the land management plan incorporates an effective monitoring program that is capable of detecting change, with adaptive flexibility to respond to those detected changes. The land management 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 land management plan, a responsive process using 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 land management plan that allows a national forest to adapt management to changing conditions and improve management based on new information and monitoring.

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

a. Designing proposed management activities to implement the plan in a way that will yield specific information and support learning.
b. 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.
c. Learning from the results of the analysis and sharing how the results either confirm or modify existing assumptions and provide feedback on management effectiveness. Learning is proactively shared with land managers and the public.
d. 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.

Use of Best Available Scientific Information

The best available scientific information has been used to inform the planning process. The planning record documents how best available scientific information was determined to be accurate, reliable, and

relevant to the issues being considered. The best available scientific information includes relevant ecological, social, and economic scientific information. Use of best available scientific information was documented for the assessment, the plan decision, and the monitoring program. 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. Development of this revised plan, under the 2012 Planning Rule and directives, was an iterative 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 publics.

Plan Concepts

This plan relies on several basic concepts that are either foundational assumptions or frameworks that are used throughout to quantify or classify plan direction. Some of these concepts are not specifically referred to anywhere else in the plan, but they set the tone for the plan throughout and are therefore important to consider during implementation.

All lands is the concept that ecosystems transcend land ownership boundaries, thus, effective land and resource 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 Carson's ecological, social, and economic role in that landscape.

At-risk species are either federally recognized as endangered, threatened, proposed, or candidate species, or species of conservation concern. Species of conservation concern are species other than federally recognized threatened, endangered, proposed, or candidate species known to occur on the Carson 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 on the Carson. For species of conservation concern, habitat management and compatible multiple uses will be accomplished in a way that ensures species' persistence on the Carson, 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., alpine and tundra, mixed conifer with frequent fire, and piñon-juniper woodland). These may be adequate to ensure persistence of at-risk species and maintain viable populations on the Carson. For other at-risk species, in addition to coarse-filter plan components, fine-filter plan components that are species-specific (timing restrictions, etc.) may be required to ensure persistence. In this land management plan, at-risk species associated with a vegetation community are listed after plan components, but are not in a text box, since their identification is not a land management plan decision, as are plan components. The at-risk species list can be changed based on new scientific information throughout the life of the land management plan, without an amendment (FSH 1909.12, 21.22b).

Adaptation to changing climate patterns is addressed throughout this plan, both 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, utilizing markets and demand for small-diameter wood and biomass, and anticipating increased recreational use (increased number of summer visitors and extended summer season of use).

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 to produce 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 non-material benefits people obtain from ecosystems such as educational, aesthetic, spiritual, and cultural heritage values; recreational experiences; and tourism opportunities (36 CFR 219.19).

Fire regime is a classification of the role that fire plays in a landscape or vegetation community. The LANDFIRE[4] project classifies fire regimes into five groups based on a combination of fire frequency and fire severity (see table 2).

Table 2. Fire regime classification descriptions

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

Note: The table is based on Fire Regime Condition Class Guidebook, version 3.0, September 2010.

Integrated resource management is 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 recreationists desire. Interrelationships between parts of the plan are identified with

[4] U.S. Geological Service web page: www.landfire.gov

cross-references to show their systematic nature. In electronic versions of the plan, these cross-references are hyperlinked (indicated by underlined blue text) to allow users to be easily redirected to the other relevant sections of the plan.

Ranges of 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. Where desired conditions specify a range of values, most acres would be managed toward the median of the range, but representation across the range is equally desired. The distribution of values within that range may vary depending on the resource. It may also be desirable to manage for desired conditions at the upper or lower end of a range in a particular area, for example, managing for lower vegetation density in the wildland-urban interface to reduce fire behavior in proximity to private property and human occupancy. Higher densities may be desired in other areas to meet habitat requirements for specific species.

Resilience is 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).

Seral states are unique phases in the overall ecology of an ecosystem. Desired conditions for many vegetation communities include seral state distributions among seral state classes with unique vegetation characteristics. Seral state classes are defined by vegetation size class, canopy cover, dominance type, and storiedness. Size classes are based on tree diameter at breast height (seedling/sapling: 0–5 inches; small: 5–10 inches; medium: 10–20 inches; large: 20–30 inches; very large: 30+ inches). Canopy cover can be non-tree (less than 10 percent tree cover); open (10–29.9 percent tree canopy cover); or closed (30+ percent tree canopy cover). Dominance type refers to the lifeform: tree, shrub, or grass. Storiedness refers to the number of tree canopy levels having greater than 10 percent canopy cover: 1 level=single-storied; 2 or more levels=multi-storied.

Sustainable operations refers to the Forest Service's commitment to use energy efficiently and reduce consumption of resources in daily operations in six footprint focus areas:

1. Energy–Improve energy efficiency and reduce greenhouse gas emissions, through the reduction of energy usage. 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 that 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 is the ability of the Carson and its resources to meet the needs of the present generation without compromising the ability to meet the needs of future generations. Sustainability includes

ecological, economic, and social capabilities. It requires the symbiotic interaction among ecological integrity, the ability of society to produce and consume or otherwise benefit from goods and services, and the ability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another in vibrant communities. (36 CFR 219.19).

Vegetation community is a definition of a group of sites that have similar plant species composition, successional patterns, and disturbance regimes, such that as a group they 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, though it is appropriate to base management for a particular vegetation community on local conditions, including soils and other site-specific indicators.

Interrelationships of Plan Content

This land management plan is not an assemblage of program plans that have 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, ecologically sustainable production of goods and services, and they contribute to economic and social sustainability. All these requirements go hand-in-hand.

To effectively manage toward 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 that resource. Effective integrated resource management recognizes the interdependency of ecological, social, cultural, and economic resources and that management of one resource can influence the management or condition of other resources.

At the end of many resource sections, there is a subsection called “Related Plan Content,” which lists other resources identified as the most relevant resources related to that section. It is recommended that these-as well as other resources not listed, but also considered important to a specific project-are reviewed by project planners and decision makers.

Consistency of Projects with the Plan

All projects and activities authorized by the Forest Service must be consistent with the land management plan (16 U.S.C. 1604(i) and 36 CFR 219.15(b-c)). If a proposed project or activity is not consistent with a plan component, 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 land management plan (36 CFR 219.15(d)):

1. **Desired conditions, objectives, and goals.** A project is consistent with plan desired conditions, objectives, or goals when it:

   a. Maintains or makes progress toward attaining one or more plan desired conditions, objectives, or goals applicable to the project;

   b. Does not foreclose the opportunity to maintain or achieve any of the applicable desired conditions, objectives, or goals 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, objectives, or goals; or

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

   The project decision document should include an explicit finding that the project is consistent with the plan's desired conditions, objectives, and goals, 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, objective, and goal set forth in the plan. A general explanation is all that is needed, so long as the consistency finding is made consistent with one of the three factors listed above.

2. **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 is designed in accordance with all applicable plan standards.[5] The responsible official may make a single finding of consistency with all applicable standards; there is no need for individual findings of consistency.

3. **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:

   a. The project or activity complies with the guideline as set out in the plan, or

   b. A project or activity design varies from the requirements of the guideline, but is as effective in meeting the purpose of the guideline and contributing 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 the requirements of one or more applicable guidelines, the project documentation should explain how the project design effectively meets the purpose of the guideline(s).

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[5] For timber projects, there should positive findings for meeting the timber standards and guidelines because the 2012 Planning Rule requires plans to have direction to meet those National Forest Management Act requirements. There must be specific findings that the project meets the requirements. For instance, if a project involves clearcutting, there must be an explanation as to why, in this situation, clearcutting is the optimum method to use. Also, based on the National Environmental Policy Act analysis describing the effects to soils, watershed etc., there must be a finding that these resources will not be "irreversibly damaged."

4. **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:
   a. The project or activity has been specifically identified in the plan as a suitable use in that area, or
   b. 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 National Environmental Policy Act. 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 content of a plan (content that is not a plan component). All administrative changes require notification of the public with outreach that is commensurate with the change to be made and the level of public and governmental interest. Substantive changes to the monitoring program require notice to the public, at least 30 days for public comment, and consideration of comments.

Plans may have other content with which project consistency is not required. This other content may include 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.

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, a project's 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 as well as 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 C.

To ensure a project is consistent with the plan, its design and implementation should consider its setting, any designated or management areas it overlaps, and plan guidance related to any resources or conditions that may be present in the area (e.g., cultural resources, nonnative invasive species, geologic formations, wildlife, etc.). Additionally, potential conflicts with other authorized projects and activities should be considered. 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 in Chapter 4 of this document, in conjunction with project-level monitoring, will provide the framework to support adaptive management on the Carson.

Transition to Plan Implementation

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

Chapter 2. Forestwide Plan Components

Ecological Sustainability and Diversity of Plant and Animal Communities

The Carson National Forest's vision is for ecosystems in the plan area to have ecological integrity and adaptive capacity. Ecosystems have integrity when their composition, structure, function, and connectivity are operating normally over multiple spatial and temporal scales. However, not every desired condition or acre has to meet the definition of ecological integrity, because some specific areas may not have the capability or because another concern, such as public safety is more important in a specific area.

Ecological restoration is an outcome of managing for desired conditions and may be necessary in degraded ecosystems. It is an intentional activity that initiates or accelerates ecosystem recovery with respect to its health (functional processes and productivity), integrity (species composition and community structure), and sustainability (resistance and resilience to disturbance) under current and future conditions. Restoration may not necessarily return an ecosystem to its former state, because contemporary constraints and conditions can cause it to develop along an altered trajectory.

Considering possible changes in species composition under the effects of changing climate patterns and with a focus on restoration, the plan components for the Carson's land management plan are designed to provide ecological conditions to sustain functional ecosystems based on a future viewpoint. Functional ecosystems are those that sustain critical ecological functions over time to provide ecosystem services including, clean air, fresh water, food, and fuel (provisioning ecosystem services); pollination, soil formation, and nutrient cycling (supporting ecosystem services); carbon storage, climate regulation, water filtration, and flood control (regulating ecosystem services); and educational, aesthetic, spiritual, cultural, and recreational experiences (cultural ecosystem services).

Photo credit: Kathy DeLucas

Vegetation (VEG)

Desired conditions and other plan components (objectives, standards, and guidelines) related to the major vegetation communities are presented first in this plan, because they provide the setting or habitat that reflects not only healthy ecological systems, but also the social and economic considerations needed for long-term sustainability. Vegetation provides ecosystem services, including climate regulation and soil stabilization (regulating), food and wood products (provisioning), nutrient cycling (supporting), and aesthetic and cultural values (cultural). Desired conditions and other plan components have been incorporated within each vegetation community for the needs and requirements of at-risk species, and, in some cases, general wildlife dependent on these major vegetation types.

Ecological desired conditions for terrestrial ecosystems are grouped by vegetation communities and described at multiple, nested scales when possible. Not all these conditions will be achievable over the life of this plan; some may only be realized over long timeframes (up to several hundred years). Most vegetation communities correspond to a mapped ecological response unit,[6] though it is appropriate to base management for a particular vegetation community on local conditions, including soils and other site-specific indicators. Small inclusions of other ecological response units or ecological response unit subtypes may be managed under a single prescription or evaluated separately at the project or activity level.

Where scientific information is available, desired conditions are based on the historical ecology of a vegetation community that can be inferred based on historic ranges of natural variability. They also reflect current conditions and stressors that may not have existed historically and reflect social and economic desires in terms of the services that humans expect from ecosystems. Therefore, desired conditions do not necessarily represent reference conditions, because it may not be possible or desirable to return to a historic condition in all situations. Ranges of values presented as part of desired conditions reflect spatial variability in soils, elevation, or aspect, and provide managerial flexibility to meet local project objectives. Ranges represent the characteristic breadth of values rather than the extremes for a given variable. Most acres should be managed toward the median of the range, but representation across the range is equally desired. For those vegetation communities with seral state proportion tables, the quantitative information they contain reflects the desired condition narrative. Seral state percentages (proportions) represent the approximate mid-point of the range of desired conditions described under the landscape scale and are used primarily to compute overall system departure[7] not intended as a prescription. In other words, the seral state percentages do not need to be achieved by every project, instead a reasonable range is expected, while managing toward those percentages on average across the landscape.

Scale

Desired conditions for forest and woodland vegetation communities are described at three spatial scales where appropriate: landscape scale (1,000+ acres), mid-scale (10 to 1,000 acres), and fine-scale (less than 10 acres). Not enough science is available to provide descriptions at all scales for alpine tundra, bristlecone pine, montane subalpine grassland, and sagebrush communities. The landscape scale describes

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[6] An exception is aspen, which is not its own ecological response unit but occurs as a seral stage in several other ecological response units. The Forest and Shrub Riparian vegetation community includes several riparian ecological response units and may include additional areas based on site specific delineations. Wetland riparian includes areas in addition to the herbaceous riparian ecological response unit.

[7] Seral state departure is calculated at the landscape scale relying on remotely sensed information such as the Southwestern Region's midscale mapping project. The minimum mid-scale vegetation mapping unit is five acres.

the big picture of desired conditions (figure 4). A landscape area comprises ten or more mid-scale units of variable elevations, slopes, aspects, soils, plant associations, and disturbance processes. It includes multiple stands and natural openings and meadows. Contributions from all seral stages and low departure at the landscape scale are positive indicators of ecosystem condition. Seral state proportions apply only at this scale.

Descriptions at the mid- and fine-scales provide additional detail necessary for guiding future projects and management activities. The mid-scale comprises assemblages of fine-scale units that have similar biophysical conditions. The mid- and fine-scales in forests and woodlands include open grass-forb-shrub interspaces and uneven-aged stand conditions consisting of single and grouped trees of different vegetation structural stages, young to old. Species composition, age, structure, and distribution of individual trees (single, grouped, or aggregates of groups) are described at the fine-scale. Fine-scale desired conditions typically contain greater variability, which is desirable for providing heterogeneity at smaller spatial scales.

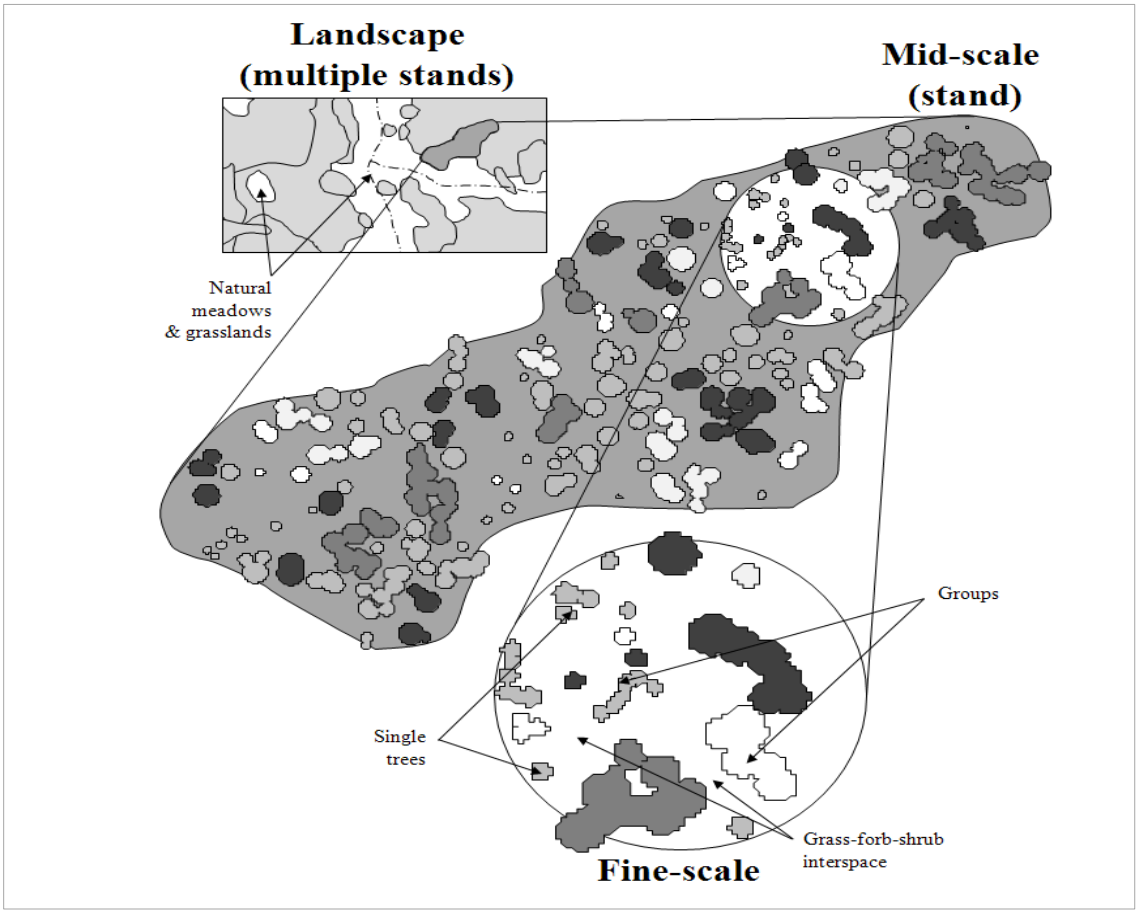

Figure 4. Example of the three spatial scales

When using this plan to develop project specifications, it is important to keep in mind that ecological desired conditions for all scales are applicable, regardless of the size of the project. Smaller projects need to consider the larger scales in terms of how the project contributes to the ecological desired conditions within the context of the larger-scale unit and larger projects need to consider the design features required to ensure that the fine-scale ecological progress is made toward desired conditions and maintained across the project area.

Consideration of scale is also important when evaluating progress toward ecological desired conditions, because the range of variability and distribution of conditions is affected by the scale at which they are viewed. For example, when ecological desired conditions are articulated at larger scales, they represent an average of fine-scale conditions across broader areas. Conditions may appear less variable when they are evaluated at large scales, even though variability does exist at smaller scales.

All Vegetation Communities Desired Conditions (FW-VEG-DC)

Landscape Scale (1,000 acres or greater)

1 Ecosystems comprise a mosaic of vegetation conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds, reflecting the disturbance regimes that naturally affect the area. Natural ecological cycles (i.e., hydrologic, energy, nutrient) facilitate the shifting of plant communities, structure, and ages across the landscape over time.

2 Ecosystems are resilient or adaptive to the frequency, extent, and severity of disturbances (e.g., human impacts, fire in fire-adapted systems, flooding in riparian systems, insects, pathogens, and climate variability). Natural disturbance regimes, including fire, predominate where practical and are allowed to function in their natural ecological role. Wildfire maintains and enhances resources, including wildlife habitat for species associated with fire-adapted systems. Uncharacteristic wildland fire behavior is minimal or absent on the landscape.

3 Ecosystems maintain or recover all of their essential components (i.e., plant density, species composition, structure, coarse woody debris, and snags), processes (i.e., disturbance and regeneration), and functions (i.e., nutrient cycling, water infiltration, and carbon sequestration) despite changing and uncertain future environmental conditions.

4 Old growth is well distributed, dynamic in nature, and shifts on the landscape over time, as a result of succession and disturbance. Old growth attributes (e.g., multistory structure, large old trees, large trees with sloughing and exfoliating bark, snags, large downed logs, and other indicators of decadence) are present in all forest and woodland vegetation communities and provide habitat for associated species.

5 Ecological conditions affecting habitat quality, distribution, and abundance contribute to self-sustaining populations of native and desirable nonnative plants and animals that are healthy, well distributed, genetically diverse, and connected (on NFS lands and to adjacent public and privately conserved lands), enabling species to adapt to changing environmental and climatic conditions. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the ecosystem.

6 Vegetation conditions allow for gradual transitions between vegetation communities. Transition zones shift in time and space, due to ecological processes affecting site conditions (i.e., fire and climate).

7 Vegetation characteristics (e.g., tree density, litter depth) support favorable water flow and quality.

8 All age classes of deciduous trees (e.g., aspen, cottonwood, and Gambel oak) are well represented on appropriate ecological settings and provide habitat for wildlife and rare plants.

9 Organic ground cover and herbaceous vegetation protect soils, facilitate moisture infiltration, and contribute to plant and animal diversity and ecosystem function.

10 Vegetation connectivity and abundance provide for genetic exchange, daily and seasonal movements of animals, and predator-prey interactions across multiple spatial scales, consistent with existing landforms and topography. Habitat configuration and availability and species genetic diversity allow long distance range shifts of plant and wildlife populations, in response to changing environmental and climatic conditions.

11 Native plant communities dominate the landscape, while invasive species are nonexistent or low in abundance and do not disrupt ecological function.

12 Native insect and disease populations are generally at endemic levels with occasional outbreaks. The scale of insect and disease outbreaks is usually restricted by variation of vegetation structure and composition.

13 The transition from NFS lands to adjacent lands where similar desired conditions are being met is seamless and does not exhibit abrupt changes in visual or ecological integrity.

14 Habitats and refugia for rare, endemic, and culturally important species are intact, functioning, and adequate for species' persistence and recovery of self-sustaining populations.

15 Overall plant composition similarity to site potential[8] averages more than 66 percent but can vary considerably at fine- and mid- scales owing to a diversity of seral conditions.

Mid-Scale (10-1,000 acres)

16 Diverse cool and warm season grasses, forb species, and litter are abundant and contiguous enough to support natural fire regimes, consistent with site potential. Herbaceous vegetation amount and structure (e.g., plant density, height, litter, and seed heads) provide habitat to support wildlife and prey species.

17 The composition, density, structure, and mosaic of vegetation conditions reduce the threat of uncharacteristic wildfires to ecosystems and local communities.

18 Native plants provide nectar, floral diversity, and pollen throughout the seasons when pollinator species are active.

Fine-Scale (10 acres or less)

19 At-risk plant community habitats (e.g., gypseous or limey sandstones; Mancos Shale soils; margins of springs; basalt lava flows and cinders; calcareous soil and alkaline clay; canyons, cliffs, and ledges; granitic soils and igneous rocks; and sandstone rocks and soils) are present, to maintain self-sustaining populations of associated at-risk plant species.

20 The structure and function of the vegetation and associated microclimate and special features (e.g., snags, logs, large trees, interlocking canopy, cliffs, cavities, talus slopes, bogs, fens, rock piles,

[8] As defined by the terrestrial ecosystem unit (TEU) potential in the "Terrestrial Ecosystem Survey of the Carson NF" (TES) (USDA FS Carson 1987).

specific soil types, and wet areas) exist in adequate quantities within the capability of the Carson, to provide habitat and refugia for at-risk species or species with restricted distributions.

21 Ecological conditions, as described in these desired conditions, provide habitat to support, sustain, and recover rare, endemic, or at-risk species.

All Vegetation Communities Standards (FW-VEG-S)

1 Collect at-risk plant species for research or scientific purposes only.

All Vegetation Communities Guidelines (FW-VEG-G)

1 Management activities and special uses occurring within federally listed species' habitat should integrate habitat management objectives and species protection measures from the most recent approved USFWS recovery plan, to maintain the persistence or contribute to the recovery of that species.

2 Where the Forest Service has entered into a signed conservation agreement that provides guidance on activities or actions to be carried out by the Carson, those activities or actions should be undertaken consistent with the guidance found within the conservation agreement, to maintain the persistence or contribute to the recovery of at-risk species.

3 Vegetation should provide for at-risk species' habitats by minimizing disturbance, providing recovery strategies, and managing for desired levels of key structural elements for at-risk species (e.g., large old trees and snags, downed woody debris, denser vegetation structure, and soil structure) important for nesting, rearing, breeding, foraging, dispersal, and other life history needs, to maintain the persistence or contribute to the recovery of at-risk species.

4 For cavity nesting birds, snags should be retained at levels indicated in vegetation desired condition statements or in the largest diameter classes available, if available, and replaced at natural recruitment rates, to maintain the persistence of cavity nesting birds.

5 Naturally ignited fires (i.e., lightning-caused fires) that occur in fire-adapted vegetation types should be managed for resource benefit when burning conditions facilitate progress toward desired conditions and risks to firefighters, infrastructure, and the public can be mitigated.

Management Approaches for All Vegetation Communities

1. To meet old growth desired conditions, consider designing management activities to restore and maintain characteristic levels of:
   a. Large, old ponderosa pine trees with reddish-yellow, wide platy bark, flattened tops, moderate to full crowns, and large drooping or gnarled limbs (e.g., Thomson's age class 4, Dunning's tree class 5, or Keen's Tree Class 4, A & B).
   b. Mature trees with large dwarf mistletoe-induced witches' brooms suitable for wildlife nesting, caching, and denning, except where retaining such trees would prevent the desired development of uneven-aged conditions over time.
   c. Large snags, partial snags, and trees greater than 18-inch diameter (DBH) with broken tops, cavities, sloughing bark, lightning scars greater than 4 inches wide, and large stick nests.
   d. Gambel oak greater than 8 inches diameter at root collar.

   e. Mature bristlecone pine.

2. In areas of high vulnerability to changing climate patterns, consider alternative management approaches to facilitate natural adaptation to changing conditions. In forest types where density management is appropriate, consider managing tree basal area at the low end of the range of desired conditions to mitigate water stress.
3. Consider using mechanical, chemical, and prescribed fire treatments to maintain existing grassland and meadow openings, expand openings by removing woody species from the perimeter, and create new openings.
4. When thinning, consider leaving characteristic levels of snags, downed logs, and other woody components that collect drifting seeds, provide shade, reduce surface temperatures, retain moisture, and increase forage for ungulate grazing.
5. Consider using methods, such as fencing, aerating soil (decompacting soils), improving livestock grazing strategies, or strategically locating constructed waters or roads to protect and enhance soil function and grassland composition, structure, and productivity.
6. Consider working closely with the U.S. Fish and Wildlife Service (USFWS) to provide for federally listed species' habitats by minimizing disturbance, providing recovery strategies, and managing for desired levels of key structural elements (e.g., large old trees and snags, downed woody debris, denser vegetation structure, and soil structure) important for nesting, rearing, breeding, foraging, and dispersal.
7. Consider working collaboratively with federally recognized tribes, New Mexico Department of Game and Fish (NMDGF), local governments, and other partners to plan and accomplish projects that will make progress toward desired conditions.
8. Consider fostering partnerships with universities and other science organizations to develop concepts and tools applicable to vegetation management, as well as to identify research opportunities related to management activities aimed at ecosystem restoration and adaptation.
9. Consider planning in cooperation with landowners, when proposed vegetation treatments are adjacent to private land.
10. Consider working with volunteer groups on projects that improve vegetation condition and ecosystem function.
11. Consider using computer models or other tools as they are developed to understand management impacts on carbon stocks and fluxes (changes over time).
12. Consider using integrated resource planning during projects to respond to changing conditions that affect recreation settings and scenic character and integrity.

Related Plan Content for All Vegetation Communities

Below are the resources identified as the most relevant resources related to this section. We recommend that you review these sections, as well as other resource sections not identified below that you deem to be relevant to your specific project.

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Alpine and Tundra (VEG-ALP)

The alpine and tundra vegetation community is present on only 9,996 acres on the Carson in the Questa and Camino Real Ranger Districts. It occurs on sites above 10,600 feet and supports sparse, low-growing vegetation as a result of unstable substrates, exposure to high winds, and a short growing season. On gradual to moderate slopes, flat ridges, valleys, and basins, where soils are fairly stable, the vegetation community may support tundra systems with diverse alpine flora, characterized by perennial, rhizomatous, sod-forming sedges, and prostrate and mat-forming forbs with thick rootstocks or taproots. Fire is not a significant disturbance in these communities; however, plants and soils are very sensitive to impacts from grazing and recreation.

Occupying the highest and coldest peaks and ridges, the alpine and tundra vegetation community is an important source of snow accumulation and water production (regulating and provisioning ecosystem services). Designated wildernesses make up 86 percent of the alpine and tundra vegetation community, but some areas, such as Kachina Peak in Taos Ski Valley and Wheeler Peak, are subject to heavy recreation from hikers, backpackers, and skiers (cultural ecosystem service). Cold temperatures are a defining feature that makes the alpine and tundra vegetation community especially vulnerable to changes in climate. The Carson plays a significant role in the sustainability of the alpine and tundra vegetation community in the broader landscape and may provide an important refuge for dependent organisms, as this vegetation community within the Carson is relatively intact.

Alpine and Tundra Desired Conditions (FW-VEG-ALP-DC)

1 Desired seral stage proportions for the alpine and tundra vegetation community at landscape scale:

Class	Description	Proportion (%)
Early	Early development	5
Herbaceous	All herb types	95
Treed	Uncharacteristic tree cover; contemporary landscapes only	0

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

3 The patch distribution of rock and herbaceous cover is finely patterned with about 60 percent total vegetation cover.

4 Tree cover is typically less than 10 percent. Completely barren or rocky areas make up only a small percentage of the vegetation community.

5 Endemic levels of disturbances (e.g., insects, diseases, fire, snow, and wind) maintain a functioning ecosystem that contains all its components, processes, and conditions. Mixed severity fires occur very infrequently, every 100 to 200 years (fire regime IIIc). Plants, animals, and geologic features that contribute to ecological diversity and uniqueness are maintained.

6 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 artic willow. Alpine fellfields

are free of snow in the winter and dominated by alpine clover, tufted hairgrass, and Bellardi bog sedge, to allow for the persistence of at-risk species.

7 Key features (e.g., boulder fields and talus slopes) that are necessary for alpine-dependent plant and animal species (e.g., alpine larkspur, marmots, pika, and bighorn sheep) are well distributed and not uncharacteristically disturbed, commensurate with the capacity of the vegetation community.

8 The alpine and tundra vegetation community continues to be resilient to natural and human-caused impacts.

Alpine and Tundra Guidelines (FW-VEG-ALP-G)

1 Trail construction and maintenance in the alpine and tundra vegetation community should minimize disturbance to at-risk plants and to important key habitat features (e.g., rock outcrops, willows, and talus slopes) for at-risk species and other alpine-dependent species (e.g., yellow-bellied marmot and American pika), to maintain the persistence of native species.

2 To assist breeding and nesting success of at-risk species, adaptive seasonal use or percent utilizations for livestock grazing should be considered and based on the best available information, as well as on site-specific factors (e.g., topography and available habitat).

At-risk Species for Alpine and Tundra

- American peregrine falcon
- White-tailed ptarmigan (Questa and Camino Real Ranger Districts)
- Alpine larkspur (Questa and Camino Real Ranger Districts)

Related Plan Content for Alpine and Tundra

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

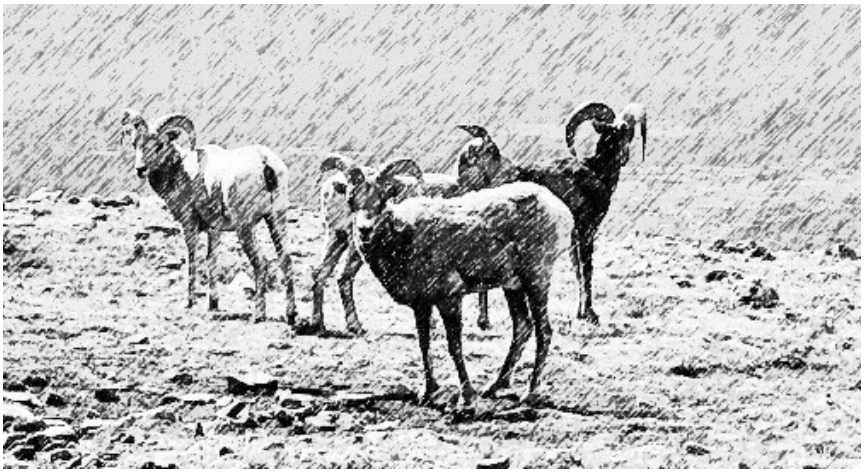

Photo credit: Peter Rich

Montane and Subalpine Grasslands (VEG-MSG)

The montane and subalpine grasslands vegetation community constitutes 125,351 acres on the Carson and occurs across every ranger district, except the Jicarilla. They are naturally fragmented, occurring as meadows and openings in spruce-fir, mixed conifer, and ponderosa pine forests, between 8,000 and 10,000 feet elevation. They are often intermingled with the wetland riparian vegetation community. A diverse mix of grass and forb species may be present, varying according to soil type, soil moisture, and temperature. Dominant species may include Arizona fescue, mountain muhly, various sedges, Parry's oatgrass, pine dropseed, Thurber's fescue, and blue grama. Grassland openings are created and maintained by a combination of tree-limiting site conditions (e.g., soils and climate) and disturbance (mainly fire). Trees may occur along the periphery of meadows and some shrubs may be present, though canopy cover was historically no more than 10 percent for either. Hydrology is closely tied to snowmelt and these meadows are seasonally wet, but do not typically experience flooding. Grassland communities are susceptible to channel and gully erosion and their size and number have been reduced—as a result of encroaching trees and shrubs and livestock grazing. Invasive species infestation is a concern and introduced Kentucky bluegrass dominates native species in some areas.

Expansive grasslands like Valle Vidal and Lucero Lakes provide important habitat, forage, and hydrologic benefits (provisioning and regulating ecosystem services). Smaller meadows and herbaceous riparian areas create unique habitats within other communities and contribute to biodiversity and livestock production (provisioning ecosystem services). The montane and subalpine grassland vegetation community has been altered from historic condition by natural and anthropogenic impacts. Bunchgrasses are less common, trees and shrubs have displaced herbaceous cover, and reduced vegetation cover and ground disturbing activities have altered hydrologic function and increased erosion.

Montane and Subalpine Grasslands Desired Conditions (FW-VEG-MSG-DC)

1 Desired seral stage proportions for montane and subalpine grassland vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Recently burned; sparsely vegetated; early development grassland	20
Herbaceous	All grass and forb types; mid to late development. Perennial-mixed grasses, <10% shrub/tree cover, >10% grass cover	80
Treed	Tree or shrub invaded; *contemporary landscapes only*	0

Landscape Scale (1,000 acres or greater)

2 The montane and subalpine grassland community is open and grassy with tree and shrub canopy cover of less than 10 percent each. Vegetation is dominated by native herbaceous plants. Regeneration, seed head production, and a balance of grass and forb species, including warm and cool season species, occur in most years, commensurate with the capability of soils. The structure, composition, and distribution of vegetation are within the range of natural variability and occur in natural patterns of abundance and diversity, varying with soil type and microclimate.

3 Herbaceous vegetation cover (herbaceous cover, decaying debris, and leaf litter) is maintained at levels that contribute to suitable hydrologic function, soil stability, and nutrient cycling, while

providing food and cover for at-risk species and other wildlife species. A diversity of native grass and forb species and adequate plant litter reduce soil compaction and erosion.

4 Soil function is sustained. Soils are permeable and capable of infiltrating water to reduce overland flows during precipitation events and allow for burrowing by small mammals (e.g., Gunnison's prairie dog, ground squirrels, and masked shrew). Adequate water infiltration discourages arroyos, gullies, and head cuts from forming in drainages. Existing arroyos and gullies are stabilizing and recovering.

5 Natural surface drainages and subsurface flow patterns are not altered by human or animal trampling, to assure water flow into connected waterbodies or streams.

6 Fire plays its natural role on the landscape. Vegetation height and density carry fire and support the historic fire return interval. Fires are low-intensity, but with high aboveground consumption. Fire return intervals are influenced by the fire regime in adjoining vegetation types and range from 1 to 35 years (fire regime II). Introduced annuals do not cause changes to the natural fire regime.

7 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

Mid-Scale (10-1,000 acres)

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

9 Depending on soil type, bare soil is no more than 30 percent by area and is most often less than 10 percent. Basal vegetation varies between 30 and 75 percent groundcover. Organic litter varies between 15 and 50 percent cover. Vegetation composition averages 40 to 60 percent grass, and 10 to 30 percent forbs.

10 Vegetation conditions provide hiding, nesting, and thermal cover in contiguous blocks for wildlife, including small mammals and songbird nesting. Soil condition, as defined by basic soil functions (e.g., stability, soil hydrology, and nutrient cycling), has the capacity to support the diversity of associated species (e.g., western burrowing owl, prairie dog, and masked shrew).

Fine Scale (10 acres or less)

11 Biological diversity is high in the montane and subalpine grassland vegetation community. Commensurate with site capability, a mosaic of vegetation density exists across the landscape, ranging from densely vegetated areas that provide cover for small mammals, ground-nesting birds, and neonate ungulates to bare areas that result from natural processes, such as freeze–thaw action or burrowing by small mammals.

12 Fine-scale features of rock piles and wet areas that are necessary to support at-risk species are well distributed, commensurate with the capacity of the vegetation community.

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

14 Grasslands are connected (consistent with the distribution of Mollisol soils) and are not fragmented.

Montane and Subalpine Grasslands Standard (FW-VEG-MSG-S)

1 Do not stage heavy equipment or log decks in montane meadows.

Montane and Subalpine Grasslands Guideline (FW-VEG-MSG-G)

1 New stock tanks and wildlife waters should be placed in locations that reduce concentrations of grazing animals and subsequent vegetation and soil effects in open grasslands and meadows.

At-risk Species for Montane and Subalpine Grasslands

- Black-footed ferret
- Northern leopard frog
- American peregrine falcon
- Western burrowing owl
- Gunnison's prairie dog
- Masked shrew

Related Plan Content for Montane and Subalpine Grasslands

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Bristlecone Pine (VEG-BP)

The bristlecone pine vegetation community is rare on the Carson, found on less than 5,000 acres scattered across the Questa and Camino Real Ranger Districts. The bristlecone pine vegetation community occurs above 10,500 feet and favors south-facing, dry, rocky ridges and slopes. Bristlecone pine is the dominant species, though Douglas-fir, Engelmann spruce, and ponderosa pine may also be present. The canopy is open and patchy, and the understory is typically sparse.

Bristlecone pine trees have unique structural and physiological qualities that make them stress tolerant and allow them to occupy sites that other species cannot. They provide unique ecological functions on these sites, including slope stability, snow retention, and post-fire recovery (regulating ecosystem services). Their presence on harsh sites influences watershed hydrology, facilitates succession, provides habitat, and maintains forested cover on sites that may otherwise become treeless (regulating and provisioning ecosystem services). As some of the oldest trees on the Carson, they are valued for their charismatic gnarled forms and their longevity (cultural ecosystem service).

Bristlecone Pine Desired Conditions (FW-VEG-BP-DC)

1 Desired seral stage proportions for the bristlecone pine vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Recently burned; grass, forb, shrub, and seedling/sapling size trees	20
Mid-Closed	Small trees, closed canopy; *contemporary landscapes only*	0
Mid-Open	Small trees, open canopy	20
Late-Open	Medium and large trees, open canopy	60
Late-Closed	Medium and large trees, closed canopy; *contemporary landscapes only*	0

Landscape Scale (1,000 acres or greater)

2 Bristlecone pine that is resistant to white pine blister rust or resilient when fungal infection occurs is retained on the landscape and provides a source of resistant genetics.

3 Trees persist despite changing and uncertain future environmental conditions and continue to provide slope stability, snow retention, and watershed hydrology.

4 Native grasses and forbs are present in the understory, but cover is generally sparse and discontinuous. However, plant litter (e.g., leaves and needles) and coarse woody debris are present in sufficient quantity to resist accelerated soil erosion and promote nutrient cycling and water retention.

5 Fire is rare in the bristlecone pine vegetation community (especially at higher elevations) and not stand replacing. Stands with continuous understory may carry low-severity surface fire (mainly at lower elevations). Bristlecone pine establishment is rare, but may be stimulated following fire that removes competition from other species.

Mid-Scale (10-1,000 acres)

6 At the mid-scale, tree distribution is patchy in the bristlecone pine vegetation community, with an open canopy influenced by disturbance, exposure, soil type, aspect, and site productivity. The majority of trees are large, late seral and widely spaced, but all age classes are represented and provide a reliable source of replacement.

7 Bristlecone pine is the dominant and most common tree species, though other occasional species may occur.

Fine Scale (10 acres or less)

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

Bristlecone Pine Guidelines (FW-VEG-BP-G)

1 Planting should use white pine blister rust-resistant trees from an appropriate seed transfer zone, to reduce spread of disease.

At-risk Species for Bristlecone Pine

- Masked shrew

Management Approaches for Bristlecone Pine

1. Consider creating a mosaic of mixed age classes and regeneration opportunities across the landscape to retain a range of bristlecone attributes in the area while white pine blister rust-resistant selection occurs rapidly in younger stands and slowly in older stands.

Related Plan Content for Bristlecone Pine

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Spruce-Fir Forest (VEG-SFF)

The spruce-fir forest vegetation community occupies the coldest and wettest forested slopes, ridges, and valleys on the Carson. It covers nearly 290,000 acres at elevations between 9,000 and 11,500 feet, bounded at upper elevations by the alpine and tundra vegetation community and transitioning to mixed conifer at lower elevations. It occurs on all districts, except the Jicarilla. Engelmann spruce, western subalpine fir, and corkbark fir are the dominant species. Near timberline, firs are less abundant; at lower elevations, mixed conifer species may be present. Below 10,500 feet, quaking aspen occurs following disturbances and may be dominant or codominant. On the Carson, common understory species include whortleberry, huckleberry, common juniper, Oregon boxleaf, spruce-fir fleabane, Jacob's-ladder, Parry's goldenrod, and strawberry. As a result of past logging, fewer large trees exist now than what occurred historically.

The disturbance frequency in the spruce-fir forest vegetation community is both historically and currently low, but the natural disturbance regime includes infrequent, but high-intensity events like wind throw, fire, and spruce beetle epidemics. The current disturbance regime in the spruce-fir forest vegetation community is probably not outside the historic norm.

The spruce-fir forest vegetation community covers the highest forested peaks and slopes on the Carson. The cold, dark forests accumulate and retain deep snowpack late into the spring, regulating snowmelt, streamflow, and water infiltration throughout the year (regulating ecosystem services). Due to the low product value and the difficulty of building roads, some areas of spruce-fir forests were not logged prior to 1950. Because these forests were neither roaded nor cut, 27 percent of the spruce-fir forest vegetation community has been designated as wilderness (cultural ecosystem service). Other areas of the spruce-fir forest vegetation community were heavily logged in the past and still lack trees in the oldest age classes. At lower elevations, the spruce-fir forest vegetation community may include some Douglas-fir, which is preferred as fuelwood by local communities (provisioning ecosystem service). Medicinal osha is collected from aspen stands and other wet areas in the spruce-fir forest vegetation community (provisioning ecosystem service).

Spruce-Fir Forest Desired Conditions (FW-VEG-SFF-DC)

1 Desired seral stage proportions for the spruce-fir forest vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Recently burned; grass, forb, and shrub types	9
Aspen	All aspen, deciduous tree mix, and evergreen-deciduous mix tree types	11
Early	Seedling/sapling and small trees, all cover classes	21
Mid	Medium trees, all cover classes	14
Late	Large trees, closed canopy	45

Landscape Scale (1,000 acres or greater)

2 Spruce-fir forest vegetation community comprises 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. Tree canopies are generally more closed than in mixed conifer forests.

3 Old growth structure generally occurs over large areas as stands or patches.

4 Vigorous trees dominate, but older declining, top-killed, lightning-scarred, and fire-scarred trees are a component that provide for snags and coarse woody debris and are well-distributed throughout the landscape. Generally, there are 13 to 30 snags greater than 8 inches in diameter per acre and 1 to 3 of those snags are 18 inches or greater in diameter. Lower snag densities within those ranges are associated with early seral states and higher densities are associated with late seral states. Coarse woody debris ranges from 5 to 30 tons per acre for early-seral stages, 30 to 40 tons per acre for mid-seral stages, and 40 tons per acre or greater for late-seral stages

5 Natural openings and subalpine meadows are well distributed throughout spruce-fir forest and are maintained by natural processes. They provide sufficient quality habitat for at-risk species to persist.

6 The understory consists of native grasses, forbs, sedges, mosses, liverworts, and shrubs.

7 In the lower spruce-fir type, mixed severity fires (fire regime III) occur infrequently. In the upper spruce-fir type, high severity fires (fire regime IV and V) occur very infrequently.

Mid-Scale (10-1,000 acres)

8 At the mid-scale, the distribution of groups and patches varies, depending on disturbance, elevation, soil type, aspect, and site productivity. Patches are primarily even-aged with variation in species composition and size, but are mostly in the hundreds of acres. Disturbances of thousands of acres are rare. There may be frequent small disturbances resulting in groups and patches of tens of acres or less. Disturbance-created grass, forb, and shrub openings may compose up to 100 percent of the mid-scale area, depending on the local disturbance history.

9 Tree density ranges from 20 to 250 square feet of basal area per acre, depending on disturbance history, structural stage, and site productivity.

10 Aspen is occasionally present in large patches, providing habitat for organisms that depend on it (e.g., northern goshawk, cavity nesters including woodpeckers and owls, and a variety of fungi and microorganisms). Where they naturally occur, all age classes of aspen are present in even-aged groups or patches and are regenerating and vigorous. A diverse understory of native herbaceous and shrub species has a variety of seral and age classes and is vigorous and regenerating.

11 Localized, accelerated soil erosion may occur following high-severity fires, but not to the extent that it results in long-term impairment to connected waters downstream or causes loss of soil productivity over major portions of the 5th or 6th code watershed.

12 Uneven-aged groups and patches compose about 20 percent of the spruce-fir forest vegetation community and provide for wildlife species that need multi-storied canopies with dense low- to mid-canopy layers.

13 Forest conditions in goshawk post-fledging areas are generally consistent with surrounding forest conditions; however, these forests contain 10 to 20 percent greater tree density (basal area) than goshawk foraging areas and the general forest. Goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than other areas in the spruce-fir forest vegetation community.

14 The wildland-urban interface has strategically located areas in a more open condition than occur in the surrounding general forest. Grass/forb/shrub vegetation and aspen may make up a much larger percentage of the wildland-urban interface than they do in the general forest. Structures in the wildland-urban interface are surrounded by grassy openings with very few to no trees, such that available fuels support surface fires.

Fine Scale (10 acres or less)

15 Mid- to old-aged trees grow tightly spaced with interlocking crowns. Trees are generally of the same height and age in early group/patch development, but may be multi-layered in late development. Small openings (gaps) are present as a result of localized disturbances (e.g., wind and disease).

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

Spruce-Fir Forest Guidelines (FW-VEG-SFF-G)

1 Soil and vegetation disturbance from management activities should occur so that impacts to long-term soil and vegetation condition are avoided and in confined, localized areas.

2 A minimum of six nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres.

3 Goshawk post-fledging areas of approximately 420 acres should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species.

4 In goshawk foraging areas and post-fledging areas, groups of six reserve trees should be retained within management-created openings greater than 0.5 acre, to maintain the persistence or contribute to the recovery of at-risk species.

5 Human presence should be minimized in occupied goshawk nest areas during nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Spruce-Fir Forest

- Canada lynx
- Northern goshawk
- Masked shrew

- Pale Townsend's big-eared bat
- Robust larkspur

Related Plan Content for Spruce-Fir Forest

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Photo credit: Allan Lemley

Aspen (VEG-ASP)

On the Carson, aspen occurs as an early seral component of other vegetation communities. It does not persist indefinitely, but is dependent on disturbance for regeneration, and therefore, its distribution is expected to shift spatially across the landscape over time. However, when a conifer seed source is unavailable, aspen may persist as a seral state for decades to centuries. Aspen is adapted to a wider range of environmental conditions than most of the plant species it is associated with—spanning elevations from ponderosa to spruce and fir forests. Where they occur, aspen stands provide important moist and cool habitat, water storage and water recharge, nutrient cycling, reduced fire intensity, and slowed fire spread. They provide a disproportionately large ecological benefit and are characterized by higher biodiversity and a greater abundance of plants, fungi, invertebrates, mammals, and cavity-nesting bird species than the surrounding forest (supporting and provisioning ecosystem services). Even small aspen stands provide refugia; the soft wood of decaying stems and snags provides valuable habitat, particularly for cavity-dependent species.

Aspen stands may be single- or multi-storied depending on disturbance history and local stand dynamics. The canopy is usually closed. Understory structure may be complex, with multiple shrub and herbaceous layers—or simple with just an herbaceous layer. The herbaceous layer may be dense or sparse and dominated by graminoids or forbs. Aspen stands provide important habitat for wildlife and plants. Some species typically found associated with the aspen vegetation community include western yarrow, violet, and several grasses and sedges. The understory may also contain shrubs, including creeping barberry, Oregon boxleaf, and mountain snowberry.

Aspen also has high scenic value and provides opportunities for recreation and cultural or spiritual experiences (cultural ecosystem services). The bright green leaves and white trunks provide a natural contrast to the surrounding forest. The aspen vegetation community attracts both residents and visitors to the Carson to enjoy abundant wildlife, shade, and scenery (cultural ecosystem services). During fall months, the landscape is transformed into a patchwork of green and gold drawing fall color lovers from around the region (cultural ecosystem services). Aspen provide unique seasonal opportunities for hiking, biking, bird watching, nature exploration, picnicking and other recreation activities (cultural ecosystem services). On the Carson, aspen is also an important source of building material (i.e., latillas and coyote fences), as well as fuelwood for local, forest-dependent communities (provisioning and cultural ecosystem services). Aspen bark is used as a medicinal tea (provisioning ecosystem service).

At lower elevations on the Carson where fire regimes have been disrupted (the mixed conifer with aspen and mixed confer with frequent fire vegetation communities), aspen is slightly to very underrepresented relative to reference conditions. It is well-represented in the higher-elevation spruce-fir forest vegetation community, but many of the existing stands are aging and being overtaken by conifers.

Aspen Desired Conditions (FW-VEG-ASP-DC)

Landscape Scale (1,000 acres or greater)

1 The aspen vegetation community occurs as a slowly shifting mosaic and in natural patterns of abundance and distribution across its range, with new aspen clones establishing over time. New openings provide adequate regeneration and old, declining stands transition to conifer dominance.

2 Fire intervals in vegetation communities where aspen is a component are similar to reference conditions and the size, age, and spatial extent of the aspen vegetation community stands reflect large-scale disturbance patterns and processes.

3 Stands with the potential for aspen are affected by disturbances that may include fire, mechanical treatments, insects, pathogens, and abiotic factors. Collectively, these agents of change promote healthy tree regeneration, decadence, and nutrient cycling and in turn contribute to high quality wildlife habitat and biodiversity.

4 Snags, downed aspen, and woody debris are scattered across the landscape and provide habitat for a variety of wildlife species (e.g., small mammals, reptiles, amphibians, and birds), while contributing to efficient nutrient cycling.

Mid-Scale (10-1,000 acres)

5 Aspen in multi-storied patches may compose 10 to 100 percent of the mid-scale area, depending on local disturbance history.

6 Aspen is successfully regenerating and recruiting into older and larger size classes.

7 Understory vegetation consists of shrubby or herbaceous species, providing forage and cover for wildlife and livestock.

Fine Scale (10 acres or less)

8 Size classes have a natural distribution, with the greatest number of stems in the smallest classes.

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

Aspen Guidelines (FW-VEG-ASP-G)

1 To provide necessary habitat characteristics for wildlife species, aspen trees 10 inches or greater diameter (DBH), both live and dead, should be protected during management activities, except where they may pose a risk to worker or public safety or to infrastructure.

2 A minimum of six nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres.

3 Goshawk post-fledging areas of approximately 420 acres should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species.

4 Human presence should be minimized in occupied goshawk nest areas during the nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Aspen

- Canada lynx
- American peregrine falcon
- Northern goshawk
- Masked shrew
- Robust larkspur

Management Approaches for Aspen

1. Consider stimulating aspen growth and managing for pure aspen stands in high-elevation forested wildland-urban interface forests to help mitigate fire hazard.
2. Consider using small patch clearcuts (less than 5 acres), conifer removal, and wildland fire to stimulate aspen sprouting in areas that currently have or previously supported aspen.
3. Consider strategies to promote aspen regeneration, such as jackstrawing, planting, public education, temporary exclosure fencing, and improving forage and browse in areas adjacent to aspen stands.
4. Consider selective removal of fire-sensitive species (i.e., white fir) and small diameter conifers. Retain large ponderosa pine and Douglas-fir.
5. Consider monitoring to quantify the size and distribution of aspen patches required to overcome existing levels of browse pressure.

Related Plan Content for Aspen

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Mixed Conifer with Aspen (VEG-MCW)

The mixed conifer with aspen vegetation community is found in the cooler, wetter sites within the mixed conifer life zone, where fires are less frequent and characterized by more mixed to high severities. The distinguishing feature of the mixed conifer with aspen vegetation community is the presence of quaking aspen in a post-disturbance seral state. On the Carson, the mixed conifer with aspen vegetation community is found on about 131,000 acres at elevations between 7,000 and 10,000 feet. It is most common in the eastside ranger districts and does not occur in the Jicarilla Ranger District.

Dominant and codominant vegetation in the mixed conifer with aspen vegetation community varies by elevation and moisture availability. Ponderosa pine occurs incidentally or is absent, while Douglas-fir, southwestern white pine, white fir, and Colorado blue spruce are dominant or codominant. Oregon boxleaf is characteristic in the understory, but a wide variety of other shrubs, graminoids, and forbs may be present, depending on soil type, aspect, elevation, disturbance history, and other factors. In the aspen component, conifer species may or may not be present in significant proportions, depending on successional status.

The mixed conifer with aspen vegetation community occurs on productive sites that grow large Douglas-fir trees that are valued as timber and fuelwood (provisioning ecosystem services). Selective harvesting during the last century has shifted stand structure and composition, favoring dense, moderate-sized, true firs. Fire exclusion has reduced opportunities for aspen establishment. Aspen in this vegetation community is slightly underrepresented and young aspen stands are particularly rare. When combined with predicted warming and drying, the current stand conditions are likely to become increasingly susceptible to insects, disease, and large, uncharacteristic wildland fires in the future.

The mixed conifer with aspen vegetation community occurs in many areas that provide important recreational opportunities including Sipapu and Red River ski resorts; the South Boundary mountain bike trail; and the Elephant Rock, Cabresto Lake, and Trout Lakes areas (cultural ecosystem services). Designated wildernesses make up 14.5 percent of the mixed conifer with aspen vegetation community (cultural ecosystem service). There are good hunting and osha collecting opportunities in the mixed conifer with aspen vegetation community forests (cultural and provisioning ecosystem services).

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

1 Desired seral stage proportions for the mixed conifer with aspen vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Recently burned; grass, forb, and shrub types	1
Aspen	All aspen, deciduous tree mix, and evergreen-deciduous mix tree types	21
Early-Mid	Seedling/sapling, small trees and medium trees, all cover classes	29
Late-Closed	Large trees, closed canopy	49
Late-Open	Large trees, open canopy; contemporary landscapes only	0

Landscape Scale (1,000 acres or greater)

2 The mixed conifer with aspen vegetation community comprises variable species of differing 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. A range of seral states, each characterized by distinct dominant species composition and biophysical conditions, are distributed across the landscape, such that each state adequately supplies the subsequent states progressively through time. Canopies in older seral stages are generally more closed than in dry mixed conifer.

3 Mixed severity fire (fire regime III) is characteristic at the lower elevations of this type (every 50 to 100 years). High-severity fires (fire regimes IV & V) occur less frequently and are more likely to occur at higher elevations.

4 Old growth structure generally occurs over large areas as stands or patches.

5 Vigorous trees dominate, but older, declining, top-killed, lightning-scarred, and fire-scarred trees are a component. Declining trees are well-distributed throughout the landscape and provide for snags, and coarse woody debris. Generally, there are an average of 20 snags greater than 8 inches in diameter per acre and 1 to 5 of those snags are 18 inches or greater in diameter. Lower snag densities are associated with early seral stages and higher densities are associated with late seral stages. Coarse woody debris, including downed logs, ranges 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.

6 Dwarf mistletoe occurrences may be present in stands with a Douglas-fir or spruce component, but rarely in other tree species. Occurrence size, severity, and amount of mortality varies among infected stands. Witches' brooms may be scattered throughout the infection, providing structural diversity in the stand and improved foraging and nesting habitat for wildlife species, such as small mammals (e.g., tree squirrels) and raptors (e.g., goshawks and red-tailed hawks).

7 An understory consisting of native grass, forbs, and shrubs is present. Mosses and lichens are prevalent and function to recycle soil nutrients.

Mid-Scale (10-1,000 acres)

8 At the mid-scale, the distribution of groups and patches varies in the mixed conifer with aspen vegetation community, depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary, but are frequently in the hundreds of acres, with rare disturbances in the thousands of acres. Groups and patches of tens of acres or less are relatively common. A mosaic of groups and patches of trees, primarily even-aged, and variable in size, species composition, and age is present. Disturbance-created grass, forb, shrub openings may compose 10 to 100 percent of the mid-scale area, depending on the local disturbance history.

9 Tree density ranges from 20 to 180 square feet of basal area per acre, depending on disturbance history and site productivity.

10 In certain places basal area is 10 to 20 percent higher than in the general forest. Examples include mid- to old-age tree groups in goshawk post-fledging family areas and north-facing slopes. Goshawk

nest areas have forest conditions that are multi-aged, but are dominated by large trees with relatively denser canopies than other areas in the wet mixed conifer type.

11 The prevalence of aspen is dependent on seral stage, but it is occasionally present in large patches, providing habitat for organisms (e.g., cavity-nesting birds, fungi, and microorganisms) that depend on it. Where they naturally occur, all age classes of aspen are present in even-aged groups or patches and are regenerating and vigorous. A diverse understory of native herbaceous and shrub species has a variety of seral and age classes and is vigorous and regenerating.

12 Fire behavior is often characterized by smoldering low-intensity surface fire, with single tree and isolated group torching. Due to the presence of ladder fuels, when environmental conditions align fires transition rapidly into the canopy as passive or active crown fire behavior with conifer tree mortality up to 100 percent across mid-scale patches (10 to 1,000 acres). High-severity fires generally do not result in areas of mortality exceeding 1,000 acres. Other more frequent disturbances affect smaller areas.

13 Uneven-aged groups and patches, comprising about 20 percent of the mixed conifer with aspen vegetation community, provide habitat for species (e.g., black bear and bobcat) that need multi-storied canopies with dense low- to mid-canopy layers.

14 The wildland-urban interface is dominated by early-seral fire-adapted species growing in a more open condition than in the surrounding general forest. These conditions result in fires that burn primarily on the forest floor and rarely spread as crown fire.

Fine Scale (10 acres or less)

15 In mid-aged and older forests, trees are typically variably spaced with crowns interlocking (grouped and clumped trees) or nearly interlocking. Trees within groups can be of similar or variable species and ages.

16 Small openings (gaps) are present as a result of disturbances and provide wildlife and plant species habitat.

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

Mixed Conifer with Aspen Guidelines (FW-VEG-MCW-G)

1 Slash piles should be retained across the landscape for several years, to increase small mammal occupancy in areas where coarse woody debris is deficient and provide nesting habitat and cover for associated wildlife species (e.g., turkeys, birds, small mammals, reptiles, and invertebrates).

2 If slash is scattered, it should be at a height that still allows big game movement.

3 A minimum of six nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres.

4 Goshawk post-fledging areas of approximately 420 acres should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species, to maintain the persistence or contribute to the recovery of at-risk species.

5 In goshawk foraging areas and post-fledging areas groups of six reserve trees should be retained within management-created openings greater than 0.5 acre, to maintain the persistence or contribute to the recovery of at-risk species.

6 Human presence should be minimized in occupied goshawk nest areas during nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Mixed Conifer with Aspen

- Mexican spotted owl
- American peregrine falcon
- Northern goshawk
- Masked shrew
- Pale Townsend's big-eared bat
- Robust larkspur

Related Plan Content for Mixed Conifer with Aspen

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Photo credit: Allan Lemley

Mixed Conifer with Frequent Fire (VEG-MCD)

The mixed conifer with frequent fire vegetation community occupies the warmer, drier sites within the mixed conifer life zone. It covers nearly 183,000 acres on the Carson at elevations of 6,000 to 10,000 feet. It is present on every district except the Jicarilla Ranger District. The mixed conifer with frequent fire vegetation community is distinguished from mixed conifer with aspen vegetation community by having a more frequent, lower severity fire regime and aspen as a minor component found within dissimilar inclusions, rather than as a seral stage. The mixed conifer with frequent fire vegetation community is dominated by ponderosa pine, with some Douglas-fir and white fir. When fire is episodic and low- to mixed-severity, both mature and juvenile white fir are killed and an open forest structure is maintained with fire-adapted ponderosa pine and Douglas-fir in the overstory, and Gambel oak, creeping barberry, and mountain snowberry are common in the understory. The natural fire regime in mixed conifer with frequent fire is highly departed and has resulted in dense, homogeneous stands with a shift toward more shade-tolerant tree species that are not adapted to fire.

Dense conifer stands outcompete aspen, which would have historically been a minor and dispersed component in the mixed conifer with frequent fire vegetation community but is now very underrepresented. Dense stands are susceptible to insects and disease and much more at risk from large, high-severity fire. There are many fewer openings that support grass, forb, and oak cover than there would have been historically, which results in less forage for wildlife and livestock grazing. Many forest-dependent communities are near mixed conifer with frequent fire forests and rely on them for fuelwood and other products, like osha (cultural and provisioning ecosystem services).

Mixed Conifer with Frequent Fire Desired Conditions (FW-VEG-MCD-DC)

1 Desired seral stage proportions for the mixed conifer with frequent fire vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree-Early	Recently burned; grass, forb, and shrub types; seedling/sapling size trees	9
Mid-Closed	Small trees, closed canopy	3
Mid-Open	Small trees, open canopy	3
Late-Closed	Medium to large trees, closed canopy	25
Late-Open	Multi-storied with open canopy, largest trees are medium to large	60

Landscape Scale (1,000 acres or greater)

2 The mixed conifer with frequent fire vegetation community comprises 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. Portions of the forest may be in various stages of development (including temporary openings or groups of very young trees) providing a source of future old growth structure on the landscape. Even-aged structure may be present on up to 10 percent of the landscape to provide structural diversity.

3 Frequent, low-severity fires (fire regime I) occur across the entire landscape, including throughout goshawk home ranges, with a return interval of 14 to 24 years. Fires burn primarily on the forest floor and typically do not spread between tree groups as crown fire.

4 Old-growth structure occurs throughout the landscape, generally in small areas as individual old growth components or as clumps of old growth. Old growth may be intermixed with groups of younger trees or discrete groups of mostly old trees.

5 Vigorous trees dominate, but older, declining, top-killed, lightning-scarred, and fire-scarred trees are a component that provide for snags and coarse woody debris and are well-distributed throughout the landscape.

6 Dwarf mistletoe occurrences may be present on ponderosa pine and Douglas-fir, but rarely in other tree species. 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. Infection size, severity, and amount of mortality varies among infected trees. Witches' brooms may be scattered throughout the infections, providing structural diversity in the stand and improved foraging and nesting habitat for wildlife species, such as small mammals (e.g., tree squirrels) and raptors (e.g., goshawks).

7 The majority of soil cover comprises native grasses and forbs, as opposed to needles and leaves, but all contribute to the fine fuels that maintain a natural fire regime.

Mid-Scale (10-1,000 acres)

8 At the mid-scale, appearance is variable, but generally uneven-aged and open. Openness typically ranges from 50 percent in more productive sites to 90 percent in less productive sites. Depending on past disturbance events and subsequent regeneration establishment small patches (generally less than 60 acres) of even-aged forest structure are occasionally present. 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. Disturbances sustain the overall variation in age and structural distribution.

9 Tree density ranges from 30 to 125 square feet of basal area per acre, with the majority coming from larger trees.

10 Trees are arranged in small clumps and groups interspersed within variably sized openings of grass/forb/shrub vegetation associations similar to historic patterns. Size, shape, number of trees per group, and number of groups per area are variable across the landscape, depending on elevation, soil type, aspect, and site productivity. More biologically productive forested sites contain more trees per group and more groups per area.

11 Snags are typically 18 inches diameter (DBH) or larger, and average 3 per acre. Smaller snags, 8 inches and larger at DBH, average 8 snags per acre. Downed logs (over 12 inches diameter at mid-point, over 8 feet long) average 3 per acre in forested areas. Coarse woody debris, including downed logs, ranges from 5 to 15 tons per acre.

12 In certain places basal area is 10 to 20 percent higher than in the general forest. Examples include mid- to old-age tree groups in goshawk post-fledging family areas, north-facing slopes, and canyon bottoms. Goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than other areas in the dry mixed conifer type.

13 Groups of aspen are present in the mixed conifer with frequent fire vegetation community where they naturally occur.

14 Where the potential exists, Gambel oak thickets with various diameter stems and low-growing, shrubby oak are present. These thickets provide forage, cover, and nesting habitat for wildlife species (e.g., small mammals, birds, deer, and elk). Gambel oak mast (acorns) provides food for wildlife species (e.g., black bear). The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

15 The wildland-urban interface comprises smaller and more widely spaced groups of trees and lower numbers of snags and coarse woody debris than surrounding general forest. Crown base heights may be higher than in areas outside the wildland-urban interface. Within the wildland-urban interface, fires burn primarily on the forest floor and rarely spread as crown fire.

Fine Scale (10 acres or less)

16 Tree groups are typically less than 1 acre and consist of 2 to 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.

17 Interspaces between groups are variably shaped, comprised of a native grass-forb-shrub mix and may contain individual trees or snags.

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

19 Density is variable, with canopy cover ranging from very open to closed.

20 Groundcover consists primarily of perennial grasses and forbs capable of carrying surface fire. Fires generally burn as surface fires, but single-tree torching and isolated group torching is not uncommon.

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

Mixed Conifer with Frequent Fire Objectives (FW-VEG-MCD-O)

1 Mechanically treat at least 5,500 to 10,000 acres, during each 10-year period following plan approval.

2 During each 10-year period following plan approval, treat at least 20,000 to 40,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or to maintain desired conditions.

Mixed Conifer with Frequent Fire Guidelines (FW-VEG-MCD-G)

1. Slash piles should be retained across the landscape for several years, to increase small mammal occupancy in areas where coarse woody debris is deficient and provide nesting habitat and cover for wildlife-associated species (e.g., turkeys, birds, small mammals, reptiles, and invertebrates).
2. If slash is scattered, it should be at a height that still allows big game movement.
3. A minimum of six nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres.
4. Goshawk post-fledging areas of approximately 420 acres should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species.
5. In goshawk foraging areas and post-fledging areas groups of three to five reserve trees should be retained within management-created openings greater than 1 acre, to maintain the persistence or contribute to the recovery of at-risk species.
6. Human presence should be minimized in occupied goshawk nest areas during the nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Mixed Conifer with Frequent Fire

- Mexican spotted owl
- American peregrine falcon
- Northern goshawk
- Pale Townsend's big-eared bat
- Robust larkspur

Related Plan Content for Mixed Conifer with Frequent Fire

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Ponderosa Pine Forest (VEG-PPF)

Ponderosa pine forest is the most common vegetation community on the Carson, comprising nearly 313,000 acres and occurring on every ranger district and spanning moisture gradients from 6,000 to 7,500 feet. Ponderosa pine is the dominant species, but other trees, such as Gambel oak, piñon pine, and juniper, may be present. There is typically a productive grass-forb-shrub understory in which Gambel oak and kinnikinnick are common. In other savanna areas, grasses and forbs dominate the understory and extensive interspaces occur between widely spaced individuals or clumps of trees. Common grass species include blue gramma, mountain muhly, muttongrass, and Arizona fescue. Ponderosa pine trees have developed mechanisms to tolerate frequent, low-intensity surface fires and adapt to drought during the growing season. The ponderosa pine forest vegetation community on the Carson is an important source of commercial timber and fuelwood (provisioning ecosystem services).

Past management activities have resulted in a ponderosa pine forest vegetation community on the Carson that is highly departed from reference conditions. The result is a lack of open canopy, few large-tree-dominated stands, and fewer snags. Beginning around the turn of the 19th century and continuing into the 1950s, high-grade logging on the Carson removed much of the most valuable merchantable timber from accessible ponderosa pine forest stands. Even-aged, relatively young dense stands of small-diameter ponderosa pine trees remain. Dense ponderosa pine forest supports less grass in the understory now than it did in the past, providing less forage for wildlife and livestock. In addition, a legacy of unmanaged livestock grazing in the early 1900s and fire suppression have significantly reduced the ability of fire to play a natural role in the ponderosa pine forest vegetation community and has allowed fire-sensitive species, such as white fir, to establish. Stands are dense and homogeneous. The current ponderosa pine forest vegetation community condition is extremely susceptible to large, uncharacteristic wildfire and disturbance agents (especially dwarf mistletoe) that will be exacerbated under a warming and drying climate. In many cases, mechanical treatment is required before reintroducing fire. Treatments that create canopy openings can induce an oak response that suppresses tree regeneration and can increase fire hazard.

Beginning in the 1940s and through the 1980s, over 50,000 acres of ponderosa pine, piñon pine, and juniper and sagebrush were converted to grasslands. These conversions were accomplished by plowing, chaining, dozer piling, tree crushing, and hand clearing with chainsaws, followed by seeding to grass (mostly crested wheat). The primary purpose of these conversion areas was to increase available forage for wildlife and livestock grazing. Some lands that have the potential to support ponderosa pine forest continue to be managed instead for forage production. Those areas are identified as Grassland Maintenance Management Areas, and are managed toward the desired conditions defined for that management area.

Ponderosa Pine Forest Desired Conditions (FW-VEG-PPF-DC)

1 Desired seral stage proportions for the ponderosa pine forest vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Recently burned; grass, forb, and shrub types	0
Early	Seedling/sapling and small trees, closed canopy	1
Mid	Single-storied with open canopy, largest trees are medium to large	3
Late	Multi-storied with open canopy, largest trees are medium to large	96
Single Story	Small to large trees, single storied, closed canopy; *contemporary landscapes only*	0

Landscape Scale (1,000 acres or greater)

2 The ponderosa pine forest vegetation community comprises trees 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. Forest appearance is generally uneven-aged and open; occasional areas of even-aged structure may be present. Denser stand conditions exist in some locations, such as north-facing slopes and canyon bottoms.

3 The majority of soil cover is comprised of native grasses and forbs, rather than needles and leaves, but all vegetative cover contributes to the fine fuels that maintain a natural fire regime.

4 Frequent, low-severity fires (fire regime I) occur across the entire landscape, including throughout the range of northern goshawks, with a return interval of 4 to 18 years. Fires burn primarily on the forest floor and typically do not spread between tree groups as crown fire.

5 Old growth structure (large, old ponderosa pine trees with reddish-yellow, wide platy bark; flattened tops; moderate to full crowns; and large drooping or gnarled limbs) occurs throughout the landscape, generally in small areas as individual old growth components or as clumps of old growth. Old growth is generally intermixed with groups of uneven-aged trees, but may occasionally occur in larger even-aged patches.

6 Vigorous trees dominate, but older, declining, top-killed, lightning-scarred, and fire-scarred trees are a component that provide for snags and coarse woody debris that are irregularly distributed across the landscape and may not exist in some patches.

7 Isolated dwarf mistletoe occurrences may be present. Dwarf mistletoe occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent of host trees in even-aged forest structures. Infection size, severity, and amount of mortality varies among infected trees. Witches' brooms may be scattered throughout the infections providing structural diversity in the stand and improved foraging and nesting habitat for wildlife species, including small mammals (e.g., tree squirrels), raptors (e.g., goshawks and owls), and invertebrate species.

Mid-Scale (10-1,000 acres)

8 At the mid-scale, forest appearance is variable but generally uneven-aged and open. In general, all age classes are represented and evenly distributed. Seedlings and saplings are maintained at sufficient levels to provide a reliable source of replacement. Occasionally patches of even-aged forest structure are present, based upon disturbance events and regeneration establishment. 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. Disturbances sustain the overall variation in age and structural distribution.

9 Tree species composition is relatively homogeneous. Trees may be isolated individuals or arranged in small clumps and groups interspersed within variably sized openings of grass/forb/shrub vegetation associations similar to historic patterns. Size, shape, number of trees per group, and number of groups per area are variable across the landscape, depending on elevation, soil type, aspect, and site productivity. More biologically productive forested sites contain more trees per group and more groups per area.

10 Snags are typically 18 inches diameter (DBH) or larger and average 1 to 2 per acre. Downed logs (greater than 12 inches diameter at mid-point, greater than 8 feet long) average 3 per acre. Coarse woody debris, including downed logs, ranges from 3 to 10 tons per acre.

11 Where the potential exists, Gambel oak thickets with various diameter stems and low-growing, shrubby oak are present. These thickets provide forage, cover, and nesting habitat for species (e.g., small mammals, birds, deer, and elk). Gambel oak mast (acorns) provides food for wildlife species (e.g., black bear). The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

12 Interspaces typically range 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 from 78 to 90 percent. Tree density within forested areas generally ranges from 22 to 89 square-foot basal area per acre.

13 In certain places, basal area is 10 to 20 percent higher in mid-aged to old tree groups compared to the rest of the forest (i.e., goshawk post-fledging areas). Goshawk nest areas have forest conditions that are multi-aged but dominated by large trees with interlocking crowns and a canopy that is denser relative to other ponderosa pine areas.

14 In the wildland-urban interface, the density of snags, downed logs, coarse woody debris, live trees, and Gambel oak may be at the low range of desired conditions, to reduce fire intensity and assist the control of fire. Groups of trees may be smaller, more widely spaced, or may have fewer trees per group (but still within desired condition) compared to areas outside the wildland-urban interface. Crown base heights may be higher than in areas outside the wildland-urban interface to reduce the potential for fire spreading to the tree canopy.

Fine Scale (10 acres or less)

15 Trees typically occur in irregularly shaped small groups of less than one acre—though they may be larger, such as on north-facing slopes. Some groups form tight clumps or trees may occur as isolated individuals, depending on soils, plant associations, climate, and disturbance.

16 Groups range in size from 2 to approximately 40 trees and may contain species other than ponderosa pine. Trees within groups may be of similar or variable ages. Crowns of trees are interlocking or nearly interlocking in groups that are mid-aged to old.

17 The interspaces between groups are variably shaped, comprised of a native grass/forb/shrub mix, and may contain individual trees or snags. Regeneration openings occur as a mosaic and are similar in size to nearby groups.

18 Groundcover consists primarily of perennial grasses, forbs, shrubs, and needle cast capable of carrying surface fire. Generally, fires burn as surface fires, but single-tree torching and isolated group torching are not uncommon and contribute to a mosaic across the landscape.

19 Rocky features, outcrops of gypseous or limey sandstones, volcanic substrate soils, and Mancos Shale soils provide habitat commensurate with the capacity of the vegetation community for at-risk species.

Ponderosa Pine Forest Objectives (FW-VEG-PPF-O)

1 Mechanically treat at least 22,000 to 50,000 acres, during each 10-year period following plan approval.

2 During each 10-year period following plan approval, treat at least 80,000 to 125,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or maintain desired conditions.

Ponderosa Pine Forest Guidelines (FW-VEG-PPF-G)

1 Vegetation treatments should be designed such that structural stages and age classes are proportionally represented to assure continuous recruitment of old growth characteristics at the appropriate scale over time.

2 To provide necessary habitat components, the largest and tallest snags (representative of the stand) and downed logs should be retained along edges of openings and within groups/clumps of trees, to provide habitat and roost sites for wildlife species (e.g., small mammals, cavity-nesting birds, and tree-dwelling bats).

3 Slash piles should be retained across the landscape for several years, to increase small mammal occupancy in areas where coarse woody debris is deficient and provide nesting habitat and cover for turkeys, birds, small mammals, reptiles, and invertebrates.

4 If slash is scattered, it should be at a height that still allows big game movement.

5 A minimum of six nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and

replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres.

6 Goshawk post-fledging areas of approximately 420 acres surrounding nest sites should be designated, to maintain the persistence or contribute to the recovery of at-risk species.

7 In goshawk foraging areas and post-fledging areas groups of 3 to 5 reserve trees should be retained within management-created openings greater than 1 acre, to maintain the persistence or contribute to the recovery of at-risk species.

8 Human presence should be minimized in occupied goshawk nest areas during the nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Ponderosa Pine Forest

- American peregrine falcon
- Northern goshawk
- Pale Townsend's big-eared bat
- Spotted bat
- Pagosa milkvetch (Jicarilla Ranger District)
- Ripley's milkvetch (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Small-headed goldenweed (Tres Piedras and El Rito Ranger Districts)

Related Plan Content for Ponderosa Pine Forest

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Photo credit: Allan Lemley

Piñon-Juniper Woodland (VEG-PJO)

The piñon-juniper woodland vegetation community covers 178,000 acres and occurs on every ranger district of the Carson. It occupies drier sites from 6,200 to above 7,500 feet, where it begins to be outcompeted by ponderosa pine and Douglas-fir. The moderate- to high-density overstory is dominated by two-needle piñon pine, Rocky Mountain juniper, and one-seed juniper. Soils are generally shallow, coarse, and often rocky, and support sparse shrubs and grasses, mainly blue and sideoats gramas. Typical disturbances (e.g., fire, insects, and disease) are high severity and occur infrequently, creating and maintaining even-aged patches. Woodland development occurs in distinctive phases, ranging from open grass-forbs to mid-aged open canopy to mature closed canopy forest.

American Indians have occupied the piñon-juniper woodland vegetation community in northern New Mexico for centuries and have used plants from these areas for many purposes, including food and building materials (cultural and provisioning ecosystem services). Piñon pine and juniper are highly valued by local, forest-dependent communities for fuelwood and pine nuts and openings provide forage for livestock and wildlife (provisioning ecosystem services). Between 2002 and 2005, bark beetles killed a significant portion of the piñon pine component on approximately 284,500 acres in the piñon-juniper woodland, piñon-juniper sagebrush, and other vegetation communities on the Carson. Soil function has been degraded due to a lack of effective groundcover, less overall organic matter, and changes in species composition, resulting in altered soil stability and reduced nutrient cycling. The pinyon jay is dependent on piñon pine trees and nuts and the piñon-juniper woodland vegetation community provides important habitat for game species, including elk, deer, and bear.

Beginning in the 1940s, continuing through the 1980s, over 50,000 acres of ponderosa pine, piñon pine, and juniper trees and sagebrush were converted to grasslands. These conversions were accomplished by plowing, chaining, dozer piling, tree crushing, and hand clearing with chainsaws, followed by seeding to grass (mostly crested wheat). The primary purpose of these conversion areas was to increase available forage for wildlife and livestock grazing. Some lands that have the potential to support the piñon-juniper woodland vegetation community are still being managed instead for forage production. Those areas are identified as Grassland Maintenance Management Areas, and are managed toward the desired conditions defined for that management area.

Piñon-Juniper Woodland Desired Conditions (FW-VEG-PJO-DC)

1 Desired seral stage proportions for the piñon-juniper woodland vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Recently burned; grass, forb, & shrub types	10
Early-Open	Seedling/sapling and open canopy small trees	5
Early-Closed	Small trees, closed canopy	15
Late-Open	Medium to large trees, open canopy	10
Late-Closed	Medium to large trees, closed canopy	60

Landscape Scale (1,000 acres or greater)

2 The piñon-juniper woodland vegetation community is characterized by even-aged patches of piñon pines and junipers that, at the landscape scale, form multi-aged woodlands. In treed seral states, piñon pine trees are occasionally absent, but one or more juniper species is always present.

3 Tree density is high, and where interlocking crowns shade the ground over extensive areas, shrubs are sparse to moderate and herbaceous cover is low and discontinuous. However, plant litter (e.g., leaves and needles) and coarse woody debris are present in sufficient quantity to resist accelerated soil erosion and promote nutrient cycling, water retention, and the microclimatic conditions necessary for piñon pine seed germination (improved nutrient and soil properties, higher soil moisture, lower temperatures, and reduced solar insolation).

4 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

5 Commensurate with site capability, native grass and forb cover is maximized to protect and enrich soils, as well as to provide forage for ungulate grazing.

6 Widespread fire occurs infrequently, on the order of centuries, and its effects are variable due to variation in groundcover. The fires that do occur are mixed to high severity (fire regimes III, IV, & V).

7 Old growth structure occurs throughout the landscape, often concentrated in mid- and fine-scale units as patches of old growth. Very old trees (over 300 years old) are present.

8 Older, declining, infested, or diseased trees provide a source of snags and coarse woody debris and are well-distributed throughout the landscape. Snags average of 2 per acre, and coarse woody debris averages 2 to 5 tons per acre.

Mid-Scale (10-1,000 acres)

9 The distribution of patches varies depending on disturbance, elevation, soil type, aspect, and site productivity. Patches are primarily even-aged and vary in size but are mostly in the 10s to 100s of acres.

10 Tree densities vary among seral stages, but average 150 to 200 trees per acre.

11 Where the potential exists, Gambel oak thickets with various diameter stems and low-growing, shrubby oak are present. These thickets provide forage, cover, and habitat for species that depend on them (e.g., small mammals, nesting or feeding birds, deer, and elk). Gambel oak mast (acorns) provides food for wildlife species, such as black bear and small mammals. The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

12 In the wildland-urban interface, the density of snags, coarse woody debris, live trees and Gambel oak may be lower than in the rest of the vegetation community to reduce fire intensity and assist in the control of fire. Trees may be younger and more widely spaced and disturbances (e.g., prescribed fire and vegetation treatments) may occur more frequently than in areas outside of the wildland-urban interface. Crown base heights may be higher than in areas outside of the wildland-urban interface to reduce the potential for fire spreading to the tree canopy.

Fine Scale (10 acres or less)

13 Small fires may occur more frequently at the fine scale, burning single trees or small patches (fire regime III, return interval 35 to 200 years).

14 Rocky features, outcrops of gypseous or limy sandstones, volcanic substrate soils, and Mancos Shale soils provide habitat commensurate with the capacity of the vegetation community for at-risk species.

Piñon-Juniper Woodland Standards (FW-VEG-PJO-S)

1 On non-grassland soils in the piñon-juniper woodland vegetation community, seral grasslands created by previous vegetation treatments must be managed toward restoration of piñon-juniper woodland vegetation community desired conditions, unless they are in a Grassland Maintenance Management Area.

Piñon-Juniper Woodland Guidelines (FW-VEG-PJO-G)

1 Treatments in the piñon-juniper woodland vegetation community should leave key habitat features (i.e., roosting trees, snags, partially dead or dying trees, large trees, or downed logs) and single or small groups of medium to large piñon trees, with some expanses of herbaceous vegetation and coarse woody debris, to provide for soil productivity, traditional uses (e.g., piñon nut gathering), and wildlife needs (e.g., foraging habitat for at-risk species, migratory birds, and other piñon-juniper obligate species).

2 Treatments in the piñon-juniper woodland vegetation community should avoid creating a sharp, well-defined edge between dense woodlands and recovered shrublands, to provide foraging habitat of at-risk species.

3 Grassland soil inclusions (Mollisols) should be managed toward montane and subalpine grasslands vegetation community desired conditions, to protect soil function and provide forage.

4 If slash is scattered, it should be at a height that still allows big game movement.

At-risk Species for Piñon-Juniper Woodland

- American peregrine falcon
- Pinyon jay
- Pale Townsend's big-eared bat
- Spotted bat
- Chaco milkvetch
- Chama blazing star
- Pagosa milkvetch
- Ripley's milkvetch
- Tufted sand verbena (Canjilon Ranger District)

Related Plan Content for Piñon-Juniper Woodland

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species; Grassland Maintenance Management Area

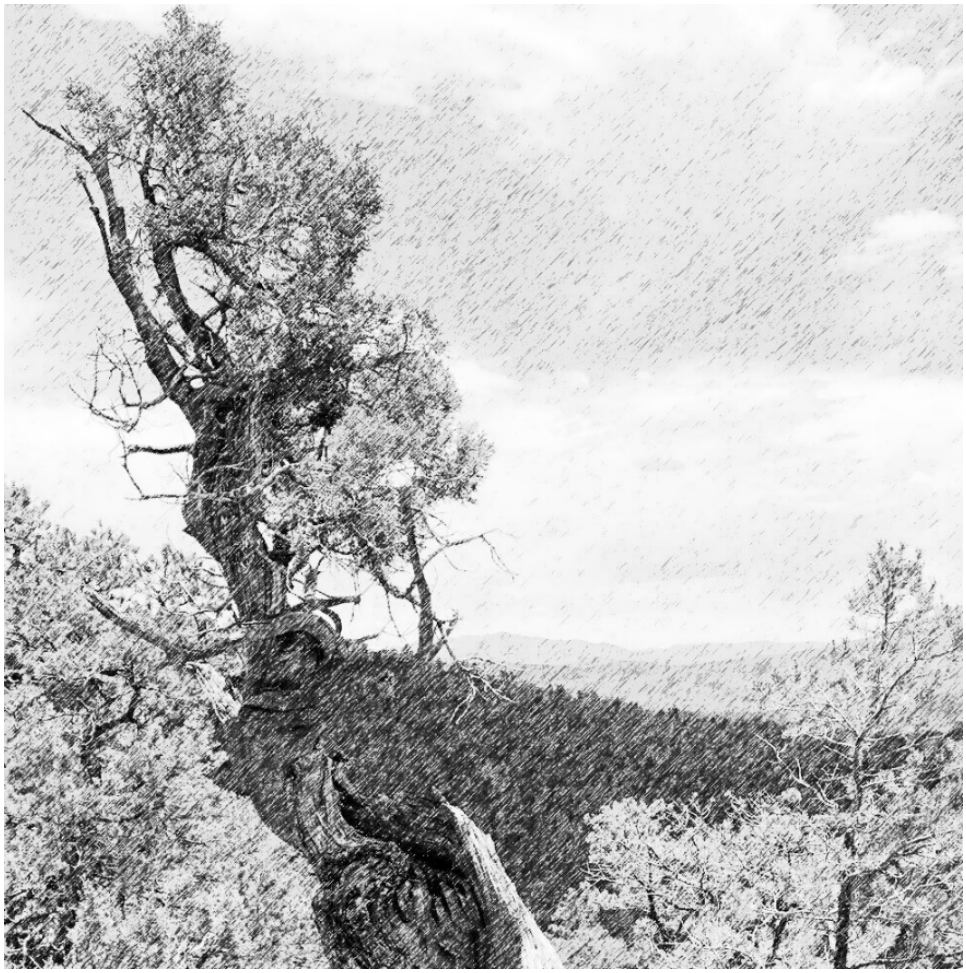

Photo credit: Peter Rich

Piñon-Juniper Sagebrush (VEG-PJS)

Piñon-juniper sagebrush is a transitional vegetation community, spanning conditions between the wetter, higher elevation piñon-juniper woodland vegetation community and the lower elevation sagebrush shrubland vegetation community. The piñon-juniper sagebrush vegetation community occurs on over 217,000 acres of the Carson, between 5,900 and 7,500 feet and is found on every ranger district. The two-needle piñon pine and Rocky Mountain juniper overstory is open, with trees occurring as individuals or in small, often even-aged clumps. Some Utah juniper is found in the southern Tres Piedras and El Rito Ranger Districts. Understory cover is made up of 6 to 25 percent big sagebrush, with a limited herbaceous layer concentrated in canopy openings. Blue grama and sideoats grama are common grass species.

Piñon pine and juniper are highly valued by local, forest-dependent communities for fuelwood, building materials, and pine nuts (cultural and provisioning ecosystem services). Openings provide forage for livestock and wildlife (cultural and provisioning ecosystem services). Recent bark beetle-induced piñon pine mortality was greatest at lower elevations and on drier sites, the same areas that favor the piñon-juniper sagebrush over the piñon-juniper woodland vegetation community. Soil function has been degraded due to a lack of effective groundcover, less overall organic matter, and changes in species composition, resulting in altered soil stability and reduced nutrient cycling. The pinyon jay is dependent on piñon pine trees and nuts and the piñon-juniper sagebrush community provides important habitat for game species including elk, deer, and bear.

Beginning in the 1940s, continuing through the 1980s, over 50,000 acres of ponderosa pine, piñon pine, and juniper trees and sagebrush were converted to grasslands. These conversions were accomplished by plowing, chaining, dozer piling, tree crushing, and hand clearing with chainsaws, followed by seeding to grass (mostly crested wheat). The primary purpose of these conversion areas was to increase available forage for wild and livestock grazing. Some lands that have the potential to support the piñon-juniper sagebrush vegetation community are still being managed instead for forage production. Those areas are identified as Grassland Maintenance Management Areas, and are managed toward the desired conditions defined for that management area.

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

1 Desired seral stage proportions for the piñon-juniper sagebrush vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Recently burned, grass, forb, & shrub types	10
Mid-Open	Seedling/sapling and open canopy small trees	25
Mid-Closed	Medium to large trees, open canopy	35
Late-Open	Small trees, closed canopy	20
Late-Closed	Medium to large trees, closed canopy	10

Landscape Scale (1,000 acres or greater)

2 The piñon-juniper sagebrush vegetation community is a mix of trees and shrubs that occurs as a series of vegetation states that move from herbaceous to shrub to tree-dominated over time. Trees occur as individuals or in smaller groups ranging from young to old across the landscape. Typically, groups are even aged. Piñon pine trees are occasionally absent, but one or more juniper species is always present.

3 The understory is dominated by moderate to high density shrubs, depending on successional stage. The shrub component consists of sagebrush or a mix of sagebrush and other shrub species, which are well-distributed. Shrub canopy is typically closed during the later successional stages. Litter and rock compose the greatest proportion of groundcover. Native grasses and forbs are sparse due to shrub dominance.

4 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

5 Native grass and forb cover are adequate (commensurate with site capability) to protect and enrich soils, as well as provide for ungulate grazing.

6 Fires are typically infrequent (fire return intervals of 80 to 100+ years) and of mixed severity (fire regime III). Stand-replacing fire may occur at longer intervals.

7 Old growth structure occurs throughout the landscape, generally in small areas as individual old growth components or as clumps of old growth. Snags and old trees with dead limbs or tops are scattered across the landscape. Large deadwood is present.

8 Older, declining, infested, or diseased trees provide a source of snags and coarse woody debris and are well-distributed throughout the landscape. Snags average 6 per acre and coarse woody debris averages 4 tons per acre.

Mid-Scale (10-1,000 acres)

9 Snags and old trees with dead limbs/tops are scattered, with snags 8 inches and above (diameter at root collar) averaging 6 snags per acre, while snags 18 inches and above average 1 snag per acre. Coarse woody debris averages about 4 tons per acre.

10 The understory is dominated by moderate to high density shrubs with a closed shrub canopy in later successional stages.

11 Where historically occurring, Gambel oak thickets with various diameter stems and low-growing, shrubby oak are present. These thickets provide forage, cover, and habitat for species that depend on them, such as small mammals, feeding or nesting birds, deer, and elk. Gambel oak mast (acorns) provides food for wildlife species (e.g., black bear and small mammals). The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

12 In the wildland-urban interface, the density of snags, coarse woody debris, live trees, and Gambel oak may be lower than in the rest of the vegetation community to reduce fire intensity and assist in the control of fire. Trees may be younger and more widely spaced and disturbances (e.g., prescribed

fire and vegetation treatments) may occur more frequently than in areas outside of the wildland-urban interface. Crown base heights may be higher than in non-wildland-urban interface areas to reduce the potential for fire spreading to the tree canopy.

Fine Scale (10 acres or less)

13 Trees occur as individuals or in smaller groups ranging from young to old. Typically, groups are even-aged. The patch size of woodlands ranges from 1 to 10s of acres, and occasionally includes patches of even-aged woodland structure, based upon disturbance events and regeneration establishment.

14 Piñon pine trees are occasionally absent, but one or more juniper species is always present.

15 Small fires may occur more frequently at the fine-scale, burning single trees or small patches, but usually not spreading through shrubs, perennial grasses, and forb groundcover (fire regime III, return interval 35 to 200 years).

16 Rocky features, outcrops of gypseous or limey sandstones, volcanic substrate soils, and Mancos Shale soils provide habitat for at-risk species, commensurate with the capacity of the vegetation community.

Piñon-Juniper Sagebrush Standards (FW-VEG-PJS-S)

1 On non-grassland soils in the piñon-juniper sagebrush community, seral grasslands created by previous vegetation treatments must be managed toward restoration of piñon-juniper sagebrush desired conditions unless they are in a Grassland Maintenance Management Area.

Piñon-Juniper Sagebrush Guidelines (FW-VEG-PJS-G)

1 Vegetation community inclusions with Mollisol soils should be managed toward montane and subalpine grassland desired conditions, to protect soil function and provide forage.

2 If slash is scattered, it should be at a height that still allows big game movement.

3 Treatments in the piñon-juniper sagebrush vegetation community should avoid creating a sharp, well-defined edge between dense woodlands and recovered shrublands, to provide foraging habitat of at-risk species.

4 Treatments in the piñon-juniper sagebrush vegetation community should leave key habitat features (i.e., roosting trees, snags, partially dead or dying trees, large trees, or downed logs) and single or small groups of medium to large piñon trees, with some expanses of shrubs and coarse woody debris, to provide for soil productivity, traditional uses (e.g., piñon nut gathering), and wildlife needs (e.g., foraging habitat for at-risk species, migratory birds, and other piñon-juniper obligate species).

At-risk Species for Piñon-Juniper Sagebrush

- American peregrine falcon
- Pinyon jay
- Spotted bat
- Chama blazing star (Canjilon and El Rito Ranger Districts)
- Ripley's milkvetch (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Tufted sand verbena (Canjilon Ranger District)

Related Plan Content for Piñon-Juniper Sagebrush

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species; Grassland Maintenance Management Area

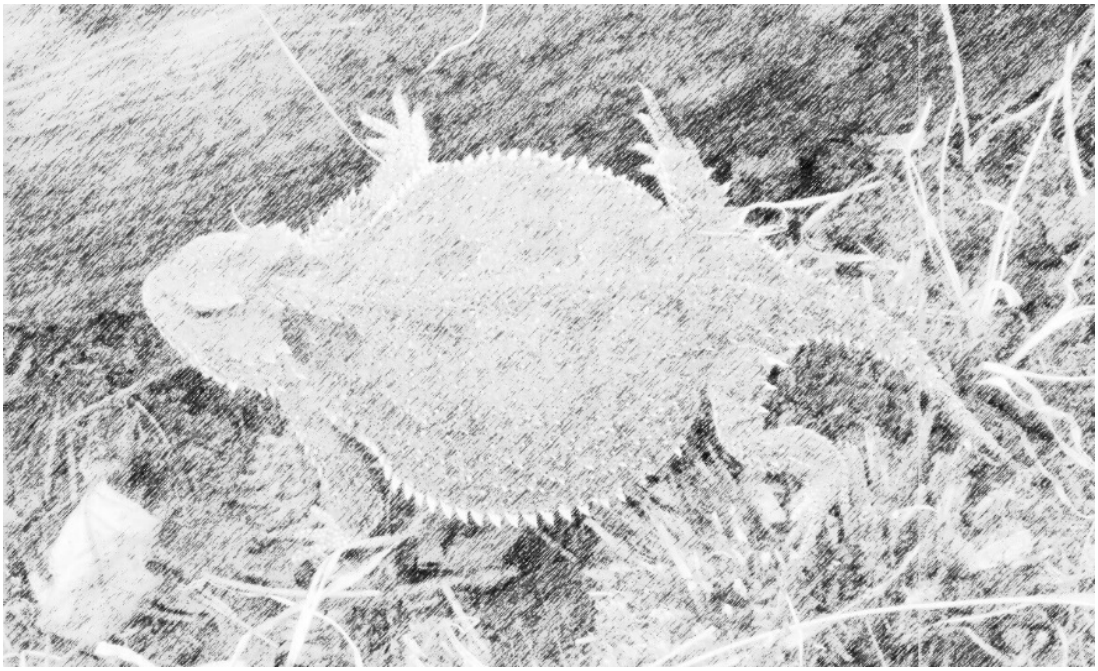

Photo credit: George Long

Sagebrush (VEG-SAGE)

The sagebrush vegetation community only occurs in significant amounts on the Jicarilla Ranger District and the southern portion of the Tres Piedras Ranger District. It covers 59,144 acres on the Carson, but is common on the lower-elevation land adjacent to the Carson. Many communities that were historically grasslands have been invaded by sagebrush shrubs, both on and outside the Carson. Sagebrush in northern New Mexico is at the southern edge of its range, and temperature and available moisture limit the amount of grass cover in the understory. Big sagebrush is the dominant species in this vegetation community, with less than 10 percent tree cover and few other shrub species present. Grama grass species occur sparsely. Historically, fires burned as frequently as every 35 years and maintained both treeless shrub states and large, grass-dominated interspaces.

Although sagebrush is a common species on the landscape surrounding the Carson, its range has shifted as trees have encroached into shrublands and shrubs have encroached into grasslands. The sagebrush vegetation community is defined by climate and soils that historically favored sagebrush over either trees or grasslands. The sagebrush vegetation community on the Carson, particularly on the Tres Piedras Ranger District, has uniquely low departure in the context landscape. The Carson plays a significant role in the sustainability of the sagebrush vegetation community in the broader landscape and may provide an important refuge for dependent organisms. A majority of soils in the sagebrush vegetation community are in unsatisfactory condition, altering soil stability and reducing nutrient cycling. A lack of effective vegetation groundcover contributes to this soil condition, and results in less available forage for livestock and lower quality habitat for wildlife. The sagebrush vegetation community is important for the western burrowing owl, the black-footed ferret, and Gunnison's prairie dog. Sagebrush is collected for medicinal and ceremonial purposes (a cultural ecosystem service).

Sagebrush Desired Conditions (FW-VEG-SAGE-DC)

1 Desired seral stage proportions for the sagebrush vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Recently burned, all herb types	15
Late-Closed	Shrub, closed canopy	30
Late-Open	Shrub, open canopy	55
Tree	All tree types; *contemporary landscapes only*	0

2 The composition, structure, and function of biotic and abiotic components of the sagebrush vegetation community are within or moving toward reference conditions. The majority of sagebrush is in mid-seral or mature states.

3 Shrub cover and the distribution of large contiguous shrub patches meet the needs of a variety of sagebrush-obligate wildlife species, as described in these desired conditions.

4 A vigorous, though not necessarily dense, understory community of native grasses and forbs is present.

5 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

6 Single trees or groups of trees cover less than 10 percent of any sagebrush vegetation community terrestrial ecosystem unit polygon and less than 5 percent of the vegetation community as a whole.

7 Shrub cover is 20 to 50 percent of any sagebrush vegetation community terrestrial ecosystem unit polygon.

8 Stand-replacing fires burn every 35 to 200 years (fire regime III).

9 Soil condition, as defined by basic soil functions (e.g., stability, soil hydrology, and nutrient cycling), has the capacity to support the diversity of associated species and at-risk species.

At-risk Species for Sagebrush

- Black-footed ferret
- American peregrine falcon
- Western burrowing owl
- Gunnison's prairie dog
- Spotted bat
- Ripley's milkvetch (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Tufted sand verbena (Canjilon Ranger District)

Management Approaches for Sagebrush

1. Consider vegetation management activities in the sagebrush vegetation community (e.g., chemical application, mowing, disking, and burning), to enhance shrubland diversity, distribution, and productivity to support wildlife.

Related Plan Content for Sagebrush

Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species

Photo credit: Kathy DeLucas

Soil Resources (SL)

Soil is the crucial area of unconsolidated mineral and organic material where organic matter accumulates and decomposes. It is the zone of maximum biological activity and nutrient release and is the basis of the terrestrial ecosystem. Soil performs four important functions—it serves as a medium for plant growth; stores, supplies, and purifies water; modifies the Earth's atmosphere through carbon storage and other means; and provides habitat for organisms that decompose organic matter (supporting and regulating ecosystem services).

The physical and chemical characteristics of soils are vulnerable to forest management activities and other disturbance. Physical characteristics include surface structure, bulk density, infiltration, erosion, and surface horizon. Impacts to these characteristics may be compaction, erosion, rutting, and loss of the surface horizon. Chemical characteristics include nutrient cycling and soil composition. Impacts to the chemical characteristic of soil may result from changes in vegetation community composition, litter loss, lack of coarse woody material, and atmospheric deposition.

Soils are variable on the Carson and range from relatively hot, dry desert soils at the lowest elevations to cold, moist soils found in the alpine tundra vegetation community at the highest elevations. Soils are inventoried and classified into terrestrial ecosystem units by the Terrestrial Ecosystem Survey for the Carson National Forest (USDA FS Carson 1987).

Soil condition or quality is rated based upon the ability of soils to sustain biological health and productivity, maintain environmental quality, cycle nutrients, and infiltrate water. From 40 to over 70 percent of montane and subalpine grasslands and lower-elevation vegetation communities of the Carson have soil conditions that are unsatisfactory. Soil conditions in the upper elevation spruce-fir forest, bristlecone pine, and mixed conifer vegetation communities are mostly satisfactory. In addition, naturally unstable geology (e.g., unconsolidated metavolcanics and slow geologic landslides) contributes to sediment loads in downstream rivers.

Soil Resources Desired Conditions (FW-SL-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. Logs and other woody materials are distributed across the soil surface to maintain soil productivity and key habitat features.
3. Vegetation, woody debris, and litter are distributed across the soil surface in adequate amounts to limit accelerated erosion and contribute to soil deposition and development.
4. Relatively undisturbed biological soil crusts (i.e., soil consisting of cyanobacteria, lichens, mosses, microfungi, and algae) are present or reestablished where the potential exists.
5. Soil productivity is not inhibited by nonnative invasive plant species.
6. Soils are free from anthropogenic contaminants that could alter ecosystem integrity or affect public health.
7. Where present, volcanic substrate soils and Mancos Shale soils provide habitat for at-risk species commensurate with the capacity of the vegetation community.

Soil Resources Guidelines (FW-SL-G)

1 Ground-disturbing management activities should be designed to minimize short- and long-term 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.

2 Soil compaction from all management activities should not affect ecological and hydrological functions.

3 Masticated material should not exceed an average depth of 4 inches, to mitigate burn severity and protect soil function.

Related Plan Content for Soil Resources

All affected vegetation communities: Watersheds and Water; Sustainable Rangelands and Livestock Grazing; Sustainable Forestry and Forest Products; Recreation; Transportation and Forest Access; and Minerals and Mining.

Photo credit: Allan Lemley

Watersheds and Water (WSW)

Watersheds produce water that flows and collects as surface water or infiltrates into groundwater. Water from the Carson supports many uses throughout New Mexico, and further downstream (provisioning ecosystem services). Streams, springs, lakes, and other natural waters are centers of high biological diversity in arid landscapes, and their ecological health is important for forest ecosystem sustainability. Wildlife is more concentrated around open water sources than in the general landscape and obligate aquatic and semiaquatic species on the Carson are dependent on these limited and scattered resources. Collectively, surface waters contribute to connectivity for wildlife across the landscape; local and urban potable water supplies; agricultural uses (including livestock watering and irrigation); and recreation (provisioning and cultural ecosystem services). Water in arid northern New Mexico also has important traditional cultural significance (cultural ecosystem services) and is sacred to many as a centerpiece of their interconnected traditions, beliefs, ceremonies, and places. It will only become more vital in the future with additional pressures from predicted changes in climate patterns and continually increasing demands from growing urban populations.

The Carson is a vital source of groundwater recharge (regulating ecosystem service). It sits above three state-declared groundwater basins – the Canadian, Rio Grande, and San Juan. All groundwater in northern New Mexico originates as infiltrating precipitation. Surface water from each basin supplies both shallow and deep geologic aquifers. Two deep aquifer systems are connected with the Carson: the Rio Grande aquifer and the Colorado Plateau aquifer. Groundwater is used on NFS and surrounding lands for many purposes, including drinking, domestic use, waste disposal, livestock and wildlife watering, and to supply Forest Service facilities.

Lands within the Carson form the headwaters of numerous rivers and streams that flow into the Rio Grande, Rio Chama, San Juan River, and Canadian River (provisioning ecosystem services). 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. On the Carson, these effects primarily occur just at the edge of the forest, but these on-forest diversions have extensive effects in the irrigated floodplain valleys that are immediately adjacent to the forest. Water is dispersed across a wider area and maintains additional riparian systems and agriculture. Surface flow from unlined ditches and irrigated fields seeps into groundwater and contributes to aquifer recharge and delayed return flow to streams.

Acequias provide cultural and provisioning ecosystem services. They disperse streams across irrigated floodplain valleys to communal agricultural lands and riparian areas while recharging groundwater and delaying return flow to streams. They bring families and traditional communities together through the shared work of maintaining them and contribute to a way of life that spans generations.

Watershed condition is integral to all aspects of resource management and use. Good watershed management maintains the productive capacity of soils; protects water quality and quantity; sustains native species; provides State designated water uses; and reduces threat of flood damage to Forest Service infrastructure and downstream values (supporting, provisioning, and regulating ecosystem services). The Carson intersects 131 6th level hydrologic unit code watersheds. Approximately 20 percent are functioning properly, most are functioning at risk. While restoration can restore proper function of many watersheds, some of those at risk are likely to remain at risk, due to reduced extent and timing of winter precipitation, risk of stand replacing fire events in forested areas, and the effects of projected increased average temperatures. Focusing 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. Due to the many first order streams located on the Carson National Forest there are opportunities for important headwater wetland restoration that are rare in the arid Southwest.

Some riparian areas surrounding open water are not in properly functioning condition and many streams on the Carson are not in full attainment of water quality standards. According to the 2016–2018 State of New Mexico Clean Water Act Section 303(d)/30b(b) Integrated Report (NMED 2018), the most common cause of impairment is high water temperature, as a result of reduced shading or reduced stream flows. High turbidity nutrient and eutrophication biological indicators and *E. coli* are also common causes of impairment of streams on the Carson.

The primary risk to watersheds on the Carson is uncharacteristic wildland fire. Watersheds containing departed vegetation types are at higher risk of erosion, sedimentation, and nonnative species invasion following uncharacteristic wildland fire, as well as a downstream risk of sedimentation. Northern New Mexico has been affected by a drought for the past two decades, causing spring runoff to diminish overall and end earlier in the spring. Drought has multiple and interrelated effects on ecological and socioeconomic resources and the benefits they provide. The availability of clean and cold water will become increasingly threatened in the future with additional pressures from predicted changes in climate patterns and continually growing user demands.

Priority Watersheds

Priority watersheds have been identified using the Forest Service national watershed condition framework; these are areas where plan objectives for restoration focus on maintaining or improving watershed condition. These priorities may change over the life of the land management plan. The USDA Forest Service watershed condition and prioritization interactive map will always contain the current watershed condition framework priority watersheds and associated information. The plan components and management approaches for Watersheds and Water (including subsections) apply to all watersheds, including priority watersheds.

Outstanding National Resource Waters

Outstanding national resource waters are 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 State of New Mexico Water Quality Control Commission. The Surface Water Quality Bureau's website identifies the most current list of designated outstanding national resource waters in the State of New Mexico. On the Carson, outstanding national resource waters designations include the West, Middle, and East Forks of the Rio Santa Barbara (Camino Real Ranger District), all surface waters within Valle Vidal (Questa Ranger District), and all perennial streams, lakes, and wetlands within the Carson's six wildernesses.

Outstanding national resource waters receive the highest level of protection under the New Mexico's Water Quality Standards, which establish designated uses for water bodies, set criteria to protect those uses, and establish provisions to preserve water quality. Outstanding national resource waters are subject to the same water quality criteria as other waters with the same designated uses; however, outstanding national resource waters receive additional protection aimed at preserving water quality. Degradation of water quality is not allowed in outstanding national resource waters except under very limited

circumstances.[9] Where water quality meets or exceeds standards, that higher water quality must be protected. Nonpoint sources of pollution in these areas must be minimized and controlled using best management practices. Land use activities that predate outstanding national resource waters designation, including grazing, are allowed to continue, but are controlled using best management practices; stocking rates will be evaluated and adjusted to ensure proper range management and protection of water quality.

Watershed and Water Desired Conditions (FW-WSW-DC)

1 Watersheds are functioning properly[10] or trending toward proper functioning condition and resilient in that they exhibit high geomorphic, hydrologic, and biotic integrity relative to their potential condition.

2 Ecological components (e.g., soil, vegetation, and fauna) are resilient or adaptive to disturbances, including human activities, changes in climate patterns, and natural ecological disturbances (e.g., fire, drought, flooding, wind, grazing, insects, disease, and pathogens) and maintain or improve water quality and riparian and aquatic species habitat.

3 Soils, riparian areas, and watersheds sustain groundwater quantity and quality and recharge in aquifers. The water table is maintained at a level that sustains native riparian and aquatic vegetation, high productivity, and soil moisture characteristics.

4 Aquatic habitats are connected and free from alterations (e.g., temperature regime changes, lack of adequate streamflow, and constructed barriers to aquatic organism passage) to allow for species migration, connectivity of fragmented populations, and genetic exchange. A constructed barrier to movement exists only to protect native aquatic species from nonnative aquatic species or for agricultural benefit (e.g., headgates).

5 Aquatic and riparian habitats support self-sustaining populations of native fish, as well as other aquatic and riparian species. Ecosystems provide the quantity and quality of aquatic and riparian habitat commensurate with reference conditions.

6 Watersheds support multiple uses (e.g., timber, recreation, grazing, and traditional uses by tribal communities and acequia associations) with no long-term decline in ecological conditions. Short-term impacts occur only when they serve to improve conditions over the life of the plan.

7 Surface water and groundwater quality meet State water quality standards for designated uses.

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[9] Per current New Mexico State Regulations, approved piscicide application and acequia operation, maintenance, and repairs are not subject to outstanding national resource water requirements. Degradation resulting from characteristic wildfire in an outstanding national resource water is part of the essential character of an outstanding national resource water. Other management activities may result in temporary and short-term changes in water quality, when those activities have been allowed by the State and either result in restoration or maintenance of the chemical, physical, or biological integrity of the outstanding national resource water and have been allowed by the State or are necessary to mitigate an immediate threat to public health or safety. Any time the State allows temporary degradation, all practical means of minimizing such degradation must be implemented. Actions that mitigate an immediate threat to public health or safety must be communicated to the New Mexico Environment Department in writing within 7 days of initiation of the action and a summary of the action taken will be provided within 30 days of initiation of the action.

[10] According to the watershed condition framework or similar current protocol.

Watershed and Water Objectives (FW-WSW-O)

1 Improve or maintain watershed function on at least 5,000 to 10,000 acres annually to include installing 35 to 100 erosion control treatments to stabilize headcuts, road drainage impacts, and other erosional features. Treatments align with priority watersheds or other community priorities.

2 Improve the condition class of at least one identified priority watershed, as defined by the National Watershed Condition framework, every 10 years following plan approval.

Watershed and Water Guidelines (FW-WSW-G)

1 For all management activities, applicable best management practices[11] should be identified and implemented, to maintain water quality, water quantity, and timing of flows and to prevent or reduce accelerated erosion.

2 New or rerouted roads should not be located within 300 feet of water resource features (except where necessary for stream crossings or to provide for resource protection), to avoid the long-term adverse impacts associated with the occupancy and modification of floodplains and water resource features.

3 Meadow management should consider patterns of recharge and discharge and minimize disruptions to groundwater levels that are critical for wetland integrity.

4 New groundwater wells, particularly those in riparian management zones (e.g., along streams or around seeps, springs, lakes, and wetlands), should be located to minimize effects on the character and function of connected water resources.

Management Approaches for the Watersheds and Water

1. Consider completing watershed restoration action plans or similar process for priority watersheds.
2. Consider including quantitative analysis of pollutant sources and pollutant load reductions in watershed restoration action plans when feasible.
3. Consider rest-rotation management within allotments to improve wetland or riparian areas that are rated as functional-at-risk or non-functional. This system of management would avoid 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.
4. 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.
5. Consider working with States, federally recognized tribes, local governments, and other interested parties to identify priority watersheds for protection and management and for improvement.

[11] As defined by the National Core Technical Guide for best management practices, the Southwestern Region Soil and Water Conservation Handbook, or other best available scientific listings of soil and water best management practices.

Riparian Management Zones (WSW-RMZ)

Riparian management zones include those portions of watersheds around lakes, perennial and intermittent streams, and open water wetlands that have characteristic riparian vegetation or provide riparian function. The riparian ecosystem within that zone 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 include riparian obligate or facultative-obligate vegetation, not all do.

Southwestern riparian ecosystems are dynamic habitats that border streams, springs, ponds, lakes or occupy other wet areas, such as wetlands, cienegas, fens, and bogs. They occur within all terrestrial vegetation communities and are the interface between the terrestrial uplands and open water. They include water-dependent plants near the water's edge and often transition to a combination of upland and riparian species as distance from water increases, which adds significantly to their ecosystem diversity. Riparian vegetation may vary widely depending on amount, timing, and source of water, as well as biophysical characteristics (e.g., salinity and gradients in saturated soils). Riparian areas are more productive than other vegetation communities in terms of plant and animal biomass per acre. As a result, they provide some of the most important habitat on the Carson National Forest and in the Southwest (supporting ecosystem service).

Healthy riparian areas slow water movement that raises the water table and saturation zone and recharges aquifers (regulating ecosystem services). Riparian zones protect streams from excessive sedimentation, erosion, and pollution, and, thus, play a role in water quality (regulating and provisioning ecosystem services). They provide shelter and food for aquatic animals and shade that is important for water temperature regulation (supporting and provisioning ecosystem services). They dissipate stream energy, which can reduce flood damage (regulating ecosystem service). They provide wildlife habitat, increased biodiversity, and habitat connectivity, enabling aquatic and riparian organisms to move along river systems and thus preventing community isolation and fragmentation (supporting ecosystem service). They are a source of large woody debris recruitment. Soils in riparian ecosystems play a key role in nutrient and water storage and distribution (regulating and supporting ecosystem services). There is no specific information for the each of these aspects, so plan components were developed using the "proper functioning condition" concept. In this way, managers can achieve desired conditions for each riparian area according to its potential or capability, which supports higher ecological functions such as habitat.

Natural disturbances in stream ecosystems include animals (e.g., beavers), flooding, and changing climatic conditions (e.g., extended drought). The seasonality and quantity of water in floods are key factors in the germination and establishment of riparian vegetation. Fire is an infrequent disturbance and is dependent on the fire regime in adjacent vegetation communities. Historically on the Carson, as in most of the Southwest, riparian areas have been influenced by water withdrawal (from private water rights), roads and motor vehicle activity, recreation pressure, and animal grazing, all of which can impact riparian ecosystem function. As a result of some of these activities, there is also a higher influx of invasive species found with riparian areas.

Riparian Management Zone Desired Conditions (FW-WSW-RMZ-DC)

1 Riparian ecosystems are not fragmented or constrained, and are properly functioning,[12] commensurate with their type and capability, riparian ecosystems have vegetation, landform, large coarse woody debris, litter, and root masses to capture sediment, filter contaminants, dissipate stream energy and overland flow from uplands to protect and enrich soils and stabilize banks and shorelines.

2 Riparian vegetation, particularly native species, support a wide range of vertebrate and invertebrate animal species. There is adequate recruitment and reproduction to maintain diverse native plant species composition indicative of the soil moisture conditions for the site and desired conditions for the vegetation community.

3 Native obligate wetland species dominate herbaceous bank cover.

4 Riparian vegetation (density and structure) provides site-appropriate shade to regulate water temperature in streams.[13]

5 Riparian ecosystems exhibit connectivity between and within aquatic, riparian, and upland components that reflect their natural linkages and range of variability. Stream courses and other links provide habitat and movement that maintain and disperse populations of riparian-dependent species, including beaver. Riparian areas are connected vertically between surface and subsurface flows.

6 Floodplains and adjacent upland areas provide diverse habitat components (e.g., vegetation, debris, logs) necessary for migration, hibernation, and brumation (extended inactivity) specific to the needs of riparian-obligate species.

7 Compared to surrounding uplands, riparian corridors have characteristics (e.g., surface water and saturated soils) that reduce the frequency and severity of fire. Fire is limited or absent. Fire that occurs is typically smoldering and of low intensity. High to mixed severity fire occurs very infrequently.

8 Natural disturbances (e.g., flooding and scouring) promote a diverse vegetation structure necessary for the recruitment of riparian-dependent species. The ecological function of riparian areas is resilient to other disturbance, including animal and human use, drought, and changes in climate patterns.

9 Commensurate with the capability of individual riparian types and consistent with the hydrologic cycle, riparian vegetation provides life-cycle habitat needs for native and desirable nonnative, obligate riparian, and aquatic species and supports other wildlife.

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[12] Functioning properly as defined by the Bureau of Land Management's properly functioning condition protocol or a similar metric.

[13] Based on New Mexico State water temperature thresholds, riparian vegetation community desired conditions, and terrestrial ecosystem unit inventory.

Riparian Management Zone Objectives (FW-WSW-RMZ-O)

1 Restore structure and function of at least 200 to 300 acres of nonfunctioning and functioning-at-risk riparian areas annually. Treatments align with priority watersheds or other community priorities.

Riparian Management Zone Guidelines (FW-WSW-RMZ-G)

1 Riparian management zones should be defined by either a site-appropriate delineation of the riparian area or mapped wetlands and a minimum buffer of 100 feet from the edge of all perennial and intermittent streams, lakes, seeps, and springs and 15 feet from the edges of ephemeral channels.[14] The exact width of riparian management zones may vary based on ecological or geomorphic factors or waterbody type, but includes those areas that provide riparian and aquatic ecosystem functions and connectivity.

2 Within riparian management zones, management activities, permitted uses, and structural developments (e.g., livestock water gaps, pipelines, fences, or other infrastructure) should occur at levels or scales that move toward desired conditions for water, soils, and vegetation and align with the most current regional riparian strategy.[15] Management activities and facilities with a small footprint (e.g., intermittent livestock crossing locations, water gaps) may be necessary to manage larger scale impacts to riparian areas or to protect life, property, or cultural sites.

3 To protect riparian function, the use of motorized equipment should be avoided in riparian management zones, except when there is a designated stream crossing or when short-term uses are required to improve resource conditions and maintain infrastructure.

4 To protect water quality and aquatic species, refueling, maintaining equipment, and storing fuels or other toxicants should not occur in riparian management zones.

Related Plan Content for Riparian Management Zones

Streams, Wetland Riparian, and Forest and Shrub Riparian

[14] The waterbody itself is considered part of the riparian management zone.

[15] 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 2020a and USDA FS 2020b).

Streams (WSW-RMZ-STM)

Stream ecosystems have flowing water; they include rivers, creeks, streams, and their associated riparian vegetation zones and flood plains as well as microhabitats like riffles, pools, and backwaters. They provide unique habitats for plants, animals, and micro-organisms that are specialized to live in and around water. Stream ecosystems moderate flood events and collect and transport water, sediment, and organic material from upslope and upstream (supporting, regulating, and provisioning ecosystem services). Lush stream corridors and cool water attract campers, hikers, and anglers (cultural ecosystem services).

Stream ecosystems provide water, forage, shelter, and habitat for nesting, roosting, and bedding and are among the most important habitats for wildlife on the Carson. Species that require water for all or part of their life cycles (i.e., aquatic and semiaquatic species) are entirely dependent on limited and scattered water sources on the national forest. Twenty-seven percent (3 out of 11) of the native fish species on the Carson are considered species of conservation concern.

There are three types of streams on the Carson National Forest: ephemeral, intermittent, and perennial. They differ in the timing and duration of water flow and corresponding vegetation. Ephemeral streams flow for short duration in response to storm events. Intermittent streams flow seasonally, usually in response to snowmelt and may contain perennial pools. Perennial streams flow year-round, though some of their flows may be below the surface.

Streams Desired Conditions (FW-WSW-RMZ-STM-DC)

1 Stream ecosystems, riparian zones, and associated stream courses are functioning properly[16] and are resilient to human and natural disturbances (e.g., flooding) and changes in climate patterns. Fluctuations in flow promote movement of water, sediment, and woody debris that is within the natural range of variability. Flooding creates a mix of stream substrates for fish habitat, including clean gravels for fish spawning and sites for germination and establishment of riparian vegetation.

2 Stream ecosystems, including ephemeral watercourses, provide connectivity that is important to at-risk species—for dispersal, access to new habitats, perpetuation of genetic diversity, seasonal movement, as well as nesting and foraging.

3 Aquatic species are able to move throughout their historic habitat, including opportunities for seasonal and opportunistic movements. Barriers to movement only exist to protect native aquatic species from nonnative aquatic species or for agricultural benefit (e.g., headgates).

4 Streams and their adjacent floodplains are connected and capable of filtering, processing, and storing sediment; aiding floodplain development; facilitating floodwater retention; withstanding high flow events; and increasing groundwater recharge.

5 Water quality meets or surpasses State of New Mexico water quality standards for designated uses.

6 The quantity and timing of stream flows are sustained at levels that maintain or enhance essential ecological functions, including channel and floodplain morphology, groundwater recharge, water quality, and stream temperature regulation.

[16] Functioning properly as defined by the Bureau of Land Management's properly functioning condition protocol or a similar metric.

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

8 Woody and herbaceous overstory and understory regulate stream temperatures and maintain soil moisture in the riparian zone.

9 Habitat conditions, as described in stream desired conditions, are capable of supporting self-sustaining native aquatic species populations. These habitat conditions include stream characteristics (i.e., riffles, runs, pools, and channel meandering) that allow for natural processes to occur (e.g., floodplain connectivity and organic matter and sediment transport). Quality aquatic habitat is provided by overhanging banks, woody and herbaceous overstory, and instream large woody debris, which regulate stream temperatures; maintain soil moisture; create structural and compositional diversity; and provide cover, food, and water for riparian species along streams.

10 In forested streams, large woody debris consists of more than 30 pieces per mile; pieces are greater than 12 inches in diameter, and greater than 35 feet in length.

11 Ungulate trampling does not significantly increase soil bulk density between years, change the structure of the plant community, or impede geomorphological development of streambank-channel geometry.

Streams Objectives (FW-WSW-RMZ-STM-O)

1 Restore or enhance at least 100 to 150 miles of stream habitat, during each 10-year period following plan approval.

2 Repair at least two road/stream crossings every 5 years following plan approval at locations where chronic sedimentation causes are found. For example, up-size culverts, reduce sediment delivery to waterways from roads, or realign stream constraining road segments. Give precedence to road crossings that are causing unacceptable road damage.

Streams Standards (FW-WSW-RMZ-STM-S)

1 Management activities in and around streams must use decontamination procedures to prevent the spread of nonnative and invasive biota, including fungi and disease.

2 Heavy equipment and vehicles used for instream management activities must be free of petroleum-based fluid residue and must not leak.

Streams Guidelines (FW-WSW-RMZ-STM-G)

1. Management of streams should include adequate vegetation cover[17] and width-to-depth ratio to move toward State of New Mexico standards for stream water temperatures.
2. Downed woody material in stream channels should be retained, to improve channel morphology, except where safety is a concern.
3. Streambed should contain less than 20 percent fines (sand, silt, clay) in riffle habitat, to maintain fish spawning.
4. Streambanks should be less than 10 percent unstable (lineal streambank distance), to reduce erosion and sedimentation.
5. In-stream authorized and other management activities that have the potential to directly deliver sediment to at-risk species core habitats should be limited to times outside of spawning and incubation seasons for those species, to protect spawning fish, eggs, and embryos.

At-risk Species for Streams

- Northern leopard frog
- Rio Grande cutthroat trout
- Rio Grande chub
- Rio Grande sucker

Related Plan Content for Streams

Riparian Management Zones and Watersheds and Water

[17] Based on New Mexico State water temperature thresholds, and density and structure defined by riparian vegetation community desired conditions, and terrestrial ecosystem unit inventory.

Waterbodies (WSW-RMZ-WB)

Waterbodies include lakes, ponds, and reservoirs. They store water and support recreation and fisheries (regulating and cultural ecosystem services). They provide unique habitats for plants, animals, and micro-organisms that are specialized to live in and around water. Together with their associated riparian ecosystems, they are among the most important habitats for wildlife on the Carson, providing water, forage, shelter, and habitat for nesting, roosting, and bedding. Species that require water for all or part of their life cycle (i.e., aquatic and semiaquatic species) are entirely dependent on the limited and scattered water resources on the Carson. Many smaller waterbodies on the Carson are constructed or modified, which improves water availability for livestock and wildlife (provisioning ecosystem services), but impounds water that would otherwise supply perennial or intermittent streams.

Waterbodies Desired Conditions (FW-WSW-RMZ-WB-DC)

1 Lakes, natural ponds, and their associated wetlands have the necessary soil, water, and vegetation attributes (e.g., diverse age classes and diverse composition of native plant species) to be resilient to human and natural disturbances and changing climate conditions across the landscape.

2 Waterbodies support native biotic communities; there is adequate riparian vegetation and large woody debris to provide ecological conditions necessary for persistence. Commensurate with site capability, native vegetation around lakes and ponds exhibits various age classes and diverse composition of native species (e.g., grasses, forbs, sedges, shrubs, and deciduous trees) and includes species that indicate maintenance of riparian soil moisture characteristics (e.g., sedges, rushes, willows, and other riparian vegetation). Vegetation associations are variable, depending on waterbody size, location, and type and may include aquatic plants or algae, submergent and floating vegetation, emergent vegetation, grasses, forbs, sedges, shrubs, and deciduous trees.

3 The physical and biological components of lakes and ponds provide habitat for a diverse community of riparian and aquatic species, including cover, forage, available water, microclimate, and nesting or breeding habitat.

4 Hydrophytes and emergent vegetation exist in patterns of natural abundance in waterbodies and associated wetlands, at levels that reflect climatic conditions. Overhanging vegetation and floating plants (e.g., water lilies), are present where they naturally occur.

5 Water quality and quantity of waterbodies meet the needs of designated uses (e.g., livestock watering, coldwater aquatic life, irrigation, wildlife habitat), consistent with water rights and site capability.

6 Ungulate trampling does not significantly increase soil bulk density between years or change the structure of the plant community around lakes and natural ponds.

Waterbodies Standards (FW-WSW-RMZ-WB-S)

1 Management activities in and around waterbodies must use decontamination procedures to prevent the spread of nonnative and invasive biota, including fungi and disease.

2 Heavy equipment and vehicles used for management activities in and around waterbodies must be free of petroleum-based fluid residue and must not leak.

At-risk Species for Waterbodies

- Northern leopard frog
- Western boreal toad (Tres Piedras and Canjilon Ranger Districts)
- Rio Grande cutthroat trout
- Rio Grande chub
- Rio Grande sucker

Related Plan Content for Waterbodies

Riparian Management Zones; and Watersheds and Water

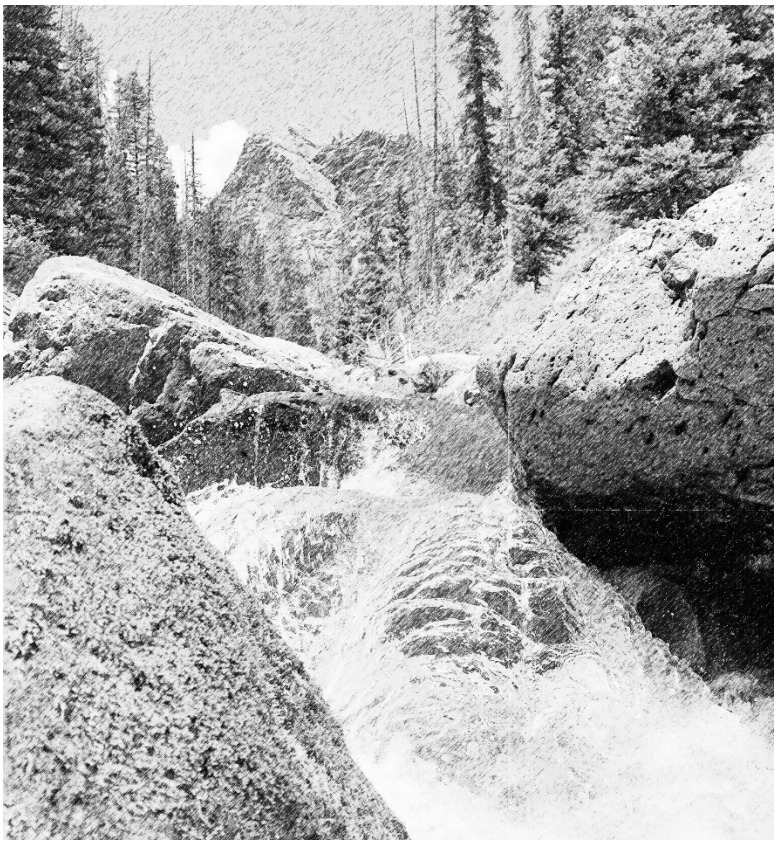

Photo credit: Peter Rich

Springs and Seeps (WSW-RMZ-SNS)

Seeps and springs occur where groundwater emerges on sloping terrain, toe-slope breaks, and geologic formation transition zones. They may contribute to streamflow or infiltrate through the immediate geology back to the groundwater (regulating ecosystem services). Seeps are a type of spring with low flow that filters to the surface through permeable soils and substrates. Springs support highly productive habitats in what may otherwise be low productivity arid landscapes. Springs and their associated wetlands are frequently more biologically diverse and ecologically stable than surrounding upland ecosystems in arid regions and they may offer biological refugia for some species, particularly those that are narrowly endemic (supporting ecosystem services).

There are multiple types of springs on the Carson that vary based on landform and geology. Examples include seeps and hanging gardens. Springs often have important traditional, cultural significance to humans inhabiting arid landscapes and provide many cultural and recreational opportunities (cultural ecosystem services). Contemporary uses consist of contributions to potable community water supplies and agricultural uses, such as livestock watering (provisioning ecosystem services). These uses are vital to domestic and commercial interests in and around the Carson (provisioning ecosystem services). Springs are also important to federally recognized tribes and pueblos that have traditionally used lands within the Carson (cultural ecosystem services).

Springs and Seeps Desired Conditions (FW-WSW-RMZ-SNS-DC)

1 Seeps and springs and their associated streams and wetlands are functioning properly[18] and have the necessary soil, water, and vegetation attributes and are resilient to human and natural disturbances (e.g., flooding) and changes in climate patterns. Water flow patterns, recharge rates, and geochemistry are similar to historic levels and persist over time.

2 Commensurate with site capability, native vegetation around seeps and springs exhibits diverse age classes and diverse composition of native species and includes species that indicate maintenance of riparian soil moisture characteristics (e.g., sedges, rushes, willows, and other riparian vegetation). Vegetation associations are variable depending on seep or spring type and may include aquatic plants or algae, submergent and floating vegetation, emergent vegetation, grasses, forbs, sedges, shrubs, and deciduous trees.

3 The physical and biological components of seeps and springs provide habitat for a diverse community of riparian and aquatic species, including cover, forage, available water, microclimate, and nesting or breeding habitat.

4 Hydrophytes and emergent vegetation exist in patterns of natural abundance in springs and associated wetlands at levels that reflect climatic conditions. Overhanging vegetation and floating plants (e.g., water lilies) are present where they naturally occur.

5 Seeps and springs provide sufficient water to maintain essential ecological functions.

[18] Functioning properly as defined by the Bureau of Land Management's properly functioning condition protocol or similar metric.

6 Seep and spring ecosystems are not fragmented by infrastructure or development, consistent with valid existing water rights. Springs are only developed or altered by human-made structures (e.g., head boxes, cisterns, and pipelines) consistent with valid water rights.

7 Water quality meets or surpasses State of New Mexico water quality standards for designated uses.

8 To maintain the persistence of at-risk species, microhabitat conditions supporting bog violet (soggy soils under shrubs and willows) are present, commensurate with site potential.

9 Nectar sources (e.g., thistle, horsemint, and Joe-pye weed) are available for at-risk species.

Springs and Seeps Objective (FW-WSW-RMZ-SNS-O)

1 Improve or maintain function of at least 10 to 20 individual springs, during each 10-year period following plan approval.

Springs and Seeps Standard (FW-WSW-RMZ-SNS-S)

1 Management activities in and around seeps and springs must use decontamination procedures to prevent the spread of nonnative and invasive biota, including fungi and disease.

Springs and Seeps Guideline (FW-WSW-RMZ-SNS-G)

1 Spring recharge areas, where known, should be managed to maintain or improve spring discharge.

At-risk Species for Springs and Seeps

- Nokomis fritillary butterfly

Management Approaches for Springs and Seeps

1. Consider using the Springs Stewardship Institute protocol to assess spring condition and submit assessments to online database.

Related Plan Content for Springs and Seeps

Riparian Management Zones and Watersheds and Water

Wetland Riparian (WSW-RMZ-WR)

Wetland riparian vegetation communities include open water wetlands, slope wetlands, marshes, wet meadows, cienegas, bogs, and fens. The wetland riparian vegetation community is extensive and inclusive, occurring at nearly all elevations on the Carson. 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.[19] 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) for growth and reproduction. Wetland riparian vegetation communities on the Carson may be connected to groundwater or completely reliant on precipitation as their water source. Wetlands may be permanent, seasonal, temporary, or ephemeral. Wetland riparian vegetation communities provides water storage, wildlife habitat, recreation, fisheries, and livestock watering (regulating, provisioning, and cultural ecosystem services). Drought and flooding are the primary natural disturbances and standing water and vegetation can fluctuate widely from basically nonexistent during dry periods to highly productive during wet periods. Increasing upland tree cover that reduces vegetation cover on upland soils contributes to wetland erosion and sedimentation. Fire is an infrequent disturbance, but many enter from adjacent vegetation types during dry periods.

Wetland types differ in water permanency, vegetation, and size. Wetlands and marshes 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 and wet meadows often occur in a mosaic with grassland vegetation communities. Wetlands and marshes 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 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 since biomass production exceeds decomposition.

Wetland riparian provides important habitat for wetland and riparian obligate species, such as Arizona willow, masked shrew, and water shrew. Wetlands and cienegas have historic and contemporary significance to federally recognized tribes, pueblos, 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).

[19] The wetland riparian vegetation community includes the herbaceous riparian ecological response unit in addition to other areas. Wetland riparian does not correspond to any single terrestrial ecosystem unit, but is a minor inclusion in many. Wetland riparian species composition cannot be separated from that of the majority of the terrestrial ecosystem unit.

Wetland Riparian Desired Conditions (FW-WSW-RMZ-WR-DC)

1 Necessary soil, hydrologic regime, vegetation, and water characteristics of wetland riparian vegetation communities sustain the system's ability to support unique physical and biological attributes and the diversity of associated species (e.g., shrews and voles). Soils' ability to infiltrate water, recycle nutrients, and resist erosion is maintained and allows for burrowing by at-risk species.

2 Upland vegetation is not encroaching, and the extent of wetlands is widening or has achieved its maximum potential and is within the natural range of variability. Development of fens continues.

3 Wetlands have groundcover and species composition (richness and diversity) indicative of site potential with vegetation comprised mostly of sedges, rushes, perennial grasses, and forbs. Meadows with the potential for hardwood shrubs contain a diversity of age classes (at least 2) along the banks of perennial streams.

4 To maintain the persistence of at-risk species, microhabitat conditions supporting bog violet (soggy soils under shrubs and willows) are present, commensurate with site potential.

5 Nectar sources (e.g., thistle, horsemint, and Joe-pye weed) are available for at-risk species.

Wetland Riparian Standards (FW-WSW-RMZ-WR-S)

1 Do not stage heavy equipment or log decks in wetland areas.

2 Management activities, permitted uses, and structural developments (e.g., livestock water gaps, pipelines, or other infrastructure) will occur in wetland areas only when necessary to move toward water, soils, and vegetation desired conditions or to protect life and property.

3 Avoid using motorized equipment in wetland areas, except when there is a designated crossing or when short-term uses are required to improve resource conditions and maintain existing infrastructure.

4 Construct no new permanent roads or motorized trails in wetland areas.

At-risk Species for Wetland Riparian

- New Mexico meadow jumping mouse
- Northern leopard frog
- Western boreal toad (Tres Piedras and Canjilon Ranger Districts)
- American peregrine falcon
- Nokomis fritillary butterfly
- Masked shrew
- Spotted bat
- Water shrew

- Arizona Willow (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Robust larkspur

Related Plan Content for Wetland Riparian

Riparian Management Zones and Watersheds and Water

Photo credit: Kathy DeLucas

Forest and Shrub Riparian (WSW-RMZ-FSR)

Forest and shrub riparian vegetation communities occur most frequently in wet drainages that range from narrow, steep, and confined to low-gradient streams with wider floodplains that provide 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 many enter from adjacent vegetation types during dry periods and effects are generally less severe than in the surrounding uplands.

Forest and shrub riparian vegetation communities includes multiple ecological response units that may be arranged into three broad groups; the cottonwood group, the montane-conifer willow group, and the cottonwood evergreen group. On the Carson National Forest, the cottonwood group includes the narrowleaf cottonwood/shrub and Rio Grande cottonwood/shrub ecological response units. The montane-conifer willow group includes the upper montane conifer/willow, willow-thinleaf alder, and ponderosa pine/willow ecological response units. The narrowleaf cottonwood-spruce ecological response unit is the only one in the cottonwood evergreen group.[20]

Forest and shrub riparian 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 federally recognized 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).

Forest and Shrub Riparian Desired Conditions (FW-WSW-RMZ-FSR-DC)

1 Desired seral stage proportions for forest and shrub riparian–cottonwood group at landscape scale:

Class	Description	Proportion (%)
Early-Open	Herbaceous, open shrub cover, or seedling/sapling trees ≥ 16 feet tall (all cover classes)	25
Mid-Open	Shrub cover ≥ 25%, or small, medium, or large trees, open canopy, ≥ 16 feet tall	50
Late-Closed	Small, medium, or large trees, closed canopy, ≥ 16 feet tall	25
Novel	Upland dominance types and exotic vegetation	0

[20] Riparian ecological response units (and thus the forest and shrub riparian vegetation community) do not correspond directly to terrestrial ecosystem units. The Assessment identified a central terrestrial ecosystem unit for five of the forest and shrub riparian ecological response units. The central terrestrial ecosystem unit is the most common ecological response unit and has similar species composition: Willow-Thinleaf Alder = terrestrial ecosystem unit map unit number 76; Upper Montane Conifer/Willow = terrestrial ecosystem unit map unit number 94; Narrowleaf Cottonwood-Spruce = terrestrial ecosystem unit map unit number 90; Rio Grande Cottonwood/Shrub = terrestrial ecosystem unit map unit number 33; Narrowleaf Cottonwood/Shrub = terrestrial ecosystem unit map unit number 84.

2 Desired seral stage proportions for forest and shrub riparian–montane-conifer willow group at landscape scale:

Class	Description	Proportion (%)
Early	Herbaceous, open shrub cover, or seedling/sapling trees ≥ 16 feet tall (all cover classes)	65
Mid-Late	Shrub cover ≥ 25%, or small, medium, or large trees, all cover classes, ≥ 16 feet tall	35
Novel	Upland dominance types and exotic vegetation	0

3 Desired seral stage proportions for forest and shrub riparian–cottonwood evergreen group at landscape scale:

Class	Description	Proportion (%)
Early	Herbaceous, open shrub cover, or seedling/sapling trees ≥16 feet tall (all cover classes)	25
Mid	Small trees, 16-40 feet tall, all cover classes	55
Late	Medium and large trees, ≥ 40 feet tall, all cover classes	20
Novel	Upland dominance types and exotic vegetation	0

4 Riparian forest vegetation provides nesting and foraging habitat for neotropical migrant birds, raptors, and cavity-dependent wildlife.

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

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

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

8 Bebb, coyote, red and Arizona willows are reproducing with a range of age classes present where the potential for these species exists.

9 To maintain the persistence of at-risk species, microhabitat conditions supporting bog violet (soggy soils under shrubs and willows) are present, commensurate with site potential.

10 Nectar sources (e.g., thistle, horsemint, and Joe-pye weed) are available for at-risk species.

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

12 Dense willow conditions (70 percent cover or greater) are retained for at-risk species habitat.

13 Beaver are present and play a role in wetland development and riparian dynamics.

Forest and Shrub Riparian Guidelines (FW-WSW-RMZ-FSR-G)

1 Connectivity within forest and shrub riparian vegetation communities 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.

2 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 down-cutting and accelerated erosion.

3 Large mature cottonwood trees should be protected from management activities that could degrade the quality of suitable habitat for at-risk species. Projects occurring in these areas should incorporate restoration prescriptions, to ensure persistence of this habitat type.

At-risk Species for Forest and Shrub Riparian

- Western yellow-billed cuckoo
- Southwestern willow flycatcher
- New Mexico meadow jumping mouse
- Wilson's warbler
- Nokomis fritillary butterfly
- Masked shrew
- Water shrew
- Arizona willow (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Robust larkspur

Management Approaches for Forest and Shrub Riparian

1. Consider reintroducing beaver, where habitat exists and where they historically occurred, but cannot repopulate naturally.

Related Plan Content for Forest and Shrub Riparian

Riparian Management Zones and Watersheds and Water

Caves and Abandoned Mines (CAM)

Caves are natural biophysical features that include any naturally occurring void, cavity, recess, or system of interconnected passages beneath the surface of the Earth or within a cliff or ledge that is large enough to permit a person to enter, whether the entrance is excavated or naturally formed. This definition includes any fissure (large crack), lava tube, natural pit, sinkhole, karst feature or other opening that is an extension of a cave entrance or an integral part of the cave.

Caves may possess significant features, characteristics, values, or opportunities. Many caves also have traditional cultural significance to federally recognized tribes and pueblos (cultural ecosystem services). Currently, no caves on the Carson are identified with significant biological, geological, cultural, or recreational value.

Abandoned mines are the remains of former mining operations. The Forest Service's Abandoned Mine Lands program identifies mine features posing a danger to the public, which are prioritized and identified for closure or remediation. The classification as abandoned applies when there are no entities or individuals left operating the mining activity or who have financial ties to the mine. The significance of this classification is that for most abandoned sites, there is no money from the original operators available to clean up the sites. Although occasionally a responsible party can be found to contribute funds toward cleanup, the major burden falls on the Forest Service to finance cleanup and remediation. Cultural ecosystem services provided by abandoned mines include history education and recreational mine exploring, when safe and appropriate.

Caves and abandoned mines provide specialized seasonal and year-round habitats for a variety of wildlife species, including bats, cliff-nesting birds, snails, reptiles, and amphibians (supporting ecosystem services). Animal species associated with these features include many species of bats and small and large mammals as opportunistic users. Bats use caves and abandoned mines as specialized niches for roosting and overwintering. Cave ecosystems rely almost entirely on the surface for nutrients. Bats deposit considerable amounts of surface nutrients into caves via guano, which can support an entire ecosystem. Eighteen bat species are known to regularly use caves or abandoned mines in the American Southwest; New Mexico is home to all these species.

Cave and Abandoned Mine Desired Conditions (FW-CAM-DC)

1. Cave and abandoned mine features provide microclimate (temperature and humidity) and geological features for associated species (e.g., bats and snakes) that require specialized niches for roosting and overwintering.
2. Caves and abandoned mines provide undisturbed habitat for native bat species, particularly in locations known to be used for maternity or hibernation roosts.
3. Archaeological, geological, and biological features of caves and abandoned mines are not disturbed by visitors.
4. Features, characteristics, values, or opportunities for which caves have been designated or nominated as "significant" are maintained.

Cave and Abandoned Mine Guidelines (FW-CAM-G)

1 Caves or abandoned mines that are to be closed should use the most currently recommended closure devices, to allow for the continued use of any species determined to be present in the cave or abandoned mine.

2 The most current Forest Service guidance or most recent decontamination procedures should be used in caves and abandoned mines to avoid spread of white-nose syndrome (*Pseudogymnoascus destructans* fungus).

3 Management activities (e.g., prescribed fire, thinning) within 100 feet of a cave or abandoned mine openings should not affect microclimate conditions by altering vegetation, hydrology, and sedimentation, except where necessary to protect associated natural resources or to protect health and safety.

At-risk Species for Caves and Abandoned Mines

- Pale Townsend's big-eared bat

Management Approaches for Caves and Abandoned Mines

1. Currently, neither the cause nor the transmission of white-nose syndrome is well understood; however, it is known that a cave or abandoned mine environment containing this fungus is infectious to certain species of hibernating bats. Consider the development of a response plan for white-nose syndrome through continued collaboration with the U.S. Fish and Wildlife Service (USFWS), Bat Conservation International, NM Department of Game and Fish, the National Speleological Society, and others with interests in conservation management for bat species.
2. Consider working with public affairs, recreation, invasive species, minerals staffs; State and other Federal agency partners; and the public to internally and externally increase white-nose syndrome awareness at local and regional levels.

Related Plan Content for Caves and Abandoned Mines

Vegetation; Nonnative Invasive Plants; Recreation

Cliffs and Rocky Features (CRF)

Cliffs and rocky features, which are common in the mountainous West, can be found across a wide elevation range spanning cool alpine landscapes to desert environments. Cliffs, rock outcrops, and talus slopes are unique habitats that increase topographic and biological diversity. On the Carson, these features provide important habitat for Rocky Mountain bighorn sheep, golden eagles, peregrine falcons, marmots, and pika. They also support numerous other wildlife and plant species, including rare and narrow endemics, such as small-headed goldenweed. Cultural and provisioning ecosystem services are also associated with these features and include rock art, rock hounding, mineral exploitation, as well as recreational activities such as rock climbing, technical mountain biking, and hiking to scenic viewpoints.

Cliff and Rocky Feature Desired Conditions (FW-CRF-DC)

1 Geological and biological features (e.g., talus slopes and rocky outcrops) of cliffs and rocky features provide wildlife and plant habitat, as well as scenic diversity.

2 Cliff ledges provide cover and nesting habitat for wildlife (e.g., raptors, snakes, bats, birds, bighorn sheep, and small mammals).

3 Rocks and rocky areas promote seedling germination and habitat conditions for wildlife and plant species.

Cliff and Rocky Feature Guidelines (FW-CRF-G)

1 Management activities affecting rockslides and talus slopes should maintain habitat and unique components (e.g., denning spaces and substrate) for wildlife (e.g., bighorn sheep, small mammals, lizards, snakes, rare plants, and land snails), to maintain the persistence or contribute to the recovery of at-risk species, unless they are to maintain designated road or trail access or protect public safety.

2 Rock climbing and related recreation activities should not disrupt the life processes of cliff or rocky feature at-risk species (e.g., American peregrine falcon, spotted bat, and small-headed goldenweed), diminish the function of specialized vegetation (e.g., mosses, lichens, and small headed goldenweed), to maintain the persistence or contribute to the recovery of at-risk species.

3 If demonstrated impacts to at-risk species, scenic integrity, cultural resources, or user-conflict concerns have been identified and communicated to the public then permanent fixed anchors for rock climbing should be allowed only by prior written authorization.

4 Where recreation or other management activities have the potential to trample known populations of at-risk plant species, signs should be posted educating the public to stay on designated trails, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Cliffs and Rocky Features

- Mexican spotted owl
- American peregrine falcon
- Pale Townsend's big-eared bat
- Spotted bat
- Chaco milkvetch (Canjilon Ranger District)
- Chama blazing star (Canjilon and El Rito Ranger Districts)
- Small-headed goldenweed (Tres Piedras and El Rito Ranger Districts)
- Tufted sand verbena (Canjilon Ranger District)

Management Approaches for Cliffs and Rocky Features

1. Consider additional survey efforts, targeted monitoring, research on life history and habitat needs, and current condition to fill information gaps on the rare and narrow endemic species that use cliffs and rocky features.
2. Consider working with public affairs, recreation, invasive species, and minerals staffs; State and other Federal agency partners; and the public to internally and externally increase the awareness and valuation of these features, especially for threatened, endangered, and species of conservation concern (e.g., small-headed goldenweed and peregrine falcon).
3. Consider partnering with volunteers, rock climbing organizations, other government agencies, cooperators, and permit holders to form a rock climbing advisory board to help co-manage sustainable rock climbing opportunities, including planning, design, implementation, operations, and maintenance of rock climbing areas and to review maintenance and replacement of fixed anchors.

Related Plan Content for Cliffs and Rocky Features

All affected vegetation communities; Wildlife, Fish, and Plants; Recreation

Wildlife, Fish, and Plants (WFP)

Species are dependent on the health of their habitats. Species viability is addressed in the plan by providing guidance to maintain or enhance habitat elements that are important for species, in addition to addressing species-specific threats. Collectively, guidance to address species viability is found in this and other sections of this plan that relate to their habitats (e.g., Vegetation and Watersheds and Water).

The Carson's diverse ecosystems create a biologically rich landscape that supports a diversity of wildlife, fish, and plant populations. The Carson is home to over 2,000 species of vertebrates, invertebrates, plants, bryophytes (mosses, hornworts, and liverworts), lichens, and fungi, some of which are at-risk species. 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 species native to, and known to occur in, the plan area, and for which there is substantial concern about the species' ability to persist in the plan area. The Carson currently has six species that are federally listed (USDI FWS 2019) under the Endangered Species Act of 1973 (Public Law 93-205). Two of those species have critical habitat designated on the Carson. Twenty-six species of conservation concern are found on the Carson.

Distinct topographical and geological conditions, particularly between the east and west sides of the Rio Grande Gorge, provide for variation in wildlife distribution and habitat use. The spatially dissimilar nature of the east (Questa and Camino Real Ranger Districts), west (Tres Piedras, El Rito, and Canjilon Ranger Districts), and the far west (Jicarilla Ranger District) influences movement patterns of wide-ranging mammal herds, such as elk, mule deer, and pronghorn.

Streams, springs, groundwater, and constructed waters are centers of high biological diversity in arid landscapes, and the ecological health of these resources is important for forest ecosystem sustainability. Stream ecosystems provide water, forage, shelter, and habitat for nesting, roosting, and bedding and are among the most important habitats for wildlife on the Carson. Species that require water for all or part of their life cycles (i.e., aquatic and semiaquatic species) are entirely dependent on limited and scattered water sources on the Carson. Collectively, these resources contribute to connecting habitat for wildlife across the landscape.

The needs of individual or groups of wildlife species include food, water, and shelter. Adequate habitat connectivity is also crucial to daily and seasonal movements, finding mates, being able to use available habitat across the landscape, and the ability to find new suitable habitats when landscape conditions change. Healthy, diverse vegetation and functioning ecosystem processes help to ensure a diversity of habitats and wildlife, while reducing risks to the sustainability of those habitats and species. In addition, unique habitats (e.g., rocky areas, unroaded areas) are necessary to sustain other species.

The Carson is primarily responsible for providing habitat to maintain species diversity on NFS lands. The Forest Service has ultimate responsibility over NFS lands, but the New Mexico Department of Game and Fish 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 federally endangered and threatened species, as well as migratory birds, while the New Mexico Department of Game and Fish is responsible for managing all other protected vertebrates, mollusks, and crustaceans as found in the 2019 State Wildlife Action Plan. 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 federally endangered and threatened species on the Carson, 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 on the Carson also provide ecosystem services by contributing to social vitality and quality of life and promoting recreational and educational opportunities (cultural ecosystem service). The opportunity to hunt, fish, or just commune with nature is a very important tradition for many northern New Mexico families and communities, as well as for in-state and out-of-state tourism and recreation (cultural and provisioning ecosystem services). Generations of families have participated in these activities and they have become part of the social fabric in developing and growing family relationships (cultural ecosystem services). Many federally recognized tribes also rely on wildlife, fish, and plant resources within the Carson for cultural and traditional uses (cultural and provisioning ecosystem services).

Hunting and fishing opportunities are important to many local residents and visitors. The Carson plays a valuable role for game and fish management in northern New Mexico. Seven of New Mexico's 11 big game species occur on the Carson. Five of the 10 small game species have abundant habitat on the Carson and there are also opportunities to hunt waterfowl, predators, and furbearers (cultural and provisioning ecosystem services). Fishing opportunities on the Carson are abundant (cultural and provisioning ecosystem services). The New Mexico Department of Game and Fish manages about seven coldwater sport fish species in New Mexico and the Carson provides angling opportunities for four of them in stream and lake habitats. Of these four, the subspecies Rio Grande cutthroat trout is the only native. The Carson provides a unique opportunity to fish for native Rio Grande cutthroat trout in 136 miles of stream.

Wildlife, Fish, and Plant Desired Conditions (FW-WFP-DC)

1 Sustainable populations of terrestrial and aquatic plant and animal species, including at-risk species, are supported by healthy ecosystems, as described by vegetation and watersheds and water desired conditions.

2 Ecological conditions (vegetation and watersheds and water desired conditions) affecting habitat quality, distribution, and abundance contribute to self-sustaining populations of terrestrial and aquatic plant and animal species, including at-risk species, that are healthy, well distributed, genetically diverse, and connected (on NFS lands and to adjacent public and privately conserved lands), enabling species to adapt to changing environmental and climatic conditions. Conditions as described in vegetation and watersheds and water desired conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the ecosystem.

3 Ecological conditions (vegetation and watersheds and water desired conditions) provide habitat that contribute to the survival, recovery, and delisting of species under the Endangered Species Act; preclude the need for listing new species; improve conditions for species of conservation concern; and sustain both common and uncommon native species.

4 Habitat conditions (vegetation and watersheds and water desired conditions) provide the resiliency and redundancy necessary to maintain species diversity and metapopulations.

5 Habitat connectivity and distribution provide for genetic exchange, daily and seasonal movements of animals, and predator-prey interactions across multiple spatial scales, consistent with existing landforms and topography.

6 Habitat configuration and availability and species genetic diversity allow long-distance range shifts of plant and wildlife populations, in response to changing environmental and climatic conditions. Barriers to movement may exist to protect native species and prevent movement of nonnative species (e.g., a fish structure to protect Rio Grande cutthroat trout from nonnative invasion).

7 To the extent possible, wildlife and fish are free from harassment and human disturbance at a scale that impacts vital functions (e.g., seasonal and daily movements, breeding, feeding, and rearing young) and could affect persistence of the species.

8 To provide foraging habitat for native pollinator species, plant communities are a mix of native grass, wildflowers, forb, shrub, and tree species, with diverse structure (including snags and large down woody material) and multiple seral stages and pattern as described in vegetation and watersheds and water desired conditions.

9 Habitats in the forest allow for the maintenance and promotion of interspecific relationships (e.g., predator-prey relationships and keystone species relationships).

10 All aquatic and riparian habitats are hydrologically functioning and have sufficient emergent vegetation (as described in watersheds and water desired conditions or by site potential), as well as macroinvertebrate populations that support resident and migratory species.

11 Risk of disease transmission from permitted domestic sheep or goats to bighorn sheep is low.[21]

Wildlife, Fish, and Plant Objectives (FW-WFP-O)

1 Restore or enhance at least 50,000 to 150,000 acres of terrestrial wildlife habitat, during each 10-year period following plan approval. This may be done in conjunction with objectives for treatment in the vegetation section.

2 Reconstruct or maintain 20 to 30 existing water developments for wildlife, during each 10-year period following plan approval. Improve seep and spring function, when needed and consistent with the purpose of the development.

3 Reduce nonnative fish within native fish populations in 4 to 6 stream reaches during each 10-year period following plan approval.

4 Improve wildlife or aquatic habitat connectivity by removing unneeded structures (e.g., fences, roads, cattleguards, culverts, and spring developments) or completing improvement projects (e.g., remove barriers, restore dewatered stream segments, connect fragmented habitat, wildlife passage friendly fences, etc.) in at least 10 to 20 locations during each 10-year period following plan approval.

5 Complete at least 30 to 40 products or activities that educate the public (particularly youth) about wildlife, fish, and plant resources during each 10-year period following plan approval. Examples include educational signs and brochures, website pages, species checklists, presentations, and field trips.

[21] Based on risk of contact models or best available science.

Wildlife, Fish, and Plant Guidelines (FW-WFP-G)

1 Management activities and special uses occurring within federally listed species habitat should integrate habitat management objectives and species protection measures from the most recent approved USFWS recovery plan, to maintain the persistence or contribute to the recovery of federally listed species.

2 Where the Forest Service has entered into a signed conservation agreement that provides guidance on activities or actions to be carried out by the Carson, those activities or actions should be undertaken consistent with the guidance found within the conservation agreement, to maintain the persistence or contribute to the recovery of at-risk species.

3 Management activities should avoid disturbance at known active raptor nests and fledging areas, to maintain the persistence or contribute to the recovery of at-risk species. Timing restrictions, adaptive percent utilizations, distance buffers, or other means of avoiding disturbance should be based on the best available information, as well as on site-specific factors (e.g., topography and available habitat).[22]

4 Management activities should avoid disturbance to big game species during birthing season and on winter range during the winter period, to maintain the persistence of big game species. Management activities should concentrate activities in time and space to reduce impacts to big game species. Timing restrictions, adaptive percent utilizations, distance buffers, or other means of avoiding disturbance should be based on the best available information, as well as site-specific factors (e.g., topography, available habitat, etc.).

5 Vegetation treatments that require seeding should use a mix of weed-free native plant species, to increase plant cover and improve quality and diversity of forage for both wildlife and livestock.

6 To conserve wildlife and fish habitat connectivity, constructed features (e.g., exclosures, wildlife drinkers, range improvements, fences, and culverts) should be maintained to support the purpose(s) for which they were built. Constructed features should be removed when no longer needed, to restore natural hydrologic function and maintain habitat connectivity.

7 Where known bat use and concentrations of bats occur (e.g., maternity colonies, hibernacula, or seasonal roosts), measures to maintain habitat and reduce disturbance by human activities through use of seasonal or permanent access restrictions should be taken. These habitats generally include abandoned mines, caves, bridges, rock crevasses, old buildings, or tree snags.

8 New infrastructure (e.g., fences, roads, facilities, drinkers) should be designed, to improve habitat connectivity.

[22] Birds known to have established nests near preexisting human activities are assumed to be tolerant of the level of activity present when the nest was established.

Wildlife, Fish, and Plant At-risk Species

- Alpine larkspur (Questa and Camino Real Ranger Districts)
- American peregrine falcon
- Arizona willow (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Black-footed ferret
- Canada lynx
- Chaco milkvetch (Canjilon Ranger District)
- Chama blazing star (Canjilon and El Rito Ranger Districts)
- Gunnison's prairie dog
- Masked shrew
- Mexican spotted owl
- New Mexico meadow jumping mouse
- Nokomis fritillary butterfly
- Northern goshawk
- Northern leopard frog
- Pagosa milkvetch (Jicarilla Ranger District)
- Pale Townsend's big-eared bat
- Pinyon jay
- Rio Grande chub
- Rio Grande cutthroat trout
- Rio Grande sucker
- Ripley's milkvetch (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Robust larkspur
- Small-headed goldenweed (Tres Piedras and El Rito Ranger Districts)
- Southwestern willow flycatcher
- Spotted bat
- Tufted sand verbena (Canjilon Ranger District)
- Water shrew
- Western boreal toad (Tres Piedras and Canjilon Ranger Districts)
- Western burrowing owl
- Western yellow-billed cuckoo
- White-tailed ptarmigan (Questa and Camino Real Ranger Districts)
- Wilson's warbler

Management Approaches for Wildlife, Fish, and Plants

1. Coordinate with the New Mexico Department of Game and Fish, USFWS, adjacent landowners, adjacent Federal and State land managers, and federally recognized tribes regarding listed and native species; reintroductions, introductions, or transplants and habitat improvements of listed or native species; control or eradication of nonnative species; control and management of diseases; and the management of sport and native fishes and animals, including the identification of refugia for native fish and animals.
2. Work collaboratively with the USFWS, New Mexico Department of Game and Fish, and other partners to develop conservation measures (e.g., public education to reduce human impacts) to prevent listing and to aid to in the recovery and delisting of federally listed species.
3. Consider working collaboratively with federally recognized tribes and pueblos, New Mexico Department of Game and Fish, State agencies, adjacent Federal land managers, local agencies, USFWS, sportsman's and conservation groups, adjacent landowners, to identify wildlife migration routes forestwide and important habitat to improve or maintain connectivity for terrestrial and aquatic species.
4. Consider identifying linkages and barriers to wildlife movements and mitigating impacts during project design, by working with New Mexico Department of Game and Fish, New Mexico Department of Transportation, federally recognized tribes, Federal, State, and local agencies, Federal and State land managers, private landowners, and other organizations.
5. Cooperate with State and Federal wildlife management agencies, to minimize conflicting wildlife resource issues related to hunted, fished, and trapped species.
6. Coordinate with the New Mexico Department of Game and Fish, USFWS, sportsman's groups, the scientific community, and other stakeholders regarding information, education, and knowledge gaps as they relate to promoting and improving wildlife, fish, and plant resources and management.
7. Work collaboratively with academia, State and Private Forestry, Forest Service Rocky Mountain Research Station, and other groups to fill information gaps related to rare and narrow endemic species that use cliffs and rocky features.
8. Coordinate with Federal and State land managers, federally recognized tribes, adjacent landowners, and other Federal and State agencies, when proposing management that may impact habitat connectivity and to discuss what mitigation may be needed.
9. Consider converting permitted domestic sheep allotments that are within Rocky Mountain bighorn sheep-occupied habitat[23] or areas of high risk of contact[24] to permitted cattle allotments.
10. In coordination with the New Mexico Department of Game and Fish, consider "dusting" prairie dog colonies with flea-controlling powder to reduce the spread of sylvatic plague. When possible, identify and potentially avoid burrows occupied with burrowing owls prior to application.
11. To increase carrying capacity for put-and-take and wild trout fisheries, consider installing stream improvement structures and allowing beaver to build and maintain beaver dams.
12. Consider non-lethal strategies when beaver need to be removed.

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[23] As defined by New Mexico Department of Game and Fish or best available science.

[24] Based on risk of contact models or best available science.

13. Consider the amounts, arrangements, and condition of natural communities and habitats that benefit wildlife during planning by multiple resource areas including range, fire, and timber.
14. Consider coordinating with the New Mexico Department of Game and Fish on native fish restoration efforts, so that management activities are consistent with the agency's fisheries management plans.

Related Plan Content for Wildlife, Fish, and Plants

All other sections

Photo credit: Jay Gatlin

Nonnative Invasive Species (NIS)

Executive Order 13112 defines an invasive species as any plant or animal species that is nonnative[25] (or alien) to the ecosystem under consideration, and which introduction causes or is likely to cause economic or environmental harm or harm to human health. 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, and interfering with natural fire regimes. Some nonnative species have invasive tendencies and threaten native species, ecosystem function, and the quantity and quality of forest goods and services. Reducing the threat of aquatic and terrestrial invasive plant and animal species will allow the Carson to better manage resilient landscapes and species populations that have a greater capacity to survive natural disturbances and uncertain future environmental conditions, such as those driven by changes in climate patterns and increasing human uses.

The nonnative species with the highest treatment priority are class A and B noxious weeds (defined by New Mexico Department of Agriculture), which have made significant increases in their overall population size in the plan area between 2007 and 2017. Class A and B noxious weeds currently known to the Carson include, but are not limited to, leafy spurge, rock snot, Canada thistle, hoary cress, and yellow toadflax. The Carson also has known populations of invasive animal species and diseases, including bullfrogs, whirling disease, and chytrid fungus. Like invasive plants, invasive animals and diseases have the potential to adversely affect native species and ecosystem function. Chytrid fungus and whirling disease has been linked to infectious disease and dramatic die-offs in amphibians and trout world-wide, while white-nose syndrome has been decimating bat populations and slowly moving westward in North America. Feral animals, including unauthorized livestock, may be an issue in the future on the Carson. These animals are managed by other agencies, such as the New Mexico Livestock Board and the USDA Animal and Plant Health Inspection Service.

Nonnative Invasive Species Desired Condition (FW-NIS-DC)

1	Nonnative invasive plant and animal species are absent or exist at levels where they do not disrupt ecological function or affect the sustainability of native and desirable nonnative species.

Nonnative Invasive Species Objective (FW-NIS-O)

1	Contain, control, or eradicate at least 300 to 500 acres of invasive species (e.g., musk thistle, spotted knapweed) annually.

[25] 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.

Nonnative Invasive Species Standards (FW-NIS-S)

1 Forest management activities must apply best management practices[26] and management guidance from the most current Forest Service Southwestern Region Guidance for Invasive Species Management, to minimize the introduction or spread of invasive species, including decontamination procedures on vehicles and equipment and using weed-free products.

2 Projects, authorized activities, and special uses must be designed (e.g., weed hay, off-highway vehicle washing, waders) to reduce the potential for introducing new species or spreading existing invasive or undesirable aquatic or terrestrial nonnative populations.

3 Domestic goats and sheep must not be used to control invasive plants in native bighorn sheep-occupied habitat.[27]

Nonnative Invasive Species Guidelines (FW-NIS-G)

1 When drafting water from streams or other waterbodies, measures should be taken to prevent entrapment of fish and aquatic organisms and the spread of parasites or disease (e.g., chytrid fungus, Didymo, and whirling disease).[28]

2 Desirable nonnative species (e.g., brown trout, brook trout, and Kentucky bluegrass) should be managed in such a way that they do not conflict with the recovery of native species or existing multiple uses.

3 Integrated pest management approaches and other treatments to control, treat or retreat noxious and invasive species should be used to improve watershed condition and maintain ecosystem function, while minimizing project impacts on native species.

4 If chemical application is necessary near sensitive habitat (e.g., developed sites, known at-risk plants, riparian areas), techniques (e.g., buffers, type of chemical, mixture) should be applied to minimize effects on native species and sensitive habitat.

5 Ground-disturbing activities should be assessed for risk of noxious weed invasion and incorporate measures that minimize the potential for the spread of noxious and invasive species.

6 Preventive measures, such as requiring pre- and post-work cleaning of equipment and using certified weed-free seed, should be implemented through contracting, permitting, and other administrative processes. Weed-free plant material should be selected for all seeding and mulching projects, to restore natural species composition and ecosystem function to the disturbed area. Plant or seed materials should be used, which are appropriate to the site, capable of becoming established, and are not invasive.

7 Fill and rock material should be inspected for nonnative invasive plants, prior to using in a project, to control the spread on nonnative invasive plants.

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[26] Best management practices as defined in the Region 3 Soil and Water Conservation Practices Handbook or other, most current regional best management practices guidance.

[27] As defined by New Mexico Department of Game and Fish or best available science.

[28] Guidance can be found in the most current version of Preventing Spread of Aquatic Invasive Organisms Common to the Southwestern Region Technical Guidelines for Fire Operations, Interagency Guidance and best available science.

Management Approaches for Nonnative Invasive Species

1. Consider prioritizing treatment based on State status, refer to the New Mexico Department of Agriculture website for the "State Noxious Weed List".
2. Consider prioritizing inventories in areas of unique and rare habitats first and then areas of high use and disturbance second (e.g., material pits, trailheads, campgrounds, corrals, roads, boat ramps, and bridges).
3. For control of invasive species, consider prioritizing areas (e.g., wilderness, research natural areas, botanical areas, wild and scenic river areas, and riparian areas) to maintain the integrity of native species and ecosystems.
4. Coordinate with stakeholders and educate the public to reduce, minimize, or eliminate the potential introduction, establishment, spread, and impact of nonnative invasive species.
5. Consider New Mexico Department Game and Fish "Clean, Drain, and Dry" guidelines as a resource to prevent nonnative species introduction and infestation into water resources.

Related Plan Content for Nonnative Invasive Species

All other sections

Photo credit: Peter Rich

Air Resources (AIR)

Air resources on national forests are important to protect. Not only does the public value the fresh air and sweeping views that national forests provide, but poor air quality can affect forest health, water quality, and fisheries. The goal of air quality management is to meet human health standards, to achieve visibility goals in areas of high scenic value, and to address and respond to other air quality concerns, such as critical atmospheric pollutant loads and atmospheric deposition of acidic chemical compounds.

Human health standards are defined by the National Ambient Air Quality Standards set by the Environmental Protection Agency for six pollutants that are harmful to public health: 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 wildernesses of high scenic value, Congress designated all wildernesses 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 management activities on the Carson are the Wheeler Peak Wilderness and the northern portion of the Pecos Wilderness. Class I areas that could be affected by projects and sources on or near the Carson include the San Pedro Parks Wilderness (Santa Fe National Forest), Bandelier National Monument (USDI Park Service), and the southern portion of the Pecos Wilderness (Santa Fe National Forest), all of which are south of the Carson.

The ecosystem services provided by air include oxygen for respiration; carbon dioxide for photosynthesis; and global redistribution of biological and physical byproducts (supporting ecosystem services), as well as the delivery of aesthetically pleasing aromas (cultural ecosystem service). These ecosystem services are generally stable and not at risk. Air quality and visibility conditions on the Carson are within regulatory levels and the trend, based on projected emission inventories, appears to be stable or is improving for most pollutants.

The main challenge in the future could be from both coarse and fine particulate matter, which can affect the ambient air quality and visibility on the Carson. Land use on and off the Carson, as well as changes in climate patterns and drought, can contribute to windblown and fugitive dust. Wildfires can also be a significant source of particulate matter and ecological restoration must take into consideration public health concerns. Smoke impacts from wildland fires and prescribed fires can affect nearby communities. Additionally, the Jicarilla Ranger District may be at risk of ozone impacts as the trend in volatile organic compounds, an ozone precursor, are increasing from natural gas development and there is a history of high ozone levels near the ranger district.

Air Resources Desired Conditions (FW-AIR-DC)

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

2 Air quality meets or surpasses State and Federal ambient air quality standards.

3 Visibility in designated wildernesses (class I and sensitive class II areas) is free of anthropogenic (human caused) impacts.

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

5 Smoke impacts on air quality-related values are consistent with state smoke management plans.

Air Resource Guidelines (FW-AIR-G)

1 Decision documents for wildfires and prescribed burns should identify smoke-sensitive areas and include management prescriptions and courses of action to mitigate impacts to air quality in those areas.

2 To reduce air impairments, dust abatement should occur during construction and road projects where dust is a potential effect.

Management Approaches for Air Resources

1. Consider advanced notification of potential smoke from fire management activities through the media to promote public awareness and protection of human health and safety, and place smoke warning signs along roads when visibility may be reduced.
2. Consider design features, best management practices, or mitigation measures to reduce fugitive dust where needed.
3. Consider working 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 Carson National Forest.

Social, Cultural, and Economic Sustainability and Multiple Use

The land is a common thread that binds all people. Our mountain landscapes are a life-sustaining resource and they help us form individual and community relationships, provide for continuity of cultural identity, strengthen ancestral connections, and contribute to the economic sustainability and stability for local communities. The communities located within or surrounding the Carson reflect the diverse and rich history of people and uses connected to the national forest.

Long-standing, land-based traditional communities established themselves and persisted in large part due to their proximity to needed resources. Plants are used for food, medicine, and ceremonial purposes; wood is used for construction, fencing, heat, and ceremonial fires; perennial streams provide domestic water and are sometimes controlled to provide water for agricultural needs or mechanical power; pasture land is used and springs are developed to support sheep and cattle; and arable land is used for crops and orchards.

The Carson's vision for social, cultural, and economic sustainability is to manage toward a healthy, diverse, and productive forest that meets the needs of traditional communities, now and into the future. The Carson provides a variety of goods and services, including water, wood products, recreational opportunities, wildlife, energy, and domestic livestock forage. Sustainable management of natural resources ensures that the availability of goods and services is achieved, and land productivity is maintained.

The management of ecosystems, goods, and services is interdependent and must adapt to change. The following sections guide the Carson's contribution to social and economic sustainability to provide people and communities with a range of social, cultural, and economic benefits for present and future generations.

This portion of chapter 2 is divided into multiple sections. The first two sections focus on traditional and cultural uses of traditional communities that have a long-standing history in and around the NFS lands managed by the Carson. These communities of northern New Mexico include federally recognized tribes and descendants of communities established under the governance of Spain and Mexico. These sections are followed by uses that are both contemporary and have historic significance, including rangeland and livestock grazing, forestry and forest products, recreation, special uses, and minerals and mining. The Heritage Resources section does not emphasize use, rather focuses on the material record of prehistoric and historic occupation and land use. These resources are essential for historic and contemporary uses and are integral to protecting and maintaining the cultural identity and socioeconomic well-being of the people who care about these natural landscapes.

Northern New Mexico Traditional Communities and Uses

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 Carson, as well as several adjacent federally recognized tribes and small incorporated towns and villages. The Carson is a community forest and each of these communities is geographically and historically rooted to a particular landscape.

The Carson manages the natural resources and landscapes that sustain northern New Mexico traditional communities, their cultures, and traditions, now and into the future. Local heritage, culture, traditions, and values have been handed down over generations and predate United States' management of this area. Long-standing use of the Carson and its natural resources is fundamental to the interconnected economic, social, and cultural vitality of many northern New Mexico inhabitants, including federally recognized tribes and pueblos, Spanish and Mexican land grants-mercedes and acequias, grazing permit holders, and

other rural historic communities. In managing National Forest System (NFS) lands, it is important to allow opportunities for these communities to be engaged with the Carson, so that sustained use of the national forest for cultural and subsistence needs are supported. These important uses or traditional uses include, but are not limited to:

- Use of common waters (e.g., acequias or irrigation ditches) for drinking, irrigating crops, and watering livestock.
- Use of common pasture for grazing livestock.
- Wood gathering 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 (including production of crafts and ceremonial uses).
- Gathering of plants and plant products for various purposes (including 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.
- Traditional uses are found in other section narratives and plan components throughout this land management plan, especially Federally Recognized Tribes, Rural Historic Communities, Cultural Resources, Rangelands and Livestock Grazing, Forestry and Forest Products, and Recreation.

The desire to recognize and preserve northern New Mexico traditional uses has been an integral part of managing the Carson National Forest and is reflected through various documents (e.g., USDA 1986; Hurst 1972; Hassell 1968). This land management 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 Carson.

The Carson 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 Carson contributes resources and uses that are important to federally recognized tribes and pueblos, land grant communities, acequia associations, rural historic communities, and many contemporary residents, all with historic, cultural, and socioeconomic connections to the national forest. To this day, these traditional communities retain a strong connection to the land and rely upon the Carson and its natural resources to sustain their cultural, spiritual, and economic way of life.

Forest management supports this traditional way of life, defined by cultural identity of traditional communities, even as changes occur brought on by public demand for development, tourism, recreation, and other more contemporary uses. Successful management of the Carson depends on the sustained success of northern New Mexico's traditional communities. The people of northern New Mexico, their culture, their 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 the ecosystem services that they obtain from the land. In addition to 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 resources at hand.

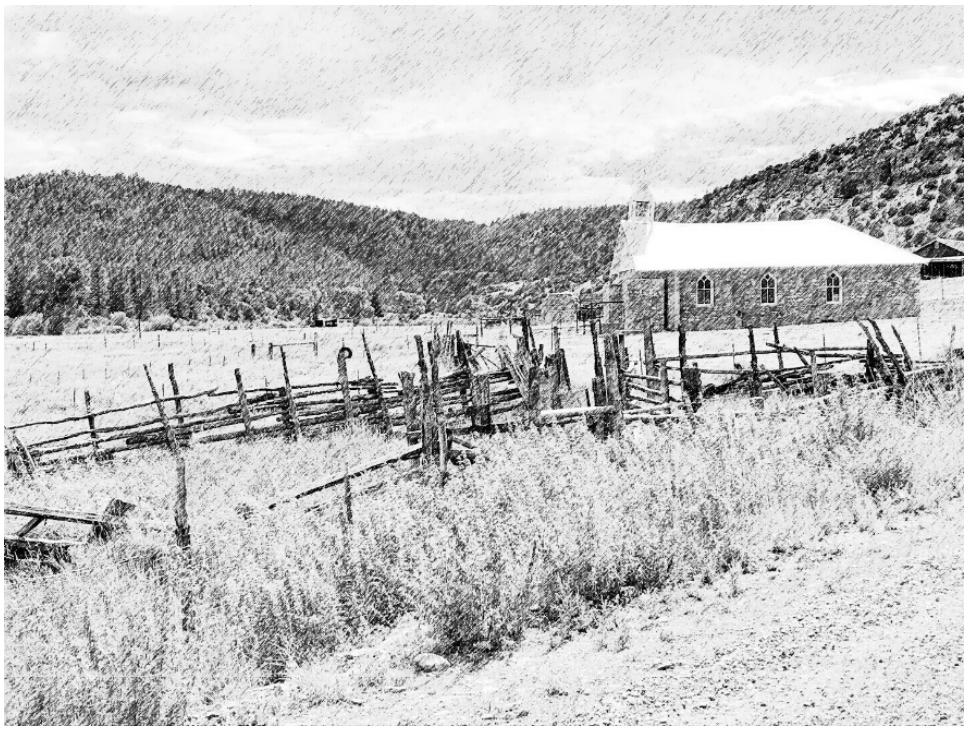

Photo credit: Peter Rich

Federally Recognized Tribes (FRT)

For much of human history, American Indians were the only people to occupy and use the lands that encompass the Carson. Their utilization of the Carson 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 Service 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 the Carson's relationship with federally recognized tribes. The plan components in this section are based upon agency 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, Executive Order 13175). A comprehensive list of these authorities can be found in appendix C.

The Forest Service manages a great diversity of landscapes and sites that are culturally important and held sacred by federally recognized tribes. Specific locations on the Carson are often held in confidence to protect these important values.

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

The Carson shares a common boundary with the Jicarilla Apache Nation, the Picuris Pueblo, the Southern Ute Indian Tribe, and the Taos Pueblo, and is near several other tribal communities.

Federally Recognized Tribes Desired Conditions (FW-FRT-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 of tribal communities and uses (e.g., livestock grazing, fuelwood gathering, traditional water use, and hunting) on 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 of tribal communities, are available and sustainable.[29]

4 Federally recognized tribes have access to sacred sites, traditional cultural properties, and collection areas for traditional and ceremonial use.

5 There are opportunities for solitude and privacy for tribal traditional and cultural activities.

6 Traditional cultural properties, sacred sites, and other locations of identified traditional and cultural use are recognized and valued.

7 The Carson National Forest provides a setting for educating tribal youth in culture, history, and land stewardship, and for exchanging information between tribal elders and youth.

Federally Recognized Tribes Standard (FW-FRT-S)

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

Federally Recognized Tribes Guidelines (FW-FRT-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 NFS lands or adjacent sites should be reburied in accordance with the requests of affiliated tribes.[30]

[29] American Indian Religious Freedom Act (AIRFA), as amended (42 U.S.C. 1996)
[30] Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (35 U.S.C. 3001)

Management Approaches for Federally Recognized Tribes

1. Coordinate with federally recognized tribes to develop collaborative proposals and accomplish projects of mutual benefit across shared boundaries and use available federally authorized or advocated programs, including the Tribal Forest Protection Act of 2004 (Public Law 108-278), and the Collaborative Forest Restoration Program.
2. Consider developing and maintaining memoranda of understanding or other agreements to better understand community needs and build respectful, collaborative relationships with federally recognized tribes.
3. Develop management tools (e.g., programmatic agreements, management plans, and memoranda of understanding) to manage traditional cultural properties collaboratively with associated communities.
4. In collaboration with federally recognized tribes, consider developing interpretive and educational exhibits or other media that focus on the history of the lands managed by the Carson, to provide the public and Forest Service employees with a greater understanding and appreciation of shared history, culture, and traditions. Social, cultural, and economic resources provide a setting for educating tribal youth in culture, history, and land stewardship, and for exchanging information between tribal elders and youth.
5. Consider working with the public to create awareness of the importance of traditional cultural properties and issues related to their management, while protecting confidential or sensitive information regarding traditional cultural properties.
6. Consider using federally authorized or advocated programs (e.g., the Tribal Forest Protection Act and Community Forest Restoration Program) to develop collaborative proposals and partnerships with federally recognized tribes to accomplish projects of mutual benefit and economic development.
7. Consider having Forest Service employees work with federally recognized tribes to understand community needs and build respectful, collaborative relationships to move toward desired conditions.
8. Consider providing training opportunities for Forest Service employees to broaden their understanding of the unique legal relationship between the Federal Government and federally recognized tribes and pueblos and American Indian law, customs, traditions, and values.
9. Consider incorporating native languages (e.g., Tiwa, Tewa, Athabaskan, Keres) into interpretive materials, to highlight the American Indian culture as part of the forest landscape and its surrounding areas.

Rural Historic Communities (RHC)

A rural historic community refers to the many peoples of northern New Mexico whose families have strong historical ties to the land. The Carson National Forest and use of its resources are integral to the subsistence, cultural, and social values that help define these people and communities. The founding of these communities generally predate the establishment of the U.S. Forest Service. Communities have a significant concentration of human activity, linkage, and continuity of land use in or immediately adjacent to the national forest. The day-to-day occupational activities of rural historic communities are rooted in the pragmatic need to make a living and evolved on a specific landscape within or adjacent to lands now managed as the Carson.

The use of the Carson provides opportunities for community interaction and maintenance of traditional culture. 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 national 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 Carson considers itself a community forest; many smaller communities call the forest home and rely upon its many resources and uses. Some people may identify with several rural historic communities. For example, some people may see themselves as being from Peñasco, a rancher, a member of a land grant, an acequia parciante, or possibly all or a combination of these. Regardless, what they have in common is a strong cultural and social tie to lands in and around the Carson. The two communities identified below have recognition by the State as governing bodies.

Land Grants-Mercedes

Between 1689 and 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 the 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 on the Carson that were once common lands of community land grants-mercedes. The Carson maintains relationships with several Spanish- and Mexican-era land grant-merced communities. Many have former common lands now administered by the Forest Service. Common lands provided land grant-merced communities access to grazing land, stone and clay, wood, game, fish, medicinal plants, water for agriculture and consumption, and other forest products—uses that continue today. 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 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 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.

Rural Historic Communities Desired Conditions (FW-RHC-DC)

1 The uniqueness and values of rural historic communities and the traditional uses important for maintaining these cultures are recognized and valued as important.

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], medicinal herbs, and micaceous clay), as well as for subsistence practices and economic support of rural historic communities (e.g., livestock grazing, acequias, firewood, vigas, latillas, gravel, soils, and other forest products) 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 national forest provides a setting for educating youth in culture, history, and land stewardship and for exchanging information between elders and youth.

Rural Historic Communities Guidelines (FW-RHC-G)

1 Traditionally used products (e.g., fuelwood, latillas, and vigas) should be available on the Carson to rural historic communities, except in areas with resource concerns or any areas otherwise restricted by standards or guidelines set forth in other sections of this plan, to move toward desired conditions.

2 Management activities should be analyzed and mitigated to prevent or minimize 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 access to operate, repair, maintain, and improve acequia infrastructure located on NFS lands.

4 Coordination with interested and affected land grant-merced and acequia governing bodies should occur at the early stages of planning and project design, to incorporate community perspectives, needs, and concerns, as well as traditional knowledge into project design and decisions.

Management Approaches for Rural Historic Communities

1. In collaboration with northern New Mexico communities, consider developing interpretive and educational exhibits or other media that focus on the history of the lands administered by the Carson, to provide the public and Forest Service employees with a greater understanding and appreciation of shared history, culture, and traditions. Social, cultural, and economic resources provide a setting for educating youth in culture, history, and land stewardship, and for exchanging information between elders and youth.
2. Consider working with rural historic communities, such as land grant-merced and acequia governing bodies, to identify partnership, education, and interpretation opportunities that can help sustain the traditional communities' heritage, language, culture, traditions, and environment in northern New Mexico.
3. Coordinate with rural historic communities, such as land grant-merced and acequia governing bodies, to build respectful, collaborative relationships and develop collaborative proposals and projects of mutual benefit.
4. Consider ways of educating northern New Mexico youth in local culture, history, and land stewardship and for exchanging information between community elders and youth (e.g., cooperate with cultural youth programs such as Youth Conservation Corps or others initiated by a community land grant, pueblo, or tribe).
5. Consider providing training opportunities for Forest Service employees to gain a deeper understanding of the unique traditional communities, customs, traditions, and values of northern New Mexico.
6. Consider offering Carson offices as welcoming places for local community members to engage with Forest Service employees and one another, disseminate and receive information, and attend meetings, seminars, and exhibits that promote community knowledge and collaboration.
7. Consider holding annual meetings with land grant and acequia governing bodies, to improve communication and relationships.
8. Consider incorporating Spanish language into interpretive materials to highlight the Hispanic culture as part of the landscape of the Carson and its surrounding areas.

9. Consider ways to make fuelwood permits available locally in the field where the fuelwood opportunity is available or allow rural communities to get a fuelwood permit at the Forest Service district office closest to them or another government office, rather than only at the district office administering the permitted area.
10. Work with land grant and acequia governing bodies, rural communities, and other community leaders to continually improve relationships and discuss shared opportunities to design projects that contribute to the cultural integrity of the many forest-dependent traditional communities.
11. Work collaboratively with land grant and acequia governing bodies, rural communities and other community leaders to maintain shared infrastructure (e.g., fencing, roads, and cattleguards) and collaborate in ecosystem restoration efforts across boundaries.
12. Work with rural historic communities to identify vital areas for motorized and non-motorized access to resources important to cultural and traditional needs.
13. Consider referencing the New Mexico Acequia Guidance document for clarification of authorities and responsibilities related to acequia management and governing body coordination.

Related Plan Content for Rural Historic Communities and Uses

Watersheds and Water; Rangelands and Livestock Grazing; Forestry and Forest Products; Transportation and Forest Access

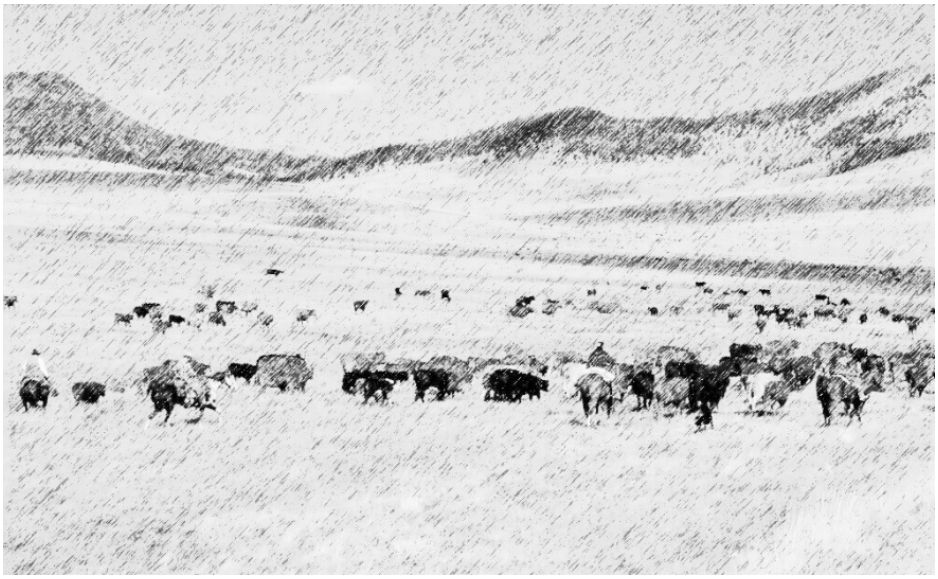

Photo credit: Michael Casados

Cultural Resources (CR)

Cultural and historic resources are objects or definite locations of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence. Cultural and historic resources are prehistoric, historic, archaeological, or architectural sites, structures, places, or objects and traditional cultural properties. Cultural and historic resources include the entire spectrum of resources for which Forest Service personnel are responsible, from artifacts to cultural landscapes. They can include, but are not limited to, objects, buildings, structures, sites, and districts eligible or listed on the National Register of Historic Places, and national historic landmarks.

Cultural and historic resources provide cultural services to a diverse spectrum of the public. Heritage sightseeing and tourism is a significant component of the economy of the plan area. Tourists are attracted by the nature and significance of historic properties, and by the character of traditional communities, a character maintained by resources and uses of the plan area.

The Carson National Forest contains cultural and historic resources (e.g., pit houses, pueblitos, masonry structures, quarries, rock art, traditional cultural properties, and culturally modified trees) that document almost continuous human presence for at least the past 12,000 years. American Indians ancestral to the ethnic affiliations of the contemporary Pueblo, Athabascan, Ute, and Comanche people have inhabited or used forest resources during much of this time. Europeans began to occupy the area over 400 years ago, while the Carson has been under the management of the Forest Service since 1906.

Many cultural resources are also considered traditionally significant to federally recognized tribes and pueblos associated with the lands of the plan area. The Carson has at least 6,636 recorded cultural resources within its boundaries. As of July 2016, only 15 percent (219,713 acres) of the national forest has been surveyed. Sixty-four percent (4,320) of the cultural resources recorded are prehistoric sites, 22 percent (1,449) are historic sites, and 10 percent (642) are multi-component sites. The remaining 5 percent (225) are unknown, with no temporally or spatially diagnostic artifacts present.

Six sites are listed in the National Register of Historic Places (Pueblito Canyon Ruin, Pueblito Canyon East, Cabresto Mesa Tower Complex, Victor Ortega Cabin, the Ring Place, and the Aldo Leopold House), with 2,588 more sites eligible for listing. In addition, there are 441 sites not eligible for listing and 3,604 sites that remain unevaluated. The Cumbres and Toltec Railroad National Historic Landmark enters a portion of the Carson and the Old Spanish National Historic Trail crosses the Carson. Conditions of the national forest's cultural resources are most notably impacted by water and wind erosion, livestock grazing, recreation, construction, vehicular traffic, and vandalism, which fortunately, in most cases, have not been severe. Many of the national forest's cultural sites are significant social and economic contributors to the Geographic Context, region, and Nation. They provide opportunities for cultural tourism, education, and research, and they are necessary for maintaining the cultural identity of the traditional communities within the Carson.

These resources are nonrenewable and, depending on the nature of the resource, can be particularly sensitive to management practices and natural and human-induced environmental degradation. Once the resource has been disturbed, damaged, moved, altered, or removed, nothing can recover the information that could have been gained through analysis or replace the opportunity for individuals to understand and experience the site. Forest Service management activities, public use, and natural processes have impacted cultural resources. Damage from vandalism (e.g., pilfering) continues to be a management issue. Current forest management practices are aimed at minimizing or avoiding negative impacts to cultural resources.

Cultural Resources Desired Conditions (FW-CR-DC)

1 Cultural and historic resources (including archeological sites, historic buildings, historic structures, and traditional cultural properties) that possess scientific, cultural, or social values are preserved and protected. Site integrity and stability are protected and maintained on sites that are susceptible to imminent risks or threats, or where the values are rare or unique.

2 Cultural and historic resources retain their visual and aesthetic integrity and physical association with culturally significant landscapes.

3 Impacts to cultural and historic resources from vandalism, looting, and other human influences are minimal.

4 The public has opportunities for learning about, appreciating, and understanding cultural and historic resources, as well as resources significant to traditional communities.

5 Traditional communities (e.g., land grant-merced and acequia governing bodies, federally recognized tribes) have opportunities to participate in the identification, protection, and preservation of cultural and historic resources that have importance to them.

6 Heritage tourism opportunities are available for the public.

Cultural Resources Standards (FW-CR-S)

1 Buildings and structures listed in or eligible for the National Register of Historic Places must be maintained to preserve their historic integrity, while also fulfilling their roles as administrative and recreational facilities, and other infrastructure functions.

2 Cultural artifacts must be preserved in situ, except when endangered, in which case they should be curated following current standards.

Cultural Resources Guidelines (FW-CR-G)

1 When adverse effects to cultural and historic resources occur, known communities to whom the resources are important should be involved in the resolution of the adverse effects.

2 Historic documents (e.g., photographs, maps) should be properly preserved and made available for research and interpretation by Forest Service, contractors, other agencies, universities, federally recognized tribes, historic Spanish and Mexican rural communities, and the public.

Management Approaches for Cultural Resources

1. Consider synthesizing cultural resource information and interpreting and sharing it with the scientific community and public through prehistoric and historic contexts, formal presentations, publications, and educational venues.
2. Consider developing a database of fire sensitive cultural sites, structures, and other resources and making it available for fire-management purposes to facilitate resource protection.
3. Consider prioritizing non-project related surveys (i.e., Section 110 of the National Historic Preservation Act) as follows: (1) areas indicated to have high cultural value or high density of cultural resources; (2) areas of importance to traditional communities; (3) areas where additional surveys will

contribute to a greater regional understanding of a specific management unit; and (4) areas where eligible cultural resources are threatened or ongoing impacts are unknown and need to be assessed.

4. Consider providing orientation and learning opportunities for Forest Service personnel, permit holders, and contractors that build support for the Section 106 process of the National Historic Preservation Act. Find teaching opportunities to educate personnel on the identification, management, and protection of significant cultural resources.
5. Consider the development of opportunities for heritage tourism in concert with local communities.
6. Through interpretive sites, historic standing structures, and other materials, consider providing opportunities for an appreciation of the region's history and an awareness of preservation efforts. In some cases, consider historic routes (e.g., railroad grades) used for recreation trails with interpretation of their history and historic features.
7. Consider using volunteer efforts to monitor and protect historic properties on the Carson National Forest.

Photo credit: Allan Lemley

Sustainable Rangelands and Livestock Grazing (GRZ)

"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). Much of this land was formerly granted to or used by traditional communities and the ancestors of current permit holders. It is important that Forest Service management recognizes and contributes to sustaining the socioeconomic needs, culture, and traditions of northern New Mexican ranchers.

The Carson issues grazing permits on numerous active allotments. Almost all permit holders are local residents, living close to the allotments where they are permitted to graze. To respond to the cultural traditions and socioeconomic needs of northern New Mexico, northern New Mexico forests (including the Carson) are unique in how they administer livestock grazing on NFS lands. Around 25 percent of the permits are issued to grazing associations with multiple members. A grazing association is a group of several members who share the use of an allotment under one grazing permit. Associations are self-governed and determine how many head of livestock each member can graze within the authorized or permitted number for the allotment. The Forest Service officially recognizes the association as the sole permit holder and often deals directly with association officers for annual authorization, billing, and operating instructions.

In addition, the Carson National Forest administers almost 40 percent of the active allotments as community allotments. Each individual rancher has a permit for a certain number of animals, along with as many as 10 to 15 other permit holders on the same allotment. These community allotments will have an association bull permit as well, but the Forest Service works directly with each permit holder. The Carson administers 35 percent of its allotments with only one permit holder. The community and association allotments were developed in response to the economic and cultural needs of traditional communities. In addition to administering community allotments with multiple permits, the Carson has also waived an acreage minimum as long as a permit holder has the facility to water livestock, a corral or facility to handle livestock, and forage-producing capability. These programs contribute to addressing the needs of many northern New Mexico families.

Livestock management on NFS lands has shifted to an adaptive management philosophy that allows appropriate seasonal changes in livestock numbers (increases and decreases) or seasons of use in response to changing ecological conditions (e.g., forage production, water availability, and precipitation patterns). Over the last decade, the Carson has worked with partners and permit holders to manage grazing pressure on sensitive areas (e.g., critical areas, riparian areas) through better distribution and improving forage conditions (e.g., restoring fire) away from sensitive areas, without reducing livestock numbers.

Livestock grazing today plays an essential role in providing ecosystem services. Continuing this way of life on ancestral lands enhances the culture and heritage for future generations. Many people living in traditional communities participate in or have connections to ranching and identify with the associated values (cultural ecosystem service). Livestock grazing contributes to the livelihood of permit holders and to the economy of traditional communities and counties (provisioning ecosystem service). Some ecological benefits from livestock grazing include invasive plant control, reduction of fine fuels (decadent grasses and forbs), maintaining open space off-forest, increased water developments in uplands, and an important source of food and fiber (cultural and provisional ecosystem services).

Sustainable Rangelands and Livestock Grazing Desired Conditions (FW-GRZ-DC)

1 Sustainable rangelands provide forage for livestock grazing opportunities that contribute to agricultural businesses, local employment, livelihoods, as well as generational ties to the land.

2 Livestock grazing contributes to the long-term socioeconomic diversity and stability and the cultural identity of local communities.

3 Rangelands are resilient to disturbances and variations in the natural environment (e.g., fire, flood, climate variability).

4 Livestock grazing and associated management activities are compatible with ecological function and process (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.

6 Wetland and riparian areas consist of native obligate wetland species and a diversity of riparian plant communities consistent with site potential and Wetland Riparian and Forest and Shrub Riparian desired conditions.

7 Range infrastructure functions to maintain or improve livestock grazing and the condition of forest ecological and cultural resources.

Sustainable Rangelands and Livestock Grazing Objective (FW-GRZ-O)

1 Annually improve or maintain at least 6 to 10 existing range improvement structures for livestock grazing.

Sustainable Rangelands and Livestock Grazing Standards (FW-GRZ-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.[31]

2 New or reconstructed fencing must allow for wildlife passage, except where specifically intended to exclude wildlife (e.g., elk exclosure fence), to protect human health and safety.

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 cattleguards).

4 Within bighorn sheep-occupied habitat[32] or areas of high risk of contact[33] domestic sheep allotments must be managed (e.g., fencing, increased herding, herding dogs, potential vaccine, or other scientifically supported strategies) to mitigate the potential transfer of disease from domestic sheep to bighorn sheep.

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[31] Guidance can be found in the most current Grazing Permit Administration Handbook and Regional Supplements or best available scientific information. Guidance for cooperating with permittees when establishing capacity can be found in the most current Grazing Permit Administration Handbook (2209.13_90).

[32] As defined by New Mexico Department of Game and Fish or best available science.

[33] Based on risk of contact models or best available science.

Sustainable Rangelands and Livestock Grazing Guidelines (FW-GRZ-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, permit renewal), to sustain livestock grazing and maintain ecological function and processes.[34]

2 Livestock grazing within riparian management zones (e.g., along streams, around seeps, springs, lakes, and wetlands) should be managed to sustain proper stream channel morphology, floodplain function ,[35] and riparian vegetation desired conditions.

3 New livestock troughs, tanks, and holding facilities should be located out of riparian management zones (e.g., along streams, around seeps, springs, lakes, and wetlands), to protect riparian ecological resources, unless necessary for resource enhancement or protection.

4 New range infrastructure (e.g., troughs, 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 the structures' footprint.

5 Salting or mineral supplementation should not occur on or adjacent to areas (e.g., known at-risk plant species habitat, riparian areas, wetlands, or archeological sites) that are especially sensitive to salt and to increased traffic from ungulates, to protect these sites.

6 Restocking and management of grazing allotments following a major disturbance (e.g., fire, flood) should occur on a case-by-case basis after consideration of site-specific resource conditions, to sustain livestock grazing.

7 Vacant or understocked allotments should be made available to permitted livestock, to provide 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 Permit conversions to domestic sheep or goats should not be allowed within bighorn sheep-occupied habitat[36] or areas of high risk of contact,[37] to mitigate the potential transfer of disease from domestic sheep to bighorn sheep.

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[34] Guidance for review and careful, considered consultation, cooperation and coordination with permit holders can be found in the most current Grazing Permit Administration Handbook and Regional Supplements or best available scientific information (2209.13_90).

[35] Proper stream channel morphology and floodplain function as defined by BLM's properly functioning condition protocol, or a similar metric.

[36] As defined by New Mexico Department of Game and Fish or best available science.

[37] Based on risk of contact models or best available science.

Management Approaches for Sustainable Rangelands and Livestock Grazing

1. Forest managers cooperate, collaborate, and coordinate with permit holders to respond to changing resource conditions. Cooperation, collaboration and coordination among Carson and permit holders is key to improving rangeland and forest conditions for multiple uses, moving toward desired conditions, and contributing to the socioeconomic well-being of local communities. In addition, collaboration among stakeholders is important, including local communities; permit holders; Federal, State, county, and local government entities.
2. Acknowledge the importance of livestock grazing as a traditional and cultural practice that helps support the socioeconomic well-being of individual families within local communities, now and into the future.
3. Consider large-scale landscape management for restoring rangelands and the heterogeneity of native plant species, with an emphasis on grass, forb, and shrub communities, to promote livestock grazing capacity, and encourage movement toward desired conditions of NFS lands.
4. Consider an adaptive management approach to manage rangelands in a manner that promotes socioeconomic well-being and stability of local communities, ecosystem resilience, sustainability, and species diversity, based on scientifically quantified changes to rangelands. An adaptive management approach is designed to provide more flexibility to grazing management, while improving or maintaining the health of rangelands.
5. Invite association members and individual permit holders on range inspections and conduct these inspections on days when most permit holders can attend.
6. Consider facilitating discussions and developing partnerships with livestock grazing permit holders, agencies, and other groups and individuals to develop collaborative proposals and implement projects that benefit multiple use on the forest.
7. Actual levels of livestock use may vary due to annual fluctuations of individual livestock operations or ecological conditions, including authorized nonuse for resource protection or personal convenience. Consider not reducing permit numbers based on actual use, including nonuse.
8. Consider facilitating a dialogue between the New Mexico Department of Game and Fish and permit holders about ungulates (e.g., elk, deer, bighorn sheep, and livestock) and their cumulative impacts on forest resources. Account for those impacts when planning projects or permitted activities.

Related Plan Content for Sustainable Rangelands and Livestock Grazing

All affected vegetation communities; Watersheds and Water; Wildlife, Fish, and Plants; Nonnative Invasive Species; Traditional Communities – Rural Historic

Sustainable Forestry and Forest Products (FFP)

Forest products include wood (timber, biomass, fuelwood) and special forest products. Special forest products include floral greenery, Christmas trees and boughs, mushrooms, wildlings (e.g., transplanted trees, shrubs, or herbaceous plants), cones, medicinal plants, cuttings, herbs, nuts, sap, berries, decorative wood, and building materials (e.g., stone, rock, gravel). National Forest System (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 desired conditions for this land management plan focus on outcomes, rather than outputs. As a result, no specific timber volume outputs are desired for the Carson. Instead, timber production activities are considered tools that economically contribute to restoring and maintaining ecosystem diversity and supporting a viable wood products processing industry (provisioning ecosystem services).

Focus has shifted toward ecological restoration and reduction of wildfire hazard to communities by creating and maintaining uneven-aged forest conditions as well as managing for desired species composition. An increasing level of regulated forest production is necessary to achieve restoration of desired conditions in forested vegetation communities at the plan scale. To facilitate achieving desired conditions, markets that will make use of forest products resulting from restoration treatments will need to be developed and supported. The Forest Service is encouraging the expansion of wood product industries to use these products.

The total volume of wood products sold by the Carson has fluctuated over time, with an overall downward trend since the 1990s. Currently, there is an emphasis on reducing the impacts of wildfires on communities and restoring fire-adapted ecosystems rather than on maximizing timber volume. The Carson seeks to integrate a timber and forest products program that supports industry and the general public, with ecosystem health, watershed restoration, wildlife habitat improvements, and hazardous fuels reduction. In northern New Mexico, access to wood products continues to be an important component of the local social and economic fabric. Fuelwood harvest is regarded as a traditional family activity and the Carson is a major source of fuelwood for the many local residents who still rely on wood to heat their homes during the cold winter months (provisioning and cultural ecosystem services). The Carson is 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 or territorial-style adobe homes that are characteristic of the architecture in northern New Mexico (provisioning and cultural ecosystem services).

To address the needs of traditional communities and families, the Carson has actively engaged in the Collaborative Forest Restoration Program. The program provides cost-share grants to stakeholders for forest restoration projects. Since 2001, 49 collaborative forest restoration projects have been awarded for restoration projects on the Carson. These projects result in reduced fire risk; improved watershed health; availability of fuelwood, latillas, vigas for local families and traditional communities; and commercial products for community stakeholders. The Camino Real Ranger District has managed a successful community partnership program referred to as stewardship blocks. The Forest Service identifies parcels of land and marks trees that community members can then harvest. Community members get fuelwood and other wood products in return for restoration work to the Carson.

To address a variety of threats, including fire, changes in climate patterns, and bark beetle infestations on the Carson, it is critical for the pace of restoration to increase. Two wood processing facilities operate within the plan area, but limited wood harvesting capability potentially restrains the Carson's ability to increase restoration. Loss of the region's wood harvesting and utilization infrastructure has been a critical

impediment to accomplishing large-scale mechanical thinning treatments necessary for prompt and effective restoration of fire-adapted forests. However, small-scale operations, such as a new wood processing facility in southern Colorado near Tres Piedras Ranger District, are signs that a competitive market for the wood fiber removed by restoration-based treatment from the Carson may be emerging. A viable industry would allow for forest restoration on a scale that will produce the needed widespread improvements in ecological health or reduction in the risk of high severity wildfire. The Carson will need to expand its capability to support industry that facilitates restoration and achievement of desired conditions.

Forest products from the Carson provide many different ecosystem services. Wood products (e.g., fuelwood and latillas) are both cultural and provisioning ecosystem services. Gathering fuelwood is a family event, but fuelwood is also essential for heating homes. Forest products (e.g., Christmas tree, herb, and piñon nut gathering) are cultural ecosystem services. Timber harvesting provides regulating and provisional ecosystem services. Timber harvesting opens up forests to allow grasses to grow, which improves water retention and contributes to the economy.

Timber Suitability

The National Forest Management Act and the 2012 Planning Rule require analysis of the suitability of NFS lands for timber production. Timber production is a specific type of timber harvest for resource use and is distinct from timber harvest used as a management tool to move toward desired conditions. Timber production is the purposeful growing, tending, harvesting, and regeneration of regulated crops of trees for industrial or consumer use. Timber production may only occur on NFS lands that are identified as being suitable for timber production. Timber harvest for reasons other than regulated production may occur on all NFS lands where not specifically prohibited (i.e., designated wilderness), including those not suited for timber production.[38]

Table 3. Timber production suitability classification for the Carson National Forest

Land Classification Category	Area (acres)
A. Total NFS lands in the plan area	1,486,353
B. Lands **not suitable** for timber production due to legal or technical reasons	1,021,003
C. Lands that ***may* be suitable** for timber production (A-B)	465,350
D. Total lands **suitable** for timber production because timber production is compatible with the desired conditions and objectives established by the plan	455,844
E. Lands **not suitable** for timber production because timber production is not compatible with the desired conditions and objectives established by the plan (C-D)	9,506
F. **Total lands not suitable** for timber production (B+E)	1,030,509

Projected Harvest Levels

The sustained yield limit is an estimate of the amount of timber that could be sustainably harvested from NFS lands suitable for timber production in perpetuity. It limits the volume of timber that could be sold from a National Forest Unit except under certain circumstances as defined by the National Forest Management Act of 1976 (16 U.S.C. 1600, 36 CFR 219.11(d)(6)). The sustained yield limit for the Carson is 422 million board feet (MMBF) or 107 million cubic feet (MMCF). The projected harvest

[38] See EIS Appendix D for a detailed description of the timber suitability and timber volume calculations analyses including mapped lands suitable for timber production.

levels—projected timber sale quantity (PTSQ) and projected wood sale quantity (PWSQ)—were calculated based on plan objectives and considering the operational capacity of the Carson. These are the estimated amounts of commercial and other wood products that are expected to be produced under the plan's direction.

Table 4. Projected harvest levels of timber products (volumes other than salvage or sanitation that meet timber product utilization standards)

Timber Products	MMCF First Decade	MMBF First Decade	Tons First Decade	MMCF Second Decade	MMBF Second Decade	Tons Second Decade
Lands suitable for timber production A1. Sawtimber (industrial softwoods, 9"+)	12.9	60.3	192,729	13.3	64.6	196,476
Lands suitable for timber production A2. Other Products (industrial softwood, 5-9" – roundwood, commonly pulpwood, mostly in the form of fuelwood)	2.4	not applicable	102,519	2.1	not applicable	82,378
Lands not suitable for timber production B1. Sawtimber (9"+)	20.8	98.1	311,883	22.9	113.2	33,8618
Lands not suitable for timber production B2. Other Products (5-9")	4.1	not applicable	13,6559	3.6	not applicable	11,2010
C. **Projected Timber Sale Quantity** (PTSQ) (A1+A2+B1+B2)	40.1	158.5	743,689	41.9	177.8	729,482

Table 5. Harvest levels of other estimated wood products (fuelwood, biomass, and other volumes that do not meet timber product utilization standards)

Estimated Wood Products	MMCF First Decade	Tons First Decade	MMCF Second Decade	Tons Second Decade
D1. Non-industrial softwood fuelwood (5"+)	5.9	1.6	6.5	1.8
D2. Hardwood fuelwood (5"+)	1.1	0.4	1.0	0.4
D3. Aspen (5"+)	0.7	0.2	0.6	0.1
E. **Projected Wood Sale Quantity** (PWSQ) (C+D1+D2+D3)	47.8	743,692	50.0	729,484

Sustainable Forestry and Forest Products Desired Conditions (FW-FFP-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 and maintenance of desired vegetation conditions.

2 Forest products are available for traditional communities and culturally important activities and contribute to the long-term socioeconomic diversity and stability 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 Private and commercial timber harvest supplements other restoration and maintenance treatments at a scale that moves toward landscape desired conditions and contributes to watershed restoration, function, and resilience; enhances wildlife habitat; creates opportunities for small and large businesses and employment; and provides 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 cutting or removal of permitted forest products is rare.

7 Native seed stock is available to supply reforestation needs.

Sustainable Forestry and Forest Products Standards (FW-FFP-S)

1 Regulated timber harvest (tree harvest for the purpose of timber production) must occur only on lands classified as suitable for timber production.[39]

2 Timber harvest must occur only where soil, slope, and watersheds will not be irreversibly damaged and protection must be provided for streams, streambanks, shorelines, lakes, wetlands, other waterbodies, fish, wildlife, recreation (including trails), and aesthetic resources.

3 Regeneration timber harvest must occur only where there is reasonable assurance of adequate restocking (based on site index or other measures) within 5 years of harvest.

4 Use even-aged timber harvest methods only where a completed interdisciplinary team review determines them to be appropriate and use clearcutting only where it is determined to be the optimum method.

5 Even-aged regeneration cuts must be shaped and blended with the natural terrain.

6 Except for harvests that are the result of a large-scale disturbance event (e.g., stand-replacing fire, wind storm, or insect or disease outbreak), any even-aged regeneration timber harvest unit (e.g., clearcutting, seed tree cutting, shelterwood cutting) must not exceed 40 acres without 60 days public notice and review by the Regional Forester.

7 The annual, forestwide sale of timber must not exceed the quantity that can be removed annually in perpetuity on a sustained-yield basis (sustained-yield limit), except as defined by the National Forest Management Act.[40]

8 Select harvesting systems primarily for their ability to move toward ecological desired conditions for the site and not for their ability to provide the greatest dollar return or unit output of timber.

[39] Management activities to meet resource objectives other than timber production (e.g., fuelwood harvest, thinning, and habitat enhancement) are permitted on all lands, "suitable" and "not suitable." For example, timber harvest for purposes other than timber production may be necessary to enhance habitat for threatened and endangered species or to improve conditions within a wildland-urban interface or in recreation sites.

[40] 16 U.S. Code § 1611(a)(b) Timber

Sustainable Forestry and Forest Products Guidelines (FW-FFP-G)

1 On lands classified as suitable for timber production, even-aged stands should have reached or surpassed 95 percent of the culmination of mean annual increment prior to having a regeneration harvest, unless regeneration harvest is needed to contribute toward achieving the desired uneven-aged vegetation conditions over the long term or treat unsustainable stand conditions resulting from insects, disease, or other damage agents.

2 On lands classified as not suitable for timber production, timber harvesting should only be used for making progress toward ecological desired conditions or for salvage, sanitation, public health, or safety.

3 Log landing areas should be located outside of areas that are especially sensitive to ground disturbance (e.g., riparian management zones, archeological sites, designated trails, and along scenery management system–concern level 1 roads), to protect resources. When landings must be in these areas, effects to the impacted resource will be mitigated.

Management Approaches for Sustainable Forestry and Forest Products

1. During the planning of forest restoration projects, consider holding discussions with federally recognized tribes and land grants-mercedes that collect plants for traditional, cultural, and ceremonial purposes to promote the plants' persistence.
2. Consider designing small timber contracts to accommodate small operations based in northern New Mexico communities.
3. When planning and implementing projects, consider working collaboratively with Federal, State, and local governments; federally recognized tribes; and private landowners to promote integrated ecological and social-economic goals of harvesting forest products through the use of mechanisms such as Collaborative Forest Restoration Projects, Tribal Forest Protection Act, youth programs, and stewardship contracting authorities to expand industry to appropriately scaled and sustainable levels.
4. Consider using woody material that results from management activities, prior to on-site burning and chipping.
5. Consider making fuelwood more available through public access within a project area, by providing some decked woody material along roads, or by allowing collection within utility or road corridors that are being thinned or cleared.
6. Consider maintaining and expanding the partnership block program on the Carson.
7. Consider ways to inform the public about the effects from illegal wood cutting, to ensure the sustainability of quality habitat over the long term. Illegal woodcutting reduces the quantity and quality of woodland habitat, especially piñon pine and juniper.
8. During the planning process, consider uneven- or even-aged timber harvest methods that reflect the scale of natural disturbances and are designed to move toward desired conditions (e.g., related to size class distribution, species composition, patch size, fuel reduction, insects, and disease).
9. Consider using even-aged management prescriptions as a strategy for achieving the desired uneven-aged conditions over the long term or at the landscape scale. Even-aged prescriptions are appropriate when they would increase or maintain a trajectory toward desired conditions, such as to regenerate aspen or when mistletoe infections are moderate to severe and the ability of the area to move toward desired conditions has been significantly impaired.

10. Consider preparing pest control plans with forest health specialists that contain appropriate mitigation measures (e.g., planting resistant tree species, maintaining species diversity, removing damaged trees, and using pesticides) and monitoring procedures. Monitoring may include:
    a. Measuring effectiveness of treated areas.
    b. Determining effects on non-target organisms.
    c. Determining effects on water quality.
    d. Determining effects of pesticide that enters the soil or air.
11. Consider treatments within infrequent-fire vegetation communities (e.g., spruce-fir forest, mixed conifer with aspen, and piñon-juniper woodland) for ecological and socioeconomic benefits.
12. Consider designating and managing stands of mature and over-mature piñon for the gathering of piñon nuts and potentially restricting the harvest of fuelwood in these stands.
13. Consider placing woody debris cross-slope and in gullies to capture sediment and slow runoff.

Related Plan Content for Sustainable Forestry and Forest Products

Northern New Mexico Traditional Communities and Uses; Scenery

Photo credit: Allan Lemley

Recreation (REC)

Over the past 30 years, the number of recreationists and businesses that support outdoor recreation have increased significantly in northern New Mexico and on the Carson National Forest. The recreation-tourism industry is the largest economic contributor to the region, attracting visitors from all over the country. Many come to experience the strong cultural distinctiveness and almost mystical and mythical quality the area provides; others come to participate in various outdoor summer and winter pursuits or enjoy the beauty of the landscape.

As many as one million people visit the Carson annually. Most visit specifically for recreation. Generally, there are slightly more non-local recreational visitors than local recreational visitors.[41] Hiking, walking, downhill skiing, snowboarding, and wildlife and scenery viewing are the primary recreation activities. The Carson is also one of New Mexico's premier destinations for year-round mountain biking, with trails like the South Boundary National Recreation Trail that attract riders from around the world. It has special trout waters for fishing and high-quality hunting units. Other important recreation activities include off-highway vehicle and motorcycle riding, cross-country skiing, snowmobiling, rock climbing, gathering of forest products, and camping. There is interest in a wide variety of trail-based recreation opportunities. As the population in New Mexico and the popularity of mountain biking and off-highway vehicle use continue to grow, the pressure for more trails will likely increase. Any new trail development needs to strike a balance between opportunities for different types of recreation and other resource concerns. The Carson National Forest will continue leveraging partnerships and volunteers for the planning, implementation, and maintenance of trails and work to increase collaboration on specific trail funding via grant proposals and volunteer participation.

It is important that forest management recognizes that recreation is as diverse as the people who live in the area and use the Carson. The recreation program must be responsive to the interests of local users, as well as those who come from outside the area. Recreation on the Carson and in northern New Mexico takes on a different meaning for many of the local peoples and communities who have for many generations called northern New Mexico home. For them, recreation can be more personal. It means spending time with their families to enjoy the benefits the national forest has to offer. Fuelwood or piñon gathering becomes a family outing that may include a picnic or other family activity. A parent may take a son or daughter hunting, who in turn takes his or her child hunting. These traditional uses create strong social bonds and for many are considered important recreation activities. Many families have a favorite spot on the Carson: a dispersed camping area, a group shelter, or other location where families and friends can come together and celebrate weddings, birthdays, life-changing events, family reunions, and holidays.

Recreational opportunities can be grouped into the following types: (1) dispersed recreation, (2) developed recreation, and (3) motorized recreation. Dispersed recreation is any recreation outside of a developed site. It is the most popular form of recreation on the Carson and includes, dispersed camping, hiking, scenic viewing, wildlife watching, horseback riding, fishing, hunting, mountain biking, and cross-country skiing. Dispersed recreation may provide a more solitary experience, access to more remote areas, a closer connection with nature, or better wildlife viewing opportunities. Secluded, less-visited spots may also provide better hunting, foraging, and fishing opportunities or a place to camp undisturbed. Among all the dispersed uses across the national forest, trail use rates the highest in both the summer and

[41] Adhikari, D. and J.A. Thacher. 2015. Economic impact analysis of the Carson National Forest. Albuquerque, NM: Department of Economics, University of New Mexico.

winter. The Carson is also popular for large family groups that enjoy dispersed camping adjacent to Forest Service roads or water sources.

The Carson National Forest has a variety of developed recreation facilities, including campgrounds, picnic areas, mountain resorts, interpretative sites, fishing piers, overlooks, and trailheads. Developed recreation provides a more accessible experience and can provide parking, interpretive opportunities, shelters, running water, or other purpose-built facilities. In many cases, these sites are a gateway to the natural benefits that the Carson provides, such as trailheads and campgrounds, but others are an attraction themselves, such as group sites and fishing piers.

Most developed campgrounds on the Carson are fee sites and are operated by a concessionaire. The remaining fee sites are managed by the Forest Service through the Recreation Enhancement Act program. Some campgrounds are on a reservation system. Campgrounds are typically open from Memorial Day through Labor Day weekend. Use is highest in July and on summer holiday weekends. Most developed trailheads are near State highways and can be accessed year-round. Due to seasonal closures or poor road conditions, remote trailheads accessed from Forest Service roads are typically inaccessible in the winter.

Motorized recreation is popular across the Carson during the summer and fall. The Town of Red River draws many visitors who participate in motorized recreation activities during the summer months. In the fall hunting season, a significant increase in the use of off-highway vehicles occurs across the Carson. Motor vehicle use maps indicate where motor vehicle use is allowed on the national forest and can be found on the Carson's website.

The Carson also provides snowmobile opportunities in the winter. Recent below-normal snowfall and above-normal temperatures in most of New Mexico have resulted in few places that have reliable snowpack for snowmobile use. Portions of the Tres Piedras, Questa, Canjilon, and Camino Real Ranger Districts are destinations for winter motorized recreation on the Carson.

Recreational settings and experiences are defined by the recreation opportunity spectrum which identifies various levels of development available for recreational activities.[42] The spectrum uses physical, biological, social, and managerial settings, ranging from primeval to paved to guide recreation planning and management. Recreation settings ranging from least to most developed are primitive, semi-primitive-nonmotorized, semi-primitive motorized, roaded natural, rural, and urban. Desired recreation opportunity spectrum classes are mapped forestwide at a broad scale.[43] Local inconsistencies may exist. The map of desired classes may need to be updated in the future to resolve these inconsistencies or to account for changed conditions. Finer-scale project design may identify more precise boundaries for desired ROS settings than are represented on the forestwide allocation map. Any changes to accommodate proposed projects should be inconsequential in achieving or maintaining the broader area's desired setting over the long term.

Outdoor recreation contributes to provisioning, cultural, and regulating ecosystem services. Activities (e.g., hunting, fishing, and fuelwood and plant gathering) are important for providing food and the social cultural fabric of many local communities (provisioning and cultural ecosystem services). These activities help maintain or control wildlife populations to improve forest and watershed health (regulating ecosystem service). Popular recreation activities (e.g., camping, hiking, biking, and skiing) help connect

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[42] Refer to USDA Forest Service (1982). Recreation Opportunity Spectrum User's Guide.

[43] https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd883565.pdf

individuals and families to nature and contribute to tourism and the local economy (provisioning and cultural ecosystem services).

Future management of the Carson recreation program must be sustainable.[44] The Carson needs to provide healthy, safe, and well-maintained recreation opportunities that are important to local communities and visitors to the area. Many of the recreation facilities on the Carson were built 30 to 50 years ago and have reached the end of their useful life without significant maintenance investment. Some facilities currently receive little or no use and no longer serve the demand that existed in years past. A sustainable recreation program will be able to adapt to changes in demand, available resources, and opportunities. The overall goal of the sustainable recreation program on the Carson is to:

- focus resources on the most appropriate recreation opportunities to meet changing public desires and demands
- maintain or enhance visitor satisfaction with the sites and services provided
- meet quality health and safety standards at all developed recreation sites
- be financially sustainable
- be environmentally sound
- maintain community sustainability

Sustainable recreation program goals apply to developed recreation sites and motorized recreation, but also to the management of dispersed recreation opportunities. Because the ability to effectively maintain and manage all recreation sites is limited as a result of reduced funding, the Carson will need to seek innovative opportunities to fund, maintain, and enhance desired recreation sites and infrastructure through partnership opportunities with local communities and governments, as well as organizations. Community engagement is essential for creating a sustainable recreation program.

Recreation Desired Conditions (FW-REC-DC)

1 The unique cultural, historical, and ecological resources of the Carson are featured through recreation opportunities, education, and interpretation. Visitors are connected to the importance of the past, present, and future of the Carson.

2 Recreation activities important to traditional communities (e.g., hunting, fishing, camping, family and group gatherings, fuelwood and piñon nut collecting, and scenic driving) are available.

3 A variety of high-quality developed and dispersed recreation opportunities and activities are available to a diverse group of forest users, including persons with disabilities. Recreation opportunities are commensurate with the desired recreation setting and other natural and cultural resource values.

4 Recreation opportunities are sustainable and contribute to the economic, cultural, and social vitality and well-being of surrounding communities.

[44] Refer to USDA Forest Service (2010). Connecting People with America's Great Outdoors: A Framework for Sustainable Recreation.

5 Recreation opportunities, including motorized and non-motorized trails, are responsive and adaptable to changing uses and trends and are available commensurate with public interest, resource capacity, and other natural and cultural resource values.

6 Conservation education, visitor information (e.g., brochures, posters, and signage) and interpretative information engage diverse communities of visitors and locals. These resources are readily available and up-to-date, make use of current technology, and encourage increased forest stewardship, shared use of forest recreation resources, ecological awareness, visitor orientation, and knowledge of recreation opportunities.

7 Conflicts among various recreation uses and other forest uses are infrequent.

8 Vandalism, littering, theft, illegal activity, or resource damage from recreation activities are infrequent.

9 Recreation sites complement the Carson's scenery resources and scenic character. Facilities range from primitive to highly developed, with an emphasis on blending the facilities with the natural landscape.

10 Recreation resources and facilities are well maintained and function as intended.

11 A spectrum of developed recreation opportunities characterized by varying levels of development and amenities consistent to the recreation setting are available. The quality, locations, and variety of recreation sites and their associated amenities add to visitor satisfaction and resource protection.

12 Year-round dispersed recreation occurs in mostly undeveloped, natural areas consistent with the recreation setting and do not impact other cultural and natural resources.

13 A system of motorized and non-motorized trails is available in a variety of settings that provide differing levels of challenge, types of experiences, and linkages to local neighborhoods, communities, and other public lands.

Recreation Objectives (FW-REC-O)

1 Develop and accomplish at least one strategy that raises awareness of discouraged practices (e.g., illegal dumping, shooting practices, driving on closed roads) to promote visitor safety during each 10-year period following plan approval.

2 Develop at least two additional methods for providing visitor information and education during each 10-year period following plan approval.

3 Develop at least one collaborative partnership for the recreation program to expand public awareness, understanding, and promote responsible behavior during each 10-year period following plan approval.

4 Accomplish two actions to maintain recreational program relevancy every 5 years following plan approval.

5 Rehabilitate five to seven areas where dispersed camping is causing unacceptable erosion during each 10-year period following plan approval.

Recreation Standards (FW-REC-S)

1 Where primitive recreation settings are desired, construct or designate no new motorized roads, trails, or areas for public, administrative, or permitted use.

2 Where semi-primitive non-motorized recreation settings are desired, construct or designate no new permanent motorized roads, trails, or areas for public, administrative, or permitted use. Any temporary road construction where semi-primitive non-motorized recreation settings are desired must be decommissioned within 2 years of project completion.

Recreation Guidelines (FW-REC-G)

1 Recreation activities should be compatible with and managed adaptively to minimize impacts to at-risk species and ecological desired conditions, including in riparian management zones (e.g., along streams, around seeps, springs, lakes, and wetlands).

2 All project-level decisions and implementation activities should be consistent with recreation opportunity spectrum classes and setting descriptions in the desired recreation opportunity spectrum, to sustain recreation settings and opportunities.

3 Recreation facilities and improvements should be designed to minimize human and wildlife conflicts (e.g., bear-proof dumpsters; capped pipe used for fences, survey markers, and signposts; and wildlife egress in plumbing vents).

4 Managing the use of technological devices (e.g., drones, unmanned vehicles, robots) or recreational trends at developed recreation sites should be considered on a case-by-case basis, to protect public safety and other resources and to preserve quality recreation opportunities.

5 Dispersed sites that are no longer consistent with the area's scenic integrity objective or result in unacceptable ecological resource damage should be closed or rehabilitated.

Management Approaches for Recreation

1. Consider recreation strategies that are more economically feasible and adaptable, to include closing or decommissioning underutilized sites and infrastructure, developing new sites or trails, and upgrading existing infrastructure to meet user needs and desires.
2. Consider providing educational, safety, and other information that enhances the visitor experience at district offices, local visitor information centers, campgrounds, and other developed recreation sites.
3. Partner with local communities, skilled stewardship organizations, volunteers, other government agencies, cooperators, and permit holders to help co-manage a sustainable recreation program, including planning, design, implementation, operations, conservation education, and maintenance, especially of trails. Recognize partners for their roles in providing recreational opportunities.
4. Consider involving local communities in partnerships and fostering long-term relationships with stakeholders to facilitate and participate in the management of sustainable recreation on the Carson.
5. Consider working with partners and volunteers in the coordination, development, and delivery of educational and community outreach programs. Actively engage urban populations, youth, and underserved communities in programs.

6. Consider coordinating with partners early in project development using a clear and concise process, to elicit collaborative input on sustainable recreation opportunities, needs, and potential conflicts.
7. Consider developing motorized and non-motorized nested loop trail systems, improved connectivity of existing routes and communities, and opportunities for long distance travel.
8. Consider using a sign coordinator to build partnerships with other organizations and user groups, to help design, develop, and install new interpretive, trail, and developed recreation signage.
9. Consider working with partners, volunteers, and potentially a fee system to provide increased capacity and revenue for trail maintenance, planning, and construction.
10. Consider converting temporary roads and other unneeded roads into motorized or non-motorized recreational trails where appropriate and feasible for expanding recreation access.

Related Plan Content for Recreation

Alpine and Tundra; Riparian Management Zones; Streams; Waterbodies; Wetland Riparian; Forest and Shrub Riparian; Cliffs and Rocky Features; Wildlife, Fish, and Plants; Nonnative Invasive Species; Sustainable Rangelands and Livestock Grazing; Transportation and Forest Access; Facilities Infrastructure; Scenery; Special Uses; Partnerships; Wilderness; Wild and Scenic Rivers; National Scenic, Historic, and Recreation Trails; Haplopappus Microcephalus Botanical Area; Recommended Wilderness Management Area; Eligible Wild and Scenic River Management Area; Developed Winter and Summer Resort Management Area; Valle Vidal Management Area; San Antonio Management Area

Photo credit: Kathy DeLucas

Transportation and Forest Access (TFA)

The Carson transportation system includes both NFS roads and trails. The system roads consist of thousands of miles of arterial, collector, and local roads that are:

1. Open to the public, shown on the motor vehicle use map, and are maintenance level 2 through maintenance level 5.
2. Closed to the public for administrative use by the Forest Service, generally maintenance level 2.
3. Permitted for individual access, generally maintenance level 2.
4. Roads placed in storage, maintenance level 1.

Forest road maintenance levels, which convey the level of service provided by and maintenance required for a specific road, range from maintenance level 1 (basic maintenance is performed to prevent damage to ecological resources) to maintenance level 5 (provides a high degree of user comfort). Most of the road system on the Carson consists of roads managed to a maintenance level 2. Twenty-two bridges are also a part of the transportation system. The construction and maintenance of the road system includes the roadbed, culverts, drainages, signage, cut and fill, and clearing of brush and overgrowth. The Carson performs routine maintenance and upkeep with a dedicated road crew and uses contractors for larger, complicated projects. Future management of roads on the national forest will increasingly rely upon partnerships with many stakeholders to maintain the road system's integrity and vehicle safety.

Temporary roads are authorized by contract, permit, lease, other written authorization, or are necessary for emergency operations. A temporary road is not a forest road and not part of the forest transportation system and is not necessary for long-term management. Temporary roads are decommissioned upon completion of the project.

Forest access is also provided through a system of non-motorized and motorized trails. There are approximately 600 miles of non-motorized trails and 85 miles of motorized trails. Maintenance and improvements are completed primarily by a small seasonal crew. Future maintenance and improvement of trails will increasingly rely upon shared partnership and volunteer assistance. Trail system maintenance includes improving drainage, signage, and clearing dead and down trees and brush. Any new trails or major improvements will require substantial partner support for project planning, additional funding, analysis of effects, and implementation.

Motorized Access (Travel Management)

From 2010 to 2013, four separate environmental analyses were conducted to identify and designate 2,613 miles of road and 85 miles of trail open to motor vehicle use under the 2005 Travel Management Rule (36 CFR §§ 212, 251, 261, and 295). These roads and trails are identified on motor vehicle use maps by area: (1) Jicarilla Ranger District; (2) Tres Piedras, El Rito, and Canjilon Ranger Districts; (3) Questa Ranger District; and (4) Camino Real Ranger District. Some of the designated roads and trails are open seasonally, while others are open year-round. Currently, the Carson has no designated areas open to cross-country motorized use (e.g., play areas). Consistent with the Travel Management Rule, motor vehicle use off designated roads and trails or outside of play areas identified on a motor vehicle use map is prohibited on the Carson.

In the winter, the Carson is a destination for motorized over-snow use, with portions of the Tres Piedras, Questa, Canjilon, and Camino Real Ranger Districts open to snowmobiling. These areas are identified on the over-snow vehicle use map,[45] separate from the motor vehicle use map.

The designated road and motorized trail system provides motor vehicle (e.g., autos, trucks, off-highway vehicles, all-terrain vehicles, motorcycles, and e-bikes) access to areas on the Carson, including private land inholdings, recreation sites, fuelwood and forest product gathering areas, administrative and recreation facilities, and to support forest and resource management. This system allows visitors to gain access to the many provisioning and cultural ecosystem services important to them. Roads allow access for fuelwood gathering, hunting, fishing, hiking, mountain biking, and other forms of recreation. Local businesses and communities benefit from visitors who can safely access and experience the Carson on NFS roads and trails.

Unauthorized Roads

The 2015 Carson Travel Analysis Plan identifies opportunities for decommissioning, placing into intermittent stored service, or converting to other uses approximately 1,950 miles of non-system roads (e.g., user-created routes and old timber roads) on the Carson. These roads remain unauthorized until one of two decisions is made: (1) the permanent purpose of the road is determined and it becomes part of the Carson National Forest roads system, or (2) the road is determined to be necessary for emergency operations or authorized by contract, permit, lease or other written authorization, in which case it becomes a temporary road but not part of the roads system. System roads should be maintained to the standards required of their maintenance level. Temporary roads should be decommissioned at the end of their use. Unauthorized roads that are unneeded should be slated for decommissioning or converted to other uses.

Non-motorized Access

All Carson lands are open to the public and can be accessed through non-motorized means. To facilitate access and use, the Carson currently maintains approximately 600 miles of non-motorized trails. Like the road system, the non-motorized trail system allows visitors to gain access to the many provisioning and cultural ecosystems services important to them. This section provides forest management for the maintenance of its system trails. The Recreation section in this plan provides forest management for the many opportunities and experiences that can be provided by a well maintained and functional trail system.

Photo credit: Allan Lemley

[45] Or other, most current direction, such as the forest visitor map.

Transportation and Forest Access Desired Conditions (FW-TFA-DC)

1 Roads, bridges, and trails are sustainably-designed; well-marked and maintained; provide safe and reasonable access for public travel, recreation uses, traditional and cultural uses, and land and resource management activities; and contribute to the social and economic sustainability of local communities.

2 Motor vehicle use maps accurately reflect current designations.

3 The road and trail sign system is maintained and provides for traveler safety, location information, and compliance.

4 System road and trail infrastructure has minimal impacts on ecological and cultural resources.

5 Unauthorized roads and trails are determined for their purpose in the transportation system or determined to be unneeded. Unneeded roads and trails are decommissioned to reduce impacts to ecological resources (i.e., watersheds, wildlife, and soil erosion) and improve habitat connectivity.

Transportation and Forest Access Objectives (FW-TFA-O)

1 Obliterate or naturalize at least 20 miles of unneeded roads within each 10-year period following plan approval.

2 Grade surfaces and clean culverts and ditches on at least 500 miles of open NFS roads annually.

3 Maintain at least 100 to 300 miles of trails (including motorized) annually.

4 Maintain at least 10 to 20 percent recreation signage during each 5-year period following plan approval.

Transportation and Forest Access Standards (FW-TFA-S)

1 Motor vehicle use off the designated system of roads, trails, and areas identified on the Carson's most updated motor vehicle use map is prohibited, except as authorized by law, permits, or orders, to protect public safety and ecological resources.

2 Over-snow use outside of designated areas identified on the Carson's most updated over-snow vehicle use map[46] is prohibited, except as authorized by law, permits, or orders, to protect public safety and ecological resources.

3 Temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects must be decommissioned upon project completion, to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use.

[46] Or other, most current direction, such as the forest visitor map.

Transportation and Forest Access Guidelines (FW-TFA-G)

1 Unauthorized and maintenance level 1 roads within a project area should be evaluated for use (e.g., temporary, administrative use, placed in storage) prior to any new road construction, to minimize negative impacts to ecological and cultural resources.

2 Construction of new system roads should be accompanied by a mitigating action (e.g., decommissioning of other unneeded roads and trails), to offset any resource damage resulting from their construction.

3 All system roads not open to the public and unauthorized roads within an ecosystem restoration project area should be evaluated for need (e.g., administrative use, placed in storage, open to the public) or determined to be unneeded (available for decommissioning) to reduce the amount of system road maintenance.

4 Unauthorized roads and maintenance level 1 roads should be evaluated based on transportation system need, long term effects to adjacent resources, and capacity to maintain additional system roads in order to identify roads eligible for decommissioning.

5 Bridges and other structures determined to be important habitat for at-risk wildlife (birds, bats, etc.) should be retained unless demolition is necessary to ensure public safety.

6 Road and trail construction and maintenance activities should avoid or minimize habitat disturbance of known at-risk species, to maintain the persistence of at-risk species.

7 To improve habitat connectivity, methods that accommodate wildlife (e.g., fencing, underpasses, overpasses, larger culverts) should be used when constructing or reconstructing highways or high traffic volume Forest Service roads.

8 System roads and trails should accommodate terrestrial and aquatic wildlife species movement and habitat connectivity.

9 Where recreation or other management activities have the potential to trample known populations of at-risk plant species, activities should avoid or minimize habitat disturbance of known at-risk plant species to maintain the persistence of at-risk species.

10 To reduce erosion, maintain access, and minimize required infrastructure maintenance, projects should reconstruct or repair transportation infrastructure (e.g., reinstall water bars, rolling grade dips, catch basins, etc.) upon project completion when heavy use or modification of roads and trails is unavoidable.

Management Approaches for Transportation and Forest Access

1. Good relationships and communications with internal and external customers and partners are important. Consider notifying county and other potentially affected users (including permit holders) of changes in road status or significant deviations in traffic patterns of a month or longer.
2. Collaborative relationships with adjacent stakeholders and public land managers are actively encouraged to develop contiguous road and trail systems across multiple ownerships. Where possible, seek opportunities for acquiring access through private lands to promote road and trail connectivity and manageability.
3. Consider continuing current road maintenance agreements and seeking to enter into new agreements with other entities, including Federal, State, and local government agencies and private organizations and individuals to provide safe travel on all roads, as well as to prevent or mitigate resource damage.
4. While developing the proposed action for environmental analysis, consider incorporating decommissioning of roads that are redundant, adversely impact flow regimes, or cause resource damage.
5. Consider predicted future runoff and other climate related impacts when reconstructing existing or building new roads.
6. Consider maintaining a spatial database of existing roads, including unneeded roads and roads needed for public access, future project use, administrative use, temporary use, and access to private land.
7. Consider seasonally or permanently closing system roads or trails that adversely impact at-risk species habitats or developing alternative travel routes.

Photo credit: George Long

Facilities Infrastructure (FAC)

The Carson provides for the maintenance and construction of multiple facilities and sites on NFS lands. Most of this work is completed through the use of qualified private contractors. Facility infrastructure includes the site (e.g., driveways, parking, landscaping), buildings, and the utilities (e.g., electric, water, wastewater) that service the site and building. The Carson has both administrative and recreation sites and facilities that it must maintain as safe and functional for employee and public use.

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 Carson has many recreation facilities and sites that it manages. These include campsites, trail heads, scenic vistas, vault toilets, and other structure or sites that support recreation opportunity on the Carson. The Forest also maintains 22 dams within its boundaries.

Other infrastructure that the Carson constructs and maintains (e.g., fish barriers and range improvements), are addressed elsewhere in the land management plan. The Carson also manages communication sites and utility corridors through special use permits, but does not provide the maintenance or construction of these sites. This infrastructure is addressed in the special use section of the land management plan.

Facilities do not detract from ecological sustainability when they are properly designed, integrated within the landscape, and well maintained. Negative economic and social contributions could result from having to close sites because funds are inadequate for appropriate maintenance to keep sites safe for human use. Closures would reduce or limit opportunities to access and gain enjoyment from recreational resources and experiences. Ecological damage would result from a key dam failure, site erosion, or issues with septic systems.

Recreation facilities infrastructure (i.e., campgrounds, dams that support fishing areas, scenic vistas, and toilet facilities) allow for recreation opportunities, which support communities directly (e.g., ski area and outfitter guide jobs) and indirectly (e.g., increased tourism in community lodging, shops, and restaurants). A well planned, managed, and maintained Forest Service infrastructure allows for these opportunities.

Facilities Infrastructure Desired Conditions (FW-FAC-DC)

1. Facilities function as intended and are safe, well maintained, and accessible to persons with disabilities.
2. Facilities are energy-efficient and renewable energy, such as solar power and biomass technology, is used for a power source. Water consumption in Forest Service buildings, grounds, and related facilities is efficient and not wasted.
3. Facilities complement the Carson's scenery resources and character.

Facilities Infrastructure Guidelines (FW-FAC-G)

1. Facilities no longer used as intended should be repurposed to accommodate a new use or be decommissioned, to minimize maintenance backlog and infrastructure deterioration and protect public safety and health.
2. Facilities and structures should be designed and maintained to minimize impacts to terrestrial and aquatic species (e.g., bear-proof dumpsters; capped pipe used for fences, survey markers, and signposts; or wildlife egress in plumbing vents).

Scenery (SCEN)

Some of the finest mountain scenery in the Southwest is found across the Carson. Elevations rise from 6,000 to 13,161 feet at Wheeler Peak, the highest peak in New Mexico. The Carson offers breathtaking views of far off mountains, the valley below, and unsurpassed sunsets from almost every elevation. Green forests with expansive mountain meadows, winding streams, colorful wildflowers, and vibrant fall colors are all peppered throughout the Carson's broad landscape. The Carson also offers open landscapes full of desert vegetation and beautiful canyon backdrops rich in colorful clays. At night, the stars are unhindered by urban lights and provide a spectacular light show.

Research shows that there is a high degree of public agreement regarding scenic preferences and people tend to value most highly those landscapes that are more visually attractive and natural-appearing. Scenic characteristics are important in creating a sense of place for local residents and visitors alike. They provide a sense of attachment to nature and a feeling of serenity or excitement, depending on the purpose of the visit. The Carson is the scenic backdrop for many communities in northern New Mexico. Scenery defines the region's character and contributes to the experiences people seek on the national forest (cultural ecosystem services). All landscapes have definable scenic character attributes. In most national forest settings, scenic character attributes are positive natural elements, such as landform, vegetation patterns, and water characteristics.

The Carson National Forest uses the scenery management system as a communicative tool for integrating scenery with the values and needs of other resource disciplines. Under this system, places are based on people's shared image of specific geographic areas and serve as the primary unit for the Carson National Forest scenery management system inventory. Places establish the physical context of recreation settings. Places serve well as an interdisciplinary analysis unit, to foster open public dialog, provide geographic focus and a shared understanding of resource issues, and build supportive relationships necessary for community-based ecosystem stewardship. Places focus on the aesthetic, recreational, and social values of a geographic area, reflecting its history, culture, social meaning and human attachments to the land, as well as the bio-physical attributes of an area.

During the process of identifying places, the physical boundaries are of less importance than their core values. These values create a "sense of place" and make each place important and unique. Key attributes of places may range widely and can include social, emotional, mental, spiritual, political, economic, aesthetic, occupational, recreational, biological, and physical aspects. These places encompass multiple jurisdictions and ownerships.

Scenic character is the unique combination of the physical, biological and cultural images that give each place its positive scenic identity. By identifying the existing valued attributes, landscape character provides a frame of reference to determine scenic attractiveness, measure scenic integrity, and describe the recreation setting. Scenic character is described throughout this plan through introductory descriptions and desired conditions.

Scenic classes describe the importance or value of a particular landscape or portions of that landscape based on a combination of scenic attractiveness and landscape visibility. Scenic classes and existing scenic character help determine scenic integrity objectives for a management activity.

Scenery Desired Conditions (FW-SCEN-DC)

1 The Carson contains a variety of ecologically sound, resilient, and visually appealing landscapes that sustain scenic character in ways that contribute to visitors' sense of place and connection with nature.

2 Natural-appearing landscapes are interconnected throughout the Carson and connected to natural landscapes outside the national forest boundary.

3 Landscapes possess vegetation patterns and compositions that are naturally variable in appearance and contribute to scenic values. The natural and cultural features that provide a sense of place are intact.

4 Visitors have opportunities to experience important scenic elements (e.g., fall colors, rolling grasslands, picturesque vistas, and green riparian corridors).

5 The Carson appears predominantly natural and human activities do not dominate the landscape.

6 High-quality scenery dominates the landscape in areas that the public values highly for scenery (e.g., scenic byways, major roads and trails, and developed recreation sites) and in areas with high scenic integrity (e.g., wildernesses, wild and scenic rivers [wild classification only], inventoried roadless areas).

7 Scenery reflects ecosystem diversity, enhances recreation settings, and contributes to the quality of life for local residents and communities, as well as for forest users from outside the area.

Scenery Guidelines (FW-SCEN-G)

1 Constructed features, facilities, and other infrastructure activities should blend with the natural appearing landscape and complement the natural setting.

2 Management activities should minimize visual disturbances and be consistent with or move the area toward achieving scenic integrity objectives:

a. In areas with very high scenic integrity objectives, the scenic character should have only minor, if any, deviations.[47] The areas should appear unaltered, with most of the area dominated by ecological processes. Range facilities are allowed, but mitigation measures should be used to minimize impacts to scenic quality.

b. In areas with high scenic integrity objectives, the scenic character should appear intact but may include deviations that are not evident (e.g., deviations 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, manmade structures and facilities should not dominate the scenic character (e.g., deviations are subordinate to the scenic character).

[47] Deviations as defined by Agricultural Handbook 701 (USDA FS 1995) are departures from scenic character and can be positive, negative, or have no effect.

d. In areas with low scenic integrity objectives, the scenic character may appear moderately altered. Management activities including manmade structures and facilities may begin to dominate the scenic character but borrow valued attributes that are compatible with or complementary to the landscape (e.g., attributes of size, shape, form, line, color, texture, patterns, or architecture from outside the landscape being viewed).

3 Management activities that result in short-term impacts inconsistent with desired scenic character should achieve scenic character goals over the long term. Short-term and long-term timeframes should be defined during site-specific project planning.

4 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 Scenery

1. Consider displaying interpretive or informational signs at sites with impacts to scenery to inform the public about the nature and consequences of such projects or events.
2. Consider cooperating 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 Carson, including along scenic byways.

Photo credit: Leeann Murphy

Special Uses (SU)

Special use permits are partnerships between the Forest Service and private businesses, academia, non-governmental organizations, or individuals to provide services to the public. Special uses are divided into two categories–lands and recreation. Additional direction for managing special uses is specified in regulations and Forest Service directives.

Lands special use permits are authorized for infrastructure-related uses, such as communication sites, utilities (e.g., electrical, communication, and internet lines), pipelines (e.g., natural gas and water), road access, sanitation, community water, recreation residences, and alternative energy development. Activities such as research, monitoring, and commercial filming are also permitted uses. Access to land surrounding communities is particularly important where those communities are surrounded by federal lands. Some existing cemeteries are permitted on the Carson National Forest. Communication sites are critical to ensuring good communications across northern New Mexico and contributing to national infrastructure systems. Utility and energy transmission rights-of-way, along with communication sites, are generally long-term commitments of NFS lands. Requests to use NFS lands for communication sites have increased over the past few years and will likely continue to increase. More demand for utility lines, renewable energy sources, community infrastructure, and private land access on NFS lands is also expected. Figure A-1 displays designated communication sites and transmission utility corridor locations on the Carson.

Recreation special use permits are authorized when the proposed activities support the Forest Service mission, meet demonstrated public needs, and are consistent with the desired conditions for the area where the use will occur. Permitted private commercial ventures include ski areas, outfitters and guides, and events. Issuing recreation permits enables the Forest Service and its partners to serve visitors and local communities by providing a broad range of nature- and heritage-based outdoor recreation and tourism opportunities that promote the responsible use and enjoyment by local communities and their visitors. These permitted uses also promote economic sustainability in local communities through the commercial opportunities provided by special use permits directly, through jobs created by the permit holder, and indirectly, through spending by the clients of a permit holder.

The administration of lands special use permits seeks to minimize impacts to forest resources and ecosystem services, such as scenic vistas (cultural ecosystem service) and wildlife habitat and soil function (supporting ecosystem services), while still meeting the infrastructure needs of the public (provisioning ecosystem services). Permitted recreation activities provide the opportunity for guided hunting and fishing, or accessing a wilderness on horseback just to experience natural surroundings in a primitive setting (cultural and provisioning ecosystem services). Recreation special use permits are mostly authorized to small businesses that help support local communities and economies (provisioning ecosystem services) and contribute to the social vitality and quality of life by promoting recreational and educational opportunities (cultural ecosystem services).

Special Uses Desired Conditions (FW-SU-DC)

1 Special uses contribute to the local economy by providing small business opportunities.

2 Special uses activities support the public's need, and conflicts with multiple-use opportunities afforded to other forest users are minimized.

3 The number of communication sites are the minimum required to meet the needs of the Forest Service and serve the public.

4 Permitted utility infrastructure is in the public interest and is the minimum required to meet the needs of the public.

5 Vegetation conditions and land uses within a right-of-way or easement facilitate the operation and management of the associated facilities and structure and may differ from the surrounding vegetation desired conditions.

6 Recreation special uses provide unique opportunities, services, and experiences for the recreating public and address a demonstrated demand for a specific recreation opportunity.

7 Services provided by recreation special uses enhance the recreation experiences of forest visitors, increase public understanding and respect for the Carson National Forest and nearby communities, provide for public health and safety, and have minimal impact to ecological and cultural resources.

8 Permitted outfitter and guide activities do not conflict with the experiences of other forest visitors.

Special Uses Standards (FW-SU-S)

1 Communication equipment or system upgrades at designated sites must not interfere with other services.

2 Designate no new transmission utility corridors.

3 Use of domestic sheep or goats through special use permit authorization (e.g., by outfitters and guides or for filming) is prohibited in bighorn sheep occupied habitat[48] or areas of high risk of contact.[49]

[48] As defined by New Mexico Department of Game and Fish or best available science

[49] Based on risk of contact models or best available science.

Special Uses Guidelines (FW-SU-G)

1 Communication equipment, pipelines, powerlines, fiber optic lines, and associated infrastructure should be co-located or adjacent and in the same corridor to minimize environmental disturbance.

2 To prevent unnecessary environmental disturbance, local energy distribution lines and smaller pipelines should be located in conjunction with the existing road system or other previously disturbed areas.

3 To prevent unnecessary environmental disturbance, existing utility rights-of-way should be used to their capacity, before evaluating new routes.

4 New or upgraded energy and utility lines should be located and designed to minimize impacts to wildlife, scenery, and wildfire risk.

5 Existing communication sites should be used before designating new sites, to minimize impacts to ecological and cultural resources.

6 Organized group events (non-motorized and motorized) authorized under a special use permit should be limited to existing NFS trails and roads, suitable developed sites, or where resource impacts are determined to be minimal.

Management Approaches for Special Uses

1. Consider authorizing special use permits for recreation events and outfitting and guiding services based on any current and future capacity studies and administrative capabilities.
2. Consider using tools that assist in efficiencies to the program or that expand administrative capacity (e.g., Environmental Assessment and Decision Making, special use modernization efforts, regional billing team, proposed statewide outfitter/guide permits).
3. Consider including reference to the most recent edition of “A Guide to Maintaining the Historic Character of Your Forest Service Recreation Residence” in the operations and maintenance plan of recreation residence special uses authorizations to provide guidance on any improvements or maintenance to eligible historic or unevaluated recreation residences.
4. Consider coordinating with the New Mexico Department of Game and Fish during special use permit authorization of domestic sheep or goat use.

Lands (LAND)

The Carson encompasses 1,587,097 total acres, with 1,486,372 acres administered by the Forest Service and 100,725 acres in other ownership within the national forest boundaries. Many of the other ownership areas are small towns and communities, but a large number are small parcels of privately owned lands. In addition, much of the national forest boundary adjoins State, BLM, and tribal lands. Ecological processes are seldom confined by administrative and jurisdictional boundaries; therefore, the impacts of management policies on adjacent lands must be recognized by the Carson. 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 decide on common goals for the landscapes they share. It brings them together to achieve long-term outcomes. Our collective responsibility is to work through landscape-scale conservation to meet public expectations for all the services people get from forests and grasslands.

The lands program handles land adjustments and identifies and maintains land line locations between National Forest System (NFS) lands and lands of other ownership. Boundary identification is important to prevent encroachment onto NFS lands. Land adjustments consolidate and improve management efficiency of resources through real estate transactions, including sales, purchases, exchanges, conveyances, donations, and rights-of-way within the Carson National Forest boundary.

Lands Desired Conditions (FW-LAND-DC)

1. NFS lands exist as a mostly contiguous land base that best provides for and contributes to long-term socioeconomic diversity and stability of local communities, management of vegetation and watershed health, wildlife habitat and diversity, and recreation and scenic opportunity.
2. Rights-of-way provide access to private property inholdings.
3. Forest boundaries are identified and correctly marked.
4. Right-of-way access to NFS lands exists where required through other lands.

Lands Guidelines (FW-LAND-G)

1. Rights-of-way for roads, utilities, and communications sites should maximize use of existing infrastructure before new uses are authorized, to minimize natural resource impacts.
2. Only one access route should be authorized to each private property inholding, regardless of the number of property owners. No new access points to private property should be authorized if a parcel is subdivided, to minimize natural resource impacts on NFS lands.
3. Right-of-way authorizations should be granted only when no other reasonable access alternatives exist, to minimize road impacts and maintain long-term transportation system viability.
4. Land ownership adjustments should consolidate and improve management efficiency of resources through real estate transactions, including sales, purchases, exchanges, and conveyances.

Management Approaches for Lands

1. Collaborative relationships with adjacent stakeholders and public land managers are actively encouraged to develop contiguous habitat connectivity across multiple ownerships.
2. Collaborative relationships with rural historic communities that are dependent on the Carson are actively encouraged to ensure traditional and cultural uses are incorporated into the management of any newly acquired lands.
3. Consider working with private landowner easement grantors to maintain continued access.
4. Consider prioritizing land acquisition or conveyance to improve management efficiency, further resource protection and use, or to serve the broader needs of the community within the scope of the authorities provided for these types of transactions.
5. Consider working with interested stakeholders to identify suitable parcels for acquisition and to explore funding opportunities, grant opportunities, and private financing.

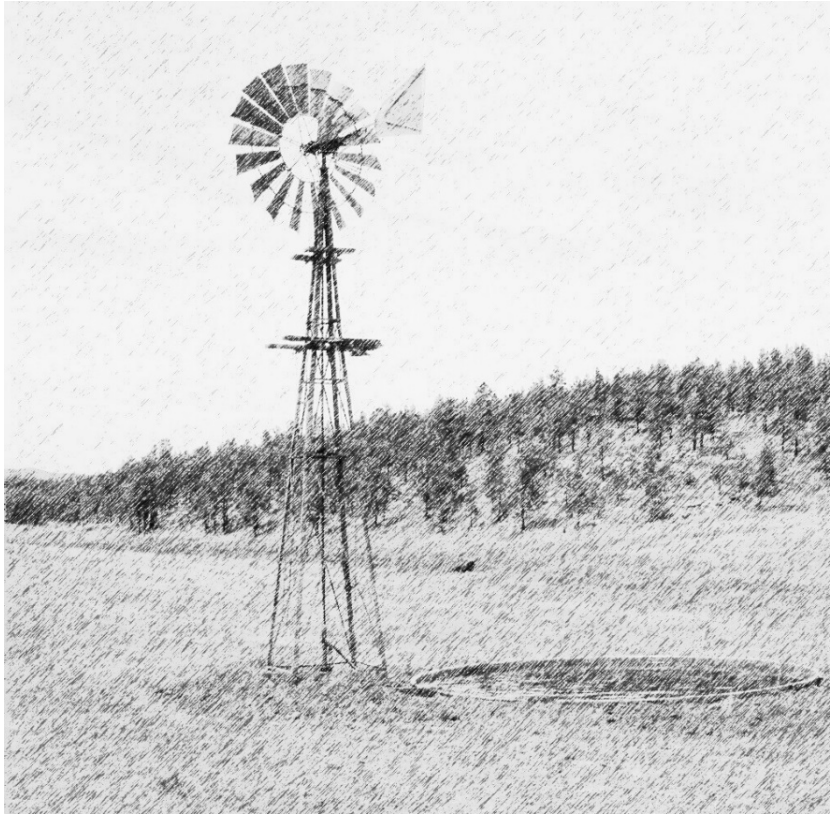

Photo credit: Michael Casados

Wildland Fire Management (FIRE)

Wildland fire is any non-structure fire that occurs in the wildlands, including unplanned human-caused fires, naturally caused fires, or prescribed fires (i.e., planned ignitions).[50] Most of the vegetation on the Carson National Forest is adapted to recurrent wildland fires started by lightning from spring and summer thunderstorms. Frequent low- to moderate-intensity fires play a vital role in maintaining the health of many fire-adapted ecosystems (supporting and regulating ecosystem services). Fire—both planned and unplanned—is a tool for restoring these fire-adapted ecosystems, if properly managed. When appropriate weather and fuel conditions exist, the use of wildland fire is a cost-effective tool for reducing the likelihood of uncharacteristic wildland fire and restoring ecosystem function.

The risk of uncharacteristic wildland fire can be reduced when fires occur within a vegetation type's historic fire regime. Vegetation structures that are more consistent with desired conditions support ecosystems that are resilient to fire disturbance. In addition to fire treatments, management activities, such as thinning and tree harvesting, may be needed to reduce tree density and canopy cover and support the natural fire regime. Strategic placement and design of fuels treatments are key to efficiently minimizing the impact from fire on values to be protected, because these activities are costly and there is limited capacity to accomplish them.

The wildland-urban interface is the area or zone where structures and other human development meet and intermingle with undeveloped wildland or vegetation fuels. Generally, the wildland-urban interface is a buffer of at least 0.5 mile around communities, private lands, or other infrastructure, though it may vary based on topography, fuels, and values at risk. This plan does not define wildland-urban interface boundaries. It may be most helpful to think of the wildland-urban interface not as a place, but rather as a set of conditions that can exist in and around nearly every community and surround other infrastructure. These conditions are defined by the amount, type, and distribution of vegetation; the flammability of the structures (homes, businesses, outbuildings, decks, fences) in the area and their proximity to fire-prone vegetation and other combustible structures; weather patterns and general climate conditions; topography, hydrology, average lot size, road construction, and more.

Wildland Fire Management Desired Conditions (FW-FIRE-DC)

1. 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.
2. Naturally ignited and planned wildland fires protect, maintain, and enhance resources and move ecosystems toward desired conditions. Fire functions in its natural ecological role on a landscape scale and across administrative boundaries, under conditions where safety and values at risk can be protected. In frequent fire systems, regular fire mitigates high-severity disturbances and protects social, economic, and ecological values at risk.
3. Planned and natural ignitions predominate. Unplanned human-caused ignitions are rare.
4. Wildland fires do not result in the loss of life, investments, infrastructure, property, or cultural resources, or create irreparable harm to ecological resources.

[50] Guidance for the implementation of Federal Wildland Fire Management Policy (Fire Executive Council 2009) provides for the consistent implementation of the 1995/2001/2003 Federal Fire Policy.

5 Wildland fires in the wildland-urban interface are predominantly low to moderate intensity. Residents living within and adjacent to the national forest are knowledgeable about wildfire protection of their homes and property, including providing for defensible space.

6 Wildland fire is understood, both internally and by the public, as a necessary disturbance process integral to the function and sustainability of ecosystems.

Wildland Fire Management Standards (FW-FIRE-S)

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

2 The response to wildfire must be spatially and temporally dynamic based on a risk management approach, while accomplishing integrated resource objectives.

3 Managers must use 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.

4 When determining the appropriate response to a wildfire, the agency administrator must consider firefighter exposure, risk, values, cost, and likelihood of success before trying to limit the size of wildfires.

5 Unplanned, human-caused fires must be managed using a suppression strategy and appropriate management responses to protect life, firefighter and public safety, investments, infrastructure, and valuable resources (e.g., cultural resources, wildland-urban interface).

6 Aerial application of retardant in live water, wetlands, and riparian areas must be avoided unless necessary to protect human safety or prevent property loss.

7 Planned ignitions in wildernesses must not be justified because they improve wildlife habitat, maintain vegetation types, improve forage production, or enhance other resource values—although these additional effects may result.[51]

[51] Planned ignitions may be used to reduce to an acceptable level the risks and consequences of wildfire within wilderness or escaping from wilderness.

Wildland Fire Management Guidelines (FW-FIRE-G)

1 To restore fire on the landscape and progress toward ecological desired conditions (as described for various resources throughout the plan), naturally ignited fires (including those occurring in designated areas) should be allowed to perform their natural ecological role to meet multiple resource objectives.

2 Response to unplanned ignitions that cross jurisdictional boundaries should be coordinated and managed to meet the jurisdictional agency's objectives.

3 Measures should be taken to prevent entrapment of fish and aquatic organisms and the spread of pathogens (e.g., chytrid fungus, Didymo, and whirling disease) when drafting (withdrawing) water from streams or other waterbodies for fire suppression activities.

4 Measures should be taken to prevent the spread of invasive plant species by equipment, personnel, or rehabilitation operations.

5 Minimum-impact suppression techniques should be used in designated areas and when impacts to sensitive resources (including wilderness and known rare or sensitive plants) could result during fire suppression activities.

6 The wildland-urban interface should be spatially delineated for projects that manage toward wildland-urban interface-specific desired conditions, to identify where those desired condition are applicable.

7 Fire management activities should protect cultural resources, with priority given to known sites where eligibility is unevaluated and to historic properties.

8 Fire management activities should be conducted in a manner that avoids compromising the persistence of at-risk species.

9 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.

Management Approaches for Wildland Fire Management

1. 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. Incident objectives and corresponding courses of action are based on interdisciplinary assessment of anticipated fire effects to site-specific values.
2. In areas that are moderately to highly departed from desired conditions, consider accepting higher fire intensities and associated fire effects at the fine scale. Multiple small areas of high mortality may be preferable to a single large, high-severity event.
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. Consider working with fire and project managers to develop practices and protocols to reduce unplanned human ignitions through information, education, and interpretive programs. Educate the public about their responsibility to help reduce human-caused wildfires by providing information in the form of signage, public contacts, and fire restrictions.
5. Consider planning and accomplishing fuels projects, planned ignitions, and all hazard response by working collaboratively with Federal, State, and local governments; local fire departments; and private landowners.
6. Consider using the best available science to prioritize treatments based on their benefit to ecological integrity or the ability to manage future fires to protect values at risk.
7. Consider assigning a wilderness resource advisor to all fires in wilderness that are not suppressed during initial attack.

Related Plan Content for Wildland Fire Management

Nonnative Invasive Species (NIS); wildland-urban interface desired conditions for each vegetation community.

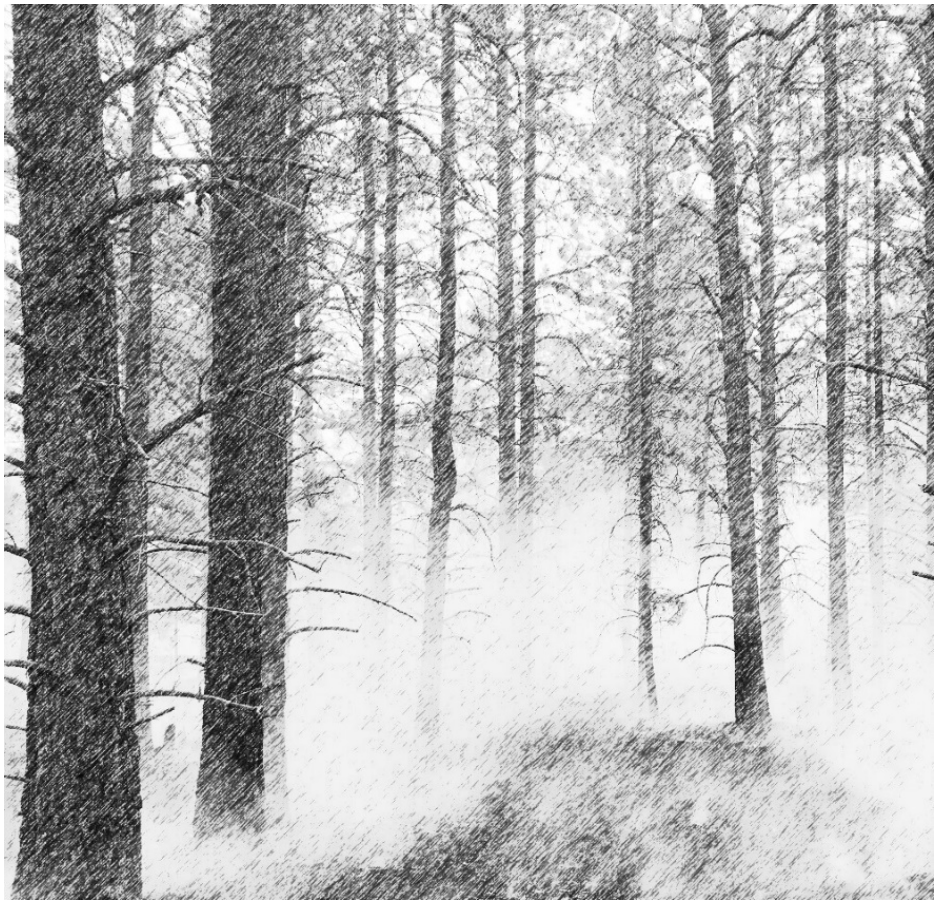

Photo credit: Kathy DeLucas

Minerals and Mining (MM)

Minerals of economic interest are classified as leasable, salable, or locatable. Coal, oil shale, oil and gas, phosphate, potash, sodium, geothermal resources, and all other minerals that may be acquired under the Mineral Leasing Act of 1920 (30 U.S.C. 181), as amended, are referred to as leasable minerals. Common varieties of rock, sand, stone, gravel, pumicite, and clay that may be acquired under the Materials Act of 1947 (30 U.S.C. 601–604) are considered salable minerals or common variety mineral materials. Minerals that are not salable or leasable (e.g., gold, silver, copper, tungsten, and uranium) are referred to as locatable minerals. Locatable mineral deposits include most metallic mineral deposits and certain nonmetallic and industrial minerals. Locatable minerals are subject to the General Mining Act of 1872 (30 U.S.C. 22-42), as amended, and for the most part, are outside the scope of this plan.

No active locatable mineral mines occur on the Carson, although uranium deposits do exist, and there are two inactive uranium mines. The Carson contains numerous abandoned gold and silver mines, and several streams are used for recreational gold panning. There are known rare-earth deposits in the Petaca Mining District.

Within Valle Vidal of the Questa Ranger District, the Valle Vidal Protection Act of 2005 (Public Law 109-385) withdraws (1) all forms of entry, appropriation, and disposal under the public land laws; (2) location, entry, and patent under the mining laws; and (3) operation of the mineral leasing and geothermal leasing laws and common variety mineral materials laws. This withdrawal is subject to valid existing rights. A private corporation currently holds coal rights on approximately 60,000 acres of Valle Vidal.

Saleable materials on the Carson include sand and gravel, decorative stones, and clay. The Carson provides opportunity for local communities to harvest these products from designated areas. The current use of these materials is such that existing sites can remain functional over an extended time.

Renewable energy sources on the Carson are limited to solar and geothermal energy. The Carson does not have any water resource that could support hydropower development and, due to terrain and accessibility issues, the Carson is considered to have low wind power potential. The Forest does have good potential to provide solar and geothermal power as a source of renewable energy. No existing renewable energy sources have been developed on the Carson for commercial or noncommercial use.

Mining and mineral resources provide provisioning and cultural ecosystem services important to communities and people around the Carson. 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.

Minerals and Mining Desired Conditions (FW-MM-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, restoring them to a natural condition.

3 Mining activities are not visually evident along major highways.

4 Information on Forest Service operating requirements and opportunities for recreational gold prospecting, gold panning, and related activities are available.

5 Common variety mineral materials are available for personal and commercial use consistent with other resource desired conditions.

Minerals and Mining Standards (FW-MM-S)

1 Limit structures or occupancy for mining purposes to only those that are necessary and incidental to approved mining operations.

2 Oil and gas leasing, exploration, and development are prohibited outside the Jicarilla Natural Gas Management Area (JICMA), until a leasing analysis has been conducted in accordance with 36 CFR 228 § 102.

3 Mining operators using suction dredging with a 2-inch hose or larger or excavating more than 2 cubic yards per year must be notified if a plan of operation is required as indicated by the area involved, the nature of the proposed operations, the route of access to the area of operations, and the method of transport.

Minerals and Mining Guidelines (FW-MM-G)

1 To reduce erosion, restoration and reclamation of surface disturbance associated with mineral activities should be implemented to achieve 70 percent of groundcover (as compared to nearby undisturbed areas) with permanent weed-free native vegetation within three growing seasons.

2 To reduce ecological impacts, reclamation should be carried out concurrently with mining. Restoration of the environment takes place at the earliest opportunity for each area on a mine site.

Management Approaches for Minerals and Mining

1. Consider the potential to use sites for mineral collection areas during the development of a reclamation plan.

Partnerships (PART)

Successful implementation of the land management plan will require the development of new and existing collaborative partnerships with Federal, State, and local governments; federally recognized tribes and pueblos; non-profit organizations; private landowners; and the public. Collaborative partnerships may include identifying, planning, funding, and implementing projects and activities together with others. Partnership opportunities begin with building strong relationships. Partnerships with rural historic communities, land grant-merced and acequia governing bodies, and federally recognized tribes will improve trust and contribute to projects that best provide for cultural, social, and economic needs. Partnerships with other government entities and nonprofit organizations will increase the Carson's ability to do quality restoration work and to develop and provide improved recreation opportunities.

The Forest Service does not expect to have the personnel or funding resources to successfully execute the many projects desired by the public and communities who use the Carson National Forest. Partnering with others across boundaries creates a dynamic of shared work, assets, and ideas and will lead to ecological, social, and cultural projects that benefit the greater forest community.

Partnerships Desired Conditions (FW-PART-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, monitoring, sustainable 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.

4 Volunteer and partnership opportunities continue to expand over time but remain within the Carson's management capacity.

Management Approaches for Partnerships

Management approaches related to partnerships are integrated throughout this plan in other sections.

1. Consider increasing internal knowledge through training in grants and agreements and the various authorities that facilitate the creation of formal partnerships.

2. Consider collaborating with academia, State and private agencies, Forest Service Rocky Mountain Research Station, and other groups to expand monitoring capabilities including the use of citizen science.

Chapter 3. Designated Areas and Management Areas Plan Components

Plan components for a designated or management area 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 conflicts with the management emphasis of the management area. For example, a forestwide desired condition in the spruce-fir forest vegetation community (SFF) describes openings to be maintained by natural processes, while a desired condition for the developed winter and summer resort management area (DEVRES) describes resort activities playing a dominant role in maintaining created grassy openings intermixed with forested areas.

Where designated areas, management areas, or forestwide direction overlap and contain conflicting plan direction, designated area plan direction takes precedence over management area direction, and management area direction takes precedence over forestwide direction. When plan direction is compatible, it is applied for all overlapping areas. When management areas overlap, the plan direction for each area will not conflict and plan direction for each area applies.

Designated Areas (DA)

The Carson has areas that contain special, exceptional, or unique values that provide important ecosystem services. Many of these areas meet the criteria to be considered special places and are awarded specially designated status. Designation protects the special values of the area and the ecosystem services those values provide. This status can be on a national, regional, or local scale. The term “designated area” refers to categories of areas or features established by, or pursuant to, statute, regulation, or policy. Designated areas are established 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. Management direction for each of the designated areas is presented in the sections that follow. The designated areas on the Carson are:

- Vallecitos Federal Sustained Yield Unit (VFSYU)
- Wilderness (WILD)
- Wild and Scenic Rivers (WSR)
- Inventoried Roadless Areas (IRA)
- National Scenic, Historic, and Recreation Trails (NTRL)
- National Scenic Byways (NSBW)
- Wild Horse Territories (WHT)
- Sangre de Cristo Pea Clam Zoological Area (ZOO)
- Haplopappus Microcephalus Botanical Area (BOT)

Vallecitos Federal Sustained Yield Unit (VFSYU)

The Sustained Yield Forest Management Act of 1944 authorized the Secretary of Agriculture to create federal sustained yield units. In 1946, northern New Mexico was facing issues of community poverty, overgrazing, and new demands for timber off National Forest System (NFS) lands. To address these issues and mitigate the effects of recent grazing reductions in the Vallecitos area, the Forest Service created the Vallecitos Federal Sustained Yield Unit (Figure A-2) in 1948, allocating 73,400 acres of NFS lands toward sustained yield management. The primary purpose of the Vallecitos Federal Sustained Yield Unit is to provide the maximum feasible, permanent support to the Vallecitos community and nearby areas, including Petaca and Cañon Plaza, from forest products industries obtaining a wood products supply from the national forest lands of the unit.

Currently, there is no operable sawmill nearby to manage the Vallecitos Federal Sustained Yield Unit as originally intended. The Carson continues to plan and accomplish thinning and fuels reduction projects in the Vallecitos Federal Sustained Yield Unit. Many of these projects are carried out for the purpose of decreasing fire hazard and maintaining the health of the forested ecosystems in the Vallecitos Federal Sustained Yield Unit. The additional purpose and benefit of many of these projects is to make fuelwood accessible and available for the surrounding communities. More recently, there has been small-scale thinning activity in the Vallecitos Federal Sustained Yield Unit, due to approved operators obtaining grant monies from the Collaborative Forest Restoration Project. These projects have been the only activity with respect to forest management in the Vallecitos Federal Sustained Yield Unit over the past 10 years. The projects have thinned acres and provided fuelwood to local communities on a small scale.

Vallecitos Federal Sustained Yield Unit Desired Conditions (DA-VFSYU-DC)

1. The Vallecitos Federal Sustained Yield Unit provides continuous support to the Vallecitos community and nearby areas with forest products.
2. Timber products are available from the Vallecitos Federal Sustained Yield Unit, to support a sawtimber industry that maintains steady employment opportunities for a local resident workforce and to provide the ability to obtain lumber for local community needs.
3. Local residents have opportunities for harvesting forest products within the Vallecitos Federal Sustained Yield Unit, to establish a wood products business.
4. Local communities have opportunities to obtain forest products from the Vallecitos Federal Sustained Yield Unit for their requirements.
5. Vegetation within the Vallecitos Federal Sustained Yield Unit is consistent with desired conditions for Mixed Conifer with Aspen, Mixed Conifer with Frequent-Fire, and Ponderosa Pine Forest.

Vallecitos Federal Sustained Yield Unit Guideline (DA-VFSYU-G)

1. The Vallecitos Federal Sustained Yield Unit should be managed according to the most recent policy statement.

Wilderness (WILD)

In 1964, Congress acknowledged the immediate and lasting benefits of wild places by passing landmark legislation that permanently protected some of the most natural and undisturbed places in America. 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 Carson manages six wildernesses (Figure A-3), comprising around 110,662 acres or 7.5 percent of the Carson. Four of these are completely managed by the Carson and the other two have shared management with the Santa Fe National Forest.

Wheeler Peak Wilderness

The Wheeler Peak Wilderness was designated by Congress in 1964. It is located in the Sangre de Cristo Mountains, the southernmost reach of the Rockies and spans 18,457 acres (Figure A-3). Wheeler Peak, is the highlight of this area; rising to 13,161 feet above sea level, it is the highest point in New Mexico. This feature attracts many visitors, making Wheeler Peak the most heavily used wilderness within the Carson.

Many of the high peaks and ridges in this area are covered by alpine tundra, rare in the American Southwest. Rocky Mountain big horn sheep are abundant year-round in this habitat type and may exhibit habituation to human presence, allowing visitors to gain a close look at these unique animals. The Wheeler Peak Wilderness is also home to elk, mule deer, golden eagles, marmots, martens, pikas, mountain lions, and black bears. Perhaps the most unusual resident of this area is the white-tailed ptarmigan found in the alpine tundra. Approximately 40 inches of precipitation fall in the Wheeler Peak Wilderness annually, making the winter months ideal for backcountry and cross-country skiing, as well as snowshoeing.

Aside from having the tallest peak in New Mexico, Wheeler Peak Wilderness also has easy access that is paved up to its trailheads. There are limited opportunities for solitude in portions of this wilderness, given its high level of use. The boundary for the Wheeler Peak Wilderness was modified to allow mountain bike use on the Lost Lake loop under the same 2014 legislation that designated the Columbine-Hondo Wilderness, resulting in no net loss of wilderness acres. The Wheeler Peak Wilderness has a 'limits of acceptable change' document guiding management of the area.

Pecos Wilderness

The Pecos Wilderness was also designated by Congress in 1964. Jointly managed with the Santa Fe National Forest, the Pecos Wilderness spans a total of 250,020 acres in the Sangre de Cristo Mountains, southeast of Peñasco and north of Santa Fe (Figure A-3). The Carson manages about 25,000 acres north of the Santa Barbara Divide Trail, which is the least visited portion of the wilderness. Currently, the northern portion of the Pecos Wilderness is the largest wilderness managed by the Carson.

Elevations on the Carson side of the Pecos Wilderness range from 8,000 to 12,835 feet, atop Jicarita Peak. South Truchas Peak (13,103 feet), the second highest point in New Mexico, is located just south of the Santa Barbara Divide, on the Santa Fe National Forest side of the Pecos Wilderness. Stands of spruce, fir, pine, and aspen are interspersed with canyons, mesas, rugged peaks and ridges, clear streams, meadows, and multiple lakes. The topography and scenery of this wilderness are diverse, creating a myriad of opportunities for recreation and habitat for elk, mule deer, black bear, turkey, and Rocky Mountain big horn sheep.

On the Carson portion of this wilderness, the Santa Barbara access is the most popular, along the Middle Fork Trail. The first 3 to 4 miles of this trail are characterized by high use and are popular for larger groups, such as school groups. After the first 3 to 4 miles, however, use drops dramatically. Portions of

the Pecos Wilderness on the Carson are known for their steep and rugged terrain. This serves to funnel use along streams and trails, where the terrain is gentler. Equestrian use is popular on the Carson's side of the Pecos Wilderness and many people begin from the Santa Fe National Forest's southern end and exit north from the Carson's side, or vice versa.

Latir Wilderness

The Latir Peak Wilderness was designated by Congress in 1980 and spans a total of 20,405 acres north of Questa, New Mexico (Figure A-3). This remote area contains deep forest cover interrupted by meadows and streams, with alpine tundra and alpine lakes found at higher elevations. Cabresto Lake is the most popular access point. From the lake, the Lake Fork Trail follows Cabresto Creek north to Heart Lake, Baldy Mountain, and Latir Mesa, all of which are within the wilderness.

The Latir Wilderness's primary access is through the Cabresto Lake area. One feature that stands out is historic Baldy cabin, characterizing the history of the area. This wilderness has many trails, but use is comparatively low with respect to the Carson's other wildernesses, thus providing more opportunities for solitude.

Cruces Basin Wilderness

The Cruces Basin Wilderness was also designated by Congress in 1980. This is the smallest wilderness on the Carson, spanning 18,867 acres, just south of the New Mexico-Colorado border (Figure A-3). It is located northwest of Tres Piedras, in the southern San Juan Mountains. Lack of designated trails and difficult access contribute to the pristine nature of this wilderness and provide excellent opportunities for solitude. All trails in this wilderness are either angler-created or game trails, with just one well-established route entering the wilderness from Osha Canyon, on the southern border.

Mountain plateau surrounds and forms the boundary between the Cruces Basin and Brazos area, adjoining to the west and southwest. Elevations range from 8,600 to 10,900 feet, featuring spruce, fir, and aspen forests, interspersed with grassy meadows and prominent rock features. The lush meadows found throughout the basin provide important summer range for elk. Mountain lions, black bear, and many other birds and mammals can be seen as well. Diablo and Beaver Creeks, located in the southern portion of the basin, are popular with fly fishermen, due to their abundant brook trout.

The Cruces Basin Wilderness is the least visited wilderness on the Carson. It is also the most difficult to access, along 15 miles of dirt road that receives little maintenance. Unlike all the Carson's other wildernesses, Cruces Basin is situated in a bowl rather than along and around mountainous peaks. It also has no designated trails.

Chama River Canyon Wilderness

The Chama River Canyon Wilderness was also designated by Congress in 1978, and encompasses 50,300 acres, with only 2,949 acres on the Carson (Figure A-3). It is managed entirely by the Santa Fe National Forest. The Wild and Scenic Rio Chama, managed jointly by the Santa Fe National Forest and the BLM, is popular among river rafters and canoeists and 6 miles run through the wilderness with colorful sandstone bluffs and impressive rock formations that rise to high rims on both riverbanks.

Varying canyon elevations also provide a wide range of vegetation, from low-lying piñon-juniper woodland to ponderosa pine and fir. Fishing opportunities abound and onshore residents include mule deer, black bears, elk, coyotes, and mountain lions. Between 70 and 80 different bird varieties are found in the Chama River Canyon.

Access to the small portion of the Chama River Canyon Wilderness that is located on the Carson is difficult because of poorly maintained dirt roads. There is one trailhead on the Carson; however, the trail is in poor condition and is not maintained.

Columbine-Hondo Wilderness

Designated by Congress in December 2014, the Columbine-Hondo Wilderness is the newest addition to the Carson's wilderness system. Before its designation, Columbine-Hondo was a wilderness study area since 1980. The current boundary encompasses 43,706 acres (Figure A-3) but may change slightly when the area is surveyed using the legal description outlined in the Columbine-Hondo Wilderness Act (Public Law 113-291). The Columbine-Hondo Wilderness is adjacent to the Wheeler Peak Wilderness in the Sangre de Cristo Mountains. Elevation ranges from 7,600 to 12,700 feet. There is an extensive and popular trail system that accesses the area from various points along New Mexico State route 150 in Hondo Canyon, as well as other plentiful recreation opportunities, including viewing scenery, wildlife watching, picnicking, camping, and hunting. There are several scenic landmarks, including Gold Hill, Lobo Peak, and Flag Mountain. Elk, deer, bear, coyote, and birds of prey can be found within the area and beavers have created small ponds on many of the streams. Wildflowers bloom throughout the spring and summer and a variety of berries, mushrooms, and herbs can be gathered seasonally along the drainages.

The Columbine-Hondo Wilderness shares many similarities with the Wheeler Peak Wilderness. They are adjacent to each other, receive high levels of use, offer easy access to wilderness opportunities, and have a high number of trails popular for day hikes. Like Wheeler Peak, the area is also popular for larger group sizes of 15 people or more and the occasional school group will visit the wilderness as well.

Since this is a newly designated wilderness, the Carson is beginning to conduct inventories and address management of its use. Signage will be assessed, along with new information released about the newly added wilderness. Illegal mountain bike use is a management challenge that may increase in the future as the activity continues to grow in popularity.

Wilderness Desired Conditions (DA-WILD-DC)

1 Wilderness contributes to ecosystem services such as clean air and water, wildlife habitat enhancement, and outstanding opportunities for solitude or primitive and unconfined recreation.

2 Natural processes (e.g., insects, disease, blowdown, and fire) are maintained and function in their natural ecological role, and species are predominantly native.

3 The environment within a wilderness is essentially unmodified. Naturally occurring scenery dominates the landscape. Human-made features are rare and use natural or complementary materials. They are present when needed to provide for public safety or resource protection.

4 Wilderness provides recreation opportunities where social encounters are infrequent and occur only with individuals or small groups so that there are opportunities for solitude. Visitors experience self-reliance, challenge, and risk while enjoying opportunities to pursue non-motorized or non-mechanized activities.

Wilderness Standards (DA-WILD-S)

1. No more than 15 persons and 15 pack stock are permitted within a single group, unless otherwise noted in a wilderness management plan. Exceptions may include special use permits, formal agreements, emergency services, and management activities for maintaining wilderness character.
2. 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.
3. Research conducted in wilderness must not adversely affect wilderness character.
4. Nonnative invasive species must be treated using methods and in a manner consistent with wilderness character, to promote natural values in designated wilderness.
5. Unpermitted goats or sheep are prohibited within wilderness.
6. A minimum requirements analysis[52] must be used when considering nonconforming or prohibited uses in designated wilderness.
7. When maintenance of fixed anchors for rock climbing is necessary, it must be accomplished without using mechanized drills and other mechanized equipment.

Wilderness Guidelines (DA-WILD-G)

1. Intervention in natural processes through management actions should only occur when this would move the area toward desired conditions, preserve wilderness character, protect public health and safety within and adjacent to wilderness, or uphold other Federal laws and regulations.
2. Management activities should be consistent with the scenic integrity objective of very high in designated wilderness, to maintain wilderness character.

[52] Arthur Carhart National Wilderness Training Center, 2008. Minimum Requirements Decision Guide, U.S. Forest Service Guidelines. Link: https://www.wilderness.net/MRDG/documents/MRDG_FS_guidelines.pdf.

Management Approaches for Wilderness

1. Consider clearly identifying wilderness boundaries through signage at official entry points and needed locations (e.g., informal access points) that is consistent with trail maps and boundary markers.
2. Consider working with local partners to maintain wilderness, including trail maintenance and construction.
3. Consider partnering with other Federal agencies to ensure management is as consistent as possible for contiguous wildernesses.
4. Consider helicopter use in wildernesses to manage fish or wildlife populations when deemed appropriate by minimum requirements analysis. Approval of helicopter use is made by the Regional Forester, after appropriate environmental analysis.
5. Consider using the most recent version of a wilderness's respective management plan, if it exists.

Photo credit: Allan Lemley

Wild and Scenic Rivers (WSR)

In 1968, Congress passed the Wild and Scenic Rivers Act to preserve the beauty and free-flowing nature of some of the most precious waterways in America. To be designated, rivers or sections of rivers must be free-flowing and possess at least one outstandingly remarkable value, such as scenic, recreational, geologic, fish, wildlife, historic, cultural, or other features identified under the Act.

The Carson includes two river sections designated as wild and scenic rivers (Figure A-3); however, both are managed by the BLM, as part of the Rio Grande Wild and Scenic River. One Carson segment is approximately 5 miles of the Rio Grande, along the west boundary of the Questa Ranger District. The other Forest Service segment is the lower 3.25 miles of the Red River, where it meets the Rio Grande. These sections were among the original eight rivers to be designated as National Wild and Scenic River Systems by Congress in 1968. Both sections of river are classified as wild, flow through deep gorges, and offer spectacular views from the gorge rim. One hiking trail leads down into the gorge from the recreation area and another from Cebolla Mesa on the Questa Ranger District.

Wild and Scenic Rivers Desired Conditions (DA-WSR-DC)

1 The outstandingly remarkable values, free-flowing condition, and classifications of wild and scenic river corridors are preserved.

Wild and Scenic Rivers Standards (DA-WSR-S)

1 Designated wild and scenic rivers must be managed to protect or enhance their free-flowing condition. Proposed water resources projects, including activities within the bed and banks and below the ordinary high-water mark of the river, require a free-flow analysis.

2 Designated wild and scenic rivers must be managed to protect or enhance existing outstandingly remarkable values.

3 Management of the Rio Grande Wild and Scenic River must comply with the BLM's river management plan.

4 Unpermitted goats and sheep are prohibited within the Rio Grande Wild and Scenic River corridor.

Inventoried Roadless Areas (IRA)

Inventoried roadless areas provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide large, relatively undisturbed landscapes with high scenic quality that are important to biological diversity and the long-term survival of many at-risk species. Inventoried roadless areas provide opportunities for dispersed outdoor recreation. They also serve as buffers against the spread of nonnative invasive plant species and serve as reference areas for study and research. The Carson National Forest manages 12 inventoried roadless areas, totaling 105,331 acres (Figure A-4).[53]

Table 6. Inventoried roadless areas on the Carson National Forest

Inventoried Roadless Area	Size (acres)	Ranger District
Bull Canyon	11,512	Canjilon
Canjilon Mountain	7,971	Canjilon
Osier Mesa	2,840	Tres Piedras
Comales Canyon	4,388	Camino Real
Pecos	13,434	Camino Real
Sierra Negra	9,469	El Rito
Cruces Basin	5,243	Tres Piedras
Latir Peak	3,572	Questa
Columbine-Hondo Wilderness	43,738	Questa
Bull-of-the-Woods	487	Questa
Wheeler Peak Wilderness	2,677	Questa

While a range of management and activities may occur in inventoried roadless areas, including system roads and motorized recreation, generally road construction and cutting of timber is limited. The Chief of the Forest Service reviews all projects involving road construction or reconstruction and the cutting, sale, or removal of timber in inventoried roadless areas, except for the following management activities, which are reviewed by the Regional Forester:

- Any necessary timber cutting or removal or any road construction including road reconstruction in emergency situations involving wildfire suppression, search and rescue operations, or other imminent threats to public health and safety in inventoried roadless areas.
- Timber cutting, sale, or removal in inventoried roadless areas incidental to the implementation of an existing special use authorization. Road construction or road reconstruction is not authorized through this re-delegation without further project specific review.
- The cutting, sale, or removal of generally small-diameter timber when needed for one of the following purposes:
    - To improve threatened, endangered, proposed species habitat;

[53] The Carson National Forest's inventoried roadless areas are managed according to the 2001 Roadless Area Conservation Rule (66 FR 3244).

- To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects within the range of variability, that would be expected to occur under natural disturbance regimes of the current climatic period; or,
- For administrative and personal use, as provided for in 36 CFR 223, where personal use includes activities, such as Christmas tree and fuelwood cutting, and where administrative use includes providing materials for activities, such as construction of trails, footbridges, and fences.

Inventoried Roadless Areas Desired Conditions (DA-IRA-DC)

1 Inventoried roadless areas encompass large, relatively undisturbed landscapes. They provide public drinking water, serve as safeguards against the spread of invasive plant species, function as biological strongholds for populations of threatened and endangered species, and provide reference landscapes for study and research.

2 Inventoried roadless areas appear natural, have high scenic quality, and provide opportunities for dispersed recreation.

Inventoried Roadless Areas Standards (DA-IRA-S)

1 Road construction or reconstruction is prohibited in an inventoried roadless area, unless the responsible official determines that a road is needed according to the circumstances allowed in the 2001 Roadless Rule (66 FR 3244). Review authorities must be followed.

2 Timber must not be cut, sold, or removed in inventoried roadless areas, unless the responsible official determines that activities meet the circumstances provided in the Roadless Rule (66 FR 3244). Review authorities must be followed.

Inventoried Roadless Areas Guidelines (DA-IRA-G)

1 Inventoried roadless areas should be managed for primitive, semi-primitive non-motorized, and semi-primitive motorized recreation settings, to preserve their roadless area characteristics.[54]

2 Management activities should be consistent with the scenic integrity objective of high, to preserve their roadless area characteristics.

[54] The following often characterize inventoried roadless areas: (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 species of conservation concern 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 (66 FR 3244).

National Scenic, Historic, and Recreation Trails (NTRL)

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 Carson administers all three types of nationally designated trails according to this act (Figure A-5). The Continental Divide National Scenic Trail is displayed in Figure A-5 as a corridor within which plan components may apply, depending on visibility. The management of all national trails may have ramifications within a corridor that surrounds the trail, as described by the plan components below.

Continental Divide National Scenic Trail

The Continental Divide National Scenic Trail traverses the Rocky Mountains from Canada to Mexico for approximately 3,100 miles (USDA FS 2015). It travels through portions of 20 national forests, 4 national parks, 13 BLM field offices, as well as various private lands in Montana, Idaho, Wyoming, Colorado, and New Mexico. Congress established the trail in 1978, 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 uses persist today and are now joined by a growing diversity of recreationists, including mountain bikers, cross-country skiers, and long-distance runners. Traversing 104 miles on the Carson National Forest, the trail navigates dramatically diverse ecosystems through mountain meadows, granite peaks, and high-desert surroundings. It is one of the most renowned trails in the United States, because of its scenic beauty, recreational opportunities, elevation gains, and primitive character.

Old Spanish National Historic Trail

Congress designated the Old Spanish National Historic Trail in 2002. The trail traverses six states (Arizona, California, Colorado, Nevada, New Mexico, and Utah) and was primarily a horse and burro pack route between Santa Fe and Los Angeles that followed portions of American Indian and Hispanic trade routes in the 1800s (National Park Service website). The entire trail (with various loops) traverses 2,700 miles, with 49.6 of those miles on the Carson.

Columbine-Twining National Recreation Trail

The Columbine-Twining National Recreation Trail was designated in 1978. It is a difficult, 14.2-mile-long trail with an elevation gain of 1,500 feet, from 7,900 to 9,400 feet, through Columbine Canyon to the ridge of Rio Hondo Canyon. The trail offers hiking through aspens to exceptional views of Lobo Peak and Flag Mountain above tree line.

The first couple of miles of the Columbine-Twining National Recreation Trail receive heavy use on either end, especially by day hikers. The trail is easily accessible from campgrounds at either end—the Columbine Campground on the north and the Twining Campground on the south—making it popular among campers. The trail is in good condition, but it can be difficult to follow along the ridgeline.

South Boundary National Recreation Trail

Designated in 1982, the South Boundary National Recreation Trail is 22 miles long and offers various summer and winter trail opportunities from Taos to Angel Fire, New Mexico. The South Boundary Trail is a diverse tour of the Sangre de Cristo Mountains, crossing ridges, valleys, and several peaks, through dense conifer forests and open stands of aspen. The trail is at its best in the fall, when aspens along the route turn shades of yellow, gold, and fiery orange.

The South Boundary Trail is one of the Carson's most popular and heavily used trails for several reasons. It offers backpacking opportunities, as well as day trips, without having to go to higher elevations, and it is near Taos and Angel Fire. It is a wonderfully scenic tour of New Mexico's Rocky Mountains and one of the premiere mountain biking trails in New Mexico. Mountain bikers travel from many parts of the country to ride this trail. The trail is also long enough to accommodate overnight mountain biking, an increasingly popular form of mountain biking.

Jicarita Peak National Recreation Trail

The Jicarita Peak National Recreation Trail was designated in 1979. It offers a challenging experience in the Pecos Wilderness and spectacular views from atop Jicarita Peak (12,835 feet), looking off to the west across the Rio Grande Valley and north to the Rocky Mountains in Colorado. Fall aspens are especially prominent along this route. Elk, marmot, ptarmigan, deer, and black bear are some of the wildlife to be found in the area. The trail is 23 miles long and starts at 8,860 feet and ends at 12,835 feet in elevation.

The stretch of the Jicarita Peak Trail between the Serpent Lake Trailhead and Jicarita Peak receives moderate use. After reaching the peak, however, the trail gets very little use. This is because a number of Forest Service trails in the area are more popular. The other popular access point to Jicarita Peak is via the Santa Barbara Trail, from the Santa Barbara Campground on the northern end of Pecos Wilderness.

National Scenic, Historic, and Recreation Trails Desired Conditions (DA-NTRL-DC)

National Scenic, Historic, and Recreation Trails

1 National scenic, historic, and recreation trails and the nature and purposes of the trail designation are protected.

2 Conflicts among recreationists are rare.

3 Designated national scenic and recreation trails are well maintained, signed, and passable.

4 Views in the immediate foreground (0 to 300 feet) of national, scenic, and recreation trails include natural-appearing landscapes. The landscapes have high scenic values and generally appear unaltered by human activities.

5 National scenic, historic, and recreation trails provide a non-motorized trail opportunity, where visitors can experience the scenic qualities of the area.

Continental Divide National Scenic Trail (CDNST)

6 The Continental Divide National Scenic Trail provides high-quality scenic, primitive hiking, pack and saddle stock opportunities while conserving natural, historic, and cultural resources along the trail. Other activities and opportunities, including mountain biking, are allowed when compatible with the nature and purposes of the Continental Divide National Scenic Trail.

7 Viewsheds from the Continental Divide National Scenic Trail have high scenic values. The foreground of the trail (up to 0.5 mile on either side) is natural-appearing and generally looks unaltered by human activities.

8 The Continental Divide National Scenic Trail is consistent with a primitive or semi-primitive non-motorized setting and may intermittently pass through more developed settings. The Continental Divide National Scenic Trail provides for a continuous route through predominately undeveloped settings.

9 Visitors are aware of the Continental Divide National Scenic Trail and the nature and purpose of the trail designation.

10 The Continental Divide National Scenic Trail 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.

11 Wild and remote backcountry segments of the Continental Divide National Scenic Trail provide opportunities for solitude immersion in natural landscapes and primitive outdoor recreation, while easily accessible trail segments complement local community interests and needs.

National Scenic, Historic, and Recreation Trails Standards (DA-NTRL-S)

Continental Divide National Scenic Trail (CDNST)

1 Management of the Continental Divide National Scenic Trail must comply with the most recent version of the Continental Divide National Scenic Trail Comprehensive Plan. Best available science can be used in lieu of the comprehensive plan if the plan is more than 15 years old.

2 Motorized use is prohibited on newly constructed segments of the Continental Divide National Scenic Trail. Existing motorized use may continue on the Continental Divide National Scenic Trail where it overlaps with existing roads or trails designated for motorized use per the motor vehicle use map.

3 Surface occupancy for geothermal energy leasing activities is prohibited within 0.5 mile either side of the Continental Divide National Scenic Trail.

4 Common variety mineral (e.g., limestone, gravel, pumice, sandstone) extraction is prohibited within 0.5 mile either side of the Continental Divide National Scenic Trail.

5 No motorized events and motorized special use permits are permitted or authorized on the Continental Divide National Scenic Trail.

National Scenic, Historic, and Recreation Trails Guidelines (DA-NTRL-G)

National Scenic, Historic, and Recreation Trails

1 National recreation trails should be managed for non-motorized and mechanized travel to enhance visitor experience, except where portions of a trail currently coincide with a designated road (e.g., portions of the South Boundary Trail) and such motorized uses may continue.

2 National historic trail segments should follow a route of historic significance as closely as possible, to protect the route and its artifacts for public use and enjoyment.

Continental Divide National Scenic Trail (CDNST)

3 New or relocated trail segments should be located primarily within settings consistent with or complementing primitive or semi-primitive non-motorized recreation opportunity spectrum classes, to retain or promote the character for which the Continental Divide National Scenic Trail was designated. Road and motorized trail crossings and other signs of modern development should be avoided.

4 Management activities should be consistent with, or make progress toward, achieving scenic integrity objectives of high or very high within the visible foreground of the trail, to protect or enhance the scenic qualities of the Continental Divide National Scenic Trail.

5 If management activities result in short-term impacts to the scenic character along the Continental Divide National Scenic Trail, mitigation measures should be included (e.g., screening, feathering, and other scenery management techniques), to minimize visual impacts at key points (e.g., vistas), within 0.5 mile either side of the trail.

6 The Continental Divide National Scenic Trail should not be permanently re-located onto routes open to motor vehicle use, to promote a non-motorized setting.

7 Special-use authorizations for new visible communication sites, utility corridors, and renewable energy sites should not be allowed within the foreground (up to 0.5 mile) and should be visually subordinate within the middle ground viewshed (up to 4 miles), to protect the Continental Divide National Scenic Trail's scenic values.

8 Linear utilities and rights-of-way should be limited to a single crossing per special use authorization of the Continental Divide National Scenic Trail 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 Continental Divide National Scenic Trail should be avoided, unless necessary for resource protection, access to private lands, or to protect public health and safety.

10 Using the Continental Divide National Scenic Trail for landings or as a temporary road should not be allowed. Hauling or skidding along the Continental Divide National Scenic Trail itself should be allowed only when design criteria are used to minimize impacts to the trail infrastructure and where the Continental Divide National Scenic Trail is currently located on an open road and no other haul route or skid trail options are available.

11 Unplanned fires in the foreground (up to 0.5 mile) of the Continental Divide National Scenic Trail should be managed using minimum impact suppression tactics or other tactics appropriate for the protection of trail values. Prescribed fires in the foreground of the Continental Divide National Scenic Trail should be managed to protect health and safety, but also incorporate the values of the trail. Heavy equipment fireline construction up to 0.5 mile of either side should not be allowed unless necessary for emergency protection of life and property.

12 The minimum trail facilities necessary to accommodate the amount and types of use anticipated on any given segment 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 naturally appearing setting along the Continental Divide National Scenic Trail.

Management Approaches for National Scenic, Historic, and Recreation Trails

1. So long as the Continental Divide National Scenic Trail's scenic values are able to be protected, consider special-use authorizations for new communication sites, utility corridors, and renewable energy sites that would not be visible within the foreground (up to 0.5 mile) or would be visually subordinate in the middle ground viewshed (up to 4 miles).
2. Consider coordinating trail management and activities across unit and jurisdictional boundaries, specifically with the Santa Fe and Rio Grande National Forests and the Bureau of Land Management.
3. Consider making alternate routes available during temporary closures resulting from natural events, such as fire or flood, or land management activities.
4. Consider constructing side or connecting trails that take users to points of interest or supply points if an opportunity presents itself and volunteers and partners are engaged in the planning and implementation efforts.
5. Consider using methods such as the Optimal Location Review process for substantial trail relocations.
6. Consider impacts to national trails viewsheds and purposes from potential land conveyances.

National Scenic Byways (NSBW)

A national scenic byway is a road recognized by the United States Department of Transportation for one or more of six intrinsic qualities: archeological, cultural, historic, natural, recreational, and scenic. The program was established by Congress in 1991, to preserve and protect the Nation's scenic, but often less-traveled, roads and to promote tourism and economic development. The Forest Service's Scenic Byways Program is intended to enhance rural community tourism and provide amazing opportunities to explore the beauty, history, and natural heritage of the national forests. This is especially true of the Enchanted Circle National Scenic Byway, an 84-mile loop of scenic driving from Taos, through Questa, Red River, Angel Fire, and back to Taos (Figure A-5). It is currently the only Forest Service scenic byway that travels through the Carson.

The Enchanted Circle National Scenic Byway has outstanding scenery, offers various recreation opportunities, and showcases the unique cultural history of northern New Mexico. It receives heavy year-round use by tourists and local commuters alike, who travel by motor vehicle, motorcycle, and bicycle. All the communities along the Enchanted Circle benefit economically from the visitation this scenic byway generates and most of the draw is from the scenic and recreational opportunities found on the Carson. The Town of Taos, Village of Taos Ski Valley, Village of Questa, Town of Red River, Village of Eagle Nest, and Angel Fire Convention and Visitor's Bureau have partnered to plan ways to add or improve recreational opportunities along the byway, as well as making it an extended stay location. The Carson has been engaged in these discussions and the national forest staff anticipates more partnership opportunities in the future.

National Scenic Byways Desired Conditions (DA-NSBW-DC)

1. Viewsheds along national scenic byways provide natural-appearing landscapes and enhance recreation tourism that supports local communities.
2. The values for which a national scenic byway is designated remain intact.
3. National scenic byways exhibit natural-appearing landscapes, where human activities do not stand out in the foreground (up to 0.5 mile; high scenic integrity).
4. National scenic byways provide roaded-natural recreation opportunities.

Wild Horse Territories (WHT)

The Carson has four designated wild horse territories. Jarita Mesa Wild Horse Territory and Jicarilla Wild Horse Territory are the only two that are occupied and managed. The Wild Free-Roaming Horses 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. Management of wild horse and burro territories is guided by individual management plans.

Jarita Mesa Wild Horse Territory comprises approximately 23,000 acres on the El Rito Ranger District (Figure A-6). The history of this herd is tied to the local Hispanic communities that have been present in the area for some 300 years. The foundation blood for the horses is Spanish mustang, but genetic testing and physical appearance indicate other bloodlines may have influenced the herd as well.

Jicarilla Wild Horse Territory comprises 75,986 acres of the Jicarilla Ranger District (Figure A-6). The history of this herd is not well known, but is assumed to be based on cavalry stock and ranch horses from the area, along with an influx of horses from the adjacent Jicarilla Apache Reservation. Genetic testing has indicated a mixed breeding background.

Wild Horse Territory Desired Conditions (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.
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.

Wild Horse Territory Standards (DA-WHT-S)

1. Humane methods must be used to gather animals, when it is determined that acceptable management levels have been exceeded.

Wild Horse Territory Guidelines (DA-WHT-G)

1. Horse numbers within a territory should be aligned with the appropriate management level as described in wild horse territory management plans.
2. Population control measures on wild horses should be implemented to maintain genetic diversity and desired resource conditions in the area.

Management Approaches for Wild Horse Territories

1. Consider coordinating with the BLM to manage wild horses on the Carson, to benefit both agencies' programs.
2. Consider partnering and coordinating with wild horse advocates, federally recognized tribes, adjacent landowners, academia, Federal and State agencies, and grazing permit holders to maintain the desired appropriate management level of wild horses through various actions, such as capture and removal and fertility control treatments.

Sangre de Cristo Pea Clam Zoological Area (ZOO)

A zoological area is a designated area that contains animal specimens, animal groups, or animal communities that are significant because of their occurrence, habitat, location, life history, ecology, rarity, or other features (FSM 2372.05 (4)). The Sangre de Cristo Pea Clam Zoological Area is the only zoological area on the Carson. The Sangre de Cristo pea clam is on the State's Group 1 Endangered List and is only known to occur in the Middle Fork Lake on the Questa Ranger District; however, this pea clam has not been determined as a valid separate species at this time. The lake, its shoreline, and immediate surrounding drainage are within the designated area as protected habitat for the pea clam.

The Sangre de Cristo Pea Clam Zoological Area is located on the Questa Ranger District (Figure A-6). This watershed is functioning at risk, meaning it exhibits moderate geomorphic, hydrologic, and biotic integrity, relative to its natural potential condition. In terms of ecological integrity, provided the pea clam is a valid species, this is the only location within the State of New Mexico where it is found.

Sangre de Cristo Pea Clam Zoological Area Desired Conditions (DA-ZOO-DC)

1 See Watersheds and Water (FW-WSW-DC).

2 See Waterbodies (FW-WSW-WB-DC).

Sangre de Cristo Pea Clam Zoological Area Standard (DA-ZOO-S)

1 Management activities, including vehicle use, must not cause pollution or change in water chemistry of Middle Fork Lake.

Photo credit: Kathy DeLucas

Small-headed Goldenweed Botanical Area (BOT)

A botanical area is a designated area that contains plant specimens, plant groups, or plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, rarity, or other features (FSM 2372.05(3)). The 60-acre Small-headed Goldenweed Botanical Area is the only botanical area designated on the Carson (Figure A-6). *Lorandersonia microcephala* is a small-headed goldenweed that is a Carson species of conservation concern and on the State Endangered Plant List. The massive granite outcrops northeast and northwest of Tres Piedras on the Carson are the only places within New Mexico where the plant has been located, thus adding to the ecological integrity of the area.

Small-headed Goldenweed Botanical Area Desired Conditions (DA-BOT-DC)

1 See Cliffs and Rocky Features (FW-CRF-DC).

2 See Ponderosa Pine Forest (FW-VEG-PPF-DC).

Small-headed Goldenweed Botanical Area Guidelines (DA-BOT-G)

1 Rock climbing and related recreation activities should not disrupt the life processes of small-headed goldenweed. Installation of permanent rock-climbing hardware should be allowed only by authorization, if small-headed goldenweed is being impacted.

2 Where recreation activities have the potential to trample known populations of small-headed goldenweed, signs should be posted educating the public to stay on designated trails.

Photo credit: Kathy DeLucas

Management Areas (MA)

The Carson has several areas requiring different management that cannot be met through forestwide plan components. These areas are identified as management areas. A management area represents an emphasis for an area or several similar areas on the landscape. Forestwide plan components are applied, unless there is overriding management direction for a specific management area. Direction for each management area is in the sections that follow. Management areas identified in this plan for the Carson are:

- Recommended Wilderness Management Area
- Eligible Wild and Scenic River Management Area
- Developed Winter and Summer Resort Management Area
- Jicarilla Natural Gas Management Area
- Grassland Maintenance Management Area
- Valle Vidal Management Area
- San Antonio Management Area

Recommended Wilderness Management Area (RWMA)

The Recommended Wilderness Management Area comprises lands recommended for wilderness designation (Figure A-7) as a result of a 4-step recommended wilderness process: (1) inventory, (2) evaluation, (3) analysis, and (4) recommendation. The purpose of the recommendation process is to identify all areas within the Carson National Forest not yet designated as wilderness, but which satisfy the definition of wilderness found in the 1964 Wilderness Act and recommend those areas deserving of future designation. The intent of this management area is to provide direction that would retain or improve the wilderness values of these areas if and until they are established by Congress. The recommendation is a preliminary administrative recommendation that will receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. The plan direction stated below will be applied to recommended wilderness management areas until such time as the area is designated as wilderness or released for other management.

Locatable mineral operations shall be recognized as authorized by the United States mining laws (30 U.S.C. 21-54). Any entry to access locatable minerals will be conducted in an environmentally sound way through appropriate administration of mineral laws and regulations to minimize adverse environmental effects on National Forest System resources. Site-specific analysis shall occur to evaluate potential effects and develop appropriate mitigation measures. Operating plans and bonds shall be used if needed, to ensure protection and restoration of surface resources.

Recommended Wilderness Management Area Desired Conditions (MA-RWMA-DC)

1 Recommended wilderness management areas retain their wilderness characteristics and contribute to clean air and water, wildlife habitat enhancement, primitive recreation opportunities, and other cultural ecosystem services.

2 Natural processes (e.g., insects, disease, blowdown, and fire) are maintained and function in their natural ecological role or are mimicked (e.g., prescribed fire, suppression of human-caused fire). Recommended wilderness management areas have minimal to no nonnative invasive species.

3 The environment within recommended wilderness management areas is essentially unmodified. Naturally occurring scenery dominates the landscape. Human-made features are rare and use natural or complementary materials. They are present when needed, to provide for public safety or resource protection.

4 Recommended wilderness management areas provide recreation opportunities where social encounters are infrequent and occur only with individuals or small groups so that there are opportunities for solitude. Visitors experience self-reliance, challenge, and risk, while enjoying opportunities to pursue non-motorized or non-mechanized activities.

5 Sustainable rangelands provide forage for livestock grazing opportunities.

Recommended Wilderness Management Area Standards (MA-RWMA-S)

1 Motor vehicles, motorized equipment, and mechanical transport must not be authorized except for emergency use or the limited needs required for management activities (e.g., grazing management, or wildlife needs) when they do not permanently degrade wilderness characteristics of the area over the long term.

2 Mechanized recreation must not be authorized in order to protect the wilderness characteristics of the area.

3 New permanent or temporary roads, motorized trails, or mechanized (e.g., mountain bike) trails for public access must not be constructed or designated in a recommended wilderness management area.

4 Timber harvest for the purpose of timber production must not be authorized in a recommended wilderness management area.

5 Infrastructure related to special use permits for energy developments (e.g., wind, solar, electrical lines) must not be authorized.

6 Sales or extraction of common variety minerals must not be authorized.

7 Nonnative invasive species must be treated using methods and in a manner consistent with wilderness characteristics to promote natural values in a recommended wilderness management area.

Recommended Wilderness Management Area Guidelines (MA-RWMA-G)

1 Intervention in natural processes through management actions (e.g., prescribed fire and active weed management) should occur only when this would move the recommended wilderness management 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.

2 Unplanned natural and planned ignitions in recommended wilderness management areas should be used, to reduce the risks and consequences of uncharacteristic wildfire, to increase apparent naturalness, or to enhance ecosystem function.

3 Management activities should be consistent with the scenic integrity objective of very high, to maintain wilderness characteristics.

4 Existing structures necessary for administration of the area should be maintained but not expanded, to protect the recommended wilderness management 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 management area.

5 Competitive events should not be permitted in recommended wildernesses, to maintain wilderness characteristics of solitude and primitive and unconfined recreation.

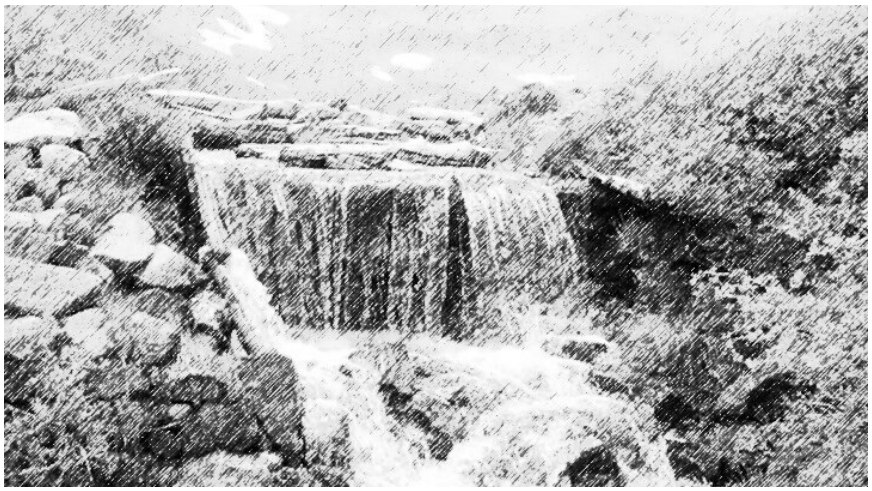

Photo credit: Allan Lemley

Eligible Wild and Scenic River Management Area (EWSR)

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 value that is outstandingly remarkable regionally or nationally.

The Carson has 51 river segments totaling approximately 170 miles that have been identified by the agency through this plan as eligible to be included in the National Wild and Scenic Rivers System. There are 79.7 miles classified as wild, 28.6 miles classified as scenic, and 62.1 miles classified as recreational.

Table 7 provides a list of river segments deemed eligible on the Carson National Forest. Each river segment is listed alphabetically by ranger district, and each has a description of the (1) segment location; (2) the segment classification; (3) the outstandingly remarkable values for which it is eligible; (4) the length of the segment in miles; and (5) a narrative describing the outstandingly remarkable values and classification determination. Identification numbers are unique to each ranger district and correspond to the river location in Figure A-8.

Agency-identified eligible rivers are managed to retain their status until a suitability determination has been made whether to recommend them for inclusion in the National Wild and Scenic Rivers System. A suitability study must analyze the effects of designation to other resource values, identify issues, and explore alternatives for protecting river values. The Carson may authorize projects and activities in eligible rivers or the surrounding corridor so long as they preserve the free-flowing condition of the river, protect the outstandingly remarkable values that provide the basis of the river's eligibility for inclusion in the system and do not affect the classification of the river segment. In most cases, in-stream structures that unnaturally impound water have a negative impact on free-flow; however, some impoundments may be allowed if they are built from natural-appearing materials that harmonize with the river environment, mimic natural events (e.g., trees falling across a river), do not cause hazards that interfere with the recreational use of the river, and do not prevent natural river processes in the future. Free-flow may be positively affected when instream structures promote more natural levels of river processes (e.g., bank erosion, channel shifting, groundwater infiltration, and floodplain development) and bed load or debris movement. For example, a degraded, incised river may be considered free-flowing, but in some cases that free-flow may be altered to restore a more natural flow by slowing water and reconnecting the river with its floodplain.

Table 7. Eligible river segments with associated classification and outstandingly remarkable values

Ranger District	ID[1]	River Segment	River Segment Location	Classification & Outstandingly Remarkable Values
Camino Real	3	Alamitos Creek	Headwaters to fish barrier	Wild (fish)
Camino Real	4	North Fork Alamitos Creek	Headwaters to Alamitos Creek	Wild (fish)
Camino Real	6	Arroyo Hondo	Forest boundary to Forest boundary	Scenic (geologic)
Camino Real	31	Rio Santa Barbara (main stem and 3 forks)	Headwaters to Jicarita Creek confluence	Wild (scenic, recreational, historic)
Camino Real	49	Rio Grande del Rancho	Private land to Forest boundary	Recreational (wildlife, other)
Camino Real	67	Agua Caliente Canyon	Headwaters to Forest boundary	Scenic (historic, cultural)
Canjilon	2	Arroyo del Yeso	FR 138 to private land	Wild (scenic, recreational, geologic)
Canjilon	5	Canjilon Creek	Private land to Forest boundary	Recreational (scenic, recreational, geologic)
Canjilon	6	Canjilon Creek	Headwaters to fish barrier	Scenic (recreational)
El Rito	3	Arroyo del Chamiso	Headwaters to Forest boundary	Recreational (scenic)
El Rito	11	Cañada de Chacon	Headwaters to El Rito Creek	Wild (fish)
El Rito	32	El Rito Creek	Headwaters to fish barrier	Wild (fish)
El Rito	33	Hachita Canyon	Headwaters to El Rito Creek	Wild (fish)
El Rito	42	Rio Vallecitos	Jarosa Creek to FR 274	Wild (scenic, recreational)
Jicarilla	3	Carracas Canyon	Forest boundary to Forest boundary	Recreational (historic)
Jicarilla	4	La Jara Canyon	Forest boundary to Vaqueros Canyon	Recreational (historic)
Questa	2	Bitter Creek	Headwaters to private land (section 21)	Recreational (recreational, historic)
Questa	4	Bull Creek	Headwaters to Lagunitas Fork	Wild (fish)
Questa	7	Chuck-wagon Creek	Headwaters to Comanche Creek	Scenic (fish)
Questa	8	Columbine Creek	headwaters to Deer Creek	Wild (fish)
Questa	9	Columbine Creek	Deer Creek to Columbine trailhead	Wild (recreational)
Questa	10	Comanche Creek	Headwaters to Costilla Creek	Recreational (scenic, recreational, geologic, fish, other)
Questa	11	Costilla Creek	Forest boundary to fish barrier	Recreational (scenic, recreational, fish)
Questa	64	Costilla Creek	Fish barrier to Forest boundary	Recreational (scenic, recreational)
Questa	12	Deer Creek	Headwaters to Columbine Creek	Wild (fish)
Questa	13	East Fork	Headwaters to trailhead	Wild (scenic, historic)

Ranger District	ID[1]	River Segment	River Segment Location	Classification & Outstandingly Remarkable Values
Questa	14	Foreman Creek	Private property boundary to Comanche Creek	Recreational (fish)
Questa	17	Gold Creek	Private land boundary to Comanche Creek	Scenic (fish)
Questa	19	Grassy Creek	Headwaters to Comanche Creek	Scenic (fish)
Questa	20	Holman Creek	Headwaters to Comanche Creek	Recreational (fish)
Questa	22	La Belle Creek	Private property boundary to Comanche Creek	Recreational (fish)
Questa	23	La Cueva Canyon	Headwaters to Costilla Creek	Scenic (fish)
Questa	24	Lagunitas Fork	Headwaters to Lake Fork	Wild (fish)
Questa	25	Lake Fork	Headwaters to Cabresto Lake	Wild (fish)
Questa	29	Little Costilla Creek	Headwaters to Comanche Creek	Scenic (fish)
Questa	34	Middle Fork	Below Middle Fork lake to private land	Scenic (historic)
Questa	41	Placer Fork	Headwaters to Columbine Creek	Wild (fish)
Questa	42	Powderhouse Canyon	Headwaters to Forest boundary	Recreational (fish)
Questa	45	Red River	Canyon mouth below Hwy 522 to fish hatchery	Recreational (recreational)
Questa	49	Rito Claro	Headwaters to Cabresto Creek	Wild (other)
Questa	53	Sawmill Creek	Headwaters to East Fork	Wild (scenic, historic)
Questa	57	Vidal Creek	Headwaters to Comanche Creek	Wild (fish)
Questa	60	Willow Fork	Headwaters to Placer Fork	Wild (fish)
Tres Piedras	36	Rio de los Pinos	Colorado border to private land boundary	Recreational (scenic, recreational, geologic)
Tres Piedras	37	Rio de los Pinos	Private land boundary to private land boundary	Recreational (scenic, recreational)
Tres Piedras	39	Rio San Antonio	Stewart Meadows to Forest boundary	Scenic (scenic)
Tres Piedras	43	Rio Tusas	Headwaters to section 16 tank	Wild (recreational)
Tres Piedras	50	Toltec Creek	Forest Boundary to private land	Wild (scenic, recreational, geologic)

1. ID is the identification number used to locate the river on the corresponding map (see Figure A-8).

There are three possible classifications of eligible river segments, based on the level of development and human use in the river and along its corridor. Table 8 contains the criteria that must be met under each classification.

Table 8. Criteria for wild, scenic, and recreational eligible river classification

Attribute	Wild	Scenic	Recreational
User Experience	Essentially primitive	Largely primitive and undeveloped	Substantial evidence of human activity.
Water Resource Development	Free of impoundment	Free of impoundment	Some existing impoundment or diversion. The existence of low dams, diversions, or other modifications of the waterway is acceptable, provided the waterway remains generally natural and riverine in appearance.
Shoreline Development	Little or no evidence of human activity. The presence of a few inconspicuous structures, particularly those of historic or cultural value, is acceptable.	No substantial evidence of human activity. The presence of small communities or dispersed dwellings or farm structures is acceptable.	Some development. The presence of extensive residential development and a few commercial structures is acceptable.
Transportation Infrastructure	Generally inaccessible except by trail. No roads, railroads, or other provision for vehicular travel within the river area. A few existing roads leading to the boundary of the area are acceptable.	Accessible in places by road. Roads may occasionally reach or bridge the river. The existence of short stretches of conspicuous or longer stretches of inconspicuous roads or railroads is acceptable.	Readily accessible by road or railroad. The existence of parallel roads or railroads on one or both banks as well as bridge crossings and other river access points is acceptable.
Water Quality	Meets, or exceeds criteria, or federally approved State standards for aesthetics, for propagation of fish, and wildlife normally adapted to the habitat of the river, and for primary contact recreation (swimming) except where exceeded by natural conditions.	No criteria are prescribed by the Wild and Scenic Rivers Act. See the Watersheds and Water section of this plan for water quality plan components that apply to all waters.	No criteria are prescribed by the Wild and Scenic Rivers Act. See the Watersheds and Water section of this plan for water quality plan components that apply to all waters.
Agriculture	A limited amount of domestic livestock grazing or hay production is acceptable.	The presence of grazing, hay production, or row crops is acceptable.	Lands may have been developed for the full range of agricultural uses.
Timber Production	Little or no evidence of past timber harvest. No ongoing timber harvest.	Evidence of past or ongoing timber harvest is acceptable, provided the forest appears natural from the riverbank.	Lands may have been developed for the full range of forestry uses. May show evidence of past and ongoing timber harvest.

Eligible Wild and Scenic River Desired Conditions (MA-EWSR-DC)

1 The outstandingly remarkable values and free-flowing condition of eligible segments are preserved.

2 Eligible river segments and their corridors are protected for the benefit and enjoyment of present and future generations.

3 The uses in eligible river corridors are consistent with the river's classification.

Eligible Wild and Scenic River Standards (MA-EWSR-S)

1 Any authorized water resources project in an eligible river segment must not adversely modify the river's free-flowing character.[55]

2 Any authorized project or activity within 0.25 mile of an eligible river segment must protect the outstandingly remarkable values that provide the basis of the river's eligibility for inclusion in the system.

3 The classification of an eligible river segment must be maintained as inventoried. Any project or activity within 0.25 mile of an eligible river segment must preserve the appropriate user experience according to the river's classification.

4 A suitability study must be conducted for any proposed project or activity that would conflict with the river's eligibility requirements.

5 Existing or new mining activity on agency-identified eligible river segments must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impairment.

6 The sale of common variety mineral material is prohibited within 0.25 mile of any wild eligible river segment.

7 Cutting of trees is prohibited in wild eligible river segment corridors, except when needed in association with a primitive recreation experience, to protect users, or to protect the outstandingly remarkable values that provide the basis of the river's eligibility for inclusion in the system.

8 New airfields must not be developed within 0.25 mile of a wild eligible river segment.

Eligible Wild and Scenic River Guidelines (MA-EWSR-G)

1 New roads or motorized trails should not be constructed within 0.25 mile of a wild classified eligible river segment, to preserve the essentially primitive user experience.

[55] Water resources projects include all modifications to the stream channel or banks below the ordinary high water mark of a river. 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.

Developed Winter and Summer Resort Management Area (DEVRES)

The Developed Winter And Summer Resorts Management Area includes the existing four privately owned resorts that are currently permitted and developed on the Carson. The existing resorts are Taos Ski Valley, Red River Ski and Summer Area, and Enchanted Forest Cross-Country Ski Area—located on the Questa Ranger District —and Sipapu Ski and Summer Resort, on the Camino Real Ranger District (Figure A-9). Initially developed and managed as ski areas, winter and summer resorts on the Carson are now operated to provide opportunities for outdoor recreation activities during all seasons of the year. Snow skiing and boarding is still one of the Carson's most popular recreation activities. These resorts provide winter sports activities and other intensively managed outdoor recreation opportunities for large numbers of national and international visitors in highly developed settings. Opportunities for solitude within the Developed Winter And Summer Resorts Management Area are limited. In some areas, use in the summer may be as intensive as in the winter.

Winter and summer resorts are managed under a special use permit. As a part of the special use permit, each ski area develops a master development plan that is accepted by the Forest Service. Master development plans describe the improvements and facilities that are desired at each resort and are the guiding documents used to describe its expected future condition. A master development plan encompasses all of the area authorized for use under permit (permit area), including portions that are currently undeveloped.

Developed Winter and Summer Resort Management Area Desired Conditions (MA-DEVRES-DC)

1 Resort activities play a dominant role in affecting the composition, structure, and pattern of vegetation across most of the management area. Vegetation is a mosaic (e.g., varying widths and shapes) that includes natural and created grassy openings intermixed with forested areas, partially forested areas, and rocky outcroppings, providing a variety of species and age classes.

2 Forests within the developed winter and summer resort management area have structure, composition, and densities that are resilient to disturbances (e.g., fire, wind throw, insects, and disease).

3 Resort facilities (e.g., buildings, lifts, and groomed trails) may be evident, but blend and harmonize with the forest setting from key viewpoints.

4 Transportation routes within the permit area blend with the surrounding forest.

5 Base area development within the developed winter and summer resort management area complements the overall forest setting and serves the needs of forest visitors.

6 Focused and diverse recreational opportunities in specific areas respond to demand. Local communities can easily access these areas for a variety of year-round motorized and non-motorized experiences.

7 Contacts with Forest Service personnel are common, generally for the purposes of providing information, education, interpretation, and monitoring compliance with the terms and conditions of the special use permit.

8 Traditional and cultural uses currently occurring within the developed winter and summer resort management area continue to be recognized.

Developed Winter and Summer Resort Management Area Guidelines (MA-DEVRES-G)

1 Scenic values of the developed winter and summer resort management area should be protected by applying basic landscape aesthetics and design principles.

2 Visibility of structures (e.g., ski lifts, roads, utilities, buildings, signs, and other constructed facilities) should be limited, to minimize their impacts outside the management area.

3 Facilities and transportation routes that are no longer used within the developed winter and summer resort management area should be removed or rehabilitated.

Photo credit: Peter Rich

Potential Developed Recreation Site Management Area (PDRMA)

This management area surrounds the existing Sipapu Ski Area and encompasses 1,032 acres. It includes locations for future recreation facilities with the potential to expand recreational opportunities and provide local economic benefit. Any future development would need to be environmentally, and economically feasible and site development plans would be made available for review to the Carson National Forest and the general public.

Potential Developed Recreation Site Management Area Desired Condition (MA-PDRMA-DC)

1	Any developments or activities protect, maintain, or improve the value of the site for future recreation development.

Management Approaches for Potential Developed Recreation Site Management Area

1. Consider working with groups and individuals interested in the management of the Potential Developed Recreation Site, to provide guidance during planning, implementation, and monitoring of developed recreation projects.
2. Consider coordinating with adjacent landowners, local communities, Federal and State land managers, and State agencies when ground-disturbing activities are proposed in the Potential Developed Recreation Site Management Area.

Photo credit: Raul Hurtado

Jicarilla Natural Gas Management Area (JICMA)

Oil and natural gas development on the Carson National Forest is currently limited to the Jicarilla Ranger District (see Figure A-10). Leasing is authorized throughout the entire district, except for the historic Gasbuggy Site (640 acres).[56] Leasing activity varies with fluctuations in the price of oil and gas. The scenic character of much of the area is culturally modified but transitions to mixed use and natural-appearing canyons and mesas. Resource issues and conflicts surrounding oil and gas development primarily focus on effects to cultural resources. Traditionally, these resources have been avoided, but in recent years site mitigation has been proposed, though not conducted. The Jicarilla Ranger District has a high density of archeological sites and cultural resources are often the final driving force for well pad and access road location. Wildlife issues primarily influence projects proposed near northern goshawk or Mexican spotted owl habitat. These issues are mitigated with survey requirements and timing limitations.

It is important to note that the special lease stipulations apply only to new leases. Pre-existing leases are subject to the stipulations of their leases. However, new development on existing leases must also comply with management direction of this plan.[57] Any additional mitigation measures would need to be justifiable, still provide reasonable access for the leaseholder, and would be incorporated in a site-specific document.

Amendment 13 of the 1986 Land Management Plan identifies five areas of resource concern with important resource values that need to be protected on the Jicarilla Ranger District. These areas and their resource values are:

- Bancos Canyon (cultural resources, watershed, wildlife habitat, and seclusion)
- La Jara Canyon (undeveloped characteristics, cultural resources, wildlife security, seclusion)
- Valencia Canyon (undeveloped characteristics, cultural resources, wildlife security, seclusion)
- Fierro Mesa and Canyon (undeveloped characteristics)
- Vaqueros Canyon (visual resources, wildlife habitat)

The Jicarilla Roads Committee is a longstanding, unique partnership between the Jicarilla Ranger District and oil and gas lease and pipeline operators. Each year, operators pledge a certain amount of services, equipment, and money to conduct maintenance on over 100 miles of NFS roads. The committee has been funding annual road maintenance on the Jicarilla Ranger District since 2000, with an annual maintenance budget of over $200,000.

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[56] The location of a nuclear experiment to fracture formations to increase gas flow conducted in 1967. The Atomic Energy Commission (now the Department of Energy) withdrew the area from leasing through Public Land Order 4232.

[57] This direction is consistent with Interior Board of Land Appeals decisions (Yates Petroleum Corp., IBLA 2006-213, 2006-226 and William P. Maycock, IBLA 2008-197, 2008-200), which give the Bureau of Land Management (BLM) discretion to modify surface operations to add specific mitigation measures supported by site-specific National Environmental Policy Act analysis undertaken during the development phase on existing leases (CO-2010-028).

Jicarilla Natural Gas Management Area Desired Conditions (MA-JICMA-DC)

1 Oil and natural gas development is consistent with mineral and leasing laws and existing rights in a manner that minimizes adverse impacts to surface and groundwater resources, air quality, watershed and forest ecosystem health, wildlife and wildlife habitat, scenic character, and other desired conditions applicable to the area and similar desired conditions on adjacent Federal and tribal lands.

2 The resource values of each area of resource concern (currently Bancos Canyon, La Jara Canyon, Valencia Canyon, Fierro Mesa and Canyon, and Vaquero Canyon) are protected, maintained, and enhanced.

Jicarilla Natural Gas Management Area Standards (MA-JICMA-S)

1 All newly developed facilities must comply with the air quality mitigation requirements set forth by the New Mexico Air Quality Bureau. When existing facilities are updated, these mitigation measures will also be followed.

2 Sound levels generated by oil and gas production and transportation must comply with BLM direction for sound in the San Juan Basin described in the "Notice to Lessees and Operators on Onshore Oil and Gas Leases within the jurisdiction of the Farmington BLM Field Office" (NTL 04-2 FFO). The Carson will continue to adopt the BLM standards as they change over time.

3 New drilling activity and completions must be limited to April 1 through October 31. This applies as a condition of approval in new leases. Exceptions may be considered on a case-by-case basis. Normal recurring production and day-to-day operations will continue to occur year-round.

4 Well pad construction is prohibited in riparian management zones.

5 New roads crossing slopes greater than 40 percent that do not specify controlled surface use must be avoided, unless there is no other option. Road construction on slopes greater than 40 percent requires an engineering design approved by the Forest Service.

6 Maximum grades must be limited to 8 percent for new roads, unless pitches are less than 300 feet (up to 10 percent permitted in some cases).

7 Pipelines must be aligned along existing roads and rights-of-way and pipes must be located to allow multiple surface uses and co-location of infrastructure (e.g., water lines, electrical lines, etc.) to occur on top of or near these lines, to minimize surface disturbance.

8 Lands disturbed in conjunction with lease development activities must be reclaimed to stable and productive conditions, to meet forestwide desired conditions, multiple-use goals, and any specific resource needs identified during project-level environmental analysis.

9 A 5-year development strategy is required prior to proposed development on leases in areas of resource concern (Bancos Canyon, La Jara Canyon, Valencia Canyon, Fierro Mesa and Canyon, and Vaquero Canyon).

10 The following stipulations apply to new leases, including those pending, currently unleased, and any existing leases that become available for leasing in the future:

a. No Surface Occupancy: A no surface occupancy stipulation must be applied to new leases in Bancos Canyon, La Jara Canyon, Valencia Canyon (beyond 300 feet from existing roads), and Fierro Canyon—as well as in Mexican spotted owl critical habitat. Leasing with a no surface occupancy stipulation in these areas of resource concern makes energy resources available for companies willing to use unconventional drilling technology. Extraction of these energy resources without roads or well pads allows the Forest Service to pursue the management objectives of protecting undeveloped characteristics, cultural resources, wildlife habitat, and seclusion of these areas.

b. Controlled Surface Use: A controlled surface use stipulation must be applied to new leases on the Jicarilla Natural Gas Management Area, to minimize the potential for excessive erosion and loss of soil productivity. With the exception of areas where a no surface occupancy stipulation is applied, new leases on the remainder of Jicarilla Natural Gas Management Area are open to development, subject to the following constraints: (1) no well pad construction on slopes greater than 20 percent, with cuts over 15 feet in depth, and (2) no roads on side slopes greater than 40 percent.

c. Timing Restrictions: New drilling activity or completion (e.g., construction, drilling, completions, swabbing, pump changes, tubing changes, replacing production equipment, or any other maintenance activity that requires heavy equipment) is limited to April 1 through October 31. This timing restriction does not apply to day-to-day maintenance and operation of producing wells.

d. Cultural Resource Lease Notice: The following statement must be included in all future lease packages prior to sale. “All development activities proposed under the authority of this lease are subject to compliance with Section 106 of the National Historic Preservation Act and Executive Order 13007. The lease may contain historic properties, traditional cultural properties, or sacred sites currently unknown to the Forest Service during the lease parcel review process. Depending on the nature of the lease developments and activities being proposed, the Forest Service will not approve any activities as part of future lease operations that have the potential to affect traditional cultural properties and historic properties, until it completes applicable requirements of the National Historic Preservation Act, including any required procedure for notification and consultation with appropriate Indian tribe(s) and the State Historic Preservation Officer. Mitigation measures may be required to avoid, minimize, or mitigate adverse effects to historic properties and traditional cultural properties, the costs of which will be borne by the lessee. The Forest Service may require modifications to surface use plans of operations or disapprove proposed exploration or development activities that are likely to adversely affect historic properties, traditional cultural properties, or sacred sites for which no mitigation measures are possible. This could result in extended timeframes for processing authorizations for development activities, as well as changes in the ways in which development are implemented.”

11 Restoration and reclamation of surface disturbance from well pad construction and well drilling must be completed to achieve 70 percent of the groundcover (compared to nearby undisturbed areas), with permanent native vegetation within 3 growing seasons. The success of groundcover establishment must be monitored until 70 percent of the groundcover is attained. Reclamation meeting the same standard is required for re-disturbance of revegetated areas.

Jicarilla Natural Gas Management Area Guidelines (MA-JICMA-G)

1 Drilling techniques, such as directional or horizontal drilling and well siting measures (e.g., co-location and twinning and closed-loop drilling), should be used, to minimize impacts to surface resources. Existing well pads, roads, and pipeline rights-of-way for new facilities should also be used.

2 Established best management practices found in the most current version of the Surface Operating Standards for Oil and Gas Development: The Gold Book[58] or other applicable sources should be applied to natural gas activities.

3 Electrification of lease facilities should be developed, to minimize noise and emissions related to internal combustion engines for new and existing leases.

4 Oil and gas-related seismic activities should be conducted on established roads or utilizing heli-portable equipment for cross-country operations, to minimize surface disturbance.

5 To prevent erosion, well pad construction on slopes greater than 20 percent, with cuts over 15 feet should be avoided, unless there is no other option.

6 All new lease roads over 300 feet in length should be closed to public motorized access, except where other resource needs dictate the road should be left open to the public, to reduce motor vehicle impacts.

7 Loop roads to access leases should be permitted only where a transportation proposal developed by the operator and approved by the Forest Service demonstrates that there would be a benefit to surface resources.

8 Centralized collection points and water pipelines for drilling and produced water should be developed, to minimize impacts to ecological and cultural resources.

9 Reclaimed areas should be monitored and maintained, to minimize the establishment of invasive plants during the reclamation period.

10 Vaqueros Canyon Area of Resource Concern – Design criteria for oil and gas development activities should adhere to the natural characteristics dominating the landscape.

[58] USDI 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book, Fourth Edition. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp. available online at https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/the-gold-book

Management Approaches for Jicarilla Natural Gas Management Area

1. Consider alternative drilling technology and various site locations before developing new well sites, roads, or pipelines within an area of resource concern, to minimize the impacts to surface resources.
2. Continue with the partnership between the Forest Service and natural gas lease and pipeline operators (Jicarilla Roads Committee) to provide services, equipment, and money for maintaining roads on the Jicarilla Ranger District.
3. Consider offsite mitigation based on the scope and complexity of the project or adverse impacts to resources due to development.

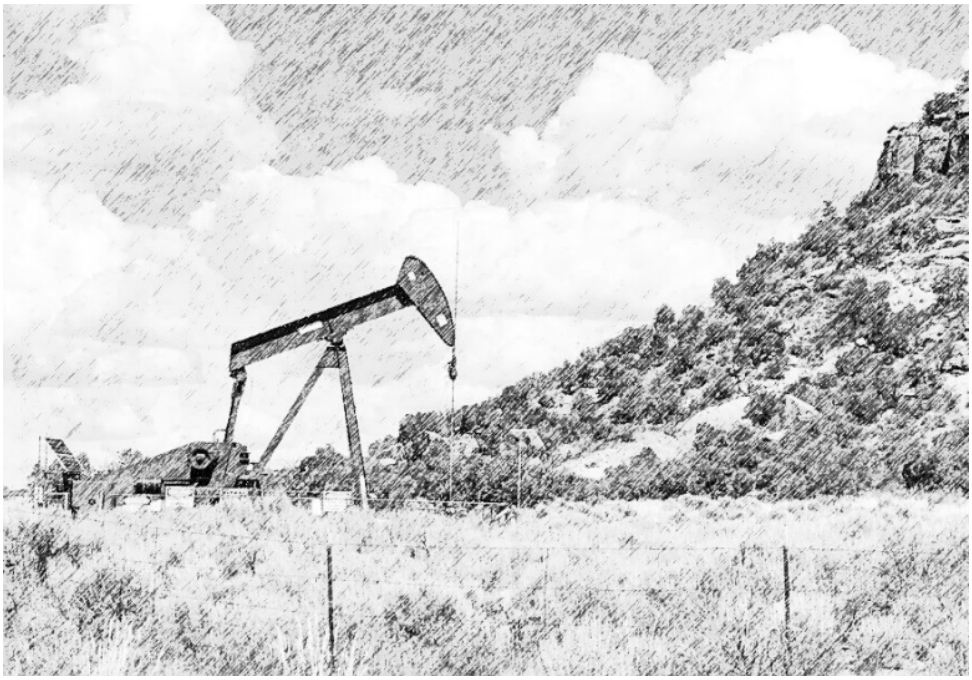


Photo credit: Peter Rich

Grassland Maintenance Management Area (GMMA)

The Carson National Forest has converted some stands of piñon pine, juniper, and ponderosa pine to production of native and introduced grass species. There are 61,824 acres identified for maintenance as grasslands through active management (Figure A-11). The original conversions were accomplished by plowing, chaining, dozer piling, tree crushing, and hand clearing with chainsaws then seeding to grass, primarily crested wheat. These conversion projects began in the late 1940s and continue to be maintained. Generally, these areas are flat to gently rolling. The soils have high revegetation potential and low to moderate erosion hazard. Most of the converted areas are natural-appearing grasslands that provide valuable habitat for many species of wildlife and many are key elk and deer winter range. The primary purpose of these conversion areas is to increase available forage for grazing, and they need to be maintained in a seral grass state if the Carson is to maintain its grazing commitment.

Grassland Maintenance Management Area Desired Conditions (MA-GMMA-DC)

1 In previously converted areas, vegetation remains in a seral grass state, with tree and shrub canopy cover of less than 10 percent each.

2 In most years, regeneration and seed head production occur and there is a balance of grass and forb species, including warm and cool season species, commensurate with the capability of soils.

3 Soil function is sustained. Soils are permeable and capable of infiltrating water to reduce overland flows during precipitation events and to allow for burrowing by small mammals (Gunnison's prairie dog and masked shrew). Adequate water infiltration discourages arroyos, gullies, and head cuts from forming in drainages. Existing arroyos and gullies are stabilizing and recovering.

Grassland Maintenance Management Area Standards (MA-GMMA-S)

1 Unconverted portions of this management area must be managed consistent with the appropriate vegetation community plan direction.

2 Native grass seed must be used when reseeding is required to reestablish native vegetation.

Management Approaches for Jicarilla Natural Gas Management Area

1. Consider focusing reseeding in areas where pre-treatment herbaceous groundcover was less than 30 percent.

Valle Vidal Management Area (VVMA)

Valle Vidal Management Area includes approximately 100,000 acres of rolling, grassland meadows surrounded by conifers, bristlecone pines, and aspen stands in the northern portion of the Questa Ranger District (Figure A-12). On December 31, 1981, the Pennzoil Company donated a portion of its 492,560-acre Vermejo Ranch in northeastern New Mexico to the people of the United States through the USDA Forest Service and called it Valle Vidal ("Valley of Life"). The special warranty deed that accompanied the donation specifically: (1) excludes the mining claims and town site within the La Belle area, (2) conveys all improvements located on the lands transferred, (3) recognizes the perpetual coal royalty interest Indenture Agreement with Kaiser Corporation, and (4) includes two road easements to Vermejo Park. No other provisions or restrictions were included in the deed.

The Valle Vidal Management Area's streams and lakes comprise the headwaters of the Costilla and Ponil watersheds. All the perennial streams within Valle Vidal are designated as Outstanding National Resource Waters by the State of New Mexico. Forests are predominantly spruce-fir, ponderosa pine, and mixed conifer, interspersed with aspen. There are large, contiguous stands of mature bristlecone pine and mixed stands of bristlecone, aspen, and large Douglas-fir trees. The variety of forest age classes and structures provides diverse habitats with abundant wildlife.

The Valle Vidal Management Area is managed for multiple uses, focusing on the restoration and protection of diverse and resilient biological communities for future generations, while providing a quality outdoor recreation experience. Wildlife habitats provide for a diversity of native plants, fish, and wildlife. Frequent fire plays a role in lessening the probability of a catastrophic wildfire, while contributing to the reestablishment of ecological processes. With its large, open meadows, Valle Vidal supports one of New Mexico's largest elk herds. Meadows are not only significant to elk, but also provide one of Valle Vidal's many scenic features for outdoor recreationists.

Outstanding (existing) mineral rights shall be recognized as authorized by the United States mining laws (30 U.S.C. 21-54). Any entry to access existing mineral rights will be conducted in an environmentally sound way through appropriate administration of mineral laws and regulations to minimize adverse environmental effects on National Forest System resources. Site-specific analysis shall occur to evaluate potential effects and develop appropriate mitigation measures. Operating plans and bonds shall be used if needed, to ensure protection and restoration of surface resources.

The Valle Vidal Management Area is a special place to the people of New Mexico and people from around the world, who come to marvel at the impressive views and its prized elk herd and their calves, to enjoy recreation and sporting opportunities, and to catch the rare Rio Grande cutthroat trout. Not only does the Valle Vidal offer outstanding scenic, wildlife viewing, and recreational opportunities, it also serves as an important resource for the ranching and agricultural communities of New Mexico, with its fresh water, firewood, and traditional grazing lands.

Valle Vidal Management Area Desired Conditions (MA-VVMA-DC)

1 Sustainable populations of terrestrial and aquatic plant and animal species are supported by healthy ecosystems, as described by Vegetation and Watersheds and Water desired conditions, especially within young rearing and winter range habitat of ungulates.

2 To the extent possible, wildlife and fish are free from harassment and human disturbance at a scale that impacts vital functions (e.g., seasonal and daily movements, breeding, feeding, and rearing young) and could affect persistence of the species.

3 Habitat conditions are capable of supporting self-sustaining native terrestrial and aquatic species populations.

4 A variety of outstanding outdoor recreation experiences (e.g. hunting, fishing, wildlife viewing, camping) are available, with an emphasis on primitive and semi-primitive settings and natural-appearing scenery.

5 Opportunities exist for outdoor, nature-based education (e.g., youth development and wilderness skills) and inspiring land stewardship.

Valle Vidal Management Area Standards (MA-VVMA-S)

1 Except for the Forest Road 1950 corridor, lands on the west side (Taos County) must be closed to all public entry from May 1 to June 30, to provide security for elk calving.

2 Except for the Forest Road 1950, Forest Road 1910, and Forest Road 1900 corridors, lands on the east side (Colfax County) must be closed to all public entry from January 1 to March 31, to provide security for elk winter range.

3 Over-snow use off designated areas identified on the Carson's most updated over-snow vehicle use map[59] is prohibited, except as authorized by law, permits, or orders, to protect public safety and ecological resources.

4 Long-term public vehicle access into Valle Vidal must be limited to the Cerrososo Canyon and Costilla Creek routes, along existing Forest Service Road 1950.

5 Addition to the current designated system of roads or motorized trails[60] for public access is prohibited.

6 Vehicle camping must be limited to Cimarron and McCrystal Campgrounds only.

7 Overnight parking for backcountry camping must be limited to designated parking areas.

8 Backcountry camping must be limited to outside of 0.5 mile of open roads, 100 yards of natural waters, or 300 yards of constructed waters.

[59] Or other, most current direction such as the forest visitor map.

[60] Not including winter over-snow trails.

9 Any livestock feed brought into Valle Vidal Management Area must be either commercially processed (pelletized) feed or certified weed-free hay.

10 Gathering of downed, dead, or green trees for firewood is prohibited except in designated areas when authorized through a fuelwood permit issued by the Forest Service.

11 Permitted livestock must not use Shuree Canyon Pasture except as a trailing pasture.

12 Infrastructure related to special use permits for energy developments (e.g., wind, solar, electrical lines) is prohibited.

13 Designated public and commercial communication sites are prohibited.

14 Subject to valid existing rights, Valle Vidal Management Area is withdrawn from:

a. all forms of mineral entry, appropriation, and disposal under the public land laws;

b. location, mineral entry, and patent under the mining laws; and

c. operation of the mineral leasing and geothermal leasing laws and common variety mineral materials laws.[61]

15 If valid existing rights are relinquished or otherwise acquired by the United States, the lands that were subject to the rights must be immediately withdrawn.[62]

16 Extraction of common variety minerals for commercial or public use is prohibited.

17 Temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects must be closed and rehabilitated upon project completion, to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use.

Valle Vidal Management Area Guideline (MA-VVMA-G)

1 Temporary roads should not be allowed, except to meet resource objectives, to protect the recreational experience.

[61] In compliance with the Valle Vidal Protection Act of 2005 (P.L. 109-385).

[62] In compliance with the Valle Vidal Protection Act of 2005 (P.L 109-385).

Management Approaches for Valle Vidal Management Area

1. Consider working with groups and individuals interested in the management of Valle Vidal to provide guidance during planning, implementation, and monitoring of environmental restoration projects.
2. Consider coordinating with the New Mexico Department of Game and Fish, so that management activities are consistent with the agency's fisheries management plans.
3. Consider coordinating with the New Mexico Department of Game and Fish to engage, educate, and inform the public, so that management supports sustainable recreation and wildlife habitat.
4. Consider identifying and working with partners to restore Shuree Lodge (in keeping with the National Historic Preservation Act and in consultation with the State Historic Preservation Officer) to use for nonprofit activities open to the public, such as an interpretive center, volunteer lodging during educational and cultural events, or as an administrative facility. Other historic structures may also be restored and adaptively reused. Potential uses include renting cabin(s) to the public as part of the Forest Service cabin rental program, administrative needs, or other appropriate uses.

Photo credit: Allan Lemley

San Antonio Management Area (SAMA)

San Antonio Management Area comprises approximately 117,035 acres of rolling, grassland surrounded by conifers, ponderosa pines, and aspen stands in the northern portion of the Tres Piedras Ranger District (Figure A-13). The San Antonio Management Area includes the Rio San Antonio gorge, San Antonio Mountain, streams with Rio Grande cutthroat trout populations, the Continental Divide National Scenic Trail, speckled granite outcrops, eligible wild and scenic rivers, wetlands, and the existing Cruces Basin Wilderness. San Antonio Mountain is the largest free-standing mountain in the Lower 48. It is the tallest of the Cerros, a solitary volcanic peak rising out of the desert floor. There is a crater (caldera) at the summit, with unique alpine grassland ecology. This area contains the renowned San Antonio Cave, one of the oldest lava tubes in North America, with some of the oldest mammalian fossils ever found. Forests are predominantly spruce-fir, ponderosa pine, and mixed conifer, interspersed with aspen. The variety of forest age classes and structures provides diverse habitats with abundant wildlife.

San Antonio Management Area is managed for multiple uses, focusing on the protection of diverse and resilient biological communities for future generations, while providing a quality outdoor recreation experience. Wildlife habitats provide for a diversity of native plants, fish, and wildlife. Frequent fire plays a role in lessening the probability of a catastrophic wildfire, while contributing to the reestablishment of ecological processes. With its large grasslands, San Antonio Management Area supports one of New Mexico's largest elk herds during critical winter months.

Locatable mineral operations shall be recognized as authorized by the United States mining laws. Any entry to access locatable minerals will be conducted in an environmentally sound way through appropriate administration of mineral laws and regulations so as to minimize adverse environmental effects on National Forest System resources. Site-specific analysis shall occur to evaluate potential effects and develop appropriate mitigation measures. Operating plans and bonds shall be used if needed, to ensure protection and restoration of surface resources.

San Antonio Management Area is a special place to marvel at the prized elk herds, to enjoy recreation and sporting opportunities (e.g., hunting, mountain biking, and snowmobiling), and to catch the rare Rio Grande cutthroat trout. Not only does the San Antonio Management Area offer wildlife viewing and recreational opportunities, it also serves as an important resource for the ranching and agricultural communities of New Mexico—with its fresh water, firewood, and traditional grazing lands.

San Antonio Management Area Desired Conditions (MA-SAMA-DC)

1 Sustainable populations of terrestrial and aquatic plant and animal species are supported by healthy ecosystems, as described by Vegetation and Watersheds and Water desired conditions.

2 To the extent possible, wildlife and fish are free from harassment and human disturbance at a scale that impacts vital functions (e.g., seasonal and daily movements, breeding, feeding, and rearing young) and could affect persistence of the species.

3 A variety of outstanding outdoor recreation experiences are available, with an emphasis on primitive and semi-primitive settings and natural-appearing scenery.

4 NFS lands exist as a mostly contiguous land base that best provides for and contributes to management of vegetation and watershed health, wildlife habitat and diversity, and recreation and scenic opportunity.

5 Opportunities exist for outdoor, nature-based education (e.g., youth development and wilderness skills) and inspiring land stewardship.

San Antonio Management Area Standards (MA-SAMA-S)

1 Addition to the current designated system of roads for public access is prohibited.

2 Temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects must be closed and rehabilitated upon project completion, to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use.

3 New or reconstructed fencing must allow for wildlife passage, except where specifically intended to exclude wildlife (e.g., elk exclosure fence) or to protect human health and safety.

4 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 cattleguards).

5 Infrastructure related to special use permits for energy developments (e.g., wind, solar, electrical lines) is prohibited.

6 Extraction of common variety minerals for commercial or public use is prohibited.

San Antonio Management Area Guidelines (MA-SAMA-G)

1 Management activities should avoid disturbance to big game species during birthing season and on winter range during the winter period. Management activities should concentrate activities in time and space to reduce impact to big game species. Timing restrictions, adaptive percent utilizations, distance buffers, or other means of avoiding disturbance should be based on the best available information, as well as site-specific factors (e.g., topography, available habitat, etc.).

Management Approaches for San Antonio Management Area

1. Consider improving wildlife or aquatic habitat connectivity within the San Antonio Management Area by removing unneeded structures (e.g., fences, roads, cattleguards, and culverts) or completing improvement projects (e.g., removing barriers and connecting fragmented habitat).

2. Consider projects in the San Antonio Management Area that improve habitat connectivity for aquatic and riparian species (e.g., remove barriers, restore dewatered stream segments, connect fragmented habitat, fences allowing wildlife passage, etc.).
3. Consider working with groups and individuals interested in the management of the greater San Antonio landscape, to provide guidance during planning, implementation, and monitoring of environmental restoration projects.
4. Consider coordinating with adjacent landowners, Federal and State land managers, and State agencies when ground-disturbing activities are proposed in the San Antonio Management Area. Consider the cumulative impacts of ground-disturbing projects that are occurring or will occur on adjacent lands and whether the spatial, temporal, or other design features can mitigate impacts to connectivity.
5. Consider the amounts, arrangements, and condition of natural communities and habitats that benefit wildlife during planning by multiple resource areas, including range, fire, and timber.
6. Consider coordinating with the New Mexico Department of Game and Fish, U.S. Fish and Wildlife Service, adjacent Federal land managers, sportsman's groups, the scientific community, and other stakeholders regarding information, education, and knowledge gaps as they relate to promoting and improving wildlife, fish, and plant resources and management.
7. Consider identifying linkages and barriers to wildlife movements and mitigating impacts during project design, by working with New Mexico Department of Game and Fish; New Mexico Department of Transportation; federally recognized tribes; Federal, State, and local agencies; Federal and State land managers; private landowners; and other organizations.

Photo credit: Peter Rich

Proposed Research Natural Area Management Area (PRNA)

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. The national network of RNAs helps protect biological diversity at the genetic, species, ecosystem, and landscape scales. RNAs that are representative of common ecosystems in natural condition serve as baseline or reference areas. 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.

The Carson National Forest has no designated RNAs, but is proposing four areas as candidates for designation by the Regional Forester and Research Station Director (Figure A-14). This includes the Clayton Pass and Little Costilla Peak proposed research natural areas on the Questa Ranger District, the La Cueva proposed research natural area on the Camino Real Ranger District, and the Yeso proposed research natural area on the Canjilon Ranger District. These areas will be managed to maintain those natural features that make them good candidates as ecological reference areas.

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.

Proposed Research Natural Area Desired Conditions (MA-PRNA-DC)

1. Research natural areas are natural-appearing and human activities do not directly or indirectly modify the integrity of ecological processes (e.g., plant succession, fire, and insects and disease).
2. Research natural areas are part of a national network of ecological areas for research, education, and maintenance of biological diversity, and serve as baseline areas for measuring ecological change from disturbances or stressors like climate change.

Proposed Research Natural Area Management Area Standards (MA-PRNA-S)

1. Vegetation manipulation or removal of forest products for commercial purposes or personal use (including firewood) must not be permitted or authorized, except when necessary to maintain ecological processes or natural characteristics.
2. Construction of new roads, trails, signs, or buildings is prohibited.
3. Special-use permits must not be issued, except for non-manipulative research.

4 Permitted livestock grazing must not be part of the management prescription beyond incidental livestock grazing (i.e., trailing).[63]

5 Motorized or mechanized recreation is prohibited.

6 New utility corridors must not be permitted or authorized.

Management Approaches for Proposed Research Natural Area Management Area

1. Consider area closure orders if dispersed recreation results in degradation.
2. Consider area closure orders to prohibit campfires and forest product gathering.

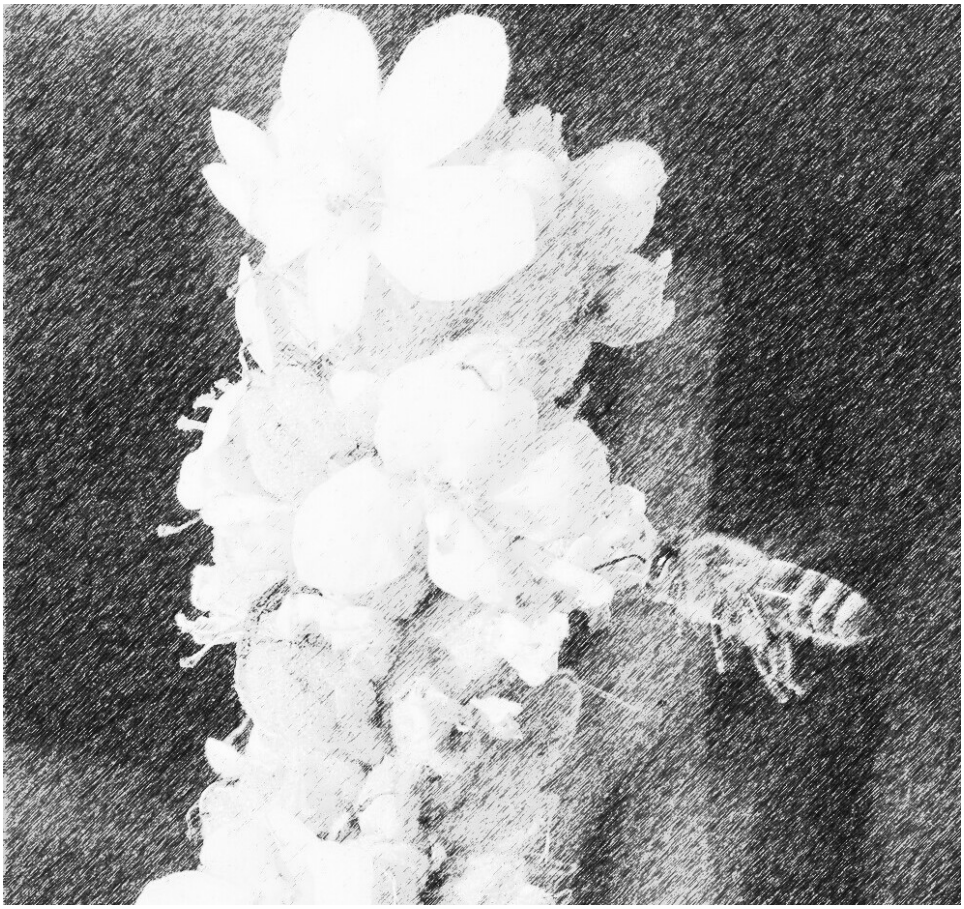


Photo credit: Allan Lemley

[63] Casual or incidental livestock grazing may be tolerated., such as trailing through the Clayton Pass proposed RNA or rare intrusions in the La Cueva proposed RNA.

Chapter 4. Plan Monitoring Program

Introduction

Under the 2012 Planning Rule, monitoring consists of two elements: the plan monitoring program and broader-scale monitoring strategies. Together, these support adaptive management by demonstrating if a change in plan components or other plan content that guide management of resources on the plan area may be needed. Broader-scale monitoring strategies are developed by the Regional Forester and are not completed at this time.

The plan monitoring program was developed collaboratively with other agencies, organizations, and individuals, in consultation with federally recognized tribes, while coordinating with Forest Service Research and State and Private Forestry. Monitoring is continuous and provides feedback for the planning cycle by testing assumptions, tracking relevant conditions over time, and measuring management effectiveness. It uses the best available scientific information while remaining within the financial and technical capabilities of the agency.

The plan-level monitoring program is informed by the assessment report (USDA FS 2015); developed concurrently with plan development; and implemented after plan adoption. Biennial monitoring evaluation reports document whether a change to the plan or change to the monitoring program is warranted based on new information, whether a new assessment may be needed, or whether there is no need for change at that time. The monitoring strategy provides a framework for subsequent monitoring and evaluation designed to inform adaptive management. The 2012 Planning Rule requires that the plan monitoring program contain at least one monitoring question and associated indicator to address each of the following eight topics (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 how ecological conditions provide for the diversity of plant and animal communities, within the Forest Service authority and consistent with the inherent capability of the planning area

IV. The status of select ecological conditions that contribute to the recovery of threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern (species of conservation concern)

V. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives

VI. Measurable changes on the plan area related to climate change and other stressors

VII. Progress toward meeting desired conditions and objectives in the plan, including for providing multiple-use opportunities

VIII. The effects of management systems to determine that they do not substantially and permanently impair the productivity of the land

IX. Changes in social, cultural, and economic conditions that are influenced by the plan and contributions of plan area management toward meeting social, cultural, and economic attributes of desired conditions to provide feedback for adaptive management toward expected and potential contributions to social and economic sustainability.

Monitoring is the part of the adaptive management strategy used to determine the degree to which on-the-ground management is maintaining or making progress toward desired conditions. The monitoring plan includes questions and performance measures designed to evaluate implementation and effectiveness and inform adaptive management.

Monitoring questions focus on providing the information necessary to evaluate whether plan components are effective and appropriate and whether management is effectively maintaining or achieving progress toward the desired conditions and objectives in the plan area. Indicators are quantitative or qualitative variables that can be measured or described and that, when observed periodically, show trends in conditions that are relevant to the associated monitoring questions.

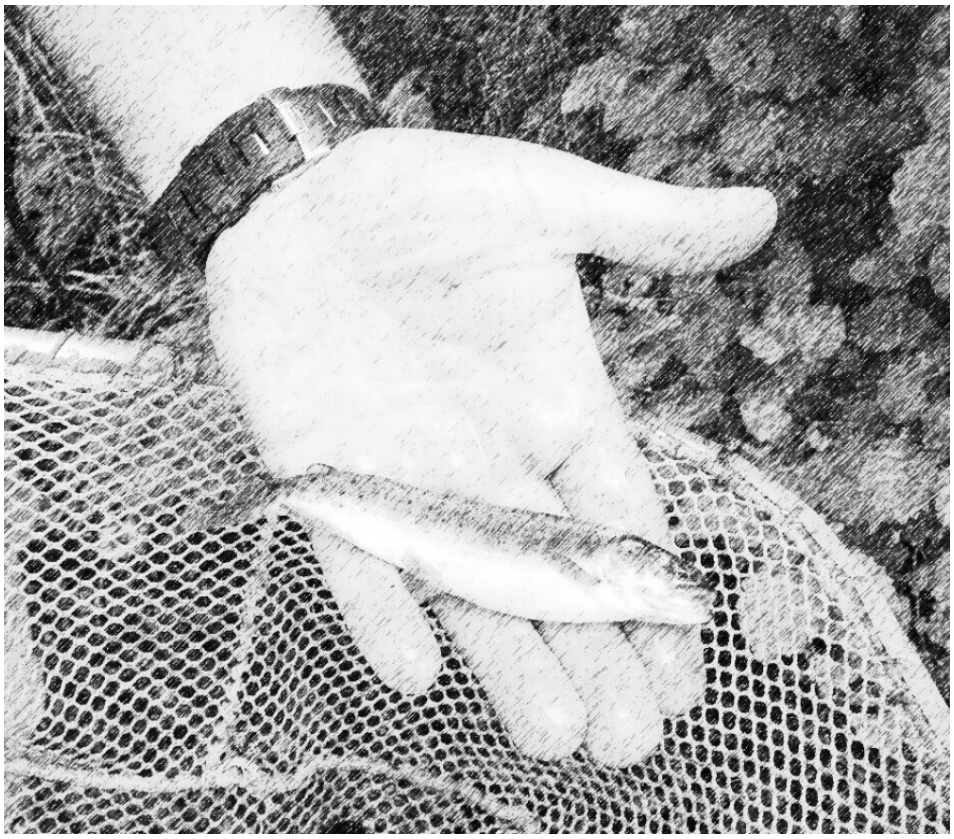


Photo credit: Jay Gatlin

Monitoring Topic I: Watershed Conditions

These monitoring questions and their associated indicators are related to water resources and watershed conditions in the plan area. The geographic scale may extend beyond the plan area and may include downstream areas where water originates in the plan area.

Table 9. Monitoring questions and associated indicators that evaluate select watershed conditions

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-WSW-DC-1 FW-WSW-O-1 FW-TFA-O-1	Are watersheds functioning properly? Are "impaired" or "functioning-at-risk" watersheds moving toward desired conditions?	Percentage of watersheds in proper functioning condition. Number of acres treated to improve watershed condition. Miles of road decommissioned	Annual for all indicators except for as necessary for project implementation for the aquatic focal species
FW-WSW-RMZ-STM-DC-5 FW-WSW-RMZ-WB-DC-5 FW-WSW-RMZ-SNS-DC-5 FW-WSW-G-1	Are best management practices being implemented to minimize impacts and improve water quality? Are best management practices effectively protecting watershed condition, including water quality?	Visual confirmation of best management practices implementation Review a sample of soil-disturbing activities for compliance with best management practices by project and allotment operating instruction implementation. Monitoring of best management practices New waterbodies listed by the State of NM as impaired for not meeting designated uses	Every 5 years
FW-VEG-DC-8	Are management actions maintaining or improving soil cover contributing to improved soil condition?	Ground cover Soil condition rating	Every 5 years
FW-WSW-DC 4 FW-WSW-O-1 FW-TFA-O-1 FW-WFP-O 2 FW-WFP-O 3 FW-WFP-O 4 FW-WFP-O 5	To what extent are forest management activities improving ecological condition for Aquatic At-Risk Species and provide habitat connectivity?	Number of fish passage barriers removed or created Number of roads decommissioned within the riparian management zone Number of culverts removed or upgraded Number of activities with stream miles of habitat improvements Stream miles treated for nonnative invasive species	Annually

Monitoring Topic II: Ecological Processes and Conditions for Terrestrial and Aquatic Ecosystems

These monitoring questions and their associated indicators are related to terrestrial and aquatic ecosystems. The monitoring questions and indicators are selected to measure the effectiveness of the plan to maintain or restore ecological conditions for key ecosystem characteristics associated with composition, structure, function, and connectivity.

Table 10. Monitoring questions and associated indicators that evaluate select ecological conditions for key characteristics of terrestrial and aquatic ecosystems

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-VEG-DC-3 FW-VEG-DC-2 FW-VEG-MCD-O-1 FW-VEG-PPF-O-1 FW-VEG-MCD-O-2 FW-VEG-PPF-O-2	What is the condition and trend of key characteristics of vegetation? Are management actions moving fire regimes toward desired conditions?	Vegetation composition, size class, and canopy cover Acres of Mixed Conifer with Frequent Fire treated Acres of Ponderosa Pine Forest treated Acres and location of insect and disease infestations and tree mortality	Vegetation characteristics-every 10 years Acres treated and acres of insect and disease–annually
FW-WFP-DC-2 FW-WSW-RMZ-SNS-O-1 FW-WFP-O 1 FW-WFP-O 4 FW-WFP-O 5	Are management activities moving terrestrial habitat toward desired conditions? What is the status of habitat for At-risk Species associated with High Elevation Forest on NFS lands? What is the status of habitat for At-risk Species associated with Frequent Fire Forest on NFS lands? What is the status of habitat for At-risk Species associated with Woodlands on NFS lands? What is the status of habitat for At-risk Species associated with Non-Wooded vegetation on NFS lands?	Number of water features maintained, improved, or installed Acres of terrestrial habitat restored or enhanced Focal Species presence	Number of water features and acres restored or enhanced–annually Focal species presence–As necessary for project implementation
FW-WSW-RMZ-DC-1 FW-WSW-RMZ-DC-2 FW-WSW-RMZ-O-1 FW-NIS-O-1	What is the condition and trend of key ecosystem components for riparian vegetation in the plan area? Are management actions maintaining or moving riparian vegetation toward desired conditions?	Acres of impaired riparian restored Stream miles treated for nonnative invasive species	Annually

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-WSW-RMZ-DC-2 FW-WSW-RMZ-DC-5 FW-WSW-RMZ-STM-O-1 FW-WSW-RMZ-SNS-O-1	Is aquatic habitat distributed, connected, and in a condition capable of supporting native aquatic species? Are management actions making progress toward desired conditions for native aquatic species?	Miles of aquatic habitat restored Number of beneficial barriers created/number of barriers removed to reduce undesired fragmentation Amount of large woody debris in streams 303d turbidity exceedance 303d temperature exceedance	Annually Every 10 to 15 years
FW-NIS-DC-1 FW-NIS-O-1 FW-NIS-S-1	What is the status and trend of invasive plant species in the plan area?	Acres of nonnative invasive inventoried Acres of nonnative invasive treated	Annually
FW-FIRE-DC-1 FW-FIRE-DC-2 FW-FIRE-G-1	Are desired fuel levels and vegetation characteristics being maintained with wildland fire? Is wildland fire playing its natural ecological role? Are fires being managed across administrative boundaries?	Acres burned, by ecological response unit Range of fire sizes, by ecological response unit Percentage of acres burned by severity class, by ecological response unit Burned acres managed for resource objectives Number of multijurisdictional fires	Every 5 to 10 years
FW-AIR-DC 1 FW-AIR-DC 2 FW-AIR-DC 3	Is air quality meeting defined standards in the plan area? Are air quality related values being impacted in Wilderness Areas and other areas of the forest?	Particulate matter ($PM_{2.5}$/PM_{10}) Surface water acidification Visibility (atmospheric aerosols in Class I airsheds)	Surface water acidification-every 2 years Every 5 years or as necessary during fires

Monitoring Topic III: Status of Focal Species

Focal species are defined by the 2012 Planning Rule as "A small subset of species whose status permits inference to the integrity of the larger system to which it belongs and provides meaningful information regarding the effectiveness of the plan in maintaining or restoring ecological conditions to maintain the diversity of plan and animal communities… commonly selected based on their functional role in ecosystems" (36 CFR § 219.19).

Focal species are not selected to make inferences about other species. Focal species are selected because they are believed to be responsive to ecological conditions in a way that can inform future plan decisions. Forest Service handbook direction (FSH 1909.12 chapter 30 § 32.13c) for focal species further specifies that every plan monitoring program must identify one or more focal species and one or more monitoring questions and associated indicators addressing the status of the focal species. The purpose for monitoring the status of focal species over time is to provide insight into the following:

1. Integrity of ecological systems on which focal species depend,
2. Effects of management on those ecological conditions,
3. Effectiveness of the plan components to provide for ecological integrity and maintain or restore ecological conditions, and
4. Progress toward achieving desired conditions and objectives for the plan area. It is not expected that a focal species be selected for every element of ecological conditions.

The key considerations for selecting focal species include:

- Does the species provide feedback that is necessary to inform management?
- Are focal species abundant enough to measure change in status?
- Are there "off-site" stressors that would mask the response to activities and conditions on NFS lands?
- Can the species be effectively monitored?
- Is the species cryptic, rare, or otherwise difficult species to monitor?
- Is it within financial capability of the unit(s)?
- Do standardized monitoring approaches exist?
- Are species responses to management activities and other stressors well known?
- Are there opportunities for multi-party monitoring?

The rule does not require managing habitat conditions for focal species, nor does it confer a separate conservation requirement for these species simply based on them being selected as focal species. The 2012 Planning Rule does not require or prohibit monitoring of population trends of focal species. Instead, it allows the use of any existing or emerging approaches for monitoring the status of focal species that are supported by current science.

Monitoring methods for evaluating the status of focal species may include measures of abundance, distribution, reproduction, presence/ absence, area occupied, survival rates, or others. The objective is not to choose the monitoring technique(s) that will provide the most information about the focal species, but to choose a monitoring technique(s) for the focal species that will provide useful information with regard to the purpose for which the species is being monitored. The expectation is that monitoring key ecosystem and watershed conditions along with monitoring the status of a set of well-chosen focal species will

provide timely information regarding the effectiveness of plan components related to plant and animal diversity.

Overall, two focal species are recommended for the Carson National Forest. The following section describes the recommended focal species and how they provide information regarding ecological integrity and ecosystem diversity. These species were selected because they will inform management about the status of ecological conditions, diversity, and integrity. Detected population changes are most likely to indicate the effects of management for the selected species.

Recommended Focal Species on the Carson National Forest

Ponderosa Pine Forest and Dry Mixed Conifer: Grace's Warbler

Grace's warbler (*Setophaga graciae*) is well-associated with ponderosa pine with open canopy characteristics and patches of mature trees (Stacier and Guzy 2002). This species uses tall ponderosa pine for both breeding and foraging; they nest in larger ponderosa trees averaging 15.1 meters tall and will often forage for insects in the upper canopy (Stacier and Guzy 2002 and references therein).

Grace's warbler response to both timber and fire management within its preferred habitat has been relatively well-studied. In general, abundance of this species declined in stands that are severely thinned, including clearcuts (Finch et al. 1997 and references therein), overstory removal plots (Kalies et al. 2010), and areas affected by wildfire (Johnson and Wauer 1996; Kalies et al. 2010). However, Grace's warbler was detected in areas with small-diameter removals and thinning and burning treatments (Finch et al. 1997 and references therein; Kalies et al. 2010). Due to its dependency on mature trees and open understory, this species is a good indicator for healthy ponderosa pine and dry mixed conifer woodlands as outlined within the desired conditions of this plan.

Although this species shows a small population decline for the state of New Mexico (Sauer et al. 2017), surveys for migratory birds indicated that it is readily found on the Carson National Forest. Also, according to New Mexico Department of Game and Fish (2016 and 2017), Grace's warbler was one of the most commonly detected species during the surveys of Sandia, Manzano, Magdalena, San Mateo, Zuni, Jemez, San Juan, and Sangre de Cristo mountain ranges. It is easily detected through vocalizations.

It is expected that management actions meeting the desired conditions outlined in this plan would have a positive effect on Grace's warbler. Detecting this species within treatment units would indicate that habitat conditions on the landscape are moving toward the stated desired conditions.

Wet Mixed Conifer: Hermit Thrush

The hermit thrush (*Catharus guttatus*) is a distinctive and relatively common species associated with old-growth, closed-canopy mixed-conifer forested habitats, including pine, Douglas-fir, fir, and spruce (Dellinger et al. 2012). In the West, this species usually builds nests a few meters above the ground in areas with abundant concealment (Dellinger et al. 2012). As an omnivore, the hermit thrush will glean insects and other invertebrates from the forest floor or shrubs but will also consume fruits (Dellinger et al. 2012). Sometimes this species will also capture prey in flight or in sub-canopy areas, but they generally use shady-leaf littered forest floors (Dellinger et al. 2012).

In general, hermit thrushes can tolerate some uneven-aged thinning (King and DeGraff 2000; Vanderwel et al. 2007; Kalies et al. 2010) and low to moderate burning (Kotliar et al. 2007). However, hermit thrush abundance declined when substantial modifications were made to forest structure, including removal of interlocking canopies and large trees (Kalies et al. 2010), clearcutting (King and DeGraff 2000; Simon et al. 2002), or a reduction in snags (Simon et al. 2002; Schwab et al. 2006). This species has also been associated with disturbances associated with management activities, including building nests on

constructed features such as re-seeded log landings, skidder trails, and openings created by road building that were more than 10 years old (Dellinger et al. 2007).

Migratory bird surveys on the Carson National Forest suggest that this species is readily detected (Beason et al. 2006, 2007), although the population shows a small population decline for the state of New Mexico (Sauer et al. 2017).

Desired conditions for wet mixed conifer consist of a mosaic of structural and seral stages with rare landscape-level disturbances; large areas of old-growth, snags, and vigorous trees with interlocking canopies; and a mixed-severity fire regime. Hermit thrushes are dependent on habitats such as those described in this plan and can withstand management activities that would move wet mixed conifer stands toward these conditions. Thus, we would expect detections of this species within treatment units where the aforementioned conditions are met and that management actions to move this vegetation toward desired conditions would have a positive effect on the hermit thrush.

Table 11. Monitoring questions and associated indicators that evaluate the status of focal species

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-VEG-DC-5 FW-VEG-DC-2 FW-VEG-PPF-DC-15 FW-VEG-PPF-DC-16 FW-VEG-PPF-O-1 and 2	What is the area of forest occupied by Grace's warbler?	Proportion of surveyed habitat in which the species is detected	As necessary for project implementation
FW-VEG-DC-5 FW-VEG-DC-2 FW-VEG-MCW-DC-2 FW-VEG-MCW-DC-5 FW-VEG-MCW-DC-15	What is the area of forest occupied by the hermit thrush?	Proportion of surveyed habitat in which the species is detected	As necessary for project implementation

Monitoring Topic IV: Status of At-Risk Species

For particular at-risk species, a select set of ecological conditions, including habitat, is monitored. The selected ecological conditions are necessary to provide for diversity of plant and animal communities and 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 identified for the Carson. The select set of ecological conditions monitored for at-risk species may include characteristics at both the ecosystem and species-specific levels of terrestrial, riparian, or aquatic ecosystems.

Table 12. Monitoring questions and associated indicators that evaluate the status of a select set of ecological conditions for at-risk species

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-VEG-DC 20 FW-VEG-DC 21	Are management actions maintaining or improving the appropriate number, distribution, and recruitment of snags?	Number, distribution, and recruitments of snags	Every 5 years
FW-VEG-DC 2	Is vegetation structure meeting or approaching desired conditions?	Departure	Every 5 to 10 years
FW-VEG-DC 5 FW-VEG-DC 10	Is vegetation structure meeting or approaching desired conditions to improve ecological for At-risk Species?	Departure	Every 5 to 10 years

Monitoring Topic V: Status of Visitor Use, Visitor Satisfaction, and Meeting Recreation Objectives

The plan monitoring program includes monitoring questions and associated indicators that address the status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.

Table 13. Monitoring questions and associated indicators that evaluate the status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-REC-DC-3 FW-REC-DC-5	What are the trends in visitation on the forest? Are visitors satisfied with the opportunities for recreation on the forest? Are new recreational uses emerging that require changed management?	National Visitor Use Monitoring (type of recreational participation); Visitor satisfaction surveys	Every 5 years
FW-REC-DC-10 FW-REC-O-4 FW-REC-O-5	Are developed recreation sites being maintained to provide a satisfactory user experience?	Percent of sites maintained to standard; Amount of deferred maintenance addressed annually; Visitor satisfaction surveys	Annually; Visitor satisfaction surveys-every 5 years
FW-TFA-DC-1 FW-TFA-DC-3 FW-TFA-DC-4 FW-TFA-O-2, 3 and 4	Are system roads and trails located and maintained to prevent resource degradation and do they support designed uses? Are system roads and trails meeting the needs of visitors?	Miles of roads and trails maintained; Miles of roads and trails accurately mapped and signed; Visitor satisfaction surveys	Annually; Visitor satisfaction surveys-every 5 years
DA-WILD-DC-3 DA-WILD-DC-4	Are management activities improving wilderness character in Designated Wilderness Areas?	Score in Wilderness Stewardship Performance; Campsite monitoring	Every 5 years

Monitoring Topic VI: Measurable Changes Related to Climate and Other Stressors

The plan monitoring program includes monitoring questions and associated indicators to determine whether there are measurable changes on the plan area related to climate change and other stressors.

Table 14. Monitoring questions and associated indicators that measure change related to climate change and other stressors that may be affecting the plan area

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-VEG-DC-3 FW-WSW-DC-2	Are vegetation conditions resilient to a changing climate? Are insect and disease populations within reference conditions? What is the relationship between these stressors and climate vulnerability predictions?	Acres of vegetation treatments; Vegetation structure and composition; Acres of canopy loss in forested vegetation communities due to fire, drought, insects, or disease; Treatment effectiveness as it relates to the Climate Change Vulnerability Assessment (USDA FS 2014); Tree planting and seeding success as it relates to Climate Change Vulnerability Assessment.	Every 5 years
FW-VEG-DC-3 FW-WSW-DC-2	What are seasonal temperature and precipitation trends?	NOAA climate trends; soil moisture trends	Annually

Monitoring Topic VII: Progress toward Meeting Desired Conditions and Objectives

Progress toward meeting desired conditions, objectives, or other plan components that do not fall under one of the other required monitoring topics are included in the monitoring program. Specifically, the plan monitoring program contains questions and associated indicators addressing the plan's contribution to communities, social and economic sustainability of communities, multiple-use management in the plan area, and progress toward meeting the desired conditions and objectives related to social and economic sustainability.

Table 15. Monitoring questions and associated indicators that evaluate progress toward meeting the desired conditions and objectives in the plan, including providing for multiple-use opportunities

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-GRZ-DC-1 FW-GRZ-DC-2 FW-GRZ-DC-3	Are rangelands providing adequate forage resources to sustain agricultural businesses, socioeconomic diversity, and cultural identity of local communities? Is rangeland condition moving toward identified vegetation desired conditions and/or ecological site potential?	Number of livestock permittees authorized (head months); Daubenmire plots or similar protocol; Allotment condition ratings	Every 10 years
FW-REC-DC-4	Are recreational opportunities contributing to local economies?	National Visitor Use Monitoring	Every 5 years
FW-FRT-DC-5	Do federally recognized tribes have adequate solitude and privacy for traditional and cultural activities?	Number of temporary closure orders issued for tribal traditional and ceremonial activities, based on tribal requests.	Every 3 years, or as available
FW-RHC-DC-2 FW-RHC-DC-6 FW-REC-DC-1	Is the Carson engaging with partners to provide opportunities for youth from local communities to participate in educational programs, cultural events and activities, and employment? Is the Carson providing interpretative and educational opportunities to the public about cultural and historic resources?	Number and type of educational programs, events, activities, and employment. Number of youths participating in educational programs, events, activities, and employment on the Carson. Number of historic and cultural interpreted sites, presentations, Passport in Time projects, and tours.	Every 2 years
FW-PART-DC-1 FW-PART-DC-2 FW-PART-DC-3	Is the Carson using partnerships to provide additional capacity and improve visitor experience?	Number of agreements with partners, by activity type, that are supporting visitor services. Number and type of projects completed with partners	Every 2 years
FW-VEG-DC-5 FW-VEG-DC-20 FW-ALP-DC-7 FW-WFP-DC-11	Are populations of bighorn sheep fluctuating more than ± 20% of the 5-year mean population size? If so, do fluctuations correlate with changes in habitat conditions that might be addressed through management activities?	Population data provided by the New Mexico Department of Game and Fish of Rocky Mountain bighorn sheep.	Every 5 years

Monitoring Topic VIII: Productivity of the Land and Effects of Management Systems

This monitoring requirement comes from the National Forest Management Act requirement that there be research regarding the effects of timber management systems on the productivity of the land, and that such research is to be based on continuous monitoring and assessment in the field. Monitoring is focused on key ecosystem characteristics related to soils and soil productivity.

Table 16. Monitoring questions and associated indicators that evaluate the effects of each management system to determine that they do not substantially and permanently impair the productivity of the land

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-SL-DC-1	Are soils in satisfactory condition? Are management actions maintaining or improving vegetative ground cover and contributing to improved soil condition?	Review a sample of projects for soil condition indicators; Best management practices monitoring; Number of acres treated to improve watershed condition	Every 5 years

Monitoring Topic IX: Social, Economic, and Cultural Sustainability

This monitoring requirement comes from the 2012 Planning Rule (FSH 1909.12 sec 32.13f), which requires monitoring questions that address the social, economic and cultural sustainability of communities. This sustainability is an inherent part of several of the other required monitoring topics.

Table 17. Monitoring questions and associated indicators that evaluate social, economic, and cultural sustainability

Selected Plan Components	Monitoring Questions	Indicators	Monitoring Interval
FW-FFP-DC-1 FW-FFP-DC-4	Are timber harvests being designed and implemented in a manner that ensures sustained-yield and future productivity?	Amount of timber harvested relative to annual amount allowed for sustainable yield	Annually
FW-PART-DC-1 FW-PART-DC-2 FW-PART-DC-4	Are partnerships increasing capacity to manage forest resources and achieve mutually shared goals while remaining within the Carson's management capacity?	Number of community lead partnerships the Carson is actively participating in.	Every 2 years

Glossary

Accelerated erosion. Erosion occurring more rapidly than normal, natural, or geologic erosion, particularly resulting from human activities or other causes that expose bare soils, for example, wildfires.

Acequia or community ditch. A historical community ditch in New Mexico that carries snow runoff, spring flows, or river water to irrigate fields or orchards 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.

Administrative use. Motorized use by Forest Service employees, permitees, or contractors of roads, trails, and areas not otherwise designated for motor vehicle use but required for the administration and protection of NFS lands.

Airshed. A geographic area that, because of topography, meteorology, 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. A term used in land management planning and this Handbook to refer to, collectively, the federally recognized threatened, endangered, proposed, and candidate species and species of conservation concern within a plan area.

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 permit holder, or resource protection. Authorized numbers are not necessarily the number on the permit.

Base area (winter and summer resorts). The developed area at the bottom of a winter and summer resort.

Base property (grazing). Land and improvements owned and used by the permit holder for a farm or ranch operation and specifically designated by the permit holder to qualify for a term grazing permit.

Best management practices. Methods, measures, or practices selected by an agency to meet its nonpoint source control needs. Best management practices include but are not limited to structural and nonstructural controls and operation and maintenance procedures. Best management practices 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 (or biocrusts). Communities of living organisms on the soil surface consisting of cyanobacteria, lichens, mosses, microfungi, and algae.

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, a species that is:
    a. The subject of a petition to list as a threatened or endangered species and for which the National Marine Fisheries Service 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
    b. Not the subject of a petition but for which the National Marine Fisheries Service has announced in the Federal Register the initiation of a status review.

Chaining. Uprooting of trees and shrubs to create a seedbed by pulling a chain behind two tractors traveling parallel to each other.

Cienega. Wet meadows and marshes that are supported by springs and groundwater seeps in arid and semi-arid regions, and generally occur at elevations below 2,000 m (6,600 feet) (Sivinski 2018).

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.

Coarse woody debris. 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 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).

Common variety mineral materials. A collective term to describe petrified wood and common varieties of sand, gravel, stone, pumice, pumicite, cinders, clay, and other similar materials. Common varieties do not include deposits of those materials which are valuable because of some property giving them distinct and special value.

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 federally listing of proposed and candidate species (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 of 2003 instructed the U.S. Forest Service to give consideration of community priorities as outlined in a county wildfire protection plan during planning and implementation of hazardous fuel reduction projects.

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 (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 Endangered Species Act (16 U.S.C. 1533), upon a determination by the Secretary that such areas are essential for the conservation of the species. Endangered Species Act, 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. Endangered Species Act, sec. 4 (a)(3) and (b)(2) (16 U.S.C. 1533 (a)(3) and (b)(2)).

Decision document. A record of decision, decision notice, or decision memo (36 CFR 220.3).

Decommission. The demolition, dismantling, removal, obliteration, and/or disposal of an otherwise undeeded asset 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 requires maintenance and is not apparent on the landscape.

Departure. The degree to which the current condition of a key ecosystem characteristic is unlike the desired 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, 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).

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. For the purposes of the land management planning regulation at 36 CFR 219, a description of specific social, economic, and ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, 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.

Diameter at breast height (DBH). The diameter of the stem of a tree measured at breast height (4.5 feet) above the ground.

Disturbance. Any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure 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).

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).

E-bike (electric bicycle). A bicycle with an integrated electric motor that can be used for propulsion, in addition to pedaling. An e-bike is considered a motor vehicle and is subject to regulation under the Travel Management Rule (36 CFR § 212.51 (a)).

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 function. The biological, chemical, and physical processes and components that take place or occur within an ecosystem.

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 variability 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. 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 ecological response unit 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:

1. Composition. The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.
2. 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.
3. 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.
4. Connectivity. See connectivity above.

Ecosystem diversity. The variety and relative extent of ecosystems (36 CFR 219.19).

Ecosystem integrity. See ecological integrity.

Ecosystem services. Benefits people obtain from ecosystems, including:

1. Provisioning services, such as clean air and fresh water, energy, food, fuel, forage, wood products or fiber, and minerals;

2. Regulating services, such as long-term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood and drought control; and disease regulation;
3. Supporting services, such as pollination, seed dispersal, soil formation, and nutrient cycling; and
4. Cultural services, such as educational, aesthetic, spiritual, and cultural heritage values, recreational experiences, and tourism opportunities.

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.

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 comprising a single age class (36 CFR 219.19).

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 regime. The pattern, frequency, and intensity wildfire that prevails in an area over long periods of time.

Forest road or trail. A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources (36 CFR 212.1).

Frequent fire-dependent ecosystem. A vegetation community that requires a fire regime 1 (>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 provides protection of the 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 fragmentation. The process by which habitat loss results in the division of large, continuous habitats into 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.

Historic properties. Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register of Historic Places.

Hydrologic unit code (HUC). A unique code for a 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. The code for each level is two digits, so for example a HUC8 or 4th code subbasin is identified by 8 digits.

- **HUC8** A hydrologic unit code 8 subbasin, or 4th code hydrologic unit is 700 square miles or larger and is divided into multiple smaller watersheds (HUC10).
- **HUC10** A hydrologic unit code 10 watershed, or 5th code hydrologic unit can range in size from 62 to 390 square miles. They are divided into multiple subwatersheds (HUC12) and nest inside subbasins (HUC8).
- **HUC12** Hydrologic unit code 12 subwatersheds, or 6th code hydrologic units are 15 to 62 square miles and nest inside watersheds (HUC10).

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, the Office of Management and Budget (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 Carson 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 Service 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, landscaping); support utilities (e.g., electrical, water, 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, and 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).

Inholding. Private property completely surrounded by National Forest System lands.

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).

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).

Jackstrawing. Groups of fallen trees usually resulting from blowdown, avalanche, flood, or insect or disease mortality.

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).

Landscape visibility (scenery management system). Accessibility of the landscape to viewers. One's ability to see and perceive landscapes. A component of scenic class.

Line officer. A Forest Service official who serves in a direct line of command from the Chief (36 CFR 219.62).

Long-term impacts. Impacts that last through the life of this plan.

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).

Management system. For the purposes of the land management planning regulation at 36 CFR 219, a timber management system including even aged management and uneven-aged management (36 CFR 219.19).

Mechanical treatment. Vegetation manipulation using machinery to achieve a prescribed outcome.

Memorandum of understanding. Describes 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 gentlemen's 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.

Mollisol. A soil of an order comprising temperate grassland soils with dark, humus-rich surface layer containing high concentration of calcium and magnesium.

Monitoring. A systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships (36 CFR 219.19).

Motor Vehicle. Any vehicle which 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. 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 NFS so that they are used 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 national policy promoting the enhancement of the environment and “will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation.” 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 Service 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 Forest System trail. A Forest Service trail other than a trail 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).

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).

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.

Natural variability. 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.

Naturalize. A type of road decommissioning treatment that restores natural vegetation and drainage.

Neonate ungulate. Offspring of a hoofed animal (e.g., fawn or calf).

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.

Obliterate. A type of road decommissioning treatment that renders the road unusable and unrecognizable.

Off-highway vehicle (OHV). Any motorized vehicle designed for or capable of cross-country 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 116-44 as amended by EO 11989). See also FSM 2355. 01–Exhibit 01.

Old-growth characteristics. Old-growth forests are forests that 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).

Outstanding national 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 outstanding national resource water designation include waters that are part of a national or State park, wildlife refuge or wilderness, 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).

Outstandingly remarkable value. A scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar river-related value that is unique, rare, or exemplary feature and is significant when compared with similar values from other rivers at a regional or national scale.

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.

Permit holder or permittee. Any person or entity that has been issued a grazing or special use permit on NFS lands.

Persistence. Continued existence (36 CFR 219.19).

Piscicide. A chemical substance that is poisonous to fish. The primary use for piscicides is to eliminate a dominant species of fish in a body of water, as the first step in attempting to populate the body of water with a different fish.

Plan or land management plan. A document or set of documents that provide management direction for an administrative unit of the NFS 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 Carson National Forest.

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 land management plan revision process. Plan development requires preparation of an environmental impact statement (EIS). 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 it 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 on 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.

Plant and animal community. A naturally occurring assemblage of plant and animal species living within a defined area or habitat (36 CFR 219.19).

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 Handbook, 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).

Properly functioning condition (PFC). A methodology for assessing the physical functioning of riparian and wetland areas. The term is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian-wetland area. In either case, properly functioning condition 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 setting and recreation opportunity spectrum. The social, managerial, and physical attributes of a place that, when combined, provides a distinct set of recreation opportunities. The Forest Service uses recreation opportunity spectrum to define desired recreation settings and categorize them into six distinct classes: Primitive, Semi-primitive Non-motorized, Semi-primitive 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. Reference conditions are represented by the characteristic natural range of variability (not the total range of variation), prior to European settlement and under the current climatic period when that information is available. For many ecosystems, natural range of variability also reflects human-caused disturbance and effects prior to settlement. To be useful as a management guide, it may be necessary to refine reference conditions according to contemporary factors (e.g., invasive species) or projected conditions (e.g., changes in climate patterns). Reference conditions are most useful as an inference of sustainability when they have been quantified by amount, condition, spatial distribution, and temporal variation.

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.

Resistance. The ability to withstand the effects of a disturbance or stressor.

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. Portion of a watershed around lakes, perennial and intermittent streams, and open water wetlands that has characteristic riparian vegetation and provides riparian function.

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 closure. An administrative road designation that prohibits public motor vehicle use. Closures may be accompanied by road decommissioning or signage but can also be exclusively a regulatory determination (not included on a Motor Vehicle Use Map). Closed roads may be used administratively or by permit.

Road decommissioning. Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1). Decommissioning includes reestablishing vegetation and, if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road by applying various treatments, including one or more of the following:

1. Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation;

2. Blocking the entrance to a road or installing water bars;

3. Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed;

4. Completely eliminating the roadbed by restoring natural contours and slopes; and

5. Other methods designed to meet the specific conditions associated with the unneeded road. (FSH 7734.1)

Road maintenance levels:

- Maintenance Level 1. Roads that are placed in storage between intermittent uses. The period of storage must exceed 1 year. These are given basic maintenance to prevent impacts to adjacent resources. Can be operated at any other maintenance level during periods of use.
- Maintenance Level 2. 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).
- Maintenance Level 3. Roads that are open and maintained for use by standard passenger cars. Most have gravel surface.
- Maintenance Level 4. 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.
- Maintenance Level 5. Roads that are open and maintained for use by standard passenger cars.

Road naturalization. Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation.

Road obliteration. Completely eliminating the roadbed by restoring natural contours and slopes.

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 National Forest System 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.

Scenic attractiveness (scenery management system). The scenic importance of a landscape based on human perceptions of the intrinsic beauty of landform, rockform, waterform, and vegetation pattern. Classified as distinctive; typical or common; or indistinctive. A component of scenic class.

Scenic character (scenery management system – also, landscape character). A combination of the physical, biological, and cultural images that gives an area its scenic identity and make it identifiable or unique. Embodies distinct landscape attributes that exist throughout the area. May include a description of landform patterns, water characteristics, vegetation patterns, and cultural elements. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

Scenic character goal (scenery management system – also, landscape character goal). A management prescription designed to maintain or modify the existing landscape character to a desired future state. The

appearance of a landscape to be retained or created over time, recognizing that a landscape is a dynamic and constantly changing community of plants and animals.

Scenic class (scenery management system). Classification of the importance or value of a particular landscape or portions of that landscape based on a combination of scenic attractiveness and landscape visibility. Used during project planning to compare the value of scenery to other resource values.

Scenic integrity (scenery management system). State of naturalness or, conversely, the level of disturbance created by human activities or alteration.

Scenic integrity objective (scenery management system). A desired level of intactness and wholeness of scenic character based on physical and sociological characteristics of an area. Refers to the degree of acceptable human activity or alteration to scenic character. Objectives define the degree of deviation in form, line, color, scale, and texture that may occur from the existing scenic character to reach the scenic character goal. They are stated in degrees of deviation from the existing landscape character in a national forest. The existing scenic character and scenic classes help determine scenic integrity objectives for a management activity.

Seral state. One of a series of transitional plant communities that develop during gradual successive change following disturbance.

Similarity to site potential. The degree of similarity between the existing vegetation (all components and their characteristics) and existing soil conditions compared to the potential natural community and the desired soil condition on a site. Also referred to as ecological status (FSH 2090.11).

Soil and Water Conservation District. 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.

Species of conservation concern (SCC). 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)).

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 (36 CFR 219.7 (e)(1)(iii)).

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).

Succession. The gradual supplanting of one structural and compositional phase of vegetation development with another in forests and grasslands following disturbances that kill, remove, or reduce vegetation. Includes the major developmental or seral stages that occur within a particular environment (36 CFR 219.36).

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 Handbook ‘‘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 rangelands. Lands that provide forage for livestock grazing opportunities and contribute to agricultural businesses, local employment, as well as traditional and generational ties to the land.

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).

Subwatershed. A hydrologic unit code 12 (HUC 12), the smallest hydrologic unit, or subdivision of a watershed considered in this assessment.

System Road. See Forest Service System Road.

System Trail. See Forest Service System Trail.

Temporary road. A road authorized by contract, permit, lease, other written authorization or is necessary for emergency operations that is not a forest road and not part of the Forest Service transportation system and not necessary for long-term management (36 CFR 212.1).

Temporary trail. A trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a Forest Service trail and that is not included in a Forest transportation atlas.

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 on the Carson. 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 Carson Terrestrial Ecosystem Survey (USDA FS Carson 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 c 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.

Off-highway vehicle (OHV). A motor vehicle that is capable of driving on and off paved or gravel surface, including all-terrain vehicles (ATVs), utility task vehicles (UTVs), and motorcycles.

Unauthorized road or trail. A road or trail that is not a forest road, trail, temporary road, or temporary trail (36 CFR 212.1).

Unneeded road. Roads that have been determined to not be needed for the long-term management of National Forest resources, as determined by an appropriate planning document. Unneeded roads are closed to public, administrative, and permitted use. After it is determined that a road is no longer needed, vegetative cover should be reestablished on the road by either artificial or natural means per the Forest and Rangeland Renewable Resources Planning Act (16 U.S.C. 1608).

Ungulate. A hooved animal, which includes wildlife (e.g., pronghorn, deer, and elk) and domestic livestock (e. g., sheep, cattle, and horses).

Upland. May refer to areas, species, systems, or conditions that are characteristic of terrestrial ecosystems, as opposed to riparian or aquatic ecosystems.

Vegetation structure. Both vertical and horizontal arrangement of vegetation. Horizontal structure may refer 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, a HUC 10 hydrologic unit, larger than a subwatershed, and nested in a subbasin.

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 Environmental Protection Agency 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.

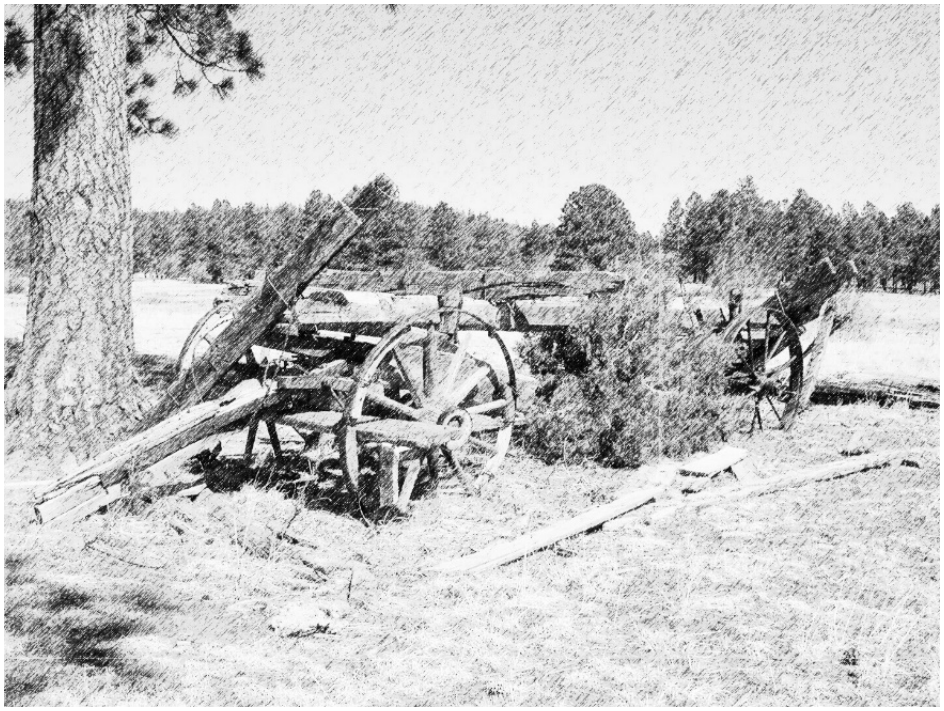
Wild and Scenic River. A river designated by Congress as part of the National Wild and Scenic Rivers System that was established in the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 (note), 1271–1287) (36 CFR 219.19).

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).

Wildland-urban interface (WUI). That area where human development adjoins public or private natural areas, or an intermix of rural and urban land uses. 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).

Witches' broom. A tree deformity created by a dense mass of shoots growing from a single point, often caused by pathogens such as dwarf mistletoe. The resulting structure resembles a broom or a bird's nest.

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.



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References

Adhikari, D. and J.A. Thacher. 2015. Economic impact analysis of the Carson National Forest. Albuquerque, NM: Department of Economics, University of New Mexico.

Beason, J., K. Hutton, R. Sparks, J. Blakesley, A. Panjabi, and D. Hanni. 2006. Monitoring the birds of the Carson National Forest: 2005 field season report. Rocky Mountain Bird Observatory.

Beason, J., K. Hutton, R. Sparks, J. Blakesley, A. Panjabi, and D. Hanni. 2007. Monitoring the birds of Carson National Forest: 2006 field season report. Rocky Mountain Bird Observatory.

Dellinger, R., P.B. Wood, and P.D. Keyser. 2007. Occurrence and nest survival of four thrush species on a managed central Appalachian forest. *Forest Ecology and Management*, 243, 248–258.

Dellinger, R., P.B. Wood, P.W. Jones, and T.M. Donovan. 2012. Hermit Thrush (*Catharus guttatus*), version 2.0. In *The Birds of North America* (A.F. Poole and F.B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. Available at: https://doi.org/10.2173/bna.261. Accessed 17 July 2018.

Finch, D.M., J.L. Ganey, W. Yong, R.T. Kimball, and R. Sallbanks. 1997. In: *Songbird ecology in southwestern ponderosa pine forests: a literature review.* Gen. Tech. Rep. RM-292. Fort Collins, CO: U.S. Department of Agriculture, Rocky Mountains Forest and Range Experiment Station; pp. 103–136.

Fire Executive Council. 2009. Guidance for Implementation of the Federal Wildland Fire Policy. https://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf

Hassell, M.J. 1968. The people of northern New Mexico and the national forests. [Unpublished report]. U.S. Department of Agriculture, Forest Service, Southwestern Region. May 13, 1968.

Hermansen-Baez, LA., J. Seitz, and M.C. Monroe. 2009. Wildland-Urban Interface: Varied definitions. http://www.srs.fs.usda.gov/factsheet/pdf/wui-varieddef.pdf (5/14/15)

Hurst, W. 1972. Memorandum to forest supervisors and district rangers. Region 3 policy on managing national forest land in northern New Mexico. U.S. Department of Agriculture, Forest Service, Southwestern Region, Regional Forester. March 6, 1972.

Johnson, T.H. and R.H. Wauer. 1996. Avifaunal response to the 1977 La Mesa fire. In: *Fire effects in southwestern forests*: proceedings of the second La Mesa Fire symposium; 1994 March 29–21; Los Alamos, New Mexico. Gen. Tech. Rep. RM-GTR-286. Fort Collins, CO: U.S. Department of Agriculture, Rocky Mountains Forest and Range Experiment Station. 216 pp.

Kalies, E.L., C.L. Chambers, and W.W. Covington. 2010. Wildlife responses to thinning and burning treatments in southwestern conifer forests: a meta-analysis. *Forest Ecology and Management* 259: 333–342.

King, D.I., and R.M. DeGraaf. 2000. Bird species diversity and nesting success in mature, clearcut and shelterwood forest in northern New Hampshire, USA. *Forest Ecology and Management*, 129, 227–235.

New Mexico Department of Game and Fish (NMDGF). 2016. Population size estimation of breeding Red-faced and Grace's Warblers in pine woodlands of New Mexico: 2016 Report. Albuquerque, NM, Ecological Services, Inc. 53 pp.

New Mexico Department of Game and Fish (NMDGF). 2017. Population size estimation of breeding red-faced and Grace's warblers in pine woodlands of New Mexico: 2017 Report. Albuquerque, NM, Ecological Services, Inc. 53 pp.

New Mexico Environment Department (NMED). 2015. Outstanding national resource waters. https://www.env.nm.gov/surface-water-quality/onrws/

New Mexico Environment Department (NMED). 2018. 2016-2018 State of New Mexico 303 (d)/ 305 (b) Integrated List for assessed surface waters. Santa Fe, NM: New Mexico Environment Department. Retrieved from https://www.env.nm.gov/wp-content/uploads/sites/25/2019/04/EPA-APPROVED2016APPA-IntegratedList.pdf

Raish, C., and A.M. McSweeney. 2003. Economic, social, and cultural aspects of livestock ranching on the Espanola and Canjilon Ranger Districts of the Santa Fe and Carson National Forests: A pilot study. Ft. Collins, CO: USDA Forest Service.

Sauer, J.R., D.K. Niven, J.E. Hines, D.J. Ziolkowski Jr., K.L. Pardieck, J.E. Fallon, and W.A. Link. 2017. The North American Breeding Bird Survey, Results and Analysis 1966–2015. Version 2.07.2017 USGS Patuxent Wildlife Research Center, Laurel, MD.

Schwab, F., N.P.P. Simon, S.W. Stryde, and G. Forbes. 2006. Effects of Postfire Snag Removal on Breeding Birds of Western Labrador. *Journal of Wildlife Management*, 70(5), 1464–1469. Available online at http://www.jstor.org/stable/4128068

Simon, N., F.E. Schwab, and R.D. Otto. 2002. Songbird abundance in clear-cut and burned stands: A comparison of natural disturbance and forest management. *Canadian Journal of Forest Research*, 32, 1343-1350. doi:10.1139/x02-057

Sivinski, R. (2018). Wetlands action plan: Arid-land spring ciénegas of New Mexico. Prepared for: New Mexico Environment Department Surface Water Quality Bureau, https://streamdynamics.us/sites/default/files/resource-docs/wetlands-action-plan-arid-land-spring-cienegas-of-new-mexico.pdf

Stacier, C.A. and M.J. Guzy. 2002. Grace's Warbler (*Steophaga graciae*), version 2.0. In *The Birds of North America* (A.F. Poole and F.B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. Available online at https://doi.org/10.2173/bna.677. Accessed 16 July 2018.

USDA FS (United States Department of Agriculture, Forest Service). 1982. Recreation Opportunity Spectrum (ROS) users guide. Washington DC: USDA Forest Service.

USDA FS (United States Department of Agriculture, Forest Service). 1995. Landscape aesthetics: a handbook for scenery management. Agricultural Handbook 701. Washington DC: USDA Forest Service.

USDA FS (United States Department of Agriculture, Forest Service). 2015. National scenic and historic trails. Available online at http://www.fs.fed.us/recreation/programs/trails/nat_trails.shtml.

USDA FS (United States Department of Agriculture, Forest Service). 2020a. Existing and desired conditions for riparian and aquatic ecosystems. Supplement to Ecosystems Riparian and Aquatic Ecosystem Strategy, Southwestern Region of the Forest Service. Technical guide MB-R3-16-14 available online at https://www.fs.usda.gov/detail/r3/landmanagement/resourcemanagement/?cid=fseprd601133. Accessed 21 April 2020. Regional Office, Albuquerque NM.

USDA FS (United States Department of Agriculture, Forest Service). 2020b. Riparian and Aquatic Ecosystem Strategy, Southwestern Region of the Forest Service. Technical guide MB-R3-16-13. Albuquerque, NM: USDA Forest Service Southwestern Region. Available online at https://www.fs.usda.gov/detail/r3/landmanagement/resourcemanagement/?cid=fseprd601133. Accessed 21 April 2020. Regional Office, Albuquerque NM.

USDA FS Carson (United States Department of Agriculture, Forest Service, Carson National Forest). 1986. Carson National Forest Plan. Albuquerque, NM: USDA Forest Service Southwestern Region.

USDA FS Carson (United States Department of Agriculture, Forest Service, Carson National Forest). 1987. Terrestrial ecosystems survey of the Carson National Forest. Albuquerque, NM: USDA Forest Service Southwestern Region.

USDA FS Carson (United States Department of Agriculture, Forest Service, Carson National Forest). 2015. Assessment Report of Ecological, Social, and Economic Conditions, Trends, and Sustainability. Taos, NM. Accessible online at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd475212.pdf.

USDI FWS (United States Department of Interior, Fish and Wildlife Service). 2019. Endangered Species Act species and migratory birds list for Taos, Rio Arriba, Colfax, and Mora Counties. Albuquerque, NM: USDI Fish and Wildlife Service.

USEPA (United States Environmental Protection Agency). 2015. Wetlands definitions. Available online at: http://water.epa.gov/lawsregs/guidance/wetlands/definitions.cfm. Accessed May 14, 2015.

Vanderwel, M.C., J.R. Malcolm, and S.C. Mills. 2007. A Meta-Analysis of Bird Responses to Uniform Partial Harvesting across North America. *Conservation Biology*, 21(5), 1230–1240.

Wildeman, G. and J.H. Brock. 2000. Grazing in the Southwest: History of Land Use and Grazing Since 1540, In: R.Jemison and C. Raish, eds., Livestock Management in the American Southwest. *Ecology, Society, And Economics* 1, 17–18.

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Appendix A. Land Management Plan Maps

This appendix includes maps referenced in sections of Chapter 3. Plan Components for Designated Areas and Management Areas.

List of Maps

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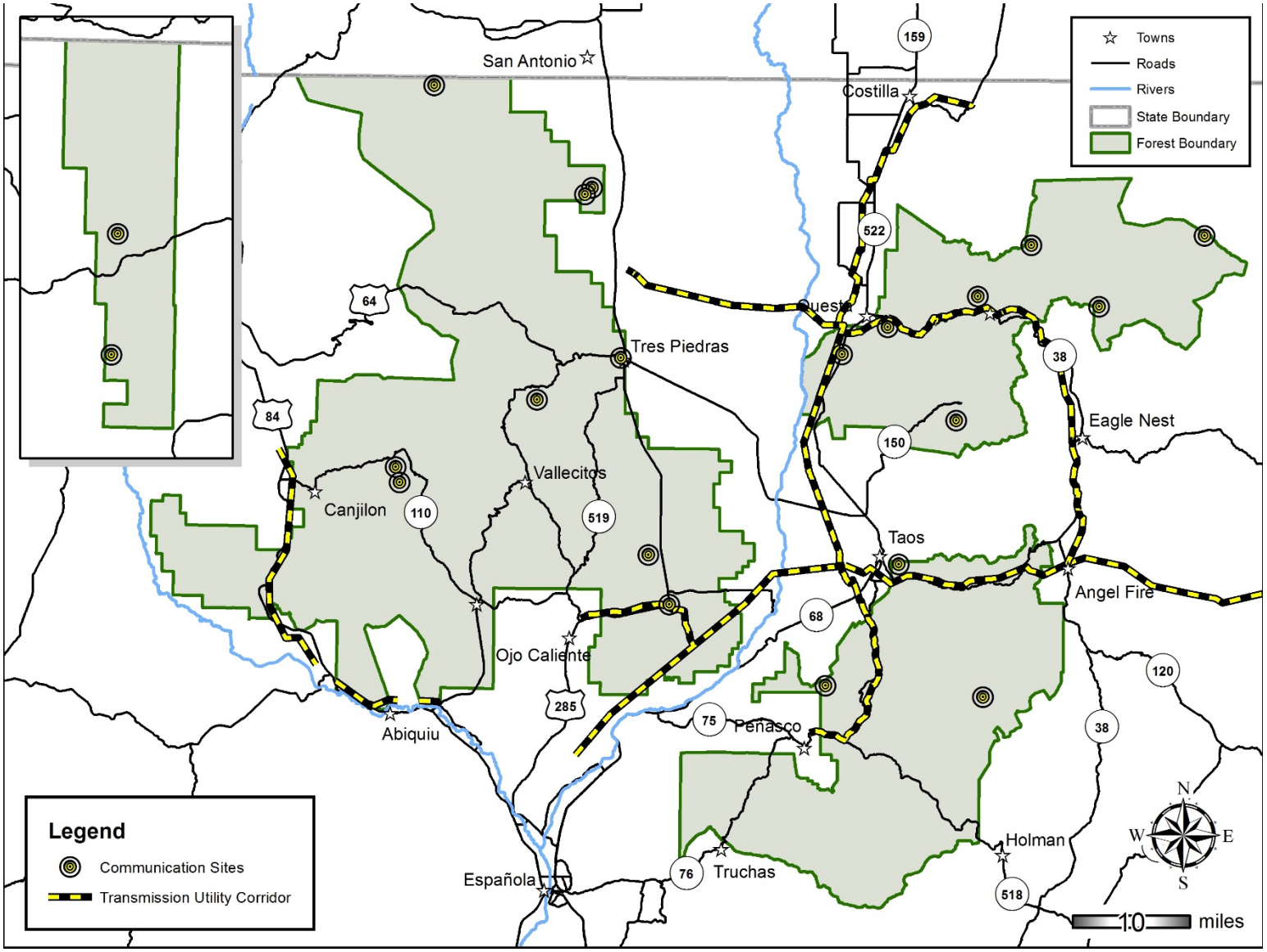

Figure A-1. Transmission utility corridors and communication sites on the Carson National Forest

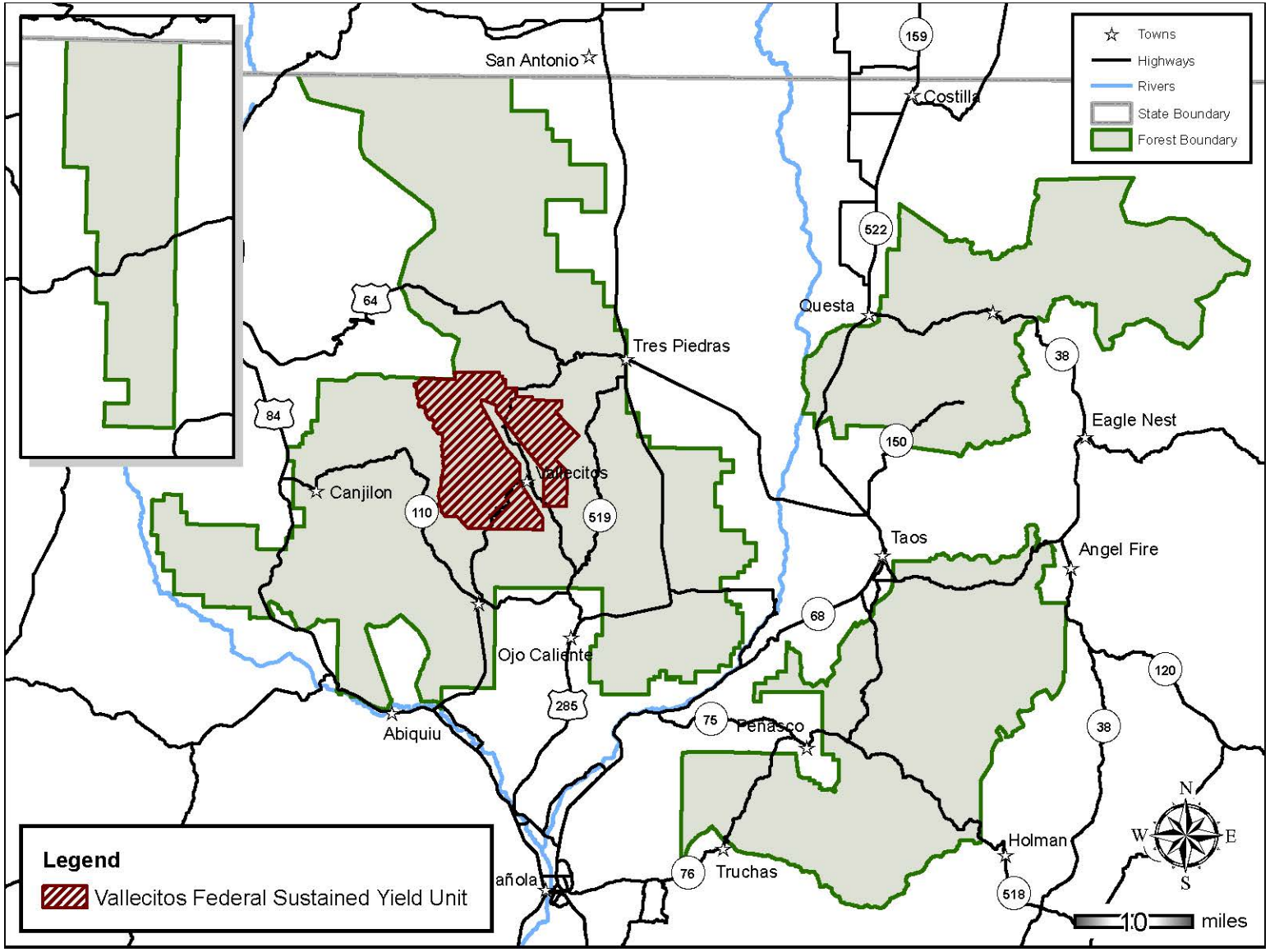

Figure A-2. Vallecitos Federal Sustained Yield Unit, El Rito Ranger District

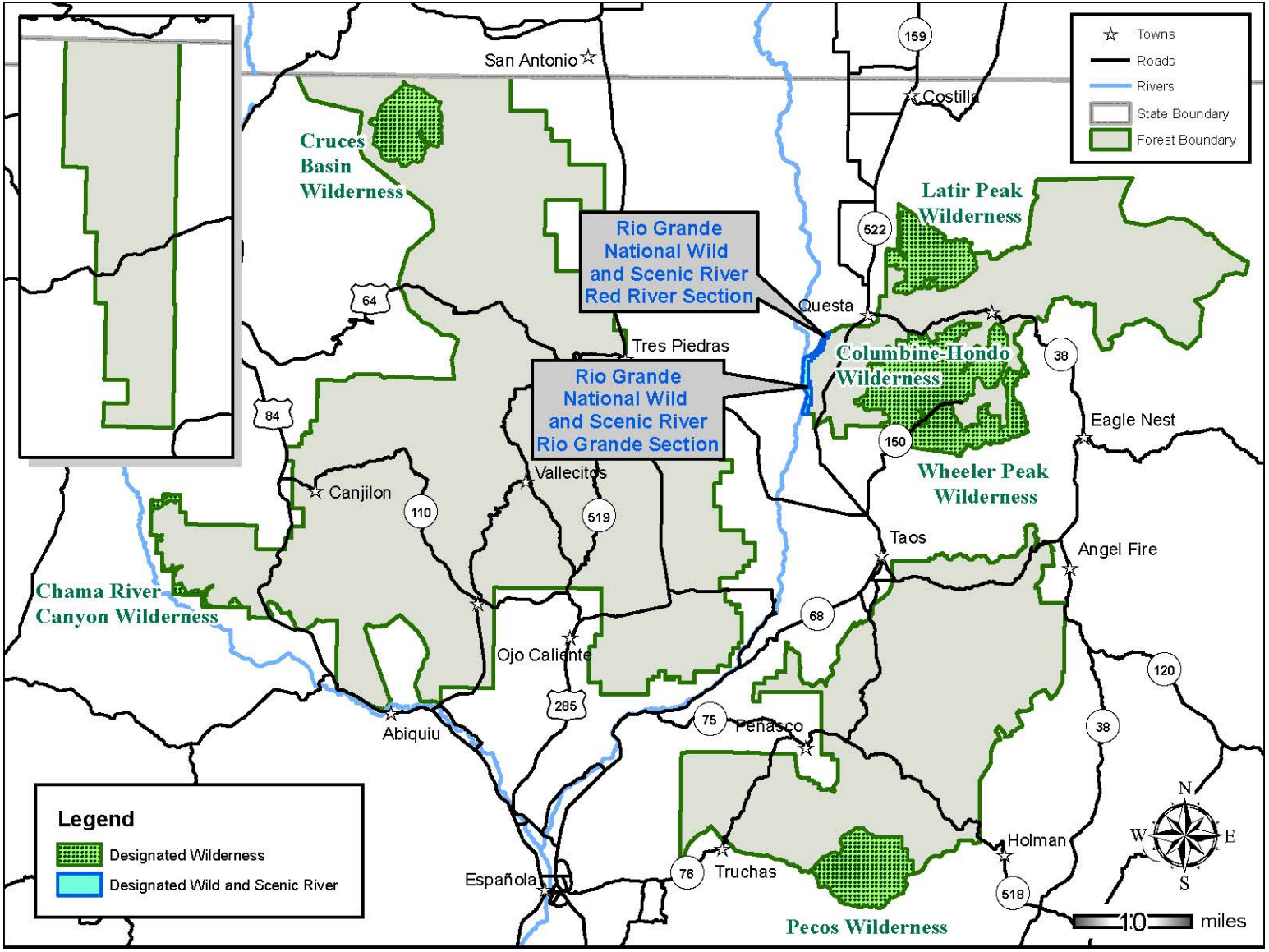

Figure A-3. Designated wilderness and designated wild and scenic rivers on the Carson National Forest

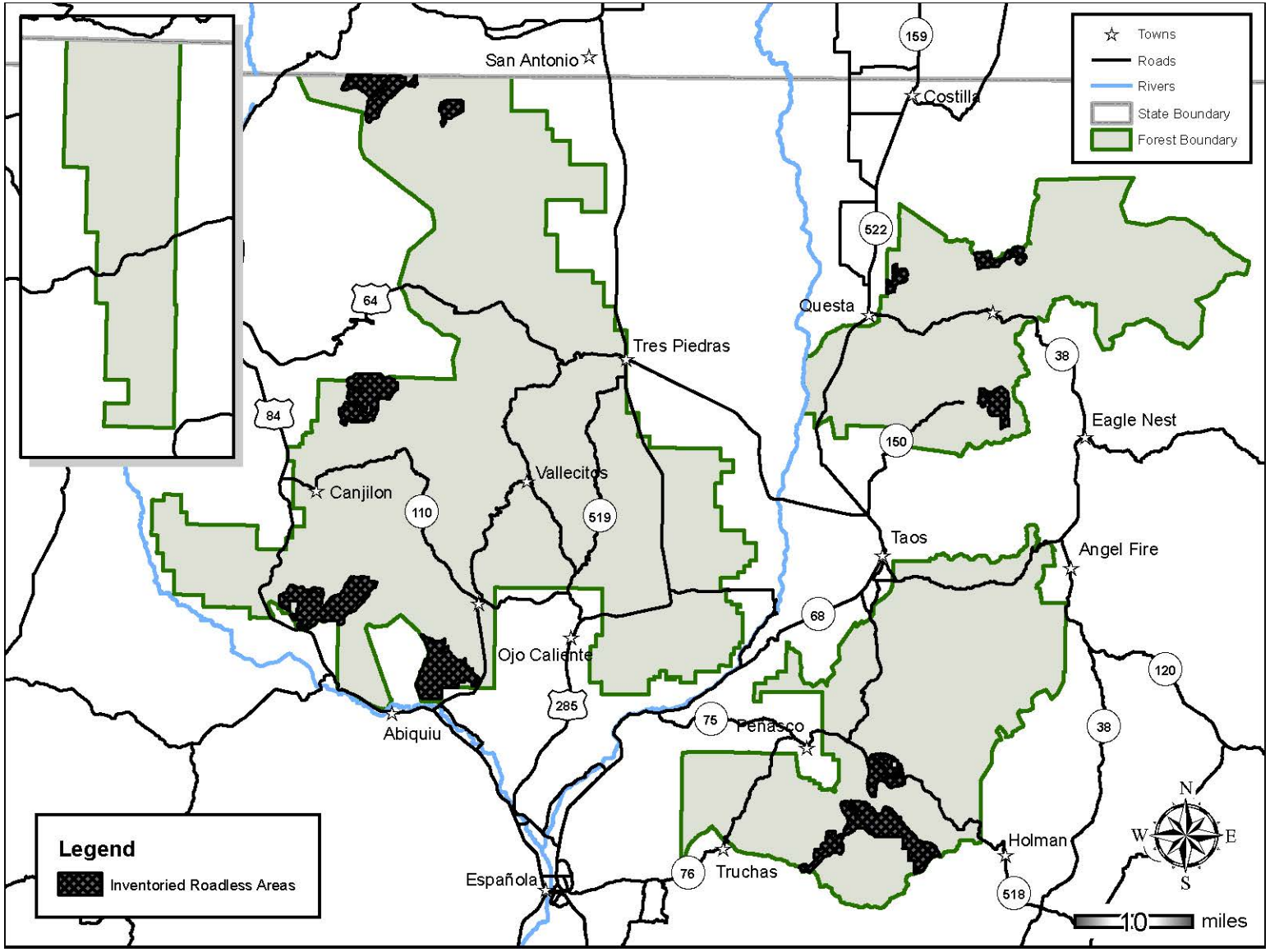

Figure A-4. Inventoried roadless areas on the Carson National Forest

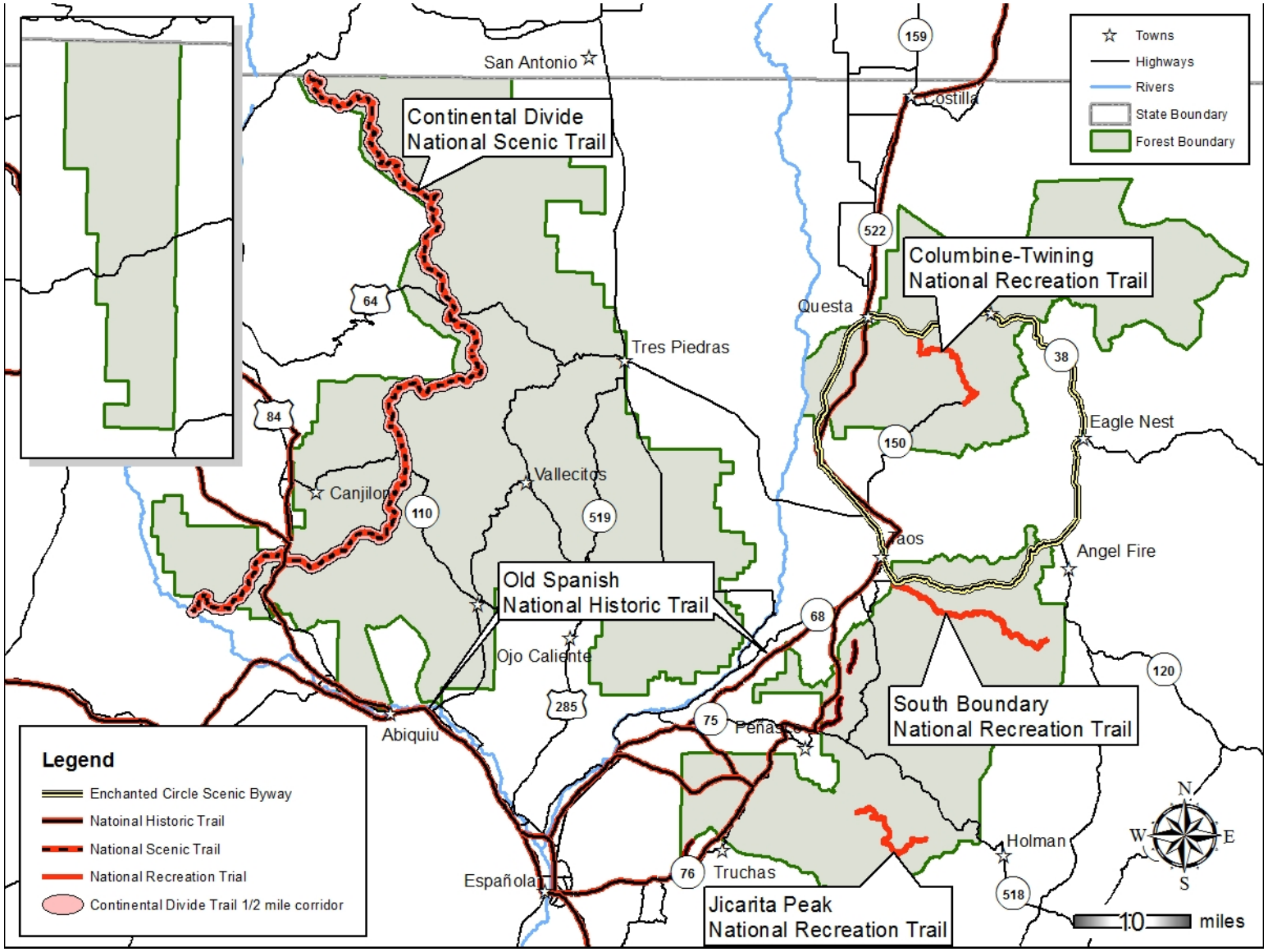

Figure A-5. National scenic, historic, and recreation trails and national scenic byways on the Carson National Forest

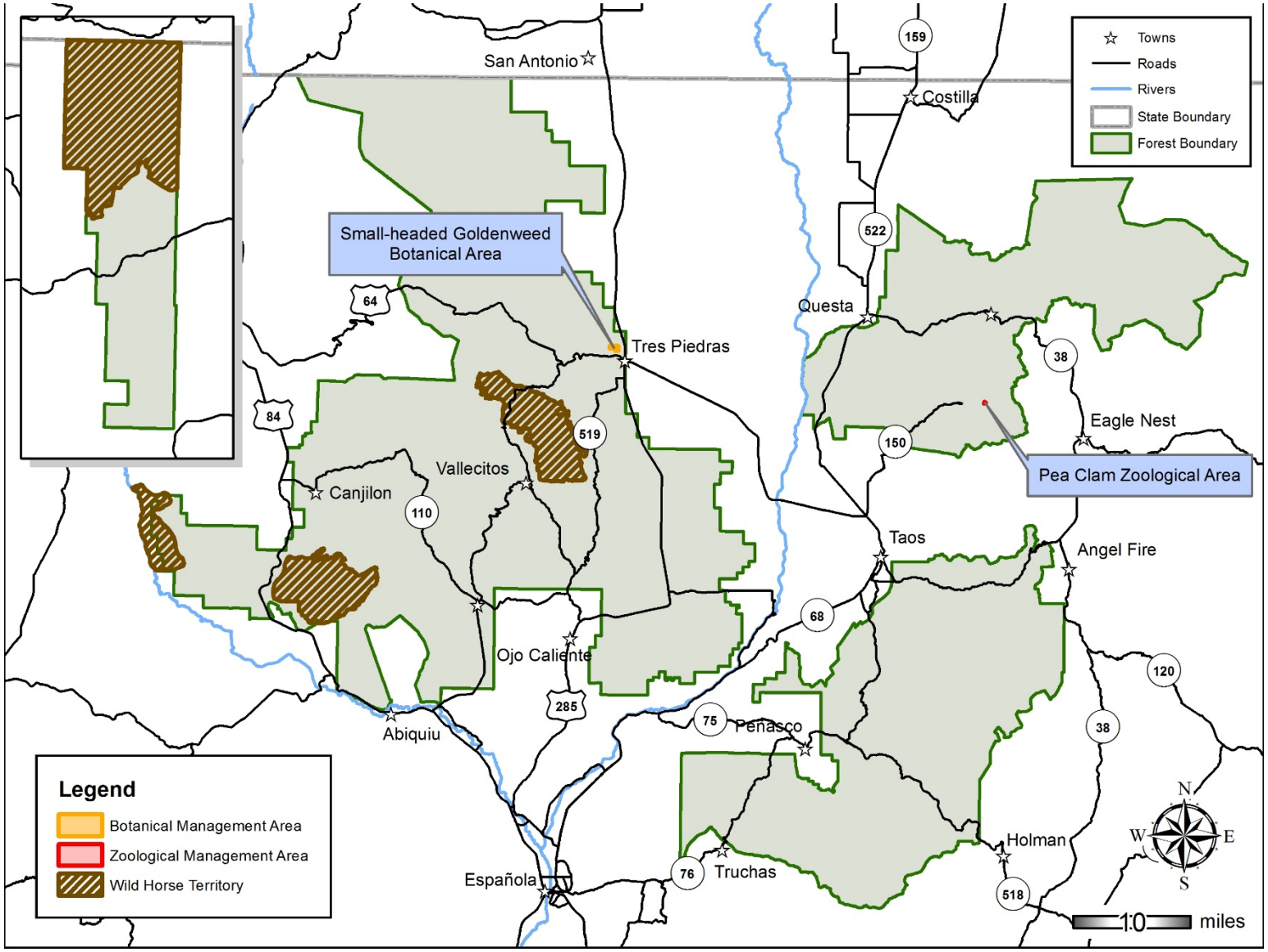

Figure A-6. Designated wild horse territories, zoological, and botanical areas on the Carson National Forest

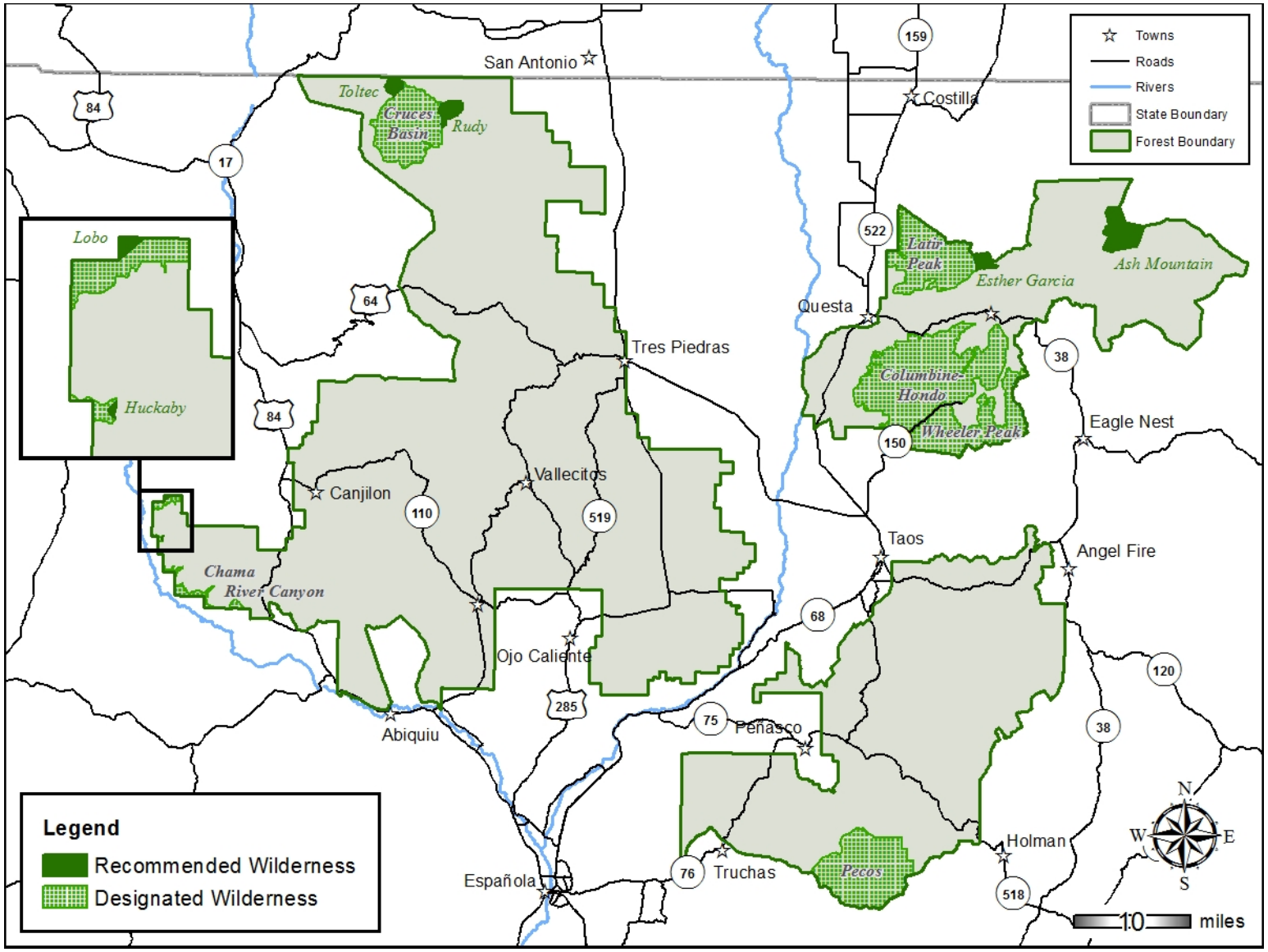

Figure A-7. Existing wilderness and recommended wilderness management areas on the Carson National Forest

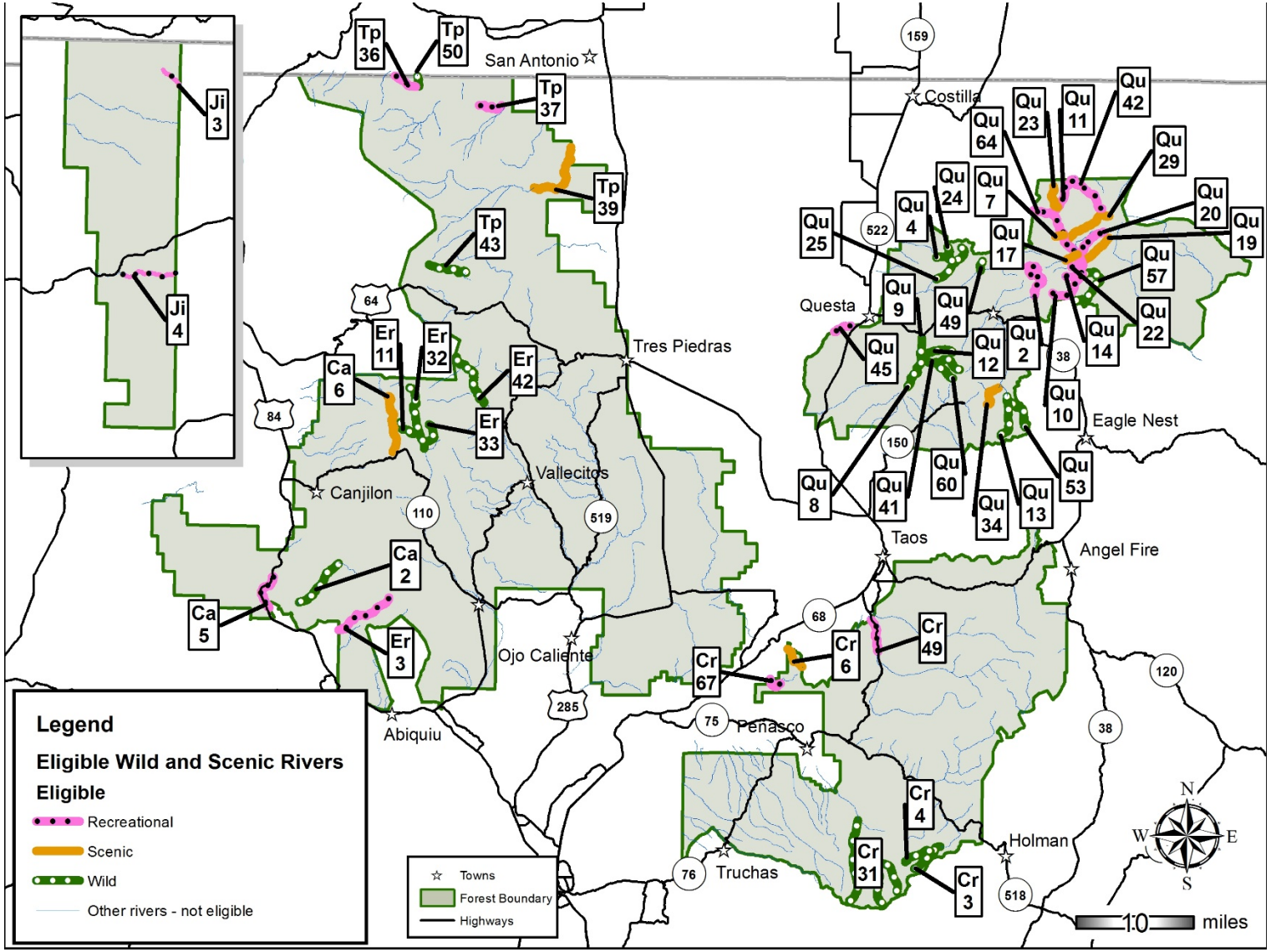

Figure A-8. Eligible wild and scenic rivers on the Carson National Forest

Note: See table 7 for more information about each eligible river. Ranger districts are abbreviated as follows: Camino Real (Cr), Canjilon (Ca), El Rito (Er), Jicarilla (Ji), Tres Piedras (Tp), and Questa (Qu).

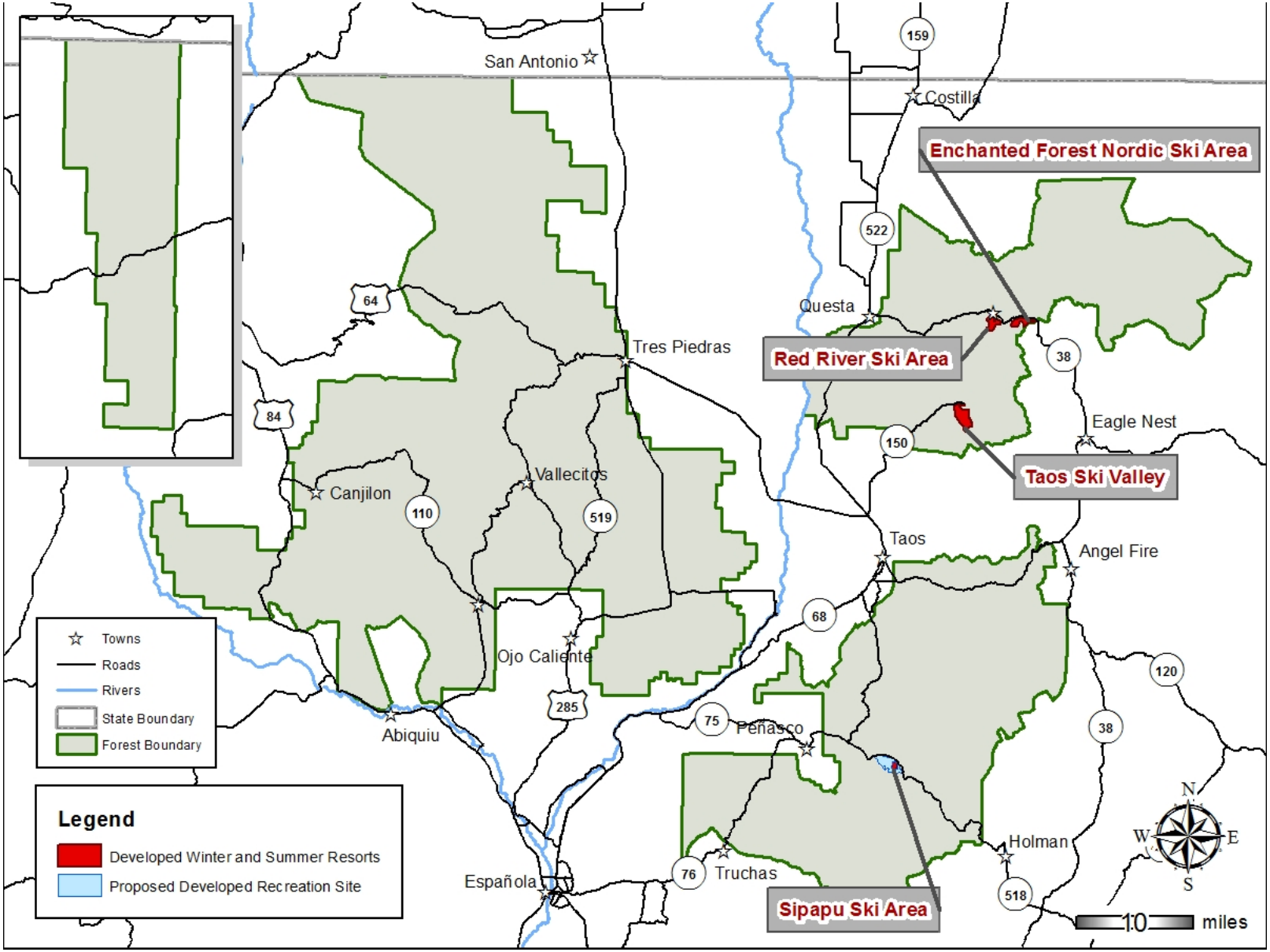

Figure A-9. Developed winter and summer resort and proposed developed recreation site management areas on the Carson National Forest

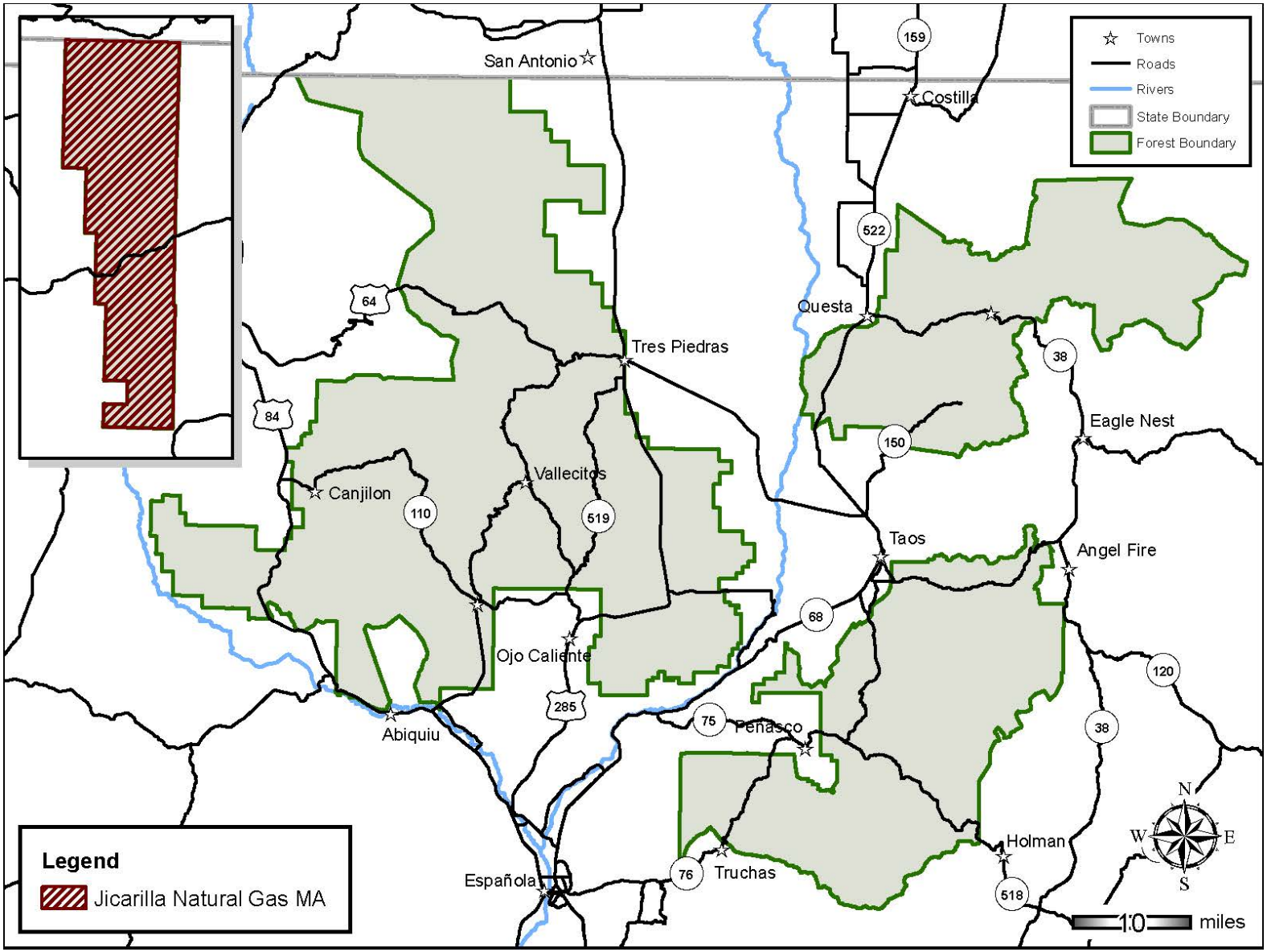

Figure A-10. Jicarilla Natural Gas Management Area on the Carson National Forest

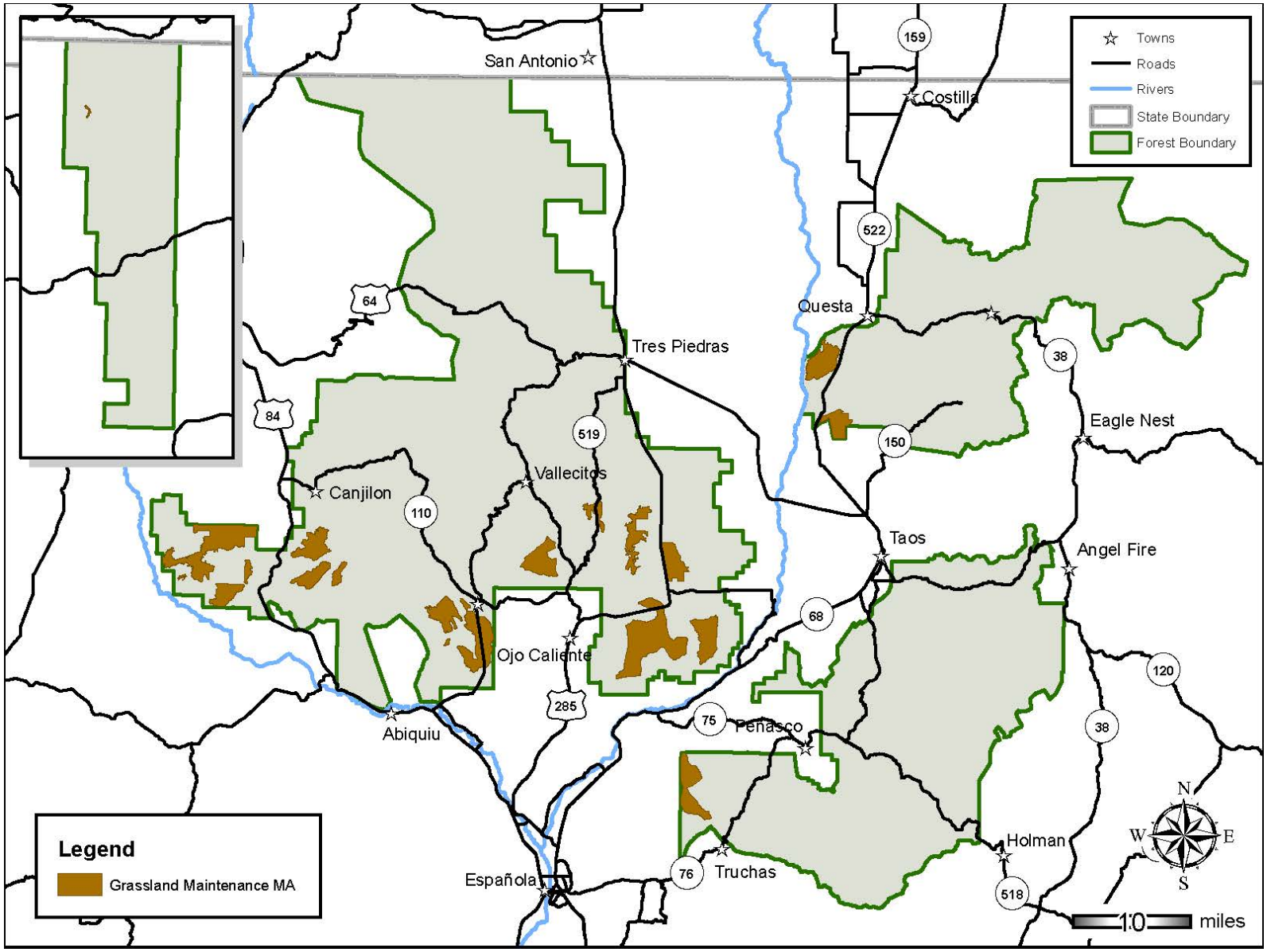

Figure A-11. Grassland maintenance management areas on the Carson National Forest

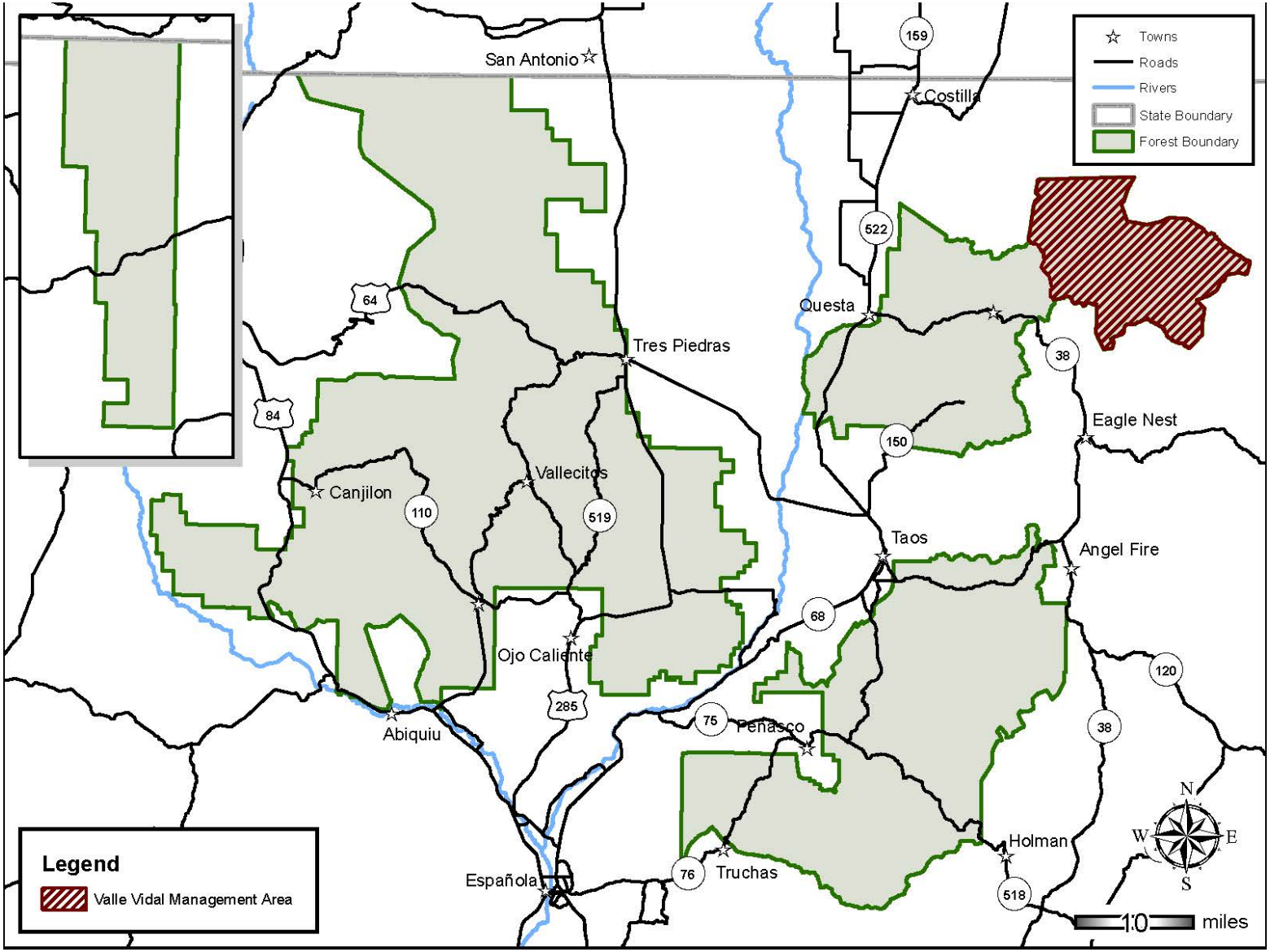

Figure A-12. Valle Vidal Management Area on the Carson National Forest

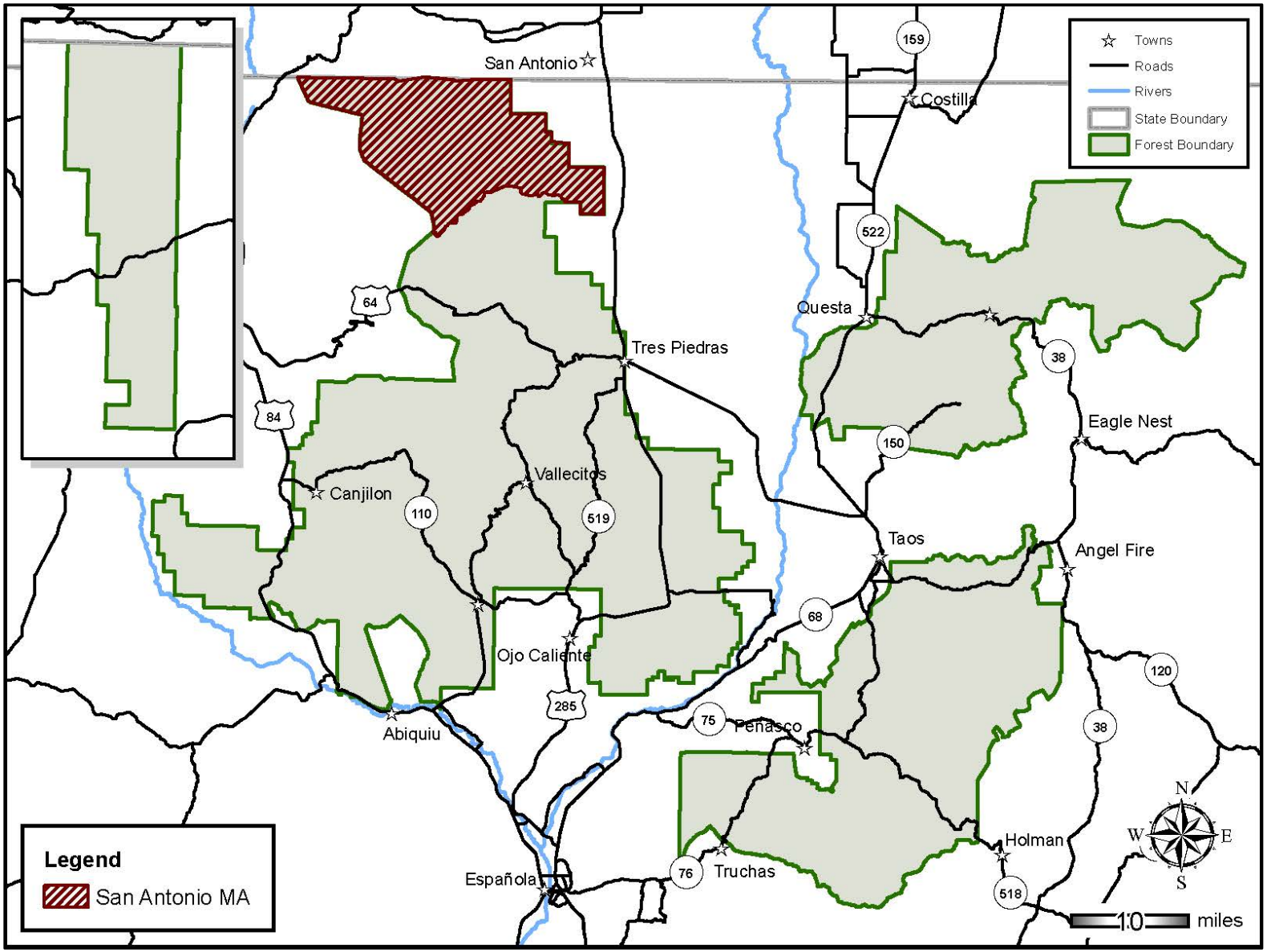

Figure A-13. San Antonio Management Area on the Carson National Forest

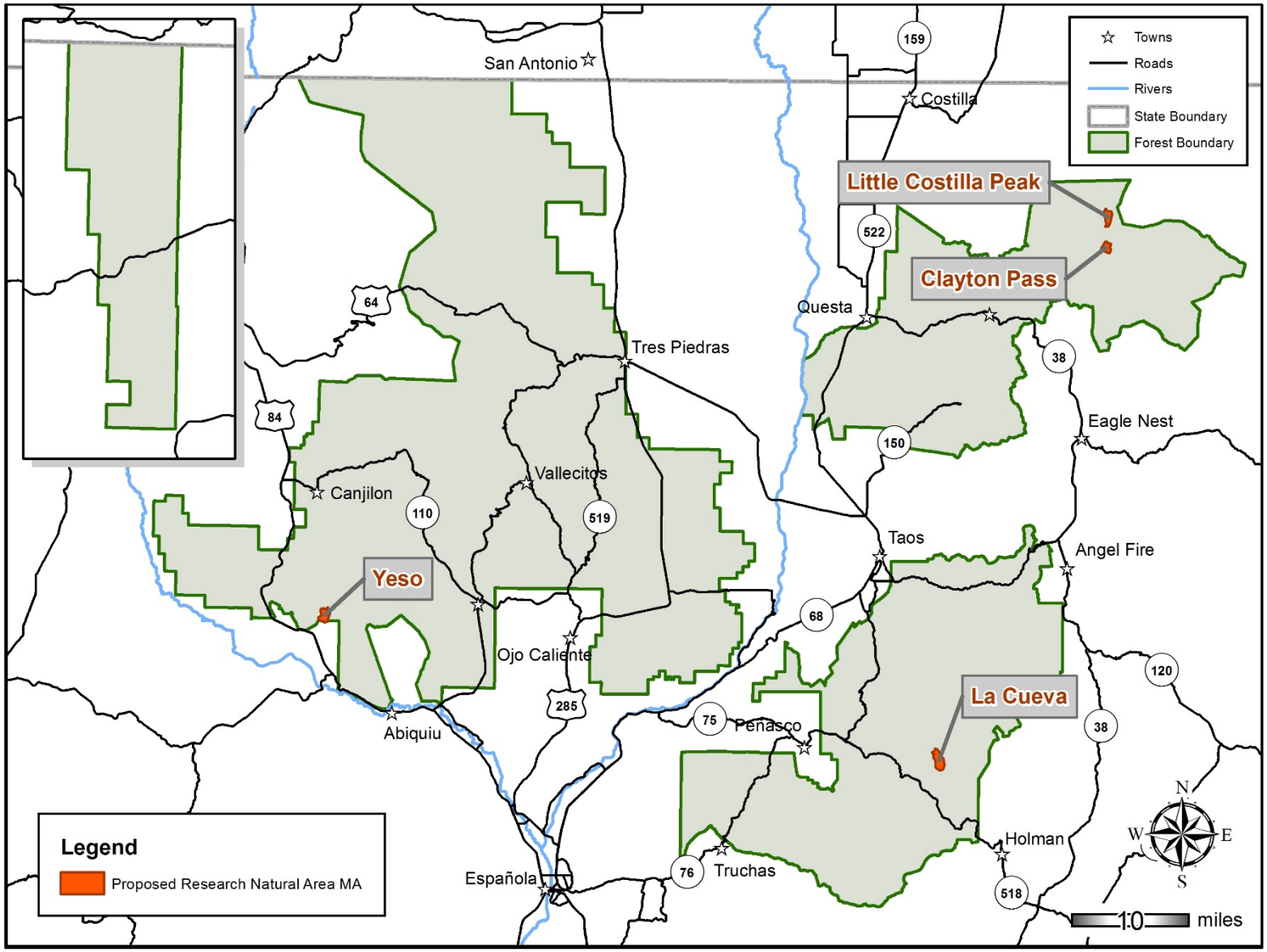

Figure A-14. Proposed research natural area management areas on the Carson National Forest

Appendix B. Proposed and Possible Actions

Introduction

This appendix describes the proposed and possible actions that may occur within the plan area during the life of the plan, including the methods of forest vegetation management expected to be used (16 U.S.C. 1604(e)(2) and (f)(2)). This list of proposed and possible actions is not intended to be all-inclusive; it is simply a list of possible actions that may take place. The actions described in this appendix do not commit the agency to perform work; instead, they are provided as possible actions that would likely be consistent with plan components, particularly the desired conditions and objectives. Furthermore, this information is not a "proposal" as defined by the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (40 CFR 1508.23, 42 U.S.C. 4322(2)(C)), rather it includes program strategies and ongoing work with partners and cooperating agencies anticipated during the next 10 to 15 years.

A plan amendment is not required to change or modify any of the proposed or possible actions. This list of actions can be updated at any time through an administrative correction of the plan.

Forestwide Management

All Vegetation Communities

- To meet old growth desired conditions, design management activities to restore and maintain characteristic levels of: large, old ponderosa pine trees; mature trees with large dwarf mistletoe-induced witches' brooms suitable for wildlife nesting, caching, and denning, except where retaining such trees would prevent the desired development of uneven-aged conditions over time; large snags, partial snags, and trees greater than 18 inch diameter (DBH) with broken tops, cavities, sloughing bark, lightning scars greater than 4 inches wide, and large stick nests; Gambel oak greater than 8 inches diameter at root collar; and mature bristlecone pine.
- In areas of high vulnerability to changing climate patterns, employ alternative management approaches to facilitate natural adaptation to changing conditions. Manage tree basal area to the low end of the range of desired conditions to mitigate water stress.
- Use mechanical, chemical, and prescribed fire treatments to maintain existing grassland and meadow openings, expand openings by removing woody species from the perimeter, and create new openings.
- Use methods, such as fencing, aerating soil (decompacting soils), improving livestock grazing strategies, or strategically locating constructed waters or roads to protect and enhance soil function and grassland composition, structure, and productivity.
- Work closely with the U.S. Fish and Wildlife Service (USFWS) to provide for federally listed species' habitats, by minimizing disturbance, providing recovery strategies, and managing for desired levels of key structural elements (e.g., large old trees and snags, downed woody debris, denser vegetation structure, and soil structure) important for nesting, rearing, breeding, foraging, and dispersal.
- Work collaboratively with federally recognized tribes, New Mexico Department of Game and Fish, local governments, and other partners to plan and accomplish projects that will make progress toward desired conditions.

- Foster partnerships with universities and other science organizations to develop concepts and tools applicable to vegetation management, as well as to identify research opportunities related to management activities aimed at ecosystem restoration and adaptation.
- Plan in cooperation with landowners, when proposed vegetation treatments are adjacent to private land.
- Work with volunteer groups on projects that improve vegetation condition and ecosystem function.
- Use computer models or other tools as they are developed to understand management impacts on carbon stocks and fluxes (changes over time).
- Use integrated resource planning during projects to respond to changing conditions that affect recreation settings and scenic character and integrity.

Bristlecone Pine

- Create a mosaic of mixed age classes and regeneration opportunities across the landscape to retain a range of bristlecone attributes in the area while white pine blister resistant selection occurs rapidly in younger stands and slowly in older stands.

Aspen

- Stimulate aspen growth and manage for pure aspen stands in high-elevation forested wildland-urban interface forests to help mitigate fire hazard.
- Use small patch clearcuts (less than 5 acres), conifer removal, and wildland fire to stimulate aspen sprouting in areas that currently have or previously supported aspen.
- Use other strategies to promote aspen regeneration, such as jackstrawing, planting, public education, temporary exclosure fencing, and improving forage and browse in areas adjacent to aspen stands.
- Selectively remove fire-sensitive species (i.e., white fir) and small-diameter trees. Retain large ponderosa pine and Douglas-fir.
- Quantify the size and distribution of aspen patches required to overcome existing levels of browse pressure.

Mixed Conifer with Frequent Fire

- Mechanically treat at least 5,500 to 10,000 acres, during each 10-year period following plan approval.
- During each 10-year period following plan approval, treat at least 20,000 to 40,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or to maintain desired conditions.

Ponderosa Pine Forest

- Mechanically treat at least 22,000 to 50,000 acres, during each 10-year period following plan approval.
- During each 10-year period following plan approval, treat at least 80,000 to 125,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or maintain desired conditions.

Sagebrush

- Use vegetation management techniques in the sagebrush vegetation community (e.g., chemical application, mowing, disking, and burning) to enhance shrubland diversity, distribution, and productivity to support wildlife.

Watersheds

- Improve or maintain watershed function on at least 5,000 to 10,000 acres annually to include installing 35 to 100 erosion-control treatments to stabilize headcuts, road drainage impacts, and other erosional features. Treatments align with priority watersheds or other community priorities.
- Improve the condition class of at least one identified priority watershed, as defined by the National Watershed Condition framework, every 10 years following plan approval.
- Complete watershed restoration action plans or similar processes for priority watersheds, including quantitative analyses of pollutant sources and pollutant load reductions when feasible.
- Consider rest-rotation management within allotments to improve wetland or riparian areas that are rated as functional-at-risk or non-functional. This system of management would avoid 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 working with partners to develop wetland action plans for headwater wetland restoration projects to address wetland stressors by identifying and prioritizing mitigation and restoration actions.
- Consider working with the State, federally recognized tribes, local governments, and other interested parties to identify priority watersheds for protection and management and for improvement.

Riparian

- Restore structure and function of at least 200 to 300 acres of nonfunctioning and functioning-at-risk riparian areas annually. Align treatments with priority watersheds or other community priorities.
- Reintroduce beaver, where habitat exists and where they historically occurred but cannot repopulate naturally.

Water

- Restore or enhance at least 100 to 150 miles of stream habitat, during each 10-year period following plan approval.
- Repair at least 2 road/stream crossings every 5 years following plan approval at locations where chronic sedimentation causes are found. For example, up-size culverts, reduce sediment delivery to waterways from roads, or realign stream constraining road segments. Give precedence to road crossings that are causing unacceptable road damage.
- Improve or maintain function of at least 10 to 20 individual springs, during each 10-year period following plan approval.
- Use the Springs Stewardship Institute protocol to assess spring condition and submit assessments to online database.

Wildlife, Fish, and Plants

- Restore or enhance at least 50,000 to 150,000 acres of terrestrial wildlife habitat during each 10-year period following plan approval.
- Reconstruct or maintain 20 to 30 existing water developments for wildlife during each 10-year period following plan approval. Improve seep and spring function, when needed and consistent with the purpose of the development.
- Reduce nonnative fish within native fish populations in 4–6 stream reaches during each 10-year period following plan approval.
- Improve wildlife or aquatic habitat connectivity by removing unneeded structures (e.g., fences, roads, cattleguards, culverts, and spring developments) or completing improvement projects (e.g., remove barriers, restore dewatered stream segments, connect fragmented habitat, wildlife passage friendly fences, etc.) in at least 10 to 20 locations during each 10-year period following plan approval.
- Complete at least 30 to 40 products or activities that educate the public, particularly youth, about wildlife, fish, and plant resources, during each 10-year period following plan approval. Examples include educational signs and brochures, website pages, species checklists, presentations, and field trips.
- Develop a response plan for white-nose syndrome through continued collaboration with the U.S. Fish and Wildlife Service (USFWS), Bat Conservation International, New Mexico Department of Game and Fish, the National Speleological Society, and others with interests in conservation management for bat species.
- Conduct additional surveys, targeted monitoring, research on life history and habitat needs, and current condition to fill information gaps on the rare and narrow endemic species that use cliffs and rocky features.
- Coordinate with the New Mexico Department of Game and Fish, USFWS, adjacent landowners, adjacent Federal and State land managers, and federally recognized tribes regarding listed and native species; reintroductions, introductions, or transplants and habitat improvements of listed or native species; control or eradication of nonnative species; control and management of diseases; and the management of sport and native fishes and animals, including the identification of refugia for native fish and animals.
- Work collaboratively with others to identify wildlife migration routes and important habitat and improve or maintain connectivity for terrestrial and aquatic species; develop conservation measures (e.g., public education to reduce human impacts) to prevent listing and to aid in the recovery and delisting of federally listed species; internally and externally increase the awareness and valuation of cliffs and rocky features, especially for threatened, endangered, and species of conservation concern (e.g., small-headed goldenweed and peregrine falcon); internally and externally increase awareness of white-nose syndrome at local and regional levels; identify linkages and barriers to wildlife movements and mitigate impacts during project design; and minimize conflicting wildlife resource issues related to hunted, fished, and trapped species.
- Coordinate with the New Mexico Department of Game and Fish, USFWS, sportsman's groups, the scientific community, and other stakeholders regarding information, education, and knowledge gaps as they relate to promoting and improving wildlife, fish, and plant resources and management.

- Work collaboratively with academia, State and Private Forestry, Forest Service Rocky Mountain Research Station, and other groups to fill information gaps related to rare and narrow endemic species that use cliffs and rocky features.
- Coordinate with Federal and State land managers, federally recognized tribes, adjacent landowners, and other Federal and State agencies, when proposing management that may impact habitat connectivity and to discuss what mitigation may be needed.
- Convert permitted domestic sheep allotments that are within Rocky Mountain bighorn sheep occupied habitat[64] or areas of high risk of contact[65] to permitted cattle allotments.
- In coordination with the New Mexico Department of Game and Fish, "dust" prairie dog colonies with flea-controlling powder to reduce the spread of sylvatic plague. When possible identify and avoid burrows occupied with burrowing owls.
- To increase carrying capacity for put-and-take and wild trout fisheries, install stream improvement structures and allow beaver to build and maintain beaver dams.
- Use non-lethal strategies when beaver need to be removed.
- Take into consideration the amounts, arrangements, and condition of natural communities and habitats that benefit wildlife during planning by multiple resource areas including range, fire, and timber.
- Coordinate with the New Mexico Department of Game and Fish on native fish restoration efforts, so that management activities are consistent with the agency's fisheries management plans.

Nonnative Invasive Species

- Contain, control, or eradicate at least 300 to 500 acres of invasive species (e.g., musk thistle and spotted knapweed) annually.
- Prioritize treatments based on State status, refer to the New Mexico Department of Agriculture website for the "State Noxious Weed List."
- Prioritize inventories in areas of unique and rare habitats first and then areas of high use and disturbance second (e.g., material pits, trailheads, campgrounds, corrals, roads, boat ramps, and bridges).
- Prioritize control of invasive species in certain areas (e.g., wilderness, research natural areas, botanical areas, wild and scenic river areas, and riparian areas) to maintain the integrity of native species and ecosystems.
- Coordinate with stakeholders and educate the public to reduce, minimize, or eliminate the potential introduction, establishment, spread, and impact of nonnative invasive species.
- Use New Mexico Department Game and Fish "Clean, Drain, and Dry" guidelines to prevent nonnative species introduction and infestation into water resources.

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[64] As defined by New Mexico Department of Game and Fish or best available science.

[65] Based on risk of contact models or best available science.

Air Resources

- Provide advanced notification of potential smoke from fire management activities through the media to promote public awareness and protection of human health and safety, and place smoke warning signs along roads when visibility may be reduced.
- Use design features, best management practices, or mitigation measures to reduce fugitive dust where needed.
- 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 national forest.

Federally Recognized Tribes

- Coordinate with federally recognized tribes to develop collaborative proposals and accomplish 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), Collaborative Forest Restoration Program).
- Develop and maintain memoranda of understanding or other agreements, to better understand community needs and build respectful, collaborative relationships with federally recognized tribes.
- Develop management tools (e.g., programmatic agreements, management plans, and memoranda of understanding), to manage traditional cultural properties collaboratively with associated communities.
- In collaboration with federally recognized tribes, develop interpretive and educational exhibits or other media that focus on the history of the lands managed by the Carson National Forest, to provide the public and Forest Service employees with a greater understanding and appreciation of shared history, culture, and traditions.
- Work with the public to create awareness around the importance of traditional cultural properties and issues related to their management, while protecting confidential or sensitive information regarding traditional cultural properties.
- Use federally authorized or advocated programs (e.g., Tribal Forest Protection Act and Community Forest Restoration Program) to develop collaborative proposals and partnerships with federally recognized tribes to accomplish projects of mutual benefit and economic development.
- Work with federally recognized tribes to understand community needs and build respectful, collaborative relationships, to move toward desired conditions.
- Provide training opportunities for Forest Service employees to gain a broader understanding of the unique legal relationship between the Federal Government and federally recognized tribes and pueblos, American Indian Law, customs, traditions, and values.
- Incorporate native languages (e.g., Tiwa, Tewa, Athabaskan, and Keres) into interpretive materials, to highlight the American Indian culture as part of the forest landscape and its surrounding areas.

Rural Historic Communities

- In collaboration with northern New Mexico communities, develop interpretive and educational exhibits or other media that focus on the history of the lands managed by the Carson National Forest, to provide the public and Forest Service employees with a greater understanding and appreciation of shared history, culture, and traditions.

- Work with traditional communities, such as land grant-merced and acequia governing bodies, to identify partnership, education, and interpretation opportunities that can help sustain the traditional communities' heritage, language, culture, traditions, and environment in northern New Mexico.
- Coordinate with traditional communities, such as land grant-merced and acequia governing bodies, to build respectful, collaborative relationships; gain local perspectives; understand needs and concerns, as well as traditional knowledge; and incorporate this information into collaborative proposals and projects of mutual benefit.
- Educate northern New Mexico youth about local culture, history, and land stewardship, and explore ways of exchanging information between community elders and youth (e.g., cooperate with cultural youth programs such as Youth Conservation Corps or others initiated by a community land grant, pueblo, or tribe).
- Provide training opportunities for Forest Service employees to gain a deeper understanding of the unique traditional communities, customs, traditions, and values of northern New Mexico.
- Offer Carson National Forest offices as welcoming places for local community members to engage with Forest Service employees and one another, disseminate and receive information, and attend meetings, seminars, and exhibits that promote community knowledge and collaboration.
- Hold annual meetings with land grant and acequia governing bodies, to improve communication and relationships.
- Incorporate Spanish language into interpretive materials to highlight the Hispanic culture, as part of the landscape of the Carson and its surrounding areas.
- Make fuelwood permits available locally in the field where the fuelwood opportunity is available or allow rural communities to get a fuelwood permit at the Forest Service district office closest to them or another government office, rather than only at the district office administering the permitted area.
- Work with land grant and acequia governing bodies, rural communities, and other community leaders to continually improve relationships and discuss shared opportunities to design projects that contribute to the cultural integrity of the many forest-dependent traditional communities.
- Work collaboratively with land grant and acequia governing bodies, rural communities and other community leaders to maintain shared infrastructure (e.g., fencing, roads, and cattleguards) and collaborate in ecosystem restoration efforts across boundaries.
- Work with rural historic communities to identify vital areas for motorized and non-motorized access to resources important to cultural and traditional needs.
- Use the New Mexico Acequia Guidance document for clarification of authorities and responsibilities related to acequia management and governing body coordination.

Cultural Resources

- Synthesize cultural resource findings and interpret and share them with the scientific community and public through prehistoric and historic contexts, formal presentations, publications, and educational venues.
- Develop a database of fire-sensitive cultural sites, structures, and other resources and make it available for fire management purposes to facilitate resource protection.

- Prioritize non-project-related surveys (i.e., Section 110 of the National Historic Preservation Act) as follows: (1) areas indicated to have high cultural value or high density of cultural resources; (2) areas of importance to traditional communities; (3) areas where additional surveys will contribute to a greater regional understanding of a specific management unit; and (4) areas where eligible cultural resources are threatened or ongoing impacts are unknown and need to be assessed.
- Provide orientation and learning opportunities for Forest Service personnel, permit holders, and contractors that instill buy-in around the Section 106 process of the National Historic Preservation Act. Find teaching opportunities to educate personnel on the identification, management and protection of significant cultural resources.
- Develop opportunities for heritage tourism in concert with local communities.
- Through interpretive sites, historic standing structures, and other materials, provide opportunities for an appreciation of the region's history and an awareness of preservation efforts. Use historic routes (e.g., railroad grades) for recreation trails with interpretation of their history and historic features.
- Consider using volunteer efforts to monitor and protect historic properties on the Carson National Forest

Sustainable Rangelands and Livestock Grazing

- Annually improve or maintain at least 6 to 10 existing range improvement structures for livestock grazing, following plan approval.
- Forest managers cooperate, collaborate, and coordinate with permit holders to respond to changing resource conditions. Cooperation, collaboration and coordination with permit holders is key to improving rangeland and forest conditions for multiple uses, moving toward desired conditions, and contributing to the socioeconomic well-being of local communities. In addition, collaboration among stakeholders is important, including local communities; permit holders; Federal, State, county and local government entities.
- Acknowledge the importance of livestock grazing as a traditional and cultural practice that helps support the socioeconomic well-being of individual families within local communities, now and into the future.
- Use large-scale landscape management for restoring rangelands and the heterogeneity of native plant species, with an emphasis on grass, forb, and shrub communities, to promote livestock grazing capacity, and encourage movement toward desired conditions of NFS lands.
- Manage rangelands using an adaptive management approach and in a manner that promotes socioeconomic well-being and stability of local communities, ecosystem resilience, sustainability, and species diversity, based on scientifically quantified changes to rangelands. An adaptive management approach is designed to provide more flexibility to grazing management, while improving or maintaining the health of rangelands.
- Invite association members and individual permit holders on range inspections and conduct these inspections on days when most permit holders can attend.
- Consider facilitating discussions and developing partnerships with livestock grazing permit holders, agencies, and other groups and individuals to develop collaborative proposals and implement projects that benefit multiple use on the national forest.

- Actual levels of livestock use may vary due to annual fluctuations of individual livestock operations or ecological conditions, including authorized nonuse for resource protection or personal convenience. Base permit numbers on capacity, not on actual use, including nonuse.
- Facilitate a dialogue between the New Mexico Department of Game and Fish and permit holders about ungulates (e.g., elk, deer, and livestock) and the cumulative impacts on forest resources. Account for those impacts when planning projects or permitted activities.

Sustainable Forestry and Forest Products

- During the planning of forest restoration projects, encourage discussions with federally recognized tribes and land grants-mercedes that collect plants for traditional, cultural, and ceremonial purposes, to promote the plants' persistence.
- Design small timber contracts to accommodate small operations based in northern New Mexico communities.
- When planning and implementing projects, work collaboratively with Federal, State, and local governments; federally recognized tribes; and private landowners to promote integrated ecological and social-economic goals of harvesting forest products through the use of mechanisms such as Collaborative Forest Restoration Projects, Tribal Forest Protection Act, youth programs, and stewardship contracting authorities to expand industry to sustainable and appropriately scaled levels.
- Use woody material that results from management activities, instead of on-site burning and chipping.
- Make fuelwood more available through public access within a project area, by providing some decked wood material along roads, or by allowing collection within utility or road corridors that are being thinned or cleared.
- Maintain and expand the partnership block program on the Carson National Forest.
- Inform the public about the effects of illegal wood cutting, to ensure the sustainability of quality habitat over the long term. Illegal woodcutting reduces the quantity and quality of woodland habitat, especially piñon pine and juniper.
- Use uneven- or even-aged timber harvest methods that reflect the scale of natural disturbances and are designed to move toward desired conditions (e.g., related to size class distribution, species composition, patch size, fuel reduction, insects, and disease).
- Use even-aged management prescriptions as a strategy for achieving the desired uneven-aged conditions over the long term or at the landscape scale. Even-aged prescriptions are appropriate when they would increase or maintain a trajectory toward desired conditions, such as to regenerate aspen or when mistletoe infections are moderate to severe and the ability of the area to move toward desired conditions has been significantly impaired.
- Prepare pest control plans with forest health specialists that contain appropriate mitigation measures (e.g., planting resistant tree species, maintaining species diversity, removing damaged trees, and using pesticides) and monitoring procedures. Monitoring may include:
    - Measuring effectiveness of treated areas
    - Determining effects on non-target organisms
    - Determining effects on water quality

  - Determining effects of pesticide that enters the soil or air.
- Apply treatments within infrequent-fire vegetation communities (e.g., spruce-fir forest, mixed conifer with aspen, and piñon-juniper woodland) for ecological and socioeconomic benefits.
- Designate and manage stands of mature and over-mature piñon for the gathering of piñon nuts and potentially restrict the harvest of firewood in these stands.
- Consider placing woody debris cross-slope and in gullies to capture sediment and slow runoff.

Timber Program

The expected timber product outputs by decade during the planning period were modeled using the Vegetation Dynamics Development Tool and are based on Forest Service Southwestern Region volume outputs and objectives for mechanical treatment in the plan. Possible actions included in this section of the appendix are related to the possible timber sale program, timber-harvesting levels, and the proportion of probable methods of forest vegetation management practices expected to be used over the life of the plan. However, speculation about the specific amount or type of treatments, frequency, location, magnitude, or numbers of actions during the plan period is not included and should not be inferred. These details related to management actions would be determined at the project level based on site-specific conditions.

Management practices applied and the volume of timber products expected are based on desired vegetation conditions, budget and resource constraints, and expected vegetation change pathways. Production of sawtimber and other wood products is expected through commercial timber harvest activities, which includes even-aged regeneration harvests (e.g., clearcut, seedtree, and shelterwood) and other non-regeneration harvests (for modeling purposes, these are mostly commercial thinning, with lesser amounts of group selection harvests); refer to table 4, table 5, and table 18. The appropriate or optimum methods of harvest would be based upon site-specific determinations, as evaluated and determined during project planning and documented in a silvicultural prescription.

Table 18. Possible annual number of acres of mechanical treatment by treatment type

Type of Harvest	Acres
Thin from below to target basal area	747
Group selection with matrix thin to target basal area	3,753
Shelterwood seed cut to target basal area	88
Clearcut with non-regeneration objective legacy trees	589
Tree planting	292

Recreation

- Develop and accomplish at least one strategy that raises awareness of discouraged practices (e.g., illegal dumping, shooting practices, and driving on closed roads) to promote visitor safety, during each 10-year period following plan approval.
- Develop at least two additional methods for providing visitor information and education, during each 10-year period following plan approval.
- Develop at least one collaborative partnership for the recreation program to expand public awareness, understanding, and promote responsible behavior, during each 10-year period following plan approval.

- Accomplish two actions to maintain recreational program relevancy, every 5 years following plan approval.
- Rehabilitate 5 to 7 areas where dispersed camping is causing unacceptable erosion, during each 10-year period following plan approval.
- Develop recreation strategies that are more economically feasible and adaptable, to include closing or decommissioning underutilized sites and infrastructure; developing new sites or trails; and upgrading existing infrastructure to meet user needs and desires.
- Provide educational, safety, and other information that enhances the visitor experience at district offices, local visitor information centers, campgrounds, and other developed recreation sites.
- Partner with local communities, skilled stewardship organizations, volunteers, other government agencies, cooperators, and permit holders to help co-manage a sustainable recreation program, including planning, design, implementation, operations, conservation education, and maintenance, especially of trails. Recognize partners for their roles in providing recreational opportunities.
- Involve local communities in partnerships and foster long-term relationships with stakeholders, to facilitate and participate in managing sustainable recreation on the Carson National Forest.
- Work with partners and volunteers in the coordination, development, and delivery of educational and community outreach programs. Actively engage urban populations, youth, and underserved communities in programs.
- Coordinate with partners early in project development using a clear and concise process to elicit collaborative input on sustainable recreation opportunities, needs, and potential conflicts.
- Develop motorized and non-motorized nested loop trail systems, improve connectivity of existing routes and communities, and provide opportunities for long-distance travel.
- Use a sign coordinator to build partnerships with other organizations and user groups, to help design, develop, and install new interpretive, trail, and developed recreation signage.
- Consider working with partners, volunteers, and potentially a fee system to provide increased capacity and revenue for trail maintenance, planning and construction.
- Consider converting temporary roads and other unneeded roads into motorized or non-motorized recreational trails where appropriate and feasible for expanding recreation access.
- Partner with volunteers, rock-climbing organizations, other government agencies, cooperators, and permit holders to help co-manage sustainable rock-climbing opportunities, including planning, design, implementation, operations, and maintenance of rock-climbing areas.

Transportation and Forest Access

- Obliterate or naturalize at least 20 miles of unneeded roads within each 10-year period following plan approval.
- Grade surfaces and clean culverts and ditches on at least 500 miles of open National Forest System roads annually.
- Maintain at least 100 to 300 miles of trails (including motorized) annually.
- Maintain at least 10 to 20 percent recreation signage, during each 5-year period following plan approval.

- Notify counties and other potentially affected users (including permit holders) of changes in road status or significant deviations in traffic pattern of a month or longer.
- Actively encourage collaborative relationships with adjacent stakeholders and public land managers to develop contiguous road and trail systems across multiple ownerships. Where possible, seek opportunities for acquiring access through private lands to promote road and trail connectivity and manageability.
- Prioritize road system maintenance to provide safe travel on all roads, as well as to prevent or mitigate resource damage. Continue current maintenance agreements and seek to enter into new agreements with other entities including Federal, State, and local government agencies, and private organizations and individuals.
- While developing the proposed action for environmental analysis, incorporate decommissioning of roads that are redundant, adversely impact flow regimes, or cause resource damage.
- Consider predicted future runoff and other climate-related impacts when reconstructing existing or building new roads.
- Maintain a spatial database of existing routes, including unneeded roads and roads needed for public access, future project use, administrative use, temporary use, and access to private land.
- Seasonally or permanently close system roads or trails that adversely impact at-risk species habitats or develop alternative travel routes.

Scenery

- Display interpretive or informational signs at sites with impacts to scenery to inform the public about the nature and consequences of such projects or events.
- 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 Carson National Forest, including along scenic byways.

Special Uses

- Base authorization of special use permits for recreation events and outfitting and guiding services on any current and future capacity studies and administrative capabilities.
- Use tools that assist in efficiencies to the special uses program or that expand administrative capacity (e.g., Environmental Assessment and Decision Making, special use modernization efforts, regional billing team, proposed statewide outfitter/guide permits).
- Include reference to the most recent edition of "A Guide to Maintaining the Historic Character of Your Forest Service Recreation Residence" in the operations and maintenance plan of recreation residence special use authorizations to provide guidance on any improvements or maintenance to eligible historic or unevaluated recreation residences.
- Consider coordinating with the New Mexico Department of Game and Fish during special use permit authorization of domestic sheep or goat use.

Lands

- Encourage collaborative relationships with adjacent stakeholders and public land managers, to develop contiguous habitat connectivity across multiple ownerships.

- Encourage collaborative relationships with rural historic communities that are dependent on the Carson, to ensure traditional and cultural uses are incorporated into the management of any newly acquired lands.
- Work with private landowner easement grantors to avoid compromising continued access.
- Prioritize land acquisition or conveyance to improve management efficiency, further resource protection and use, or to serve the broader needs of the community within the scope of the authorities provided for these types of transactions.
- Work with interested stakeholders to identify suitable parcels for acquisition and to explore funding opportunities, grant opportunities, and private financing.

Fire Management

- Manage 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. Incident objectives and corresponding courses of action are based on interdisciplinary assessment of anticipated fire effects to site-specific values.
- When planning and implementing fuels projects and all-hazard response, work collaboratively with Federal, State, and 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.
- Work with fire and project managers to develop practices and protocols to reduce non-prescribed human ignitions through information, education, and interpretive programs. Educate the public about their responsibility to help reduce human-caused wildfires by providing information in the form of signage, public contacts, and fire restrictions.
- Plan and accomplish fuels projects, planned ignitions, and all hazard response by working collaboratively with Federal, State, and local governments, and private landowners.
- Prioritize treatments based on their benefit to ecological integrity or the ability to manage future fires to protect values at risk using best available science.
- Assign a wilderness resource advisor to all fires in wilderness that are not suppressed during initial attack.

Minerals and Mining

- Consider the potential to use sites for mineral collection areas during the development of a reclamation plan.

Partnerships

- Increase internal knowledge through training in grants and agreements and the various authorities that facilitate the creation of formal partnerships.
- Collaborate with academia, State and private agencies, Forest Service Rocky Mountain Research Station, and other groups to expand project-level monitoring capabilities.

Designated and Management Areas

Wilderness

- Clearly identify wilderness boundaries through signage at official entry points and needed locations (e.g., informal access points) that is consistent with trail maps and boundary markers.
- Work with local partners to maintain wilderness, including trail maintenance and construction.
- Partner with other Federal agencies to ensure management is as consistent as possible for contiguous wildernesses.
- Consider helicopter use in wilderness to manage fish or wildlife populations when deemed appropriate by minimum requirements analysis The Regional Forester approves helicopter use after appropriate environmental analysis.
- Use the most recent version of a wilderness's respective management plan, if it exists.

National Scenic, Historic, and Recreation Trails

- So long as the Continental Divide National Scenic Trail's scenic values can be protected, consider special-use authorizations for new communication sites, utility corridors, and renewable energy sites that would not be visible within the foreground (up to 0.5 mile) or would be visually subordinate in the middle ground viewshed (up to 4 miles).
- Coordinate trail management and activities across unit and jurisdictional boundaries, specifically with the Santa Fe and Rio Grande National Forests and the Bureau of Land Management.
- Make alternate routes available during temporary closures resulting from natural events, such as fire or flood, or land management activities.
- Construct side or connecting trails that take users to points of interest or supply points if an opportunity presents itself and volunteers and partners are engaged in the planning and implementation efforts.
- Use methods such as the Optimal Location Review process for substantial trail relocations.
- Consider impacts to national trails viewsheds and purposes from potential land conveyances.

Wild Horse Territories

- Coordinate with the BLM to manage wild horses on the Carson, to benefit both agencies' programs.
- Partner and coordinate with wild horse advocates, federally recognized tribes, adjacent landowners, academia, Federal and state agencies, and grazing permit holders to maintain the desired appropriate management level of wild horses through various actions, such as capture and removal and fertility control treatments.

Potential Developed Recreation Site

- Consider working with groups and individuals interested in the management of the Potential Developed Recreation Site, to provide guidance during planning, implementation, and monitoring of developed recreation projects.
- Consider coordinating with adjacent landowners, local communities, Federal and State land managers, and State agencies when ground-disturbing activities are proposed in the Potential Developed Recreation Site Management Area.

Jicarilla Natural Gas Management Area

- Consider alternative drilling technology and various site locations, prior to developing new well sites, roads, or pipelines within an area of resource concern, to minimize the impacts to surface resources.
- Continue with the partnership between the Forest Service and natural gas lease and pipeline operators (Jicarilla Roads Committee) to provide services, equipment, and money in maintaining roads on the Jicarilla Ranger District.
- Consider offsite mitigation based on the scope and complexity of the project or adverse impacts to resources due to development.

Valle Vidal Management Area

- Work with groups and individuals interested in the management of Valle Vidal to provide guidance during planning, implementation, and monitoring of environmental restoration projects.
- Coordinate with the New Mexico Department of Game and Fish, so that management activities are consistent with the agency's fisheries management plans.
- Identify and work with partners to restore Shuree Lodge (in keeping with the National Historic Preservation Act and in consultation with the State Historic Preservation Officer) to use for nonprofit activities open to the public, such as an interpretive center, volunteer lodging during educational and cultural events, or as an administrative facility. Other historic structures may also be restored and adaptively reused. Potential uses include renting cabin(s) to the public as part of the Forest Service cabin rental program, administrative needs, or other appropriate uses. Do not allow private for-profit commercial facilities.

San Antonio Management Area

- Improve wildlife or aquatic habitat connectivity within the San Antonio Management Area by removing unneeded structures (e.g., fences, roads, cattleguards, and culverts) or completing improvement projects (e.g., removing barriers and connecting fragmented habitat).
- Implement projects in the San Antonio Management Area that improve habitat connectivity for aquatic and riparian species (e.g., remove barriers, restore dewatered stream segments, connect fragmented habitat, fences allowing wildlife passage, etc.).
- Work with groups and individuals interested in the management of the greater San Antonio landscape, to provide guidance during planning, implementation, and monitoring of environmental restoration projects.
- Coordinate with adjacent landowners, Federal and State land managers, and State agencies when ground disturbing activities are proposed in the San Antonio Management Area. Consider the cumulative impacts of ground-disturbing projects that are occurring or will occur on adjacent lands and whether the spatial, temporal, or other design features can mitigate impacts to connectivity.
- Consider the amounts, arrangements, and condition of natural communities and habitats that benefit wildlife, during planning by multiple resource areas including range, fire, and timber.
- Coordinate with the New Mexico Department of Game and Fish, USFWS, adjacent Federal land managers, sportsman's groups, the scientific community, and other stakeholders regarding information, education, and knowledge gaps as they relate to promoting and improving wildlife, fish, and plant resources and management.

- Identify linkages and barriers to wildlife movements and mitigate impacts during project design, by working with New Mexico Department of Game and Fish, New Mexico Department of Transportation, federally recognized tribes, Federal, State, and local agencies, Federal and State land managers, private landowners, and other organizations.

Proposed Research Natural Area Management Area

- Order area closures if dispersed recreation results in degradation.
- Order area closures to prohibit campfires and forest product gathering.

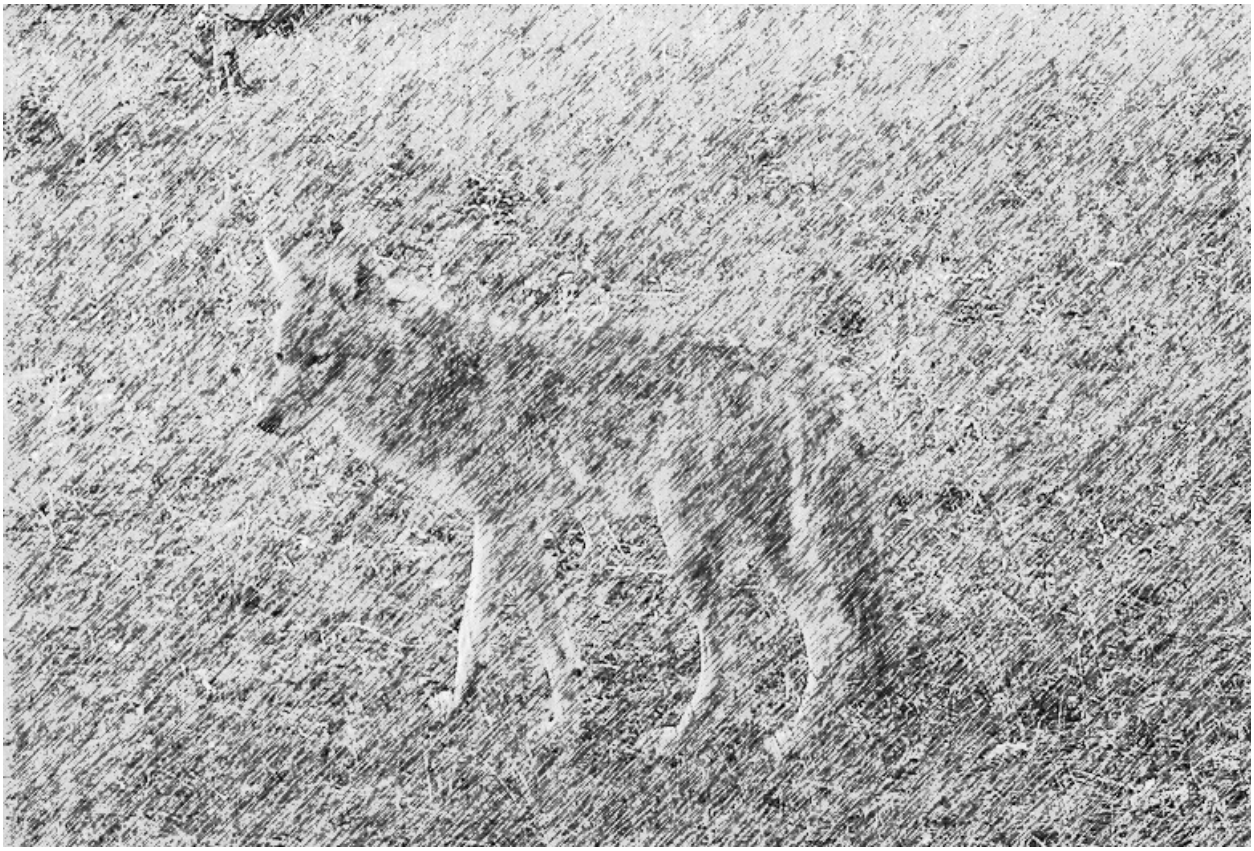

Photo credit: Jay Gatlin

Appendix C. Relevant Laws, Forest Service Regulations, Polices, Directives, and Other Sources of Information

The operating environment for managing NFS lands comes from a variety of sources. This appendix contains a partial listing of relevant statutes, regulations, policies, and agreements that provide management direction but are not restated in this plan. The Carson National Forest develops projects and activities 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 Forest Service handbooks and manuals, programmatic agreements, memoranda of understanding, memoranda of agreement, and existing decisions.

Federal Statutes

The following is a partial list of relevant laws enacted by Congress. A Federal statute or law is an act or bill that has become part of the legal code through passage by Congress and approval by the President (or via congressional override). Although not 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 eliminating 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 14th amendment and to regulate commerce, 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 older.

Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469)

Also known as the Archaeological Recovery Act, this act 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 that might be lost or destroyed as the result of the construction of a federally authorized dam or other construction activity. This act 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 (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.

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.

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)

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 managing 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 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 ensure 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 Carson, 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
- Black-Footed Ferret Recovery Plan

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.

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 Water Pollution Control Act and Amendments of 1972 (Clean Water Act)

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 eliminating 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.

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; to 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. 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 U.S.C. Chapter 205 Forest development roads and trails).

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974

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.

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.

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.

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.

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 to effectively perform 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 to preserve, develop, and assure 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 that are 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

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 to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. It is the primary statute governing the administration of national forests.

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 (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 to give a sense of orientation to the American people. Directs all Federal agencies to consider 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.

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 provide outdoor recreation and the conservation and enjoyment of significant scenic, historic, natural, or cultural qualities; National Historic Trails follow travel routes of national historic significance; National Recreation Trails 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.

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 implementing laws or regulations regarding lease sales and prohibits the issuance of oil or gas leases upon certain lands allocated or designated as wilderness.

Organic Administration Act of June 4, 1897

Authorizes the President of the United States 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 implement 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 to transport 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 use 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 that 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 that 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.

Rescissions 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 compliance is required. Notwithstanding any other law, term grazing permits that expire or are waived before the National Environmental Policy Act 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 National Environmental Policy Act analysis and decision for the allotment, the terms and conditions of existing grazing permits may be modified, if necessary, to conform to such National Environmental Policy Act analysis and subsequent decision.

Secure Rural Schools and Community Self-Determination Act of 2000

A portion of Forest Service funds generated through multi-use activities, such as grazing, timber production, and special use permits, is distributed to rural counties whose tax base was limited by the growing amount of Federal land to help maintain local roads and schools. By the year 2000, after decades of declining agency revenues, Congress passed the Secure Rural Schools and Community Self Determination Act to help stabilize the funds available to rural counties. Payments (termed Payments in Lieu of Taxes) are divided into three distinct categories, or Titles: Title I for roads and schools, Title II for projects on Federal lands, and Title III for county projects.

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 the 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 or 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 or she determines it to be in the public interest.

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 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 or rangeland.

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 that 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.

Wild Free-Roaming Horses and Burros Act of December 15, 1971

(As amended by Federal Land Policy Management Act of 1976 and Public Rangelands Improvement Act of 1978)

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 "wildernesses" 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 "wildernesses" except as provided for in the act or by a subsequent act.

Carson wildernesses are designated under the following authorities:

- Columbine-Hondo Wilderness Act of 2014 (Public Law 113-291) designates Columbine-Hondo Wilderness, adjusts the boundary of Wheeler Peak Wilderness.
- New Mexico Wilderness Act of 1980 (Public Law 96-550) designates Latir Peak and Cruces Basin Wildernesses, adds 14,700 acres to Wheeler Peak Wilderness.
- Endangered American Wilderness Act of 1978 (Public Law 95-237) designates the Chama River Canyon Wilderness.
- The Wilderness Act of 1964 (Public Law 88-577) designates Wheeler Peak and Pecos Wildernesses.

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

Below is a partial listing of relevant Executive orders. Executive orders are official documents by which the President of the United States provides instructions to executive departments and agencies. 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. It can also establish an advisory body or task force.

Executive Order 11593 Protection and Enhancement of the Cultural Environment, 1973

States 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.

Executive Order 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.

Executive Order 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.

Executive Order 12898

(Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994)

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.

Executive Order 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.

Executive Order 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."

Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, 2000

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.

Executive Order 13186 Responsibility of Federal Agencies to Protect Migratory Birds, 2001

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 the National Environmental Policy Act evaluate effect on migratory birds; and promote research, education, and training related to conservation of migratory birds.

Executive Order 13195 Trails for America in the 21st Century, 2001

"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."

Executive Order 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.

Executive Order 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.

Executive Order 13423 Strengthening Federal Environmental, Energy, and Transportation Management, 2007

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.

Executive Order 13443 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.

Executive Order 13514 Federal Leadership in Environmental, Energy, and Economic Performance, 2009

Expands on the energy reduction and environmental performance requirements for Federal agencies identified in EO 13423. The goal is to establish an integrated strategy toward 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.

Executive Order 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 national and regional Forest Service policies relevant to this plan. A complete listing can be found in Forest Service Manuals and Forest Service Handbooks at http://www.fs.fed.us/im/directives/.

The directives system is the primary basis for the management and control of all internal programs and serves as the primary source of administrative direction for Forest Service employees. The system sets forth legal authorities, management objectives, policies, responsibilities, delegations, standards, procedures, and other instructions.

The Forest Service Manual (FSM) contains legal authorities, goals, objectives, policies, responsibilities, instructions, and the necessary guidance 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

- FSM 1920 Land and Resource Management Planning
- FSM 1950 Environmental Policy and Procedures

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)
- FSM 2200 Range Management
- 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 2320 Wilderness Management
- FSM 2330 Publicly Managed Recreation Opportunities
  - FSM 2332.11 Hazard Trees
- 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

- FSM 2540 Water Uses and Development, Southwestern Region supplement
  - FSH 2509.25 Watershed Conservation Practices Handbook

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 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 Preconstruction Handbook
  - FSH 7709.57 Road Construction Handbook
  - FSH 7709.59 Road Operations
- FSM 7720 Development (Policy on Transportation)
- FSM 7730 Operation and Maintenance

Forest Service Regulations

Below is a partial listing of relevant regulations. Federal executive departments and administrative agencies write regulations to implement laws. Regulations are secondary to law. However, both laws and regulations are enforceable.

36 CFR 60 National Register of Historic Places

Sets forth the procedural requirements for listing properties on the National Register.

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 62 National Natural Landmarks Program

The procedures in this part set forth the processes and criteria for identifying, evaluating, designating, and monitoring of national natural landmarks.

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 212 Travel Management

Sets forth the requirements for developing and administering the forest development transportation system.

36 CFR 219 Planning

Sets forth a process for developing, adopting, and revising land and resource management plans for the National Forest System.

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 Sale and Disposal of National Forest System Timber

Sets forth the requirements relating to the sale and disposal of National Forest System timber.

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 241 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 254 Landownership Adjustments

Sets forth the rules and procedures relating to exchange and conveyance of National Forest System lands.

36 CFR 261 Prohibitions

Sets forth the general prohibitions relating to the use and occupancy of National Forest System lands.

- 36 CFR 261.7 Unauthorized livestock

36 CFR 293 Wilderness-Primitive Areas

Sets forth the requirements for the administration of wilderness and primitive areas.

36 CFR 294 Special Areas

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 295 Parts 212, 251, 261, 295 Travel Management, Designated Routes and Areas for Motor Vehicle Use; Final Rule

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 or 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 Parts 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, Environmental Protection Agency-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 1500 Council on Environmental Quality

Council on Environmental Quality regulations implementing the National Environmental Policy Act.

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.

50 CFR 402 Regulations Governing Interagency Cooperation—Endangered Species Act of 1973, as amended

Interprets and implements the act. Addresses forms of consultation (early, formal, informal, and emergency), conferencing, preparation of biological assessments, designation of lead agency, responsibilities of Federal agency following issuance of a biological opinion, reinitiation of formal consultation, and irreversible or irretrievable commitment of resources.

State Regulations

- New Mexico Administrative Code, Title 20, Chapter 2, Part 3. Ambient Air Quality Standards
- New Mexico Administrative Code, Title 20, Chapter 2, Part 65. Smoke Management
- New Mexico Administrative Code, Title 20, Chapter 6, Part 2. Ground and Surface Water Protection
- New Mexico Administrative Code, Title 20, Chapter 6, Part 4. Standards for Interstate and Intrastate Surface Water

Programmatic Agreements

- Memorandum of Understanding between the Jicarilla Apache Tribe and the USDA Forest Service, Carson National Forest (anticipated during the life of the plan).
- Memorandum of Understanding between the Ohkay Owingeh Pueblo and the USDA Forest Service, Carson National Forest (2017).
- Memorandum of Understanding between the Picuris Pueblo and the USDA Forest Service, Carson National Forest (2017).
- Memorandum of Understanding between the Southern Ute Tribe and the USDA Forest Service, Carson National Forest (coming soon).
- Memorandum of Understanding between the Taos Pueblo and the USDA Forest Service, Carson National Forest (2017).
- Memorandum of Understanding between the National Speleological Society and the USDA Forest Service (2011).
- Memorandum of Understanding among the U.S. Department of Agriculture, U.S. Department of Commerce, U.S. Department of Defense, U.S. Department of Energy, Environmental Protection Agency, The Council on Environmental Quality, The Federal Energy Regulatory Commission, The Advisory Council on Historic Preservation, and U.S. Department of the Interior, regarding cooperation in Federal agency review of electric transmission facilities on Federal land.
- Memorandum of Understanding between the State of New Mexico Environment Department and the U.S. Forest Service Southwestern Region (2012).
- First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities among New Mexico Historic Preservation Officer and Arizona State Historic Preservation Officer and Texas State Historic Preservation Officer and Oklahoma State Historic Preservation Officer and the Advisory Council on the Historic Preservation and United States Department of Agriculture Forest Service Southwestern Region.
- Memorandum of Understanding between the Forest Service and the Fish and Wildlife Service to Promote the Conservation of Migratory Birds.
- Memorandum of Understanding between Animal and Plant Health Inspection Service – Wildlife Services and the Forest Service National Forest System (concerning wildlife damage management on National Forest System lands).
- Memorandum of Understanding among the Arizona Game and Fish Department, New Mexico Department of Game and Fish, Animal and Plant Health Inspection Service Wildlife Services, Forest Service, Fish and Wildlife Service, White Mountain Apache Tribe, and various counties in

Arizona and New Mexico for the conservation, management, and wild persistence of the Mexican wolf in its recovery area.

Other Sources of Information

Climate Change

- Forest Service, FS-957b, National Roadmap for Responding to Climate Change (February 2011)
- U.S. Forest Service Transportation Resiliency Guidebook: Addressing Climate Change Impacts on U.S. Forest Service Transportation Assets (September 2018)

Cultural Resources

- Forest Service, Southwestern Region, Cultural Affiliations: Prehistoric Cultural Affiliations of Southwestern Indian Tribes
- National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties
- Secretary of Interior National Register Bulletins
- Secretary of Interior Guidelines for Rehabilitation of Historic Buildings
- Archeology and Historic Preservation: Secretary of the Interior Standards and Guidelines, as amended and annotated
- Advisory Council on Historic Preservation, Consultation with Indian Tribes in the Section 106 Review Process: A Handbook
- Advisory Council on Historic Preservation, Guidance of Coordinating the National Environmental Policy Act and Section 106
- Region 3 Policy on Providing Forest Products to Federally Recognized Tribes for Traditional and Cultural Purposes (in development)
- U.S.C. Title 25 Indians, Chapter 32 – A Cultural and Heritage Cooperation Authority, (Section: 3051-3057)
- 36 CFR § 261 Prohibitions in Areas Designated by Order; Closure of National Forest System Lands to Protect Privacy of Tribal Activities
- National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties
- U.S. Department of Agriculture, Departmental Regulation Number 1350-002: Tribal Consultation, Coordination, and Collaboration
- U.S. Department of Agriculture, Report to the Secretary of Agriculture: USDA Policy and Procedures Review and Recommendations Indian Sacred Sites
- 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

- U.S. Department of Agriculture, American Indians and Alaska Native: A Guide to USDA Programs
- Advisory Council on Historic Preservation, Consultation with Indian Tribes in the Section 106 Review Process: A Handbook

Eligible and Suitable Wild and Scenic Rivers

- FSH 1909.12 Land Management Planning Handbook, Chapter 80 – Wild and Scenic River Evaluation (Section: Interim Management of Eligible or Suitable Rivers)
- IWSRCC (Interagency Wild and Scenic Rivers Coordinating Council), An Introduction to Wild and Scenic Rivers (Technical Report) www.rivers.gov/documents/wsr-primer.pdf
- IWSRCC (Interagency Wild and Scenic Rivers Coordinating Council), A Compendium of Questions & Answers Relating to Wild & Scenic Rivers (Technical Report)

Energy Corridors

- Record of Decision: USDA Forest Service Designation of Section 368 Energy Corridors on National Forest System Land in 10 Western States, January 14, 2009: Appendix A: Forest Service Land Use Plan Amendments

Lands

- Taos County Comprehensive Plan
- Rio Arriba County Comprehensive Plan
- Colfax County Comprehensive Plan
- U.S. GAO (United States General Accounting Office). 2004. Treaty of Guadalupe Hidalgo: Findings and possible options regarding longstanding community land grant claims in New Mexico. GAO-04-59.

Minerals and Geology

- Memorandum of Understanding between the National Speleological Society and the Forest Service Cave and Karst Management
- 36 CFR § 228, Subpart A – Locatable Minerals
- 36 CFR Part 290 Cave Resources Management

Mining and Minerals

- 36 CFR § 228, Subpart A – Locatable Minerals

National Scenic, Historic, and Recreation Trails

- U.S. Department of the Interior, Old Spanish National Historic Trail, Final Comprehensive Administrative Strategy
- 2009 Continental Divide National Scenic Trail Comprehensive Plan

Nonnative Invasive Species

- Forest Service Southwestern Region Guidance for Invasive Species Management
- Forest Service, Guide to Noxious Weed Prevention Practices

- Forest Service, Operational Guidelines for Aquatic Invasive Species Prevention and Equipment Cleaning
- Preventing Spread of Aquatic Invasive Organisms Common to the Southwestern Region Technical Guidelines for Fire Operations, Interagency Guidance Rev. August 2009

Rangelands and Livestock Grazing

- Interagency Ecological Site Descriptions: Handbook for Rangelands (January 2013)
- Forest Service, Southwestern Region, Rangeland Analysis and Management Training Guide (2013)
- Bureau of Land Management, Measuring and Monitoring Plant Populations (Technical Reference 1730-1, 1998)
- Interagency Ecological Site Descriptions: Handbook for Rangelands (January 2013)
- FSH 2209.13 Grazing Permit Administration Handbook, Southwestern Region Supplement

Recreation

- Recreation Opportunity Spectrum (ROS) users guide (1982)
- Forest Service, Outdoor Recreation Accessibility Guidelines (Section: Technical Provisions)
- Forest Service, Trails Accessibility Guidelines (Section: Technical Provisions)
- Forest Service, Connecting People with America's Great Outdoors: A Framework for Sustainable Recreation (2010)

Riparian Areas

- Forest Service, Southwestern Region, Riparian and Aquatic Ecosystem Strategy, Southwestern Region of the Forest Service. Technical guide MB-R3-16-13
- Forest Service, Southwestern Region, Existing and desired conditions for riparian and aquatic ecosystems. Supplement to Ecosystems Riparian and Aquatic Ecosystem Strategy. Technical guide MB-R3-16-14
- Bureau of Land Management, Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lotic areas. Tech. Ref. 1737-15
- Bureau of Land Management, Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lentic areas. Tech. Ref. 1737-16
- Forest Service, Technical Guide to Managing Groundwater Resources Part 2 (Section: Overview of National Groundwater Policy) (FS-881)
- Forest Service, National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1 (FS-990a)
- Forest Service, Groundwater-Dependent Ecosystems: Level II Inventory Field Guide (General Technical Report WO-86b)

Scenery

- Forest Service, (1995) Landscape Aesthetics: A Handbook for Scenery Management (Agriculture Handbook 701)

Soil Resources

- FSM 2550 Soil Management, Southwestern Region Supplement, Soil Management
- USDA Forest Service, (2013). Technical Guidance for Soil Quality Monitoring in the Southwestern Region, (Letter dated January 16, 2013)
- Forest Service, National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1 (FS-990a)

Vegetation

- Interagency Ecological Site Descriptions: Handbook for Rangelands (January 2013)

Watersheds and Water

- Forest Service, National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1 (FS-990a)
- Forest Service, Watershed Condition Framework: A Framework for Assessing and Tracking Changes to Watershed Conditions (FS-977)
- Forest Service, Watershed Condition Classification and Technical Guide (FS-978)
- New Mexico Administrative Code, Title 20 – Environmental Protection, Chapter 6 (Water Quality)
- Memorandum of Understanding between Forest Service Southwestern Region and the State of New Mexico Environment Department
- Forest Service, Technical Guide to Managing Groundwater Resources Part 2 (Section: Overview of National Groundwater Policy) (FS-881)
- Forest Service, Groundwater-Dependent Ecosystems: Level II Inventory Field Guide (General Technical Report WO-86b)
- Forest Service, Southwestern Region, Acequia Guidance (2019)

Wildland Fire Management

- Forest Service, Southwestern Region, Minimum Impact Suppression Tactics
- Interagency Prescribed Fire Planning and Implementation Procedures Guide (Section: Prescribed Fire Planning Process)
- Interagency Standards for Fire and Aviation Operations (Red Book), Forest Service Wildland Fire and Aviation Program Organization and Responsibilities
- Interagency Standards for Fire and Aviation Operations (Red Book), Forest Service Wildland Fire and Aviation Program Organization and Responsibilities (Section: Fuels Management)
- Interagency Guidance for Implementation of Federal Wildland Fire Management Policy (February 13, 2009)
- Annual Interagency Guidance for Preventing Spread of Aquatic Invasive Organisms Common to the Southwestern Region (Section: Technical Guidelines for Fire Operations)
- National Wildfire Coordinating Group Memorandum Number 024-2010, Terminology Updates Resulting from Release of the Guidance for Implementation of Federal Wildland Fire Management Policy (2009)

- Preventing Spread of Aquatic Invasive Organisms Common to the Southwestern Region Technical Guidelines for Fire Operations, Interagency Guidance Rev. August 2009
- Forest Service, Carson National Forest Fire Management Plan
- Cimarron Watershed Alliance Community Wildfire Protection Plan (2008)
- Colfax County Community Wildfire Protection Plan (2008)
- Enchanted Circle Regional Fire Protection Association Community Wildfire Protection Plan (2006)
- Mora County Community Wildfire Protection Plan (2005)
- Rio Arriba County Community Wildfire Protection Plan (2008)
- Taos County Community Wildfire Protection Plan (2009)
- Taos Pines Association Community Wildfire Protection Plan (2006)
- Taos Pueblo Community Wildfire Protection Plan (2009)
- Upper Rio Chama Community Wildfire Protection Plan (2008)
- Village of Questa Community Wildfire Protection Plan (2008)

Wilderness

- Forest Service, Southwestern Region, Minimum Impact Suppression Tactics
- Forest Service, Minimum Requirements Decision Guide http://www.wilderness.net/MRA
- Wilderness.net toolboxes http://wilderness.net/index.cfm?fuse=toolboxes
- Forest Service, Keeping it Wild: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System (RMRS-GTR-212)

Wildlife, Fish, and Plants

- Federal Register legal notices for 50 CFR § 217 Endangered Species Act listings, proposed listings, designated critical habitat, proposed critical habitat, five-year reviews, and other species or habitat status changes
- Species recovery plans
- Protection of Bald and Golden Eagles-Definition of "Disturb" (Federal Register, Volume 72, Number 107, June 5, 2007); Authorizations Under the Bald and Golden Eagle Protection Act for Take of Eagles (Federal Register, Volume 73, Number 98, May 20, 2008); and Forest Service Southwestern Region direction regarding Permitting Regulations for Take of Eagles (November 18, 2009)
- National and State bald eagle management guidelines (recommendations for avoiding disturbance, activity specific guidelines, and additional recommendations)
- Forest Service, Management Recommendations for the Northern Goshawk in the Southwestern United States (General Technical Report RM-217)
- Terrestrial species current biological opinions
- Conservation assessments/strategies and agreements with the Fish and Wildlife Service and other agencies
- Comprehensive Wildlife Conservation Strategy for New Mexico

- Forest Service and the Western Hummingbird Monitoring Network, Western Hummingbird Partnership Action Plan (Section V: Conservation Actions)
- Western Association of Fish and Wildlife Agencies, Wild Sheep Working Group, Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat (Management Recommendations)
- Rio Grande Cutthroat Trout Wildfire Risk Assessment
- Conservation Agreement for Rio Grande Cutthroat Trout in the States of Colorado and New Mexico
- New Mexico Rare Plant Conservation Strategy

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Appendix D. Other Supporting Plan Documentation

- Carson National Forest Assessment Report
- Ecological Response Unit Document
- Desired Recreation Opportunity Spectrum Mapping
- Region 3 Climate Change Guidance
- Scenic Integrity Objectives
- Species of Conservation Concern Report
- Terrestrial Ecosystem Unit Inventory (on file at the Carson National Forest Supervisor's Office)
- Timber Suitability and Calculation of Harvest Levels (EIS Appendix)
- Vallecitos Federal Sustained Yield Unit Policy Statement
- Wild and Scenic River Report
- Wilderness Recommendation Inventory and Evaluation Report