Introduction

Purpose and Scope

The primary purpose of this report is to identify the current ecological conditions and trends in the Southwest Jemez Mountains Assessment Area (assessment area) and compare them with "reference conditions". The difference between existing and reference conditions is sometimes referred to as the ecological departure. Knowledge of ecological departure from a range of reference conditions provides a critical context for managing sustainable ecosystems (Swanson et al 1994). Thus, this assessment report is intended to be used as a tool for developing a landscape restoration strategy.

Reference conditions are generally defined by using the latest scientific approximation of the natural or historical range of variation (prior to European settlement), focusing on key ecological attributes of structure, composition and function. Reference conditions used in this report may also be defined as federal land management standards, based on environmental laws, regulations or policies. Those can include Forest Service directives (Forest Service Manual and Handbook-FSM/FSH), and the goals, standards, and guidelines in the Santa Fe National Forest Land Management Plan (Forest Plan). Therefore, reference conditions, as used in this report, are not synonymous with desired conditions. Desired conditions include social, cultural and economic considerations, and reference conditions do not factor in those variables. The range of reference conditions described in this report is assumed to represent the best understanding of properly functioning ecological conditions. This report does consider social and economic land use activities and the contribution of a healthy ecosystem on socio-economic values.

This assessment report is not a NEPA document. It does not propose treatments or analyze proposed treatment activities. It does not result in any land management decisions. All proposed actions on federal land must undergo an environmental analysis and decision-making process in accordance with NEPA regulations at 40 CFR 1500-1508. This report provides descriptions of ecological conditions and trends that form a basis for identifying ecosystem restoration needs in the area. It will be used to inform development of a 10-year landscape restoration treatment strategy and associated site-specific project proposals, which will be developed in collaboration with all interested stakeholders. Restoration treatments are actions aimed at improving the resilience or adaptive capacity of ecosystems that have been degraded by human intervention (Allen et al 2002).

Scientific Data and Methods

Depending on the resource being evaluated, multiple geographic scales were used in evaluating ecosystem conditions and trends, so that important ecological processes were not missed or misrepresented. For example, the team evaluated conditions for forest vegetation cover types, biophysical settings, 6th hydrologic unit code watersheds, specific wildlife and plant species habitats, soil types, grazing allotments, urban interface areas, and other geographic scales.

The scope of this assessment focuses on Santa Fe National Forest (National Forest) land within the boundaries of the 210,000-acre multi-jurisdictional landscape. Relevant conditions on adjoining lands are also considered, where appropriate. The 210,000-acre assessment area includes the entire Valles Caldera National Preserve (Preserve), along with small portions of private and tribal land. A separate interdisciplinary (ID) team simultaneously assessed existing ecological conditions on the Preserve.

The Preserve's existing conditions report(s) will be used in conjunction with this assessment report to provide a continuous coverage of existing condition descriptions for the entire 210,000-acre landscape. The National Forest and Preserve reports will be evaluated together during the preparation of a landscape-scale "all lands" restoration strategy. Where data was consistent and available for the entire 210,000-acre area, it is displayed in this report. This assessment is based on information available in National Forest and Preserve databases from February 2009 through February 2010.

To prepare this report, the Forest Service compiled and reviewed the best available science related to the ecosystems in this area, and used the best available inventories and databases to describe current resource conditions. The Literature Cited section includes the scientific literature used, and each resource section of this report describes the scientific methodologies and data sources used. Data accuracy was variable, and attempts were made to verify and update the information where practical. Data was primarily derived from the National Forest's Geographical Information Systems (GIS), Natural Resource Information System (NRIS), Forest Service Vegetation Database (FSVEG), Forest Inventory, and Analysis Database (FACTS), Infrastructure Databases (INFRA-Roads) and other standard Forest Service databases. The LANDFIRE and FlamMap vegetation and fire analysis tools were also used, which are national standards (Stratton 2009). More information on those data sources and fire behavior computer modeling tools used are contained in each resource section.

Additional information about existing conditions was obtained from past environmental analysis documents completed in accordance with National Environmental Policy Act (NEPA regulations). The team reviewed past environmental analysis documents from over 30 vegetation and fuels management projects and aquatic habitat/stream and riparian restoration projects proposed in this area over the past 20 years, which cumulatively cover over 85,000 acres (78percent) of National Forest lands within this assessment area.

The team also used information from other broad-scale assessment reports that describe existing conditions and trends in this area. These include assessment reports for the Jemez National Recreation Area (1998), East Fork Jemez Wild and Scenic River (1999), and the Upper and Middle Jemez River Watershed (2005). Those assessments cover virtually the same landscape area that is addressed by this report, although this report provides important updates based on the latest data and science.

The team also used stream condition inventories and assessments completed for the major drainages in this area, such as for East Fork Jemez River (2002), Rio Cebolla (2003), Rio Guadalupe (2004 and 2006), and San Antonio Creek (2005). These are available in the fisheries reports link on the National Forest's website at http://www.fs.fed.us/r3/sfe.

The SW Jemez Mountains restoration website at:
http://www.fs.fed.us/r3/sfe/jemez_mtn_rest/index.html contains over 40 maps, 13 draft specialist reports, and 28 key assessment report documents used to develop this assessment.

Collaboration

Public involvement and collaboration in developing this assessment has been an on-going process, beginning in the summer of 2009. A small group of collaborators consisting of the Forest Service, Forest and Watershed Restoration Institute, The Nature Conservancy, and Valles Caldera

Trust formed a collaborative restoration group in 2008 and met nearly every month through 2009. About July 2009, this group began outreaching to all potentially interested stakeholders to expand collaboration on restoration planning in the Jemez Mountains. We used various mailing lists and email networks to reach out to interested parties. The purpose of the outreach was to determine who wanted to collaborate in defining the ecological restoration conditions and needs, and be involved in identifying and prioritizing restoration treatments across this landscape, or to be involved in subsequent project-level planning, implementation, and monitoring activities. The assessment of ecological conditions and restoration needs was identified as the initial collaborative planning step.

The process was open to anyone interested, and information was freely exchanged through a variety of phone calls, emails, meetings, field trips, workshops, and on a shared website. Below is a summary of the broader collaborative effort that got underway in the summer of 2009 and continued intensively through March 2010 to assess ecological conditions and restoration needs, and develop the restoration treatment strategy and proposal for funding under Title IV of the 2009 Omnibus Public Lands Management Act. Details are contained in files at the National Forest headquarters office and available on the SWJM restoration website.

- The Forest Service, Forest and Watershed Restoration Institute, The Nature Conservancy, and Valles Caldera Trust developed a Collaboration Plan for the SW Jemez Mountains restoration planning efforts, and began to expand their collaborative forest restoration planning process to other stakeholders. The restoration strategy is a long-term collaborative effort that includes developing an assessment of ecological conditions and restoration needs as the initial planning step (US Forest Service 2009c).
- Held meetings (and then continued communications) with: NM Forest Industries Association, WildEarth Guardians, NM Department of Game and Fish, Los Alamos National Laboratory, Bandelier National Monument (NPS), Cuba Regional Economic Development Organization (CREDO), Jemez Pueblo, Santa Clara Pueblo, Los Alamos and Sandoval Counties, Firewise Homeowner Associations, and land management agencies.
- Distributed a Southwest Jemez Mountains Restoration Status Report and Map to a comprehensive mailing list of approximately 200 potentially interested parties (100 agencies/organizations and 100 individuals). The Oct/Nov Status Report described the assessment area, planning processes, timeline, and opportunities for collaboration.
- Conducted a collaborative field trip with local scientific professionals in forest restoration, fire management, wildlife and fish habitat management, water resources management, wood products utilization, and other related fields, to discuss existing and reference conditions.
- Called and talked with over 12 non-profit organizations involved in Jemez Mountains management activities, such as NM Trout & Trout Unlimited, Rocky Mountain Elk Foundation, HawksAloft, Native Plant Society, Center for Biological Diversity, OHV groups, etc.
- Developed and continuously managed a website for collaboration on the Southwest Jemez Mountains Restoration Planning, including collaboration on developing this assessment. The website included an email correspondence link, participation interest form, comment form, maps, reference documents, draft documents, and links to SW Jemez Restoration partner's websites.

- Continued to coordinate and network with over 30 key stakeholder groups and agencies, through email and phone discussions, as well as several small group meetings, such as with State Forestry, State Game & Fish, industry groups, and others.
- Collaborated with 5 leading research scientists who have a long-term partnership with land managers in the area, have conducted research in the area and published literature on forest ecology in the Jemez Mountains (Dec. 2009 to Feb. 2010).
- Held a 3-day workshop (Feb. 9-11, 2010) to collaboratively develop the SW Jemez Mountains restoration strategy, formed working groups to focus on specific elements of the strategy and proposal, and made plans for continued collaboration on the restoration work. Over 60 participants, representing over 30 different groups, agencies, and tribes participated in the workshop.
- Continued to collaborate on the restoration strategy and funding proposal with representatives from over 30 different agencies, groups, tribes, through a variety of meetings, conference calls, netmeetings, and email correspondence (Feb. to Mar. 2010).

Area Location and Setting

The 210,000-acre Southwest Jemez Mountains landscape assessment area is located in the Jemez Mountains in the central region of New Mexico, as shown on the vicinity map (cover page). The assessment area boundary is primarily defined by the upper and middle Jemez River watersheds (5^{th}-code hydrologic units). The assessment area was expanded just outside the southwest boundary of the middle Jemez River watershed to include the Virgin, Holiday and Schoolhouse mesa area. It was further expanded outside the southeast boundary of the watershed to include the Paliza canyon area. This assessment area boundary was developed as a result of a comprehensive forest-wide screening process to identify priority landscapes for ecological restoration, considering all the 6^{th}-level watersheds on the National Forest (supporting documents on file).

The cities of Los Alamos and Espanola are located about 20 to 30 highway miles to the northeast of the assessment area, with Santa Fe located due east of the area, and Albuquerque and Rio Rancho about 40 to 50 miles southeast of area. Access to and through the area is primarily along New Mexico State Route 4, a 2-lane paved highway that connects this area to other major highways in north-central New Mexico. Highway 4 is the main artery of the Jemez Mountain Trail National Scenic Byway, which includes short excursions on state roads 502, 126 and 290.

Land management and ownership jurisdictions are shown in Figure 1 (page vi). The northern half of the area primarily consists of national forest system lands on the Preserve that are managed by the Valles Caldera Trust (Trust). The southern half consists of national forest system lands on the National Forest that are managed by the Forest Service. The National Forest land in this area is almost entirely on the Jemez Ranger District (99 percent). Private lands are intermingled in the area and include the communities of Canon, Jemez Springs, Ponderosa, La Cueva, Thompson Ridge, and Sierra de los Pinos. The Bandelier National Monument, managed by the National Park Service, and Pueblo of Santa Clara, are adjacent to the area on the east side of the Preserve, along with the city of Los Alamos and Los Alamos National Laboratory (a $6 billion dollar nuclear research complex). The Pueblo of Jemez lands comprise about 2 percent of the assessment area, near Paliza Canyon. Additional Pueblo land extends south of the area. Table 1 (below) and Figure 1 (page vi) show the land jurisdictions and their percent coverage within the assessment area.

Table 1. Land jurisdictions and percentages

Land Jurisdiction	Acres	Percent
Forest Service	110,427	52
Valles Caldera Trust	86,200	41
Private	9,820	5
Pueblo of Jemez	3,845	2
State of New Mexico	281	< 0.2

Vegetation in the area is diverse, with upwards of 100 plant associations (Muldavin and Tonne 2003). Over 90 percent of the area is forested and the rest is grasslands and shrublands. The forested areas are comprised of approximately 50 percent ponderosa pine and dry mixed conifer forest, 26 percent woodlands (piñon, juniper and Gambel oak), and 24 percent wet mixed conifer species (white fir, spruces, limber pine and aspen). The area supports a wide variety of wildlife habitats and species, including the threatened Mexican spotted owl and a number of sensitive species. The area includes over 180 miles of perennial (year-round) streams, which support cold water fish species.

The area contains highly variable terrain, including flat-topped mesas, red rock canyons, narrow river gorges and waterfalls, the wide grasslands of the Valles Caldera, geothermal hot springs, and large granite outcrops like Battleship Rock. Elevations range from just over 11,000 feet on Redondo Peak (on the Preserve) to approximately 5,500 feet on the lower Jemez River, where it exits on the National Forest boundary near Cañon. About 20 percent of the area has steep slopes, averaging over 40 percent grade. Precipitation averages about 20 inches a year, mostly from heavy summer rains and winter snowstorms. Figure 2 shows the topography and slope, including slopes over 40 percent grade where log skidding equipment is limited by Forest Plan standards.

Recreational use of the area is high, particularly along the Jemez River's Highway 4 corridor. Dominant activities are hiking, mountain biking, camping, rock climbing, hunting, fishing, cross-country skiing, and picnicking. Special area designations include the congressionally designated Preserve, Jemez National Recreation Area, and East Fork Jemez Wild and Scenic River, along with the administratively designated Monument Canyon Research Natural Area and an unnamed Inventoried Roadless Area. In addition, this area is archaeologically one of the richest in the U.S., with exceptionally high numbers of pre-historic and historic remains and National Historic Register sites.

Commercial land use activities occur in thearea under special use authorizations, such as mining for pumice, film-making, harvesting firewood and other small wood products, and providing outdoor recreation "outfitter and guide" services. The Preserve portion in particular has experienced intensive livestock grazing and timber cutting activity 15 to 30 years ago while it was a private ranch, and has historically been used by Native Americans and others for a variety of land use activities (Anscheutz and Merlan 2007).

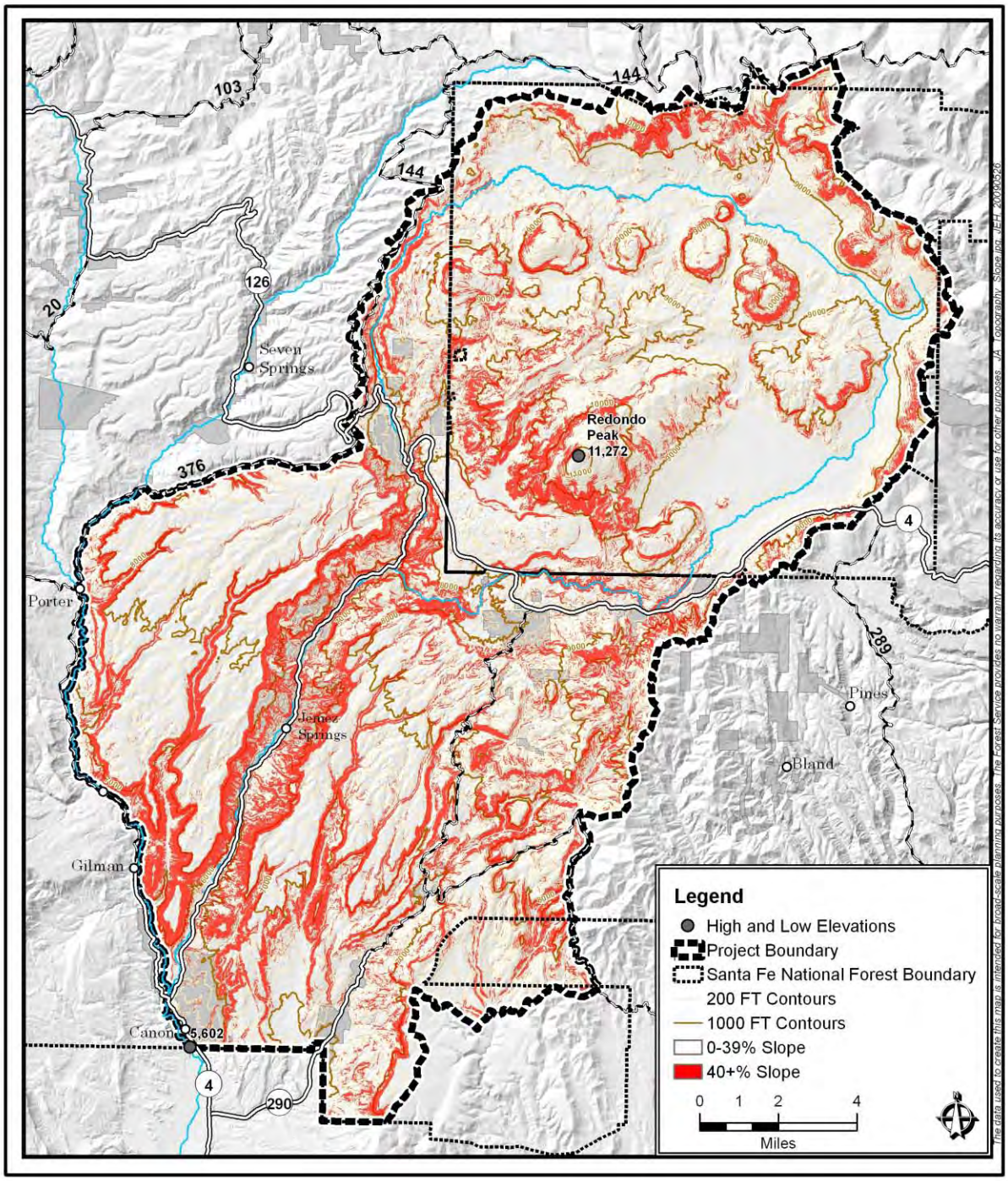

Figure 2. Topography and slope, including slopes over 40 percent

Management Direction

Santa Fe National Forest

Nearly half the assessment area is within the Jemez Ranger District of the National Forest. The Forest Plan provides broad, programmatic management direction for how to manage these national forest lands (US Forest Service 1987a). Management direction in the Forest Plan is in the form of forest-wide goals, standards and guidelines, as well as management area-specific objectives, standards and guidelines. The National Forest land in the assessment area covers portions of 11 different Forest Plan management areas (Figure 3, page 22). Management direction on approximately 60 percent of those National Forest acres emphasizes primarily cultural resources protection and management (areas I, P, R, S), with 36 percent emphasizing primarily recreation resources (areas C, E, F/X, L, X). The remaining 4 percent emphasizes wildlife (area N) and research (area M). Figure 3 displays where these management areas lie within the assessment area. Management area I is not shown on that map due to the sensitivity of the cultural resources and potential for disrupting sites in that area (36 CFR 296.18).

Table 2 summarizes the management emphasis (objectives) for each management area located within the assessment area. It also identifies the percent of the assessment area covered by each management area. Two smaller management areas, F (East Fork Jemez Wild and Scenic River) and M (Monument Canyon Research Natural Area) are within an overlapping management area X (Jemez National Recreation Area). Where management areas overlap, authorized activities must be compatible with both sets of management area direction. If there is any conflicting management direction, the most environmentally conservative direction applies.

Table 2. Forest Plan management areas and their emphasis

Management Area and Percent of Assessment Area	Management Emphasis
X = 26% Jemez National Recreation Area	Conserve, protect and restore the recreational, ecological, cultural, religious, and wildlife resource values for which the JNRA was designated. Timber harvesting and livestock grazing may occur where compatible with the values for which the JNRA was designated.
R = 26% Cultural Resources/ Wildlife-Timber	Cultural resource location, inventory, nomination, and protection are emphasized. The emphasis is also on wildlife habitat improvement and essential habitat protection and enhancement. Grazing and timber harvest activities occur where compatible with the primary emphasis of this area.
P = 14% Cultural Resources/ Timber-Wildlife	Cultural resource location, inventory, nomination, and protection are emphasized here. Provides primary wildlife habitat. Emphasis is also on enhancement of wildlife habitat diversity and timber production where consistent with other resource integration and the primary emphasis.
I = 14% Cultural Resources2	Emphasis is on providing active management of cultural resources including protection, stabilization, interpretation, evaluation, and opportunities for research. Use restrictions will be imposed as necessary to protect the cultural values. No timber harvest is allowed unless necessary to protect or enhance the cultural resources.

Table 2. Forest Plan management areas and their emphasis

Management Area and Percent of Assessment Area	Management Emphasis
S = 7% Cultural Resources/ Wildlife-Range	Cultural resource site location, inventory, nomination, and protection are emphasized in these lower elevation areas. Emphasis in this area is also on key wildlife habitat protection, habitat improvement, and forage and firewood production. Recreational opportunities are dispersed and consist primarily of firewood and Christmas tree gathering.
E = 5% Dispersed Recreation-Visual/ Timber	Providing a broad range of dispersed recreation opportunities or minor developed sites. Providing scenic backdrops; maintaining visual quality. Providing timber and firewood production and enhancement of wildlife habitat diversity. Grazing activities vary in intensity.
F (F/X) = 3 % Wild and Scenic River1	Preserve and protect the outstandingly remarkable values for which the river was congressionally designated, for the benefit and enjoyment of present and future generations. The outstandingly remarkable values for this wild and scenic river are: scenery, recreation, geology, ecology, fisheries and wildlife. The Jemez National Recreation Area (X) overlaps this Wild and Scenic River management area F.
N = 2% Threatened-Endangered Species Habitat	Protect and enhance essential wildlife habitat, especially for threatened and endangered species. Not included in the suitable timber base although certain timber management activities as well as grazing, firewood, and fire management may occur when consistent with the protection emphasis of this area. Predominantly remaining in a natural condition.
C = 2% Recreation-Visual/ Wildlife-Timber	Enhancement of visual quality and developed recreation opportunities while protecting essential wildlife habitat and riparian zones. Grazing and timber activities occur where they are consistent with the emphasis of this area.
M (M/X) = 0.3% Research Natural Areas1	Research Natural Areas (RNAs) will be managed to provide opportunities for non-disruptive research and education. Management includes allowing natural processes to occur and the protection of natural features. Use restrictions will be imposed as necessary to keep areas in their natural or unmodified condition. No harvest of timber or firewood, nor any livestock grazing. Monument Canyon RNA is a 640-acre section of ponderosa pine forest. The Jemez National Recreation Area (X) overlaps this RNA management area M.
L = 0.4% Semi-Primitive Non-Motorized Recreation	Providing outstanding opportunities for semi-primitive non-motorized recreation. Primarily unroaded. Timber harvest and road building are not consistent, but wildlife, range, and fuels management may occur where consistent with emphasis. Will receive priority in dispersed pre-recreation management, trail, and trailhead development, and trail maintenance.

Sources: Santa Fe National Forest Plan (US Forest Service 1987a) and Santa Fe National Forest Geodatabase (May 2009)

1 F/X is where the East Fork Jemez Wild and Scenic River corridor (F) lies within the Jemez National Recreation Area (X). M/X is where the Monument Canyon Research Natural Area (M) lies within the Jemez National Recreation Area (X). There is also a small parcel is where the cultural resource protection area (I) lies within a threatened and endangered species protection area (N).

2 Management area I locations may not be disclosed on public maps due to the sensitivity of these resources and potential for disrupting sites, in accordance with regulations at 36 CFR 296.18.

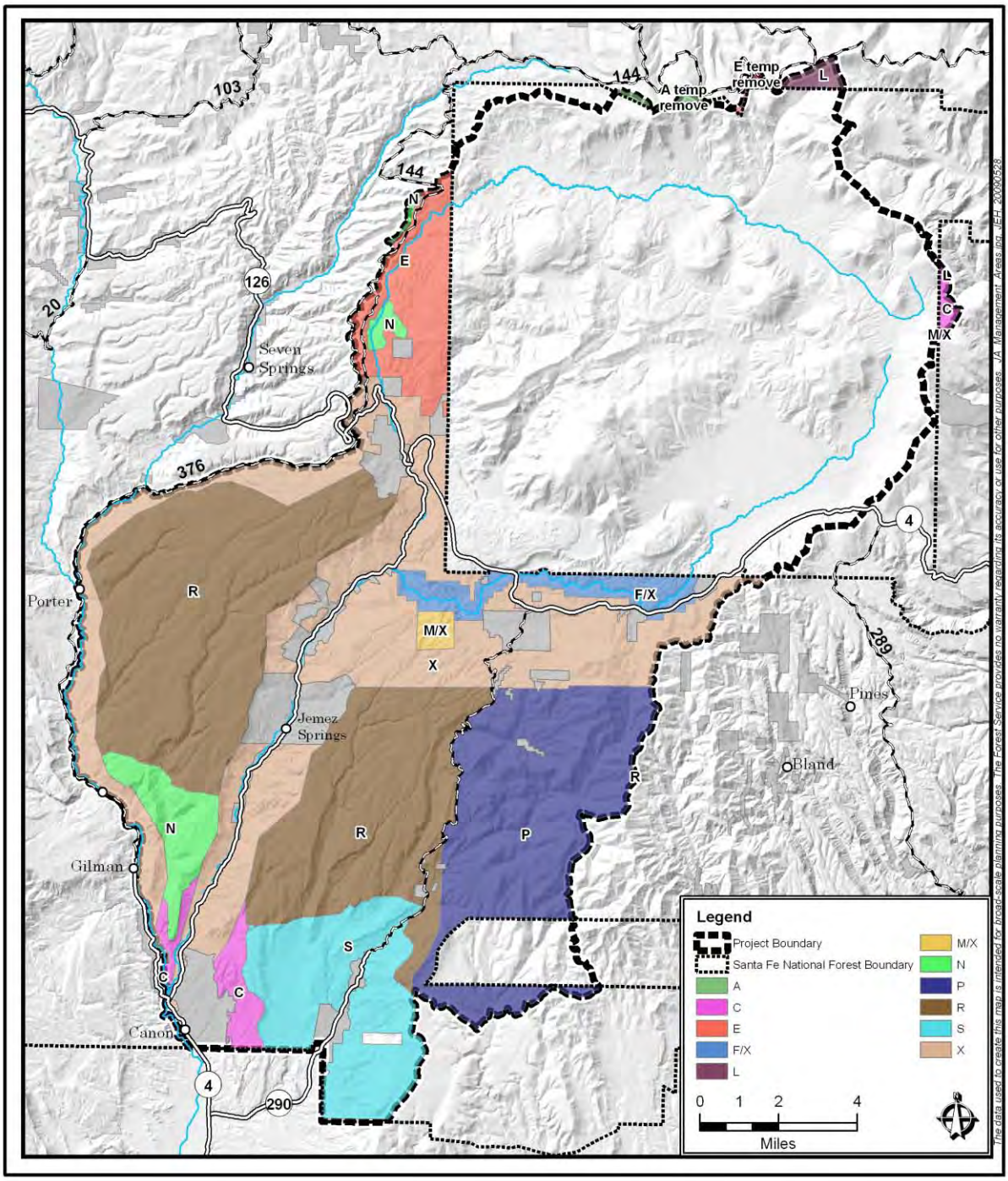

Figure 3. Forest Plan management areas

Valles Caldera Trust and Preserve

The Valles Caldera Trust was created by the Valles Caldera Preservation Act of 2000 (Public Law 106-248) to preserve and protect the 89,000-acre area formerly known as the Baca Ranch. The Act states that the purposes of the Preserve are "… *to protect and preserve the scientific, scenic, geologic, watershed, fish, wildlife, historic, cultural, and recreational values of the Preserve, and to provide for multiple use and sustained yield of renewable resources*." In August 2002, the Trust began managing the Preserve as an experiment in public land management, with a goal of financial self sufficiency along with ecological sustainability. The Master Plan for Interpretation (VCT 2005) and Strategic Plan (VCT 2006) provide an interim interpretive plan and strategic plan to guide the Trust's management of the Preserve while comprehensive land management plans are being developed. An existing conditions report for the Preserve's landscape restoration management plan was developed concurrently with this assessment report to consider ecological conditions across jurisdictional boundaries within the 210,000-acre landscape.

Refer to the Preserve web site for more details, and for their Existing Conditions Reports that cover the Preserve's block of land within this assessment area.

Local Communities

The assessment area contains one incorporated municipality— the Village of Jemez Springs— with a population of approximately 375 residents (U.S. Census 2000). Other small rural communities are scattered throughout the area, including Ponderosa, La Cueva, Thompson Ridge, and Sierra de los Pinos. They are all managed in part through homeowner associations. Most local businesses in the area are based on tourism and recreation-related activities. (Refer to socio-economic section).

Management of hazardous fuels on private properties in the assessment area is facilitated in part by an interagency program called Firewise USA (www.firewise.org). Communities in this area participate in Firewise as the Eastern Greater Jemez Wildland Urban Interface (WUI) Corridor group. These groups and others also worked with on the Sandoval County Community Wildfire Protection Plan (Sandoval County 2008), which identifies all the communities in this area at high risk of damage or loss from wildfire. Both the Jemez WUI assessment and CWPP are available on the SWJM restoration website.

The Eastern Greater Jemez WUI Corridor group and others involved in developing the CWPP evaluated the WUI communities in the Jemez Mountains assessment area, identified wildfire hazards and risks, and defined ways that private property owners could reduce hazardous fuels and the ignitability of their structures, and improve fire response capabilities. Over the past several years, the Forest Service completed fuels reduction treatments around the WUIs in this assessment area. The WUI working group also worked with State Forestry, Natural Resources Conservation Service, the local Soil and Resource Conservation District and willing landowners in the area to reduce hazardous fuels and wildfire risk to over 50 private properties in the area, and 20 more just outside the area. The CWPP highlighted the need for additional activities on both public and private lands to reduce the negative impacts that wildfires may have on these communities. Further information about fire and fuels management is in the vegetation, fuels and fire section of this report.

Pueblo of Jemez

The Pueblo of Jemez (also known as Jemez Pueblo) is a sovereign nation with an independent government and tribal court system. The Governor convenes tribal council meetings and executes the decisions of the tribal council. The Pueblo is a federally recognized tribe with over 3,500 tribal member residents. The Pueblo has a Department of Resource Protection that works with tribal leaders to protect, preserve and manage the Pueblo's natural and cultural resources. The Pueblo developed and now manages the Walatowa Woodlands Initiative—a program that provides forest thinning and restoration services and custom lumber by-products. The Pueblo, Valles Caldera Trust, and Forest Service are working collaboratively to create an integrated strategy for forest restoration and hazardous fuel reduction in this multi-jurisdictional landscape.