Heritage Resources

Introduction and Methodologies

This section evaluates and compares the existing and reference conditions of heritage resources within the assessment area. The term “heritage resources” is used to encompass archeological sites, in-use historic buildings (and other structures and features), and traditional cultural properties (TCPs).

To complete this analysis, several types of information were used to gather heritage resource data, including heritage resource types and the distribution of those resources on the landscape; in order to understand how this project could affect them. Heritage resource tables built from GIS layers describe each site in order to assign sensitivity when exposed to the elements. A literature search identified site types and the effects on those sites by other similar projects completed in the past, and also helped to describe the distribution of heritage resources based on altitude, slope and aspect; procured resources, and proximity to water; as well as current fuel loads. Maps were used as a visual tool to identify heritage resource distribution based on location and topography. The maps also predicted site density in areas where there is no survey data or invalid survey data, thus protecting resources not identified in other sources of information. This also identifies the need to use another tool; predictive models, to pinpoint high density areas.

Surveys and Consultation

The record of heritage resource sites has been defined by heritage resource survey and reconnaissance activities conducted within the assessment area. A total of 442 survey and reconnaissance activities have been conducted, covering approximately 56 percent of the National Forest portion of the assessment area (Figure 57). Of these, 193 of these activities are considered to be valid, having been conducted to current Forest Service heritage resources survey standards. The valid activities cover approximately 40 percent of the area. By contrast, only about 25 percent of the National Forest as a whole has been examined by survey and reconnaissance activities; 13 percent of the National Forest has been examined by valid activities.

Survey and reconnaissance activities have recorded 2,916 heritage resource sites (Figure 58). These sites constitute approximately 32 percent of all 9,216 sites recorded on the National Forest, and approximately two percent of all recorded sites in the state of New Mexico, based on current site registration numbers in the New Mexico Cultural Resource Information System database. The Forest Service initiated consultation with the Jemez Pueblo to notify them of this landscape assessment and upcoming forest restoration strategy, and to gather information on TCPs in the project area. The locations and sensitivity of TCPs is information held only by the Pueblo, and cannot be identified or protected without collaboration with them. As provided for in the American Religious Freedom Act, in areas of Native American religious use, the Forest Service will determine, with the appropriate traditional religious leaders, actions to preserve the religious practices and to protect Native American religious sites and shrines from ground disturbing activities.

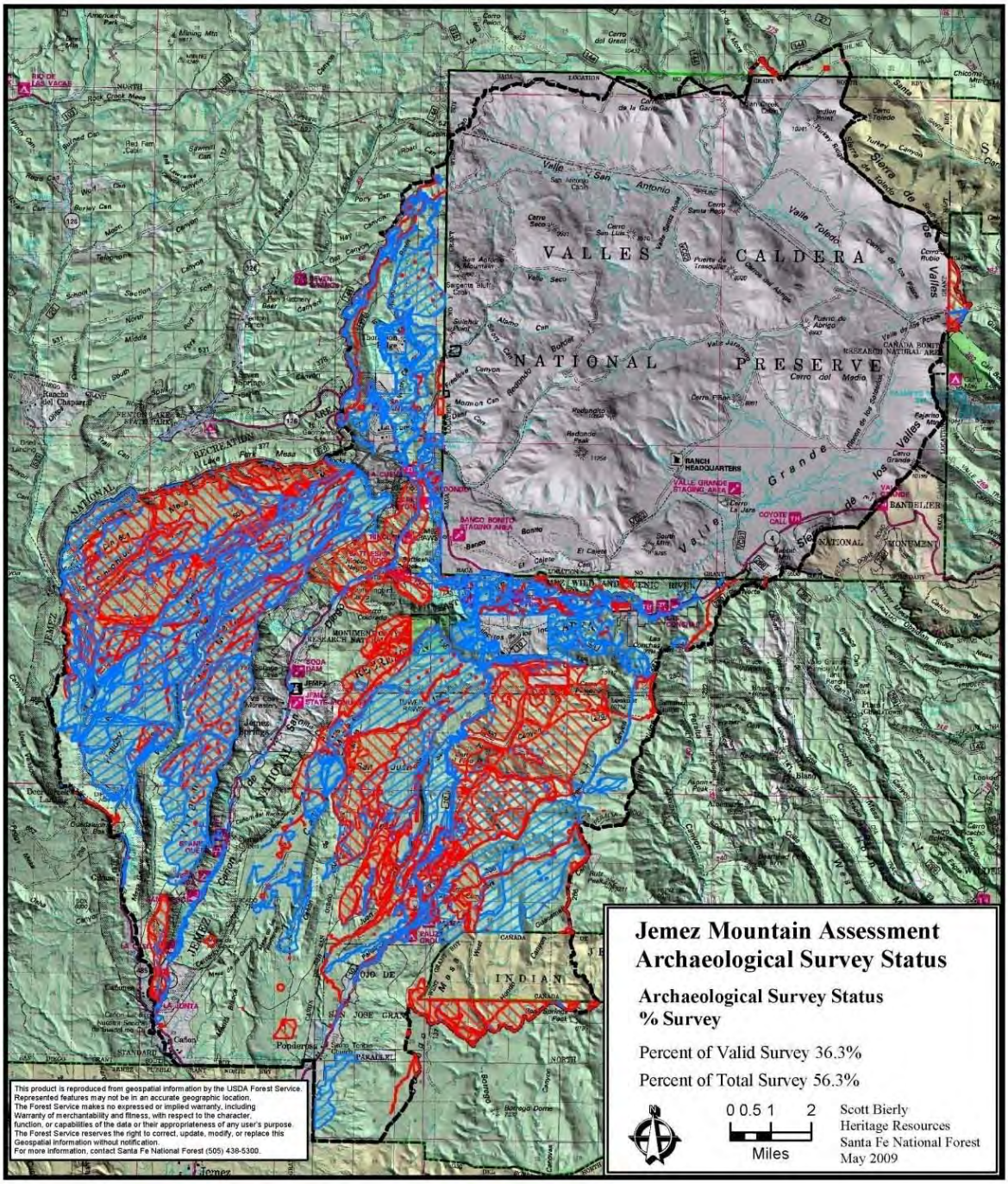

Figure 57. Archaeological survey status on National Forest Land

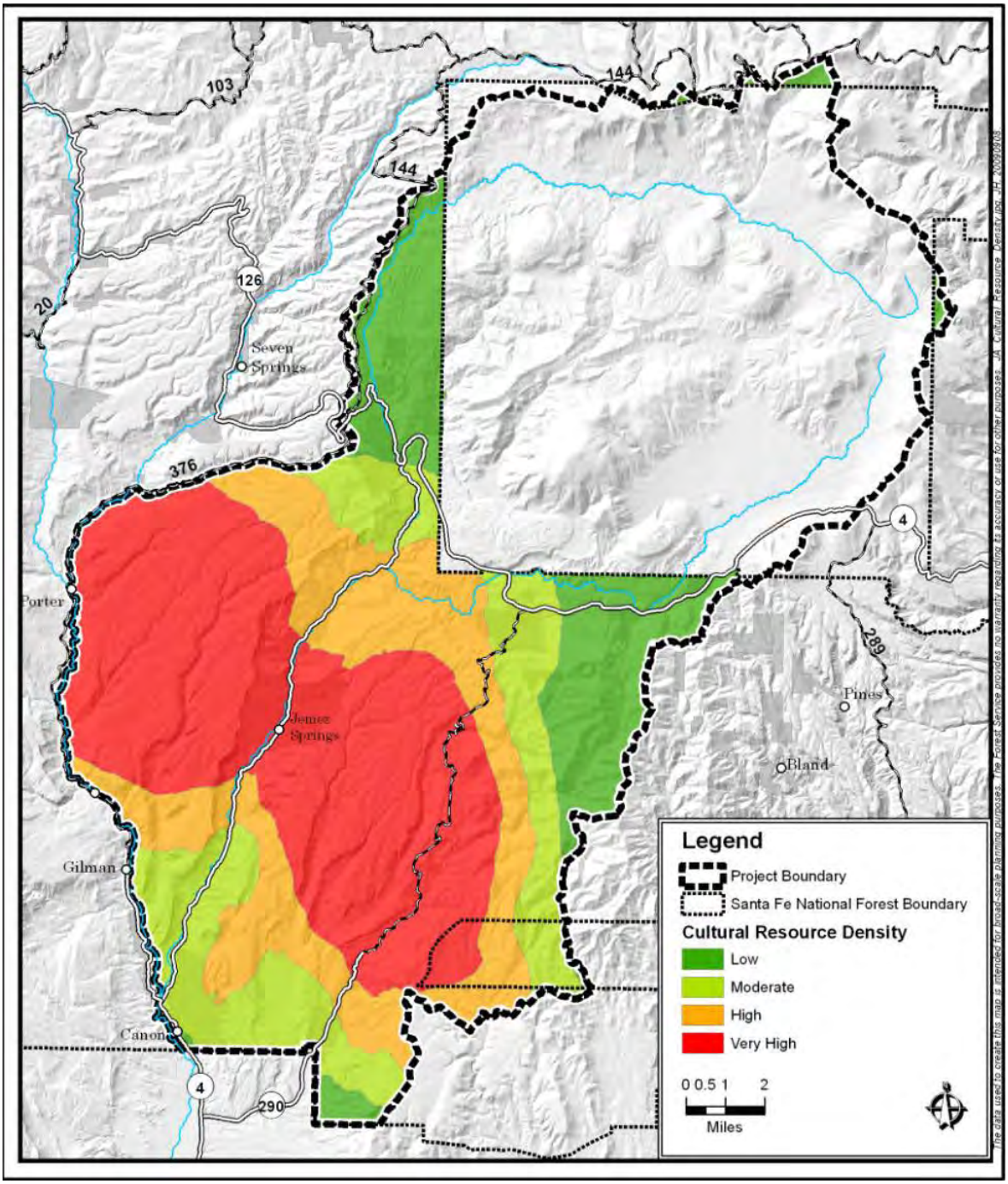

Figure 58. Heritage resource site density on National Forest land in the area

There are also numerous guidelines requiring coordination of Native American heritage resource needs with other resource management activities. This consultation and coordination is typically done in coordination with project planning, and information is shared to allow the Pueblo and tribal leaders to evaluate potential impacts to cultural and religious sites and identify possible mitigation measures. Heritage resource management is conducted in accordance with National Historic Preservation Act and implementing regulations at 36 CFR 800.

Heritage Resource Sites

The National Forest land within the assessment area is within a historic cultural area known as the Jemez plateau or Jemez province. This area contains archeological and in-use historic remains from Native American, Hispanic and Anglo/Euro-American residence and use in the area. There are archaeological sites that date from paleo times as early as 10,000 years ago or earlier right through the archaic middle Holocene from 7,500 to 1,000 years before present; however the majority of heritage resources within the assessment area are archeological sites that date to the Native American (Pueblo Indian) use and occupation of the Jemez Plateau between approximately A.D. 1150 and 1700. Toward the end of that era, the Spanish colonized New Mexico and brought about many changes to the local native culture (Elliott 2002).

The Native American occupation of the plateau is considered by archeologists to be one of the largest and densest during this time period not only in the Southwest but in the entire North American continent (Snead et al. 2004). The Pueblo Indian occupants of these archeological sites were the ancestors to people within the contemporary Native American community of Jemez Pueblo, a sovereign Indian tribe (Sando 1982). Thus, pre-historic and proto-historic site density in this area is considered the highest in the United States.

The scientific, historic and cultural significance of archeological sites in this area is also considered to be exceptional. The Forest Plan recognizes the significance of archaeological sites in the area, with over 60 percent of the assessment area allocated to management areas that emphasize heritage resource management and protection (shown in Table 2 and Figure 3). The exceptional historic/pre-historic significance of the area is also indicated by the proportion of sites listed on the National Register of Historic Places. There are 42 sites listed on the Register within the assessment area; approximately 65 percent of all the register sites located on the National Forest.

The highest heritage resource site density occurs at elevations below 8000 feet. Some sites do exist above 8000 feet but most of those were used for hunting. Thus the potential for sites at high elevations is considered low. Mesa tops and canyons below 8000 feet, especially those with close proximity for water and not located on steep slopes, were the most desirable areas for pre-historic peoples(Skinner 2003). Historic sites however, are spread more evenly across the landscape and occur at just about every elevation and landscape. Historic sites, most dating to the late 19th and early 20th century, are related to uses such as logging, associated railroad construction and sheep and cattle grazing. The main types of sites found in the area include: pueblos; field houses; cavates, rock shelters and cliff dwellings, game traps and hunting blinds; agricultural features, artifact scatters and a variety of historic sites.

Pueblos

There are 84 native pueblos (living structures) that date to the pre-historic and proto-historic periods within this area. The rooms in the pueblos are generally set in a rectangular configuration and may be one- to three-story room blocks around a central plaza. Round ceremonial structures called kivas are also located in and around the pueblo. Most of the pueblos in the project area are reduced to rubble mounds; however a few still have some standing features such as walls, and some also contain perishable materials such as wooden vigas(support beams). Large pueblos are considered to be fire sensitive sites that should be protected by the removal of fuels from the site, black lining or other methods of fire avoidance.

Field Houses

There are approximately 2,025 recorded field houses in the assessment area.A field house is a small structure of one to four rooms generally considered puebloan (pre-historic to proto-historic), and associated with agricultural areas or fields. Most of these structures have been reduced to rubble mounds, however a few may have standing walls and perishable features. While burning over these sites usually does not affect the integrity, high intensity fires could overheat cultural deposits changing geomagnetic dating potential as well as damage to the cultural material buried in the field house. Also these houses are often built using soft and porous tuff rock which can change color, spall and shatter during such high intensity fires. As a result, these sites are considered fire sensitive and should be protected from intense fire.

Cavates, Rock Shelters and Cliff Dwellings

The area contains approximately 20 cavates, 83 rock shelters, and no known cliff dwellings. Cavates, rock shelters and cliff dwellings are three types of puebloan living or storage sites associated with cliff faces. Cavates are holes or caves hollowed out in cliff faces that have tuff soft enough to dig in. Rock shelters are natural recesses in the base of cliffs that have not been made with human hands, but rather through wind or wave action in the past. The roofs of both these structures may be smoke blackened, and they may contain rooms. Cliff dwellings are medium to large pueblo type structures built into the cliff faces in large overhangs and recesses. Fire has a minimal potential to impact these types of sites, unless they contain petroglyph rock art or outside structures. There are several examples of such rock art at some of these sites.

Game Traps and Hunting Blinds

Three game trap and hunting blinds have been found from the frequent pre-historic hunting activity that occurred. Game traps, such as raptor traps, are often identified as pit features near mesa tops. Hunting blinds were used to hide the hunter from the prey. These particular sites within the assessment area would not be affected by fire.

Agricultural Features

Agricultural features, represented by several different kinds of ground alterations, indicate the production of native plants for food, such as corn, squash, beans and peppers. Sites include check dams for diverting water to the gardens, and rock alignments delineating garden areas, used from pre-historic through the historic era. Fields commonly are described as terraces that have small stone alignments in the front of the terrace landings (Fliedner 1975). While there may be thousands of agricultural features in this area, only 27 have been recorded to date, because they so

readily blend into the landscape. Many are recorded as simple features or Isolated Occurrences (IO) and not sites, and occur commonly near field house and pueblo sites. While these sites can be harmed by ground disturbing activities, fire generally has little to no effect on them.

Artifact Scatters

There are about 203 artifact scatters recorded in the assessment area. These are sites with no obvious structural features. Artifact scatters can include pre-historic stone and pottery to historic artifacts like cans and bottles. Some of the scatters date from the late archaic to the paleo times 10,000 years ago. These sites can be somewhat susceptible to fire, especially high intensity fire, and ground disturbing activities.

Historic Sites

There are approximately128 historic sites recorded in this area, ranging from whole camps like those used for logging to single features such as sheep pens or hunting blinds. They may include sites historic trails and roads. Many trails and roads follow routes that have been used since pre-historic times. Historic sites typically have artifacts such as glass, nails and cans associated with them. These sites are especially sensitive to fire because many include wood material. Thus, both fire and ground disturbing activities can still greatly affect the integrity of these sites.

Traditional Cultural Properties

There are two TCPs in the area along with a number of potential TCPs, which are being evaluated for eligibility to be listed in the National Register of Historic Places. A TCP is considered eligible the National Register of Historic Places if it is associated with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (Parker and King 1990). The nature of TCPs is strictly confidential; however, the two identified TCPs in this area would both be affected by ground disturbing activities including fire. Thus, the decision to use prescribed fire on or around these TCPs must be evaluated on a case-by-case basis, in consultation with the Pueblos.

Other Sites

There are about 130 other types of sites dating from pre-historic to historic that do not categorize easily because of their obscurity or numbers. They include burials, cache pits, and hearths, as well as jacal structures (burnt adobe), kivas, pithouses, pre-historic features, rock features, and shrines. These sites are important, and are either somewhat sensitive or highly sensitive to fire.

Forest Plan Direction

The Forest Plan contains forest-wide and specific management area direction relevant to management and protection of heritage resources. Thus, these Forest Plan standards and guidelines provide “reference conditions” that are useful in developing the landscape restoration strategy and site-specific proposed actions. This management direction is summarized and paraphrased to reduce bulk and redundancy. Management areas are described and shown on a map in Table 2 and Figure 3, at the beginning of this report. The following lists the most relevant forest-wide standards and guidelines followed by management area standards and guidelines for the management areas in this assessment area. Refer to the Forest Plan for additional detail.

Forest-wide Standards and Guidelines

- Heritage (or cultural) resources management includes an active program of inventory, nomination, protection, and restoration, as well as interpretation and research.
- Complete coordination and cooperative planning with the State Historic Preservation Office, other State and Federal government agencies, and Native American tribes.
- Survey areas scheduled for "undertakings" (ground disturbing activities), in consultation with the State Historic Preservation Officer (SHPO) and, as appropriate, the Advisory Council on Historic Preservation (ACHP). Complete 100 percent survey of all project areas specified in the lawsuit settlement agreement (Save the Jemez/State of New Mexico v. Forest Service).
- Complete inventory and site marking (and avoidance) at a sufficient level to protect sites from management activities.
- Identify, prioritize and survey areas not scheduled for surface disturbing projects, such as areas that lack site density information, have a high site density, or have a high potential for vandalism.
- Assess the potential effects of proposed actions upon cultural resources, and evaluate all sites to determine if they are potentially eligible for the National Register of Historic Places (NRHP).
- Manage and protect all sites listed in, eligible for, nominated to, or potentially eligible for the NRHP to achieve a "no effect" finding. Where resource conflicts preclude this, manage sites to achieve a "no adverse effect" finding. Where there is evidence of vandalism, artifact collecting, or illicit excavation, implement appropriate protective measures, such as signing, fencing, administrative closure, remote sensing, increased patrolling, or public education. For evidence of natural deterioration, implement appropriate stabilization measures. Enforce laws firmly and with appropriate uniformity, and emphasize personal contacts to reduce pot hunting of cultural resources.
- In planning and conducting fire and fuel management activities: (a) consult with the Forest or District Archeologist prior to activities such as construction of firelines or prescribed burning to avoid impacts to cultural resources; (b) consider potential impacts to cultural resources when determining strategies for managing wildfires, including "escape" fires; and (c) avoid the use of bulldozers on slopes greater than 40 percent.

Management Area I - Standards and Guidelines

These areas contain high value cultural resources representing the major cultures which once lived on the National Forest, and the majority of the Forest's National Register sites occur within this management area. Because of the sensitivity of the location of these areas and the potential for disruption of the sites due to disclosure of their locations, this management area does not appear on public maps and locations remain confidential, in accordance with 36 CFR 296.18.

- Exclude major land disturbing activities and focus these areas on cultural resource site nomination, interpretation, and research.
- Continue to evaluate additional areas for possible inclusion to management area "I", based on site density, unique size or quality, and characteristics of a particular time period or cultural adaptation not sufficient represented in current management areas.
- Evaluate roads through important sites for the possibility of closure or realignment.

- Evaluate all NRHP sites for mineral withdrawal and closure to off-road vehicle use.
- Monitor NRHP and other high priority sites every other year, and take appropriate action to protect those sites.
- Locate range structures to avoid the concentration of livestock on cultural resources.
- Allow tree removal to reduce damage to cultural resources, and personal use firewood harvesting, if removal does not conflict with the cultural resource objectives for the area. Identify, mark if appropriate, and direct use away from cultural resource sites.
- Do not construct roads except where necessary for permitted special uses, mineral activities, private land access, to access adjacent management areas where other reasonable access is not available or to support cultural resource management. Close all unnecessary roads where they currently exist.
- Manage wildfires with sensitivity to the cultural resources being protected. Identify fireline locations in consultation with the archaeologist. Use natural barriers, roads, or other non ground disturbing methods where possible to suppress wildfires.
- Allow prescribed fire or other fuel treatments only if the activity will maintain or enhance cultural resource values.

Management Areas P, R and S - Standards and Guidelines

These management areas contain a rich resource of historic and pre-historic sites, and management emphasis is on heritage resource inventory, nomination, and protection

- Evaluate and nominate, as appropriate, sites in this area that are not currently listed in the NRHP. Allow interpretation and development of NRHP sites, in consultation with Native American tribes, federal and state agencies and citizen groups.
- Protect important cultural resource sites by emphasizing law enforcement and site monitoring.
- Evaluate roads through important sites for the possibility of closure or realignment.
- Evaluate all NRHP sites for mineral withdrawal and closure to off-road vehicle use.
- Monitor NRHP and other high priority sites every other year, and take appropriate action to protect those sites.
- Stabilize or repair damaged cultural resource sites, based on severity of damage and the relative importance of the site.
- Design timber sales and stand improvement projects to avoid or properly mitigate disturbance to archeological or Indian religious sites.
- Allow prescribed fire and fuel treatment activities, commensurate with protection of the cultural resources.
- Use non-ground disturbing methods for firelines where possible (fire retardant, natural barriers, etc), and consult with the archaeologist prior to constructing firelines.

Management Area X- Jemez National Recreation Area

- Ensure protection of religious and cultural sites and provide access to those sites by Indian peoples for traditional cultural and customary uses

- When marking or identifying archaeological sites to be protected during project implementation, consider options other than paint.
- Strive to maintain the character of the Civilian Conservation Corps (CCC) facilities through the use of similar materials and design elements.

Management Area F- East Fork Jemez Wild and Scenic River

- Use education and interpretation as the primary means to protect heritage resources, by increasing appreciation and respect for historic and pre-historic sites.

Programmatic Agreement

The *Programmatic Agreement Regarding Historic Property Protection and Responsibilities* outlines Forest Service responsibilities for management of historic properties, public participation, and tribal consultation. It describes fire sensitive sites and how these sites will be identified in consultation with the State Historic Preservation Office and fire management personnel. Fire-sensitive sites determined to be ineligible for the National Register of Historic Places do not require protection under Section 106.

Recreation & Scenic Quality

Introduction and Methodologies

This section evaluates and compares the existing and reference conditions of recreation and scenery resources within the assessment area, based on a variety of sources including: the Forest Plan, the Jemez National Recreation Area Assessment Report and Management Plan, the Jemez Wild and Scenic River Corridor Plan, Forest's Recreation Facility Master Plan and National Visitor Use Monitoring Report (2005), the 2005 Jemez Watershed Assessment, Forest Service Manual 2370 and Forest Service Trails Handbook 2309.11k, and the Forest Service's Recreation Opportunity Spectrum handbook (US Forest Service 1986).

Recreation Opportunities and Settings

Outdoor recreation is a dominant activity within the assessment area, which lies in close proximity to the most populated cities in New Mexico. The area contains many developed campgrounds, picnic areas, fishing access areas, trails, and trailheads. The Wallotowa Visitor Center, jointly managed by the Forest Service and Pueblo of Jemez, provides interpretive displays and visitor information. In addition, numerous opportunities exist for dispersed (undeveloped) recreation, based on a well-developed system of access roads (shown in Figure 59). While most roads in the area are dirt or gravel roads, four state highways provide access in the assessment area, highways 4, 126, 485, and 290. There are also four specially designated areas within the assessment area: Jemez National Recreation Area (JNRA), East Fork of the Jemez Wild and Scenic River (WSR), Monument Canyon Research Natural Area (RNA), and an unnamed Inventoried Roadless Area (IRA).

The Recreation Opportunity Spectrum (ROS) classification system is used to describe the variety of recreational settings provided on national forest system lands. There are four (or six) ROS settings that occur in the assessment area: Rural, Roaded Natural, Semi-Primitive Motorized, and Semi-Primitive Non-Motorized, as shown on the map in Figure 60. The relative percentage of each ROS in the assessment area is as follows:

- Roaded Natural (RN): 45 percent
- Semi-Primitive Motorized (SPM): 44.4 percent
- Semi-Primitive Non-Motorized (SPNM): 10.4 percent
- Rural (R): <0.2 percent

Seven descriptors for each ROS setting provide additional management tools, and describe the relative degree of: access (roads, trails); remoteness from human activities; naturalness of the physical environment; social encounters (expected frequency of encountering other people); visitor impacts; visitor management (regulation, control); and facilities (services, development). The ROS setting does not apply to private lands, although private inholdings are considered in managing for ROS settings on surrounding National Forest land (Figure 60). (US Forest Service 1986).

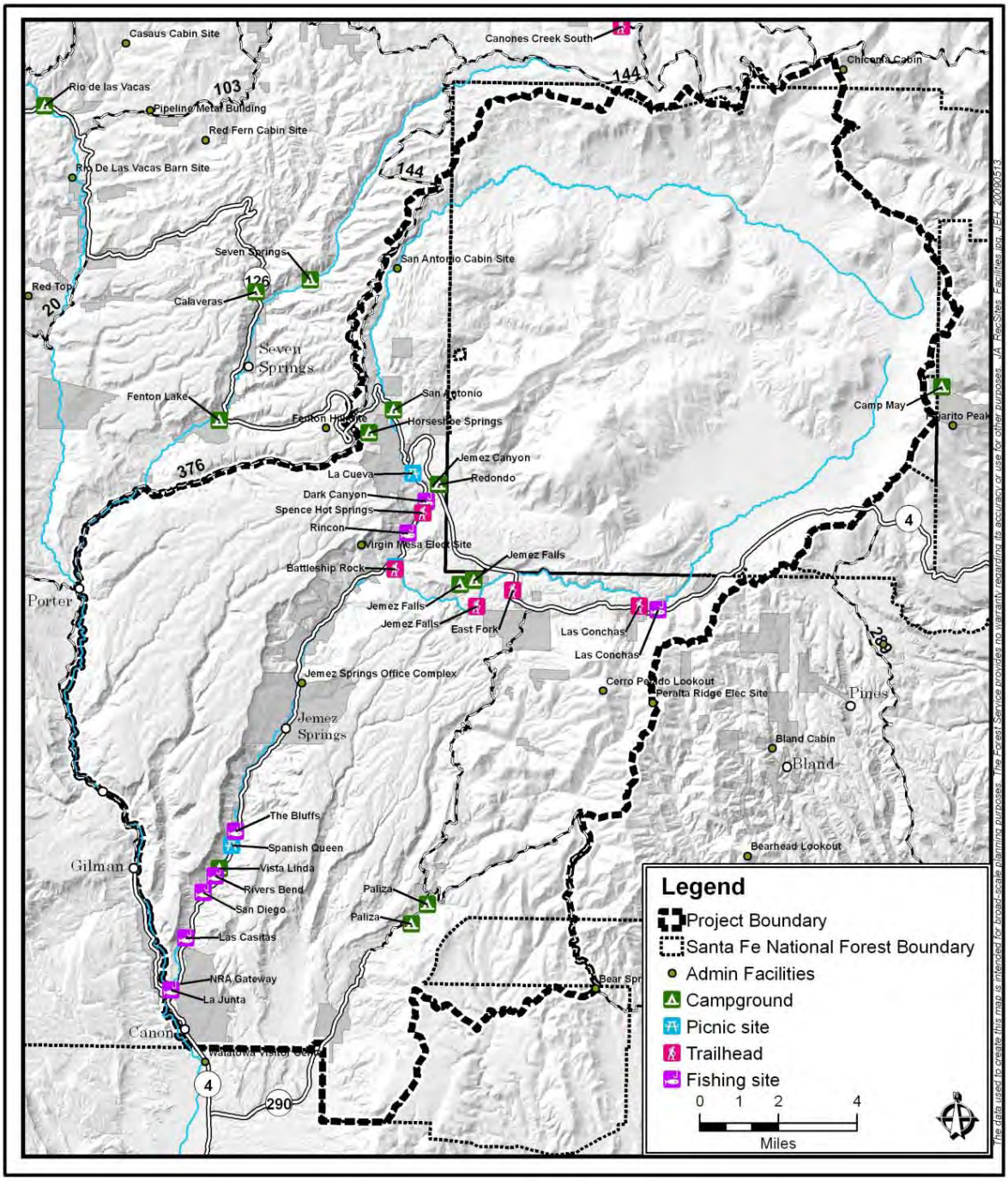

Figure 59. Developed recreation facilities

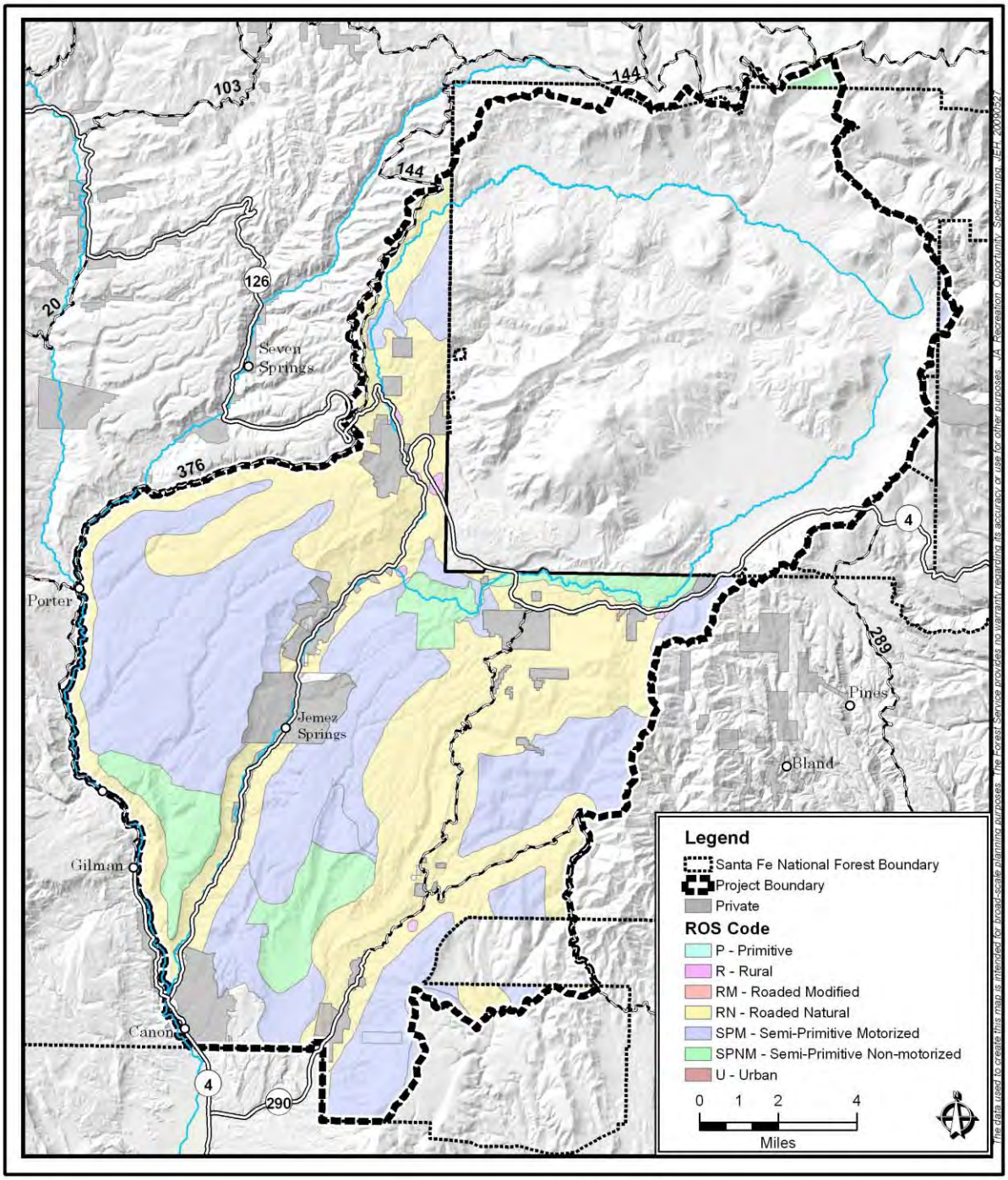

Figure 60. Recreation opportunity spectrum settings

Developed Recreation

The Forest Plan directs managers to provide recreational facilities within the JNRA that minimize impacts on scenic beauty, natural character, and archaeological and religious sites (PL 103-104, Sec. 2[j]). In providing for recreational facilities, emphasis shall be placed on the preservation, stabilization, and protection of cultural resources and conservation of wildlife.

There are seven developed Forest Service campgrounds within the assessment area, of which five are in the JNRA. They are all heavily used, especially between Memorial Day and Labor Day. A list of campgrounds and units available at each is presented in Table 43. Fees are charged under the Recreation Enhancement Act (REA) at all of these campgrounds. Sites at Paliza and Redondo can be reserved through the National Reservation System. These campgrounds are generally full to capacity every weekend from Memorial Day to Labor Day.

Table 43. Forest Service campgrounds and number of units at each site

Campground	Area	Number of Units
San Antonio	JNRA	47
Redondo	JNRA	59
Jemez Falls	JNRA	52
Vista Linda	JNRA	13
Paliza	Outside JNRA –Vallecito Ck	30
Paliza Group 1 & 2	Outside JNRA – Vallecito Ck	16 & 8

Source: (JNRA 1997; Forest website)

There are six Forest Service picnic areas within the assessment area, all of which fall within the JNRA. Fees are charged at three of these sites. Jemez Falls Group site can be reserved for use through the National Reservation System. Table 44 shows the list of picnic areas and number of units available at each. These day-use sites are popular and on weekends they fill to capacity. Over-crowding has caused parking and access problems within several of the sites (Battleship, La Cueva and Jemez Falls Family).

Table 44. Forest Service picnic areas and number of units at each site

Picnic Area	Number of Units
Battleship	33
Jemez Falls Group Area	1 (up to 100 people)
La Cueva	12
Las Conchas	0 (fishing access site)
Spanish Queen	12

Source: (Forest website)

The need for change in developed recreation within the assessment area includes the following:

- Increase availability of developed recreation sites, while staying within RN ROS. Include addition/expansion of both campgrounds and picnic areas.
- Decrease resource impacts from large groups of picnickers at fishing access points by converting some of these areas to picnic sites or by increasing the number of developed picnic areas.
- Reduce human-created resource impacts within developed recreation sites caused by overcrowding of campgrounds and picnic areas by increasing the number of sites available through the National Recreation Reservation System.

Dispersed Recreation

Hunting is a major recreation activity in the assessment area. Hunting is allowed in accordance with state and federal regulations. The assessment area includes Big Game Hunting Unit 6A, 6B, and 6C. Big Game Unit 6A includes the Jemez watershed, Unit 6B includes the Valles Caldera, and Unit 6C includes a small portion near Las Conchas. The hunting unit boundary division for Unit 6C follows Peralta Canyon. The New Mexico Department of Game and Fish (NM Game and Fish) is responsible for issuance of hunting tags for the various big game species within the hunting units. Small game units are also issued by NM Game and Fish; however, these small game tags or stamps are typically issued for statewide use on public or permissible private lands.

Fishing is a very popular activity and available on every major stream in the assessment area. The Jemez River, East Fork Jemez, Vallecito Creek, and San Antonio Creek fisheries are composed of naturally reproducing brown trout, rainbow trout, and a host of other native and non-native species. Developed fishing access points include: La Junta, Las Casitas, San Diego, River's Bend, The Bluffs, Las Conchas, Rincon, and Dark Canyon. The Lower Jemez River sites are increasingly used for picnicking, making access by anglers more difficult, due to limited parking. However, anglers can access fishing locations all along the river, outside developed sites.

There are no opportunities for motorized boating because the waterbodies in the assessment area are too small or have large amounts of course woody debris blocking the channels. Small boaters may be able to negotiate portions of some streams, although it is fairly dangerous and limited.

Other dispersed recreation activities in the assessment area are soaking in the hot springs, hiking, biking, primitive camping, picnicking, photography, rock-hounding, horseback riding, and wildlife viewing. The hot springs are extremely popular, with parking areas being full most days of the week during the peak recreation season. This is particularly true of Spence Hot Springs; however, due to poor grade and pumice soils, erosion of the parking area and trail are extensive, causing safety concerns for visitors to the area, though closing the area to use is virtually impossible to enforce. Camping in the Forest Road 376 corridor is extremely popular, with most campsites being utilized each weekend. Though the area is designated as a dispersed camping corridor by the Forest Plan, the amount of use is increasing and impacts from trash, human waste, and loss of vegetation in riparian areas is a major issue. Dispersed camping also takes place in the Forest Road10 corridor, though not to as great an extent as on Road 376 and does not appear to be affecting the visual quality objectives of the area.

The Forest Plan directs managers, when rehabilitating recreation facilities, to consider the dispersed area that the facility serves and resource capacities associated with the dispersed area. It also directs managers to eliminate illegal dumpsites and other garbage and debris.

The need-for-change in dispersed recreation management includes the following:

- Increase cooperation with the State Department of Transportation and law enforcement agencies to reduce parking issues within the Highway 4 corridor and eliminate pedestrians along the highway, particularly at Las Conchas trailhead, Soda Dam, and El Puente Blanca.
- Restore natural conditions at the hot and warm springs by reducing use of these areas.
- Reduce resource degradation in the FR 376 corridor that is occurring from vehicles parking on roadside vegetation by increasing the amount of constructed parking areas.
- Reduce resource impacts from overcrowding and overuse of dispersed camping sites within the Rio Guadalupe and Rio Cebolla river corridors. Establish system of designated campsites within these areas.
- Increase riparian vegetation and scenic values in heavily used areas within the JNRA, particularly the WSR, by closing and rehabilitating denuded sites.
- Reduce resource impacts from overcrowding and overuse of dispersed camping sites within the WSR corridor by providing designated dispersed campsites or camping zones away from the stream and riparian areas. Limit camping in the WSR corridor.
- Increase recreation opportunities within the WSR corridor, outside of riparian zones.
- Reduce recreational use in reaches 1 and 6 of the WSR corridor that result in bank erosion and instability.
- Reduce human waste and trash within riparian areas along river corridors.
- Increase presence and monitoring within the assessment area to improve compliance with closure orders, particularly within the JNRA and WSR corridor.
- Reduce erosion and sedimentation at Spence Hot Springs area. Improve parking to reduce resource impacts and degradation to the springs caused by over use of the area.

Recreation Special Uses

A number of recreation special use permits are issued within the assessment area each year including those for recreation events like the Adventure Race and NM Motorcycle Trials Event; non-commercial group uses like family reunions; commercial uses like outfitting and guiding (hunting, rock climbing, sight-seeing, birding…), and filming. Several major motion pictures and television series have been filmed in the assessment area.

Special use permit authorizations may be issued on the National Forest when the proposed use: fulfills a demonstrated special need without unduly infringing the general public; meets approved management plans and will not adversely impact natural resources; and serve a function that cannot be provided off National Forest land.

Special Area Designations

Jemez National Recreation Area

The congressionally designated Jemez National Recreational Area (management area X) was established in 1993, and an assessment report, EA and management plan for this area were completed as an amendment to the Forest Plan (US Forest Service 1998, 2002). The Jemez National Recreation Area receives about 1.6 million visitors each year. It is accessed by State Highway 4, a State Scenic and Historic Byway, and State Highway 126. Within the NRA is the 3,520-acre congressionally designated East Fork of the Jemez Wild and Scenic River corridor, management area F in the amended Forest Plan (US Forest Service 2002d).

The JNRA is managed for the following goals, and standards and guidelines, some of which are required by the 1993 JNRA Act (shown in italics). Some are paraphrased here to make this document more concise. These JNRA goals, standards and guidelines are adequately addressed by past, current, or planned management activities. (US Forest Service 2002f).

- *Permit scientific investigations in the area if they are in the public interest and compatible with the purposes of the JNRA Act (PL 103-104, Sec. 2[m]).*
- *Establish a visitor center and interpretive facilities in or near the recreation area for the purpose of providing for education relating to the interpretation of cultural and natural resources of the recreation area (PL 103-104, Sec. 2[k]).*
- Do not use marketing or other methods to increase visitation to the area.
- Encourage volunteer programs and partnerships with other agencies, tribes, local communities, and user groups in planning, implementing, and monitoring activities.
- Provide opportunities for tribes, local rural communities, and user groups to present information on their culture and traditions to visitors.
- Maintain the option of charging user fees to help offset the costs of managing the JNRA.
- Work with local cooperative emergency services to increase or improve emergency services so that local residents are assured of prompt emergency care.
- Provide facilities, services, and opportunities that reflect the interests and values of local residents, in addition to considering the desires of non-resident visitors.
- Work with the State Highway Department and local communities to minimize the impacts from the increasing traffic through the area.
- Manage for the level of recreational development consistent with the Recreational Opportunity Spectrum (ROS) classifications for this area.
- When rehabilitating recreation facilities, consider the dispersed area that the recreation facility serves and consider resource capacities associated with the dispersal area.
- Manage the four landscape units (Lake Fork, Guadalupe, East Fork, and Lower Jemez) to emphasize each unit's unique recreation opportunities and character and to reduce negative impacts of overuse.
    - Manage the Lake Fork and Guadalupe for dispersed recreation.
    - Manage the East Fork for both developed and dispersed recreation as further defined in the management direction for the East Fork WSR.
    - Manage the Lower Jemez for developed recreation.

Rio Guadalupe and Rio Cebolla Corridors

The majority of dispersed recreation activities in the assessment area occur within the JNRA, particularly in the Rio Guadalupe corridor. On most weekends during peak recreation season (Memorial Day to Labor Day), numerous campsites are used throughout this corridor, as well as areas posted as closed. Forest Plan direction calls for this corridor to be managed for dispersed recreation.

Stream inventories conducted in 2003 on the Rio Guadalupe and Rio Cebolla and reported in 2004 Stream Inventory reports, found that in the summer the Guadalupe corridor receives a considerable influx of people recreating along its stream banks (US Forest Service 2003b, 2004a-c). Dispersed campsite inventory completed in 2003 (Respect the Rio 2003) found that the Guadalupe corridor has 22 complexes and 127 individual campsites (see Table 45). These campsites are characterized by large areas of exposed soil, which during rain events can lead to heavy sediment loading in the streams. There is approximately 123 acres of disturbed ground along Rio Guadalupe associated with dispersed camping (US Forest Service 2003, 2004b-c). Fence and sign maintenance is needed in this corridor. While Table 45 quantifies impacts along these two streams, stream side recreation impacts occur throughout the assessment area, adversely affecting water quality, fisheries, wildlife habitat and proper ecological functions, as described in other sections of this report.

Table 45. Dispersed campsite conditions along Rio Guadalupe and Rio Cebolla

Inventory Component	Rio Guadalupe	Rio Cebolla	Total
Complexes (number)	22	29	**51**
Individual Sites (number)	127	130	**257**
Fire Rings (number)	265	226	**491**
Disturbed Soil (acres)	123	132	**255**
Vegetation Loss (acres)	43	45	**88**
Damaged Trees (number)	435	710	**1,145**
Unstable Banks (feet)	420	822	**1,242**
Toilet Proximity to Stream (feet)	130	9	

The 2003 campsite inventory also identified human impacts throughout the Guadalupe corridor, including user-created roads and trails, dams, angler trails, and trash (see Figure 61 and Figure 62). Areas denuded by dispersed camping are prevalent along the left bank. Orea at the end of the reach (Gilman Peak) is commonly used as an illegal dumping site. Garbage and toilet paper occur in many areas of the corridor. The Forest Plan directs managers to eliminate illegal dumpsites and other garbage and debris, and manage recreation uses in a manner that protects resources.

Human impacts in the Guadalupe Box area are represented by graffiti on the rocks, jeep trails, and angler trails. Fishing line, tires and other trash was found in the stream. Pools near the top of Reach 3 are used as swimming holes, and the Gilman tunnels are a popular stopping point for forest visitors. Yet much of the stream and bank are degraded by human impacts.

Figure 61. Campsite litter along the banks of the Rio Guadalupe, 2004

Figure 62. Dispersed campsite next to Rio Guadalupe, 2004

The Forest Plan directs that when rehabilitating recreation facilities, consider the dispersed area that it serves and the natural resource capacity associated with the dispersal area. In 2003-2004, the Contact Ranger Program documented intensity of use, where visitors resided, changes witnessed by repeat visitors, and suggestions for improving the experience. Also, visitors were asked if they would pay a fee to visit the area. Survey results found there are many different types

of users in different corridors, a progressive growth in visitation, many new dispersed sites, a willingness to pay a minimal fee, and that most visitors reside in the Albuquerque area.

As a result of this program, the Guadalupe corridor underwent changes during the summer of 2004 under the Respect the Rio program These changes included modifying dispersed campsites that encroach on the stream banks; closing Forest Road 376 (road to the river) to all vehicles; prohibiting overnight use at Deer Creek Landing, a popular swimming hole and camping area; planting native vegetation in degraded riparian areas; and adding educational signs throughout the watershed to inform visitors about low impact camping, native ecosystems, and the purpose of the restoration activity.

After one season, there appeared to be a large reduction in trash, vegetation was starting to re-establish, and people seemed to be reading and understanding the Respect the Rio messages. However, information gathered after 2005 indicated that users have become less respectful of the resource. Trash and human waste are again a major issue, riparian resources are being disregarded, and the number of streamside campsites is growing. Signs are often vandalized and fences pulled down by people trying to access closed areas along the river.

Similarly, in the Rio Cebolla drainage, there are many dispersed trails and campsites, including 130 individual sites and 822 feet of unstable banks. The heavy recreational use of these areas has degraded riparian vegetation, stream banks, and water quality. The numerous dispersed trails and campsites near the river have resulted in loss of vegetation, increased soil compaction, erosion and sediment input to the stream. Many of the dispersed campsites are also within the floodplain—an unsafe situation for overnight visitors. Also, visitors have been seen removing large woody debris from the stream and floodplain for firewood, which further degrades the stream.

Along San Antonio Creek, similar impacts from heavy recreational uses occur. In 2002, Forest staff took measures to reduce the amount of dispersed recreation in the area. They constructed buck and pole fences along Lake Fork Canyon to reduce areas where dispersed camping occurred next to streams. Unnecessary roads and trails were closed to prevent further degradation to soils and vegetation, which improved stream and riparian habitat along 3 miles of stream. However, the fences used to limit access are currently in a state of disrepair and need to be replaced in order to continue to keep these areas closed.

East Fork of the Jemez Wild and Scenic River

A congressionally designated Wild and Scenic River (WSR) occurs on the East Fork of the Jemez, designated in the Forest Plan as Management Area F. The WSR corridor lies approximately 5 miles northeast of Jemez Springs, within the JNRA. The WSR is bounded by the Preserve to the north and National Forest lands on the east, south, and west. It has been in the national WSR system since 1990. It is 11 miles long, flows in a westerly direction, and has a corridor averaging no more than 320 acres per mile, comprising approximately 3,518 acres (US Forest Service 2002a).

The first two-mile segment of the WSR from the Preserve boundary to the second highway crossing of New Mexico State Hwy 4 is the designated recreation segment, or Conchas Reach. The next 4 miles extending from the second water crossing to the third highway crossing is the designated wild segment. The wild segment must remain free of impoundments and generally

inaccessible (except by trail), with shorelines essentially primitive and waters unpolluted. This segment contains the Middle Reach and Box Reach. The last 5 miles ending at the confluence with San Antonio Creek is the designated scenic segment. This scenic segment must similarly remain free of impoundments and with shorelines largely primitive and undeveloped, but can be accessible in places by roads. This segment contains the Battleship Reach and Falls Reach.

During a 2009 Need for Change analysis, many concerns were identified for this WSR corridor, such as loss of streamside vegetation, erosion of heavily used areas, and trash and human waste left at campsites (US Forest Service 2009d). A great deal of dispersed recreation takes place within the WSR corridor. Public access to the river is an issue, in part due to the limited parking space available along Highway 4 at the Las Conchas trailhead, and along the highway at El Puente Blanca. This poses a serious safety risk to visitors and drivers along the highway due to traffic speed (55 mph). On a given weekend there may be as many as 30 vehicles parked along the highway in this area, with visitors walking down the highway to access the river.

Management emphasis in the WSR is to preserve and protect the outstandingly remarkable values for which the river was designated. Forest-wide management direction for WSRs is to maintain the river's free-flowing character while providing quality water based recreation opportunities, wildlife habitat improvement, and other resource management consistent with the intent of the WSR Act. The WSR Act specifies that designated rivers and the outstandingly remarkable values they possess will be "protected for the benefit and enjoyment of present and future generations". The outstandingly remarkable values for this WSR are: scenery, recreation, geology, ecology, fisheries and wildlife.

The following abbreviated Forest Plan standards and guidelines apply to recreation and access management in this WSR corridor:

- Manage the corridor as a SPNM setting, except along the highway and in recreation sites
- Reduce over-capacity parking, by encouraging parking in low use areas…
- Emphasize resource protection and scenic values… rehabilitate denuded sites….
- In the Wild segment, develop water crossings to the minimum level and only where necessary for protecting resources and providing for public safety.
- Manage the Las Conchas Picnic Area/Fishing Access area at the standard service level.
- Provide information and education to warn people about safety hazards…cliff jumping…
- Provide wildlife viewing opportunities where possible.
- Where fences are necessary, design fences to allow for public passage-ways….
- Discourage camping in riparian areas…..
- Prohibit camping adjacent to Las Conchas trailhead, before the first stream crossing.
- Enforce closures to ensure that resource impacts remain within acceptable limits.
- Provide designated dispersed campsites or camping zones away from the stream banks.
- Do not construct new campgrounds, picnic grounds or trailheads in the corridor...
- Prohibit rock climbing in the petroglyph area at Battleship Rock….
- Provide frequent monitoring and official presence at heavily used recreation areas.
- Inform the public and enforce rules about Leave No Trace practices…
- …Manage pedestrian traffic along Highway 4 to discourage walking in travel lanes...

- …Prohibit discharging of firearms...
- Prohibit new road construction and motorized use, except along highways and ….
- Prohibit use of motorized rafting or boating.
- Permit the use of mechanical conveyances, such as mountain bicycles.
- Relocate, rehabilitate or eliminate user-created trails…
- Maintain system trails to agency standards for a SPNM classification...
- Provide trail segments and bridges over streams to disperse use and reduce impacts…
- Repair or replace bridges to protect river resources and free-flowing conditions….
- Create public partnerships for trail maintenance, river clean-up and rehabilitation….
- Have snow plowed from parking areas used for winter recreation activities….

Monument Canyon Research Natural Area (RNA)

The Monument Canyon Research Natural Area (RNA), Management Area M, was created in 1932 …*to preserve in a natural state a typical area of western yellow pine as found in northern New Mexico*. This area is managed to provide opportunities for research and education, and to represent an undisturbed ponderosa pine forest ecosystem.

Most of the RNA has a SPNM ROS classification. While this ROS classification prohibits motorized vehicle use, illegal motorized use has resulted in many user-created roads and trails. The proliferation of two-track roads and ATV trails in the RNA and throughout the assessment area is being addressed by travel management planning, in accordance with the 2006 Travel Management Rule. The RNA is currently undergoing scientific research studies and treatments to restore natural ecological structures and functions for this ponderosa pine forest ecosystem.

Inventoried Roadless Area (IRA)

There is one inventoried roadless area (IRA) within the assessment area, located at the southern end of Virgin Canyon and Virgin Mesa. The IRA overlaps Forest Plan Management Area N, a Threatened, Endangered and Sensitive Species Habitat management area (see management area map, Figure 3, at beginning of this report). This IRA has a SPNM ROS classification where motorized vehicle use is prohibited. This area has seen proliferation of user-created roads, which should be addressed in the travel management planning process under the 2006 Travel Management Rule.

Management in the IRA must conform to the 2001 Roadless Rule, although this rule has been the subject of conflicting judicial opinions in Wyoming and California District Courts. Due to the uncertain outcome of on-going litigation on the 2001 Roadless Rule, current interim Forest Service direction requires proposed new roads or tree-cutting activities in IRAs to be approved by the Regional Forester or Forest Service Chief, depending on the proposed action.

Other Management Areas

Several Forest Plan management areas within the assessment area focus on recreation, either as a primary or secondary emphasis. Management Area C emphasizes developed recreation facilities as well as dispersed use. Management area E also emphasizes recreation and is generally open to motorized uses.

Management area L is designated for roadless recreation, similar to management of the Inventoried Roadless Area within the assessment area. Management area L, management area N (the IRA), and much of the WSR corridor constitute three distinct portions in the assessment area that are managed for Semi-Primitive Non-Motorized recreation. The SPNM ROS areas are closed to all motorized vehicle travel except for access to parking areas at trailheads, and motorized use authorized by special permits. Mountain biking is permitted in these SPNM areas. Human interaction is limited in these SPNM areas, and should be no more than 6-15 human encounters per day on the trails.

Management Areas P, R, S and I emphasize management of cultural resources, and dominate much of the assessment area. Recreation direction in these management areas focuses on enhancing recreational enjoyment of important historic sites, and allows for cultural resource interpretive sites to be developed where they simultaneously protect cultural resources.

Roads and Trails

Roads

There is a well-established road system throughout the assessment area. Figure 63 shows the National Forest system roads and trails in the current roads database (April 2009). There are sufficient roads to accommodate public recreation access needs along with forest and rangeland management activities in the area. There does not appear to be a need for additional permanent roads in the area for the foreseeable future.

Road density is excessive in parts of the area where system roads alone average 3 to 6 miles per square mile. User-created roads add to that density. The Forest Plan calls for roads to average a maximum of 2 to 3 miles per square mile, depending on the specific management area. There are over 400 miles of low-maintenance, high-clearance vehicle (maintenance level 2) roads on the National Forest lands in the assessment area that are in excess of the minimum road needs identified in the Travel Management proposed action. Thus, these roads are identified in travel management planning database for closing or decommissioning, although there is a need for additional field verification prior to actually closing or decommissioning them. Many are user-created roads in very poor condition, crossing drainages without adequate stream protection, and causing adverse stream and riparian impacts. During the travel management planning process in 2009, Jemez Ranger District employees and the public identified several road-related concerns in the assessment area, including: safety hazards, conflicts with other uses, and environmental damage (wildlife, water, soil, etc).

Under the Travel Management (TM) Rule and proposed action, public motorized vehicle travel off designated routes will no longer be allowed. However, there may be a few fixed distance corridors along road-sides designated for motorized dispersed camping or big game retrieval. In management areas F, I, L, M, N, and X that occur in assessment area, no open motorized travel routes will occur and public motorized use will be limited to big game retrieval during the hunting season. Additionally, some management area boundaries will be adjusted to correct errors on original Forest Plan maps. The JNRA Management Plan (amended to the Forest Plan) called for closing 14 miles of open roads (allowing administrative or permittee use only on those roads), along with decommissioning approximately 84 miles of roads. However, those actions have not yet been implemented.

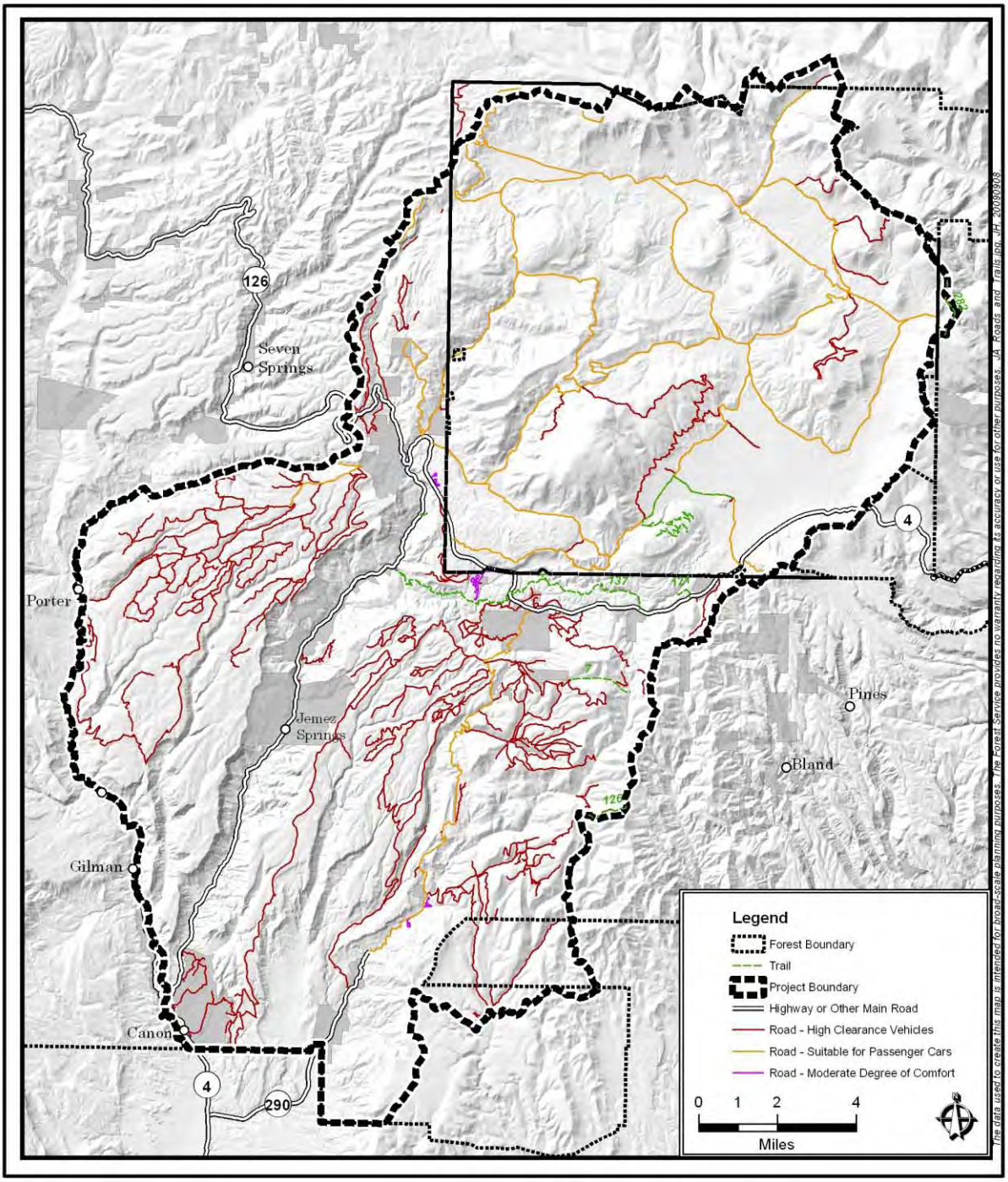

Figure 63. Designated roads and trails, April 2009

Trails

There are approximately 13 miles of designated trails on Forest land in the assessment area. Most are associated with developed recreation facilities and points of interest in the JNRA. Developed trailheads include Battleship, East Fork, Las Conchas and Jemez Falls, which access the East Fork trail 137. The Peralta Canyon trail has parking at both ends but is relatively undeveloped. Trail degradation by OHV and ATV use has resulted in a proliferation of user-created trails and roads crossing the historic trail or road system, or overlapping entire sections of historic trails.

Designated trails within the assessment area include:

- Trail 126 Peralta Ridge 1.11 miles long
- Trail 130 Spence Hot Springs 0.33 miles long
- Trail 134 East Fork Box Trail 0.35 miles long
- Trail 135 Spur Trail East 0.28 miles long
- Trail 137 East Fork Trail 9.44 miles long
- Trail 7 Cerro Palado 1.66 miles long

Some of the needs identified for trails include the following:

- Increase coordination with the State to contribute to goals of the State Comprehensive Outdoor Recreation Plan (SCORP).
- Increase trails for all use types, including motorized, non-motorized and winter-use trails.
- Increase trails designated for specific uses, to reduce user conflicts and disperse uses. Separate motorized and non-motorized trails within the Guadalupe corridor.
- When increasing designated trails, consider inclusion of user-created trails, if they can be brought up to Forest Service trail standards within a reasonable amount of cost. Continue to work with volunteer trail and OHV organizations to maintain trail systems.
- Increase parking for winter sports including Nordic skiing in the East Fork, and parking for snowmobiling and Nordic skiing around the junction of FR 126 and FR 376.
- Increase parking at trailheads, particularly at Las Conchas trailhead, along the Rio Cebolla, and along San Antonio creek.
- Reduce stream bank degradation along Rio Guadalupe, Rio Cebolla, and EF WSR by providing for water crossings where appropriate.
- Stop the proliferation of user created motorized trails in SPM and SPNM ROS settings, and close or obliterate non-system trails causing unacceptable resource damage.
- Increase maintenance of closure fences and signs, particularly in the Guadalupe corridor.

Specific trail management needs in subunits of the JNRA are as follows:

- *In Lake Fork Subunit*: Designate motorized/non-motorized use areas; provide trailhead parking along San Antonio Creek; provide parking and pedestrian trails along Rio Cebolla for fishing access; convert some two-track roads to non-motorized trails along San Antonio Creek; and continue to work with the State Highway Department to add more parking along Highway 126 near FR 376 junctions for winter sports.
- *In Guadalupe Subunit*: Designate motorized/non-motorized use areas; separate motorized and non-motorized use trails; designate dispersed recreation sites and small parking areas

along FR 376 to access the river; provide pedestrian trails from dispersed sites and parking areas to the river.

- *In Lower Jemez Subunit*: Allow only pedestrian-use trails; design new trails to be consistent with existing trails; limit new trails to hardened, designated access to and along the river.
- *In East Fork Subunit*: permit only non-motorized use on Trail 137; add some non-system trails to the system; link Trail 137 to other non-system trails; add more trailhead parking; and continue working with New Mexico Ski Club to identify more cross-country skiing trails.

Scenic Quality

The Visual Management System (VMS) used by the Forest Service describes scenic characteristics and sensitivity levels, along with visual quality objectives, for all National Forest lands. The VMS is used to plan, manage and monitor activities on the National Forest. Visual quality objectives incorporate the variability of scenic quality, visual sensitivity, and the ability of various forest landscapes to undergo alteration. The VMS considers effects of both human and natural processes on the esthetics of the landscape. (US Forest Service 1974).

The primary visual resource management needs are to ensure that the VQOs assigned to each landscape are met, when planning and implementing activities in the area. The most important need-for-change related to scenic quality in the assessment area is to close or obliterate unnecessary roads and trails, especially those in SPNM areas and Retention VQO areas.

In the JNRA, the scenery is to be managed toward a Retention VQO. The current landscape character in the JNRA ranges from Naturally Evolving and Naturally Appearing Forest to Heavily Altered. Thus, there are landscapes where human activities have occurred but do not dominate the landscape, landscapes where natural processes dominate the esthetics, and areas more heavily altered by human activities. In the Guadalupe corridor, the natural beauty and scenic integrity of the area remain virtually intact. However, over-use of dispersed camping sites, vandalism (graffiti) and user created trails detract from the scenic integrity in the immediate foreground zone. And uncontrolled roads and trails have impacted the riparian area, making it appear heavily altered. Visual features include dramatic, steep, rocky and narrow canyons, and broad lush meadows. Some of the middle- and fore-ground areas around Gilman and Butterfly Springs have less scenic diversity or distinction.

The lower Jemez River corridor has a slightly altered appearance due to human activities and developments. However, the visual and spatial diversity in this river corridor is high, so human modification remains subordinate to the overall character of the area. Thus, the scenic quality in this entire sub-unit is classified as distinctive. In the East Fork corridor, the vegetation and landforms are highly scenic, even though the highway detracts from the natural forest setting. Some areas along the East Fork are classified as distinctive, although the majority of this subunit is classified as common. The Lake Fork subunit is the least modified by human activity. The foreground in this landscape is distinctive along FR 376, in Lake Fork Canyon, and along some sections along Highway 126. There are a few scattered sections of this subunit along Jighway 126 and FR 376 classified as common or minimal (less scenic diversity or distinctive features). The VQOs along FR 10 vary from Retention (R) in the Paliza Campground Area, to Partial Retention and Modification in the Cerro del Pino area.

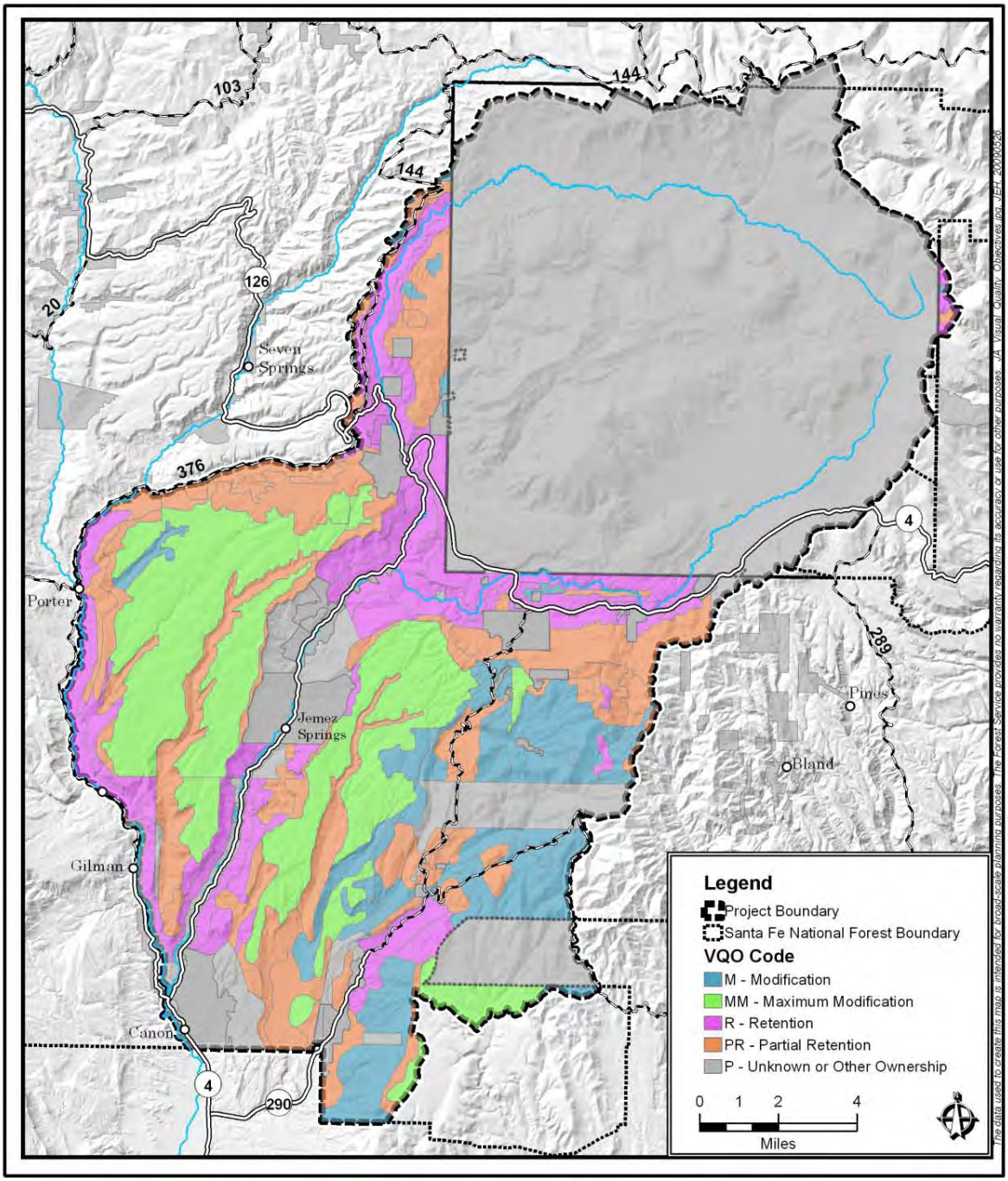

Figure 64. Visual quality objectives

Rangelands and Livestock Grazing

Introduction and Methodology

This section briefly describes and compares the existing and referenced conditions of rangeland resources in the assessment area, including livestock grazing management in the area. Information was obtained from the current (April 2009) Geographical Information System (GIS) database, along with the Range Infrastructures Database (INFRA) and others. Additional information was obtained from the most recent Environmental Assessment (EA) or Environmental Impact Statement (EIS) for the grazing allotment within this assessment area.

Grazing Management

There are seven livestock grazing allotments in the assessment area (over 200 acres in size), as shown in Figure 65. The following table shows those allotments, their total acreage in the area, capacity acres, number of permitted livestock, season of use, and grazing system.

Table 46. Grazing management on each major range allotment in the area

Allotment Name	Nat. For. Acres in Area	Full & Potential Capacity Acres	Permitted Livestock	Permitted Season	Grazing System
San Diego	54,758		264	Yearlong	Short-duration in riparian pastures; Deferred rotation in summer pastures; and Continuous grazing in winter pastures
V-Double Slash	22,488		181	Yearlong	2 pastures Continuous System
Vallecitos	15,917	22,395	107	5/1 – 11/7	5 pastures Deferred Rotation System
Cebolla San Antonio	7,161	9,915	347	6/1 – 10/31	
Ponderosa	2,561	1,265	28	11/1 – 4/30	1 pasture Continuous System
Las Conchas	1,365		27	6/1 – 9/30	
Peralta	1,236	2,835	53	6/1 – 10/31	2 pasture –Deferred Rotation

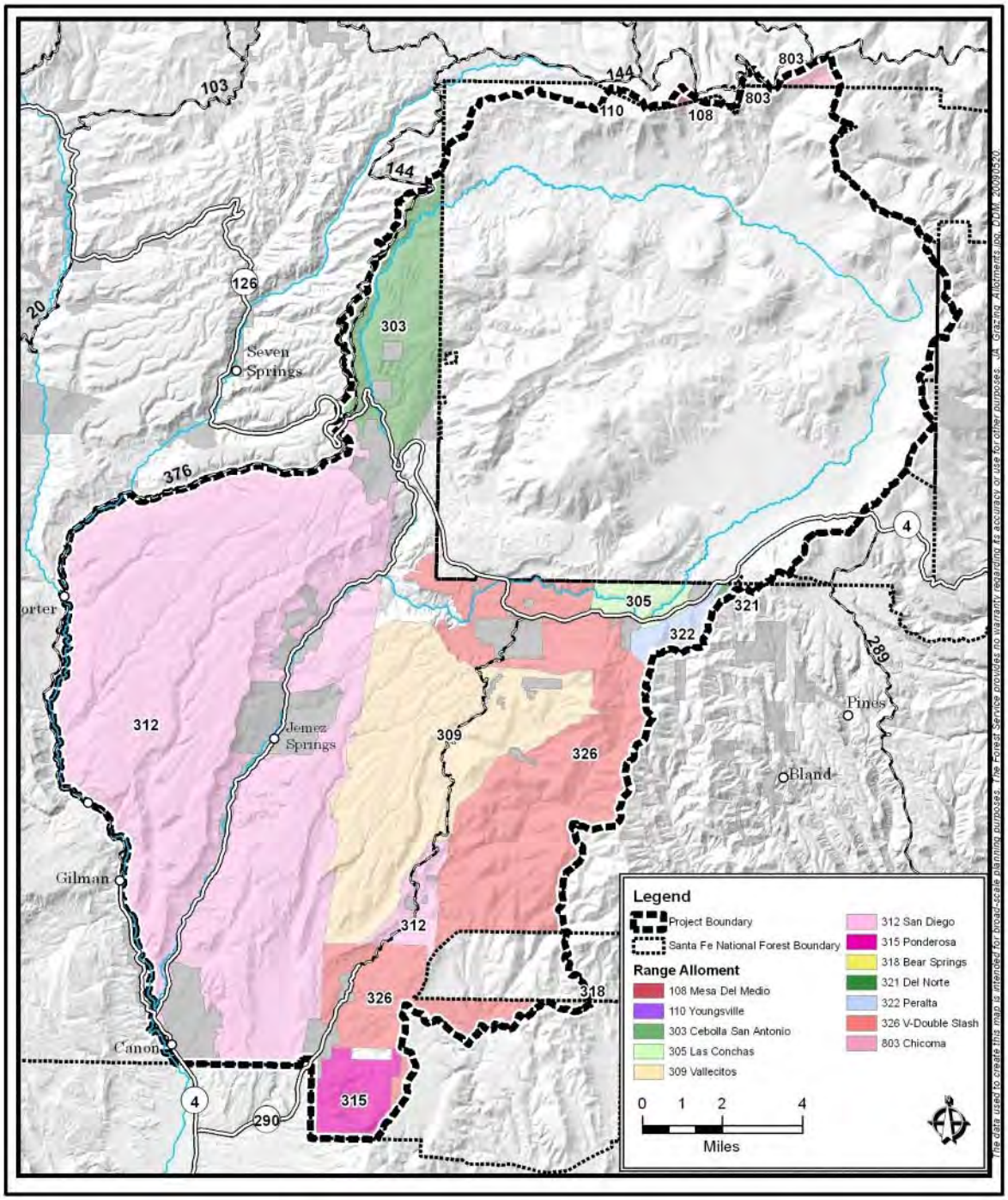

Figure 65. Livestock grazing range allotments

The Forest Plan defines allowable forage utilization standards for varying range conditions and grazing systems. In general, the utilization guidelines prescribe light to moderate grazing intensity (30 to 40 percent for affected allotments). Moderate grazing utilization typically allows the palatable forage species to maintain themselves, though not to their maximum producing ability. Light grazing utilization typically allows palatable forage species to maximize their herbage producing ability. Research convincingly shows that 40 to 50 percent use is moderate on most rangelands and 30 to 35 percent use is needed for improvement in rangeland vegetation (Holechek et al. 1999). Allowable utilization guidelines continue to be applied in the assessment area to allocate forage to grazing ungulates (livestock and elk primarily) while setting stocking rates during the site-specific NEPA analysis for allotment management plans. Proper stocking rate continues to be a key factor in maintaining favorable ecological conditions of rangelands.

Current livestock grazing is managed to avoid grazing in high recreation use areas between Memorial Day and Labor Day, and to severely limit grazing duration in riparian areas (e.g., Guadalupe, Cebolla, Lake Fork, and East Fork Jemez corridors). Over the past 20 years, grazing management strategies including installation of new riparian fences and water tanks have resulted in improved ecological conditions within areas that were previously degraded by livestock.

Some of the reference conditions (standards and guidelines) and continuing management needs identified for the rangeland resources include the following:

- Full capacity rangeland should be within the range of natural capability, exhibit the biodiversity necessary for a sustainable ecosystem, and be in fully functioning range condition.
- Maintain or move herbaceous species composition and surface components, such as litter and basal vegetative percentages toward site potential.
- Forage species composition should exhibit a suite of species that are appropriate for the site based on the potential natural capacity description.
- Move toward satisfactory range conditions with a mid to high similarity to potential natural capacity.
- Improve livestock distribution and follow rotation schedules to minimize overuse in certain areas. Do not exceed 40 percent utilization of forage species.
- Control or eliminate non-native and invasive plant populations within the allotment. This topic is addressed in detail in the Vegetation section of this report. The recently completed Final EIS for Invasive Plant Control on the Santa Fe and Carson National Forests describe proposed actions to reduce or eliminate invasive, non-native plant species, and the associated environmental consequences. (A revised EIS and Record of Decision are expected to be finalized by December 2010).

Minerals and Mining

Introduction and Methodologies

This section evaluates and compares the existing and reference conditions of the mineral resources within the assessment area. The Forest Service mineral resources management program is composed of three parts– locatable minerals, salable minerals, and leasable minerals. All three types of minerals exist within the assessment area. There is also an Abandoned Mine Lands Rehabilitation Program that is being implemented in the assessment area.

The Documented Mine Sites Table (Table 47) lists and the Mining Sites Map (Figure 66) illustrates the location of the documented mine sites. The sites are referenced on the map and in the text by the identification (ID) numbers in the table. The site list and map were compiled from the Mineral Resources Data System (US Geological Survey 2005), the Forest Abandoned Mine layer (Forest Service 1997), and the New Mexico Mineral Industry Location System (EDAC 1994).

Locatable Minerals

The Forest Plan requires managers to …*support environmentally sound energy and minerals development and reclamation,* and to *foster and encourage mineral development*…within the overall context of the principles of ecosystem management.

Table 47 shows all of the documented mine sites of all types, as well as geothermal sites, and their status, within the assessment area.

The locatable minerals available to be mined in the assessment area include copper (with associated gold and silver), uranium, sulfur, perlite, and pumice used in the stonewash laundry industry. Most pumice is classified as a common (saleable) mineral material, although some pumice in this area is currently classified as locatable, primarily due to its market value.

Locatable minerals are those minerals for which mining claims can be located. Currently, there are no active mining operations within the assessment area (June 2009).

- There are two small red-bed copper prospects in the study area (sites 11, 12), but no appreciable copper or the associated gold and silver has been produced since the 1940s. The commodity for site 15 is unknown, but it is presumed to be precious metals as it is a placer claim.
- There are two uranium prospects (sites 13, 14) which were never put into production.
- There is one site (site 10) where small amounts of sulfur were produced from private land.
- There is one site (site 16) where exploration for perlite was done, but no production was recorded.
- There are three stonewash-laundry pumice sites (sites 17, 18, 19). Site 17 has been reclaimed, site 18 is in the process of being reclaimed, and site 19 has been proposed but not authorized.

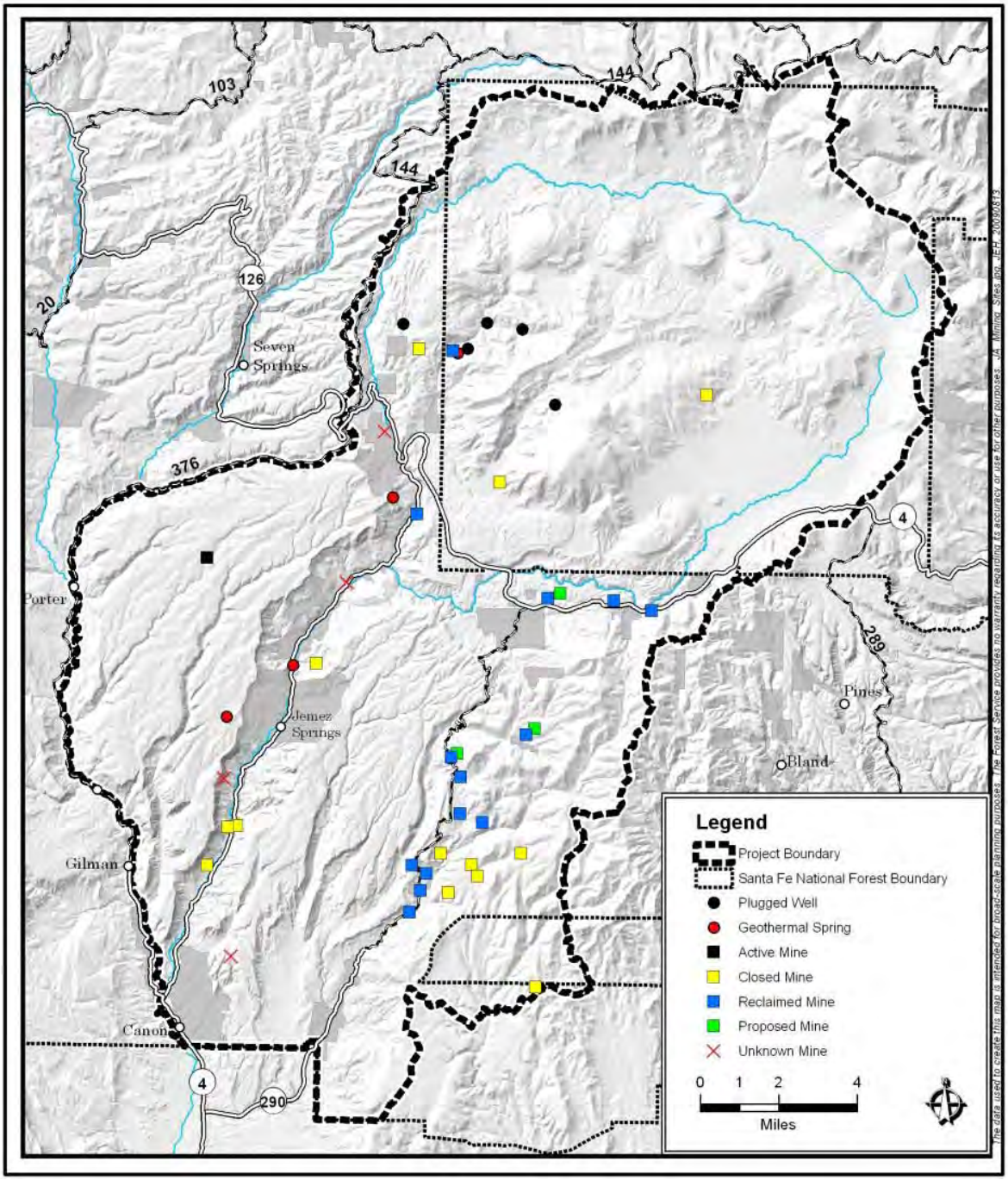

Figure 66. Mines (active, proposed and closed) and geothermal sites

Table 47. Status of locatable and saleable mines and geothermal sites

ID No.	Name	Type	Commodity	Surface Owner	Status
1	Steam Well 1 - Western Pet. # 1 Bond	Geothermal Well	Geothermal	Preserve	Plugged
2	Steam Well 2 - Baca Land & Cattle #2	Geothermal Well	Geothermal	Preserve	Plugged
3	Steam Well 3 - Baca Land & Cattle #1 & #3	Geothermal Well	geothermal	Preserve	Plugged
4	Steam Well 4 - Baca Land & Cattle #4, Union Oil	Geothermal Well	Geothermal	Preserve	Plugged
5	Steam Well 5 - unknown	Geothermal Well	Geothermal	Forest	Plugged
6	Sulfur Springs	Hot Spring	Geothermal	Preserve	Active - no commercial use
7	Jemez Hot Springs	Hot Spring	Geothermal	Private	Active - commercial use
8	Soda Dam Springs	Hot Spring	Geothermal	Private	Active - no commercial use
9	San Antonio (Murray) Spring	Hot Spring	Geothermal	Forest	Active - no commercial use
10	Sulfur Bank Group	Locatable Mine	Sulfur	Private	Unknown
11	Spanish Queen Mine	Locatable Mine	Copper, Silver, Gold	Private	Closed - partial reclaimed
12	Pyramid Pumice Mine, Spanish Queen Mine	Locatable Mine	Gold, Copper	Forest	Abandoned
13	N.E. Soda Dam Prospect	Locatable Mine	Uranium	Forest	Closed - no work done
14	Tex-N Prospect	Locatable Mine	Uranium	Forest	Reclaimed
15	La Plata Placer	Locatable Mine	Unknown	Forest	Reclaimed
16	unknown	Locatable Mine	Perlite	Forest	Closed - unknown
17	Las Conchas	Locatable Mine	Pumice	Forest	Reclaimed
18	El Cajete	Locatable Mine	Pumice	Forest	In reclamation
19	El Cajete No. 2	Locatable Mine	Pumice	Forest	Proposed
20	Gravel Pit 1	Salable Mine	Sand/Gravel	Preserve	Closed - reclaimed
21	Gravel Pit 2	Salable Mine	Sand/Gravel	Forest	Closed - reclaimed

Table 47. Status of locatable and saleable mines and geothermal sites

ID No.	Name	Type	Commodity	Surface Owner	Status
22	Gravel Pit 3	Salable Mine	Sand/Gravel	Private	Unknown
23	Gravel Pit 4	Salable Mine	Sand/Gravel	Preserve	Closed - reclaimed
24	Pit Number 60-42-S	Salable Mine	Sand/Gravel	Forest	Closed - reclaimed
25	Pit Number 64-56-S	Salable Mine	Sand/Gravel	Private	Unknown
26	Walsh Pit	Salable Mine	Sand/Gravel	Forest	Closed
27	Pit Number 74-4-S	Salable Mine	Crushed Rock	Forest	Abandoned - natural reclaim
28	Cebollito Rock Pit	Salable Mine	Crushed Rock	Forest	Active
29	Pumice Mine 1	Salable Mine	Pumice	Forest	Closed - reclaimed
30	Pumice Mine 2	Salable Mine	Pumice	Forest	Closed - reclaimed
31	Pumice Mine 3	Salable Mine	Pumice	Forest	Closed - reclaimed
32	Pumice Mine 4	Salable Mine	Pumice	Private	Abandoned
33	Pumice Mine 5	Salable Mine	Pumice	Forest	Closed - reclaimed
34	Pumice Mine 6	Salable Mine	Pumice	Private	Closed - reclaimed
35	Pumice Mine 7	Salable Mine	Pumice	Forest	Closed - reclaimed
36	Pumice Mine 9	Salable Mine	Pumice	Forest	Closed - reclaimed
37	Pumice Mine 8	Salable Mine	Pumice	Forest	Closed - reclaimed
38	Pumice Mine 10	Salable Mine	Pumice	Forest	Closed - reclaimed
39	Old Utility Block	Salable Mine	Pumice	Forest	Closed - reclaimed
40	South Pit	Salable Mine	Pumice	Forest	In reclamation
41	Utility Block	Salable Mine	Pumice	Forest	In reclamation
42	Cerro del Pino	Salable Mine	Pumice	Forest	in reclamation
43	Boone Duran	Salable Mine	Pumice	Forest	Proposed
44	South Pit Expansion	Salable Mine	Pumice	Forest	Proposed

There are 66 unpatented mining claims within the area (Bureau of Land Management 2009). All of these unpatented claims are located for pumice. The locatability of pumice on four of these claims is being contested by the Forest Service through the Bureau of Land Management and USDI Interior Board of Land Appeals, with a determination expected in 2010. If the pumice on those four claims is determined to be common variety and not subject to location, the validity of the remainder of the unpatented claims may be contested.

Salable Minerals

Salable minerals are common materials that are sold directly to the public by the Forest Service. These include common stone, fill materials, clay, gravel, and pumice. At the current time, there is

one active site, three sites undergoing reclamation, 19 sites which have been closed or abandoned, and two proposed sites.

- Sites 20 through 26 are sand and gravel pits. All of the pits on National Forest lands have been closed and reclaimed, but there are two sites (sites 22 and 25) on private land where the status is unknown.
- Sites 27 and 28 are crushed rock pits on National Forest lands. Site 27 is closed and has naturally reclaimed. Site 28 is an active site, although there are no current contracts.
- Common pumice has been mined extensively in the study area since at least the early 1940s. Sites 29 through 44 are salable pumice mines. Sites 29 through 39 have been closed and reclaimed or abandoned. Sites 40 through 42 are closed and undergoing reclamation. Sites 43 and 44 have been proposed, but have not been authorized.

Leasable Minerals

Leasable minerals are materials for which the Bureau of Land Management must issue a lease. These include oil, natural gas, and geothermal resources.

There are no records of oil or natural gas production or leasing within the assessment area.

Geothermal resources are present, as demonstrated by the test drilling projects in the 1970s and the numerous hot springs in the assessment area. The project area is within a prospective geothermal area (US Forest Service 1977). Drilling inside and adjacent to the southwestern corner of the Valle Caldera demonstrated there was some potential for geothermal steam production for electrical generation, and the Hot Dry Rock project conducted by the Dept. of Energy/Los Alamos National Labs at Fenton Hill (just west of the area) demonstrated the potential for an enhanced geothermal project; however, no commercial electrical generation has occurred.

Direct use of geothermal energy, such as hot spring spas, occurs within the assessment area, and provides a sizeable economic impact to the community of Jemez Springs.

- Five geothermal wells (sites 1 – 5) have been documented, although numerous other wells are referenced in the literature (Summers 1976; Waring et al. 1983). All of the geothermal wells are plugged.
- Four hot springs (sites 6 – 9) have been documented. All of these are still flowing, but only site 7 (on private land) is being utilized commercially.

Abandoned Mines

Forest managers are responsible for identifying and conducting remedial activities to mine sites that have been abandoned without proper reclamation and present hazards to the forest resources or the public. Two sites on National Forest lands (site 12 and 27) and one site (site 32) on private land have been identified within the assessment area. None of these sites present environmental hazards (acid mine drainage or hazardous material) but they present public safety hazards.

State and Federal agencies are continuing to inventory for these hazards, so additional sites may be identified in the future.

Social and Economics

Introduction and Methodologies

This section describes socioeconomic conditions through a series of demographic, social, and economic variables. It also addresses the potential for a sustainable supply of woody products over time. Woody materials are harvested from trees as a by-product of ecosystem restoration efforts, providing social and economic benefits. Having a marketplace for wood products is a crucial component of developing a collaborative restoration strategy in which stakeholders on all sides would benefit. This section assesses the existing marketplace (demand) for small diameter wood products as well as the potential for the development of new markets. This section also addresses the need to monitor social and economic changes to determine the progress toward meeting social-economic objectives that accompany the ecosystem restoration objectives.

The discussion of sustainable supply of wood products includes consideration of probable restoration activities on both the National Forest and Preserve. Woody material removed from both land jurisdictions is expected to provide a long-term (minimum 10-year) flow of products to local markets.

Two different study areas are used in describing the locally affected area. The “local area” is defined as Sandoval County and serves as the base area for statistical analysis in the existing conditions. The entire assessment area is within this County and comprises a large portion of the County. The “production area” adds Rio Arriba, Santa Fe and Los Alamos Counties, which abut the assessment area. These areas are within a reasonable transportation distance for wood product removal and utilization from the assessment area. People from these counties also frequently recreate in and use resources within the assessment area (Sandoval County 2009).

Analytical methods used for this section range from qualitative analysis of social values to quantitative modeling of economic impacts. The best available scientific methods were used, considering the purpose of this assessment. These methods allow one to determine how a restoration strategy may contribute toward the economic and social sustainability objectives outlined in Title IV of the 2009 Omnibus Public Lands Management Act (Collaborative Forest Landscape Restoration). Contributions to this analysis came from a collaborative forest restoration working group that formed in February 2010, consisting of representatives from the wood products industry, interest groups and public land managers. This group helped to collect information regarding the potential wood supply and demand for small diameter products (US Forest Service 2009c)

Forest restoration activities that contribute to the economy primarily involve cutting down and removing trees, transporting logs and biomass to processing facilities, processing logs and wood biomass into saleable products, and distributing products. There are also support activities such as machine maintenance and fuel procurement, indirect activities such as supplying spare parts and fuel, and induced economic activities such as changes in public spending as a result of increased income derived from the economic activities previously mentioned. All of these activities require human labor and capital. IMPLAN provides a computer model that helps describe the production processes and outputs associated with forest restoration treatments.

Economic benefits were estimated by applying regional economic science to the local study area. The volume of jobs and income per unit of measurement of woody products are developed from an economic impact analysis on Sandoval County. Economic modeling was done with IMPLAN version 2.0 and 2007 data. Additionally, another Forest Service analysis tool called Forest Economic Analysis Spreadsheet Tool (FEAST) was used to import data specific to the National Forests and generate outputs by resource area. FEAST was used in conjunction with IMPLAN to estimate economic impacts to the local area (Sandoval County). Economic sectors listed in this section use the 2-digit North American Industry Classification System (NAICS) codes that group industries based on the primary activity with which they are engaged.

Demographics

Located in north-central New Mexico, Sandoval County is economically and culturally diverse. Sandoval County was created in the New Mexico territory in 1852 (as part of Santa Anna County), established as its own entity in 1903. Los Alamos County was separated out of Sandoval County in 1949 (www.sandovalcounty.com). County residents rely heavily on ranching operations for income and as a historical cultural tradition. Natural resource-based recreation is becoming an increasingly popular source of economic stimulus. Visitors are drawn to the unique landscape and climate of northern New Mexico to participate in a variety of outdoor recreation activities. The recreational and agricultural opportunities supported by the assessment area generate significant levels of economic stimulus. Sandoval County currently encompasses 3,716 square miles and includes a total of 6 incorporated communities: Bernalillo, Cuba, Corrales, Jemez Springs, Rio Rancho and San Ysidro (www.sandovalcounty.com).

Sandoval County has experienced substantial population growth in recent years. Between 2000 and 2008, the population grew by 36 percent; this is much faster than New Mexico and the United States which grew by 9 percent and 8 percent respectively (Table 48). Much of this population growth is result from industrial change. Manufacturing enterprises such as Intel have opened production facilities and drawn workers to the area. This has contributed to making Sandoval County the second highest in weekly wages in the state (www.mrcog-nm.gov/content/view/37/94/). The local area is also rich in natural amenities, which make it highly desirable location for many residents. While manufacturing in the larger towns has stimulated population growth in the County, agriculture jobs have declined, slowing the growth of rural communities.

Table 48. Population and growth rate

Area	2000	2008	Percent Change
Sandoval County	89,908	122,298	36
New Mexico	1,819,046	1,984,356	9
United States	281,421,906	304,059,724	8

Source: factfinder.census.gov

Age distribution across Sandoval County is dominantly middle aged. Most individuals lie within the 25 to 54 year old age group, with most in their 30s. This suggests that the majority of residents are of working age and likely dependent on their employment status to support themselves. Areas with an older population typically have a higher percentage of retirees, and are thus less dependent on local employment. There are no significant differences in the age

distribution between the county and state; the largest difference is that Sandoval County has a slightly higher percentage of individuals in the 35- to 44-year-old age (US Census Bureau 2000c).

Ethnic distribution across Sandoval County is predominantly Caucasian, however, a large percentage is American Indian and Latino. Less than 4 percent of the County is reportedly comprised of other ethnicities (African American, Asian, Pacific Islander) (US Census Bureau 2000a). Inherent weaknesses in the Census data include the fact that individuals can report more than one race, and race and ethnicity definitions are complex and confusing to many residents. It is clear, however, that American Indians and Latinos have a strong history in Sandoval County, and many are still actively engaged in employment tied to natural resources and/or livestock grazing. Thus, the Forest and Preserve provide resources needed to sustain many minority residents.

Employment and Income

Minnesota IMPLAN Group (MIG) reports annual economic data for all counties in the United States (IMPLAN 2007). Employment reported includes full-time, part-time, seasonal and self employment. IMPLAN reports jobs rather than full-time equivalents, so a person with multiple jobs will show up more than once in the data. This prohibits a comparison with population data.

Employment in Sandoval County is approximately 36,109 jobs (IMPLAN 2007 data). Table 49 reports total employment by industry sectors. Manufacturing is the largest employing sector, accounting for 45 percent of total jobs. Professional scientific and technical services jobs are the second most abundant. Relative abundance of jobs is largely influenced by high-tech companies like Intel. Agriculture (including ranching) and forestry account for less than one percent of employment. Historically, livestock based agriculture and forestry services were dominant sectors. A total of 82 of these kinds of jobs remain in the County (0.2 percent of total jobs). Yet agriculture and forestry jobs help maintain the traditions and cultures that are important to locals, especially to the American Indian and Latino residents. (US Census Bureau 2000b)

Table 49. Employment by sector in Sandoval County

Sector	Number of Jobs	Percent of Total
Manufacturing (except wood products)	16,329	45.2%
Professional Scientific & Technical Services	6,687	18.5%
Information	3,513	9.7%
Construction	3,128	8.7%
Transportation & Warehousing	2,421	6.7%
Retail trade	1,140	3.2%
Wholesale Trade	1,106	3.1%
Finance & Insurance	947	2.6%
Real Estate & Rental	317	0.9%
Agriculture, Fishing & Hunting	265	0.7%
Mining	87	0.2%
Wood Products Manufacturing	82	0.2%

Sector	Number of Jobs	Percent of Total
Utilities	45	0.1%
Forestry & Logging	42	0.1%
Total	**36,109**	**100%**

Source: IMPLAN 2007

Unemployment rates for the County and New Mexico are shown in Table 50. In the past three years, unemployment in both the County and State have been rising. The larger increase in the County's unemployment rate is likely a result of job cuts in high-tech companies. When forest restoration activities begin, it is likely that the new jobs would be filled by the local labor supply and not by in-migration, based on the high level of unemployed workers in the area (US Bureau of Labor Statistics 2009).

Table 50. Unemployment rate for Sandoval County and New Mexico, 2005 - 2009

Point in Time	Sandoval County	New Mexico
September 2005	5.0%	4.8%
September 2006	3.9%	3.8%
September 2007	4.1%	3.2%
September 2008	5.1%	4.2%
September 2009	9.0%	7.4%

Source: www.bls.gov/lau/, US Bureau of Labor Statistics

The median household income for Sandoval County is approximately $54,705, slightly higher than the median for the State and U.S., at $41,509 and $50,740 respectively (US Census Bureau 2007). Although household income in the County is higher than the State, 11 percent of the County population and 13.7 percent of minors live the below the poverty standard (www.census.gov/cgi-bin/saipe/saipe.cgi; US Census Bureau 2000b). Most of the income comes from manufacturing jobs, which are higher paying relative to other job sectors. Manufacturing accounts for 45 percent of total employment and 60 percent of total income (IMPLAN 2007). Agriculture and forestry currently make up only 0.4 percent of total income, but this proportion could greatly increase with creation of forest restoration-related jobs and income, envisioned for the 10 to 20 years.

Wood Product Supply and Demand

Demand for small diameter wood products was evaluated at a broader scale than Sandoval County alone, and considered the existing and potential infrastructure to support wood product enterprises. This broader production area consists of Sandoval, Rio Arriba, Santa Fe and Los Alamos Counties, which are in relatively close proximity to the assessment area (approximate 50 mile radius). Several proprietor-owned wood products businesses exist in the production area.

Demand for wood products includes both manufacturer demand for raw material and consumer demand for finished products. The price for finished products must at least cover the production costs, including harvest and transportation costs. For New Mexico forest industries, the high cost of transporting wood from stump to mills is often the most limiting factor. If a large quantity of

wood can be sustainably supplied from a centralized area such as the Jemez Mountain range, it can help attract an increase in demand for thinning operators, truck drivers, wood product manufacturers, and distributors. New wood product businesses may emerge in or near the Jemez Mountains based on the projected wood supply from this area over the next several decades.

The assessment of forest conditions in this area indicates that there is an abundance of small diameter trees that should be removed in order to meet ecological restoration objectives. A steady long-term supply of woody material could encourage new wood utilization operations and products in New Mexico.

Thus, managers from the Forest and Preserve assessed the potential supply of woody material from the assessment area, using a combination of stand exam and GIS data. Additional wood products from restoration activities are anticipated to come from surrounding forest land, including the rest of the Jemez, Cuba, Coyote, and Espanola Districts on the west side of the National Forest, along with neighboring portions of the Carson and Cibola National Forest, as well as the adjacent Jemez and Santa Clara Pueblos. Harvestable acreage is typically considered to be on the slopes with less than 40% grade, and these gently sloping forest areas are readily accessible by a well-developed road system. This supply of wood products is further facilitated by the close proximity of the Jemez Mountains to Interstate Highways I-25 and I-40, and the State's largest population centers (Albuquerque, Rio Rancho, Santa Fe, Espanola, and other cities). It is roughly estimated that over 100,000 acres of forestland could be thinned within and adjacent to the assessment area over the next 10 years, if there is a sufficient demand for wood products to help offset the thinning and transportation costs. It is estimated that these thinned acres could yield an average of 8.5 ccf/acre from trees that would mostly range from 5 to 16-inches in diameter.

Treatment costs for contracted thinning, wood removal, and slash preparation services would likely average about $620 per acre, excluding slash burning that would probably be done by the Forest Service. These costs would be offset by the price contractors will pay for the value of the harvested material, which is uncertain at this time and varies widely among different wood processors. Higher value products and greater offsets would be realized if new businesses decide to locate in the area to take advantage of this significantly increased wood supply.

Processing and distributing the material is one part of industry's role, along with the initial harvest and transport of raw material to processing facilities. The New Mexico Forest Workers Safety Certification (FWSC) Training Program indicates that there are over 400 workers in the state that are certified to conduct the harvest activities, with 113 of those within the production area. Existing harvesters/haulers in the local area include Velasquez, Conley, Cordova, Barela, Restoration Solutions, Western Wood Products, Chimayo Conservation Corps, Rocky Mountain Conservation Corps, Jemez Pueblo, Santa Clara Pueblo, HR Vigil, Mt. Taylor Pellets, and many others. This provides an indication of existing capacity to conduct harvest activities (http://www.forestguild.org/workers_comp.html). However, industry may respond to the increase in wood supply in central New Mexico by hiring and training additional employees.

Past experience demonstrates that material from the Jemez Mountains can be efficiently transported to cities within about a 120 mile radius, including Albuquerque, Española, Raton, Grants, Taos, Las Vegas and others. Mt. Taylor Millwork for example is currently getting material from as far away as El Paso and Reserve (with the BCAP program). As biomass markets continue to expand over the next decade, distances could remain viable in the absence of BCAP

funds. A thinning contractor recently hauled low value wood from the Jemez Mountains to Taos and Las Vegas.

While there are no large-capacity lumber mills in the area, there are several smaller plants and a potential to attract additional processing plants in the area. The Jemez Pueblo operates a forest restoration thinning crew and wood processing facility within this landscape (Walotowa Woodlands Initiative) and the Santa Clara Pueblo also has a restoration thinning crew.

Several existing proprietor-owned businesses in and immediately around the area produce a variety of wood products, including specialty building materials (latillas, vigas and beams), specialty carvings for homes, wood chips, wood stove pellets, small furniture, and firewood. Approximately 23 percent of custom homes built in New Mexico include vigas (structurally or ornamentally), with each unit using an average of 255 lineal feet of vigas at a cost of $6.20 per lineal foot (Milakovsky and Irland 2009). Also, firewood is an important use of woody material in the region. It provides a cost savings in the form of reduced heating expenses, and an economic opportunity for entrepreneurs. Over 36 percent of houses in the Jemez Pueblo area are heated from wood (US Census Bureau 2000), and the Santa Fe National Forest sells thousands of personal-use firewood permits annually. Wood utilization businesses that recently communicated with Forest and Preserve managers indicated that wood supply is not keeping pace with the demand for their products; thus, they are seeking additional sources of raw material.

Wood utilization companies in the New Mexico/Arizona region who may be interested in expanding their operations into the SW Jemez Mountains area include existing companies who produce: firewood pellets, wooden pallets (for shipping and transportation industries), posts and poles for residential and commercial use; vigas and latillas for home and commercial buildings; log homes; firewood; and lumber-composite building materials. There is also a potential for creation of wood biomass-fueled energy plants that could supply power to schools, hospitals, or research laboratory facilities in the local area. Other companies that conduct thinning operations may also be interested in the potential contracts that could come from this assessment area. Restoration-related labor employment opportunities could include decommissioning or closing roads, treating invasive weeds, planting willows and other native vegetation along streams, and other ecological restoration work envisioned for this area.

Table 51 displays the wood utilization and products that can reasonably be expected to be produced from this area, based on information from local industry representatives. Products not on this list are not likely to be economically viable due to the cost of establishing new plants in the area, such as for products like particleboard, fiberboard, veneer, plywood, and paper.

Table 51. Wood products currently processed in New Mexico or Arizona

Firewood, commercial use
Firewood, personal use
Biomass for energy: electricity and heat; wood stove pellets
Milled and preserved lumber, bolts, posts, poles, treated lumber, latillas, vigas
Wood containers and pallets, including wood boxes, flats, baskets, casks, crates
Engineered wood members, trusses, composite lumber materials
Prefabricated wood building materials

Mulch and bark for landscaping, animal bedding, erosion control, etc.

Although wood products businesses declined in the past 20 years, this trend could change if there is a steady and centralized wood supply, along with the new technologies for utilizing small diameter trees. Retail demand for lumber in the U.S. is expected to increase in 2010 and 2011 (Western Wood Products Association 2010). The Forest Service's use of stewardship contracting is a tool that could facilitate thinning, wood removal and transportation contracts. When awarding forestry contracts, the Forest Service also has the authority to give consideration to local contractors in economically disadvantaged rural communities, and to award contracts to local non-profit entities.

If a large amount of woody material could be supplied from this assessment area, it is clear that thinning treatment costs could be reduced (offset by product value), while supporting a wide variety of businesses, providing new jobs, and stimulating local rural economies. Non-market benefits could also be realized. Non-market benefits include social values stemming from improved ecosystem health and wildlife habitat, recreational values, scenic values, and reduced wildfire damage to the environment and private property. Improving the health of forests and watersheds in the Jemez Mountains would also contribute to maintaining and enhancing cultural and spiritual values that are tied to the natural environment in this area.