Socioeconomic Assessment

of the Cibola National Forest

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A project of this scope can only be completed with the cooperation and collaboration of many individuals.

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Abbreviations

AUM	Animal Unit Month
BLM	Bureau of Land Management
CFRP	Collaborative Forest Rehabilitation Program
DOD	Department of Defense
ESA	Endangered Species Act
FS	Forest Service
IRA	Inventoried Roadless Area
MSA	Metropolitan Statistical Area
NF	National Forest
NLCD	National Land Coverage Data
NMDOT	New Mexico Department of Transportation
NVUM	National Visitor Use Monitoring
OHV	Off-Highway Vehicle
RD	Ranger District
ROW	Right-of-Way
VMS	Visual Management System

Executive Summary

This report provides a socioeconomic assessment of the relationships between the four mountain Ranger Districts (RDs) of the Cibola National Forest (Cibola NF), the 10 counties with boundaries within the Cibola NF, and neighboring communities. This includes Indian Reservations, Pueblo lands and Land Grant communities. This assessment was commissioned by the Southwestern Regional Office of the USDA Forest Service (USDA FS or FS), and serves as a source of information for the development of a revised plan for Cibola NF.

The assessment is based primarily on secondary data sources, including those of the United States Census Bureau, the Bureau of Land Management, the Geological Survey, the Federal Highway Administration, Bureau of Economic Analysis, and the Bureau of Labor Statistics as well as the New Mexico Department of Transportation, the NM Department of Labor, NM Department of Game and Fish, and those plans and other documents produced by county governments. The most important source of data was National Forest Service (FS) records including the Forest Service infrastructure (INFRA) database and their GIS databases. In some cases, specific information was not available in a form appropriate to this analysis, requiring BBER to make estimates, using the best available data. In other cases, data were not available at all and this fact limited the analysis possible. Information sources and analysis methods are thoroughly documented throughout the report.

The Cibola NF consists of scattered "islands" of mountainous terrain that are under FS management. Cibola NF spans 10 New Mexico counties which are widely divergent in their socioeconomic characteristics. The assessment area, which includes Native American and Land Grant communities as well as Albuquerque and rapidly-growing Rio Rancho, is a study in contrasts. The study area includes a dynamic mix of peoples from different socioeconomic circumstances and with different histories and cultural traditions. Depending on their background, people in the assessment area may have differing and often conflicting perspectives on the Cibola NF and how land is used, and may be expected to make different and at times conflicting demands on the resources of the NF.

The Cibola National Forest makes a substantial and significant contribution to the socioeconomic well-being of the assessment area, representing many elements of a superior quality of life. A major finding of this study is that visitor spending in Sandia RD is the largest and most significant contributor to the economic impact of the Cibola NF. Additionally, ranching and FS operations provide important and much needed economic activity in rural areas.

This conclusion is the result of a socioeconomic analysis, based on seven assessment topics: demographics and socioeconomic trends in communities neighboring the Cibola NF, access to the NF, land cover and ownership, NF users and uses, special areas and places, economic impacts, and community relationships. In sum, the findings of these topics are as follows:

Demographic and Socioeconomic Trend:

The population of all counties in the assessment area grew between 1980 and 2000. The assessment area's population rose from 644,000 to 884,000, increasing 37 percent, slightly below the 40 percent average for the state. Bernalillo County comprised the majority of population in the area and exhibited relatively stable growth of 33 percent, as the population grew by 137,000 during the two decades. Sandoval County, which includes Rio Rancho, topped the list in growth. Many of the fastest growing communities have been in the Albuquerque Metropolitan Statistical Area (MSA) and, in addition to Rio Rancho, include: Bernalillo, Corrales, Estancia, Los Lunas,

Los Ranchos de Albuquerque and Rio Communities[1]. This growing population base has one major implication for the FS: **more use.** To complicate matters, in areas with growing residential populations like Bernalillo and Sandoval Counties, homes are being built on private land abutting the national forest. Subdivisions near the forest raise access concerns by either obstructing traditional points of access or by facilitating access to places previously difficult to get to. Homes in or near the Forest also impact the methods and costs of fire management.

Following the national trend, the population in the assessment area counties is aging. In the more rural counties of Catron and Lincoln, this aging process appears to have been accelerated by both the out-migration of the young and the in-migration of those in their retirement years. An older population, with more time on their hands, may seek out the recreational and leisure opportunities of the forest; they also, however, may be willing to volunteer their time on various types of FS projects.

New Mexico was the first state in the United States with a majority minority population. The 10 assessment counties vary considerably in their racial and ethnic composition, with Cibola (40%) and McKinley (75%) counties having very large Native American populations, and Socorro (49%) and Valencia (55%) having large proportion of their population identifying as Hispanic or Latino. Between 1990 and 2000, the Hispanic population in the Cibola NF counties increased their share of the total from 35% to 38%, while the state as a whole increased from 38% to 42%. The Native American population also increased – from 11.7% to 12.3% in the assessment area versus 8% to 9% statewide.

Poverty in the assessment area tracks with race and ethnicity. Native Americans as a group were most likely to be in poverty in 2000, with over one-third of Native Americans living below the federal poverty level. Among Native Americans, poverty is greatest in the rural counties. Nevertheless, even in urban areas their rates of poverty exceed those of other racial and ethnic cohorts. Poverty percentages by race in the assessment area are: White Alone (12%), African Americans (19%), American Indians (37%), Asians (14%), and “Other” (21%). In terms of ethnicity, 20% of Hispanics and 15% of Non-Hispanics were below the federal poverty level.

Access

New Mexico is served by two major interstates, Interstate 40 and Interstate 25. Interstate 40 runs east-west near the Mt. Taylor RD and through the Sandia RD, providing relatively direct access to both areas. Access to the Sandia RD is also available via Route 550 through the town of Placitas from Interstate 25 north of Albuquerque. The other two Ranger Districts are further away from these major interstates, but can still be accessed using other highways and local roads. Governor Richardson's Investment Partnership (GRIP) projects allocated funds to infrastructure improvements on I-40, expanding traffic capacity.

The Albuquerque International Sunport is the largest and busiest airport in New Mexico and is only 24 miles from the Sandia RD. The Sandia RD is the smallest in acreage, but has the most visitors, as it is located next to New Mexico’s major population base and easily accessible by air and by interstate, as I-25 and I-40 intersect in Albuquerque.

[1] Rio Communities is an unincorporated settlement and a census-designated place (CDP) in Valencia County, New Mexico east of Belen with a year 2000 population of 4,213. http://www.city-data.com/city/Rio-Communities-New-Mexico.html.

Vehicle miles traveled and vehicles per road mile are heaviest in the counties that surround the Sandia RD, particularly Bernalillo county, although vehicle per road mile area also high in Valencia County (624). Total vehicle miles traveled are also high in McKinley County near the Mt. Taylor RD. These measures of traffic density are lowest in the counties touching or surrounding the Magdalena RD and the Mountainair RD.

Population growth in the wildland-urban interface of the Cibola NF raises issues regarding access and right-of-way. Most areas surrounding all four of the RDs are privately owned land. In areas such as Mt. Taylor, access issues are further complicated by tribal and state owned land, interspersed with national forest.

The growing use of Off Highway Vehicles (OHVs), particularly for unmanaged recreation is viewed as one of the four major threats by the USDA FS, providing impetus for the Travel Management Directive, under which all the NFs will have to designate which roads and trails will be open to motorized vehicles.

Land Cover

GIS data show that about 60 percent of the Cibola NF is evergreen forest, encompassing 1,254,520 acres. Shrubland and herbaceous grasslands make up most of the remaining 40 percent. Over half of the forest's shrubland (293,843 acres) is in the Magdalena RD. Herbaceous grassland covers 233,889 acres in the Mountainair RD, accounting for 31.5 percent of Cibola NF's herbaceous grasslands.

Landcover defines land use capabilities, which strongly influence land ownership. The majority of land within the exterior boundary of the National Forests is federally owned. However, there are 797,707 acres of private land in-holdings within the administrative boundary of the National Forest, accounting for 24 percent of the total acreage within this exterior boundary. Frequently, there are parcels of forest land scattered around the boundaries of the forest that are costly and difficult to manage and can pose significant right-of-way issues. Land exchanges are one way to address this issue, allowing the Forest Service to exchange less ideally located land parcels with better suited privately owned parcels to create a more contiguous administrative unit, but such exchanges are often controversial.

Users and Uses

The FS management strategy is guided by the multiple-use mandate.[2] However, increased usage of essentially limited resources can ultimately give rise to conflict over land use. In the Cibola NF, recreational uses, like hiking, camping, picnicking, skiing, off-highway vehicle (OHV) use, and rock climbing – have increasingly eclipsed the more traditional economic pursuits of grazing, timber, hunting and mining, although these latter uses are critical to the livelihood of people living in communities adjacent to the forest. This Socioeconomic Assessment found recreation to be the primary land use of the Cibola NF[3]. Another major use is grazing. Twenty-two percent of grazing on public land occurs within the Southwest Region of the NF system. Grazing is the second most substantial commercial activity on the Cibola NF and has a significant economic impact in rural communities. The timber industry is not a major economic force in the area today, nor does it provide many jobs. However, small-diameter wood harvesting is a potential source of

[2] *Multiple-Use Sustained-Yield Act of 1960*, 16 U.S.C. §§ 528-531, June 12, 1960.
[3] Refer to Chapters 4 and 5, and Section 5.1 in this document for a detailed report.

economic development. There may be market potential for small diameter wood products, including fuel wood, heating pellets, mulch, panels, composite products, fence posts, round wood construction, and "character wood" niches.

Native American tribes make ongoing use of FS managed lands for religious and other cultural purposes. The Cibola NF has archaeological resources, cultural lands, and sacred sites that are unequivocally important to tribes.

One of the most public and farthest-reaching multiple-use debates is the use of OHVs. The FS acknowledges that unmanaged recreation, primarily OHV use, is one of the four largest threats facing the National Forest System.

Special Areas, Recreational Sites, and Heritage and Cultural Resources

Special Areas in the Cibola NF include Wilderness areas and inventoried roadless areas (IRAs). Much of the IRAs on the Cibola NF exist within established Wilderness areas such as the Apache Kid Wilderness in the Magdalena RD and the Manzano Mountain Wilderness in the Mountainair RD. Within the Cibola NF, there are 160,000 acres of IRAs where neither road construction nor reconstruction is allowed. These areas comprise 8% of NF System lands in New Mexico, including the Kiowa NG. The legal status of these lands and what may need to be done to protect them has changed with recent court decisions.

The Cibola NF features over 135 developed recreational sites. Developed sites include campgrounds, picnic areas, shooting ranges, visitor centers, and interpreted historical and/or archaeological sites, and are maintained with the help of volunteers.

Within the boundaries of the National Forest, there are numerous areas of cultural significance to the indigenous peoples of the surrounding areas. These places are of importance to Native American tribes and pueblos for their traditional cultural and religious activities. Maintaining the integrity and sanctity of these traditionally significant areas is a challenge for both the Forest Service and the local native peoples.[4]

Economic Impact

Analysis using the IMPLAN regional economic model indicates that visitor spending is by far the largest contributor to economic activity generated by Cibola NF. Ranching and USDA FS operations contribute a much smaller but significant amount. Timber harvesting plays only a minor role. Ranching is an important activity in New Mexico and plays a critical role in the economy and culture of many small rural communities. In small rural communities, the NF can be particularly critical for subsistence activities, like hunting and gathering herbs, as well as providing a source of cash income (e.g., from the sale of firewood or Christmas trees).

Community Relationships

The FS has an extensive history of working with local communities on various projects, ranging from economic development to forest health and sustainability. Partnerships are an indispensable method of managing operations and conducting business. They are a vital means of achieving

4 Russell, J. C., & Adams-Russell, P. A. (2005b). Values, Attitudes and Beliefs Toward National Forest System Lands: The New Mexico Tribal People (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 11, 2005

goals that might not be met by the FS alone. The most common partners are non-governmental organizations, which are typically non-profit organizations such as neighborhood associations and agricultural sustainability groups. One way the FS has been teaming up with community groups is through the Collaborative Forest Restoration Program (CFRP). This program provides cost-share grants to stakeholders for forest restoration projects on public land which are designed through a collaborative process. Cibola NF had the support of over 800 volunteers in 2005.

1 Introduction

1.1 Statement of Purpose

This report provides a socioeconomic assessment of the Cibola National Forest (Cibola NF) and surrounding counties and communities that comprise the assessment area. The report explores relationships and linkages between the USDA Forest Service (USDA FS or FS) managed lands, the visitors and other users of the forest, and the surrounding communities. Specifically, this report contains information and analysis intended to help the FS and the public:

1. Document and assess the current contributions of the Cibola NF to the socioeconomic health and cultural vitality of the communities neighboring the public land.
2. Identify opportunities and strategies to address land use conflicts arising from growing multiple use concerns.
3. Compile information and analyses that would be helpful in developing a forest management and planning framework in one place.

1.2 Sources of Information and Analytical Methods

The Cibola NF is an administrative unit divided into six Ranger Districts. Four of those districts, Mt. Taylor, Magdalena, Mountainair, and Sandia, comprise the Cibola National Forest, and two districts administer four National Grasslands (Kiowa/Rita Blanca, and Black Kettle/McClellan). The assessment area of this report includes only the four mountain Ranger Districts (RDs) of the Cibola NF. The socioeconomic assessment of the four National Grasslands was conducted independently and completed in July of 2005.[5]

Information in this assessment is largely drawn from secondary data sources. Secondary data sources often involve data collected for specific purposes, but the data may be useful for other purposes. Key data sources for this report include:

- Demographic and economic data sets, such as those available from the United States Census Bureau and the Bureau of Economic Analysis;
- Administrative, land management and resource data mostly provided by the FS and the Bureau of Land Management (BLM); and
- Contextual and historical information obtained from archival sources, such as newspapers, internet sites and trade journals.

1.3 Assessment Area and Level of Analysis

The Cibola NF comprises 2,108,552 acres and consists of four Ranger Districts that span ten counties. The Cibola NF is adjacent to or includes lands claimed by several Indian reservations, Pueblo lands, and land grant communities. While the borders of the Cibola NF are not nearby any other national forests, the Cibola NF assessment area shares county coverage with other national forests.

[5] Mitchell, J., and Cook, J. (2005, September). *Socioeconomic Assessment of the Region 3 National Grasslands*. Bureau of Business and Economic Research, University of New Mexico. Albuquerque, NM.

Sandoval County, for example, hosts sections of two Cibola NF ranger districts as well as parts of the Santa Fe NF. **Figure 1** is a map of the Cibola NF and vicinity. Much of the data used for this report is available only on a county-level. The area includes only New Mexico counties that contain or touch any of the four Ranger Districts of the Cibola NF. The assessment area is comprised of 10 New Mexico counties (41,959 square miles[6]). **Table 1** lists the counties in the assessment area and shows the acreage within FS boundaries and that managed by the FS within each of the counties.[7]

[6] 26,853,702 acres
[7] See USDA FS Website http://www.fs.fed.us/land/staff/lar/definitions_of_terms.htm for terminology.

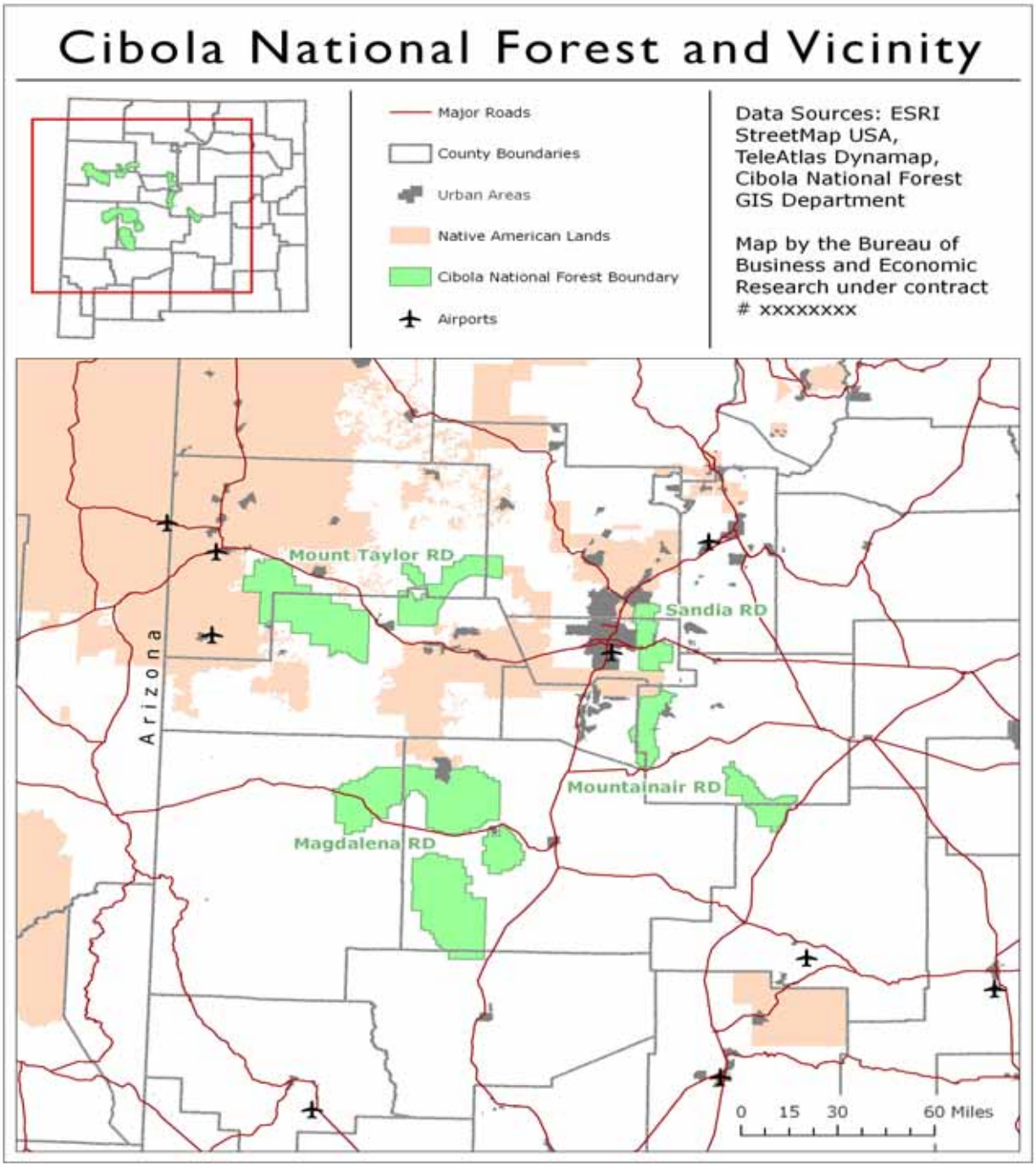

Figure 1.1 Cibola National Forest Assessment Area

Table 1.1 Cibola National Forest Acreage by County

	Total Cibola NF Acres in County	Forest Service Managed Acres	Acres Under Other Ownership	Total Acres in County	Cibola NF as a % of Total County Acres
Bernalillo	**94,665**	**74,682**	**19,983**	**747,797**	**12.66%**
Catron	**223,493**	**158,039**	**65,454**	**4,442,089**	**5.03%**
Cibola	**379,538**	**305,061**	**74,477**	**2,909,927**	**13.04%**
Lincoln	**53,396**	**34,271**	**19,125**	**3,089,791**	**1.73%**
McKinley	**249,996**	**189,196**	**60,800**	**3,496,296**	**7.15%**
Sandoval	**52,116**	**45,024**	**7,092**	**2,376,987**	**2.19%**
Sierra	**21,172**	**18,869**	**2,303**	**2,711,922**	**0.78%**
Socorro	**832,720**	**614,805**	**217,915**	**4,255,339**	**19.57%**
Torrance	**184,826**	**155,224**	**29,602**	**2,139,967**	**8.64%**
Valencia	**16,631**	**15,937**	**694**	**683,588**	**2.43%**
Total of All Counties	**2,108,552**	**1,611,108**	**497,445**	**26,853,702**	**7.85%**

Sources: Cibola National Forest GIS Department and ESRI Arc GIS Street Map USA 2004
Calculations: Done by UNM-BBER.

The largest portion of forest service managed land (614,805 acres) is in Socorro County, where parts of the Magdalena Ranger District cover almost 20% of the county's area. Some counties, such as Catron and Sandoval have more USDA NF than the table above indicates, since the table shows only the area covered exclusively by the Cibola NF. Catron County is largely covered by the Gila NF, while Sandoval County includes a large portion of the Santa Fe NF.

About 23 percent (497,445 acres) of land within the Cibola NF boundaries is owned by entities other than the USDA FS, such as Native American Tribes, land grant communities, private landowners, and the State of New Mexico. The Native American lands are designated as reservation or puebloan, depending upon the tribe. Land grants are a legacy of the Spanish and Mexican colonial era, whereby land was bestowed upon pueblos, individuals and/or communities by the Spanish Crown or the Mexican Republic. These land grants were recognized by the United States in 1848 with the Treaty of Guadalupe Hidalgo when New Mexico was incorporated as a US territory.[8]

As noted above, two of the six Cibola NF Ranger Districts are National Grasslands. These grasslands have been assessed in a separate report and are not included in this report.[9] The remaining four districts of Cibola NF are referred to as the "Mountain Districts." There are several unique characteristics regarding the configuration of Cibola NF Mountain Districts:

1. The Districts are generally not in one contiguous area, but are associated with particular mountain ranges. The Cibola NF consists of relatively scattered "islands" of mountainous terrain surrounded by other land jurisdictions, including Native American tribal lands and land grant communities.
2. The counties in the ten-county assessment area vary substantially in their social and economic characteristics. The Sandia Ranger District for example, abuts an area of New

[8] Robert J. Torrez, Former State Historian. (1997). *New Mexico's Spanish and Mexican Land Grants*. New Mexico State Records Center and Archives. http://www.nmgs.org/artlandgrnts.htm.
[9] Mitchell, J., and Cook, J. (2005, September) *Socioeconomic Assessment of the Region 3 National Grasslands*. Bureau of Business and Economic Research, University of New Mexico. Albuquerque, NM.

Mexico where over 1/3 of the state's population reside. The other three Ranger Districts are in rural areas of the state.

3. Each of the four Ranger Districts shares borders with land grant communities and Native American Pueblos and reservations.

Where it is possible and appropriate, information is presented on a ranger district level. While some information is provided on individual communities, it was often difficult, if not impossible, to assemble meaningful data for geography below the county level. Furthermore, much of the data provided by the FS are at the forest level and cannot be disaggregated to the individual ranger districts.

The residents living around and within the exterior boundaries of the USDA FS managed lands are from diverse socioeconomic and cultural backgrounds. These various groups of people represent differing, and often opposing, expectations of the services and management obligations of the FS. The areas surrounding the ranger districts include a mixture of land grant areas, pueblos and other reservation land, small rural communities and the state's major metropolitan area, the Albuquerque MSA. Later chapters of this report examine the opportunities and challenges that this heterogeneity presents for managing FS lands. The following sections describe each of the ranger districts and include a discussion of historical land uses. The information presented is based on information from the USDA FS, the FS website, and other sources. **Figures 1.2 to 1.5** are maps of each Ranger District.

Mt. Taylor Ranger District

The Mt. Taylor Ranger District is comprised of two mountain ranges, the San Mateo and Zuni Mountains, and totals nearly 520,000 acres of NF land. The district covers parts of McKinley, Sandoval and Cibola Counties and abuts the Zuni Pueblo and the Navajo Nation. Elevations range from 6,500 to 11,301 feet. Mt. Taylor is the highest peak in the San Mateo range (11,301 ft) and an area of special religious and cultural significance to several Native American communities. In the Zuni range, Lookout Mountain is the highest peak (9,128 ft.). The San Mateo and the Zuni Mountains contain rich heritage resources, including archaic, ancestral Puebloan, and Navajo sites, historic sawmills and logging communities, railroad grades, mines, and homesteads. The mountain ranges provide vital resources for grazing, timber extraction, and recreation. The highland snow pack is the primary water resource for the lowland communities. I-40 serves as a major thoroughfare and access point to the District.

Figure 2 provides a map of the Mt. Taylor RD.

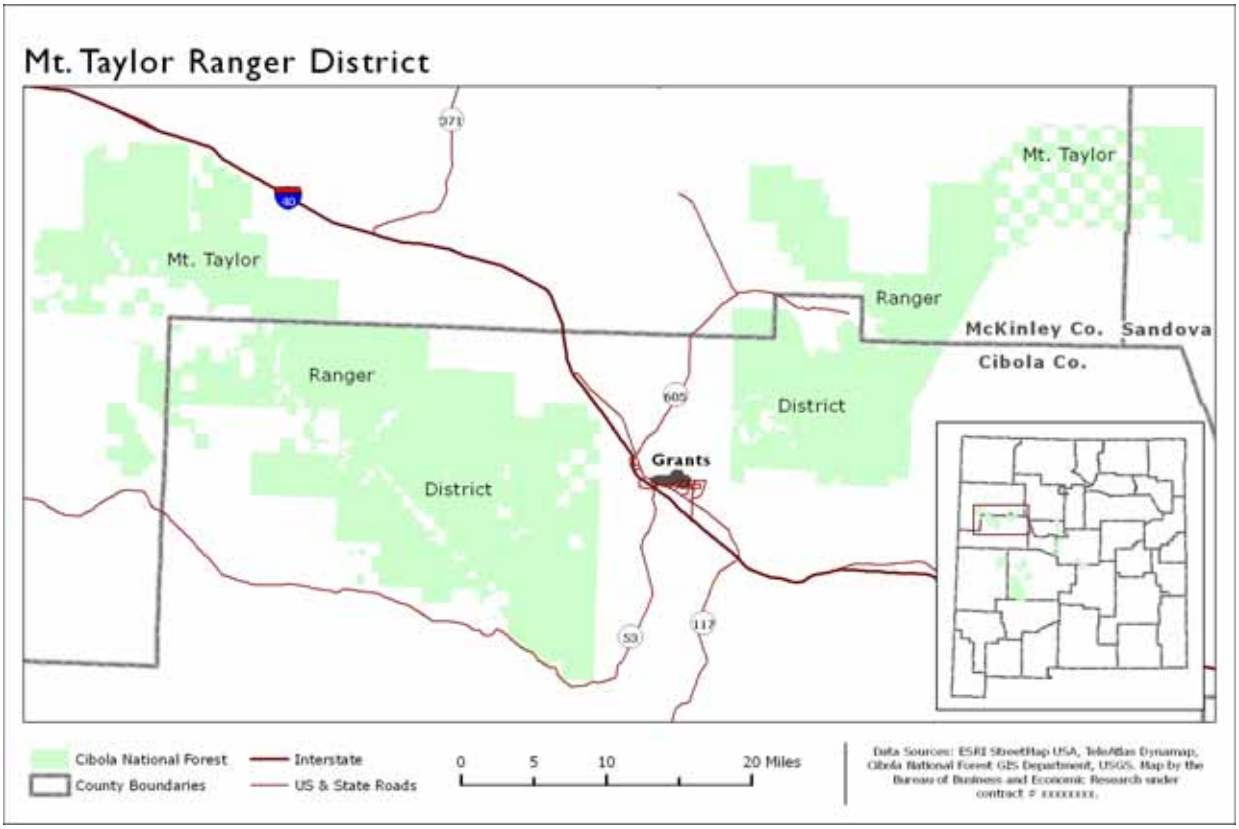

Figure1.2 Mt. Taylor Ranger District

The map shows a checkerboard pattern of land ownership in the areas surrounding the Zuni Mountains to the southwest and the San Mateo Mountains to the northeast. About 22 percent of the land within the Mt. Taylor RD administrative boundaries is owned by entities other than the FS. The area 25 miles northeast of Grants in McKinley County is known as the "Checkerboard" because of the mix of property held in trust for various tribal governments intermingled with private, non-tribal property holdings within reservation boundaries. [10] This pattern of varied land ownership creates jurisdictional problems, making it difficult to coordinate land and resource programs, and has long been a source of conflict among forest users, private land owners and FS officials. The issues are discussed further in Chapter 4, "Land Cover and Ownership."

Mt. Taylor Ranger District experienced a period of aggressive logging in the early 1900s. As the transcontinental railroad extended into the Zuni mountain region, camps of settlers established themselves throughout the area. Consequently, Grants and the surrounding area began to grow. However, as the national economy declined in the early 1930s, so did the timber industry. By World War II, logging had come to a complete stop, only to give way to the region's next profitable endeavor, uranium mining. Uranium mining produced significant profits beginning in the early 1950s and continuing through the early 1980s. By 1979, an estimated 6,000 workers were employed mining and milling uranium in the vicinity of Mt. Taylor RD. Grants and its neighbor village, Milan, grew to about 15,000 people. After the Three Mile Island accident,

[10] Tom Purdom, *Independent* (Gallup), April 11, 2001.

however, the price of uranium plummeted, resulting in the closure of most of the uranium operations in the area.

The Bluewater Creek valley of the Mount Taylor RD sustained large herds of cattle in the 1940's.[11] However, over time, the combination of intense grazing, logging and road building severely compromised the riparian qualities of the creek. The Forest Service has been working to restore the area as a riparian habitat over the last 10-15 years. Current management efforts in the Mt. Taylor RD are focused on rehabilitating areas where extensive logging and grazing has occurred since the early 1900s.

Mt. Taylor holds considerable cultural significance for many of the Pueblos as well as the Navajo. The mountain figures prominently in oral traditions, and for some tribes it is considered the home of several deities and kachinas. The mountain is used for a number of traditional cultural and religious activities.[12] For the Navajo, Mt. Taylor is the southern most of the four sacred mountains, and is called the Blue Bead, or Turquoise, Mountain.[13, 14,15]

Magdalena Ranger District

The Magdalena Ranger District is the largest district in the Cibola NF, composed of four separate and distinct mountain ranges in southwest New Mexico. The ranges include the Datils, Bears, San Mateos and Magdalena Mountains. The change in elevation from about 6,000 feet in the southern portion of the San Mateos to the 10,700 ft. peak of South Baldy provides great variation in topography and accompanying ecosystems. With an area of approximately 900,000 acres, the district covers the three counties of Socorro, Catron, and Sierra. The largest city in the area is Socorro, with a population of about 9,000 people. US Route 60 is the major access point for the area. See **Figure 3** for a map of the Magdalena RD.

The Magdalena RD includes two Wilderness Areas designated by Congress in 1980. The Apache Kid Wilderness is a 44,650 acre area in the higher elevations of the southern San Mateo Mountains. The topography is rugged, with many narrow steep canyons cutting through high mountain peaks. Vegetation includes piñon and juniper in lower elevations, ponderosa pine in middle elevations, and spruce, fir and aspen in higher elevations. The area has a trail system of 68 miles, one third of which is in primitive condition. The Withington Wilderness covers an 18,824 acre area with elevations varying from 6,800 to 10,100 feet on the eastern slopes of the San Mateo Mountains north of the Apache Wilderness.

The history of the Magdalena RD dates back to 1899 with the creation of the Gila Forest Reserve. The Magdalena RD has been a part of Magdalena's economic life for nearly a century. This long history makes the FS the oldest continuous employer in Magdalena. Even today, the residents near the Magdalena RD look to the FS for economic development.

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[11] USDA FS (2006) Mt. Taylor Ranger District, http://www.fs.fed.us/r3/cibola/districts/mttaylor.shtml.
[12] C. Benedict, Forest Service Archaeologist, Cibola NF, USDA FS, New Mexico.
[13] Van Valkenburgh, R. F. (1974). "Navajo Sacred Places." In C.Kluckhohn, (Ed.), *A Short History of the Navajo People*. Garland Publishing, Inc., New York, p. 57.
[14] Roessel, R. A. (1983). *Dinétah, Navajo History, Vol. II*. Navajo Curriculum Center, Rough Rock Demonstration School. Rough Rock, AZ. Pgs. 89, 91.
[15] Danielle Knight (1999, June 15). "Sacred Native American Sites Threatened." *Interpress Third World News* (IPS). Laguna, NM.

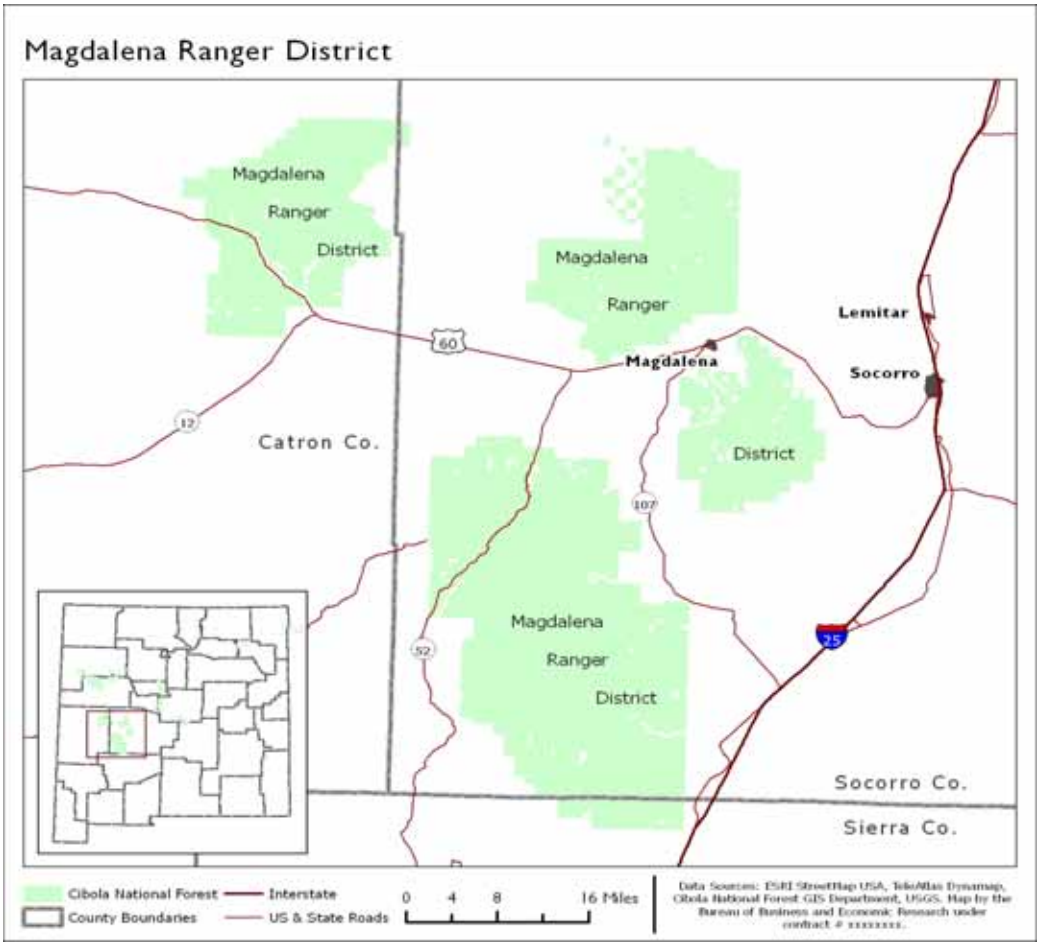

Figure 1.3 Magdalena Ranger District

Historically, the land in the Magdalena RD was subject to expansive logging and mining operations. Mining of lead and other metals was booming until about 1920.[i] The Magdalena Mountains provided timber and firewood for Ft. Craig on the Rio Grande, when it was in operation as a military outpost from 1854 to 1885. Although major timber sales stopped in 1974, current timber related endeavors include firewood for residential and commercial use, and small diameter products such as poles, posts, novelty wood, and Christmas trees. [16] Mining and extractive uses are mostly a relic of the past. The district still has an extensive grazing program, with at least 40 grazing allotments and at least 55 permittees[17], which supports the area's ranching base. Generally speaking, the area is open to grazing, mostly cattle (8,000 permitted), with both yearlong and seasonal grazing allotments. The Magdalena RD is also used for recreation, including hiking, camping, horseback riding, rock climbing, and off-highway vehicles (OHV). Elk hunting in Magdalena RD is a major attraction for sportsmen and sportswomen across the country. Other common game species in the district are white tail deer, black bears, mountain lions, turkeys and pronghorn antelope. Current major uses of FS land include state and

[16] USDA FS (2006). Magdalena Ranger District. Cibola National Forest Website. http://www.fs.fed.us/r3/cibola/districts/magdalena.shtml.
[17] USDA FS, INFRA Database.

county roads, telephone and power lines, communication sites and private roads. The Langmuir Laboratory for Atmospheric Research holds the largest special use permit.

Mountainair Ranger District

The Mountainair Ranger District comprises the Gallinas and Manzano Mountains. The Manzano Mountains run north and south reaching elevations of 6,000 to 10,098 feet at Manzano Peak. The mountain range slopes gently upward from the Estancia Valley to about 8,000 feet and then rises abruptly to its peak. The west side drops steeply into the uplands of the Rio Grande Valley. The

Manzano Mountains are situated in the midst of the fastest growing region in New Mexico – the Albuquerque MSA, comprised of Bernalillo, Sandoval, Torrance and Valencia Counties. By contrast, the Gallinas Mountains are an isolated range west of Corona. The Gallinas rise to an elevation of 8,637 feet at Gallinas Peak, the highest point in the range. **Figure 1.4** provides a map of the Mountainair RD.

The Mountainair RD includes the Manzano Mountain Wilderness. There are more than 64 miles of well-developed trails that provide access to the Wilderness, but the lack of reliable water sources and a limited number of campsites may discourage use.[18] The Manzanos are also not as readily accessible as the other ranges in the Cibola NF, and the Wilderness is near small communities and somewhat distant from larger population centers.

Current land use issues facing the Mountainair RD are directly related to the rapid growth around the mountain areas. Urban development is encircling the Manzano Mountains. As a result, new values, desires and needs are being introduced that may conflict with traditional ways of life and culture in the area. According to the Cibola FS website, recreational use in the Mountainair RD has tripled in the last 10 years, challenging more traditional uses, such as grazing, firewood, recreational herb gathering, as well as habitat integrity. [19] Mountain lions and desert bighorn sheep find refuge in these mountains. Expanding recreational use is likely to mean an increase in wildlife encounters.

The Mountainair RD's past is a history of Native American "first use" and Spanish conquest. The people of Isleta Pueblo say they originally lived at the base of the Manzano Mountains, east of their present pueblo on the Rio Grande. In the 1600s, Spaniards found several inhabited Piro and Tiwa pueblos in the foothills of the Manzanos foothills. The ruins of the missions established by the Spanish survive at the Abo and Quarai units of the Salinas Pueblo Missions National Monument, which is managed by the National Park Service.[20]

[18] Wilderness.net. *Manzano Mountain Wilderness*. http://www.wilderness.net/index.cfm?fuse=NWPS&sec=wildView&wid=339.
[19] http://www.fs.fed.us/r3/cibola/districts/mountainair.shtml.
[20] National Park Service. (2006, October). Salinas Pueblo Missions. National Park Service Website: http://www.nps.gov/sapu/.

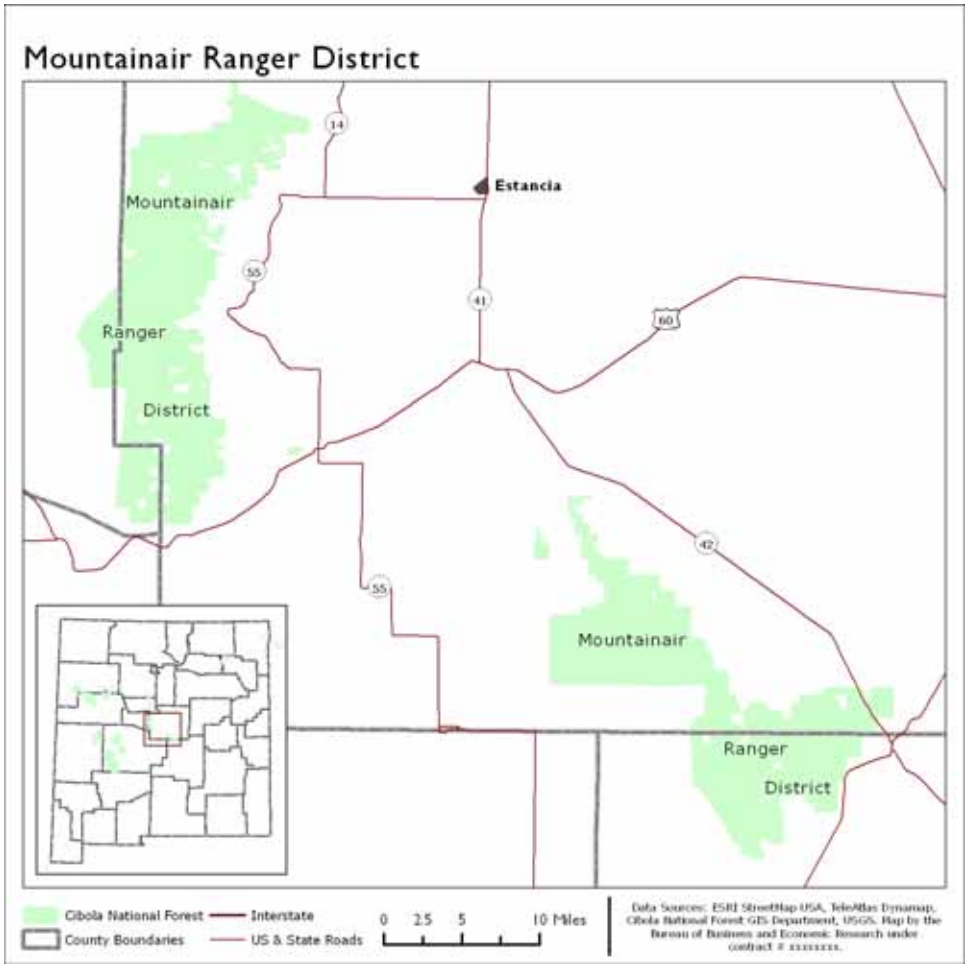

Figure 1.4 Mountainair Ranger District

The pueblos and the missions were abandoned because of famine and persistent raids by nomadic Indians prior to the 1680 Pueblo Revolt. Following the re-conquest of the area in 1692, Hispanic settlers occupied areas in the Manzano Mountains and were eventually given land grants by the Spanish Crown. These villages remain today in the mountains' eastern foothills, where their inhabitants pursue traditional uses of the land such as wood gathering and hunting. It was one of these villages, Manzano, which gave the mountains their name. Tradition says the village took its Spanish name from apples (manzanas) grown in ancient orchards here, and the name spread to the nearby range.

Today, the area surrounding the Manzanos is home to small agricultural communities, most established by the land grants. The area is characterized by its geographic isolation and relatively limited economic activity. The FS is working with local communities to promote use of the NF lands for economic development. In some areas, the FS is working on projects that encourage tourism and recreation. In other areas of Torrance County, a wood products industry is being developed.

Sandia Ranger District

The Sandia Ranger District is the smallest of the districts, with only 100,555 acres, but it is a destination for millions of visitors each year. More than half these visitors ride the Sandia Peak Tram or drive the Sandia Crest National Scenic Byway to enjoy the panoramic views of central New Mexico and the many recreational opportunities afforded. The Tram is the world's longest single section cable aerial tramway, ascending 4,000 feet in about 15 minutes, gliding along the western face of the Sandia Mountains[21].

The Sandia RD is adjacent to the state's largest population center. More than 800,000 residents live in areas surrounding the ranger district. This assessment finds that visitor spending in the Sandia RD is, by far, the greatest contributor to economic development in the Cibola NF assessment area. (Refer to Section 7.3 and Table 7.5 for details.)

Sandia Crest lies along the summit of the Sandia Mountains, which rise to an elevation 10,678 feet. The Sandia RD covers land in both Bernalillo and Sandoval Counties. Proximity is probably the most valued attribute of the Sandia Mountain range. The Sandias are very much a part of everyday life for the thousands of residents within the Albuquerque MSA. The southern part of the district includes the Manzanita Mountains, which form a low ridge between the Manzano Mountains to the south and the Sandias to the north. The Sandia RD is home to the Tijeras Pueblo Archaeological site, a principal developed site that is open and interpreted for the public and located immediately behind the Sandia Ranger Station in Tijeras. The Sandia RD wildlife program partners with such organizations as the Albuquerque Wildlife Federation, HawkWatch International, Central New Mexico Audubon Society, and the Sandia Mountain Bear Watch, and the New Mexico Habitat Stamp Program. The participation of such organizations encourages use of the district by bird-watchers and wildlife enthusiasts from all parts the state, and adds to the opportunities for nature watching activities.

The Sandia RD area includes the Sandia Mountain Wilderness Area, established through the Endangered American Wilderness Act of 1978. The area, originally 30,981 acres, increased to the present day 37,232 acres with the acquisition of part of the Elena Gallegos Land Grant in 1981. The area encompassed by the Sandia RD has direct ties to Spanish Land Grant communities established by the King of Spain in the 1700s and Mexican land grants in the 1820s, some of which are still active.

Figure 1.5 provides a map of the Sandia RD.

[21] Sandia Peak Ski & Tramway Website. (2005). http://www.sandiapeak.com/.

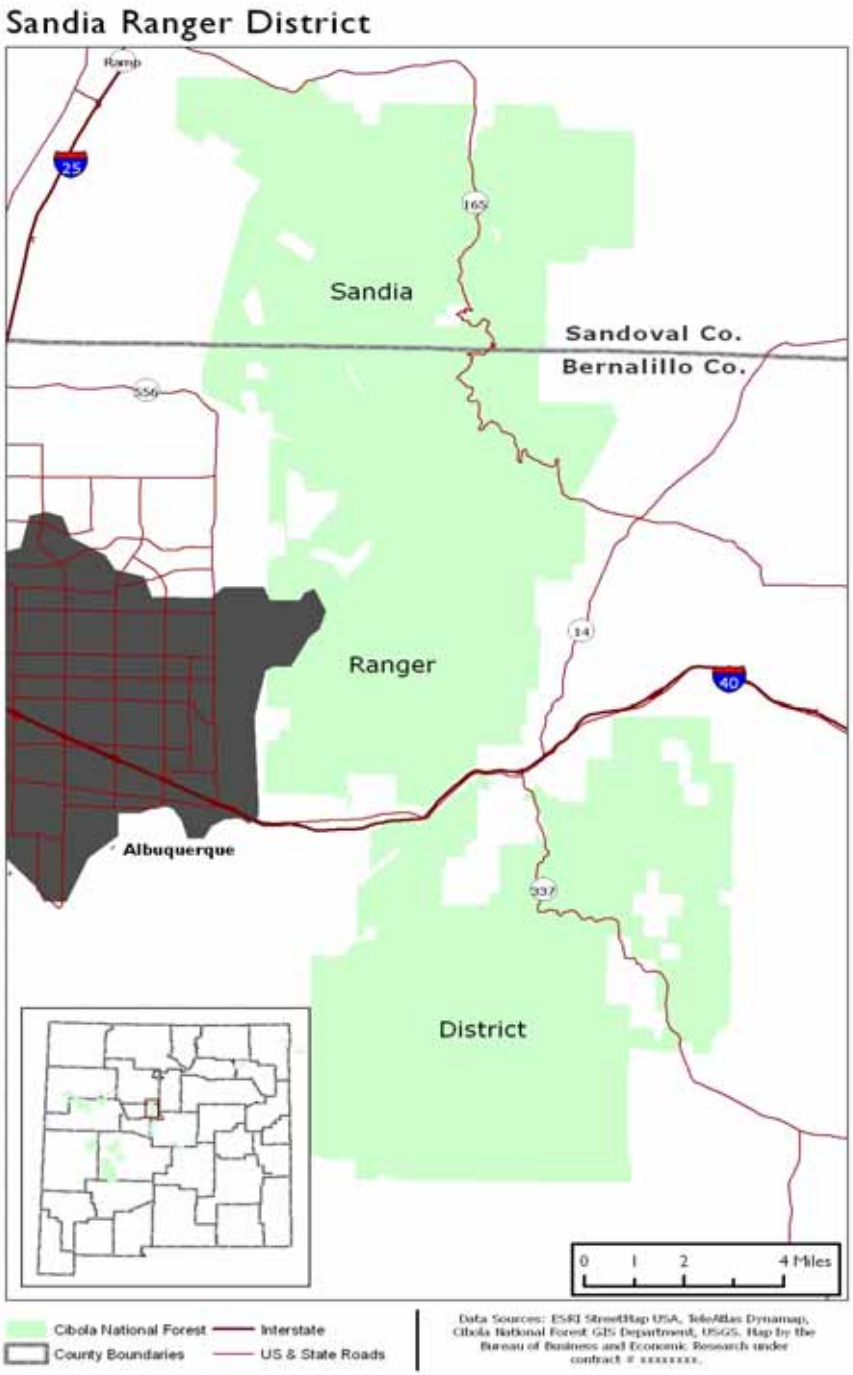

Figure 1.5 Sandia Ranger District

Issues facing the Sandia RD are related to increased usage associated with the rapid residential growth in portions of Bernalillo and Sandoval Counties. Maintaining adequate levels of customer service for all users is one of the greatest challenges for the FS.

A portion of the Manzanita Range in the Sandia RD has had limited public access since 1943, as it is in the Military Withdrawal Area, which was withdrawn from the FS for the exclusive use of the US Department of Energy and the US Air Force.[22]

A significant historical land use in the Sandia RD involves the spiritual paths of Native Americans, especially those who now live in Sandia Pueblo. According to the Pueblo, the Sandia people have occupied an area located approximately 13 miles north of what is now Albuquerque for at least 700 years. The Sandia Mountain is central to the Pueblo's religious beliefs, practices, prayers, oral histories and songs and contains the holiest of Pueblo shrines.[23] According to the Pueblo, it lost land after various congressional mandates and government surveys modified some of the forest boundaries. Sandia Pueblo filed a lawsuit against the Secretaries of Interior and Agriculture in 1994. The court found that the Secretary of Interior violated the Administrative Procedures Act in denying the Pueblo's claim for a corrected survey. The conflict between the United States and the Sandia Pueblo involved an issue common to the national forests: access and right of way. The primary road into the national forest was without legitimate right-of-way, and crossed private property. On April 4, 2000, the Pueblo and the federal government signed a negotiated settlement agreement that resolved this conflict. New Mexico Senator Jeff Bingaman then proposed a bill to the Senate that would transform Sandia's sacred ancestral territory into the T'uf Shur Bien Preservation Trust Area to be owned by the federal government and managed by the FS as part of the Cibola NF.[24] In early 2003, an amendment to the 108th Congressional Appropriations Act enacted the agreement.[25] The agreement guarantees unobstructed access for religious and cultural practices and other purposes by tribal members. In addition, the agreement ensures that affected homeowners in the Pueblo's land claim area have clear title to their property, and expressly authorizes existing rights-of-way and easements in perpetuity.[26]

1.4 Organization of the Report

The organization of this socioeconomic assessment is based on the collection and analysis of data pertinent to each of the seven individual assessment topics. Chapter 2 provides information on demographic trends in the counties within the assessment area. Chapter 3 discusses the access and travel within the larger region. Chapter 4 examines the land cover, land ownership and uses, and includes material on conveyances and exchanges. Chapter 5 examines the users of the Cibola NF and explores land use patterns and policies. Chapter 6 examines specially designated areas in the forest, including recreational sites and heritage resources. Chapter 7 provides an assessment

[22] A nuclear weapons stockpile was stored in Manzano Mountain for 40 years. A presidential emergency relocation center was built deep inside Manzano Mountain as a command post for President Eisenhower. It retained this function until the advent of thermonuclear weapons, by which time it was no longer regarded as a survivable site. According to Global Security.Org, the Manzano storage area "contains structures authorized to store nuclear materials and waste," and continues to have materials "stored on a long-term basis." Global Security.Org write-up on Sandia National Laboratories, www.globalsecurity.org/wmd/facility/sandia_nm.htm.

[23] Pueblo of Sandia Official Website (2002, June) "*Sandia Mountain Claim*." http://www.sandiapueblo.nsn.us/mountain/mtn_claim.htm.

[24] Taliman, V. (2002, March 22). "Legislation Hopes to Settle Sandia Land Claim." *Indian Country Today*. http://www.indiancountry.com/content.cfm?id=1016808777.

[25] US Congress. *T'uf Shur Bien Preservation Trust Area Act*, 16 U.S.C. 539. 108th Congress. Public Law 108-7. S117 STAT. 280 (2003, February 20).

[26] Office of Senator Pete V. Dominici. (2003, February 20) "*Senators Confirm Sandia Mountain Agreement Signed into Law*," Press Releases and Statements. http://domenici.senate.gov/news/topicrecord.cfm?id=190541&code=Indians.

of the economic impacts the Cibola NF has on the surrounding counties of the assessment area. Chapter 8 discusses relationships between the Cibola NF and surrounding communities at the local and regional levels. Chapter 9 identifies opportunities, risks, and special circumstances facing the National Forest lands and their management. Opportunities, Risks, and Special Circumstances

The Cibola NF consists of scattered “islands” of mountainous terrain that are under FS management and span 10 New Mexico counties which are widely divergent in their socioeconomic characteristics. The assessment area, which includes Native American and Land Grant communities, as well as Albuquerque and fast-growing Rio Rancho, is a study in contrasts and includes a dynamic mix of peoples from different socioeconomic circumstances with different histories and cultural traditions. Depending on their background, people in the assessment area may have differing, and often conflicting, perspectives on the Cibola NF and how land is used. These communities may be expected to make different, and often conflicting, demands on the resources of the NF.

2 Demographic Patterns and Trends

The chapter examines the changing demographic characteristics of those living in the 10 counties of the Cibola National Forest assessment area.

2.1 Population Density and Growth

Table 2.1 shows that urban Bernalillo County has by far the highest population density -- 477 persons per square mile. Other counties with relatively high population densities are the adjacent Valencia and Sandoval counties, respectively with 62 persons and 24 persons per square mile. By contrast, Catron County has only 0.5 persons per square mile.

Table 2.1 2000 Population Densities (sq. mile)

	Population Density
Bernalillo	477.4
Catron	0.5
Cibola	5.6
Lincoln	4.0
McKinley	13.7
Sandoval	24.2
Sierra	3.2
Socorro	2.7
Torrance	5.1
Valencia	62.0

Source: US Census Bureau, 2000 Decennial Census.

Note: Population Density calculated as per square square mile of land area.

As shown in **Table 2.2** the population of all counties in the assessment area except Cibola grew between 1980 and 2000.[27] Cibola County's population declined after the uranium industry went bust and thousands of jobs were lost. The population in the assessment area rose from 644,000 to 884,000, increasing 37 percent, or slightly below 40 percent for the state. Bernalillo County, which includes the City of Albuquerque and comprises the majority of population in the area, exhibited relatively stable growth over the 20 year period, with a population increase of 137,000, or 33 percent. Population in Sandoval County, where Rio Rancho is located, increased by 82% during the 1980's and by another 42% during the 1990's, while Valencia County had population growth above 40% in both decades. The population in Torrance County, grew by 37% between 1980 and 1990, with growth accelerating to 62% during the 1990's. Torrance County is now officially part of the Albuquerque MSA. Many of the fastest growing communities have `been in the Albuquerque MSA and include, in addition to Rio Rancho, Bernalillo, Corrales, Estancia, Los Lunas, Los Ranchos de Albuquerque, and Rio Communities.

[27] Valencia County was split into Cibola and Valencia Counties in the early 1980s. The 1980 population split between the area that became Cibola and that which is the new Valencia County is based on BBER's estimate.

Table 2.2 County Population Growth Forecast, 1990 & 2000

	Historical			Projected		
Cibola NF Counties	**1980**	**1990**	**2000**	**2010**	**2020**	**2030**
Bernalillo	419,700	480,577	556,678	631,839	698,832	759,000
Catron	2,720	2,563	3,543	4,063	4,459	4,752
Cibola	30,346	23,794	25,595	27,681	29,157	30,231
Lincoln	10,997	12,219	19,411	23,792	27,100	29,715
McKinley	56,449	60,686	74,798	88,163	101,750	114,854
Sandoval	34,799	63,319	89,908	126,294	162,409	197,182
Sierra	8,454	9,912	13,270	16,723	19,857	22,672
Socorro	12,566	14,764	18,078	21,421	24,493	27,137
Torrance	7,491	10,285	16,911	21,690	24,979	27,479
Valencia	30,768	45,235	66,152	86,708	108,064	128,922
CIBOLA NF COUNTIES	614,290	723,354	884,344	1,048,374	1,201,100	1,341,944
TOTAL NM	1,303,303	1,515,069	1,819,046	2,112,986	2,383,116	2,626,553

	Percent Change				
Cibola NF Counties	**80-90**	**90-00**	**00-10**	**10-20**	**20-30**
Bernalillo	15%	16%	26%	11%	9%
Catron	-6%	38%	26%	10%	7%
Cibola	-22%	8%	14%	5%	4%
Lincoln	11%	59%	40%	14%	10%
McKinley	8%	23%	36%	15%	13%
Sandoval	82%	42%	81%	29%	21%
Sierra	17%	34%	50%	19%	14%
Socorro	17%	22%	35%	14%	11%
Torrance	37%	64%	48%	15%	10%
Valencia	47%	46%	63%	25%	19%
CIBOLA NF COUNTIES	18%	22%	36%	15%	12%
TOTAL NM	16%	20%	31%	13%	10%

Source: US Census Bureau, Decennial Census, 1980, 1990, 2000. UNM-BBER population projections and calculations.

Population growth outside the Albuquerque MSA was moderate during the 1980's except in Cibola and Catron Counties, where population actually declined. Growth accelerated in each of the non-metro counties during the 1990's, with Lincoln County growth accelerating from 11% to 59%, and Catron County seeing a population surge of 38% between 1990 and 2000. Fast growing communities in the non-metro area include Capitan, Crownpoint, and Ruidoso Downs.

BBER has projected population growth in each New Mexico County through 2030.[28] The population in the assessment area is projected to increase to 1,342,000, or 28%, by 2030. Population in the assessment area is expected to grow by 36% during this decade, versus 31% statewide. As can be seen in the table, the strongest growth will be in Sandoval (81%), Valencia (63%), Sierra (50%) and Torrance (48%) Counties, with the slowest growth forecast for Cibola County (14%). While overall population growth in the assessment area will slow after 2010, to

[28] These projections, which were done in 2003, are summarized in a table on the BBER website (http://www.unm.edu/~bber/demo/table1.htm) and available in more detail by year, by sex and by age on a CD.

15% between 2010 and 2020 and to 12% in the decade which follows, the area will continue to out-perform the state. Bernalillo County's population is expected to grow 36 percent to 759,000 by 2030. Counties that are projected to grow rapidly in this period include Sandoval, Valencia, Torrance, and Sierra. Contributing to the attraction of these areas is the development of a commuter rail system running between Belen, Los Lunas, Albuquerque, Los Ranchos, Bernalillo and (ultimately) Santa Fe. Counties adjacent to Bernalillo County can expect to see some spillover as Bernalillo County residents migrate seeking access to these amenities, but lower housing prices still available in the more rural communities.

2.2 Racial/Ethnic Composition

As shown in **Table 2.3** and **Table 2.4**, between 1990 and 2000, the Hispanic population in the 10 assessment counties grew from 252,000 to 338,000, boosting their share of the total Cibola NF population from 35 to 38 percent. Hispanics increased their share of the total population in Bernalillo, Sandoval, and Valencia counties.

Regarding racial groups, the share of the population self-defining as White dropped from 72 percent to 65 percent in the 10 county assessment area between 1990 and 2000. The share of Whites fell in each of the assessment counties, while the share of those identifying themselves as of more than one race or "Other", many of whom are Hispanic, increased sharply, from 13 to 19 percent. In 2000, those self-identifying as Whites maintained a majority in all counties except McKinley and Cibola. These two counties have large Native American populations, accounting for 75 percent and 40 percent, respectively. The Navajo Nation, the second largest Indian Nation in the US, in terms of membership, and the Zuni Pueblo, both own lands in McKinley County. American Indians, with a population increase of 24,000 over the decade, comprised 12 percent of the total Cibola NF population in the two most recent censuses. The population of Asians and Pacific Islanders also increased modestly.

New Mexico was the first state in the United States with a total minority population exceeding that of the White Non-Hispanic population. White Non-Hispanics share of the total Cibola NF population dropped from 51 percent to 45 percent (not shown) between censuses. In 2000, While not shown in the table, White Non-Hispanics made up at least 70 percent of the population in Catron, Lincoln, and Sierra counties and the majority in Torrance and Sandoval counties.

Table 2.3 Racial / Ethnic Composition by County

	ETHNICITY		RACIAL GROUP					
	NON-HISPANIC	HISPANIC	WHITE ALONE	AFRICAN AMERICAN	AMERICAN INDIAN	ASIAN OR PACIFIC ISLANDER	OTHER	TOTAL
Year 1990								
Bernalillo	302,267	178,310	369,445	13,199	16,296	7,386	74,251	480,577
Catron	1,835	728	2,508	7	21	2	25	2,563
Cibola	15,685	8,109	13,899	191	9,155	81	468	23,794
Lincoln	8,792	3,427	11,175	65	132	28	819	12,219
McKinley	52,922	7,764	13,295	295	43,570	245	3,281	60,686
Sandoval	45,947	17,372	43,440	939	12,491	503	5,946	63,319
Sierra	7,533	2,379	9,254	39	77	12	530	9,912
Socorro	7,707	7,057	11,423	114	1,491	212	1,524	14,764
Torrance	6,393	3,892	8,951	43	128	23	1,140	10,285
Valencia	22,502	22,733	35,037	500	1,329	200	8,169	45,235
CIBOLA NF COUNTIES	**471,583**	**251,771**	**518,427**	**15,392**	**84,690**	**8,692**	**96,153**	**723,354**
Year 2000								
Bernalillo	323,113	233,565	393,851	15,401	23,175	11,325	112,926	556,678
Catron	2,864	679	3,109	10	78	26	320	3,543
Cibola	17,040	8,555	10,138	246	10,319	112	4,780	25,595
Lincoln	14,436	4,975	16,228	68	379	65	2,671	19,411
McKinley	65,522	9,276	12,257	296	55,892	376	5,977	74,798
Sandoval	63,471	26,437	58,512	1,535	14,634	992	14,235	89,908
Sierra	9,782	3,488	11,541	64	197	34	1,434	13,270
Socorro	9,268	8,810	11,365	116	1,974	216	4,407	18,078
Torrance	10,628	6,283	12,495	280	354	76	3,706	16,911
Valencia	29,781	36,371	44,001	837	2,183	292	18,839	66,152
CIBOLA NF COUNTIES	**545,905**	**338,439**	**573,497**	**18,853**	**109,185**	**13,514**	**169,295**	**884,344**

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations by UNM BBER.

Note: Ethnicity can be of any race. The "Other" group includes two or more races.

Table 2.4 Percent Racial / Ethnic Composition by County

	ETHNICITY		RACIAL GROUP					
	NON-HISPANIC	HISPANIC	WHITE ALONE	AFRICAN AMERICAN	AMERICAN INDIAN	ASIAN OR PACIFIC ISLANDER	OTHER	TOTAL
Year 1990								
Bernalillo	63%	37%	77%	3%	3%	2%	15%	100%
Catron	72%	28%	98%	0%	1%	0%	1%	100%
Cibola	66%	34%	58%	1%	38%	0%	2%	100%
Lincoln	72%	28%	91%	1%	1%	0%	7%	100%
McKinley	87%	13%	22%	0%	72%	0%	5%	100%
Sandoval	73%	27%	69%	1%	20%	1%	9%	100%
Sierra	76%	24%	93%	0%	1%	0%	5%	100%
Socorro	52%	48%	77%	1%	10%	1%	10%	100%
Torrance	62%	38%	87%	0%	1%	0%	11%	100%
Valencia	50%	50%	77%	1%	3%	0%	18%	100%
CIBOLA NF COUNTIES	**65%**	**35%**	**72%**	**2%**	**12%**	**1%**	**13%**	100%
TOTAL NM	62%	38%	89%	2%	8%	1%	0%	100%
Year 2000								
Bernalillo	58%	42%	71%	3%	4%	2%	20%	100%
Catron	81%	19%	88%	0%	2%	1%	9%	100%
Cibola	67%	33%	40%	1%	40%	0%	19%	100%
Lincoln	74%	26%	84%	0%	2%	0%	14%	100%
McKinley	88%	12%	16%	0%	75%	1%	8%	100%
Sandoval	71%	29%	65%	2%	16%	1%	16%	100%
Sierra	74%	26%	87%	0%	1%	0%	11%	100%
Socorro	51%	49%	63%	1%	11%	1%	24%	100%
Torrance	63%	37%	74%	2%	2%	0%	22%	100%
Valencia	45%	55%	67%	1%	3%	0%	28%	100%
CIBOLA NF COUNTIES	**62%**	**38%**	**65%**	**2%**	**12%**	**2%**	**19%**	100%
TOTAL NM	58%	42%	86%	2%	9%	1%	2%	100%

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations by UNM BBER.

Note: Ethnicity can be of any race. The "Other" group includes two or more races.

2.3 Age of Population

Table 2.5 presents data on the changing age composition of the population by county in the assessment area. Shown are the percentages of those within each cohort as derived from the 1990 and 2000 Censuses followed by BBER's projections for each age cohort in 10-year increments until 2030. As can be seen, throughout the assessment area, the population aged over the decade of the 1990's. The population under age 15 is shrinking and the population over age 65 typically increasing their share. Two exceptions stand out: In both Sierra, which has a large retirement community, and Torrance, the percentage 65 and older shrank, as did the population under 15, while the working-age population expanded. The general aging of the population in the Cibola NF counties corresponds with the national trend, that the American population is becoming older.[29,30]

[29] United States Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, Wan, H., Sengupta, M., Velkoff, V., DeBarros, K. (December 2005). *65+ in the United States 2005*. Washington, DC. Retrieved October 2006, http://www.census.gov/prod/2006pubs/p23-209.pdf.

The 15-64 age cohort represents those of working age. This cohort increased its share of the population in all of the counties during the decade of the 1990s. Looking forward, however, this cohort is projected to lose share – in the current decade and beyond (the cases of Bernalillo, Catron, Cibola and Lincoln) or after 2010 (the remaining counties in the assessment area).

Of interest are Sierra, Lincoln, and Catron counties. While the average age was 35 in New Mexico in 2000, in the aforementioned counties the average age was 49, 44, and 48, respectively. We have noted the growth in the working age population in Sierra during the 1990's. In Lincoln and Catron Counties, the population 65 and old increased by two and a half percentage points, while that under 15 declined by three or more percentage points. Both counties may have lost some of their younger members to job opportunities elsewhere, but both seem also to have attracted in-migration by those of retirement age.

The aging of the population in the assessment counties may be expected to place new demands on the Cibola NF, since the recreational uses and interests may change,[31] but retirees may have the leisure time to volunteer their services or to become involved in partnerships with the FS. Nationally, aging populations present new challenges for governments, as those retiring from the workforce expect to receive services funded through revenues generated by a workforce, which is a shrinking portion of the total population. These retirees will compete for federal and state funds as they seek services such as Medicaid and Social Security. One consequence for Federal agencies like the Forest Service may be increased competition for funding in an era of flat or declining government revenues.

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[30] United Nations Department of Economic and Social Affairs, Population Division, *Report: World Population Ageing: 1950-2050.* http://www.un.org/esa/population/publications/worldageing19502050/, and Profile: United States of America, http://www.un.org/esa/population/publications/worldageing19502050/pdf/207unite.pdf.

[31] The relationship between age and pursuit of outdoor recreational activities is generally found to be an inverse relationship, with younger people more active in their pursuit of outdoor recreational activities. However, the importance of age varies depending upon the type of activity. See H. Ken Cordell , Gary T. Green , and Carter J. Betz, "*Recreation and the Environment as Cultural Dimensions in Contemporary American Society*," Leisure Sciences Vol 24, No 1 / January 01, 2002, pp. 13 – 41. See also, Bergstrom, John C. and Cordell, H. Ken, "*An Analysis of the Demand for and Value of Outdoor Recreation in the United States*," Journal of Leisure Research, v23 n1 p67-86 1991.

Table 2.5 Age of Population by Broad Cohort & County

		Percent Distribution				
		Actual		Projections		
County	Age	1990	2000	2010	2020	2030
Bernalillo	0 - 14	22.4%	21.0%	19.4%	18.6%	17.6%
	15 - 64	67.2%	67.5%	67.2%	63.6%	60.6%
	65 yrs. & over	10.5%	11.5%	13.4%	17.8%	21.8%
Catron	0 - 14	22.0%	16.3%	13.2%	14.5%	14.7%
	15 - 64	62.6%	64.9%	57.8%	48.9%	46.3%
	65 yrs. & over	15.4%	18.8%	29.0%	36.6%	39.1%
Cibola	0 - 14	28.8%	25.4%	22.5%	21.2%	19.8%
	15 - 64	62.9%	63.9%	63.6%	60.3%	56.4%
	65 yrs. & over	8.4%	10.7%	13.9%	18.4%	23.8%
Lincoln	0 - 14	21.5%	18.5%	13.9%	13.7%	13.2%
	15 - 64	63.2%	63.7%	60.8%	55.0%	52.0%
	65 yrs. & over	15.3%	17.9%	25.2%	31.4%	34.8%
McKinley	0 - 14	33.5%	31.7%	23.6%	22.5%	21.0%
	15 - 64	60.3%	61.4%	67.6%	65.1%	62.2%
	65 yrs. & over	6.1%	6.9%	8.9%	12.4%	16.8%
Sandoval	0 - 14	27.9%	24.6%	18.9%	18.2%	17.5%
	15 - 64	62.1%	64.8%	67.6%	63.7%	59.9%
	65 yrs. & over	10.0%	10.6%	13.5%	18.1%	22.7%
Sierra	0 - 14	16.7%	16.4%	12.7%	13.0%	12.5%
	15 - 64	51.6%	55.9%	56.6%	53.3%	50.8%
	65 yrs. & over	31.7%	27.7%	30.7%	33.7%	36.8%
Socorro	0 - 14	25.6%	23.3%	19.7%	19.4%	18.1%
	15 - 64	64.0%	65.8%	66.0%	62.4%	60.3%
	65 yrs. & over	10.5%	10.9%	14.3%	18.2%	21.6%
Torrance	0 - 14	26.8%	25.2%	18.7%	19.5%	18.5%
	15 - 64	61.8%	64.9%	68.8%	63.5%	59.7%
	65 yrs. & over	11.3%	9.8%	12.4%	17.0%	21.9%
Valencia	0 - 14	26.1%	25.1%	20.9%	20.7%	19.8%
	15 - 64	63.9%	64.8%	66.8%	63.7%	61.1%
	65 yrs. & over	10.0%	10.2%	12.3%	15.6%	19.2%
CIBOLA NF COUNTIES	0 - 14	24.3%	22.3%	19.3%	18.6%	17.6%
	15 - 64	65.4%	66.5%	67.1%	63.2%	60.0%
	65 yrs. & over	10.4%	11.2%	13.6%	18.3%	22.4%
NEW MEXICO	0 - 14	25.1%	23.0%	20.0%	19.2%	17.9%
	15 - 64	64.2%	65.3%	66.1%	62.6%	59.7%
	65 yrs. & over	10.7%	11.7%	13.9%	18.2%	22.4%

Source: New Mexico County Population Projections: July 1, 1990 to July 1, 2030; UNM-BBER, April 2004.

2.4 Income and Poverty

The first column of **Table 2.6** presents data from the decennial Census on per capita income in 1989 and 1999 in constant 1999 dollars by county for the assessment area. As can be seen, per capita income increased in all counties over the decade.[32] On a percentage basis, per capita income increased the most in Lincoln County. Since the population is small, this result could reflect changes at the higher income levels. As indicated in **Appendix Table A.1,** Lincoln County experienced a high level of in-migration from outside the county between 1995 and 2000. Sandoval County also exhibited substantial per capita income growth along with rapid population growth.

Table 2.6 Per Capita Income and Persons in Poverty, 1989 & 1999

	1989			1999		
	Per Capita Income	Persons Below Poverty	Percent of Persons Below Poverty	Per Capita Income	Persons Below Poverty	Percent of Persons Below Poverty
Bernalillo	17,643	68,845	14%	20,790	74,987	13%
Catron	11,080	657	26%	13,951	860	24%
Cibola	8,829	7,753	33%	11,731	6,054	24%
Lincoln	13,888	2,384	20%	19,338	2,855	15%
McKinley	8,602	26,118	43%	9,872	26,664	36%
Sandoval	14,080	9,852	16%	19,174	10,847	12%
Sierra	13,140	1,882	19%	15,023	2,706	20%
Socorro	11,881	4,282	29%	12,826	5,539	31%
Torrance	11,616	2,153	21%	14,134	3,106	18%
Valencia	13,295	8,288	18%	14,747	10,806	16%
TOTAL CIBOLA COUNTIES	**15,659**	**132,214**	**18%**	**18,552**	**144,424**	**16%**
TOTAL NM	14,596	305,934	21%	17,261	328,933	18%

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations by UNM BBER.

Note: The poverty line is the federal established poverty level. Per capita income is in 1999 dollars. The 1989 per capita income figures were adjusted for the effects of inflation using the Consumer Price Index (CPI-U-RS)

Per capita income in 1999 varies significantly by county, ranging from a high of $20,790 in Bernalillo County to less than half that amount ($9,872) in McKinley County. Per capita income exceeded the 2000 New Mexico average of $17,261 only in Bernalillo, Sandoval, and Lincoln counties.

[32] Calculated from self-reported income in 1989 and 1999. The Census definition of income is different from and the estimates produced generally lower than the US Bureau of Economic Analysis. The Census definition is closer to a “cash received” concept. According to the Census Bureau website (factfinder.census.gov), "Total income" is the sum of the amounts reported separately for wages, salary, commissions, bonuses, or tips; self-employment income from own non-farm or farm businesses, including proprietorships and partnerships; interest, dividends, net rental income, royalty income, or income from estates and trusts; Social Security or Railroad Retirement income; Supplemental Security Income (SSI); any public assistance or welfare payments from the state or local welfare office; retirement, survivor, or disability pensions; and any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony.

Table 2.6 also shows the percentage of persons who were living below the federal poverty level in each of the counties in the assessment area. In 1999, 144,000 persons lived in poverty in the Cibola NF counties, an increase of more than 12,000 persons from 1989. However, the poverty rate declined from 18 percent to 16 percent for the entire assessment area, compared to a decline from 21 percent to 18 percent for the state as a whole. While real per capita income grew in each of the assessment counties, the population living below poverty actually increased in Sierra and Socorro Counties. Note that in the non-metro counties, the poverty rate was in every case above the New Mexico average of 18.4 percent in 1999. While reductions were evident in rural counties like Cibola, Catron, Socorro, and McKinley counties, the percentage of population living under poverty is, in each case, exceedingly high. McKinley County, with its high percentage of Native Americans, had more than one-third of the population below poverty. As one would expect, Bernalillo and Sandoval counties, where most of the population and industry are located, had the lowest poverty rates in the assessment area with 13 and 12 percent respectively.

As is evident in **Table 2.7**, poverty in the assessment area tracks with race and ethnicity. Over one third of those identifying as American Indian lived under the federal poverty level in 2000. Among American Indians, poverty is greatest in the rural counties. Nevertheless, even in urban areas their rates of poverty exceed those of other racial and ethnic cohorts. Poverty rates by race in the assessment area were: Whites (12%), African Americans (19%), American Indians (37%), Asians (13%), and "Other" (21%). Twenty percent of Hispanics in the assessment counties lived below poverty, compared to 15% of Non-Hispanics. Sandoval County had the lowest percentage of Hispanics below poverty, with virtually no difference between Hispanics and Non-Hispanics.

Rising incomes are associated with increased demand for outdoor recreation.[33] Traditionally, many people in rural communities went into the forest to gather wood and to hunt, and these types of activities continue to be of importance to nearby residents.[34] Those living near or below the poverty level may supplement a meager income by engaging in various subsistence activities, including hunting and fuel wood gathering, as well as in efforts to bring cash into the family, such as selling pinon nuts, fire wood and Christmas trees from the NF.

[33] Rising incomes are associated with increased demand for outdoor recreation. See, John C. Bergstrom and H. Ken Cordell, *"An Analysis of the Demand for and Value of Outdoor Recreation in the United States*," Journal of Leisure Research, v23 n1 p67-86 1991. Also see H. Ken Cordell , Gary T. Green , and Carter J. Betz, "*Recreation and the Environment as Cultural Dimensions in Contemporary American Society*," Leisure Sciences Vol 24, No 1 / January 01, 2002, pp. 13 – 41.

[34] See summaries of focus groups with residents living near each of the ranger districts in J.D. Russell & P.A. Adams-Russell, (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005.

Table 2.7 Percent in Poverty by Race and Ethnicity, 2000

	ETHNICITY		RACIAL GROUP					
	NON-HISPANIC	HISPANIC	WHITE	AFRICAN AMERICAN	AMERICAN INDIAN	ASIAN	OTHER	TOTAL
Bernalillo	31,041	43,946	42,902	2,877	5,688	1,517	22,003	74,987
Catron	733	127	728	0	70	0	62	860
Cibola	4,057	1,997	1,228	29	3,306	7	1,484	6,054
Lincoln	1,585	1,270	2,040	3	74	0	738	2,855
McKinley	24,274	2,390	1,441	87	23,464	21	1,651	26,664
Sandoval	7,790	3,057	3,657	116	5,251	59	1,764	10,847
Sierra	1,699	1,007	2,249	10	66	0	381	2,706
Socorro	2,776	2,763	2,448	47	1,309	39	1,696	5,539
Torrance	1,614	1,492	2,078	28	16	0	984	3,106
Valencia	2,973	7,833	6,399	97	239	0	4,071	10,806
CIBOLA NF COUNTIES	**78,542**	**65,882**	**65,170**	**3,294**	**39,483**	**1,643**	**34,834**	**144,424**
Percent of Total Group								
Bernalillo	10%	19%	11%	20%	26%	15%	19%	14%
Catron	26%	20%	23%	0%	67%	0%	22%	24%
Cibola	25%	25%	13%	21%	33%	5%	32%	25%
Lincoln	11%	26%	13%	5%	24%	0%	28%	15%
McKinley	37%	26%	12%	29%	43%	6%	28%	36%
Sandoval	12%	12%	6%	9%	35%	7%	12%	12%
Sierra	18%	30%	20%	32%	35%	0%	27%	21%
Socorro	31%	32%	23%	64%	65%	25%	39%	32%
Torrance	16%	25%	17%	26%	6%	0%	27%	19%
Valencia	10%	22%	15%	16%	12%	0%	22%	17%
CIBOLA NF COUNTIES	**15%**	**20%**	**12%**	**19%**	**37%**	**13%**	**21%**	17%
TOTAL NM	16%	20%	14%	23%	36%	14%	24%	18%

Source: US Census Bureau, Decennial Census, 2000. Calculations by UNM BBER.

Note: The poverty line is the federal established poverty level. Ethnicity can be of any race.

2.5 Household Composition

Total households in the assessment area grew by 69,000 over the decade of the 1990s to number 333,000 in 2000. **Table 2.8** presents household composition by type of household for 1990 and 2000. Households in the assessment area are exhibiting the same trend as seen in the US, where there are proportionally more single households, or non-family households headed by a single person, and more households headed by a female, with children or other dependents and no male head who is present. In 2000, for example, Catron County had 1,587 total households, of which 471 (30%) are single households and 140 (9%) are female-headed family households.

The 13 percent of female households in the assessment area parallels that of the state as a whole. In general, there are fewer female headed households in counties where ranching is a predominant industry, such as Catron, Lincoln, and Sierra. Counties with high Native American populations, such as Cibola and McKinley, show much higher rates of female-headed households.

Both the number and the percentage share of single households have been increasing because of a trend in marrying at later ages. However, roughly one-third of the residents in single person households in the state are over 65 years of age.

Table 2.8 Type of Household, 1990 & 2000

	Number of Households			Percent of Total Households	
	Total	Single	Female Headed Family	Single	Female Headed Family
Year 1990					
Bernalillo	185,445	48,091	20,967	26%	11%
Catron	1,063	269	69	25%	6%
Cibola	7,197	1,287	1,049	18%	15%
Lincoln	4,761	1,176	398	25%	8%
McKinley	16,864	3,081	3,093	18%	18%
Sandoval	20,925	3,486	2,252	17%	11%
Sierra	4,431	1,425	324	32%	7%
Socorro	5,297	1,249	627	24%	12%
Torrance	3,681	770	329	21%	9%
Valencia	15,192	2,609	1,615	17%	11%
CIBOLA NF COUNTIES	**264,856**	**63,443**	**30,723**	**24%**	**12%**
Year 2000					
Bernalillo	220,939	62,898	27,894	28%	13%
Catron	1,587	471	140	30%	9%
Cibola	8,335	1,740	1,416	21%	17%
Lincoln	8,206	2,196	777	27%	9%
McKinley	21,441	4,182	4,826	20%	23%
Sandoval	31,412	6,255	3,733	20%	12%
Sierra	6,103	2,194	506	36%	8%
Socorro	6,690	1,763	955	26%	14%
Torrance	6,067	1,393	745	23%	12%
Valencia	22,714	4,274	2,915	19%	13%
CIBOLA NF COUNTIES	**333,494**	**87,366**	**43,907**	**26%**	**13%**

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations done by UNM BBER.
Note: Single households are non-family households headed by a single person. Female headed family households include children.

2.6 Educational Attainment

Table 2.9 presents educational attainment for the 25-year and older population in 1990 and 2000. Attainment levels generally advanced in 2000, compared to a decade earlier, as the share of the population with at least some college or a college degree increased, while those with high school or less declined.

Table 2.9 Educational Attainment by County (%)

	Less than 9th Grade	9th to 12th Grade	HS Grad or GED	Some College; no degree	Assoc., BA/BS or More	Total
Year 1990						
Bernalillo	7%	11%	28%	22%	32%	100%
Catron	11%	15%	31%	19%	23%	100%
Cibola	15%	19%	38%	15%	14%	100%
Lincoln	10%	13%	32%	25%	20%	100%
McKinley	21%	20%	30%	14%	15%	100%
Sandoval	8%	12%	31%	23%	25%	100%
Sierra	17%	19%	35%	17%	12%	100%
Socorro	17%	16%	31%	17%	20%	100%
Torrance	13%	15%	39%	20%	14%	100%
Valencia	11%	16%	34%	22%	17%	100%
CIBOLA NF COUNTIES	**9%**	**13%**	**29%**	**21%**	**28%**	**100%**
TOTAL NM	11%	14%	29%	21%	25%	100%
Year 2000						
Bernalillo	6%	10%	25%	23%	36%	100%
Catron	7%	14%	29%	24%	25%	100%
Cibola	9%	16%	37%	21%	18%	100%
Lincoln	5%	10%	28%	27%	29%	100%
McKinley	16%	19%	28%	20%	18%	100%
Sandoval	5%	9%	29%	25%	32%	100%
Sierra	9%	15%	31%	26%	19%	100%
Socorro	12%	16%	29%	19%	24%	100%
Torrance	8%	15%	33%	25%	19%	100%
Valencia	9%	15%	32%	23%	21%	100%
CIBOLA NF COUNTIES	**7%**	**11%**	**27%**	**23%**	**32%**	**100%**
TOTAL NM	9%	12%	27%	23%	29%	100%

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations done by UNM-BBER.

In 2000, the population with at least some college measured 55 percent, improving from 49 percent in 1990. The changes in the assessment area are in the same direction as those of New Mexico. Thirty-six percent of the 25 and older population in Bernalillo County had a post secondary degree in 2000 – the highest percent among the Cibola NF counties. While making advances between censuses, Socorro (12%) and McKinley (16%) counties both have a significant proportion of adults with a ninth grade or lower education level. The state average in 2000 was 9 percent. The percentage of those with at least some college level education varied by county in 2000, ranging from McKinley County (38%) to Bernalillo County (59%). McKinley County also has the highest proportion (35%) of persons with less than a high school education.

Educational attainment is closely tied to one's ability to generate income. The average earnings of a person with a bachelor's degree in 2005 were 80% more than those of someone with a high

school diploma.[35] As educational attainment increases, the likelihood of poverty decreases. This correlation is also evident in the assessment area by reviewing the counties with a high percentage of persons with less than a high school education as shown in Table 2.7 and comparing it to the counties with high percentages of poverty shown previously in Table 2.5.

Increasing incomes and education in the assessment area counties are likely to place additional demands on the Cibola NF in terms of recreation.[36] Reducing poverty could make communities less dependent on forest products for subsistence and for cash income.

2.7 Housing

Table 2.10 presents figures from the 1990 and 2000 Census on the number of housing units and the occupied status of these units in each county in the assessment area. As would be expected, the number of dwellings in all counties has increased as population has increased. The housing stock expanded by over 73,000 units between 1990 and 2000. While the housing stock increased about 20 percent in the Cibola NF area, the stock grew at more than twice that rate in Sandoval, Torrance, and Valencia Counties – the Albuquerque MSA counties abutting Bernalillo County.

Table 2.10 Housing Units and Whether Occupied

	1990			2000		
	Total	Occupied	Vacant	Total	Occupied	Vacant
Bernalillo	201,235	185,582	15,653	239,074	220,936	18,138
Catron	1,552	1,010	542	2,548	1,584	964
Cibola	9,692	7,292	2,400	10,328	8,327	2,001
Lincoln	12,622	4,789	7,833	15,298	8,202	7,096
McKinley	20,933	16,588	4,345	26,718	21,476	5,242
Sandoval	23,667	20,867	2,800	34,866	31,411	3,455
Sierra	6,457	4,428	2,029	8,727	6,113	2,614
Socorro	6,289	5,217	1,072	7,808	6,675	1,133
Torrance	4,878	3,670	1,208	7,257	6,024	1,233
Valencia	16,781	15,170	1,611	24,643	22,681	1,962
CIBOLA NF COUNTIES	**304,106**	**264,613**	**39,493**	**377,267**	**333,429**	**43,838**

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations done by UNM-BBER.

Of interest is the high number of vacant houses in Lincoln (46%), Catron (38%), and Sierra (30%) Counties in 2000. As indicated in **Table 2.11** below, the majority of these vacant homes are for seasonal or recreational use. Note that both the number and the percent of homes classified as vacant in Lincoln County decreased over the decade, suggesting that some vacationers may have decided to become permanent residents. Both Catron and Sierra Counties saw sizeable gains in the number of vacant homes, but in Sierra these homes declined as a percent of the total.

[35] http://www.census.gov/population/www/socdemo/educ-attn.html. According to the press release for the Current Population Survey 2005 data on education and earnings, "Adults age 18 and older with a bachelor's degree earned an average of $51,554 in 2004, while those with a high school diploma earned $28,645… Those without a high school diploma earned an average of $19,169..." www.census.gov/Press-elease/www/releases/archives/education/007660.h

[36] Bergstrom and Cordell. 1991. “An Analysis of the Demand for and Value of Outdoor Recreation in the United States.” Journal of Leisure Research. 23:1:79.

As demonstrated in Table **2.12**, the housing stock in the assessment area is relatively new, ranging from an average of 17 years in Sandoval County to 30 years in Socorro County. The stock in the counties where the greatest percentage of new building has occurred (Sandoval, Torrance, and Valencia) yields a lower average housing age. Also shown is the percentage of households that lack complete plumbing. There is a correlation between counties of high poverty (Table 2.5) and the lack of plumbing in a dwelling. In New Mexico the average age of the housing stock rose from 22 to 27 years and the proportion of households without plumbing stayed level at 3 percent. The number of houses that lacked plumbing facilities increased by 1,827 units between 1990 and 2000, but declined from 4 percent to 3 percent of the stock. McKinley County has the highest proportion of houses (28%) that lacked plumbing facilities in 2000. The majority of counties improved but three showed a small increase in the housing units that lacked complete plumbing.

Table 2.11 Vacant Housing by Type

	For rent	For sale only	Rented or sold, not occupied	Seasonal or recreatl use	For migrant workers	Other vacant	Total vacant
Year 1990							
Bernalillo	53%	12%	5%	2%	0%	27%	100%
Catron	10%	6%	2%	48%	4%	30%	100%
Cibola	16%	5%	6%	20%	0%	52%	100%
Lincoln	5%	6%	2%	81%	0%	6%	100%
McKinley	9%	4%	9%	22%	1%	56%	100%
Sandoval	11%	14%	8%	25%	0%	40%	100%
Sierra	16%	9%	2%	49%	2%	22%	100%
Socorro	28%	8%	2%	7%	1%	53%	100%
Torrance	7%	14%	5%	21%	1%	53%	100%
Valencia	26%	21%	9%	5%	3%	35%	100%
CIBOLA NF COUNTIES	**28%**	**10%**	**5%**	**27%**	**1%**	**30%**	**100%**
Year 2000							
Bernalillo	59%	17%	5%	9%	0%	11%	100%
Catron	1%	6%	1%	67%	0%	24%	100%
Cibola	12%	6%	4%	49%	0%	28%	100%
Lincoln	5%	4%	1%	86%	0%	4%	100%
McKinley	7%	6%	3%	40%	0%	44%	100%
Sandoval	20%	17%	8%	37%	0%	18%	100%
Sierra	12%	10%	3%	62%	0%	12%	100%
Socorro	23%	11%	8%	29%	0%	29%	100%
Torrance	10%	18%	10%	22%	0%	41%	100%
Valencia	25%	27%	5%	19%	0%	24%	100%
CIBOLA NF COUNTIES	**31%**	**12%**	**4%**	**35%**	**0%**	**17%**	**100%**

Table 2.12: Age of Housing Stock and Plumbing Availability

	Average Age of Housing Stock		Lacking Complete Plumbing Facilities	
	1990	**2000**	**1990**	**2000**
Bernalillo	22.8	27.1	0.5%	0.5%
Catron	28.7	28.9	10.1%	10.8%
Cibola	23.8	28.3	10.8%	10.3%
Lincoln	22.3	23.5	1.4%	1.3%
McKinley	20.1	23.9	30.4%	27.7%
Sandoval	15.2	17.2	5.6%	3.6%
Sierra	24.7	28.8	1.2%	2.6%
Socorro	26.2	30.3	5.4%	5.5%
Torrance	23.7	22.6	3.6%	3.0%
Valencia	19.5	20.6	1.4%	1.3%
CIBOLA NF COUNTIES	**22.7**	**25.1**	**3.6%**	**3.4%**
TOTAL NM	22.2	27.0	3.0%	3.0%

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations done by UNM-BBER.

For the four counties surrounding the Sandia Ranger District (Bernalillo, Sandoval, Torrance, and Valencia) data are collected on building permits by the Middle Rio Grande Council of Governments (MRCOG) from local governments in the region and used in regional planning. For planning purposes, the data are grouped into relatively small geographic areas know as Data Analysis Sub Zones (DASZ). Data by DASZ were available from 2000 through July of 2005 in most cases. By looking at building permits issued for single-family housing from DASZs at the edge of the Sandia RD one can gain an understanding of how increasing populations may be encroaching on the wildland-urban interface (WUI).

Table 2.13 presents the number of permits issued from the DASZs on the Sandia RD edge from 2000 until mid-2005. For the Sandia RD, DASZs that touch the district were only found in the Sandoval and Bernalillo counties. Data are aggregated to the county level for Bernalillo and the southeastern corner of Sandoval counties. As can be seen, over 2000 total permits have been issued in the last five years[37]. In Bernalillo County, 49 percent of these permits (746 of the 1,528) were issued in three DASZs in the foothills to the west of the Sandia Mountains. Two DASZs of note in Bernalillo County for future planning are on the east side of the Sandia Mountains and numbered 3021 and 3031. These DASZs include PAAKO, a high-end community of expensive single-family dwellings built around a golf course. According to planners at MRCOG, PAAKO is projected to grow to 1,400 single-family units over the next 20 years. Similarly, many of those houses permitted in the southeastern part of Sandoval County are more expensive single-family homes. These are homes on the northern edge of the Sandia RD near the community of Placitas.

[37] This number is for single-family homes. Only four multi-family structures were indicated in the permit data for the DASZs included and all of these were four-plexes.

Table 2.13: Total Permits for Single Family Dwellings in DASZs Abutting the Sandia Ranger District

	2000	2001	2002	2003	2004	2005	Total
Bernalillo County	347	278	292	288	252	71	1,528
Sandoval County	85	94	108	117	74	29	507
Total	432	372	400	405	326	100	2,035

2.8 Net Migration

Table 2.14 examines the net migration into the assessment area at the county level. In each decennial Census, respondents are asked about their county and state of residence five years previous. Shown in **Table 2.14** then are only those in New Mexico who are five years of age or older. Thus, for the assessment area in 2000, approximately 47 percent of those in the area were movers (had changed addresses in the past five years). Of the 387,011 movers, 201,851 (52%) had moved from a house in the county of residence to another house within the same county. In the assessment area 99,616 persons (26%) moved to the area from other states. Of those who moved from other states, the regions of origin are Northeast (9%), Midwest (16%), South (30%), and West (44%), belying the perception that many of the in-migrants to the Southwest are escaping from the colder North. It is notable that Texas is in the South region and that California dominates the West region.

Table 2.14 Net Migration

	NEW MEXICO				TOTAL CIBOLA NF COUNTIES			
	1990	2000	% of Total 1990	% of Total 2000	1990	2000	% of Total 1990	% of Total 2000
TOTAL	1,390,048	1,689,911	100	100	663,759	821,452	100	100
Same House	719,628	919,717	52	54	333,691	434,441	50	53
Different House	670,420	770,194	48	46	330,068	387,011	50	47
in the United States	645,519	731,488	46	43	319,796	370,681	48	45
Same County	345,469	400,128	25	24	169,509	201,851	26	25
Different County	300,050	331,360	22	20	150,287	168,830	23	21
Same State	107,289	126,093	8	7	57,633	69,214	9	8
Different State	192,761	205,267	14	12	92,654	99,616	14	12
Northeast	14,311	15,329	1	1	8,068	8,674	1	1
Midwest	28,270	29,457	2	2	16,143	15,831	2	2
South	73,548	72,497	5	4	29,978	30,614	5	4
West	76,632	87,984	6	5	38,465	44,497	6	5
Puerto Rico	110	398	0	0	59	229	0	0
Elsewhere	24,791	38,308	2	2	10,213	16,101	2	2

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations done by UNM BBER.

Minimal differences in these percentages occur in the assessment area between the 1990 and 2000 Census data. Overall, in 1990 a higher percentage of movers who came to New Mexico were from the Midwest and the South. The total number of movers into the assessment area from other Western states is up slightly between 1990 and 2000. At the county level, only Lincoln County breaks this trend: the people moving into Lincoln from out-of-state are from the South, most likely Texas.

2.9 Opportunities, Risks and Special Circumstances

The assessment area for Cibola NF mountain ranger districts includes the largest metropolitan area in the state, the Albuquerque MSA, with a population now exceeding 800,000. It includes some of the fastest growing communities in the county, among them Rio Rancho, which experienced a 4-fold increase in population between 1980 and 2000 and now has a population approaching 70,000. Move away from Sandia RD, which is surrounded by the MSA, however, and the picture changes from that of a dynamic fast growing urban center to that of small rural communities, many of which have experienced little if any growth over the past few decades. The contrast is sharp. Bernalillo County, with a population that today exceeds 600,000 had a population density approaching 500 people per square mile in 2000; Catron County, with 3,400 people (estimated in 2005, down from 3,543 in 2000) had a population density of 0.5 people per square mile in 2000. The large and growing population base in the Albuquerque MSA is a special circumstance that affects management decisions not simply in the Sandia RD but throughout the Cibola NF. The diverse size, differing growth paths and contrasting demographics of the communities in the assessment area, however, also create a special set of circumstance for the Cibola NF.

The population increased in all counties between 1990 and 2000, as did real per capita income, and these changes may be expected to impact forest use, particularly the demand for recreation.[38]

Counties where poverty is most prevalent include rural counties, those with high percentages of minority populations (especially Native Americans), those that exhibit lower levels of education, and those with more housing with no indoor plumbing facilities. Poverty rates fell dramatically in some areas, particularly in McKinley and Cibola Counties, although there were slight increases in both Sierra and Socorro counties. Despite these improvements, people in many rural communities will continue to be more dependent on agriculture and other traditional uses, such as grazing, wood gathering and piñon harvesting. Management decisions that curtail these uses could significantly impact the well-being of certain populations.

The demographic data developed in this chapter generally follow the demographics of the US as a whole – the population is aging, the population is becoming more racially diverse, educational attainment has increased, and per capita incomes have generally grown. More households are headed by women or are single person households. Cordell, Green and Betz have explored how the changing demographics may affect the demand for different types of outdoor recreation as well as environmental attitudes. Changing demographics and the attitudes and beliefs of various cohorts (whether age, race, income, or educational level), can result in differing expectations of how the lands should be managed.[39]

On a national level, America is aging and life spans are increasing as well.[40] The leading edge of the Baby Boomers reaches age 60 this year. As this massive cohort moves into their retirement years, they will have more leisure time to spend on various recreational pursuits, including travel,

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[38] Rising incomes are associated with increased demand for outdoor recreation. See, Bergstrom and Cordell. 1991. "An Analysis of the Demand for and Value of Outdoor Recreation in the United States." Journal of Leisure Research. 23:1:79. and Cordell, Green, and Betz "Recreation and the Environment as Cultural Dimensions in Contemporary American Society." Journal of Leisure Sciences. 24:1:13-41.
[39] Cordell, Green, and Betz "Recreation and the Environment as Cultural Dimensions in Contemporary American Society." Journal of Leisure Sciences. 24:1:13-41.
[40] U.S. Census Bureau. (October 2001). *Age: 2000, Census 2000 Brief*, Washington, D.C. http://www.census.gov/prod/2001pubs/c2kbr01-12.pdf.

but also on volunteer activities, from which the Cibola NF could benefit.[41] The aging of the US population and of the population in the assessment area counties can be expected to place new demands on Cibola NF for recreation as well as for more cultural and heritage displays and interpretive events. Serving this population may require investments in infrastructure to make areas of the forest more accessible to those with limited mobility. Many retirees become amenity migrants, and many come searching for sunshine, mountain vistas and opportunities for outdoor recreation -- all of which can be found in communities near the Cibola NF. Finally, the aging of the US population is already placing a heavy demand on federal entitlement programs, such as Medicare, Medicaid, and Social Security, intensifying the competition for federal dollars. Discretionary spending on Forest Service programs is at risk.

Finally, there are many who may desire to build houses at the wildland-urban interface. This was evidenced in the DASZ permit data obtained from the Mid-Region Council of Governments (MRCOG). New, single family dwellings at the edge of the Sandia RD continue to flourish. These are often more expensive houses built on land that is sold at premium prices, and their owners have a stake in NF policies and perhaps the clout to try to affect decisions. In addition to the access issues raised by this type of development, housing at the wildland-urban interface also impacts Cibola NF policies about fire and the reduction of fuel loads. Strategies for fighting fires when there are dwellings in or near the forest now must devote additional resources to the protection of those houses and the lives of their residents. Residents at the forest edge may also oppose thinning and thinning methods. Also, housing in the forest can alter access and impact forest use. New roads built to developments can impact forest health by creating runoff problems, air pollution problems, and access to new areas where unmanaged recreation can occur.

[41] The relationship between age and pursuit of outdoor recreational activities is generally found to be an inverse relationship, with younger people more active in their pursuit of outdoor recreational activities. However, the importance of age varies depending upon the type of activity. See Cordell , Green , and Betz, op. cit. and Bergstrom and Cordell, op. cit.

3 Access and Travel Patterns

This chapter discusses current and potential access issues in each of the Cibola National Forest Ranger Districts. The analysis considers current traffic patterns along major routes and future trends, including planned capital outlays, to identify potential limitations as well as expansions to future access.

The analysis is based wholly on secondary data, including information from the New Mexico Department of Transportation (NMDOT). The data on average annual daily traffic come from the Highway Performance Monitoring System (HPMS), maintained by the Federal Highway Administration (FHWA). These data can be accessed online at the Bureau of Transportation Statistics[42]. Estimates of the projected growth of vehicle miles traveled for counties in the assessment area are provided by the Environmental Protection Agency (EPA) and are based on 1996 HPMS data.[43] Geographical data on national roads are obtained from the ESRI ArcGIS® StreetMap USA 2004.

3.1 Location of Major Transportation Routes

Figure 3.1 presents a map of the principal highways and airports that serve the larger region. The two interstate highways which serve as major thoroughfares for the entire state are Interstate 40 (I-40), which is a major east-west cross-national shipping route, supporting high levels of heavy truck traffic, and Interstate 25 (I-25) which runs generally north-south through New Mexico, continuing into Colorado to the north, and ending in Las Cruces, NM in the south, where it also connects to Interstate 10. Interstates I-40 and I-25 intersect in Albuquerque at the "Big-I" interchange.

I-40 provides direct access to both the Mt. Taylor and Sandia RDs, which lie along its length. Though Interstate I-25 does not provide direct access to any of the forest areas, it does provide secondary access to the Sandia RD through the town of Placitas via State Highway 165, and to the Magdalena RD via State Highway 169, which comes in to Magdalena from the north. However, Magdalena RD is most readily accessed from Highway 60 (west), which meets I-25 in Socorro. Socorro is about 70 miles south of Albuquerque, and it's an additional 35 miles from Socorro to the town of Magdalena (from I-25). The Mountainair RD can be accessed by taking I-25 to Highway 60 (east), connecting in Bernardo. The town of Mountainair is about 48 miles away from I-25. The Mountainair RD can also be accessed from I-40, connecting to NM Route 41 near Tijeras. The distance between the Mountainair RD and I-40 is about 40 miles.
the town of Magdalena (from I-25). The map in Figure 3.1 shows the relative distance between the Mountainair and Magdalena Ranger Districts and the major Interstates and highways.

[42] Bureau of Transportation Statistics: The Intermodal Transportation Database, TranStats. (2006). Highway Performance Monitoring System - Core Data. http://www.transtats.bts.gov/databases.
[43] U.S. Environmental Protection Agency. (2000, March 24) VMT Growth Factors by State, Website: Technology Transfer Network Ozone Implementation. http://www.epa.gov/ttn/naaqs/ozone/areas/vmt/stindex.htm.

Figure 3.1 Map of Principal Highways and Airports in Region

Table 3.1 shows the distance of each ranger district to the major Metropolitan Statistical Areas (MSAs) in the southwestern region of the United States. The only major population bases within reasonable driving distance are Albuquerque, Santa Fe and Las Cruces, implying that most visitors to the forest come from within the state. Many of the cities listed below have a national forest located nearer than the Cibola NF, such as the Gila and Santa Fe NFs.

Table 3.1 Distance from Major Cities to Cibola National Forest Ranger Districts

	(Miles by Ranger District)			
City	**Mt Taylor**	**Mountainair**	**Magdalena**	**Sandia**
Albuquerque, NM	80	82	105	24
Amarillo, TX	364	292	392	277
Denver, CO	522	475	551	460
El Paso, TX	345	282	216	289
Farmington, NM	184	261	287	203
Las Cruces, NM	301	238	173	245
Lubbock, TX	398	281	426	310
Phoenix, AZ	391	545	348	487
Pueblo, CO	411	364	439	348
Roswell, NM	276	159	191	189
Santa Fe, NM	138	94	166	82
Tempe, AZ	405	558	337	500
Tucson, AZ	396	519	454	526

Source: http://www.mapquest.com

Table 3.2 is a list of roadways around the four ranger districts.

Table 3.2 Roadways Around Cibola National Forest

	Mt Taylor	**Magdalena**	**Mountainair**	**Sandia**
Interstate	**I-40**	**I-25**		**I-40**
US Route		**US 60**	**US 54** **US 60**	
State Road	**NM 53** **NM 602** **NM 117**	**NM 1** **NM 107** **NM 12** **NM 163** **NM 52** **NM 36**	**NM 337** **NM 42** **NM 55** **NM 41**	**NM 14** **NM 165** **NM 333** **NM 337** **NM 44** **NM 536** **NM 285** **NM 550**

Table 3.3 shows lane miles in each county in the assessment area by road classification. Except for Bernalillo County, all counties are mostly rural. NMDOT defines rural areas as areas where the population is under 5,000 persons; any area with more than 5,000 people is defined as an urbanized area.[44] According to the NMDOT Strategic Plan, the primary function of interstate and arterial roads is to move people and goods efficiently. The function of collector and local roads is to provide access to homes and businesses.

[44] Bureau of Transportation Statistics: The Intermodal Transportation Database, TranStats. (2006). Highway Performance Monitoring System - Core Data. http://www.transstats.bts.gov/Tableinfo.asp?Table_ID=1102.

Table 3.3 Lane Miles of Road by County and Classification

Rural					
		Other Principal			
County	Interstate	Arterial	Minor Arterial	Collector & Local	County Total
Bernalillo	191	1	0	1,112	1,304
Catron	0	171	121	3,481	3,773
Cibola	223	0	0	3,890	4,113
Lincoln	0	294	113	2,845	3,252
McKinley	235	103	159	5,320	5,818
Sandoval	103	388	94	4,280	4,865
Sierra	195	0	2	1,690	1,887
Socorro	307	102	157	3,419	3,986
Torrance	194	152	123	3,123	3,592
Valencia	88	19	0	662	769
Total	1,537	1,231	768	29,822	33,358

Urban					
		Other Principal			
County	Interstate	Arterial	Minor Arterial	Collector & Local	County Total
Bernalillo	230	876	401	3,092	4,599
Catron	0	0	0	0	0
Cibola	29	28	16	139	211
Lincoln	0	0	0	0	0
McKinley	42	63	9	173	287
Sandoval	10	75	55	105	245
Sierra	12	21	2	21	57
Socorro	18	18	2	123	160
Torrance	0	0	0	0	0
Valencia	6	8	3	88	104
Total	346	1,090	488	3,739	5,664

Source: US Department of Transportation HPMS Database

Five of the Cibola NF counties have Interstates passing through them: McKinley, Cibola, Bernalillo, Valencia, Socorro, and Sandoval. Bernalillo County has, by far, the most urban lane miles. McKinley County has the highest number of rural miles in the assessment area, and is second highest in urban miles, although well below Bernalillo County, primarily because of the I-40 corridor. Sandoval County is in a similar situation. However, Sandoval is growing much faster than McKinley. Catron and Lincoln Counties are not served by an interstate, but forest areas are still accessible by collector and local roads in Lincoln County, and by rural roads in Catron County. Catron, which is only served by rural roads, is home to the Datil Mountains of the Magdalena RD, as well as having a majority of the Gila National Forest within its boundaries.

3.2 Airports

The largest airport in the vicinity of the Cibola NF is the Albuquerque International Sunport in Albuquerque, New Mexico. It is the largest and busiest airport in New Mexico with roughly six million travelers a year.[45] Albuquerque is where two of New Mexico's major Interstates (I-25 and I-40) intersect, facilitating access to other areas of the state. Albuquerque Sunport is only 24 miles away from the Sandia RD, and it is also the closest major airport to the Magdalena and Mountainair RDs, 104 and 85 miles, respectively.

There are also a number of municipal airports near the RDs that can serve as access points to the Cibola NF. The nearest one to Sandia RD, besides Albuquerque International, is the Santa Fe Municipal Airport located about 9 miles west of Santa Fe and about one hour drive from Albuquerque. There are two airports near the Mt. Taylor RD, the Gallup Municipal Airport and the Crownpoint Airport. There are several other municipal airports throughout New Mexico (Socorro, Belen, Carrizozo), but the airports mentioned above are those that have regularly scheduled flights accessible to visitors. Refer back to **Figure 3.1** to see the airport locations on a map.

3.3 Traffic Flows

Table 3.4 shows estimated daily vehicle miles traveled (VMT) and VMT per lane mile by county for all counties in the assessment area. VMT are calculated by multiplying the Average Annual Daily Traffic (AADT)[46] by road length in an area. VMT per lane-mile offers a useful measure of the intensity of road traffic and is strongly correlated with population density. The measure is also useful in comparing traffic density among geographical areas.

Table 3.4 Daily Vehicle Miles Traveled

County	Estimated VMT	VMT per Lane-Mile
Bernalillo	6,467,424	1,096
Catron	37,588	10
Cibola	466,178	108
Lincoln	228,320	70
McKinley	728,337	119
Sandoval	716,562	140
Sierra	135,976	70
Socorro	208,162	50
Torrance	279,080	78
Valencia	545,156	624

Source: US Department of Transportation (2001), HPMS Database, Calculated by UNM-BBER

As expected, traffic is much heavier in Bernalillo than in other counties in the assessment area, with about 1,000 vehicles crossing any given stretch of road per day. Valencia County also has heavy traffic, with about 624 vehicles per day crossing any given stretch of road. Contributing to

[45] Albuquerque International Sunport Website. http://www.cabq.gov/airport/.
[46] The Average Annual Daily Traffic (AADT) is the daily flow of motor traffic averaged out over the year, providing a useful and simple measurement of how busy a given road is.

this heavy traffic are the many Valencia County residents who commute to and from Albuquerque.

Socorro County has relatively light traffic considering I-25 runs right through the county. Mountainair and Torrance Counties are the furthest away from the two major interstates in New Mexico, and are served mostly by less traveled highways and local roads.

The Environmental Protection Agency (EPA) estimates VMT growth factors using population projections for each county. **Figure 3.2** shows how traffic flows are expected to increase in the state's urban areas and in the areas near the Cibola NF between 2007 and 2030. [47] Growth rates are estimated to be moderately high in Bernalillo and Sandoval Counties. The Sandia RD is located in Bernalillo County, while Sandoval contains much of the Santa Fe NF. Torrance County is projected to have less growth in traffic than Bernalillo. Growth is also expected to be less dramatic in Socorro County, even though U.S. Highway 60, which is often used by travelers going between New Mexico and Arizona, meets I-25 in Socorro.

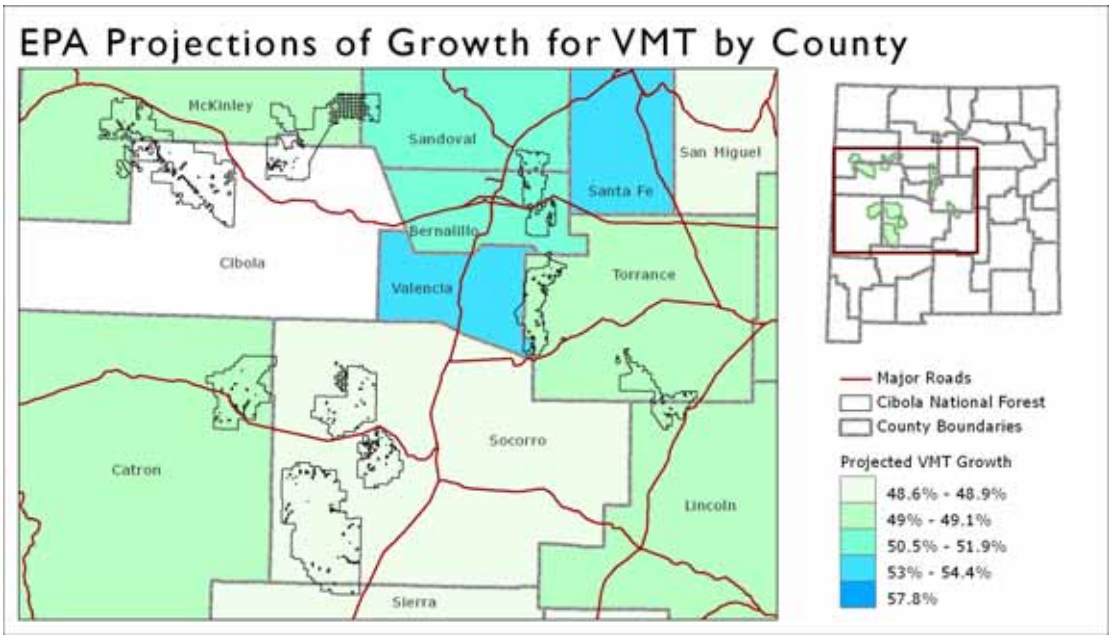

Figure 3.2 EPA Projections VMT Growth Through 2030

3.4 Capital Outlays and Transportation Infrastructure Improvements

As part of Governor Richardson's Investment Program (GRIP), monies have been programmed for transportation infrastructure improvements throughout New Mexico. Many of the projects are along Interstate 40, which is a major access route for both the Mt. Taylor and Sandia Ranger Districts. An exhaustive list of the projects can be found in the **Appendix Table A.2**. Below is a list and brief description of the major GRIP projects around the Cibola NF[48].

[47] U.S. Environmental Protection Agency. (2000, March 24). VMT Growth Factors by County: New Mexico. http://www.epa.gov/ttn/naaqs/ozone/areas/vmt/vmtnmgf.htm.
[48] Information and descriptions obtained from the NMDOT Strategic Plan 2004-2005

I-40 West of Gallup (4 miles) and I-40 Thoreau East (4 miles). The improvements will reconstruct east and west bound lanes with sub-grades designed to withstand heavy traffic. The original roadway was constructed on a clay sub-grade, not intended to maintain 56% heavy truck traffic (10,000 to 15,000 trucks daily).

I-40 Between Carlisle and Juan Tabo, in Albuquerque. This major undertaking will replace six miles of deteriorating road that is 15 to 20 years beyond its design life.

I-40 at Moriarty in Torrance County. This section serves truck traffic as well as daily commuters through Moriarty. The aim of the project is to reconstruct the road and add drainage and guardrail improvements.

US Route 54 Tularosa to Vaughn. This 120-mile stretch of road is part of a highway that connects Alamogordo to Santa Rosa. This portion of Route 54 passes immediately west of the Lincoln NF and runs along the southeastern edge of the Mountainair RD. The construction will include resurfacing, restoration and rehabilitation of the roadway.

US Route 54 Vaughn to Santa Rosa. This 38-mile stretch of road between Vaughn and Santa Rosa allows westbound travelers from I-40 a more immediate access to Mountainair RD.

Rail Runner. The Rail Runner is a new commuter rail project running between Belen, Albuquerque, and Bernalillo to ease traffic congestion and offer a commuter alternative. Its service will be extended to Santa Fe in mid-2008.

The GRIP program illustrates the state's investment to improve and expand the traffic capacity of I-40 near population centers like Albuquerque and Gallup. These improvements could result in more people accessing the forests, especially in the Sandia and Mt. Taylor RDs.

3.5 Forest Roads and Trails

Forest roads provide access for both forest users and FS officials and staff to areas within the Cibola NF. Access to the forest becomes critical in the event of a forest fire or other catastrophic event.

The Cibola NF features about 5,257 miles of roadways on forest-managed land.[49] About 78 percent of the total road miles are covered with "native materials," meaning a dirt road in most cases.[50] The next most common road treatment (165 miles) is crushed aggregate, which is composed of mostly gravel or other screened materials. Less than one percent of the roads are paved with asphalt. **Table 3.5** breaks down road types by ranger district. Magdalena RD clearly has the most forest road miles, probably due to its size of area in comparison to the other districts.

[49] Estimates of forest roads are based on data provided in the INFRA database. Any estimation errors inherent in the data (such as missing records) are not accounted for in this report. Duplicates were removed. This data includes all roads, including decommissioned roads.
[50] USDA Forest Service INFRA Data Dictionary.

Table 3.5 Lengths of Forest Roads and Road Types in Cibola National Forest

Surface Type	Segment Length Miles	Surface Type	Segment Length Miles	Surface Type	Segment Length Miles
District Not Identified		**Mt Taylor**		**Magdalena**	
Unidentified Type	1	Unidentified Type	273	Unidentified Type	1
Asphalt	2	Asphalt	0	Asphalt	5
Crushed Aggregat	52	Crushed Aggregat	81	Crushed Aggregat	0
Bituminous Surfac	28	Bituminous Surfac	4	Bituminous Surfac	0
Improved Native	17	Improved Native	14	Improved Native	8
Native Material	140	Native Material	1,420	Native Material	1,813
Other	16	Other	0	Other	0
Paved	473	Paved	0	Paved	0
TOTAL	**729**	**TOTAL**	**1,792**	**TOTAL**	**1,827**
Mountainair		**Sandia**		**Total Cibola Districts**	
Unidentified Type	64	Unidentified Type	18	Unidentified Type	357
Asphalt	0	Asphalt	0	Asphalt	7
Crushed Aggregat	25	Crushed Aggregat	7	Crushed Aggregat	165
Bituminous Surfac	1	Bituminous Surfac	9	Bituminous Surfac	42
Improved Native	47	Improved Native	1	Improved Native	87
Native Material	618	Native Material	119	Native Material	4,110
Other	0	Other	0	Other	16
Paved	0	Paved	0	Paved	473
TOTAL	**755**	**TOTAL**	**154**	**TOTAL**	**5,257**

Source: USDA Forest Service Infra Roads Database. Calculations done by UNM-BBER.

The FS maintains designated areas of forest wilderness as roadless areas - areas where roads cannot be constructed or reconstructed. See discussion in Chapter 6, "Special Areas."
The National Forest road and building infrastructure management systems (INFRA) database defines a trail as "a linear feature constructed for the purpose of allowing the free movement of people, stock or OHVs."[51] Cibola NF features nearly 300 developed trails, totaling almost 700 miles. [52] **Table 3.6** provides information on the linear miles and the number of forest trails in each ranger district. Magdalena RD and Mountainair RD each have high numbers of trail miles, but each has a very small number of actual trails. Sandia RD has the highest number of trail-miles (345), accounting for more than half of all trail miles in the Cibola NF. Sandia RD is the smallest district in area, but has the most visitors and developed recreational sites. A complete list of all trails in the Cibola NF is provided in the **Appendix Table A.3**.

[51] USDA Forest Service (2003, June). Official Trail Designations. USDA FS Website. http://www.fs.fed.us/r3/measures/Inventory/Trails.htm.
[52] Estimates of forest trails are based on data provided in the INFRA database. Any estimation errors inherent in the data (such as missing records) are not accounted in this report. Duplicates were also removed.

Table 3.6 Trail Types and Lengths in the Cibola National Forest[53]

Trail Type	Segment Length (Miles)	Trail Type	Segment Length (Miles)
District Not Identified		**Mt Taylor**	
Snow Trail	0	Snow Trail	4
Standard/Terra Trail	5	Standard/Terra Trail	17
TOTAL	5	**TOTAL**	21
Mountainair		**Sandia**	
Snow Trail	0	Snow Trail	55
Standard/Terra Trail	104	Standard/Terra Trail	290
TOTAL	104	**TOTAL**	345
Magdalena		**Total Cibola Districts**	
Snow Trail	0	Snow Trail	55
Standard/Terra Trail	189	Standard/Terra Trail	583
TOTAL	189	**TOTAL**	638

Source: USDA Forest Service Infra Trails Database. Calculations done by UNM-BBER.

One issue regarding roads and trails relates to the access. Private property owners within or along the boundary of the forest may decide to put up a fence, lock a gate, and/or post no trespassing signs to curtail public access through their property.[54] Securing a permanent public right of way may be time-consuming and expensive.

The roads and trails catalogued above do not include all the roads and trails that have been created in the forest by people taking their motorized vehicles, including off-highway vehicles (OHVs) "off road". In part to address the problem of OHVs, the National Forest Service has promulgated a new management directive, the Travel Management Rule, requiring each of the NF's to designate those roads, trails, and areas that are open to motor vehicle use. [55] (See discussion in the next section.)

3.6 Off-Highway Vehicles and the Travel Management Rule

One of the most heated multiple-use debates is over the use of OHVs. The FS acknowledges that unmanaged recreation, primarily OHV use, is one of the four largest threats facing the National Forest System. According to the National Forest Service, OHV ownership has grown from 5 million in 1972 to 36 million in 2002.[56] On November 2, 2005, the FS announced its Travel

[53] Definitions of Trails as outlined in "USFS Trail Planning and Management Fundamentals":
Standard/Terra Trail: The predominant foundation of the trail is ground (as opposed to snow or water); and that is designed and managed to accommodate ground-based trail use.
Snow Trail: The predominant foundation of the trail is snow (as opposed to ground or water); and that is designed and managed to accommodate snow-based trail use.

[54] This happened, for example, when the private owners decided to deny public access via the road to the Canyoncito picnic ground and trail heads in the Sandia RD. Incident as recounted by BBER Director Lee Reynis.

[55] USDA FS. (2005, November 9). *Travel Management; Designated Routes and Areas for Motor Vehicle Use*. The Federal Register / Vol. 70, No. 216/ Wednesday, November 9, 2005/ Rules and Regulations, P. 68264. http://www.fs.fed.us/recreation/programs/ohv/final.pdf.

[56] Jeffers, A., (2006). *Four Threats to the Health of the Nation's Forests and Grasslands*, USDA FS Website: Four Threats. http://www.fs.fed.us/projects/four-threats/.

Management Rule on OHV use in National Forests and Grasslands.[57] New guidelines provide different strategies to deal with the growing consequences of OHV use in the forests. The new rules went into effect on December 9, 2005.[58] Overall, these policy revisions call for the re-designation of trails and routes, including creating designated route maps to show which trails are designated for different types of uses.

Responses to the legislation, however, are mixed. OHV advocates, such as the Southwest Four Wheel Drive Association, believe the regulations leave too many unanswered questions about OHV use.

> *Our major concerns … include failure to provide a time period for which emergency closures can be effective; confusion over the use of the term OHV, 4-wheel drive vehicle, and SUV; lack of clarity that a "trail" can be used for 4-wheel drives and other vehicles over 50" in width; lack of clarity that non-street legal vehicles may be used on "roads" where appropriate; and lack of certainty that the agency will conduct a robust route inventory.*[59]

Aside from recreational vehicle users, ranchers are concerned the rules do not go far enough in limiting the use of recreational vehicles. Adams and Russell-Adams described the concerns of ranchers who graze livestock.[60] The ranchers wanted stricter limits on OHV use, including use permits, speed limits and enforcement of rules. They were concerned that remapping is not enough to curtail what they see as dangerous behavior. OHVs have practical uses, and many ranchers use them in their own work. Local residents, however, perceive non-resident OHV users as a problem and want to promote "responsible use."[61]

In another study by Adams and Russell-Adams, representatives from New Mexico's indigenous populations raised other concerns about OHV use.[62] Native American representatives said they felt left out of the decision-making process on OHV use. They perceived the FS as opening and creating trails that would increase access to lands adjacent to tribal lands and to sacred areas within the forest. They claim "first-among equals" as a right to "more authority" in guiding the decision-making process. [63]

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[57] USDA FS. (2005, November 2). "USDA Forest Service Releases Final Rule for Motorized Recreation in National Forests & Grasslands," US Forest Service Press Release. http://www.fs.fed.us/news/2005/releases/11/travel-management.shtml.

[58] USDA FS. (2005) "Travel Management; Designated Routes and Areas for Motor Vehicle Use." The Federal Register / Vol. 70, No. 216/ Wednesday, November 9, 2005/ Rules and Regulations, P. 68264. http://www.fs.fed.us/recreation/programs/ohv/final.pdf.

[59] Southwest Four Wheel Drive Association. (2004). Land Use Issues. SFWDA Website. http://www.swfwda.org/index.php?des=landuseinfo.

[60] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, p. 27.

[61] Ibid.

[62] Russell, J. C., & Adams-Russell, P. A. (2005b). *Values, Attitudes and Beliefs Toward National Forest System Lands: The New Mexico Tribal People* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 11, 2005, p. 24, 41.

[63] Ibid., p. 21.

Environmental groups have posed the strongest opposition saying that the new maps legitimize user-created trails.[64] In a 2004 article in the *Albuquerque Journal*, an environmental activist is quoted "it's a great first step … what needs to come with it is some … enforcement capability.[65]"

The same article reports on OHV use within the Sandia RD.

> *"There is an influx in motor vehicles in the forest and on trails. They are fast, loud, and go wherever they please," said Elaine Morrell, volunteer trails coordinator for Bernalillo County Parks and Recreation. "I know a lot of equine people who won't even ride in the Cedro Peak area anymore because they are too scared of potential accidents with these people.*[66]

The president of a local mountain biking group said many of the existing single-track trails in the Sandias and Manzanos Mountains were built and maintained by motorized two-wheelers, but it is the four-wheelers that end up ruining the single-track trails. The majority of the discussion group was agreeable with OHV users riding where they are legally allowed to ride or having their own designated area, but signs spelling out rules and regulations are lacking, according to Morrell.[67]

Since legislation was finalized so recently, all interested parties are waiting to see the results before issuing formal statements on the new laws. OHV remains a volatile debate among users in the National Forest.

3.7 Opportunities, Risks, and Special Circumstances

Two of the ranger districts, Mt. Taylor RD and Sandia RD, lie along or near one of the state's major thoroughfares, Interstate 40. Sandia RD is surrounded by the large and growing Albuquerque MSA, which features the state's only international airport and the "Big-I," where Interstates 40 and 25 intersect. Automobile traffic in the areas adjacent to the Sandia RD is the busiest and most intense in the state, and this traffic will continue to increase as the population grows. Traffic in the Mt. Taylor RD is moderate, but might be less if not for the proximity of I-40, a major trucking and shipping route. Capital outlays for infrastructure improvements along I-40 will invite more traffic as some roads are being expanded from 2 lanes to 4 lanes. This could translate to more forest visitors. While the other RDs within the Cibola NF are served by the interstate system, the access points are more distant from the interstate system requiring additional travel along state highways and other roads – unless one lives in an adjacent community.

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[64] Associated Press. "Forest Service to corral off-road vehicles: Regulation aims to stop proliferation of illegal trails by motor enthusiasts". MSNBC, November 3, 2005. Washington. http://www.msnbc.msn.com/id/9899401.
[65] Soussan, T. "U.S. Plans To Limit Off-Highway Vehicles," September 9, 2004, Albuquerque Journal, Main Section.
[66] Ibid.
[67] Ibid.

Cibola NF will be most impacted by growth in population and associated traffic in Bernalillo, Sandoval and Valencia Counties. The greatest impact is likely to be on Sandia RD, already the busiest area in the Cibola NF.

New housing development in areas adjacent to FS lands may affect access to the forest. Access to NF road and trail systems may be impeded by the development of private land that previously provided access points used by residents and others. However, new residences also mean new roads, and this can increase traffic into and around the forest. Many forest users, and especially those living in close proximity to the forest, fear increased access will result in damage through overuse, neglect and deliberate vandalism.[68] Some landowners have blocked access to the forest with locked gates and "No Trespassing" signs to protect their privacy and property.

The issue of access and right-of-way is long-standing and difficult to resolve. One way the FS has attempted to address right-of-way issues is through land-exchanges. If the FS lacks the resources to acquire right of way, partnerships with public and private groups may provide other options. The City of Albuquerque and Bernalillo County have sometimes acted to maintain public access through their Open Space purchases. A good example is the City's acquisition of lands providing access to Three Gun Canyon in Tijeras Canyon of the Sandia RD. Private groups such as the Trust for Public Land may also be willing to partner in helping to preserve access. [69]

Finally, there is the new Travel Management Rule, requiring each of the NF's to designate those roads, trails, and areas that are open to motor vehicle use. Such designation provides a way of restricting OHV use in much of the forest and thus reducing potential damage to the forest, as well as limiting the conflicts with other users. The FS could set aside areas specifically for OHV use, but it is important to note that OHVs are not only used for recreation purposes but have considerable utility in ranching, enabling one to access quickly problem areas and substituting for horses in a range of tasks, including hauling materials. OHV's can also have utility in forest uses such as collecting firewood and hunting.

[68] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, pgs 19, 28.

[69] In Southern California, for example, the Trust for Public Land has "permanently protected thousands of acres …" adding "land to all of Southern California's national forests, protected important wildlife corridors, provided fantastic recreational opportunities, and increased public access to open space." http://www.tpl.org/tier2_kad.cfm?folder_id=805.

4 Land Cover, Ownership and Forest Health

This chapter examines the land cover types and related land ownership and use patterns in the Cibola NF, and discusses threats both to the health of the forest and to the specific plants and animals that live therein. The first section examines land cover and ownership in each of the ranger districts. The second section discusses recent land exchanges and the policy environment around future conveyances. The third section takes up the issue of forest health, discussing major developments threaten forest health.

4.1 Land Cover on Cibola National Forest

Data on land cover are derived from the United States Geological Survey National Land Coverage Data set (NLCD), raster based Landsat imagery. The data were obtained for each county with a 30-meter resolution. The ESRI ArcInfo Geographic Information Systems (GIS) software was used to extract the necessary data for each contextual geographic area.

Table 4.1 below provides land cover classifications for each ranger district based on data compiled in the NLCD.[70] (The landcover definitions used are summarized in Appendix 4.) Table 4.1 covers the gross Cibola NF acreage, and therefore includes both FS administrated acreage and other acreage.[71]

For the most part, the four ranger districts have little variety in the types of land cover. About 60 percent of the Cibola NF is evergreen forest, encompassing 1,254,520 acres. Shrubland and herbaceous grasslands make up most of the remaining 40 percent. Over half of the forest's shrubland (293,843 acres) is in the Magdalena Ranger District. Herbaceous grassland covers 233,889 acres in the Magdalena RD, accounting for 58.9 percent of the Cibola NF's total herbaceous grassland, while 31.5 percent is in the Mountainair RD. These three land cover types make up almost 99 percent of the forest. **Figure 4.1** is a map of the different types of land cover in the Cibola NF.

[70] See Appendix Table A10 for Landcover descriptions and definitions.
[71] See USDA FS Website http://www.fs.fed.us/land/staff/lar/definitions_of_terms.htm for terminology.

Table 4.1 Land Cover on Cibola National Forest (Acres)

	Mt Taylor	Magdalena	Mountainair	Sandia	Total CNF
Bare Rock/Sand/Clay	1,718	1,218	1	26	2,962
Commercial/Industrial/Transporta	24	94	-	154	272
Deciduous Forest	2	10	3,833	4	3,849
Emergent Herbaceous Wetlands	24	-	-	-	24
Evergreen Forest	498,957	543,957	111,592	100,108	1,254,614
Fallow	-	-	0	0	0
Grasslands Herbaceous	29,987	233,889	125,213	8,058	397,147
High Intensity Residential	-	-	-	-	-
Low Intensity Residential	3	4	-	157	164
Mixed Forest	7,493	4,051	-	1,654	13,198
Open Water	362	-	-	0	362
Pasture/Hay	-	-	-	-	-
Quarries/Strip Mines/Gravel Pits	101	31	-	382	514
Row Crops	-	-	469	-	-
Shrubland	115,589	293,843	14,094	11,098	434,624
Small Grains	-	-	21	-	-
Urban/Recreational/Grasses	0	-	-	8,058	8,058
Woody Wetlands	0	0	-	0	1
Total	654,262	1,077,097	255,223	129,699	2,116,281

Note: Small errors in calculations are the result of 'edge rounding' associated with the use RASTER based NLCD.
Source: USGS EROS, National Land Cover Data (NLCD), Date 1992 (New Mexico). Calculations by UNM-BBER.

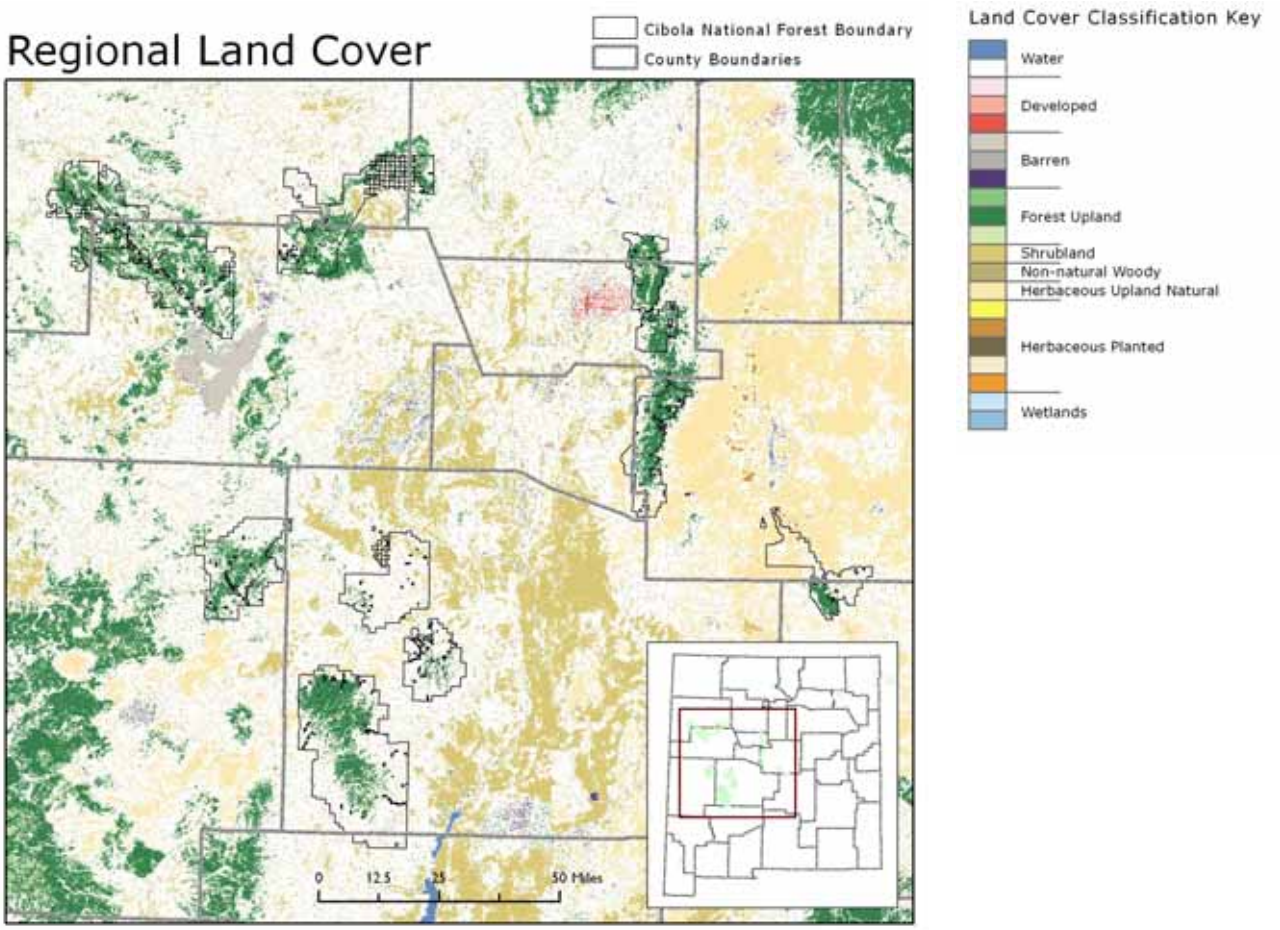

Figure 4.1 Land Cover on Cibola National Forest

In addition to land cover, land ownership is an important consideration in land use and planning policies. There are about 497,445 acres of privately owned land within the exterior boundaries of the Cibola NF, making up about 24 percent of the entire forest. **Figures 4.2 through 4.5** illustrate the land ownership of each ranger district in great detail. **Figure 4.2** considers land ownership on the Mt. Taylor RD. Note the checkerboard pattern of land ownership between the mountain ranges, illustrating a mix of tribal, private and federal land ownership. Each land may have differing interests for the public and private land managers, causing potential land use debates. Land exchanges and conveyances are a common way to "swap" parcels of land so the NF is able to manage continuous areas rather than isolated parcels. This can be a lengthy and difficult process, as is discussed in greater detail in Section 4.2.

Mt. Taylor RD is three-fourths evergreen forest. The Cibola NF has 362 acres of open water, virtually all of which is contained in the Mt. Taylor RD. Mt. Taylor RD, therefore, hosts the only substantial fishing opportunities available in the Cibola NF.

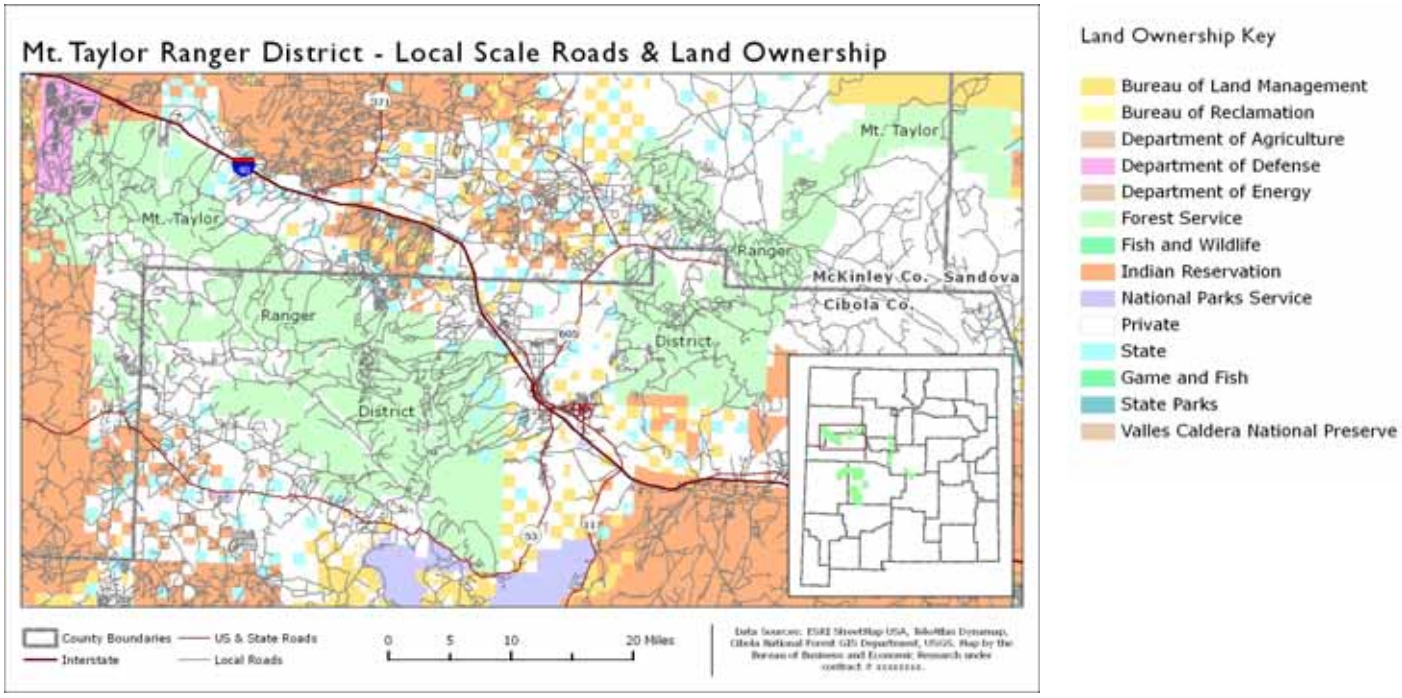

Figure 4.2 Land Ownership on Mt. Taylor Ranger District

Magdalena has the largest amount of evergreen forest land coverage, as well as having substantial areas of shrubland (27.3%) and grasslands (21.7%), making the area suitable for grazing. **Figure 4.3** examines land ownership in the Magdalena RD. Sixty seven percent (293,867 acres) of the Cibola NF's shrubland is in Magdalena RD. However, private landowners own 40 percent of this shrubland. Fifty eight percent (233,904 acres) of the Cibola NF's herbaceous grasslands are in Magdalena RD and 28 percent of these are privately owned. Within the Cibola NF, Magdalena RD has the highest concentration of privately held land (27%).

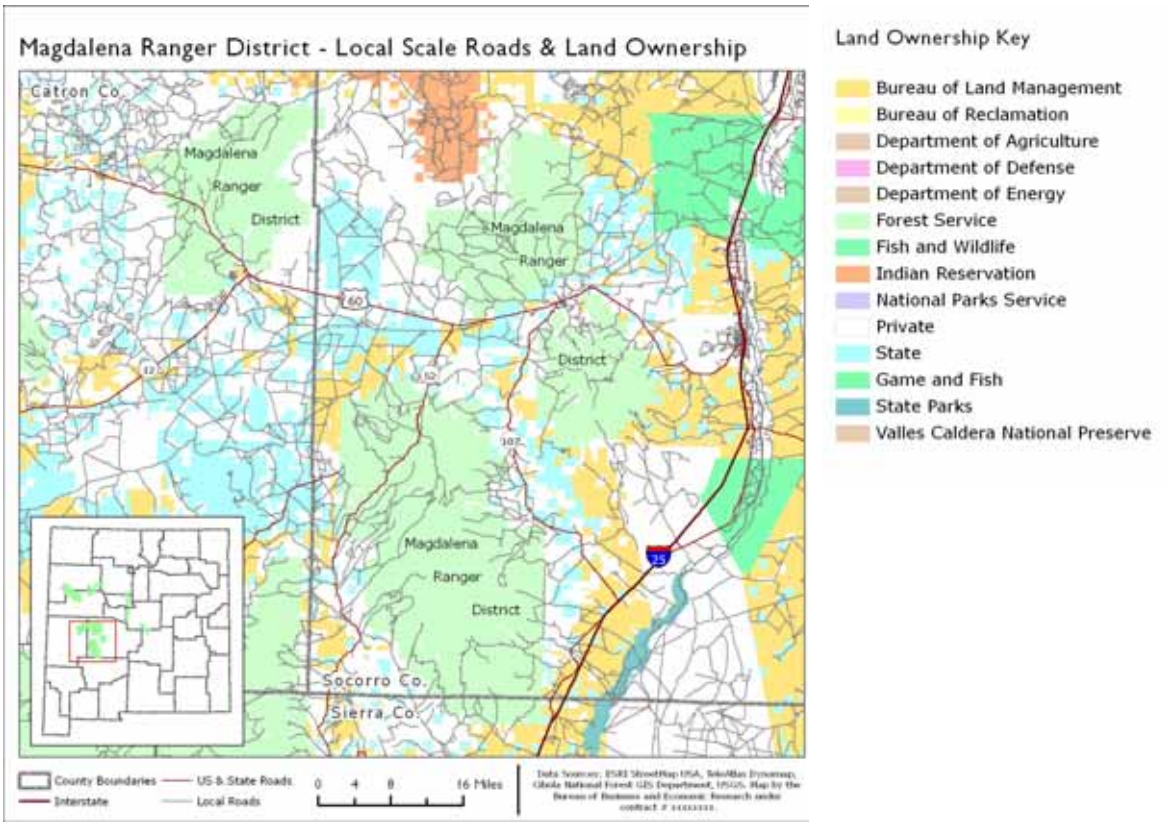

Figure 4.3: Land Ownership on Magdalena Ranger District

Figure 4.4 presents a picture of land ownership in the Mountainair RD. In terms of land area, Mountainair is the third largest district out of the four in the Cibola NF. About 20% of the land in the Mountainair RD is privately owned. Herbaceous grasslands cover nearly 55 percent of the Mountainair RD.

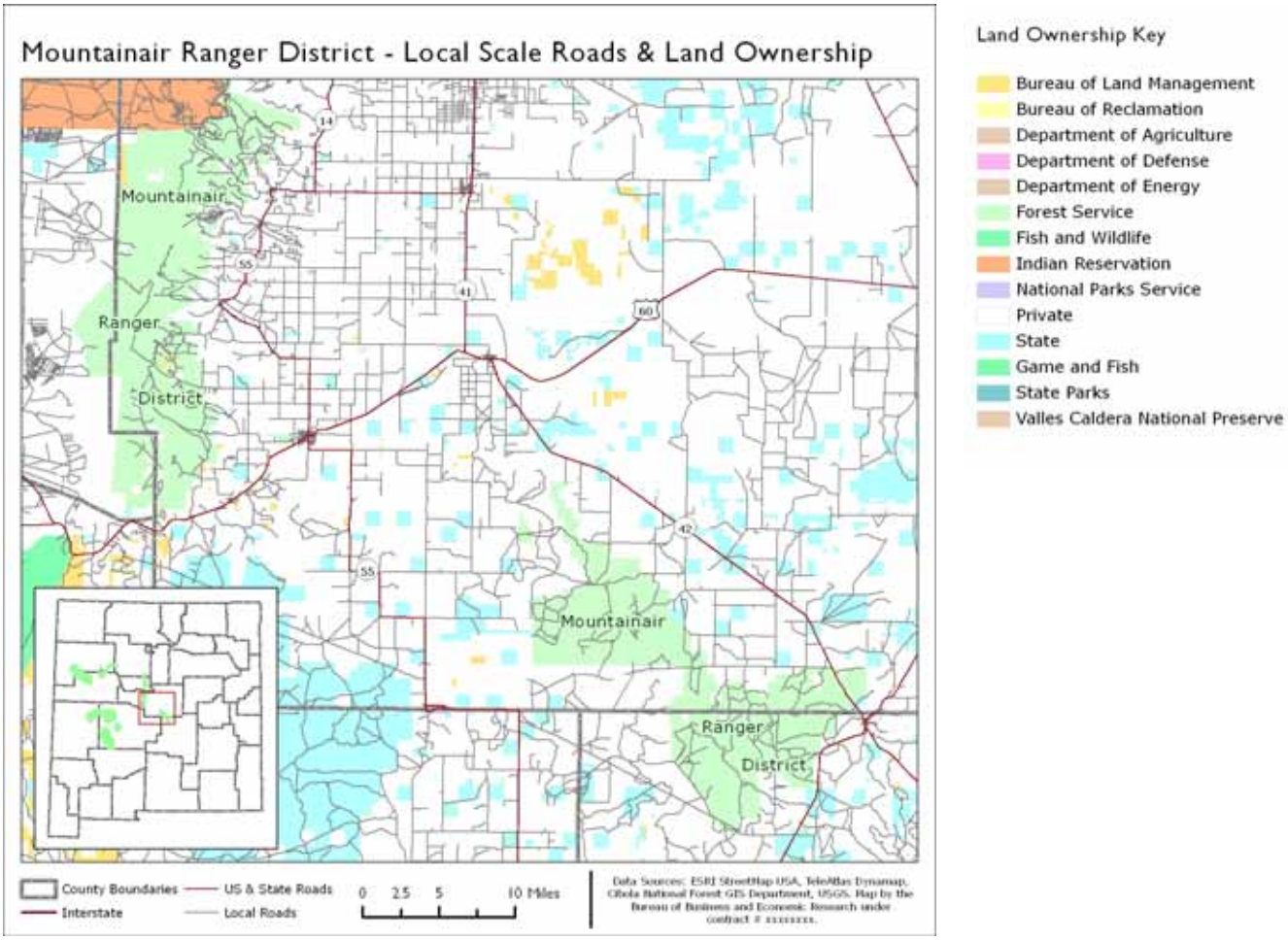

Figure 4.4 Land Ownership on Mountainair Ranger District

The Sandia RD is the smallest ranger district with 121,656 acres, of which 82 percent is covered by evergreen forest. Figure 4.5 shows land ownership in the Sandia RD. Less than 18 percent of the land in the Sandia RD is privately owned, the smallest proportion among the districts in the Cibola NF. This district's recreation potential, its accessibility and its proximity to the largest population center in New Mexico all contribute to the Sandia RD being visited by more people than all the other ranger districts combined. Population pressure and high levels of use make this area more susceptible to forest health issues, including fire.

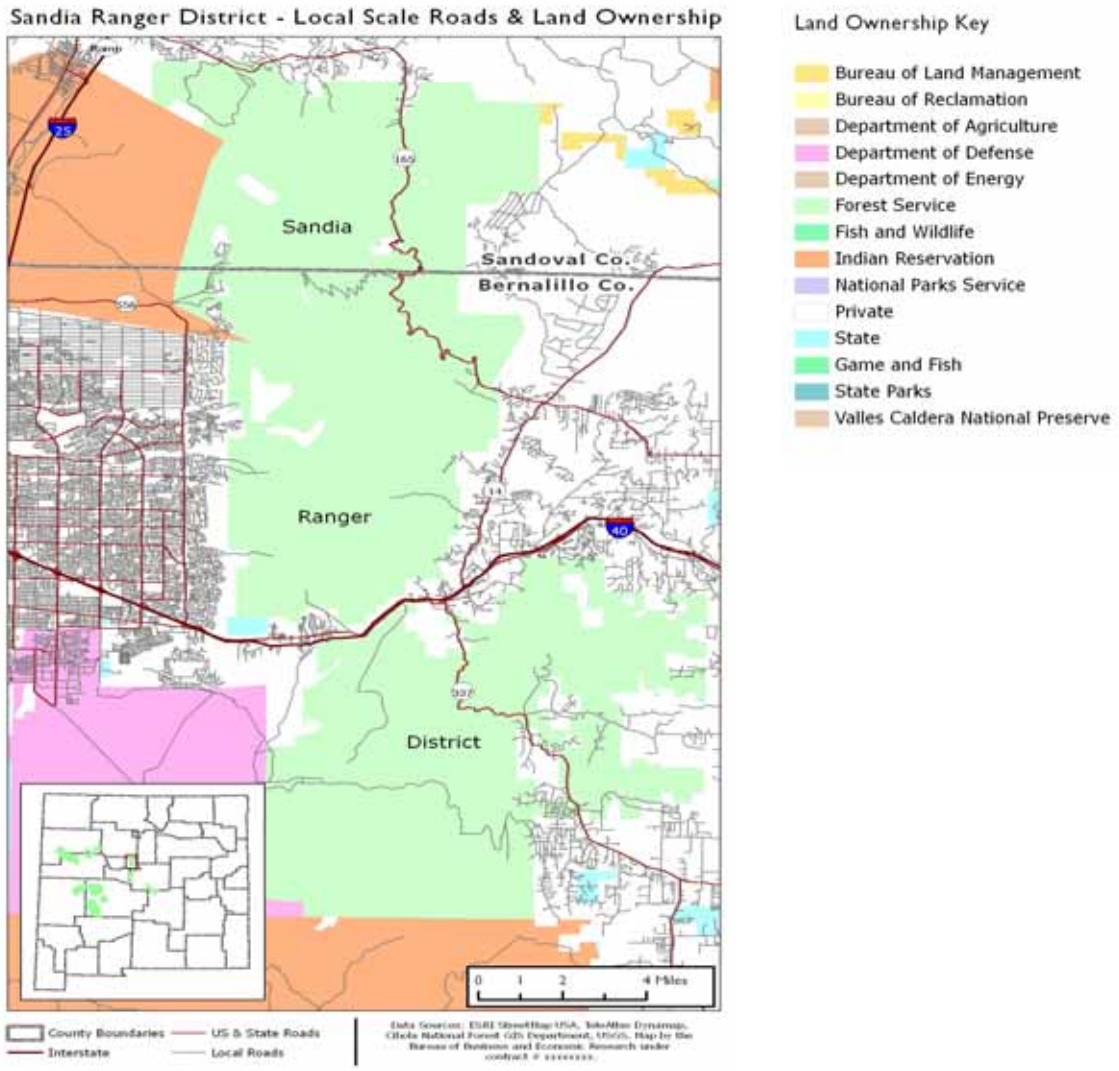

Figure 4.5 Land Ownership on Sandia Ranger District

The above tables and maps discussed land cover and ownership separately. **Table 4.2** provides data for both land cover and ownership status for each district. As previously stated, the majority of the Cibola NF is covered with evergreen forest, most of which is National Forest System land. The Magdalena RD has the highest number of evergreen forest acres under private ownership, with Mt. Taylor RD a close second.

Table 4.2 Land Cover of Publicly and Privately Owned Land in Cibola National Forest

	Mt Taylor			Magdalena			Mountainair			Sandia			Cibola NF TOTAL		
	FS	Private	Total	FS	Private	Total	FS	Private	Total	FS	Private	Total	FS	Private	Total
Bare Rock/Sand/Clay	1,488	224	1,712	491	725	1,215	1	-	1	21	4	25	2,002	956	2,957
Commercial/ Industrial/ Transportation	4	16	20	18	76	94	-	-	0	11	143	153	33	240	273
Deciduous Forest	-	2	2	10	-	10	3,616	218	3,834	4	-	4	3,632	219	3,852
Emergent Herbaceous Wetlands	10	14	24	-	-	0	-	-	0	-	-	0	10	14	24
Evergreen Forest	395,662	103,345	499,006	440,041	103,880	543,921	99,876	11,715	111,592	85,095	15,042	100,136	1,020,591	233,952	1,254,543
Fallow	-	-	0	-	-	0	0	-	0	-	0	0	0	0	0
Grasslands Herbaceous	23,590	6,395	29,985	168,091	65,813	233,904	90,740	34,488	125,228	4,775	3,279	8,054	287,229	109,966	397,196
High Intensity Residentl	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0
Low Intensity Residentl	0	3	3	-	4	4	-	-	0	1	156	157	2	163	165
Mixed Forest	6,190	1,306	7,496	4,019	32	4,051	-	-	0	1,643	11	1,655	11,852	1,347	13,199
Open Water	191	171	362	-	-	0	-	-	0	-	0.4	0.4	191	171	362
Pasture/Hay	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0
Quarries/ Strip Mines/ Gravel Pits	26	77	103	1	30	31	-	-	0	66	316	382	93	424	517
Row Crops	-	-	0	-	-	0	78	404	482	-	-	0	73	403	476
Shrubland	86,097	29,453	115,549	178,874	114,993	293,867	11,506	2,584	14,090	8,648	2,437	11,085	285,142	149,445	434,587
Small Grains	-	-	0	-	-	0	22	-	22	-	-	0	16	-	16
Urban/ Recreational/ Grasses	-	0	0	-	-	0	-	-	0	0	3	3	0	3	3
Woody Wetlands	0	-	0	0	-	0	-	-	0	0	-	0	1	-	1
Total	513,257	141,006	654,263	791,546	285,553	1,077,099	205,839	49,409	255,248	100,265	21,391	121,656	1,610,867	497,304	2,108,171

Note: Small errors in calculations are the result of 'edge rounding' associated with the use RASTER based NLCD.
Source: USGS EROS, National Land Cover Data (NLCD), Date 1992 (New Mexico). Calculations by UNM-BBER.

Table 4.3 presents the data in a manner that takes into account the role of public and private land managers in promoting particular land uses within the Cibola NF. Because the privately, or other, owned acreage within the Cibola NF boundaries is relatively small, an index is used. The index values in the table indicate what land cover type the land owners/administrators are concentrating on. If private land-owners have a disproportionately high percentage of their holdings of a particular land type in a particular district relative to the totals for the district, this suggests a greater interest in and use of this land type by private owners.[72] Conversely, no holdings or a disproportionately small percentage of their holdings in a particular land type suggests little or no interest.

Note the relatively high values of the index across the districts among private land owners for all land classified as "Residential", "Commercial/Industrial/Transportation", "Quarries, Strip Mines

Table 4.3 Public and Private Land Use in Cibola National Forest

	Mt Taylor		Magdalena		Mountainair		Sandia		Cibola NF Total	
	FS	Private	FS	Private	FS	Private	FS	Private	FS	Private
Total (acres)	78%	22%	73%	27%	81%	19%	82%	18%	76%	24%
Bare Rock/Sand/Clay	1.1	0.6	0.5	2.2	1.2	*	1.0	0.9	0.9	1.4
Commercial/Industrial/Transportation	0.3	3.7	0.3	3.0	*	*	0.1	5.3	0.2	3.7
Deciduous Forest	*	4.6	1.4	*	1.2	0.3	1.2	*	1.2	0.2
Emergent Herbaceous Wetlands	0.5	2.7	*	*	*	*	*	*	0.5	2.5
Evergreen Forest	1.0	1.0	1.1	0.7	1.1	0.5	1.0	0.9	1.1	0.8
Fallow	*	*	*	*	1.2	*	*	5.7	0.7	2.1
Grasslands Herbaceous	1.0	1.0	1.0	1.1	0.9	1.4	0.7	2.3	0.9	1.2
High Intensity Residential	*	*	*	*	*	*	*	*	*	*
Low Intensity Residential	0.2	4.0	*	3.8	*	*	0.0	5.6	0.0	4.2
Mixed Forest	1.1	0.8	1.4	0.0	*	*	1.2	0.0	1.2	0.4
Open Water	0.7	2.2	*	*	*	*	*	5.7	0.7	2.0
Pasture/Hay	*	*	*	*	*	*	*	*	*	*
Quarries/Strip Mines/Gravel Pits	0.3	3.5	0.0	3.7	*	*	0.2	4.7	0.2	3.5
Row Crops	*	*	*	*	0.2	4.3	*	*	0.2	3.6
Shrubland	0.9	1.2	0.8	1.5	1.0	0.9	0.9	1.3	0.9	1.5
Small Grains	*	*	*	*	1.2	*	*	*	1.3	*
Urban/Recreational/Grasses	*	4.6	*	*	*	*	0.1	5.3	0.1	4.0
Woody Wetlands	1.3	*	1.4	*	*	*	1.2	*	1.3	*

Source: USGS EROS, National Land Cover Data (NLCD), Date 1992 (New Mexico). Calculations by UNM-BBER.

and Gravel Pits", and "Row Crops". By contrast, the FS has values higher than 1 for the various forest types and woody wetlands. This suggests, along with the extensive acreage, that the land cover type on which the FS focuses its management is the vast evergreen forest and mixed forest, which today is typically used for recreational purposes. Therefore, recreation would be considered the primary land use for the Cibola NF. The Index_{NF} values for Grasslands Herbaceous show that this land cover type, used primarily for grazing, has slightly higher values for private

[72] The index number is calculated in the following manner for FS administrated land within each district:
IndexNF = (LCFS / Total Acreage FS) / (LC Dist / Total Acreage Dist)
The index number for privately owned land within the NF boundaries is calculated similarly:
IndexPriv = (LCPriv / Total Acreage Priv) / (LC Dist / Total Acreage Dist)
where,
LCFS = Acreage for a given land cover type that is administrated by the FS
LCPriv = Acreage for a given land cover type that is privately or other owned
LCDist = Total acreage for a given land cover type within a Ranger District
Total Acreage FS = Total FS administrated land within a Ranger District
Total Acreage Priv = Total privately or other owned land within a Ranger District
Total Acreage Dist = Total Acreage for a given District

land than NF administered lands. Grazing occurs on both privately owned and federally managed lands. The values are close, because ranchers may have an interest in grazing on public land, as the fees are less costly than fees for grazing on private land.[73]

4.2 Land Conveyance and Exchanges

The Forest Service provided BBER with data concerning land conveyances and exchanges in the Cibola NF. Generally speaking, isolated parcels of forest land scattered around the boundaries of the forest are often costly and difficult to manage and pose significant right-of-way issues. However, these parcels can still hold leverage. FS officials have often expanded contiguous forest areas by trading isolated parcels for land more desirable to the FS on the edge of or inside FS boundaries. **Table 4.4** below lists three exchanges in the Cibola NF[74] over the past 17 years. The "Federal Acres" and "Federal Values" columns list the values of property that were transferred to private ownership. The "Non-Fed" columns show values of property that were conveyed to the United States government.[75]

Clearly, the L-Bar land exchange with Caprock Pipe and Supply is the largest and most substantial land exchange in the Cibola NF in the last 20 years. The exchange conveyed 11,319 acres of federal land to private ownership. In turn, the federal government acquired about 12,252 acres of land.[76] The exchange area is located in the northeast corner of the Mt. Taylor RD, approximately 30 miles northeast of Grants, New Mexico. According to the FS, the exchange consolidated forest system lands, simplified property boundaries and addressed right of way and access issues. The land exchange was initiated to address the "checkerboard" patterns of land ownership in the area. While the large transfer may seem beneficial for the forest and its management, some users argue that the exchange resulted in the loss of prime elk hunting land, and that the transfer was pushed through without public input.[77]

Table 4.4 Land Conveyance and Exchanges for Cibola National Forest

CASE NAME	FY YEAR	FED ACRES	FED $VALUE PLUS CASH	NON-FED ACRES	NON-FED VALUE PLUS CASH
UTRUP NM NM 84101	FY91	114.9	$396,000	791.0	$396,000
BROWN, JAMES B. NM NM 88952	FY94	691.0	$525,000	487.5	$525,000
CARPROCK PIPE&SUPPLY L-BAR NM NM 103229	FY02	11,319.3	$7,400,000	12,250.0	$7,300,000

US Forest Service

[73] United States Government Accountability Office. (2005, September). Report to Congressional Requesters, "Livestock Grazing," GAO-05-869. Washington, D.C. Retrieved October 2006, from http://www.gao.gov/cgi-bin/getrpt?GAO-05-869.
[74] This does not include the National Grasslands.
[75] USDA FS: personal communication, 21 March 2006.
[76] USDA FS. L-Bar "*Land Exchange is Completed.*" News Release*, Cibola News*, Cibola National Forest Website. http://www.fs.fed.us/r3/cibola/news/01news_releases/lbar.htm.
[77] The Independent, Gallup.

The potential sellable land includes up to 2,930 parcels of national forests and national grasslands in 34 states. The parcels vary in size from less than one acre to a 900 acre parcel of forest in Virginia. Through this sale of small parcels, the FS hopes to raise $800 million to turn over to rural school districts and to counties to maintain roads. This is to compensate areas that have been hurt by logging cutbacks on federal land, mostly in the state of Oregon.[78, 79] Critics of the plan argue that it is "a dollar of forest for a dime of education,"[80] implying that it is inappropriate to sell the land to address an ongoing need. According to newspaper reports, 7,447 acres in the Cibola and Lincoln National Forests are slated for sale.[81] The USDA FS Website shows 7,373 acres of "lands potentially eligible for sale" by the National Forest in the State of New Mexico.[82]

4.3 Forest Health

Forest health is a central concern to the FS and forest users. Healthy forests provide important resources, such as clean water and air, to villages, towns, and cities. FS research shows that 80 percent of fresh groundwater in the United States originates from federal forestlands. The role of forests in absorbing carbon from the air is also well documented.[83] Forests also provide safe refuge for wildlife and some of the most endangered species of plants and animals. However, the strategies implemented to protect forest health are often at the center of conflicts. For example, environmental groups heavily advocated the end of logging in order to protect endangered wildlife, such as the Mexican Spotted Owl. After the reduction of heavy logging, other forest users became concerned with the resulting overgrowth and fire danger.

At the national level, the USDA FS has indicated four areas of major concern that are overarching issues for all NF lands. Presented as the "Four Threats," these areas are: fire and fuels, invasive species, loss of open space, and unmanaged recreation. Growing populations and increased use adds to the difficulty of reducing these threats on public lands. All of these critical management issues are relevant to the Cibola NF, and some are discussed in more detail in other chapters. The specific threats and possible impacts in the Cibola NF are briefly described below.

4.3.1 Fire and Fuels

Much of the West has been under drought conditions for the past several years. Continued drought conditions in addition to high fuel loadings have created dangerously potential fire conditions for much of the West.[84] Some 26 million acres in the West have been identified as fuels treatment "hot spots" or high priority areas. Many of these areas are classified as FRCC3, "significantly altered from the normal range." These are areas that have missed multiple periodic cleansing fires. FRCC3 areas where there is a high risk of large and destructive fires that can be dangerous and difficult to control.

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[78] USDA FS. (2006). Spotlight: President's FY 2007 Budget Proposal for the Forest Service – "*Secure Rural Schools and Community Self-Determination Act Extension*." http://www.fs.fed.us/.
[79] Bismarck Tribune Staff. (2006, February 24). *The Bismarck Tribune*. Bismarck, North Dakota.
[80] Sam Hananela. "Missouri Legislators Line Up in Opposition to Sale of Mark Twain Forest Lands," March 19,2006. *The Associated Press*.
[81] Includes Kiowa National Grasslands.
[82] USDA FS Website. (2006) *Lands and Realty Management*. http://www.fs.fed.us/land/staff/spd.html#Newmexico.
[83] Ibid.
[84] USDA FS. (2004, June). *Fire and fuels*. http://www.fs.fed.us/projects/four-threats/documents/firefuels-fs.pdf.

Uncontrolled fires can result in substantial environmental and economic impacts. Wildfire devastation impacts lives, property, wildlife habitat, fragile ecosystems, water, and soils, and timber resources.[85] Fires and the corresponding reduction of tree cover can result in deterioration of fresh water supplies and collateral damage because of increased runoff, increased flooding, and aquifer depletion.[86]

Of the 21 million acres of National Forest lands in the Southwestern Region, more than 80 percent is at moderate to high risk of "uncharacteristic" wildfire. These fires are larger and more intense than naturally occurring wildfires. They can alter soils, reducing their ability to retain moisture, accelerate erosion, and compromise water quality. Further, wildlife habitats and the forests' aesthetic quality are damaged. Prevention strategies are not inexpensive and are not always well received by the public. An article in the Albuquerque Journal in September 2005 describes a scaling back of a thinning project because of community resistance.[87] However, others are concerned with the heavy undergrowth and dry brush which are major fuels.

Treatments to reduce fuels and restore ecosystems involve various techniques, including thinning, prescribed burning, and clearing the forest of debris. Treatments can be biological, mechanical, or chemical.[88] Costs for treatment in 2004 were roughly $120 per acre although estimates of costs using mechanical means are cited in a range of $500 to $1,000 per acre (USDA FS, 2003). Nevertheless, the costs of responding to and controlling a fire can be hefty as well. In May of 2004, the Albuquerque Journal reported that the Lookout Fire in the Sandia and Mountainair Ranger Districts had burned 5,100 acres, required 565 firefighters and personnel, three helicopters, eleven fire engines, and four bulldozers. The total cost was estimated at just over $1 million.[89]

One major complicating factor related to fire management in the Cibola NF has been the increased number of people living at the forest's edges – the wildland-urban interface (WUI). Many urban subdivisions are being situated closer and closer to forested areas for their aesthetic and economic values. Extensive residential development expands the set of concerns for FS officials confronting the prospect of an early and intense fire season. In late February 2006, Cibola NF officials issued fire restrictions for all ranger districts. Fire restrictions are not usually issued until much later in the year. A record-breaking dry winter resulted in forest officials planning for forest fires and implementing extensive fire restrictions on forest lands.[90] There was concern entering the 2006 fire season, as the Cibola NF's "energy release components" level had reached the same level as the May 2000 level when the Cerro Grande fire occurred.

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[85] USDA FS. (2006, October). *Fire and fuels: Quick facts*. USDA FS Website: Four Threats. http://www.fs.fed.us/projects/four-threats/facts/fire-fuels.shtml.
[86] Sedell, J., Sharpe, M., Apple, D. D., Copenhagen, M., & Furniss, M. (2000, January). "Water and the forest service." USDA FS Document FS-660. http://www.fs.fed.us/publications/policy-analysis/water.pdf.
[87] Journal Staff. "Cibola Forest Trims Thinning Project Near Tajique," September 15, 2005. *Albuquerque Journal*.
[88] USDA FS. (2003). Position paper: *Fire and fuels build up*. http://www.fs.fed.us/publications/policy-analysis/fire-and-fuels-position-paper.pdf.
[89] Telegraph Staff. "$5,000 Reward Offered In Lookout Fire," May 27, 2004. *Albuquerque Journal.*
[90] Mygatt, M. "Dry Winter Landscape Prompts New Mexicans to Brace for Grim Fire Season," March 8, 2006. *Associated Press*.

4.3.2 Invasive Species and Insects

Invasive species have been characterized as a "catastrophic wildfire in slow motion."[91] Non-native, invasive plants and insects can cause major disruptions in ecosystem function. Invasive species can reduce biodiversity and degrade ecosystem health in forest areas. The damage caused by invasive organisms affect the health of not only the forests and rangelands but also of wildlife, livestock, fish, and humans.[92]

Invasive plant life, such as bull thistle, bindweed and salt cedar, is a concern complicating forest management all over New Mexico. However, some forest managers have come under heated criticism for the use of herbicides to kill these noxious weeds.[93] Critics argue that herbicides pose risks to fragile aquatic life and sensitive wildlife pollinators, such as butterflies.

Salt cedar (tamarisk) is a tree that grows along rivers and streams, absorbing and transpiring large amounts of water making it an invasive species that greatly impacts watersheds and riparian systems. FS personnel mechanically remove the tamarisk in sensitive areas or where infestations are small. However, mechanical removal is considered unpractical for infested areas with many miles of stream or covering hundreds of acres. Unfortunately, the use of herbicides over large areas means more herbicides in the watershed. Tribal and pueblo peoples have also expressed concern over the use of herbicides that can make their way onto their lands.[94]

The fire danger in the Cibola NF is often times intrinsically linked to the bark beetle. Forests are at risk of beetle infestations due to recent drought conditions in the area.[95] Bark beetles infest piñon and other pine varieties distressed from already existing drought conditions. The result is rapid mortality of large stands of trees, resulting in higher fuel levels. The beetles typically have a two-year life cycle and regulate their own population. However, they can cause extensive damage to forests. Traditional wisdom dictates "once you see the beetles, it's already too late."

4.3.3 Loss of Open Space and Pristine Areas

Forest areas located at the edges of growing towns and cities, or in prime recreation areas popular for second-home development are the most at-risk of losing open space. Increases in housing density and associated development (such as power lines, septic and sewer systems, and shopping centers) can result in changes in wildlife habitats, changes in forest health, reduced opportunities for outdoor recreation and greater loss of life and property to wildfire. The development of private lands in and surrounding the Cibola NF can result in a decrease in open space. In the Sandia RD houses are being built closer to the base of the mountains and access to trails and forest lands may be limited. Also at risk are the traditional uses of forest land as newcomers have different interests in the land as compared to local residents who depend on the land for their livelihood.

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[91] Fred Norbury, Assoc. Deputy Chief, FS. (2005). Statement before the Subcommittee on Public Lands and Forests, Committee on Energy and Natural Resources. http://energy.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=1500&Witness_ID=4269.

[92] USDA FS. (2006, March 24). Invasive Species Program. USDA FS Website. http://www.fs.fed.us/invasivespecies/definition.shtml.

[93] Berdie, J. Letter to Editor, January 14, 2006. *Santa Fe New Mexican*.

[94] Russell, J. C., & Adams-Russell, P. A. (2005). *Values, Attitudes and Beliefs Toward National Forest System Lands: The New Mexico Tribal People* (Issue Brief). Placerville, CA: Adams-Russell Consulting.

[95] Sharpe, T. "Preparing for the worst," February 21, 2006. *The Santa Fe New Mexican.*

Road construction in wilderness areas is a potential threat to pristine forest areas. The debate over the preservation of inventoried roadless areas (IRAs) and the wilderness areas represents active and current struggles over the conservation of pristine areas. Community and activist groups advocate for the preservation of "pristine" forest areas that are not permanently altered by human interference. Other stakeholders argue that roads are needed to provide access for resource extraction as well as for fire prevention and control.

4.3.4 Unmanaged Recreation

Off-highway vehicle (OHV) use is the primary form of unmanaged recreation in the Cibola NF. The growing use of OHVs has major implications for forest planning and management. The effects of OHV use include miles of unplanned trails and roads, erosion, recreational use conflicts, spread of invasive species, damage to cultural resources and historical sites, disturbance to wildlife, destruction of habitats, and risk to public safety.

As discussed in Chapter 2, the FS implemented the Travel Management Rule for OHV use in National Forests and Grasslands which went into effect in December of 2005.[96] New guidelines provide re-designation of trails and routes for different types of uses. Response to the plan has been mixed, and it has been suggested that there may be a need for more clarity in the designations.

4.4 Opportunities, Risks, and Special Circumstances

The majority of the Cibola NF is covered with evergreen forests, and maintaining the health of those forests is a major consideration. Forests users and forest planners have been concerned with the overstocked forest conditions. Some areas of federal land were once open and park-like, supporting between 5 and 15 trees per acre.[97] Today, these areas are straining under 150 trees per acre, which is described by some as "choking to death."[98] Some forest users perceive the need for logging, or at least forest thinning to promote forest health and economic development.[99] This was most clear in a focus group of Sandia RD land users who identified the most prominent issue regarding forest vegetation and timber is the perception of too many trees per acre, resulting in increased fire danger.[100] Some participants suggested that traditional activities such as wood gathering and grazing can help control fire danger. While not all users would agree on the effect of traditional uses on fire danger, it is clear that users are concerned with the seemingly intense density of trees. The fire danger is especially of concern in the Sandia RD, where over 100,000 acres of evergreen forest are very close to major population centers. The risks just described also provide an opportunity: the concerns that diverse populations in the assessment communities have about the fire hazard and generally about the health and continued vitality of the forest

[96] USDA FS. (2005). "USDA Forest Service Releases Final Rule for Motorized Recreations in National Forests & Grasslands." FS Press Release. http://www.fs.fed.us/news/2005/releases/11/travel-management.shtml.
[97] Southern Regional Water Program, A Partnership of USDA Cooperative State Research, Education, and Extension Service (CSEERS) & Land Grant Colleges and Universities. *Environmental Restoration in New Mexico*. http://srwqis.tamu.edu/states/newmexico/environment.aspx.
[98] Oversight Field Hearing before the Subcommittee of Resources, 108th Congress, December 15, 2003.
[99] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, pgs. 30-31.
[100] Ibid., p. 24.

provide a common ground and a basis for bringing diverse groups together in the search for workable solutions.

The mountain systems of the Cibola NF are assets to the surrounding communities with potential in stimulating economic development. Thus, for example, residents in the communities near the Magdalena RD identified their forest vistas and landscapes as an asset in making the area into more of a travel "destination." The Torrance County Comprehensive Land Use Plan specifically promotes more partnerships with the FS to work on projects to increase access and improve trails. Projects to remove brush and small diameter trees reduce the fire hazard and also have the potential of spawning new forest product industries.

The checkerboard pattern of land ownership continues to present challenges to FS management, including right-of-way and access issues. Land exchanges, such as the L-Bar exchange, help to address these issues, but it is important to consider public reactions, especially when grazing and recreational interests are involved. Recreation is the primary use and principal economic activity of the Cibola NF, and grazing is the next most significant land use and economic activity.[101] A federal program to sell the scattered plots of land and give the revenues to rural public schools and to counties for road maintenance has been controversial. Among the various questions raised by the sell-off is the appropriateness of using one time revenues to meet ongoing needs. As mentioned at the end of the previous chapter, there may be ways of partnering with local communities and nonprofit organizations to address right-of-way and public access issues.

The strong market for residential properties on the wildland-urban interface has stimulated housing development. New housing inside or on the forest's perimeter creates a whole series of complex management issues: what kind of road access to allow to properties inside the forest; what to do about the denial of traditional local access to the forest as the new owners put up fences and no trespassing signs; how to protect these new properties from fire and other threats – and how to pay for this protection. It is critical to understand the roles those lands now being subdivided have had in the larger ecological systems of the Cibola NF, e.g., their role providing forage and other sustenance for wildlife.[102] It is also critical to understand how the new uses of the land may threaten the health of the forest, e.g., by introducing non-native species. The new residents create new demands that may be incompatible with managing for multiple uses: e.g., they don't like the smoke generated by programs to clean-out brush and other kindling. They also put new demands on limited local government resources.

This chapter discussed the relationship between the Cibola NF's land cover and its uses. The next chapter delves further into issues regarding forest uses and users.

[101] Refer to Chapter 7 for the details on the economic activity in the Cibola NF.
[102] See, for example, Jack Ward Thomas and Stephanie Lynn Gripne, "*Maintaining Viable Farms and Ranches Adjacent to National Forest for Future of Wildlife and Open Space*." Rangelands *24(1)* February 2002, pp. 10-16.

5 Forest Uses and Users

This chapter discusses how different parts of the forest are used, in terms of land cover and land use, as well as the users themselves. The Forest Service manages the land for a variety of purposes from recreation and tourism to grazing and resource extraction. The Forest Service also manages scenic resources for the neighboring communities and visitors. Many diverse individuals and groups own, manage, and use forest resources, and they interact with the forest environment in a broad assortment of ways that have significant consequences for forest ecosystems and the people who depend on them.[103]

While traditionally the national forests supported resource-based industries, like wood-products, mining, and grazing, recreational use of the forest is growing. Recreational uses include activities such as hiking, picnicking, camping, skiing, bird-watching, hunting, OHV use, and rock climbing. Spending by recreational users is estimated to have the largest economic impact on the Cibola NF assessment area. (See Chapter 7) Moreover, these estimates do not include the substantial economic benefit derived by the individual recreational user.[104]

The FS is guided by a multiple-use mandate to administer lands for the purpose of recreation, grazing, timber, watershed, fish and wildlife.[105] However, the multiple-use principle is not without challenges. With increased usage from growing populations, an inherent dilemma in the multiple-use rule is clear. Inevitably, there is an increased likelihood that one type of use will impinge on another, creating the potential for conflict. Land-use conflict is a major challenge for FS officials because it is inherent in practically every forest planning decision. While many forest users are hesitant to suggest limiting access, increasing attention is being given to how some users, like those using recreational Off Highway Vehicles (OHVs), are degrading the land and the experiences of others.[106] See discussion on Off Highway Vehicles in Section 2.6 of the chapter on Travel and Access.

Multiple-use issues are especially sensitive when they involve Native American communities. FS managed lands are used by tribes for religious and cultural purposes. The Cibola NF contains archaeological sites, lands of cultural significance, traditional hunting grounds, and sacred sites, which are unequivocally important to tribes. Tribal communities are concerned with protecting sacred sites and with limiting outsider knowledge both of their special areas and of how these areas are used by the tribes.

5.1 Recreation

The major finding of this socio-economic assessment is that recreation is the primary use of the Cibola NF, and newer recreational activities, such as OHVs, mountain biking, rock climbing, geo-caching, and trail running are adding to this trend. Some areas also attract visitors for winter

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[103] Dwyer, J. F. (1995). *"Integrating Social Sciences in Ecosystem Management: People-Forest Interactions in the Urban Fores*t." In H. K. Cordell (Ed.), *Integrating Social Sciences and Ecosystem Management: A National Challenge*. Athens, GA: USDA Forest Service, Southern Research Station.

[104] See, for example Fix, P and J. Loomis (1997) Journal of Leisure Research. 23(3). P. 342-352. These researchers found that the economic benefit, as measured in terms of consumer surplus, for mountain bikers in Moab, Utah, was upwards of $200 per visit. This means that mountain bikers would pay up to $200 over and beyond actual travel expenses to ride the mountain trails, because of the benefits they gain from their recreation.

[105] *Multiple-Use Sustained-Yield Act of 1960*, 16 U.S.C. §§ 528-531, June 12, 1960.

[106] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, p. 27.

recreation, such as snow-boarding, snowshoeing, skiing and a winter sport quadrathlon. While all ranger districts possess some forms of recreational sites, Sandia RD has the most developed sites and attracts the most visitors.

Data collected by the Forest Service indicate at least two million people visited the Cibola NF in 1999-2000. By far, most visitors are local residents taking day trips to the forest for recreational purposes. The FS estimates how many people access the forest with the National Visitor Use Monitoring (NVUM) survey. Using data from the NVUM project, **Table 5.1** provides an estimate of how many people visit the forest for recreation and wildlife related purposes. Recreational visitors access the forest for purposes such as hiking, camping (overnight and day-only) and picnics. It is important to note that many areas of the forest are not "fee areas," meaning visitors can access the site without charge. The wildlife data include hunters, fishers, and wildlife "watchers" (photographers, birdwatchers, etc).

Unfortunately, the NVUM data neither provide the number of visitors for each ranger district nor identify where visitors are from. However, if most visitors to the Cibola NF are local residents taking day trips for recreational purposes, then it would follow that the district next to the largest population base and with the highest degree of transportation access would have the highest number of those visitors. The Sandia Ranger District is adjacent to the City of Albuquerque, with a metro area population of close to 800,000, and is accessible from Interstates 25 and 40. In addition, people from the Albuquerque area have access to the NF via the Sandia Peak Tramway, which also provides direct access to skiing on the Cibola NF. Numerous hiking trails also originate on the east side of Albuquerque, allowing visitors access directly from the city.[107] Sandia also offers the most recreational opportunities with more trailheads, picnic grounds and interpretive sites, than any other district. (See Chapter 6, Table 6.1 for a listing of recreational sites by RD.)

Table 5.1 Number of Recreational & Wildlife Forest Visitors of Cibola National Forest

Type of Visit	Recreation	Wildlife
Non-local Day Travel to Forest	95,066	8,267
Non-local Overnight Stay on Forest Land	0	0
Non- local Overnight Without Stay on Forest Land	342,238	29,760
Local Day Travel to Forest	1,140,792	99,199
Local Overnight With Stay on Forest Land	38,026	3,307
Local Overnight Without Stay on Forest Land	133,092	11,573
Total CNF Forest Users	1,749,214	152,106

Source: NVUM Cibola 2000. UNM-BBER Calculations are an estimation of visitors that do not include National Grasslands.

Visitor attractions in Sandia RD, such as the Sandia Tram, restaurants and the ski resort, attract millions of visitors each year. Visitor spending is the single largest contributor to the economic impact of the Cibola NF and most of that spending occurs in the Sandia RD. Spending profiles of various recreational visitors is discussed in Chapter 7, "Economic Impacts."

[107] Access is in some instances provided through Open Space areas of the City of Albuquerque, e.g., Elena Gallegos.

5.2 Hunting and Wildlife

The wildlife in the Cibola NF attracts visitors, ranging from hunters to wildlife watchers. In 2001, 595,000 New Mexico residents participated in hunting, fishing, or wildlife watching, contributing about $1 billion to the state's economy.[108] In the Sandia RD, the most popular for recreational activities, watchers are especially interested in birds, such as hawks, eagles and other raptors.

Under federal mandate, hunting is regulated by the states, which are responsible for issuing permits and licenses. In New Mexico, permits for elk, deer and antelope are issued on a lottery basis to New Mexico residents and non-residents. The seasons and hunting dates are highly regulated. A full description of elk and deer hunting regulations can be found in the **Appendix Table A.5**.

Elk is the premier big game in the state. During the autumn months, sportsmen and women make their way to the Gila National Forest and to the Magdalena and Mt. Taylor RDs of the Cibola NF for guided and unguided hunts. A later section in this chapter will provide data showing that hunting guides and outfitters purchase the greatest number of special use permits in the area. In New Mexico, small geographical areas on public lands are designated as hunting management "units." The units are used to divide hunting areas, as regulations regarding hunting dates and limits are set at the unit-level. Although areas of the Gila NF are best known for their elk hunts[109], units 17 and 18 in the Cibola NF are also popular. Elk unit 17 is located in Socorro County, in the San Mateo Mountains. Elk Unit 18 is also in Socorro, but outside the Cibola NF boundary. The New Mexico Fish and Game Department issues up to 250 elk hunting licenses for bow hunters between September 1st and 24th. Additionally, the Department issues up to 500 licenses in unit 17 for muzzleloader hunters.[110]

For fishing, the Cibola NF offers limited opportunities. McGaffey Lake near Gallup in the Mt. Taylor RD, and Tajique Creek in the Manzano Mountains are places where fisherman and anglers can try their luck within the Cibola NF.

Mt. Taylor RD is home to many wildlife species, including deer, elk, wild turkey and bear. As mentioned, the Magdalena RD is prime elk hunting country. The Cibola NF supports numerous resident avian species, including vireos, nuthatches, and Blue Gambel's and Montezuma quail. Many species of raptors, such as red-tailed hawks, peregrine falcons, small kestrel falcons, and large golden eagles, can be viewed in the mountainous areas.

Available NVUM did not differentiate hunters from wildlife watchers. Consequently, it is difficult to confidently state how many people hunt or watch wildlife in the Cibola NF, but one can use the Wildlife counts of **Table 5.1** for an idea. According to the NVUM data, about 150,000 people visited the forest to watch or hunt wildlife.

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[108] US Department of the Interior. (2002). *2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation* (Rep.). Fish and Wildlife Service: 50 State Reports. http://fa.r9.fws.
[109] Especially Elk Units 16A though 16E.
[110] New Mexico Game & Fish. (2006). *New Mexico Wildlife Big Game Rules & Information Booklet*. http://www.wildlife.state.nm.us/publications/BigGameRulesandInformationBooklet.htm.

5.3 Grazing

Approximately 95 million acres, accounting for 65 percent of the entire National Forest System, are used for grazing in the western states. Twenty-two percent of all grazing on public land occurs in the southwest region of the NF system. Grazing is the second most substantial commercial activity in the Cibola NF and has a significant economic impact on surrounding rural communities. (See Chapter 7, "Economic Impacts") **Table 5.2** lists the number of grazing permits issued over the past several years [111] by each ranger district. As might be expected by examining the land cover, Magdalena RD has issued the most grazing permits (40), accounting for almost half of all allotments in the mountainous districts of the Cibola NF. An allotment is an area of land where one or more individuals graze their livestock. An allotment may have single or multiple permits in operation at the same time. The Magdalena RD has the most active allotments, followed by the Mt. Taylor RD.

Table 5.2 Number of Grazing Permits Sold in Cibola National Forest

Number of Permits		Number of Allotments		
	# Permits	Active	Closed	Vacant
Mt Taylor	46	27	1	1
Magdalena	57	40	0	2
Mountainair	25	17	1	0
TOTAL	**128**	**84**	**2**	**3**

Table 5.3 lists the number of animal unit months (AUMs) in the Cibola NF. The AUM is the amount of forage needed to sustain one cow and her calf, one horse, or five sheep or goats for a month. The table also provides BBER's estimate of the number of employees needed to sustain each year's level of grazing based upon estimates of man-hours derived from the IMPLAN® model.[112] Employment in grazing has a moderate economic impact, compared to the impact of employment in recreation and the FS itself. Again, this will be analyzed in greater detail in Chapter 7.

[111] FS staff indicated the data covered "the past several years," personal communication 03/27/2006.
[112] IMPLAN® is a PC based regional economic analysis system, originally developed by the USDA Forest Service, it is now used by multiple federal agencies. The current IMPLAN database and model is maintained and sold by Minnesota IMPLAN Group, Inc., http://www.implan.com.

Table 5.3 Animal Unit Months on Cibola National Forest, 2001-2005[113]

Year	AUM's	Employees
1991	53,243	40
1992	0	0
1993	79,978	61
1994	95,413	72
1995	128,753	98
1996	118,372	90
1997	109,186	83
1998	29,078	22
1999	139,012	105
2000	149,725	114
2001	120,461	91
2002	129,456	98
2003	140,627	107
2004	96,274	73
2005	76,493	58

Source: USDA Forest Service Grazing INFRA Database

Grazing fees are charged per AUM. The grazing fee for Western public lands was raised to $1.43 per AUM from $1.35 in 2003.[114] The 2005 fee is $1.79 per AUM.[115] Total permit values were not calculated in view of missing grazing fee data in the INFRA database.

The INFRA database also contains data indicating the acreage of grazing allotments. Since it was not clear whether the figures included acreage from other entities such as BLM or private in-holdings, BBER did not try to calculate the number of acres managed by the FS and used for grazing in each ranger district.

5.4 Timber

Timber has roots as a traditional use in the Cibola NF, but is not a commercial draw for this forest presently. There is interest in small diameter wood products, but there are concerns that the FS cannot provide a long term supply of wood.[116] **Table 5.4** shows the value of timber sales from 2000 to 2004, based on the Timber Information Manager (TIM) database.[117] The "Sales" column shows the amount collected by the FS for rights to harvest the forest, such as permits and other fees. When an entity purchases rights to the forest, it can access the forest for one year. The "Cut"

[113] Note: Data obtained from forest-level hard copy records. Reliability of the data is unknown as only available records were utilized. Records may be missing for any given year. Cells with data missing indicate data is not available.
[114] USDA Forest Service News Release: FS-0406 February 20, 2004
[115] US Dept of Interior, Bureau of Land Management. (2005, February 9)."The 2005 Grazing Fee, Surcharge Rates, and Penalty for Unauthorized Grazing Use." Instruction Memorandum No. 2005-067. http://www.blm.gov/nhp/efoia/wo/fy05/im2005-067.htm.
[116] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005. p. 37.
[117] The Timber Information Manager (TIM) is a set of computer systems and database used by the U.S. Forest Service and the U.S. Department of Agriculture for managing technical and financial data about the sale of forest products and timber on U.S. Forest Service lands.

column indicates the dollar amount that was collected from the sales of the cut timber, not including fuel wood. The TIM database includes the cut and sales volume of a million board feet (MBF).[118]

Table 5.4 Timber Sales on Cibola National Forest, 2000-2004

Year	Sales	Cut
2000	$80,837	$93,000
2001	$90,822	$79,151
2002	$68,430	$86,761
2003	$68,058	$64,872
2004	$76,075	$68,304
Total	$384,223	$392,089

Source: TIMS Database,Cibola National Forest.

According to the TIM data, the most profitable forest product in 2004 was fuel wood, which accounted for about 88 percent ($1,266,368) of the total timber cut value for 2004. In terms of special forest products, the major draw is Christmas trees, as can be seen in **Table 5.5**. The data show that the USDA FS collected about $19,000 in permits, but there is no significant value in the cut products.

As will be shown in Chapter 7, the timber industry is not a major economic force in the area, nor does it provide many jobs. Outside of Christmas trees, there was low production. As an aside, New Mexico (Santa Fe NF) donated the Christmas tree for the United States Capitol tree-lighting ceremony in 2005. In 1991, the Carson NF donated a tree.[119]

[118] MBF is a measure of wood where one board foot equals the volume of a one inch thick board, 12 inches wide and 12 inches long.
[119] Coleman, M. "Have Yourself a Merry Little Christmas Tree," December 9, 2005. *Albuquerque Journa*l. http://www.abqjournal.com/news/washington/414862nm12-09-05.htm.

Table 5.5 Non-Timber (Special) Product Activity on Cibola National Forest, 2004

Product	Cut Volume (MBF)	Sales Volume (MBF)	USFS Value (Permit)	Price per MBF or Cord	Cut Value
Misc. Convert	0.00	50.00	$500	$0.00	$0
Christmas Trees	1,846.00	1,909.00	$19,099	$0.00	$0
Misc. Not Convert	0.00	0.00	$60	$0.00	$0
Transplant	0.00	0.00	$1,208	$0.00	$0
Total Non-Timber	1,846.00	1,959.00	20,867.00	0.00	0.00

Source: TIMS Database,Cibola National Forest.

Timber resources are collected for traditional and cultural purposes as well. Wood gathering, piñon harvesting, and wildling gathering are important activities in local communities. The Cibola NF provides resources essential for local users in subsistence and religious purposes. Local and indigenous peoples gather wood for heating homes, and collect piñon nuts, herbs, and plants for subsistence and medicinal uses. Those who live in and near the forest have a traditional understanding of the forests health, and partake in gathering activities that they believe will benefit the forest by decreasing fire dangers caused by excessive overgrowth.[120]

Small-scale fuel wood harvesting is a form of subsistence for many residents near the forest areas, as they depend on the wood for heat. A twenty dollar permit allows the harvesting of a maximum of four cords of dead and down firewood as well as dead standing pine and juniper. Up to ten cords of wood for personal use are allowed per household.[121]

A potential source of economic development in timber products is the use of small-diameter wood to create products, such as heater pellets, mulch, panels, composite products, composite flooring, fence posts, round wood construction, and "character woods" for use in adobe-type housing construction. The Mountainair RD is collaborating with a small business in the town of Mountainair to clear small diameter wood that is perceived as excessive undergrowth within the forest, and that may pose a major fire hazard. Small diameter wood is often referred to as an underutilized resource because it can be used for a variety of products, including those used in sustainable house building. [122] If well managed, small-diameter wood harvesting can be a major economic resource for the small, rural communities.

The Collaborative Forest Restoration Program (CFRP) of the U.S. Forest Service is encouraging partnerships among stakeholders to develop and market products of small diameter trees as well as undertaking other forest restoration activities. The CFRP provides grants to eligible groups or tribes that are contributing to the forest restoration activities. The CFRP promotes forest sustainability across Forest Service boundaries, and is an opportunity to positively influence small timber harvesting and marketing.[123]

[120] Russell, J. C., & Adams-Russell, P. A. (2005). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting. P. 34.
[121] US Federal News, "Cibola National Forest to Offer Firewood Permits" January 24, 2006.
[122] Geiger, Owen. (n.d.). *Small Diameter Wood - An Underutilized Building Material*. Geiger Research Institute of Sustainable Building Website, Crestone, CO. http://www.grisb.org/publications/pub2.htm.
[123] USDA FS (2006). Collaborative Forest Restoration Program (CFRP). USDA FS Website: Southwestern Region, State and Private Forestry. http://www.fs.fed.us/r3/spf/cfrp/.

Mining

Renewed interest in mining uranium in New Mexico and other areas in the southwest has been sparked by increasing energy costs and by the rising prices of uranium.[124] Alternative energy sources are coming into consideration more and more in view of high energy prices and the environmental issues surrounding the burning of fossil fuels. Nuclear power, which requires uranium, is one of those alternatives. Mining companies are seeking to reopen existing uranium mines and/or selling mining rights to smaller junior companies eager to profit from the rising price of uranium.

The Grants Minerals Belt, a name applied to a productive uranium area in New Mexico, covers an area from approximately 30 miles west of Albuquerque to 15 miles northeast of Gallup, from the Church Rock Mine to the Marquez Mine. This area was mined extensively during the boom period of the 1950's until demand for uranium collapsed after the nuclear accident at Three Mile Island in 1979 and the nuclear disaster at Chernobyl nuclear power plants in 1986. Communities surrounding the uranium mines may have benefited economically during the boom years, but faced, what Paul Robinson, from the Southwest Research and Information Center in Albuquerque, has described as a "legacy of busted uranium economies, health impacts from human exposures, and land and water contamination for past uranium exploration and production."[125] There is reluctance, especially in the Native American communities of that area, to allow the reopening of uranium mines or exploration of new mines, due to the threats to health and feared desecration of sacred lands. In April of 2005, the Navajo Nation President, Joe Shirley, Jr., signed the Diné Natural Resources Protection Act of 2005, a bill banning uranium mining and milling on Navajo Nation land.[126] Some areas proposed for uranium mining are within the Cibola NF boundaries, and some are in areas of the NF that are culturally sensitive to Native Americans. The Mt. Taylor Mine, for instance, is on a mountain that is significant in many of the cultural traditions to Native Peoples in the area and is sacred to the Navajo.

The Mount Taylor Mine in the Mt. Taylor RD, is the largest uranium mine in the U.S and includes a 4,000-ton-per-day uranium mill. "Operated between 1984 and 1990 by Chevron Resources, the 3,300-foot-deep Mt. Taylor Mine is the deepest underground mine in the U.S. containing an estimated 100 million pounds of yellowcake."[127] It is currently under the management of Rio Grande Resources Corporation. Though the mine has been placed on standby since 1989, and allowed to fill up with water, it "contains an in-place resource of over 100 million pounds U3O8 (38,500 mtU). Presently, the deposit is being evaluated for development as an in situ leach operation."[128]

There is question as to whether there truly is a need for renewed uranium exploration and mining at this time. The World Nuclear Association has released a report stating that, despite the rising market prices for uranium, there is enough uranium in known and existing supplies to power

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[124] Robinson, P. (2006). *Need or Greed? Uranium Prices & Demand: Is the sudden interest in new uranium mining a matter of real need or plain old-fashioned greed?* Voices from the Earth, Southwest Research and Information Center, Vol. 7, No. 3, Fall 2006. Albuquerque, NM. Pg 4.
[125] Ibid.
[126] Navajo Nation Council, *Diné Natural Resources Protection Act of 2005*. http://www.sric.org/uranium/DNRPA.pdf.
[127] Shuey, C. (2006). *The New U-Boom: Speculation or Serious Development?* Voices from the Earth, Southwest Research and Information Center, Vol. 7, No. 3, Fall 2006. Albuquerque, NM. Pg 7.
[128] General Atomics and Affiliated Companies. (2006). http://www.ga.com/riogrande.php.

present day nuclear plants for the next seventy years.[129] The present supply constitutes currently identified mines, existing stockpiles, and sources from disarmed nuclear weapons.

Regardless of existing supplies, the rising market price of uranium is attracting interest in reopening and exploring uranium deposits on or near the Mt. Taylor and Magdalena RDs. Some small communities are looking forward to the economic benefits. However, those benefits may come at the cost of potential adverse environmental impacts associated with deposits of radioactive mine tailings, radioactive mill waste, and contaminated surface and ground water supplies.[130]

> *"In terms of both short and long term environmental impact, uranium mining is by far the most environmentally problematic of any mining activity because radioactivity of the ore presents an intangible that cannot be chemically mitigated."*[131]

5.5 Special Use Permits

The Cibola NF sanctions the use of the national forest lands by issuing special use permits. Permits authorize occupancy, usage, rights to and privileges on the forest lands. The permits allow for a wide range of activity on the forest as a whole, but each district is utilized for only a few purposes. As **Table 5.6** shows, special use permits have been granted for mostly recreational and communications related uses. Also reported below is the amount of fees collected for each permit category.

In the Mt. Taylor RD, 119 special use permits have been issued since 1952, with a total of approximately $17,770 in fees collected. One hundred fourteen of those permits are still active. The vast majority (96%) of permits have been issued for recreational purposes. Since 2000, 23 permits were issued for guides and outfitters, more than half of them being in 2005. While the greatest number of permits is for recreational purposes, they do not generate the highest amount of collected fees. Recreational permits have generated about $4,800 since 1988. Most of the fees collected have been from permittees with communications-related uses such as cellular towers and private mobile radio service. Since 1962, these users paid about $11,048 in fees, 62% of all fees collected in the district.

[129] World Nuclear Association (2006, June). *Supply of Uranium* (Issue Brief). http://www.world-nuclear.org/info/inf75.htm.
[130] U.S. Environmental Protection Agency. (2006, May). *Uranium Mines*. RadTown USA Website. http://www.epa.gov/radtown/uranium-mines.htm.
[131] Klauk, E. (2006). *Environmental Impacts on the Navajo Nation from Uranium Mining*. *Impacts of Resource Development on Native American Lands.* NSF, DLESE Website. http://serc.carleton.edu/research_education/nativelands/navajo/environmental.html.

Table 5.6 Special Use Permits on Cibola National Forest (1949-2005)

Permit Category	Mt Taylor District				Magdalena District				Mountainair District				Sandia District			
	# Active	# Closed	# Revoked	Rent Total	# Active	# Closed	# Revoked	Rent Total	# Active	# Closed	# Revoked	Rent Total	# Active	# Closed	# Revoked	Rent Total
Recreation	41	3	0	$6,685	27	12	0	$10,954	2	3	1	$121	17	36	0	$154,599
Agriculture	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	$0
Community/Public Information	1	1	0	$61	-	-	-	-	-	-	-	-	2	2	0	$0
Feasibility, Research, Training, Cultural Resources, & Historical	*	0	0	$0	3	1	0	$0	4	0	0	$0	10	2	0	$59
Industry	2	0	0	$61	-	-	-	-	1	0	0	$0	0	4	0	$2,520
Energy Generation/Transmission	9	0	0	$2,157	2	0	0	$0	7	0	0	$596	6	0	0	$1,483
Transportation	22	0	0	($2,253)	16	0	0	$364	15	1	0	$976	21	0	0	$364
Communications	29	1	0	$11,048	7	0	0	$5,506	24	4	0	$15,981	61	2	0	$340,989
Water (Non-Power Generating)	5	0	0	$121	9	0	0	$546	8	0	0	$182	4	0	0	$182
TOTAL SPECIAL USE PERMITS	109	5	0	$17,880	64	13	0	$17,370	61	8	1	$17,856	122	46	0	$500,197

Notes: 1). Permits Issued Encompass Those from 1952-2005. 2). The Number of Active Permits were calculated as "the number of issued minus the number of closed and revoked permits for each district."
Source: USDA Forest Service 2005 Special Use Permit Database (SUDS). Calculations by UNM-BBER..

The Magdalena RD issued 77 total permits since 1941, with approximately $17,370 in collected fees. Like the Mt. Taylor RD, most permits (51%) were for recreational uses. All 39 recreational permits were issued since 2000, 38 of which were for guides and outfitters, representing the largest increase in the number of special use permits issued in the entire forest. In 2005 alone, 30 permits were issued for guides and outfitters, 11 of which have been closed. Since 2000, $10,954 has been paid in fees for guide and outfitter permits, accounting for 63% of all fees collected in the Magdalena District since 1941. As described in a previous section, the Magdalena RD is a popular elk hunting locale.

The Mountainair RD granted 69 total special use permits, with 28 being for communications related uses, specifically private mobile radio and commercial mobile radio services. Since1976, the District has collected about $15,981 in fees, accounting for 89% of the District's total collected fees. The Mountainair RD issued less recreational use permits than the other districts; only five since 2005.

Since 1952, The Sandia RD had issued 168 total special use permits, of which 122 were still active, and had collected over $500 thousand in permit fees. Among the RDs in the Cibola NF, Sandia accounts for the largest number of recreational permits, 53 since 1988, but only 17 are still active. In 2004 and 2005, the District granted 39 permits for "recreational events," which was the most common type of recreational use permit. Sandia RD has collected $154,599 in fees for recreational permits since 1988, but the biggest revenue producer has been communications-related uses ($340,989), i.e., for radio towers on the Sandia Crest. Sandia RD has also issued four permits to authorize the filming of motion picture and television projects since 2004.

5.6 Illegal Uses

Table 5.7 lists the most common violations on the Cibola NF. In 2005, the FS recorded 579 violations in their LEIMARS[132] database. The most common offense was non-compliance in fee areas, with 461 violations. In 2004, this violation was recorded 682 times. Other common

[132] Law Enforcement and Investigations Management Attainment Reporting System (LEIMARS).

violations include operating a vehicle carelessly and littering. A complete list of violations is provided in the **Appendix Table A.6**.

Table 5.7 Violations on Cibola National Forest

Offense Code	Total Violations	Violation Codes
36CFR26117	461	Non-compliance in Fee Areas (includes parking)
NA	29	Other, No code provided
36CFR26154F	19	Operating a vehicle carelessly, recklessly, or without regard to the rights or safety of other persons
36CFR26111D	16	Failing to dispose of all garbage in proper receptacles
36CFR2619B	14	Removing any natural feature or other property of the US (property)
36CFR2619A	10	Damaging any natural resource or other property of the US (property)
36CFR2616A	5	Cutting or otherwise damaging any timber, tree, or other forest product, except as authorized by a special-use authorization, timber sale contract, or Federal law or regulation is prohibited

5.7 Opportunities, Risks, and Special Circumstances

The Cibola NF attracted over two million visitors in 1999-2000. When the associated expenditures are taken into account, recreation is the single largest economic contributor to the Cibola NF assessment area. The Cibola NF offers visitors a wide range of recreational opportunities, including hiking and trail running, picnicking, camping, mountain biking, rock climbing, geo-caching, snow-boarding, snowshoeing, both cross-country and down-hill skiing, OHV use, hunting and wildlife viewing. The close proximity of the Sandia RD offers mountain vistas as well as proving a multitude of conveniently accessible outdoor recreation options to the residents of the largest MSA in New Mexico. The Sandia RD is a unique and valuable asset for MSA residents and businesses. It is an asset that must be protected in the face of more and recreational use by the large and growing population in the Albuquerque MSA. Recreational over-use is less of a concern in the remaining mountain ranger districts, even though these are all accessible via major Interstates or Highways and offer New Mexican residents and visitors a wide variety of recreational opportunities, as well the chance to explore and enjoy a diversity of terrain, often encountering few other people.

In addition to recreation, the Cibola NF is utilized for its grazing resources, timber and mining. The multiple uses and opportunities that the forest offers can also result in conflict between the disparate groups of users.

Grazing is the second most important economic activity on the Cibola NF. A debate between ranchers and environmentalists (among others) is causing the public and the FS to evaluate the impacts of grazing on public land. Environmental groups (and even retired and former FS staff[133,134]) often argue that grazing causes soil compaction, reducing the absorption of rainfall

[133] Fager, L. "Letter to Editor," July 10, 1998. *Albuquerque Journal*..

and limiting the recharge of aquifers and affecting the water table. Others will argue that grazing allows livestock to trample much of the overgrown brush that has become such a fire danger. Ranching interests often perceive environmental groups as 'non-local' entities who do not understand the land and its condition as much as those who depend on it for their livelihood. Ranching and grazing are responsible for much of Cibola NF's economic impact in rural areas.

Timber products are no longer a major industry in the Cibola NF, but timber products still have potential for economic development. The harvesting of small diameter wood can provide economic benefits for small rural communities. In a national economy where oil prices are above $60 per barrel, alternative energy sources become more important. Wood-pellet stoves are becoming more and more popular, causing the demand for wood pellets to increase. Small-diameter wood can provide premium grade pellets that burn more efficiently and produce fewer emissions. Small diameter wood, however, can also be used to make composite wood products, small-diameter wood structures and decorative accents The FS is already working to encourage economic development in this area with the Collaborative Forest Restoration Program (CFRP). (See Chapter 7 on CFRP programs.)

There is renewed interest in uranium mining in New Mexico and other areas in the southwest driven by the rising prices of uranium.[135] Though there are potential economic benefits for small communities in the Grants Mineral Belt area, there are also many environmental consequences to uranium mining and exploration. There are already numerous mines on the Cibola NF in the Mt. Taylor and Magdalena RDs. There may be some economic potential for the small communities surrounding these areas; however, history has shown that these benefits are not long term.[136] Renewed uranium mining activity in these areas may be expected to have environmental impacts on forest lands and watersheds.

In the Magdalena RD, the USDA FS is the longest-running employer in the area, serving as a substantial source of income and other economic activity. Going beyond this FS presence and grazing activities, there is interest in utilizing the resources of the forest for small-scale economic development.[137] The communities surrounding the Magdalena RD have been interested in exploring the economic development options offered by the forest. Assets such as Heritage Resource sites (interpreted historical and archaeological sites), Wilderness Areas, wildlife, scenic mountain vistas – these assets could all be used to develop the Magdalena RD into more of a destination for travelers, perhaps with the creation of a scenic by-way. In the Mountainair RD, residents of Torrance County and the land grant communities are participating in small-scale activities such as wood harvesting and local tourism.

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[134] Davis, T. "Staffers Say Their Agency Betrayed the Land," March 31, 1998. *High Country News*. http://www.hcn.org/servlets/hcn.Article?article_id=4044.
[135] Robinson, P. (2006). *Need or Greed? Uranium Prices & Demand: Is the Sudden Interest in New Uranium Mining a Matter of Real Need or Plain Old-Fashioned Greed? Voices from the Earth*, Southwest Research and Information Center, Vol. 7, No. 3, Fall 2006. Albuquerque, NM. p. 4.
[136] Shuey, C. (2006). *The New U-Boom: Speculation or Serious Development? Voices from the Earth*, Southwest Research and Information Center, Vol. 7, No. 3, Fall 2006. Albuquerque, NM. p. 7.
[137] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, p. 37.

6 Special Areas, Recreational Sites, Heritage and Cultural Resources

This chapter describes the National Forest system's abundant offerings in the way of unique places for recreation, education, research, preservation, and quality outdoor experiences. The Forest Service inventories and manages sites as Special Areas, Recreational Sites, and as Heritage Resources. This section will discuss Special Areas and Recreational Sites and their benefits to visitors, researchers, educators, and to local communities.

6.1 Special Areas, Wilderness and IRAs

Special Areas are places designated by Congress or by top level administration within the National Forest Service, as unique because of the special characteristics and the opportunities they provide. The designations include Wilderness, National Historic Landmark (NHL), National Scenic Area (NSA), and National Monument (NM). Other Special Areas include Inventoried Roadless Areas (IRAs), Research Natural Areas, Wild and Scenic Rivers, National Recreation Trails, and National Scenic Byways, of which one example is the Sandia Crest National Scenic Byway in the Sandia RD. [138]

Wilderness areas, established by the Wilderness Act of 1964, are part of a system of wild lands that contribute significantly to the ecological, educational, and social health of its users and surrounding communities. The Wilderness Area designation protects water and other natural resources and culturally significant sites; as well as providing shelter for endangered species and offering a living laboratory for research. Beyond community benefits, Wilderness areas provide unique resources for individuals, such as an opportunity to explore personal values while experiencing risk, reward, and self-reliance.[139] The Act describes a wilderness as *"an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."* [140] Wilderness areas in the Cibola NF include the Sandia Mountain Wilderness in the Sandia RD, the Manzano Mountain Wilderness in the Mountainair RD and the Apache Kid Wilderness in the Magdalena RD. The Sandia Mountain Wilderness, which was established in 1978, includes 37,232 acres that are split to accommodate other uses at the top of Sandia Crest. The Manzano Mountain Wilderness was established in 1978 and covers 36,875 acres. The Apache Kid Wilderness was designated by Congress in 1980, and covers 44,626 acres. [141]

In January 2001, the Clinton administration enacted the Roadless Area Conservation Rule ("The Roadless Rule"), protecting 58.5 million acres of wild national forest land from most commercial logging and road building.[142,143] Since that time, The Roadless Rule has been challenged by nine lawsuits in U.S. Federal District Courts in Idaho, Utah, North Dakota, Wyoming, Alaska, and the

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[138] USDA FS (2004, February 4). Congressionally Designated Special Areas. USDA FS Website: *Recreational Activities*.http://www.fs.fed.us/recreation/programs/facts/special_areas.shtml.
[139] Recreation.gov. (2004, May 1). USDA FS Website, Apache Kid Wilderness. http://www.recreation.gov/detail.cfm?ID=4476 .
[140] US Congress, *Wilderness Act of 1964*, Public Law 88-577 (16.S. C. 1131-1136), 88th Congress, Second Session. (1964, September 3).
[141] Wilderness.net. Manzano Mountain Wilderness. http://www.wilderness.net/index.cfm?fuse=NWPS&sec=wildView&wid=339 .
[142] NMPIRG. (2006). "Battle Over Roadless Areas Goes to States." *NMPIRG Citizen Update*. http://nmpirg.org/newsletters/summer06/story4.html .
[143] USDA FS (2005, May). Roadless Area Conservation Rule – Timeline. http://roadless.fs.fed.us/xdocuments.shtml, and http://roadless.fs.fed.us/documents/m-05/04_26_05_roadless_rule_timeline.html.

District of Columbia, and it's implementation has been delayed by the Bush Administration.[144] In July of 2003, The Roadless Rule was deemed in violation of the National Environmental Policy Act and the Wilderness Act by the U.S. District Court. Consequently, in 2005, the USDA Forest Service announced a national Advisory Committee to help implement a "new" roadless rule.[145] This new rule, supported by the Bush Administration, was aimed to create a collaborative process with states on regulations specific to the needs and requirements of each state. This new rule created a petition process allowing governors to determine which areas would continue to be protected. Governors could also petition to open IRAs to mining and logging. If a governor chose not to petition, the area could be opened to development. Critics argued the bureaucratic requirements involved in the petition process provided little incentive for governors to participate, which could result in the opening of IRA lands to commercial interests. In May of 2006, New Mexico Governor Bill Richardson submitted the first western state petition, requesting protection of all IRAs within New Mexico. On September 20, 2006, a federal judge in California struck down the Bush Administration rules and reinstated The Roadless Rule established by the Clinton Administration.[146] It is unknown at this time whether this decision will be appealed by the current administration.

In New Mexico, there are 1,102,000 acres of IRAs which do not allow road construction or reconstruction), making up about 12% of the National Forest System land in the state.[147] In addition, there are 66,000 acres of IRA that do not allow road construction and reconstruction that the FS Forest Plan recommends as wilderness.[148] Much of the inventoried roadless areas on the Cibola NF exist in established Wilderness Areas, such as the Apache Kid Wilderness in the Magdalena RD and the Manzano Mountain Wilderness in the Mountainair RD, which are illustrated in **Figure 6.1.**

[144] Wilderness Society, The. (n.d.). *National Forest Roadless Areas: Background and History.* http://www.wilderness.org/OurIssues/Roadless/background.cfm?TopLevel=Background.
[145] USDA (2005, May 13). "USDA Forest Service Acts to Conserve Roadless Areas in National Forests." USDA Newsroom, *News Release*. Release No. 0148.05. http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB?contentidonly=true&contentid=2005/05/0148.xml.
[146] Kenworthy, T. "Judge Reinstates Ban on Forest Development," September 20, 2006. *USA TODAY*. http://www.usatoday.com/news/washington/2006-09-20-forest-rule_x.htm.
[147] USDA FS map of NM Inventoried Roadless Areas on NF lands.
[148] USDA FS (2001, January). "Inventoried Roadless Area Acreage, Categories of NFS Lands Summarized by State." http://roadless.fs.fed.us/documents/feis/data/sheets/acres/appendix_state_acres.html.

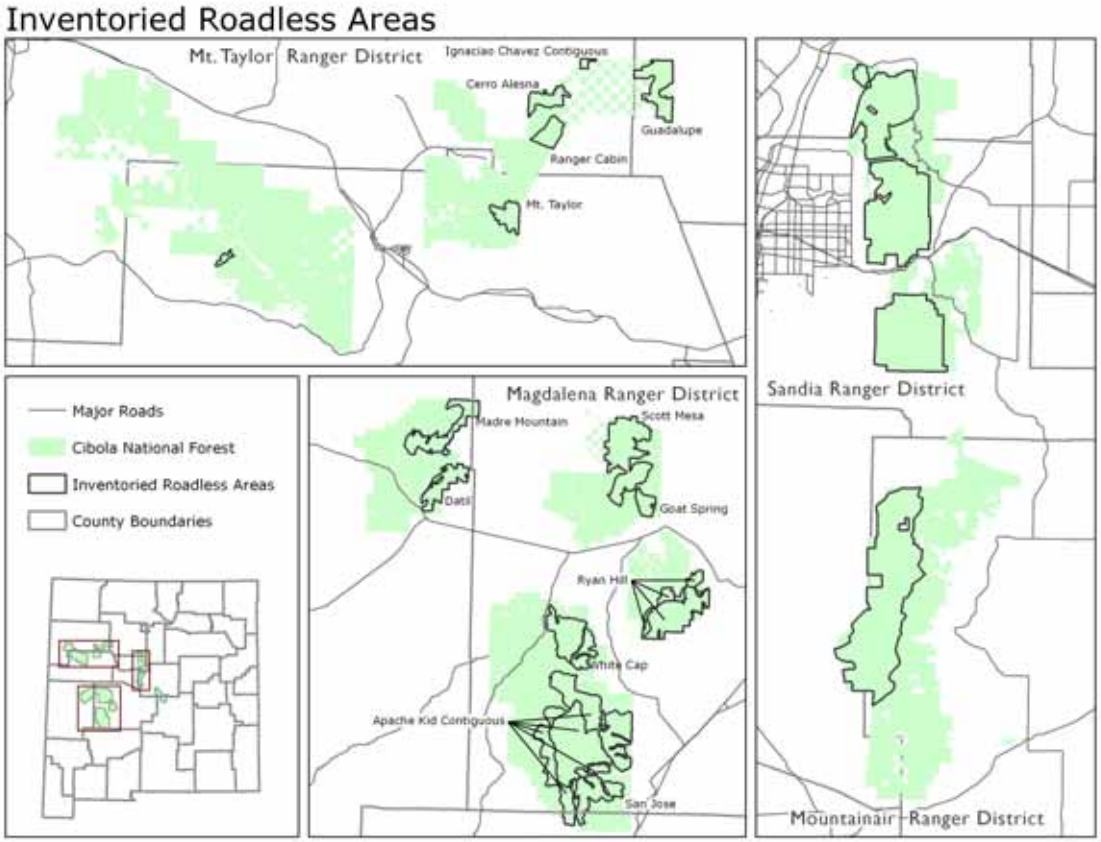

Figure 6.1 Inventoried Roadless Areas on Cibola National Forest

6.2 Recreational Sites and Heritage Resources

The Cibola NF features over 135 designated recreational sites. A complete list of recreational sites is in **Appendix Table A.7** at the end of this document. In the Mountainair District, The Red Canyon, Fourth of July and New Canyon campgrounds provide starting points for hikers and allow access into the 70 mile network of trails in the Manzano Mountain Wilderness. For motor home campers, the Mt. Taylor RD McGaffey campground is the only site in the Cibola NF with full hookups for RVs and motor homes.

Table 6.1 lists the number of recreation sites in each district, as listed in the INFRA database. By far, the Sandia RD has the most with 71 sites, accounting for almost half of the sites in the Cibola NF. The Sandia RD also offers the most recreational opportunities with more trailheads, picnic grounds and interpretive sites of the four mountain ranger districts.

Table 6.1 Recreation Site Type by Ranger District

Recreation Site Type	Mt. Taylor	Magdalena	Mountainair	Sandia
Campground/ Picnic Site	8	5	14	22
Trailhead	5	1	19	37
Interpretive Site	2	0	1	8
Observation Site	3	1	0	0
Complex	2	0	0	1
Fishing Site	2	0	0	0
Winter Sports Site	1	0	0	1
Information Site	0	1	1	2

Source: USDA Forest Service INFRA Database

Magdalena RD has the fewest developed recreational sites, even though it is the largest ranger district. However, about 43% of Magdalena RD's land cover is a combination of Herbaceous Grassland and Shrubland – the type of land cover most suited for grazing -- and the ranger district has the greatest amount of privately owned land in-holdings within the FS exterior boundaries. By contrast, Sandia RD has the smallest proportion of grazing types of land cover, and the smallest proportion (18%) of privately owned land in-holdings.

Recreational sites are classified as either developed or dispersed sites. A developed site is a discrete place containing a concentration of facilities and services used to provide recreation opportunities to the public. Recreation sites are developed within different outdoor settings to facilitate desired recreational use. Developed sites include campgrounds, picnic areas, shooting ranges, and visitor centers. Dispersed recreation involves activities that occur outside of developed recreation sites, and includes such activities as boating, hunting, fishing, hiking and biking. In other words, dispersed sites are popular areas that have no facilities or services. **Figure 6.2** shows the approximate location of developed and dispersed recreational sites in the Cibola NF.[149]

The Forest Service also manages Heritage Resources under the Heritage Program. The purpose of the program is to "*protect significant heritage resources, to share their values with the American people, and to contribute relevant information and perspectives to natural resource management*."[150] The FS manages over 5,000 pre-historic and historic sites. Some sites within this program have been investigated, documented and opened to the public as interpreted sites offering informational panels and brochures. Examples of these interpreted sites on the Cibola NF are the Kiwanis Cabin, the Tijeras Pueblo Archaeological site, Pueblo Blanco Archaeological site, and the Zuni Mountain Auto Tour.

[149] Data was obtained from USDA Forest Service INFRA database. The data was unclear as to which sites were developed and dispersed, so the map shows approximations.
[150] USDA FS (2006, March 20). "Programs: Heritage Resources." USDA Website: Recreation, Heritage & Wilderness Programs. http://www.fs.fed.us/recreation/programs/heritage/.

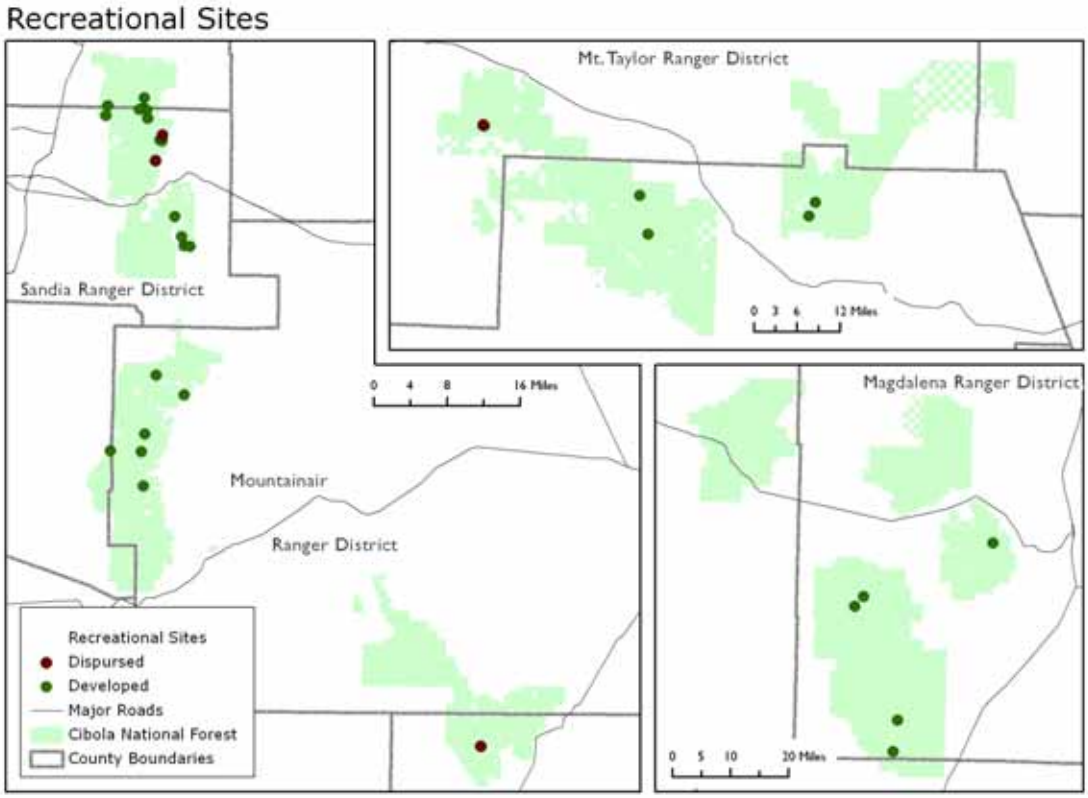

Figure 6.2 Developed and Dispersed Recreational Sites

6.3 Cultural Resources

In addition to formally designated areas, there are areas of cultural significance to indigenous peoples. These places are of importance to Native American tribes for their traditional cultural and religious activities. Out of respect for the privacy of tribal activities and uses, the identity and other information about these places are kept strictly confidential. However, the location and nature of many of these sites are not revealed by the tribes, even to FS personnel, in an effort to protect their privacy and the sanctity of the site.[151] The fact that many of these sites are unknown complicates managing multiple uses of the forest and its resources.

6.4 Opportunities, Risks, and Special Circumstances

Key issues involving special areas are intrinsically linked to the cultural values and uses of the forest users, including tribal groups, ranchers and recreation-seekers. Special areas, places, and areas of cultural significance are often areas involved in the most heated multiple-use debates. With growing populations near the Sandia and Mountainair Ranger Districts, FS officials may need to evaluate the area's capacity for increased use. A large concern among users is that forest lands are being opened up to provide more access, including areas that have been historically

[151] Russell, J. C., & Adams-Russell, P. A. (2005b). *Values, Attitudes and Beliefs Toward National Forest System Lands: The New Mexico Tribal People* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 11, 2005, pgs. 19-20.

protected as wilderness areas. Critics, such as the Public Interest Research Group (PIRG), argue new federal plans could exploit wilderness areas and make them vulnerable to commercial development.[152] While development may be beneficial for some, others are worried that increased access will be a detriment to the integrity and health of the forest landscapes, especially with OHV use. The situation is further complicated by the privacy concerns of the local tribal groups. Tribal uses of land can easily conflict with non-tribal users. In a study examining tribal attitudes and values regarding Forest Service managed lands, tribal representatives suggested that they should have a more active role in forest planning, management and decision-making processes. This would allow them to ensure their special areas are not compromised by other uses.[153]

At the heart of many debates regarding land use, there appears to be conflict over who has "more" rights to the land. While the National Forest is public land and everyone should have access, some believe they should have privileged status when it comes to forest planning and decision making. For instance, grazing interests in Magdalena RD are frustrated by the political pull of "non-local" environmental groups who do not have the level of knowledge and understanding of the land that the ranchers possess.[154] Residents near the Mountainair RD may perceive large numbers of visitors as potentially harmful to the integrity of the area.

The tribes and pueblos of New Mexico have ancestral ties to lands that lie within and adjacent to the National Forest, and therefore view these lands as their "Homeland." This heritage provides Native peoples with what they believe as "first right," or at the least, an active and influential role, in decision-making processes that involve the use of this land and its resources.[155]

Another common complaint regarding the management of these special places is the perception that decisions are made without adequately inviting comments from the public or other interested parties. This has certainly been the case with land exchanges and tribal land use conflicts, even though the FS has formal procedures for inviting public comments.[156] The Native tribes cultural value of "first right" can conflict with the formal procedures of communication and protocol on the federal agency's side.[157] Native Americans prefer that their comments be solicited very early on in any decision-making process, rather than as a response to implemented plans.

> *Participants emphasized the importance of coordination prior to a planned action rather than "after-the-fact" that can result in unproductive outcomes or "a splinter in the finger." Meaningful coordination and consultation is believed to occur when an action is "a twinkle in the eye"*

[152] U.S. PIRG. (2004, July 12). News Room: *Statement of U.S. PIRG Executive Director Gene Karpinski on the Bush Administration's Proposal to Repeal the Roadless Rule*, U.S. Public Interest Research Group. http://uspirg.org/uspirgnewsroom.asp?id2=13808&id3=USPIRGnewsroom&.
[153] Russell, J. C., & Adams-Russell, P. A. (2005b). *Values, Attitudes and Beliefs Toward National Forest System Lands: The New Mexico Tribal People* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 11, 2005, pgs 22-23.
[154] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, pgs. 30-34.
[155] Russell, J. C., & Adams-Russell, P. A. (2005b). *Values, Attitudes and Beliefs Toward National Forest System Lands: The New Mexico Tribal People* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 11, 2005, p. 21.
[156] Ibid., pgs. 13-15.
[157] Ibid., p. 21.

> *or when the action is conceived (Russell and Adams-Russell, 2005b, pg 30).*[158]

Otherwise, the cultural differences in the approach to decision-making processes can create frustration and friction with the local tribes. Native American tribes and/or pueblos adjacent to the Cibola NF, particularly the Mt. Taylor RD, have provided positive comments regarding communications from the NF personnel in comparison to what other NM Tribes have experienced with other NF offices.[159] Despite this, it is impossible to know what areas may be at risk for the pueblos and tribes if they are unable to share the locations of the cultural places at stake.

With growing population pressures and increasing conflicts between government bureaucracy and forest users, the management of special areas promises to become more complicated. As stated in the Wilderness Act of 1964, with *"...increasing population, accompanied by expanding settlement and growing mechanization,* [the Act helps to] *secure for the American people of present and future generations the benefits of an enduring resource of wilderness."*[160]

[158] Russell, J. C., & Adams-Russell, P. A. (2005b). *Values, Attitudes and Beliefs Toward National Forest System Lands: The New Mexico Tribal People* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 11, 2005, p. 30.
[159] Ibid., p. 15.
[160] *Wilderness Act of 1964*. http://www.wilderness.net/NWPS/documents/publiclaws/88-577.pdf.

7 Economic Impacts

7.1 Cibola National Forest Region Economy

The importance of the Cibola National Forest for the local region is intimately related to the economic composition of the region itself. The economic region in this case includes all counties that contain or lay adjacent to the Cibola NF. This includes Bernalillo, Catron, Cibola, Lincoln, McKinley, Sandoval, Sierra, Socorro, Torrance and Valencia counties. The most prominent feature of the region is Bernalillo County, which contains the city of Albuquerque, and by far is the largest economy in the ten county area, accounting for three-quarters of the employment in the region. Sandoval and McKinley Counties, the second and third largest economies in terms of employment, contain just 11 percent of the region's employment. The disparity between counties in terms of economic activity has substantial ramifications in terms of measuring the impact of the Cibola NF on each county. In cases where the local economy is robust and well developed, the economic contribution of the Cibola NF is less significant, while communities with smaller and less diverse economies may depend more heavily on the economic resources of the forest. This is true in its simplest form because the activity generated by the forest makes up a larger percentage of the total economic activity of the county. However, there are subtleties at work here as well, in that the population of small economy counties may be quite poor and more likely to depend on forest related products as a source of income or subsistence. Additionally, the large economy of Bernalillo County is largely service oriented, while the economies of the other counties consist of relatively large primary industry and government sectors.

Table 7.1 shows total employment and per capita income for 2000 by county. Bernalillo has 76 percent of the region's employment, and a per capita income that is nearly double that of smaller economy counties. The Sandia RD is unique among the Cibola districts in that much of it lies within Bernalillo County next to Albuquerque, and enjoys a substantially large degree of recreational use by the metropolitan area residents. As such, it sustains a high degree of recreational use and very small degrees of forest product-based uses, such as logging or grazing.

Table 7.1 Total Employment by County, 2000

	Employment	Percent Employment	Per Capita Income	PCI Relative to Bernalillo
Bernalillo	394,104	76%	27,046	1.00
Catron	1,456	0%	14,377	0.53
Cibola	8,656	2%	14,935	0.55
Lincoln	10,536	2%	18,999	0.70
McKinley	27,417	5%	13,549	0.50
Sandoval	32,379	6%	23,932	0.88
Sierra	4,603	1%	17,168	0.63
Socorro	7,237	1%	15,424	0.57
Torrance	15,918	3%	17,631	0.65
Valencia	18,801	4%	20,511	0.76
Total	521,107	100%	18,357	0.68

Source: Bureau of Economic Analysis

From **Table 7.1**, we get a sense that the Cibola NF region contains very little economic activity, except in the region's one large metropolitan center, which accounts for a huge portion of the regions economy. In order to understand the industrial differences between counties in the region, **Table 7.2** shows the industry composition of employment for the regional counties in 1980, 1990 and 2000. The largest sector in Bernalillo County is the service sector, which also

shows the largest growth of any sector from 1990 to 2000. Federal, state, and local government also make up a substantial portion of Bernalillo's economy. This is true for all counties, but the government sectors in general are substantially larger in counties with smaller economies. This is particularly true in Catron, Cibola, and Socorro Counties. These counties are significantly dependent on the federal government as a source of employment, and the USDA FS is one of these sources.

Over the last 20 years, the trend has been a shift from primary industries to service industries as local economies have grown and the national economy transitions to a service-based economy. This is particularly true in large economy counties such as Bernalillo, where the service sector has more than doubled since 1980.

Table 7.2 Total Employment in Primary Industry Sectors by County in 1980, 1990, and 2000

Bernalillo	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	223,621	313,738	394,104	100%	100%	100%	0.00%	0.00%
Farm Employment	787	587	624	0%	0%	0%	-0.16%	-0.03%
Non-farm Employment	222,834	313,151	393,480	100%	100%	100%	0.16%	0.03%
Private Employment	174,574	252,047	328,254	78%	80%	83%	2.27%	2.95%
Agricultural services, forestry, and fishing	915	2,025	3,485	0%	1%	1%	0.24%	0.24%
Mining	462	947	768	0%	0%	0%	0.10%	-0.11%
Construction	14,689	16,759	25,351	7%	5%	6%	-1.23%	1.09%
Manufacturing	17,934	22,895	22,082	8%	7%	6%	-0.72%	-1.69%
Transportation and utilities	12,060	14,298	19,553	5%	5%	5%	-0.84%	0.40%
Wholesale trade	13,239	15,889	18,535	6%	5%	5%	-0.86%	-0.36%
Retail trade	38,404	54,125	68,693	17%	17%	17%	0.08%	0.18%
Services	58,122	100,809	138,926	26%	32%	35%	6.14%	3.12%
Government and government enterprises	48,260	61,104	65,226	22%	19%	17%	-2.11%	-2.93%
Federal, civilian	12,575	13,889	13,362	6%	4%	3%	-1.20%	-1.04%
Military	6,842	7,543	5,951	3%	2%	2%	-0.66%	-0.89%
State and local	28,843	39,672	45,913	13%	13%	12%	-0.25%	-0.99%
State government	11,843	16,687	21,020	5%	5%	5%	0.02%	0.01%
Local government	17,000	22,985	24,893	8%	7%	6%	-0.28%	-1.01%

Catron	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	1,059	1,246	1,456	100%	100%	100%	0.00%	0.00%
Farm Employment	349	282	274	33%	23%	19%	-10.32%	-3.81%
Non-farm Employment	710	964	1,182	67%	77%	81%	10.32%	3.81%
Private Employment	418	607	825	39%	49%	57%	9.24%	7.95%
Agricultural services, forestry, and fishing	(D)	(D)	(D)	--	--	--	--	--
Mining	(L)	(D)	(L)	--	--	--	--	--
Construction	40	64	(D)	4%	5%	--	1.36%	--
Manufacturing	117	106	58	11%	9%	4%	-2.54%	-4.52%
Transportation and utilities	12	46	69	1%	4%	5%	2.56%	1.05%
Wholesale trade	(L)	(L)	(L)	--	--	--	--	--
Retail trade	86	110	160	8%	9%	11%	0.71%	2.16%
Services	127	188	287	12%	15%	20%	3.10%	4.62%
Government and government enterprises	292	357	357	28%	29%	25%	1.08%	-4.13%
Federal, civilian	127	151	129	12%	12%	9%	0.13%	-3.26%
Military	12	13	12	1%	1%	1%	-0.09%	-0.22%
State and local	153	193	216	14%	15%	15%	1.04%	-0.65%
State government	34	66	63	3%	5%	4%	2.09%	-0.97%
Local government	119	127	153	11%	10%	11%	-1.04%	0.32%

Cibola	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	(N)	6,202	8,656	--	100%	100%	--	0.00%
Farm Employment	(N)	222	194	--	4%	2%	--	-1.34%
Non-farm Employment	(N)	5,980	8,462	--	96%	98%	--	1.34%
Private Employment	(N)	4,053	5,285	--	65%	61%	--	-4.29%
Agricultural services, forestry, and fishing	(N)	30	(D)	--	0%	--	--	--
Mining	(N)	210	(D)	--	3%	--	--	--
Construction	(N)	150	344	--	2%	4%	--	1.56%
Manufacturing	(N)	699	370	--	11%	4%	--	-7.00%
Transportation and utilities	(N)	303	347	--	5%	4%	--	-0.88%
Wholesale trade	(N)	124	211	--	2%	2%	--	0.44%
Retail trade	(N)	1,211	1,540	--	20%	18%	--	-1.73%
Services	(N)	1,073	2,071	--	17%	24%	--	6.62%
Government and government enterprises	(N)	1,927	3,177	--	31%	37%	--	5.63%
Federal, civilian	(N)	369	420	--	6%	5%	--	-1.10%
Military	(N)	120	85	--	2%	1%	--	-0.95%
State and local	(N)	1,438	2,672	--	23%	31%	--	7.68%
State government	(N)	536	639	--	9%	7%	--	-1.26%
Local government	(N)	902	2,033	--	15%	23%	--	8.94%

Lincoln	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	5,970	7,219	10,536	100%	100%	100%	0.00%	0.00%
Farm Employment	523	440	476	9%	6%	5%	-2.67%	-1.58%
Non-farm Employment	5,447	6,779	10,060	91%	94%	95%	2.67%	1.58%
Private Employment	4,423	5,590	8,719	74%	77%	83%	3.35%	5.32%
Agricultural services, forestry, and fishing	85	126	172	1%	2%	2%	0.32%	-0.11%
Mining	47	143	(D)	1%	2%	--	1.19%	--
Construction	560	510	843	9%	7%	8%	-2.32%	0.94%
Manufacturing	117	191	336	2%	3%	3%	0.69%	0.54%
Transportation and utilities	190	213	332	3%	3%	3%	-0.23%	0.20%
Wholesale trade	51	66	(D)	1%	1%	--	0.06%	--
Retail trade	1,023	1,768	2,390	17%	24%	23%	7.36%	-1.81%
Services	1,589	1,965	3,235	27%	27%	31%	0.60%	3.48%
Government and government enterprises	1,024	1,189	1,341	17%	16%	13%	-0.68%	-3.74%
Federal, civilian	171	133	135	3%	2%	1%	-1.02%	-0.56%
Military	51	62	64	1%	1%	1%	0.00%	-0.25%
State and local	802	994	1,142	13%	14%	11%	0.34%	-2.93%
State government	286	363	197	5%	5%	2%	0.24%	-3.16%
Local government	516	631	945	9%	9%	9%	0.10%	0.23%

McKinley	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	21,210	21,784	27,417	100%	100%	100%	0.00%	0.00%
Farm Employment	258	243	251	1%	1%	1%	-0.10%	-0.20%
Non-farm Employment	20,952	21,541	27,166	99%	99%	99%	0.10%	0.20%
Private Employment	15,364	15,493	20,064	72%	71%	73%	-1.32%	2.06%
Agricultural services, forestry, and fishing	25	56	(D)	0%	0%	--	0.14%	--
Mining	4,651	808	716	22%	4%	3%	-18.22%	-1.10%
Construction	902	794	(D)	4%	4%	--	-0.61%	--
Manufacturing	947	1,379	1,523	4%	6%	6%	1.87%	-0.78%
Transportation and utilities	932	864	879	4%	4%	3%	-0.43%	-0.76%
Wholesale trade	505	1,289	3,174	2%	6%	12%	3.54%	5.66%
Retail trade	4,188	5,234	6,131	20%	24%	22%	4.28%	-1.66%
Services	2,685	4,384	5,835	13%	20%	21%	7.47%	1.16%
Government and government enterprises	5,588	6,048	7,102	26%	28%	26%	1.42%	-1.86%
Federal, civilian	2,493	2,370	2,409	12%	11%	9%	-0.87%	-2.09%
Military	264	312	247	1%	1%	1%	0.19%	-0.53%
State and local	2,831	3,366	4,446	13%	15%	16%	2.10%	0.76%
State government	251	532	728	1%	2%	3%	1.26%	0.21%
Local government	2,580	2,834	3,718	12%	13%	14%	0.85%	0.55%

Sandoval	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	5,583	14,723	32,379	100%	100%	100%	0.00%	0.00%
Farm Employment	448	416	411	8%	3%	1%	-5.20%	-1.56%
Non-farm Employment	5,135	14,307	31,968	92%	97%	99%	5.20%	1.56%
Private Employment	3,851	12,052	26,710	69%	82%	82%	12.88%	0.63%
Agricultural services, forestry, and fishing	141	230	308	3%	2%	1%	-0.96%	-0.61%
Mining	34	44	110	1%	0%	0%	-0.31%	0.04%
Construction	596	1,063	2,531	11%	7%	8%	-3.46%	0.60%
Manufacturing	643	2,831	(D)	12%	19%	--	7.71%	--
Transportation and utilities	201	397	2,306	4%	3%	7%	-0.90%	4.43%
Wholesale trade	74	288	(D)	1%	2%	--	0.63%	--
Retail trade	698	2,835	5,368	13%	19%	17%	6.75%	-2.68%
Services	1,063	3,474	6,719	19%	24%	21%	4.56%	-2.84%
Government and government enterprises	1,284	2,255	5,258	23%	15%	16%	-7.68%	0.92%
Federal, civilian	212	389	347	4%	3%	1%	-1.16%	-1.57%
Military	159	323	298	3%	2%	1%	-0.65%	-1.27%
State and local	913	1,543	4,613	16%	10%	14%	-5.87%	3.77%
State government	130	106	206	2%	1%	1%	-1.61%	-0.08%
Local government	783	1,437	4,407	14%	10%	14%	-4.26%	3.85%

Sierra	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	2,774	3,334	4,603	100%	100%	100%	0.00%	0.00%
Farm Employment	390	302	328	14%	9%	7%	-5.00%	-1.93%
Non-farm Employment	2,384	3,032	4,275	86%	91%	93%	5.00%	1.93%
Private Employment	1,731	2,299	3,315	62%	69%	72%	6.56%	3.06%
Agricultural services, forestry, and fishing	63	50	(D)	2%	1%	--	-0.77%	--
Mining	63	61	(D)	2%	2%	--	-0.44%	--
Construction	164	191	320	6%	6%	7%	-0.18%	1.22%
Manufacturing	36	(D)	(D)	1%	--	--	--	--
Transportation and utilities	163	166	124	6%	5%	3%	-0.90%	-2.29%
Wholesale trade	34	(D)	(D)	1%	--	--	--	--
Retail trade	533	669	879	19%	20%	19%	0.85%	-0.97%
Services	504	832	1,252	18%	25%	27%	6.79%	2.24%
Government and government enterprises	653	733	960	24%	22%	21%	-1.55%	-1.13%
Federal, civilian	146	104	120	5%	3%	3%	-2.14%	-0.51%
Military	39	51	44	1%	2%	1%	0.12%	-0.57%
State and local	468	578	796	17%	17%	17%	0.47%	-0.04%
State government	186	221	297	7%	7%	6%	-0.08%	-0.18%
Local government	282	357	499	10%	11%	11%	0.54%	0.13%

Socorro	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	4,899	6,576	7,237	100%	100%	100%	0.00%	0.00%
Farm Employment	513	527	589	10%	8%	8%	-2.46%	0.12%
Non-farm Employment	4,386	6,049	6,648	90%	92%	92%	2.46%	-0.12%
Private Employment	2,428	3,611	4,293	50%	55%	59%	5.35%	4.41%
Agricultural services, forestry, and fishing	24	64	(D)	0%	1%	--	0.48%	--
Mining	57	20	(D)	1%	0%	--	-0.86%	--
Construction	207	264	302	4%	4%	4%	-0.21%	0.16%
Manufacturing	76	308	194	2%	5%	3%	3.13%	-2.00%
Transportation and utilities	136	156	142	3%	2%	2%	-0.40%	-0.41%
Wholesale trade	111	39	(D)	2%	1%	--	-1.67%	--
Retail trade	678	1,096	946	14%	17%	13%	2.83%	-3.59%
Services	1,006	1,476	2,223	21%	22%	31%	1.91%	8.27%
Government and government enterprises	1,958	2,438	2,355	40%	37%	33%	-2.89%	-4.53%
Federal, civilian	378	256	238	8%	4%	3%	-3.82%	-0.60%
Military	72	75	60	1%	1%	1%	-0.33%	-0.31%
State and local	1,508	2,107	2,057	31%	32%	28%	1.26%	-3.62%
State government	981	1,517	(D)	20%	23%	--	3.04%	--
Local government	527	590	(D)	11%	9%	--	-1.79%	--

Torrance	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	8,351	11,434	15,918	100%	100%	100%	0.00%	0.00%
Farm Employment	432	472	494	5%	4%	3%	-1.04%	-1.02%
Non-farm Employment	7,919	10,962	15,424	95%	96%	97%	1.04%	1.02%
Private Employment	6,355	9,402	13,173	76%	82%	83%	6.13%	0.53%
Agricultural services, forestry, and fishing	46	124	188	1%	1%	1%	0.53%	0.10%
Mining	737	362	271	9%	3%	2%	-5.66%	-1.46%
Construction	519	780	1,330	6%	7%	8%	0.61%	1.53%
Manufacturing	440	594	410	5%	5%	3%	-0.07%	-2.62%
Transportation and utilities	207	333	363	2%	3%	2%	0.43%	-0.63%
Wholesale trade	86	218	226	1%	2%	1%	0.88%	-0.49%
Retail trade	1,563	2,379	3,310	19%	21%	21%	2.09%	-0.01%
Services	2,400	4,005	5,944	29%	35%	37%	6.29%	2.31%
Government and government enterprises	1,564	1,560	2,251	19%	14%	14%	-5.08%	0.50%
Federal, civilian	295	318	312	4%	3%	2%	-0.75%	-0.82%
Military	91	118	99	1%	1%	1%	-0.06%	-0.41%
State and local	1,178	1,124	1,840	14%	10%	12%	-4.28%	1.73%
State government	206	147	365	2%	1%	2%	-1.18%	1.01%
Local government	972	977	1,475	12%	9%	9%	-3.09%	0.72%

Valencia[1]	1980	1990	2000	1980%	1990%	2000%	Change in % 1980-1990	Change in % 1990-2000
Total	17,898	12,479	18,801	100%	100%	100%	0.00%	0.00%
Farm Employment	1,015	654	845	6%	5%	4%	-0.43%	-0.75%
Non-farm Employment	16,883	11,825	17,956	94%	95%	96%	0.43%	0.75%
Private Employment	13,085	8,181	13,537	73%	66%	72%	-7.55%	6.44%
Agricultural services, forestry, and fishing	92	173	(D)	1%	1%	--	0.87%	--
Mining	3,244	63	(D)	18%	1%	--	-17.62%	--
Construction	1,429	860	1,590	8%	7%	8%	-1.09%	1.57%
Manufacturing	339	393	1,139	2%	3%	6%	1.26%	2.91%
Transportation and utilities	1,080	664	1,020	6%	5%	5%	-0.71%	0.10%
Wholesale trade	381	315	250	2%	3%	1%	0.40%	-1.19%
Retail trade	2,788	2,256	3,833	16%	18%	20%	2.50%	2.31%
Services	2,719	2,684	4,078	15%	22%	22%	6.32%	0.18%
Government and government enterprises	3,798	3,644	4,419	21%	29%	24%	7.98%	-5.70%
Federal, civilian	299	116	167	2%	1%	1%	-0.74%	-0.04%
Military	280	230	219	2%	2%	1%	0.28%	-0.68%
State and local	3,219	3,298	4,033	18%	26%	21%	8.44%	-4.98%
State government	1,015	1,613	1,504	6%	13%	8%	7.25%	-4.93%
Local government	2,204	1,685	2,529	12%	14%	13%	1.19%	-0.05%

1In 1980, Valencia County included Cibola County, so comparisons between 1980 and later years are inaccurate.
Notes: (D) Non-disclosure of confidential information, but included in totals, (L) Less than 10 jobs, and (N) Data not available for this year.
Source: Bureau of Economic Analysis

Table 7.2 suggests that the counties of the Cibola NF region are divided not only in terms of the size of the economy and per capita income, but also in terms of a service orientation of the economy. The picture is a typical one, in which the larger economy is able to support both a larger degree of wealth as well as a more specialized economy, consisting of service industries that would not be sustainable in smaller economies.

Table 7.3 provides data on the occupational distribution of residents in each of the assessment counties in 2000. Note that there is much less variation among the counties than is seen when looking at employment by place of work and by industry. Bernalillo County has a higher proportion of people in management and professional services, but does not differ greatly from the other counties in terms of other service occupations. However, the smaller economy counties do have a larger proportion of residents in construction, production, and transportation occupations than Bernalillo County. In Bernalillo County, management and other professional occupations make up 38 percent of resident occupations. Within Catron and Sierra Counties, the two smallest economies, management and other professional occupations make up just over 30 percent of the jobs held by residents, but these counties have higher proportions in construction, production and transportation occupations, with 17 and 22 percent of male residents, respectively, in these jobs in the labor force, compared to 10 percent for Bernalillo County.

These differences in economic makeup are as we would expect, with a larger economy being capable of supporting a wider range of more specialized positions. The importance of the forest to the local economy is then not only affected by the relative size of the economic contribution of the forest to the region, but also by its occupational and industrial makeup. Those counties that rely heavily on primary industries, such as mining, logging, or ranching, are more heavily dependent on the resources of the Cibola NF.

Table 7.3 Occupational Distribution for Region Counties in 2000

	Bernalillo County	Catron County	Cibola County	Lincoln County	McKinley County	Sandoval County	Sierra County	Socorro County	Torrance County	Valencia County
Management and Professional	38%	31%	30%	28%	32%	36%	27%	37%	30%	27%
Professional and related	24%	19%	20%	16%	24%	23%	15%	26%	16%	17%
Education, training, and library	6%	8%	10%	6%	11%	5%	5%	9%	5%	6%
Healthcare practitioners and technical	5%	2%	4%	3%	6%	4%	5%	3%	3%	4%
Service	16%	16%	24%	20%	17%	15%	23%	18%	17%	17%
Sales and office	28%	22%	21%	28%	25%	28%	22%	20%	22%	26%
Farming, fishing, and forestry	0%	5%	1%	2%	1%	0%	3%	3%	2%	1%
Construction, extraction, and maintenance	9%	16%	13%	14%	12%	10%	16%	14%	15%	14%
Production and transportation	9%	10%	12%	9%	14%	11%	9%	9%	14%	15%
Total Private Employment	262,588	1,270	8,703	8,539	21,940	38,870	4,470	7,127	6,786	27,063

Source: US Census 2000. Calculations by UNM-BBER.

In **Table 7.4**, we see annual unemployment rates for the regional counties. Here again we see a distinction between the larger economies of Bernalillo County, where unemployment has been relatively low, and Catron and other small economy counties, where unemployment has, at least until the last few years, been quite high. This distinction further emphasizes the importance of the forest for the smaller economies in the region. In cases where wage and salary job opportunities are limited, unemployment is high and incomes low, the resources of the forest continue to support subsistence activities (hunting, gathering of edible plants, firewood for heat and cooking), as well as providing the resource base for activities that can provide cash income (e.g., selling Christmas trees).

Table 7.4: Average Annual Unemployment Rates for Region Counties, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Bernalillo	4.1	4.5	3.8	3.7	3.0	3.4	4.2	4.8	4.8	4.6
Catron	15.3	14.5	13.0	10.9	11.0	6.7	6.2	7.1	8.1	7.9
Cibola	12.0	14.0	10.2	7.0	7.2	5.7	5.4	6.3	5.3	5.2
Lincoln	10.7	8.3	6.4	4.5	4.1	4.3	3.9	4.0	3.9	4.0
McKinley	8.0	9.9	8.1	7.3	5.8	6.0	5.3	6.4	6.8	7.0
Sandoval	4.1	5.0	4.0	4.8	2.8	3.6	4.7	5.5	5.1	4.9
Sierra	5.4	3.6	4.4	3.1	3.2	3.8	5.0	5.0	5.1	5.3
Socorro	8.3	7.7	6.7	5.7	4.7	4.9	5.0	4.9	4.7	4.6
Torrance	7.2	7.4	5.9	4.2	4.6	4.4	3.9	4.6	5.3	5.3
Valencia	4.4	4.6	4.9	4.5	3.8	4.2	4.8	5.3	5.4	5.1
NM TOTAL	6.4	7.4	7.1	6.3	6.0	5.2	4.8	5.2	5.8	5.9

Source: Bureau of Labor Statistics, Local Area Unemployment Statistics (LAUS).

The ten counties that comprise the region containing the Cibola NF fall into two groups: those that contain significant metropolitan areas and correspondingly larger economies, and those that have sparser populations and less economic activity. Albuquerque is by far the largest metropolitan area, but other counties, such as McKinley and Sandoval, and to a lesser extent Lincoln, Torrance, and Valencia, have enough of an economic base to provide higher per capita income and lower unemployment levels. For all counties except Bernalillo, but especially those counties with very small economies, the combination of low per capita income, high unemployment rates and a larger reliance on primary industries serves to make those counties more reliant on forest derived products and economic activity.

7.2 Methodology and Organization of the Cibola National Forest Impact

In estimating the contribution of the Cibola NF to the regional economy, we consider both the operations of the USDA FS in the region as well as the various uses of forest related products. The IMPLAN software is used to determine total economic value of each activity and the operations of the USDA FS. IMPLAN uses county-level input-output (I-O) data to determine the extent to which these activities contribute to the local economy. In doing so, IMPLAN distinguishes between direct, indirect, and induced impacts, where:

> **Direct impacts** include the economic value generated by the activity itself, such as the value of cattle grazed on land in the Cibola NF. This also includes employment and labor income derived directly from the activity.
>
> **Indirect impacts** include the value generated by purchases to support that activity and the corresponding purchases to support those activities, in perpetuity. For example, indirect impacts would include the value of fencing purchased for ranching, the value of steel purchased to make the fencing, and so on.
>
> **Induced impacts** capture the value of economic activity generated from spending by employees that produce the direct and indirect goods. The ranch employees will purchase food, pay for electricity, etc., all of which generates additional value from the purchases, as well as sparking new rounds of indirect and induced value.

The IMPLAN region is the same region used throughout this report, consisting of all counties containing or bordering any of the Cibola NF districts. These counties include: Bernalillo, Catron, Cibola, Lincoln, McKinley, Sandoval, Sierra, Socorro, Torrance and Valencia. This single region, containing the above 10 counties, makes up the area considered as “local,” and the results shown from IMPLAN are for this region of 10 counties as a whole.

As discussed in Chapter 6: **Users and Uses**, the principal economic value generating activities related to the forest land itself include ranching, timber harvests, and recreation and wildlife visits. For each activity, we estimate the direct impact, and use IMPLAN to estimate the total economic value by direct, indirect, and induced impacts. The FS is unusual in that it does not directly produce a good or service, and so there is no easy measure of its direct economic value, except perhaps the direct employment provided. Instead, we look at FS expenditures on goods and services purchased locally and on payroll to estimate the first round of indirect and induced impacts of the FS, and the corresponding economic activity generated by each. The indirect activity begins with FS expenditures on goods and services; and the induced activity, with the disposable income of FS employees.

This analysis draws on a wide range of data and information sources. Data on the structure of the local economies and characteristics of the workforce come largely from the 2000 Decennial Census Summary File 3 and US Department of Labor Local Area Unemployment Statistics. The USDA FS provided data on the specific activities that occurred in the Cibola NF. Specific sources included INFRA (grazing), NVUM (recreation and wildlife), and the Cibola NF Supervisor’s office (procurement, wages & salaries). The US Department of Agriculture National Agricultural Statistics Service (NASS) was the source of data on agricultural land values and cattle stocking rates.

7.3 Direct Impact of the Cibola National Forest on Local Economies

The principal economic activities in the Cibola NF include ranching, timber harvests, recreation and wildlife visits, and the operation activities of the FS. To maintain consistency, data for 2004 were used wherever possible. However, if data for that year did not exist, or more recent data were more easily available, those were utilized instead, adjusting values back to 2004. Data for recreation and wildlife visitors were from 2000, and data for FS salaries and wages were from fiscal year 2005. All other data are from 2004.

The USDA FS provided data on cattle grazing from the INFRA database in terms of Animal Unit Months (AUMs). Estimates of the number of employees needed per AUM were derived from the IMPLAN model. Together these values provide an estimated number of employees needed to produce the 2004 AUMs. Using IMPLAN output per employee, we derive a ranching output for grazing on the Cibola NF. This is the direct value of ranching on Cibola NF land.

Similarly, timber harvesting data were derived from the TIMS database provided by the FS. The total value of cut timber provides a measure of the direct value of timber harvesting in the Cibola NF. The 2004 total value of cut timber is derived from 2004 timber prices.

For recreation and wildlife visitors, estimates of visitors from NVUM data were used, broken out into several categories based on locality (local or non-local), the type of trip (day, overnight on the forest, overnight off the forest), and the reason for the visit (recreation or wildlife). The USDA FS also provided an average expenditure profile for each type of visitor, which estimates the direct economic value of visitor spending to the local economy. These estimates include a variety of recreational activities such as skiing, hiking, camping, and other uses.

Finally, for FS operations, the USDA FS provided data on salaries and wages for its Cibola NF employees and total spending with an associated expenditure profile for use in IMPLAN. Since the direct economic value associated with the FS is unknown, we use expenditures to capture the first round indirect impacts and salaries and wages to capture the first round induced impacts. In both cases, the associated later round indirect and induced impacts are calculated by the IMPLAN model.

Table 7.5 is a summary of the output, employment, and labor incomes directly associated with these activities.[161] These local direct inputs are, in effect, 'what you see' – a measure of activities and their economic value as they actually occur in the Cibola NF. For example, there is the equivalent of 2,193 full-time annual jobs that directly supply goods and services supported by the local spending of recreation and wildlife visitors, and 71 full-time annual jobs in the ranching industry. In the case of the FS, employment is the number of employees directly employed by the FS in the Cibola NF, and labor income is the wages paid to those employees. Output for the FS is actually local FS spending on operations, not including the costs of fighting wildfires, which involve large amounts of non-local labor and business and hence are excluded altogether.

The direct impacts indicate that visitor spending is by far the largest contributor to economic activity generated by the Cibola NF. Ranching and USDA FS operations contribute a much smaller but significant amount, and timber harvesting plays only a minor role.

[161] Labor income is the sum of employee compensation and proprietor income.

Table 7.5 Direct Impacts of the Cibola National Forest, 2004

(000s of 2002 $, except employment)

	Output	Employment	Labor Income
Ranching[1]	5,051	71	709
Timber Harvesting	1,314	5	305
Visitors & Recreation	135,213	2193	48,286
Forest Service Operations[2]	6,442	233	7,559
Total	148,020	2,502	56,860

[1] For Ranching, we use proprietor income from 2001, since proprietor income for 2002 is negative

[2] Forest service operations output is actually the first round of local indirect spending, while labor income is disposable employee income

7.4 Economic Impacts and Multipliers

The direct activities associated with the Cibola NF create indirect and induced impacts as businesses and workers make expenditures and purchases, and these funds cycle through the local economy. The sum of the direct, indirect, and induced expenditures constitutes the total impact the Cibola NF has on the economies of the neighboring communities. These impacts, in terms of employment, income and total output, are summarized in **Table 7.6**. Economic multipliers are shown in **Table 7.7**. Economic multipliers, equal to the total impact divided by the direct impact, indicate the effectiveness of the industry in generating growth in the local economy.

In total, the Cibola NF contributes directly or indirectly an estimated 3,454 jobs and $85 million in income to the economies of the ten counties included in this study. This is equivalent to about 0.85 percent of the 405,756 total jobs in these areas in 2004. As noted, recreational spending is by far the largest contributor to this activity, accounting for 85 percent of the jobs and 83 percent of the labor income created by forest related activities. Ranching and FS operations also contribute significantly. This varies by ranger district, with the Sandia RD facing a much higher degree of recreational use as discussed above, and the Magdalena and Mount Taylor districts having a larger degree of grazing, as discussed in Chapter 6.

Table 7.6 Direct, Indirect, and Induced Impacts of the Cibola National Forest, 2004

TOTAL OUTPUT IMPACTS (000s of 2002 $)

	Direct	Indirect	Induced	Total
Ranching	5,051	3,672	872	9,594
Timber Harvesting	1,314	361	220	1,895
Visitors & Recreation	135,213	35,567	31,300	202,081
Forest Service Operations	--	7,965	6,679	14,644
Total	141,578	47,565	39,071	228,213

TOTAL EMPLOYMENT IMPACTS (#)

	Direct	Indirect	Induced	Total
Ranching	71	38	11	120
Timber Harvesting	5	2	3	10
Visitors & Recreation	2,193	374	381	2,948
Forest Service Operations	233	63	80	376
Total	2,502	477	475	3,454

TOTAL LABOR INCOME IMPACTS (000s of 2002 $)

	Direct	Indirect	Induced	Total
Ranching	709	910	290	1,909
Timber Harvesting	305	96	73	474
Visitors & Recreation	48,286	11,585	10,403	70,273
Forest Service Operations	7,559	2,630	2,155	12,344
Total	56,859	15,220	12,921	85,000

The comparatively large contribution of recreational and visitor spending to the economy is the result of the fact that the Cibola NF contains the Sandia RD near Albuquerque. This RD has a high number of visitors due to its proximity to the large population base of Albuquerque and due to the fact that it includes the Sandia Ski Area and Tramway. Many local residents recreate in the district, and many visitors to New Mexico, who fly in and out of the Albuquerque Sunport, visit the Sandia RD, generating large amounts of visitation and spending. In fiscal year 2001-2002, the Tram had 235,359 riders and the Sandia Peak Ski Area had 44,405 skiers. Using NVUM estimates for skier spending, the direct economic contribution of ski visitors is $6.4 million[162]. **Table 7.7** shows the direct, indirect, and induced impacts of skier spending.

[162] The figure for skier spending is based on the number of skiers provided by Sandia Ski Area and Tramway, and uses NVUM spending estimates. USDA FS NVUM estimates of the number of skiers are much higher (309,998), and lead to a spending contribution of $44 million. Here we use the more conservative number.

Table 7.7 Direct, Indirect, and Induced Impacts of Sandia Ski Area Skier Spending, 2001

	Direct	Indirect	Induced	Total
Output	4,226	1,040	1,106	6,372
Employment	73	11	14	98
Labor Income	1,775	344	368	2,487

The economic multipliers shown in **Table 7.8** offer additional insights into the economic dynamics of the Cibola NF. The initial observation is that the multipliers are fairly low, though typical of New Mexico in general, indicating that direct activities either require few inputs or, more likely, that the small local economies are unable to provide many of the inputs, forcing purchases from outside the region.

Table 7.8 Economic Multipliers for the Cibola National Forest, 2004

	Output	Employment	Income
Ranching	1.90	1.68	2.69
Timber Harvesting	1.44	1.95	1.55
Visitors & Recreation	1.49	1.34	1.46
Forest Service Operations	--	1.61	1.63
Total	--	1.38	1.49

7.5 Discussion of Results

The examination of the economic impact of the Cibola NF on the ten county region results in some interesting insights.. Although the contribution of Cibola NF to the regional economy seems small, its importance for small communities is obscured by the economic dominance of Bernalillo County.

For small communities, the presence of the Cibola NF supports the local economy in a number of crucial ways. As discussed earlier, in low income and high unemployment areas, a significant portion of the population can depend on the forest as a source of food, heat, and income. In this sense, the impact of the forest is underestimated, since there is a significant degree of unmeasured gathering of fuel wood and hunting or fishing. These products, if used at home, never enter the market, or are not captured because no permit was issued. Additionally, the substantial recreational spending by visitors is an important source of income and employment in these rural small economy areas.

In the case of tourist spending as a result of visitors to the forest, the comparatively large impacts are almost certainly underestimated, since their role as an attraction extends beyond the direct visitors of the forest to creating an atmosphere or “buzz.” Tourism plays an important role in all local communities, especially in New Mexico. The importance of the Cibola NF as a recreational and cultural site for locals and in contributing to the perceptions of New Mexico that encourage tourism should not be underestimated. There are certainly contributions from the forest in terms of scenery and other aesthetic values that further encourage visitors, even if they are not explicitly visiting the region for the forest.

In looking at the impacts of logging, the extremely small number of employees is due to the seasonal and temporary nature of logging operations. These operations have a very high output to employee ratio, especially since employment is measured in full-time equivalents on an annual basis. The number of employees is certainly much larger, but that isn't reflected here because of their temporary nature.

Ranching is an important part of the New Mexico economy as a whole, and its importance should not be overlooked. Cattle products are the largest animal commodity produced in the region, and the use of the Cibola NF lands for grazing plays a significant role in making that production possible. Additionally, ranching plays important cultural and historical roles that extend beyond its economic value, especially in rural communities.

7.6 Opportunities, Risks, and Special Circumstances

The geographic region containing the Cibola NF consists largely of small communities with low income and a lack of job opportunities. Bernalillo County contains the city of Albuquerque, the region's only large metropolitan area, and the largest city in New Mexico. These two quite distinct areas have characteristics that are consistent with other urban or rural areas. The metropolitan area in Bernalillo County has a much higher degree of economic activity and higher per capita income. It is increasingly dependent on the growth of the service sector. The rural area comprising the rest of the region is generally characterized by extremely low incomes, higher unemployment levels, and a stronger dependence on primary and tourist industries for employment.

In examining forest planning and management issues, we are left with the difficulty of assessing the relevance of the Cibola NF in two distinct areas for which the forest plays very different roles. In Bernalillo County, the Sandia RD abuts the city of Albuquerque, and is used by a large number of trail runners, day hikers and other city residents. Additionally, the Sandia RD contains a number of additional attractions that also contribute to the local economy, such as the Sandia Ski Area and Tramway. As strongly as the urban area in Bernalillo County makes use of the recreational properties of the Sandia RD, the economic contribution of the Cibola NF is a very small portion of the economy in the Albuquerque metropolitan area, but a much larger portion of the economy in small rural communities. As noted above, the presence of the large economy of Bernalillo County creates the illusion that the forest is relatively inconsequential to the region's economy, but the more rural areas of the region depend heavily on the economic contribution of the forest.

In contrast, the large rural area comprising most of the Cibola NF region makes use of the Cibola NF districts in a very different way. The low income and stronger dependence on primary industries and tourism, as well as dependence on the use of forest products for heating and food leads to a stronger reliance on tangible forest products, such as fuel wood, and grazing. Forest visitors also play an important role in this case by providing a valuable flow of dollars into the rural communities.

Recognizing this division and the different needs of communities in the Cibola NF assessment area is important in managing the resource. For example, efforts to develop timber harvesting in the Sandia RD may encounter significant objection from Bernalillo County residents, while meeting a large degree of approval in the rural areas of the region. The urban area of Bernalillo County almost certainly makes much stronger use of the forest for recreation, while the rural

communities are more dependent on the economic benefits derived from forest products. Any attempt to curtail these activities may have ramifications beyond reducing the availability of timber or grazing land, since a reduction in fuel wood gathering or hunting would negatively impact people in these rural areas dependent on the forest for subsistence as well perhaps as their livelihood.

Given the importance of visitor spending in all areas, future planning should ensure that management policies do not disrupt the flow of visitors to the forests, as this could remove a significant source of income in rural communities, and a major attractor in the Bernalillo County area.

8 Community Relationships

This chapter describes the relationships between communities surrounding the Cibola NF and the Forest Service. **Appendix Table A.8** provides population counts and decade growth rates for all those incorporated municipalities and designated places within the Cibola NF counties. Data are arranged by Forest District.

The FS has an extensive history of working with local communities on various projects, ranging from economic development to forest health and sustainability. Partnerships are an indispensable method of managing operations and conducting business. They are a vital means of achieving goals that might not be met by the FS alone. Data provided by the FS show that over 200 community organizations and businesses partner with the FS on various projects. **Table 8.1** below lists the types of partners the FS worked with in 2005.

Table 8.1 Partnership Types for All New Mexico Forests, 2005

Partner Type	Example	Number of Partnerships
Federal	Department of Energy	15
State Government	NM Human Services Dept.	22
Local Government	Torreon Land Grant	38
Tribal	Pueblo of Acoma	19
Non Governmental Org.	Albuquerque Wildlife Federation	48
Private	The Corona Group	36
Universities/ Public Schools	Mountainair High School	28

Source: USDA Forest Service

The most common partners are non-governmental organizations, typically non profit organizations such as neighborhood associations and agricultural sustainability groups. State agencies are also common partners, including the Department of Children, Youth and Families and the New Mexico State Land Office. The partnerships work to benefit both the forest land and the users.

Partnerships not only help the FS meet its objectives, but they help local communities as well. The 1990 Farm Bill allowed the Mountainair RD to provide economic development assistance through grants and challenge cost share agreements. Torrance County has been working with the Mountainair RD to promote the area as a tourist attraction for recreation. Some of the smaller land grant communities are working with the RD to pursue opportunities in wood products that are beneficial to the health of the forest.

Residents of communities surrounding the Magdalena RD wanted to increase their partnership agreements with the FS, especially with the goal of economic development. Participants in a focus group study expressed an interest in capitalizing on historic and natural resources found in the area.[163]

[163] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, discussion of focus group regarding the Magdalena RD, pp. 32-38.

8.1 Collaborative Forest Restoration Program (CFRP)

One way the FS has been teaming up with community groups is through Collaborative Forest Restoration Program (CFRP). The Community Forest Restoration Act of 2000 (Title VI, Public Law 106-393) established a collaborative forest restoration program in New Mexico. The program provides cost-share grants to stakeholders for forest restoration projects which are designed through a collaborative process. Projects must address specific issues, such as wildfire threat reduction, ecosystem restoration, preservation of old and large trees, and increased utilization of small diameter wood products. The CFRP grants aim to encourage utilization of small diameter tree materials in local economies by means of training, job creation and marketing. The program seeks to encourage multiparty monitoring and collaboration among diverse stakeholders with a goal of restoring forests to "healthy forests." The Act authorizes up to $5 million annually for the projects.[164] State, local, and tribal governments, educational institutions, landowners, conservation organizations, and other interested public and private entities can apply for funds.[165]

In New Mexico, about 75 projects were funded between 2001 and 2005; eighteen were in the Cibola NF. An example of a funded CFRP project is managed by P&M Plastics, a private business in Mountainair. The project proposed to treat 1,500 and 3,000 acres of Ponderosa pine forest over three years in the Mountainair RD. The forest treatments were designed to reduce the risk of catastrophic fire and improve forest and watershed health and wildlife habitat. The project also addressed issues of economic development by providing six jobs related to harvesting and 65 jobs in and around Mountainair related to a biomass utilization industry creating composite wood products from small diameter wood removed from treatment areas. The use of small-diameter wood offers great potential for economic development, improving forest health, and creating working relationships between the FS and local communities.

While this project was managed by a private business, other partners on the project include The Forest Guild, The Nature Conservancy, the Pueblo of Isleta and the Youth Conservation Corps.

8.2 Volunteers

According to data collected from the Forest Service, the Cibola NF benefited from the work of over 800 volunteers in 2005. There is no doubt that volunteers comprise a major source of labor for the FS, allowing the agency to take on more projects than it could without volunteers. Volunteers perform a long list of tasks, including maintaining recreation sites and trails, litter pick up and wildlife restoration. The relationships between volunteers and the forest service not only benefit the national forest, but the volunteers themselves are provided opportunities learn about the forest, wildlife and forest health.

Table 8.2 shows the gender and age breakdown of all the Cibola NF volunteers in 2005. Sixty-three percent of all Cibola NF volunteers were over 55 years of age, which implies older people are more likely to have the time, willingness and interest to volunteer with the FS.

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[164] USDA FS (2006). Collaborative Forest Restoration Program (CFRP). USDA FS Website: Southwestern Region, State and Private Forestry. http://www.fs.fed.us/r3/spf/cfrp/.
[165] Southwest Area Forest, Fire and Community Assistance Grants. (2006). "Collaborative Forest Restoration Program: Working together for New Mexico's Forests and Communities." Southwest Area Grants Website. http://www.southwestareagrants.org/nm/cfrp.php.

Table 8.2 Age and Gender of Cibola National Forest Volunteers, 2005

Age	Male	Female	Total
Under 18	83	41	124
18-54	104	72	176
55+	307	206	513
TOTAL	494	319	813

Source: USDA Forest Service

The USDA FS estimates the appraised value of 27,414 volunteer hours at over $400,000 in 2005, as shown in **Table 8.3.** The estimates account for the "skill-level" of volunteers, adjusting appraised value to the Government Pay Grade scale. The "person years" column illustrates how many years worth of work was subsidized by the efforts of volunteers. The benefits thus calculated to the FS are greatest for volunteer efforts related to recreational activities and facilities (campground and trail maintenance). Volunteers provide almost $200,000 worth of time and about 8 person-years worth of work. Volunteers also contribute substantially to heritage programs and wildlife related projects. The benefits go both ways, and people living in Albuquerque and other communities are able to find satisfying volunteer opportunities through the FS.

Table 8.3 Value of Volunteers on Cibola National Forest

Resource Category	Accumulated Hours	Appraised Value (Dollars)**	Person Years*
Recreation	13,594	$187,152	7.55
Heritage Program	3,127	$59,120	1.74
Wildlife, Fish & Rare Plants	2,630	$48,445	1.46
Range Management	32	$0	0.02
Forest Management	0	$0	0.00
Watershed & Air Management	0	$0	0.00
Protection	361	$8,676	0.20
Research	0	$0	0.00
Business & Finance	69	$788	0.04
Facilities Construction (Off-Center)	0	$0	0.00
Facilities Construction (On-Center)	0	$0	0.00
Other Facilities	0	$0	0.00
Other	7,601	$107,728	4.22
TOTALS	27,414	$411,909	15.23

* Accum. Hours/1800 Hours (Expressed in years)

** Accum. Hours*Estimated Government Pay Grade

Source: USDA Forest Service

8.3 Opportunities, Risks, and Special Circumstances

The direct benefits of the forest are concentrated mostly in the communities surrounding the forest areas. For example, many visitors to the Sandia RD are residents from the Albuquerque metropolitan area who are visiting for a day of hiking or wildlife watching.[166] Proximity is one of

[166] USDA FS NVUM Visitor data do not show where forest visitors originate.

the greatest benefits offered by the Sandia RD, providing one-third of the state's population access to forest and wilderness and all of the associated amenities. People who utilize the forest for economic purposes, such as ranchers, are typically residents of the areas surrounding the forest.

Native American tribes view much of the land surrounding and within the National Forest as their ancestral homeland, and the NF has great importance for their traditional cultural and religious activities. The Cibola NF contains many sites that are culturally significant to these indigenous people. The ability of the tribes to work with FS personnel in maintaining the integrity of these sites is of utmost importance to them.

The Cibola NF offers much to the communities of the assessment area, but it also draws on the resources these local communities. First, there are formal working agreements between community partners, such as CFRP grants. With the help of these agreements, the FS is able to facilitate innovative projects aimed at improving forest health and reducing threats, such as fires and non-native species. The local communities provide a healthy supply of volunteers for the forest. The Sandia RD, in particular, is next to a population of people who experience the Sandia Mountains as part of their everyday life. Volunteers are often eager to help the Forest Service maintain facilities and protect wildlife.

In addition to direct-service benefits, Native American tribes and generational ranchers hold a traditional wisdom about the land and its health, which can be a resource for forest management. As people who have lived with the land and have depended on it for their livelihood, they believe they know when forest health is being compromised. They also can help predict possible outcomes of forest planning initiatives. Tribal groups and other communities are often eager to share their concerns and knowledge about the forest land.

The relationships held between the FS, as an agency, and the local communities are also important. Communities often look to the FS to make decisions regarding land use conflicts. Native American tribes can easily view the FS as an advocate and also as a threat, especially when it comes to protecting special areas. Locals fear that environmentalists can influence FS decisions more than landowners and local forest users can, and these groups often have opposing interests. Continued communication between the FS, local communities and other agencies can promote relationships and facilitate cooperation among all those involved.

9 Opportunities, Risks and Special Circumstances

"Success of the Forest Service in the 21st century will be measured by the Agency's ability to sustain the flow of social and economic benefits to the American people while also ensuring that the capacity of the nation's forests and grasslands to provide ecological benefits is undiminished."[167]

Initially started in 1905, the mission of the USDA Forest Service was to manage and allocate the resources of the National Forests. Today the mission is *"to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations"*.

The last forest plan for the Cibola National Forest was completed in 1986. While there have been periodic addendums to this plan, it reflects a mission that is different from the current FS mission. In the past, the FS has been focused on managing the Cibola NF as a resource – defining what could be extracted and in what quantities. The new mission focuses on sustainability with the intention of preserving the forest assets for both current users and for future generations. The new mission of the FS is also more inclusive, requiring more community involvement in the decision making process. The FS will need to seek common ground among groups who may have very different views about NF lands and how they should be managed.

In providing a context for this major planning effort, this final chapter discusses the opportunities and risks as well as the special circumstances faced by the Cibola NF.

9.1 Socio-Economic Diversity

The Cibola NF consists of scattered "islands" of mountainous terrain that are under FS management and that span 10 New Mexico counties widely divergent in their socioeconomic characteristics. The assessment area, which includes Native American and Land Grant communities as well as Albuquerque and fast-growing Rio Rancho, is a study in contrasts and includes a dynamic mix of peoples from different socioeconomic circumstances and with different histories and cultural traditions. These diverse communities have differing (and often conflicting) perspectives on the Cibola NF and how land is used, and may be expected to make different (also often conflicting) demands on the resources of the NF.

The assessment area for Cibola NF mountain ranger districts includes the largest metropolitan area in the state, the Albuquerque MSA, with a population now exceeding 800,000. It includes some of the fastest growing communities in the country, among them Rio Rancho, which experienced a 4-fold increase in population between 1980 and 2000 and now has a population approaching 70,000. Move away from Sandia RD, which is surrounded by the MSA, however, and the picture changes from that of a dynamic fast growing urban center to that of small rural communities, many of which have experienced little if any growth over the past few decades. The contrast is sharp. Bernalillo County, with a population that today exceeds 600,000 had a population density approaching 500 people per square mile in 2000; Catron County, with 3,400 people (estimated in 2005, down from 3,543 in 2000) had a population density of 0.5 people per square mile in 2000. The large and growing population base in the Albuquerque MSA is a special

[167] USDA FS. (2006, October). *Four Threats: Questions and Answers*. http://www.fs.fed.us/projects/four-threats/questions-answers.shtml.

circumstance that affects management decisions not simply in the Sandia RD but throughout the Cibola NF.

The diverse size, differing growth patterns and contrasting demographics of the communities in the assessment area, however, also create a special set of circumstances for the Cibola NF. The large and relatively affluent population living in Bernalillo County has growing demands for recreation. By contrast, those living in small rural communities, and particularly Native American populations, may have very high rates of poverty. Traditional activities such as hunting and fuel gathering are critical subsistence activities. Forest activities, such as fuel wood gathering and cutting down trees for sale as Christmas trees, also provide communities with important sources of cash income. As Chapter 7 demonstrates, rural communities are often very dependent on economic activities based on forest resources. Now, an increasing number of small communities are looking to the forest for economic development opportunities and to the FS to assist in these efforts.

9.2 Population Growth and Changing Demographics

The Albuquerque MSA, which has a population of 800,000 today, is expected to have 1.1 million residents by 2030. By that year, population in the 10-county assessment area will be more than 1.3 million, accounting for more than half the people in the state. The proximity of the Cibola NF to this large and growing population means that the Cibola NF will experience increasing pressures and demands – and more threats to forest health -- on an accelerated time table. Population growth assures that more people, with differing needs and attitudes about the lands managed by the FS, will now compete for those resources.

Although the population in each of the assessment area counties is growing, the population pressures will be felt very differently from one RD to another. The proximity of the Cibola NF is major asset for the Albuquerque MSA and is a big draw for in-migrants. Most impacted by the MSA's large and growing population is the Sandia RD, which is surrounded by the MSA. This district provides an abundance of recreational opportunities all year-round as well as offering distinctive mountain vistas enjoyed by visitors, by newcomers as well as by long-time residents.

The population increased in all counties between 1990 and 2000, as did per capita income, and these changes may be expected to impact forest use, particularly the demand for recreation. Poverty rates fell dramatically in some areas, particularly in McKinley and Cibola Counties, although there were slight increases in both Sierra and Socorro counties. Despite these improvements, people in rural economies will continue to be dependent on agriculture and other traditional uses, such as grazing, hunting, wood gathering and piñon harvesting. Management decisions that curtail these uses could significantly impact the well-being of certain populations.

The changing demographics of the assessment area generally follow the patterns for the US as a whole: the population is aging, the population is becoming more racially and ethnically diverse and educational attainment has increased. More households are headed by women or are single person households. As discussed below, these trends may have important implications for forest use.

On a national level, America is aging and life spans are increasing as well.[168] The leading edge of the Baby Boomers has reached age 60. As this massive cohort moves into their retirement years, they will have more leisure time to spend on various recreational pursuits, including travel, but also on volunteer activities, from which the Cibola NF could benefit.[169] The aging of the US population and of the population in the assessment area counties can be expected to place new demands on Cibola NF for recreation as well as for more cultural and heritage displays and interpretive events. Serving this population may require investments in infrastructure to make areas of the forest more accessible to those with limited mobility. Many retirees become amenity migrants, and many come searching for sunshine, mountain vistas and opportunities for outdoor recreation -- all of which can be found in communities near the Cibola NF. Finally, the aging of the US population is already placing a heavy demand on federal entitlement programs, such as Medicare, Medicaid, and Social Security, intensifying the competition for federal dollars. Discretionary spending on Forest Service programs is at risk.

Rising incomes are associated with increased demand for outdoor recreation.[170] Cordell, Green and Betz explored how the changing demographics may affect the demand for different types of outdoor recreation as well as environmental attitudes. Changing demographics and the attitudes and beliefs of various cohorts (whether age, race, income, or educational level), can result in differing expectations of how the lands should be managed.

9.3 Travel and Access

Two of the ranger districts, Mt. Taylor RD and Sandia RD, lie along or near one of the state's major thoroughfares, Interstate 40. Sandia RD is surrounded by the large and growing Albuquerque MSA, which features the state's only international airport and the "Big-I," where Interstates 40 and 25 intersect. Automobile traffic in the areas adjacent to the Sandia RD is the busiest and most intense in the state, and this traffic will continue to increase as the population grows and as the State attracts more visitors. Traffic in the Mt. Taylor RD is moderate, but might be less if not for the proximity of I-40, a major trucking and shipping route. Use of the Mt. Taylor RD is expected to increase in the future.

While the other RDs within the Cibola NF are served by the interstate system, the access points are more distant from the interstate system, requiring additional travel along state highways and other roads – unless, of course, one lives in an adjacent community. Nevertheless, in addition to the Mount Taylor RD, the Mountainair and Magdalena RDs are all likely to attract more visitors in the future, including many who will seek new experiences in less traveled, perhaps less crowded, areas and the tranquility offered by more remote locations.

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[168] U.S. Census Bureau. (October 2001). *Age: 2000, Census 2000 Brief*, Washington, D.C. http://www.census.gov/prod/2001pubs/c2kbr01-12.pdf.

[169] The relationship between age and pursuit of outdoor recreational activities is generally found to be an inverse relationship, with younger people more active in their pursuit of outdoor recreational activities. However, the importance of age varies depending upon the type of activity. See H. Ken Cordell , Gary T. Green , and Carter J. Betz, "Recreation and the Environment as Cultural Dimensions in Contemporary American Society," Leisure Sciences Vol 24, No 1 / January 01, 2002, pp. 13 – 41.

[170] John C. Bergstrom, and H. Ken Cordell, , "An Analysis of the Demand for and Value of Outdoor Recreation in the United States," Journal of Leisure Research, v23 n1 p67-86 1991. Also see, H. Ken Cordell , Gary T. Green , and Carter J. Betz, "Recreation and the Environment as Cultural Dimensions in Contemporary American Society," Leisure Sciences Vol 24, No 1 / January 01, 2002, pp. 13 – 41.

The State's GRIP program is bringing $1.6 billion to bear on improving transportation infrastructure around the state. The program includes monies for infrastructure improvements along Interstate 40, a major access route for the Cibola NF, as mentioned above. Other improvements, especially in the northwest part of New Mexico and in Albuquerque, will allow increased traffic capacity, possibly inviting even more visitors to the Cibola NF.

Access to NF road and trail systems may be impeded by the development of private land that previously provided access points used by residents and others. However, new residences also mean new roads, and this can increase traffic into and around the forest. Many forest users, and especially those living in close proximity to the forest, fear increased access will result in damage through overuse, neglect and deliberate vandalism.[171] Some landowners have blocked access to the forest with locked gates and "No Trespassing" signs to protect their privacy and their property.

The issue of access and right-of-way is long-standing and difficult to resolve. One way the FS has attempted to address right-of-way issues is through land-exchanges. If the FS lacks the resources to acquire right of way, partnerships with public and private groups may provide other options. The City of Albuquerque and Bernalillo County have sometimes acted to maintain public access through their Open Space purchases. A good example is the City's acquisition of lands providing access to Three Gun Canyon in the Sandia RD. Private groups such as the Trust for Public Land may also be willing to partner in helping to preserve access. [172]

9.4 Unmanaged Recreation

The FS acknowledges that unmanaged recreation, primarily OHV use, is one of the four largest threats facing the National Forest System. The new Travel Management Rule, which went into effect on December 9, 2005[173], requires each of the NF's to designate those roads, trails, and areas that are open to motor vehicle use. Such designation provides a way of restricting OHV use in much of the forest and thus of reducing potential damage to the forest as well as limiting the conflicts with other users.

Unmanaged recreation is a contentious issue, defying simple solution. Local responses to the legislation have been mixed. OHV advocates believe the regulations leave too many unanswered questions about OHV use. Ranchers are concerned the rules do not go far enough in limiting what they see as dangerous behavior and want stricter limits on OHV use, including use permits, speed limits and enforcement of rules. Native Americans are concerned that the FS is opening and creating trails that would increase access to lands adjacent to tribal lands and sacred sites. Environmental groups have posed the strongest opposition saying that the new maps legitimize user-created trails. OHVs have practical uses, and many ranchers use them in their own work.

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[171] Russell, J. C., & Adams-Russell, P. A. (2005a). *Values, Attitudes and Beliefs Toward National Forest System Lands: The Cibola National Forest* (Issue Brief). Placerville, CA: Adams-Russell Consulting, September 23, 2005, pgs 19, 28.

[172] In Southern California, for example, the Trust for Public Land has "permanently protected thousands of acres,…" adding " land to all of Southern California's national forests, protected important wildlife corridors, provided fantastic recreational opportunities, and increased public access to open space." See descriptions of local programs at http://www.tpl.org/tier2_kad.cfm?folder_id=805.

[173] USDA FS. (2005) Travel Management; Designated Routes and Areas for Motor Vehicle Use. The Federal Register / Vol. 70, No. 216/ Wednesday, November 9, 2005/ Rules and Regulations, P. 68264. http://www.fs.fed.us/recreation/programs/ohv/final.pdf.

Local residents, however, perceive non-resident OHV users as a problem and want to promote "responsible use."[174]

9.5 Forest Health

Forest health is a central concern to the FS and forest users. Healthy forests provide important resources, such as clean water and air, to villages, towns, and cities. FS research shows that 80 percent of fresh groundwater in the United States originates from federal forestlands. The role of forests in absorbing carbon from the air is also well documented.[175] Forests also provide safe refuge for wildlife and some of the most endangered species of plants and animals. However, the strategies implemented to protect forest health are often at the center of conflicts. For example, environmental groups heavily advocated the end of logging in order to protect endangered wildlife, such as the Mexican Spotted Owl. After the reduction of heavy logging, many forest users became concerned that the forests were overgrown and that this overgrowth created dangerous wildfire conditions.

Continuing drought conditions compromise forest health and create significant fire dangers. Campground and trail closures due to fire danger and lack of snowfall for winter recreation reduce the economic benefits of visitor spending. Drought poses special problems for ranchers, who must be concerned about adequate forage and water for livestock.

Activities to promote forest health and create conditions where fire can once again play a salutary role can have the additional benefit of providing jobs and income and may even foster meaningful economic development in neighboring communities. Rural communities typically offer limited employment opportunities, so residents may engage in subsistence activities as well as a variety of activities that bring cash into the household. Training local residents to be crews for managed burns or to fight fires can provide the FS with a local workforce for these efforts as well as providing cash, much of which is likely to be spent within the surrounding area. Clearing the forests of brush and small diameter trees could create work for local residents as well as providing inputs to support various forest product industries. Small diameter wood can be used to make a variety of products, including heater pellets and sustainable building supplies. With rising energy costs caused by high oil and gas prices, many households are converting to pellet-burning stoves and heaters, creating a large and immediate demand.

The FS mission of sustainability is a long-term objective overlaid on a society that tends to think in short-term objectives. While Americans have become more environmentally conscious, they also exhibit paradoxical behaviors that can create environmental damage. Many of the issues tied to forest health are directly related to the publics desire to obtain short-term benefits (e.g., housing at the WUI, unmanaged OHV use). Thus, it is increasingly desirable that the public be educated and informed about the fragility of the Forest system and the impacts associated with its misuse. FS Partners and volunteers help to mediate some of this, and these efforts should be encouraged. It may also be useful to reach out to and educate the communities of special interest groups, such as hunting, fishing, and OHV user organizations. Participants in these types of organizations tend to be less inclined to violate rules and regulations once they are familiar with them and aware of the consequences. The education of these groups also provides a capacity for policing and reporting of those who violate these rules.

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[174] For more discussion on these views see Chapter 2, section 2.6.
[175] Ibid.

9.6 Loss of Open Space in the Wildland-Urban Interface

There is strong market for residential properties in the wildland-urban interface (WUI). This is particularly true in WUI of the Sandia RD, where housing permit data obtained from the Mid-Region Council of Governments (MRCoG) indicate considerable new housing development. The homes are often more expensive houses built on land that is sold at premium prices, and their owners have a stake in NF policies. Housing in the WUI can alter access and impact forest use. Traditional access points may be blocked. New roads built to developments can create runoff and air pollution problems as well as providing access to new areas where unmanaged recreation can occur. In addition to the access issues raised by this type of development, housing at the WUI impacts Cibola NF policies about fire and the reduction of fuel loads. Strategies for fighting fires when there are dwellings in or near the forest now must devote additional resources to the protection of those houses and the lives of their residents. Residents at the forest edge may oppose thinning and the smoke generated by programs to clean-out brush and other kindling.

It is critical to understand the roles those lands in the WUI now being subdivided have had in the larger ecological systems of the Cibola NF, e.g., their role providing forage and other sustenance for wildlife.[176] The new uses of the land may threaten the health of the forest, by introducing non-native species, by disrupting the territory and migration patterns of fragile forest species.

Agriculture in and around the Cibola NF has supported a way of life that spans centuries. Recent storm-related road closures and transportation shut-downs have placed renewed emphasis on the importance of buying food locally. There may be an opportunity to protect the WUI by working with farmers and ranchers to increase the viability of their enterprises. There may also be opportunities for the FS to work collaboratively – with local governments, conservancy groups and others – to acquire, for open space, lands that will otherwise be subdivided and sold for residential or other incompatible uses and/or to purchase development rights from ranchers. Additionally, there may be opportunities to work with communities to place reasonable restrictions on existing (where possible) and on future residential subdivisions within the WUI. The above could be combined with pubic education campaigns regarding the importance of farming/ranching and open space to the NF and to the quality of life in the assessment counties. Resort development on the periphery of the forest may or may not be a compatible use, depending upon the nature and extent of the development. However, there should be opportunities to work with local governments and citizen groups to put reasonable restrictions on this development to ensure compatibility for forest needs.

9.7 Different Economies, Different Uses for the Forest, Different Impacts, Different Prospects

The geographic region containing the Cibola NF consists of many small rural communities that are generally characterized by their low incomes, high unemployment, and continued dependence on natural resource-based and tourist industries. But ,it also contains the largest metropolitan area

[176] See, for example, Jack Ward Thomas and Stephanie Lynn Gripne, "*Maintaining Viable Farms and Ranches Adjacent to National Forest for Future of Wildlife and Open Space*," *Rangelands 24(1)* February 2002, pp. 10-16.

in the state, the Albuquerque MSA, which has a per capita income that is approaching the national average.[177]

The Cibola National Forest makes a substantial and significant contribution to the socioeconomic and cultural well-being of the assessment area, representing many elements of a superior quality of life. One of the principal finding of this study is that visitor spending in Sandia RD is the largest and most significant contributor to the economic impact of Cibola NF, but surely such spending only hints at the value of this amenity to economic development in the Albuquerque MSA and to the potential development of surrounding rural areas. Ranching and FS operations remain important sources of jobs and income to rural areas adjacent to the Cibola NF, with timber harvesting now playing a diminished role. However, there may be opportunities associated with harvesting small diameter trees. Mining was once important, particularly in the Mount Taylor RD, and there is renewed interest in mining uranium, although the Navajo and others recall a legacy of health and environmental problems. There are opportunities for partnerships between the FS and rural communities that promise benefits in terms of local economic development.

The Sandia RD abuts the city of Albuquerque, and is used extensively for recreation -- by trail runners, day hikers, skiers, bikers and others. Additionally, the Sandia RD contains a number of additional attractions that also contribute to the local economy, such as the Sandia Ski Area and Tramway, and High Finance Restaurant. As much recreational use as is made of the Sandia RD by residents of the urban area and visitors, the total estimated economic contribution of the Cibola NF is small relative to the economy of the Albuquerque MSA. The dominance of the Albuquerque MSA within the economy of the assessment area may create an illusion that the Cibola NF is relatively unimportant to the assessment area's economy. However, the small rural economies of the region are heavily dependent on primary industries, like ranching, FS operations (employment and local procurement), and on forest visitors who provide a valuable inflow of dollars into the rural communities. While many depend on the forest for their livelihood, residents in rural communities also use the forest for such subsistence activities as hunting and wood gathering.

As the population in the Cibola NF assessment area has increased and the regional economy has grown, economic activities have shifted from natural resource-based industries, like agriculture, timber and mining, to recreation and service industries. Cibola NF's primary economic activity today is recreation, reflecting increasing education and affluence. The "resource intensive" jobs and the communities dependent on natural resource industries may continue to decline, while the opportunities for recreation-based tourism increase. Small rural communities may attract investments in second homes. Some of these small communities may also attract retirees and those "knowledge workers" who are less tied to a specific place of work.

There are opportunities for the FS to work with rural communities to strengthen their economies. One set of opportunities involves harvesting small diameter trees. Timber is no longer a major economic force in the region, but wood products industries based on harvesting small diameter trees hold promise, both for the health of the forest and as an economic development strategy for some rural communities.

[177] According to the US Bureau of Economic Analysis preliminary estimates, Albuquerque MSA per capita income in 2005 was 88.4% of the US average.
http://www.bea.gov/newsreleases/regional/spi/sqpi_newsrelease.htm.

A second set of opportunities relates to recreation. Many remote areas of Cibola Forest have tremendous recreational potential, but investments may need to be to provide better visitor access and to turn sites of historical and other interest into visitor attractions. Newly developed and lesser-known recreation sites may also require more advertising and other efforts to attract visitors. Thus, active partnership between the FS and local residents and businesses and other organizations may be critical to turning these opportunities into successful economic development enterprises. While some may readily embrace the idea of becoming a "travel destination", others will have concerns about increased visitor traffic. Communication is critical if communities are to get visitor traffic on their own terms.

9.8 Importance of Volunteers and Partnerships

With the increased demand for services and increasing competition for limited federal resources, the Cibola NF can benefit from new ways of leveraging its limited resources. Volunteers can be enlisted to help with various work projects and to be the "eyes and ears" of the FS, patrolling popular trails as well as those in more remote areas. Volunteers can also help with public education. The majority of the Cibola NF's volunteers are over 55 years of age. Over the next few years, more and more Baby Boomers will retire, with many seeking meaningful ways to contribute to society. The cohort is healthier, wealthier, and bigger than any 60 year + age group in history. Outreach and involvement of this group could ameliorate some of the problems created by shrinking budgets in the face of growing forest use. In 2005, volunteers provided over $400,000 in unpaid labor hours in the Cibola NF alone. Volunteers can also provide access to groups who would not normally be reached by other FS programs.

Partnerships are an essential aspect to accomplishing FS objectives. Partnering with local communities and local government agencies can provide additional resources for the FS. Partnerships also further the FS mission which calls for inclusiveness in the decision making process. The demographic breadth and the needs of Cibola NF's constituency are daunting. The democratic approach to decision-making is rife with inherent dangers of excluding underrepresented groups and over-emphasizing the interests of small, special interest groups that are well-organized and "loud." The staff of Cibola NF, with its deep expertise and understanding of sustainability and forest health, must retain the capacity to make the final decisions on the lands it manages. Reaching out to and educating partners from local and tribal governments could provide the Cibola NF assistance in managing the lands that abut FS lands.

Partnering with State and local government bodies will become an increasingly important opportunity for the Cibola NF. State and local governments have the capacity to influence building and sprawl at the WUI where forest health could be most adversely affected. They can also advocate for more development near the forest as a way of increasing in-flow of money into the area. Additionally, they can also provide the labor (volunteer and paid) to help in forest maintenance.

The collaborative efforts of the Cibola NF with local community groups on projects concerning forest health and economic development have great potential, especially in rural areas. Programs such as the Collaborative Forest Restoration Program (CFRP) offer examples of how both the forest and surrounding communities can benefit from collaborative arrangements. By expanding projects to include tourism development, for example, Cibola NF may benefit from increased visitors in rural areas.

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11 Appendices

Table A1 Net Migration for Counties in Assessment Area Where Lived 5 Years before 1990 and before 2000

	New Mexico				Total All Counties				Bernalillo County				Catron County			
			% of Total				% of Total				% of Total				% of Total	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
TOTAL	1,390,048	1,689,911	100	100	663,759	821,452	100	100	443,989	518,381	100	100	2,403	3,394	100	100
Same House	719,628	919,717	52	54	333,691	434,441	50	53	209,479	253,614	47	49	1,237	1,960	51	58
Different House	670,420	770,194	48	46	330,068	387,011	50	47	234,510	264,767	53	51	1,166	1,434	49	42
in the United States	645,519	731,488	46	43	319,796	370,681	48	45	225,998	251,788	51	49	1,166	1,430	49	42
Same County	345,469	400,128	25	24	169,509	201,851	26	25	130,495	154,634	29	30	388	307	16	9
Different County	300,050	331,360	22	20	150,287	168,830	23	21	95,503	97,154	22	19	778	1,123	32	33
Same State	107,289	126,093	8	7	57,633	69,214	9	8	27,147	31,592	6	6	258	344	11	10
Different State	192,761	205,267	14	12	92,654	99,616	14	12	68,356	65,562	15	13	520	779	22	23
Northeast	14,311	15,329	1	1	8,068	8,674	1	1	6,016	5,846	1	1	73	17	3	1
Midwest	28,270	29,457	2	2	16,143	15,831	2	2	12,367	11,261	3	2	29	48	1	1
South	73,548	72,497	5	4	29,978	30,614	5	4	22,924	20,712	5	4	13	85	1	3
West	76,632	87,984	6	5	38,465	44,497	6	5	27,049	27,743	6	5	405	629	17	19
Puerto Rico	110	398	0	0	59	229	0	0	54	210	0	0	0	0	0	0
Elsewhere	24,791	38,308	2	2	10,213	16,101	2	2	8,458	12,769	2	2	0	4	0	0

	Cibola County				Lincoln County				McKinley County				Sandoval County			
			% of Total				% of Total				% of Total				% of Total	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
TOTAL	21,857	23,585	100	100	11,420	18,448	100	100	53,144	67,873	100	100	57,103	83,382	100	100
Same House	13,669	15,894	63	67	5,882	9,268	52	50	34,999	47,405	66	70	29,383	47,166	51	57
Different House	8,188	7,691	37	33	5,538	9,180	48	50	18,145	20,468	34	30	27,720	36,216	49	43
in the United States	8,075	7,556	37	32	5,466	8,870	48	48	17,798	19,985	33	29	27,202	35,258	48	42
Same County	4,634	3,883	21	16	2,509	3,549	22	19	11,201	12,751	21	19	6,269	9,710	11	12
Different County	3,441	3,673	16	16	2,957	5,321	26	29	6,597	7,234	12	11	20,933	25,548	37	31
Same State	2,203	2,200	10	9	1,156	2,205	10	12	2,536	2,097	5	3	11,842	13,325	21	16
Different State	1,238	1,473	6	6	1,801	3,116	16	17	4,061	5,137	8	8	9,091	12,223	16	15
Northeast	46	40	0	0	22	99	0	1	147	281	0	0	1,312	1,607	2	2
Midwest	148	124	1	1	100	354	1	2	536	436	1	1	1,762	2,054	3	2
South	251	313	1	1	1,219	1,910	11	10	673	956	1	1	2,167	3,392	4	4
West	793	996	4	4	460	753	4	4	2,705	3,464	5	5	3,850	5,170	7	6
Puerto Rico	5	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0
Elsewhere	108	135	0	1	72	310	1	2	347	483	1	1	518	944	1	1

	Sierra County				Socorro County				Torrance County				Valencia County			
			% of Total				% of Total				% of Total				% of Total	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
TOTAL	9,359	12,668	100	100	13,587	16,854	100	100	9,489	15,725	100	100	41,408	61,142	100	100
Same House	4,818	6,411	51	51	7,101	9,863	52	59	5,377	8,425	57	54	21,746	34,435	53	56
Different House	4,541	6,257	49	49	6,486	6,991	48	41	4,112	7,300	43	46	19,662	26,707	47	44
in the United States	4,467	6,107	48	48	6,155	6,684	45	40	4,067	7,196	43	46	19,402	25,807	47	42
Same County	1,846	2,085	20	16	2,798	3,068	21	18	1,269	1,754	13	11	8,100	10,110	20	17
Different County	2,621	4,022	28	32	3,357	3,616	25	21	2,798	5,442	29	35	11,302	15,697	27	26
Same State	1,186	1,694	13	13	1,678	2,034	12	12	1,872	3,171	20	20	7,755	10,552	19	17
Different State	1,435	2,328	15	18	1,679	1,582	12	9	926	2,271	10	14	3,547	5,145	9	8
Northeast	82	159	1	1	92	166	1	1	71	101	1	1	207	358	0	1
Midwest	273	392	3	3	263	153	2	1	98	316	1	2	567	693	1	1
South	457	699	5	6	571	632	4	4	449	727	5	5	1,254	1,188	3	2
West	623	1,078	7	9	753	631	6	4	308	1,127	3	7	1,519	2,906	4	5
Puerto Rico	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
Elsewhere	74	150	1	1	331	302	2	2	45	104	0	1	260	900	1	1

Source: US Census Bureau, Decennial Census, 1990 and 2000. Calculations by UNM BBER.

Table A2 Capital Outlays for Transportation Projects near the Cibola National Forest

Counties	Road	Terminus	Year	Amount	Description
Catron	US180	9.1 Miles north Grant/Catron C/L - South	2009	3,000,000	Pavement Rehabilitation
Catron	US180	9.1 Miles north Grant/Catron C/L - South	2009	3,000,000	Reconstruction
Catron	US180	2.0 Miles north of Grant/Catron C/L - South	2009	2,000,000	Pavement Preservation
Catron	US180	2.0 Miles north of Grant/Catron C/L - South	2009	1,000,000	Reconstruction
Catron	US180	Guardrail Installation	2006	400,000	Guardrail, Safety
Catron	US180	Rockfall Mitigation	2006	292,000	Rockfall Mitigation
Catron	US180	Guardrail Installation	2006	150,000	Guardrail, Safety
Catron	US180	4 miles south of JCT nm0012 - south	2007	500,000	Alignment Study
Catron	US180	4 miles south of JCT nm0012 - south	2009	6,700,000	Reconstruction
Catron	US180	Rockfall Mitigation	2006	460,000	Rockfall Mitigation
Catron	US180	Rockfall Mitigation	2006	224,000	Rockfall Mitigation
Catron	US180	10 Miles South of JCT NM0012 - South	2010	6,700,000	Reconstruction
Cibola	LOCAL	3 miles east of refinery interchange - east	2008	2,000,000	Reconstruction
Cibola	I40	3 miles east of refinery interchange - east	2009	6,300,000	Reconstruction
Cibola	I40	MP 69 to 79	2011	5,600,000	Pavement Preservation
Cibola	I40	McCarty's Interchange - East	2010	3,000,000	Pavement Preservation
Cibola	I40	Acomita Interchange	2006	1,721,000	Right-of-Way Acquisition
Cibola	I40	Acomita Interchange	2007	2,500,000	Ramp Modifications
Cibola	I40	Acomita Interchange	2008	7,000,000	Interchange Rehabilitation
Cibola	I40	Seama Interchange	2007	6,500,000	Interchange Rehabilitation
Cibola	I40	I40 Exit 108 - Ram	2006	200,000	Bridge Rehabilitation
Cibola	I40	I40 Exit 108 - Ram	2006	1,000,000	Ramp Modifications
Cibola	I40	MP 114 to 117	2011	4,000,000	Pavement Preservation
Cibola	I40	Laguna Interchange (Formerly New Laguna Interchange)	2011	1,000,000	Bridge Deck Replacement
Lincoln	US70	US 70 in Ruidoso	2007	285,000	Pedestrian Facilities
Lincoln	US70	Ruidoso to Hondo	2006	2,497,843	Debt Service
Lincoln	US70	Ruidoso to Hondo	2007	2,493,519	Debt Service
Lincoln	US70	Ruidoso to Hondo	2008	2,494,273	Debt Service
Lincoln	US70	Ruidoso to Hondo	2009	2,494,528	Debt Service
Lincoln	US70	Ruidoso to Hondo	2010	2,497,068	Debt Service
Lincoln	US70	Ruidoso to Hondo	2011	2,493,441	Debt Service
Lincoln	US70	Chaves and Roosevelt C/L	2007	1,500,000	Pavement Preservation
Lincoln	US380	Capitan - East for 7 miles	2007	4,800,000	Pavement Rehabilitation
Lincoln	US380	1.5 Miles East of JCT NM0220 - East	2006	750,000	Bridge Replacement
Lincoln	US380	1.5 Miles East of JCT NM0220 - East	2006	2,250,000	3R & Reconstruction
Lincoln	US380	5.4 Miles West of JCT US 70 - East	2006	3,889,000	Overlay
McKinley	NM118	Rockfall Mitigation	2006	142,000	Rockfall Mitigation
McKinley	NM118	JCT Ford Ave east to Patton Drive	2011	2,000,000	Access Control
McKinley	NM118	East of Gallup - East of State Police to NM0566	2008	5,500,000	Reconstruction
McKinley	I40	4.0 Miles West of Gallup West Interchange - East	2006	5,000,000	Reconstruction
McKinley	I40	4.0 Miles West of Gallup West Interchange - East	2006	150,000	Right-of-Way Acquisition
McKinley	I40	I-40 Bridges over 2nd & 3rd Streets in Gallup	2006	1,200,000	Bridge Preventative Maintenance
McKinley	I40	Fort Wingate Spur Bridges	2009	550,000	Bridge Rehabilitation
McKinley	I40	Fort Wingate Spur Bridges	2010	650,000	Bridge Rehabilitation
McKinley	I40	Accel / Decel Lanes	2006	1,500,000	Auxiliary Lanes
McKinley	I40	Refinery Bridge Exit 39, and Others	2011	420,000	Bridge Rehabilitation
McKinley	I40	Refinery Interchange - East	2007	500,000	Ramp Modifications
McKinley	I40	Thoreau Interchange	2007	5,800,000	Reconstruction
McKinley	I40	Thoreau Interchange	2006	200,000	Right-of-Way Acquisition
McKinley	I40	Thoreau Interchange	2006	100,000	Bridge Rehabilitation
McKinley	I40	Thoreau Interchange	2006	500,000	Overlay
McKinley	I40	Thoreau Interchange	2006	100,000	Pedestrian Facilities
McKinley	I40	Thoreau Interchange	2006	2,191,500	Bridge Replacement
McKinley	I40	Thoreau Interchange	2006	2,817,000	Bridge Rehabilitation
McKinley	I40	Thoreau Interchange	2006	2,191,500	Interchange Reconstruction
McKinley	I40	Thoreau Interchange	2006	1,000,000	Reconstruction
McKinley	I40	Thoreau Interchange	2006	5,000,000	Reconstruction
McKinley	NM0053	Intersection Zuni 301 - East	2006	175,000	Road Improvements
Sierra	I25	I-25, MP 75 to MP 88	2011	7,000,000	Pavement Preservation
Sierra	I25	Truth or Consequences Interchange Structures	2008	2,500,000	Bridge Rehabilitation
Sierra	I25	Cuchillo Interchange- North	2009	1,800,000	Bridge Replacement
Sierra	I25	Cuchillo Interchange- North	2009	400,000	Bridge Rehabilitation
Sierra	I25	Cuchillo Interchange- North	2009	2,000,000	Pavement Rehabilitation
Sierra	I25	Cuchillo Interchange- North	2009	1,800,000	Reconstruction
Sierra	I25	Cuchillo Interchange- North	2009	70,000	Right-of-Way Acquisition
Sierra	I25	Montichello Canyon	2008	4,000,000	Reconstruction
Sierra	I25	Milepost 92 to Milepost 102	2007	1,750,000	Pavement Preservation
Socorro	I25	I-25 Bridges, 1.18 Miles South of Magdelena Interchange	2009	1,500,000	Bridge Rehabilitation
Socorro	I25	MP 115 to MP 139	2009	8,000,000	Pavement Preservation
Socorro	I25	I-25, MP 134 - MP 139	2008	3,000,000	Pavement Preservation
Socorro	I25	Cuba Road, AT&SF Manzanares Street and NM0439 Structures	2007	3,500,000	Bridge Rehabilitation
Socorro	I25	Bridges Over Ojitos	2010	2,000,000	Bridge Replacement

Table A3 Forest Trails and Types on Cibola National Forest

Mt Taylor District	
TRAIL NAME	TRAIL TYPE
Juan Tabo Canyon	Standard/Terra Trail
Quad	Standard/Terra Trail
Upper Salazar Ski	Snow Trail
Quad	Snow Trail
Coal Mine Interpretive	Standard/Terra Trail
Continental Divide	Standard/Terra Trail
Gooseberry	Standard/Terra Trail
Water Canyon	Standard/Terra Trail
Strawberry Canyon	Standard/Terra Trail

Mountainair District	
TRAIL NAME	TRAIL TYPE
Jaral	Standard/Terra Trail
Encino Cnayon	Standard/Terra Trail
Ojito	Standard/Terra Trail
Yellowstone	Standard/Terra Trail
Vigil	Standard/Terra Trail
Gavilan	Standard/Terra Trail
Fourth of July	Standard/Terra Trail
Crimson Maple	Standard/Terra Trail
Spring Loop	Standard/Terra Trail
Albuquerque	Standard/Terra Trail
Bosque	Standard/Terra Trail
Box Canyon	Standard/Terra Trail
Cerro Blanco	Standard/Terra Trail
Cottonwood	Standard/Terra Trail
Fourth of July (Spur)	Standard/Terra Trail
Kayser Mill	Standard/Terra Trail
La Mosca	Standard/Terra Trail
Manzano Crest	Standard/Terra Trail
New Canyon	Standard/Terra Trail
Ox Canyon	Standard/Terra Trail
Pine Shadow	Standard/Terra Trail
Red Canyon	Standard/Terra Trail
Spruce Spring	Standard/Terra Trail
Trail Canyon	Standard/Terra Trail
Commanche Canyon	Standard/Terra Trail
Monte Largo	Standard/Terra Trail
OSHA	Standard/Terra Trail
Salas	Standard/Terra Trail
Trigo	Standard/Terra Trail

Magdalena District	
TRAIL NAME	TRAIL TYPE
East Fork Sawmill	Standard/Terra Trail
Mill Canyon	Standard/Terra Trail
Hop Canyon	Standard/Terra Trail
Hardy Ridge	Standard/Terra Trail
Hardy Spring	Standard/Terra Trail
West Fork	Standard/Terra Trail
Ryan Hill	Standard/Terra Trail
Sixmile	Standard/Terra Trail
Mesa	Standard/Terra Trail
Dead Horse	Standard/Terra Trail
South Baldy	Standard/Terra Trail
Copper Canyon	Standard/Terra Trail
North baldy	Standard/Terra Trail
Timber Peak	Standard/Terra Trail
Drift Fence	Standard/Terra Trail
East Red	Standard/Terra Trail
Arache Kid	Standard/Terra Trail
Cowboy	Standard/Terra Trail
San Mateo	Standard/Terra Trail
Skeleton Ridge	Standard/Terra Trail
Indian Creek	Standard/Terra Trail
Milo	Standard/Terra Trail
Shipman	Standard/Terra Trail
Smith	Standard/Terra Trail
Whitewater	Standard/Terra Trail
Maverick	Standard/Terra Trail
Coffee Pot	Standard/Terra Trail
Teepe Peak	Standard/Terra Trail
Nave	Standard/Terra Trail
Cold Spring	Standard/Terra Trail
Post	Standard/Terra Trail
Big Rosa	Standard/Terra Trail
Water Canyon	Standard/Terra Trail
Potato Canyon	Standard/Terra Trail
Chimney	Standard/Terra Trail
Hughes Mill	Standard/Terra Trail
Monica	Standard/Terra Trail
Rosedale	Standard/Terra Trail
South Canyon	Standard/Terra Trail

Table A 3: Forest Trails and Types on Cibola National Forest, Continued

Sandia District			
TRAIL NAME	TRAIL TYPE	Cedro Single Track	Standard/Terra Trail
Upper Faulty	Standard/Terra Trail	Challenge	Standard/Terra Trail
Wolf Spring	Standard/Terra Trail	Chimney Canyon	Standard/Terra Trail
Tunnel Canyon	Standard/Terra Trail	Cienega	Standard/Terra Trail
Tunero	Standard/Terra Trail	Cienega Horse Bypas	Standard/Terra Trail
Tierra Monte North	Standard/Terra Trail	Cienega Nature	Standard/Terra Trail
Old La Luz	Standard/Terra Trail	Cole Spring	Standard/Terra Trail
Mighty Mule	Standard/Terra Trail	Crest Nature	Standard/Terra Trail
Manzanita	Standard/Terra Trail	Crest Spur	Standard/Terra Trail
Lorenzo Canyon	Standard/Terra Trail	Chuchilla Lupe	Standard/Terra Trail
Lone Pine	Standard/Terra Trail	Doc Long/Sulpher Li	Standard/Terra Trail
Jaral Pueblo Basin	Standard/Terra Trail	Domingo Baca	Standard/Terra Trail
Jaral Cabin	Standard/Terra Trail	Dump Canyon	Standard/Terra Trail
Doude House	Standard/Terra Trail	Embudito	Standard/Terra Trail
Capulin	Snow Trail	Embudo	Standard/Terra Trail
Old Highway	Standard/Terra Trail	Embudo Bypass	Standard/Terra Trail
Madera Alternate	Snow Trail	Faulty	Standard/Terra Trail
Las Huertas Picnic	Standard/Terra Trail	Foothills	Standard/Terra Trail
88A	Standard/Terra Trail	Foothills-Easement	Standard/Terra Trail
Las Huertas Overlook	Standard/Terra Trail	Gravel Pit	Standard/Terra Trail
Las Huertas Overlook	Snow Trail	Hawkwatch	Standard/Terra Trail
Chamisiso	Standard/Terra Trail	Hobbies	Standard/Terra Trail
Mahognany	Standard/Terra Trail	Jaral	Standard/Terra Trail
Ponderosa	Standard/Terra Trail	Juan Tabo Cabin	Standard/Terra Trail
Rabbit Run	Standard/Terra Trail	Juan Tabo Canyon	Standard/Terra Trail
Bear Scat 2 Track	Standard/Terra Trail	10K	Standard/Terra Trail
Lower Pine	Standard/Terra Trail	Kiwanis Cabin Road	Standard/Terra Trail
Meadow 2 Track	Standard/Terra Trail	La Cueva	Standard/Terra Trail
Cedro-Ridge 2 Track	Standard/Terra Trail	La Cueva Crossing	Standard/Terra Trail
Coyote Split	Standard/Terra Trail	La Luz	Standard/Terra Trail
Cedro Creek Mature	Standard/Terra Trail	Meadow Ridge	Standard/Terra Trail
Gambles Oak	Standard/Terra Trail	Mud Spring	Standard/Terra Trail
Coyote Split	Standard/Terra Trail	Old Ccc	Standard/Terra Trail
Aspen Loop	Snow Trail	Old Ccc	Standard/Terra Trail
Nine Mile	Snow Trail	Oso Corridor	Standard/Terra Trail
Rocky Point	Snow Trail	Tram Nature	Standard/Terra Trail
Rocky Point	Standard/Terra Trail	Pino Canyon	Standard/Terra Trail
Pinyon	Standard/Terra Trail	Powerline	Standard/Terra Trail
POWERLINE	Standard/Terra Trail	Rattlesnake	Standard/Terra Trail
Pinyon 2 Track	Standard/Terra Trail	Raspberry	Standard/Terra Trail
Wild Cat	Standard/Terra Trail	San Antonio	Standard/Terra Trail
Shootin Marbles	Standard/Terra Trail	Sandy Arroyo	Standard/Terra Trail
Rocky Top	Standard/Terra Trail	Sunset Canyon	Standard/Terra Trail
Juan's Trail	Standard/Terra Trail	Sunset Ridge	Standard/Terra Trail
Poker Chip	Standard/Terra Trail	Switchback	Standard/Terra Trail
GRANITE	Standard/Terra Trail	Tecolote	Standard/Terra Trail
Kiwanis Cabin Road	Snow Trail	Tejon	Standard/Terra Trail
Tram Nature Trail	Snow Trail	Three Gun Spring	Standard/Terra Trail
Crest Natrue Trail	Snow Trail	Tierra Monte Cutoff	Standard/Terra Trail
Crest	Snow Trail	Tramway	Standard/Terra Trail
Tree Spring	Snow Trail	Tree Spring	Standard/Terra Trail
Challenge	Snow Trail	Waterfall	Standard/Terra Trail
Cienga Equestrian	Standard/Terra Trail	Tin Shed	Standard/Terra Trail
#270	Standard/Terra Trail	Strip Mine	Standard/Terra Trail
Gravel Pit	Snow Trail	Placitas West	Standard/Terra Trail
Capulin Peak	Standard/Terra Trail	Piedra Lisa	Standard/Terra Trail
Capulin Peak	Snow Trail	Madera Alternate	Standard/Terra Trail
La Madera Overlook	Standard/Terra Trail	109E	Standard/Terra Trail
10K	Snow Trail	Piedra Lisa-La Luz	Standard/Terra Trail
Ellis	Snow Trail	109D	Standard/Terra Trail
Ccc Road	Standard/Terra Trail	109C	Standard/Terra Trail
Cajun Pine	Standard/Terra Trail	Perdiz Link	Standard/Terra Trail
Otero Canyon	Standard/Terra Trail	109B	Standard/Terra Trail
#56A	Standard/Terra Trail	100	Standard/Terra Trail
#56B	Standard/Terra Trail	67A	Standard/Terra Trail
#56C	Standard/Terra Trail	67	Standard/Terra Trail
#56D	Standard/Terra Trail	65	Standard/Terra Trail
#87	Standard/Terra Trail	62	Standard/Terra Trail
#160	Standard/Terra Trail	Palomas Placitas	Standard/Terra Trail
#161A	Standard/Terra Trail	Survey	Snow Trail
Turkey Trot	Standard/Terra Trail	Oso Corridor	Snow Trail
#183	Standard/Terra Trail	Switchback	Snow Trail
#183B	Standard/Terra Trail	Buried Cable	Snow Trail
#183C	Standard/Terra Trail	Osha Spring	Standard/Terra Trail
#183C	Standard/Terra Trail	#252	Standard/Terra Trail
#183E	Standard/Terra Trail	#252A	Standard/Terra Trail
#207	Standard/Terra Trail	Agua Sarca	Standard/Terra Trail
San Antonio	Standard/Terra Trail	Apache Canyon	Standard/Terra Trail
Blue Ribbon	Standard/Terra Trail	Apache Spur	Standard/Terra Trail
#246	Standard/Terra Trail	Del Agua	Standard/Terra Trail
#252Aa	Standard/Terra Trail	Del Orno	Standard/Terra Trail
North Ski Area	Standard/Terra Trail	Ellis	Standard/Terra Trail
#323A	Standard/Terra Trail	Ellis	Standard/Terra Trail

Table A 3: Forest Trails and Types on Cibola National Forest, Continued

Blue Ribbon	Standard/Terra Trail	Apache Spur	Standard/Terra Trail
#246	Standard/Terra Trail	Del Agua	Standard/Terra Trail
#252Aa	Standard/Terra Trail	Del Orno	Standard/Terra Trail
North Ski Area	Standard/Terra Trail	Ellis	Standard/Terra Trail
#323A	Standard/Terra Trail	Ellis	Standard/Terra Trail
#305	Standard/Terra Trail	Escondito Spring	Standard/Terra Trail
305A	Standard/Terra Trail	Fletcher	Standard/Terra Trail
Aps South	Standard/Terra Trail	Granite	Standard/Terra Trail
Armijo	Standard/Terra Trail	Hatchery	Standard/Terra Trail
Barro Canyon	Standard/Terra Trail	Historic Wagon	Standard/Terra Trail
Barts	Standard/Terra Trail	Movie	Standard/Terra Trail
Bear Canyon	Standard/Terra Trail	Osha Loop	Standard/Terra Trail
Bill Spring	Standard/Terra Trail	Palomas Peak	Standard/Terra Trail
Buried Cable	Snow Trail	Palomas Placitas	Standard/Terra Trail
Canoncito	Standard/Terra Trail	Penasco Blanco	Standard/Terra Trail
Cerro Pelon	Standard/Terra Trail	Perdiz Canyon	Standard/Terra Trail
Casa Loma	Standard/Terra Trail	Osha Spring	Standard/Terra Trail
Cedro Peak	Standard/Terra Trail	Pruella	Standard/Terra Trail
Rna Link	Standard/Terra Trail	Rincon	Standard/Terra Trail
Sandia Cave	Standard/Terra Trail		
Survey	Standard/Terra Trail		
Tunnel Spring East	Standard/Terra Trail		

Source: USDA Forest Service Infra Trails Database

Table A4 National Landcover Data (NLCD) Definitions

National Land Cover Data
Version 09-10-2000
This land cover data set was produced as part of a cooperative project between the U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (USEPA) to produce a consistent, land cover data layer for the conterminous U.S. based on 30-meter Landsat thematic mapper (TM) data. National Land Cover Data (NLCD) was developed from TM data acquired by the Multi-resoultion Land Characterization (MRLC) Consortium. The MRLC Consortium is a partnership of federal agencies that produce or use land cover data. Partners include the USGS (National Mapping, Biological Resources, and Water Resources Divisions), USEPA, the U.S. Forest Service, and the National Oceanic and Atmospheric Administration.

NEW MEXICO Version 09-10-2000
The New Mexico NLCD set was produced as part of a project area encompassing portions of Federal Regions 6. This data set was produced under the direction of the MRLC Regional Land Cover Characterization Project of the USGS EROS Data Center (EDC), Sioux Falls, SD. Questions about the data set can be directed to the MRLC Regional Team at (605) 594-6114 or mrlc@edcmail.cr.usgs.gov.

NLCD Land Cover Classification System Land Cover Class Definitions

Water - All areas of open water or permanent ice/snow cover.

11. Open Water - All areas of open water; typically 25 percent or greater cover of water (per pixel).

Developed - Areas characterized by a high percentage (30 percent or greater) of constructed materials (e.g. asphalt, concrete, buildings, etc).

21. Low Intensity Residential - Includes areas with a mixture of constructed materials and vegetation. Constructed materials account for 30-80 percent of the cover. Vegetation may account for 20 to 70 percent of the cover. These areas most commonly include single-family housing units. Population densities will be lower than in high intensity residential areas.

22. High Intensity Residential - Includes highly developed areas where people reside in high numbers. Examples include apartment complexes and row houses. Vegetation accounts for less than 20 percent of the cover. Constructed materials account for 80 to100 percent of the cover.

23. Commercial/Industrial/Transportation - Includes infrastructure (e.g. roads, railroads, etc.) and all highly developed areas not classified as High Intensity Residential.

Barren - Areas characterized by bare rock, gravel, sand, silt, clay, or other earthen material, with little or no "green" vegetation present regardless of its inherent ability to support life. Vegetation, if present, is more widely spaced and scrubby than that in the "green" vegetated categories; lichen cover may be extensive.

31. Bare Rock/Sand/Clay - Perennially barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, beaches, and other accumulations of earthen material.

32. Quarries/Strip Mines/Gravel Pits - Areas of extractive mining activities with significant surface expression.

33. Transitional - Areas of sparse vegetative cover (less than 25 percent of cover) that are dynamically changing from one land cover to another, often because of land use activities.

Examples include forest clearcuts, a transition phase between forest and agricultural land, the temporary clearing of vegetation, and changes due to natural causes (e.g. fire, flood, etc.).

Forested Upland - Areas characterized by tree cover (natural or semi-natural woody vegetation, generally greater than 6 meters tall); tree canopy accounts for 25-100 percent of the cover.

41. Deciduous Forest - Areas dominated by trees where 75 percent or more of the tree species shed foliage simultaneously in response to seasonal change.

42. Evergreen Forest - Areas dominated by trees where 75 percent or more of the tree species maintain their leaves all year. Canopy is never without green foliage.

43. Mixed Forest - Areas dominated by trees where neither deciduous nor evergreen species represent more than 75 percent of the cover present.

Shrubland - Areas characterized by natural or semi-natural woody vegetation with aerial stems, generally less than 6 meters tall, with individuals or clumps not touching to interlocking. Both evergreen and deciduous species of true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions are included.

51. Shrubland - Areas dominated by shrubs; shrub canopy accounts for 25-100 percent of the cover. Shrub cover is generally greater than 25 percent when tree cover is less than 25 percent. Shrub cover may be less than 25 percent in cases when the cover of other life forms (e.g. herbaceous or tree) is less than 25 percent and shrubs cover exceeds the cover of the other life forms.

Non-natural Woody - Areas dominated by non-natural woody vegetation; non-natural woody vegetative canopy accounts for 25-100 percent of the cover. The non-natural woody classification is subject to the availability of sufficient ancillary data to differentiate non-natural woody vegetation from natural woody vegetation.

61. Orchards/Vineyards/Other - Orchards, vineyards, and other areas planted or maintained for the production of fruits, nuts, berries, or ornamentals.

Herbaceous Upland - Upland areas characterized by natural or semi-natural herbaceous vegetation; herbaceous vegetation accounts for 75-100 percent of the cover.

71. Grasslands/Herbaceous - Areas dominated by upland grasses and forbs. In rare cases, herbaceous cover is less than 25 percent, but exceeds the combined cover of the woody species present. These areas are not subject to intensive management, but they are often utilized for grazing.

Planted/Cultivated - Areas characterized by herbaceous vegetation that has been planted or is intensively managed for the production of food, feed, or fiber; or is maintained in developed settings for specific purposes. Herbaceous vegetation accounts for 75-100 percent of the cover.

81. Pasture/Hay - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops.

82. Row Crops - Areas used for the production of crops, such as corn, soybeans, vegetables, tobacco, and cotton.

83. Small Grains - Areas used for the production of graminoid crops such as wheat, barley, oats, and rice.

84. Fallow - Areas used for the production of crops that are temporarily barren or with sparse vegetative cover as a result of being tilled in a management practice that incorporates prescribed alternation between cropping and tillage.

85. Urban/Recreational Grasses - Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.

Wetlands - Areas where the soil or substrate is periodically saturated with or covered with water as defined by Cowardin et al.

91. Woody Wetlands - Areas where forest or shrubland vegetation accounts for 25-100 percent of the cover and the soil or substrate is periodically saturated with or covered with water.

92. Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for 75-100 percent of the cover and the soil or substrate is periodically saturated with or covered with water.

Table A5 Hunting Regulations for Cibola National Forest

Big Game Hunting

Species	License/Permit Type	Hunt Dates/Season	Special Weapons	Units/Counties/Zones
Elk	LOS	Varies per unit form 10/8-12/31	Any legal sporting arm	Units 9, 10, 36, 37, 16A, 16B, 16C, 16D, 21A, 21B; 24
Elk	LOS	Varies per unit from 9/1-9/22	Bow only	Units 6A, 16A, 16B, 16C, 16D, 16E, 17, 21A, 21B, 24, 7,9 10, 18, 34, 36, 37
Elk	LOS	Varies per unit from 10/1-11/15	Mobility Impaired	Units 16A, 16D, 9
Elk	LOS	Varies per unit from 10/1-12/3	Muzzleloader	Units (9, 10, 36, 37, 7, 16E, 17, 24)
Elk	DL	Varies per unit from 10/1-12/14	Any legal sporting arm	Units 6A, 7, 9, 10, 16A, 16B, 16C, 16D, 16E, 21A, 21B, 2436, 37
Elk	DL	Varies per unit from 9/1-9/22	Bow only	Units 5, 6A, 7, 9, 10, 13, 15, 16A, 16B, 16C, 16D, 16E, 17, 18, 21, 24, 38, 39
Elk	DL	Varies per unit from 10/8-11/9	Mobility Impaired	Units 9, 16A, 16D
Elk	DI	Varies per unit from 10/1-12/15	Muzzleloader	Units 6A, 7, 9, 10, 15, 16E, 17, 24, 36, 37
Antelope	DL	Varies per unit from 9/1-10/9	Any legal sporting arm	Units 3, 5, 6, 9-13, 18, 20, 34, 36-39
Antelope	DL	8/20-8/28	Bow only	Units 5, 6, 8-10, 13, 17, 20, 34, 36-38
Antelope	DL	Varies per unit from 8/6-9/10	Mobility Impaired	Units 3, 5 , 6 9, 10, 13, 19-20, 34, 36-39
Antelope	LOS	9/17-918 or 9/24-9/25	Any legal sporting arm	Units 3, 5, 8, 10
Deer	DL	11/11-11/15, 10/28-11/1, 11/4-116, 9/1-9/22, 1/1-1/15	Any legal sporting arm	Units 6A, 8, 16,17, 18, 2021, 24
Deer	DL	10/28-11/21	Muzzleloader	Units 6A, 7, 8,10,14, 15, 16, 17, 18, 20, 21, 24, 36, 37, 38
Deer	DL	9/1-922, 1/1-1/15	Bow only	Units 6A, 7, 8,10,14, 15, 16, 17, 18, 20, 21, 24, 36, 37, 38
Bear	OTC	Varies per zone from 8/16-11/15	Bow Only	Zones 1, 3, 4, 5, 6
Cougar	OTC	10/1-3/31	Any legal sporting arm	Zones A, B, E, F, G, H, I, J, K, M, O
Turkey	OTC	4/15-4/30	Any legal sporting arm	Unit 2
Barbary Sheep	OTC	4/1/05-3/31/06	Any legal sporting arm	Units 9, 13, 19, 20, 21, 36, 37
Javelina & Barbary Shhep	DL	1/15-3/15	any legal sporting arm	Units 12,13, 17, 20, 21
Furbearers	OTC	Varies per furbearer from 4/1/05-3/31/06	Dogs, firearms, bows, traps/snares	Specific closed areas

Small Game and Waterfowl Hunting

Species	License/Permit Type	Hunt Dates/Season	Special Weapons	Units/Counties/Zones
Quail	OTC	11/15-2/15	Any legal sporting arm	Statewide
Pheasant	OTC	12/8-12/11	Any legal sporting arm	Statewide except Valencia County
Pheasant	OTC	12/10	Any legal sporting arm	Valencia North & South Public Hunts
Dove	OTC	9/1-10/30	Any legal sporting arm	North zone (McKinley, Sandoval, Cibola, Bernalillo)
Dove	OTC	9/1-9/30, 12/1-12/30	Any legal sporting arm	South Zone (Catron, Socorro, Cibola, Bernalillo, Valencia)
Band Tailed Pigeon	OTC	10/1-10/20	Any legal sporting arm	Southwest (Socorro, Catron, Sierra)
Band Tailed Pigeon	OTC	9/1-10/30	Any legal sporting arm	Remainder of state
Squirrel	OTC	9/1-1031	Any legal sporting arm	GS-1, S-4
Squirrel	OTC	10/1-11/20	Any legal sporting arm	GS-2
Blue Grouse	OTC	9/1-10/15	Any legal sporting arm	GS-1
Blue Grouse	OTC	10/1-10/31	Any legal sporting arm	GS-2
Sandhill Crane	OTC	11/5-11/6	Any legal sporting arm	Estancia Valley Hunt (SCRO 101)
Sandhill Crane	OTC	Varies per Hunt Area from 10/31/06-1/31/06	Any legal sporting arm	Middle Rio Grande Valley Hunt
Sandhill Crane	OTC	Varies per Hunt Area from 10/31/06-1/31/06	Any legal sporting arm	Southwest Hunt
Waterfowl	OTC	Varies across state from 12/31-1/23	Any legal sporting arm	Statewide

License abbreviations:
DL - Draw License
LOS - Land-Owned Sign-up Issued Permit
Harvest Limit abbreviations:
MB - male bull
A - antlerless elk
APRE - an elk with 5 or more points on a least one antler
ES - any on elk
APRD - a deer with 3 or more points on at least one antler
Hunt Code:
GS -Both Grouse and Squirrel hunt; S - squirrel only

Sources;
New Mexico Department of Game and Fish, *Big Game and Furbearer Rules and Information, 2005-2006*. http://www.wildlife.state.nm.us/recreation/hunting/index.htm, accessed July 5, 2005.
New Mexico Department of Game and Fish, *Small Game and Waterfowl Rules and Information, 2004-2005*. http://www.wildlife.state.nm.us/recreation/hunting/index.htm, accessed July 5, 2005.

Table A6 Violations of Cibola National Forest, 2005

Venue	Offense Code	Total Violations	Violation Codes
FED	36CFR26117	461	Boundary Waters Canoe Area Wilderness
FED	36CFR26154F	19	a vehicle carelessly, recklessly, or without regard to the rights or safety of other persons
FED	36CFR26111D	16	Failing to dispose of all garbage in proper receptacles
FED	36CFR2619B	14	Removing any natural feature or other property of the US (property)
FED	36CFR2619A	10	Damaging any natural resource or other property of the US (property)
	NA	6	No code provided
FED	36CFR2616A	5	Cutting or otherwise damaging any timber, tree, or other forest product, except as authorized by a special-use authorization, timber sale contract, or Federal law or regulation is prohibited (timber and other forest products)
FED	FSMHS690000	5	No code provided
FED	36CFR26111E	4	Dumping of any refuse, debris, trash, or litter brought as such from private property or from land occupied under permit, except where a container, dump, or similar facility has been provided and is identified as such, to receive trash generated from priv
FED	36CFR26158BB	4	Possessing a beverage (during occupancy) which is defined as an alcoholic beverage by State Law (occupancy and use)
FED	FSM5300	4	No code provided
STA	30-16-1	3	No code provided
FED	36CFR26110F	3	of any person.
FED	36CFR26110K	2	Use or occupancy of National Forest System land or facilities without special use authorization
FED	36CFR26112D	2	Blocking, restricting, or otherwise interfering with the use of a road, trail, or gate
FED	36CFR26115G	2	No code provided
FED	36CFR26115H	2	No code provided
FED	36CFR26116M	2	No code provided
FED	FSM5100	2	No code provided
FED	16USC470EE	1	No code provided
FED	21USC841A	1	Unlawful possession or intent to distribute a controlled substance
STA	30-16-3 B	1	No code provided
STA	30-22-5	1	No code provided
FED	36CFR26110D	1	Discharging a firearm capable of taking life or damaging property
FED	36CFR26111B	1	Possessing or leaving refuse, debris, or litter in an exposed or unsanitary condition is prohibited (sanitation)
FED	36CFR2614A	1	Engaging in fighting
FED	36CFR26152A	1	Building, maintaining, attending, or using a fire, campfire, or stove fire (fire)
FED	36CFR26152B	1	Using an explosive
FED	36CFR26158B	1	Entering or using a developed recreation site
FED	36CFR26158I	1	Possessing, parking or leaving more than two vehicles per camp unit
FED	36CFR2615D	1	Leaving a fire to escape from control (fire)
FED	36CFR2617A	1	Placing or allowing unauthorized livestock to enter or be in the
FED	36CFR26154A	0	Using any type of vehicle prohibited by an order (on NFS roads)
FED	36CFR26154D	0	Operating a vehicle in violation of the speed, load, weight, height, length, or width specified in the order
FED	36CFR26158T	0	Possessing, storing, or transporting any part of a tree or other plant
			Other, No code provided

Table A7 Recreational Site Listing for Cibola National Forest

District	Designated Area Type	Name
Mt Taylor	Campground/Picnic Site	Ojo Redondo
Mt Taylor	Campground/Picnic Site/Fishing Site	McGaffey Campground
Mt Taylor	Fishing Site	McGaffey Lake
Mt Taylor	Campground/Picnic Site	Quaking Aspen
Mt Taylor	Campground/Picnic Site	Lobo Canyon
Mt Taylor	Campground/Picnic Site	Coal Mine
Mt Taylor	Fishing Site	Bluewater Creek
Mt Taylor	Interpretive Site (Major)	Northwest Multi Agency Visitors centers
Mt Taylor	Picnic Site	McGarrfey
Mt Taylor	Campground	McGaffey
Mt Taylor	Picnic Site	McGaffey Group
Mt Taylor	Other Winter Sports Site	Quadrathalon Run/Ski
Mt Taylor	Trailhead	Gooseberry
Mt Taylor	Trailhead	Water Canyon
Mt Taylor	Trailhead	Continental Divide
Mt Taylor	Trailhead	Coal Mine Nature
Mt Taylor	Trailhead	Strawberry Canyon
Mt Taylor	Interpretive Site (minor)	Zuni RR Toilet
Mt Taylor	Observation Site	Oso Ridge Lookout
Mt Taylor	Observation Site	La Mosca Lookout
Mt Taylor	Observation Site	McGaffey Lookout
Mt Taylor	Complex	Coal Mine
Mt Taylor	Complex	McGaffey
Magdalena	Campground/Picnic Site	Springtime
Magdalena	Campground/Picnic Site	Luna Park
Magdalena	Campground/Picnic Site	Hughes Mill
Magdalena	Campground/Picnic Site	Bear Trap
Magdalena	Campground/Picnic Site	Water Canyon
Magdalena	Information Site	Magdalena Ranger Station
Magdalena	Observation Site	Mt. Withington Lookout
Magdalena	Observation Site	Grassy Lookout
Magdalena	Observation Site	San Mateo Peak Lookout
Magdalena	Observation Site	Davenport Lookout
Magdalena	Trailhead	Mesa
Mountainair	Campground/Picnic Site	Capilla
Mountainair	Campground/Picnic Site	New Canyon
Mountainair	Campground/Picnic Site	Red Canyon
Mountainair	Campground	Tajique
Mountainair	Campground/Picnic Site	Fourth of July
Mountainair	Trailhead	Box Canyon
Mountainair	Interpretive Site (Minor)	Red Canyon Interpretive
Mountainair	Campground	Red Canyon
Mountainair	Trailhead	Albuquerque
Mountainair	Trailhead	Bosque
Mountainair	Trailhead	Capilla Peak
Mountainair	Trailhead	Cerro Blanco

Table A7 Recreational Site Listing for Cibola National Forest, Continued

District	Designated Area Type	Name
Mountainair	Trailhead	Comanche
Mountainair	Trailhead	Encino
Mountainair	Trailhead	Kayser Mill
Mountainair	Trailhead	Monte Largo
Mountainair	Trailhead	New Canyon
Mountainair	Trailhead	Ox Canyon
Mountainair	Trailhead	Pine Shadow
Mountainair	Trailhead	Red Canyon/Spruce Spring
Mountainair	Trailhead	Trail Canyon
Mountainair	Trailhead	Trigo
Mountainair	Trailhead	Fourth of July
Mountainair	Picnic Site	Fourth of July
Mountainair	Picnic Site	Red Canyon
Mountainair	Trailhead	Cottonwood
Mountainair	Information Site	Mountainair Ranger Station
Mountainair	Observation Site	Gallinas Peak Lookout
Mountainair	Trailhead	Crimson Maple Interpretive
Mountainair	Trailhead	Spring Loop Interpretive
Mountainair	Campground	Red Cloud (new)
Mountainair	Campground	Capilla Peak
Mountainair	Campground	Fourth of July
Mountainair	Campground	John F. Kennedy
Mountainair	Campground	New Canyon
Mountainair	Campground	Red Cloud
Mountainair	Observation Site	Capilla Peak Lookout
Sandia	Picnic Site	Juan Tabo
Sandia	Picnic Site/Trailhead	La Cueva
Sandia	Trailhead	La Luz
Sandia	Picnic Site	Las Huertas
Sandia	Trailhead	Tunnel Spring
Sandia	Trailhead	Doc Long
Sandia	Picnic Site/Nature trail	Sulphur Canyon
Sandia	Picnic Site/Trailhead	Cienega Canyon
Sandia	Trailhead	Tree Spring
Sandia	Picnic Site/Nature trail	Balsam Glade
Sandia	Trailhead	Ellis Trailhead
Sandia	Picnic Site/Snowpark	Capulin Springs
Sandia	Campground/Picnic Site	Capulin Snow play
Sandia	Picnic Site	Nine Mile
Sandia	Picnic Site	Dry Camp
Sandia	Trailhead	Cedro Trailhead
Sandia	Campground	Cedro Peak
Sandia	Picnic Site	Pine Flat
Sandia	Picnic Site	Oak Flat
Sandia	Campground	Dead Man
Sandia	Trailhead (Historic Register Site)	Sandia Cave
Sandia	Ski Area Alpine	Sandia Peak
Sandia	Interpretive Site (Major)	Four Seasons Visitor Center
Sandia	Information Site	Sandia Crest Information Center
Sandia	Information Site	Sandia Rangers Station Information Cente
Sandia	Interpretive Site (Major)	Tijeras Pueblo Interpretive Trailhead

Table A7 Recreational Site Listing for Cibola National Forest , Continued

District	Designated Area Type	Name
Sandia	Interpretive Site (Minor)	Cienega Group Reservation Site
Sandia	Interpretive Site (Minor)	Summit Nature Trail
Sandia	Interpretive Site (Minor)	Crest Nature Trail
Sandia	Trailhead	Kiwanis Cabin
Sandia	Interpretive Site (Major)	Doc Long Interpretive Site
Sandia	Interpretive Site (Minor)	Kiwanis Cabin Interpretive Site
Sandia	Trailhead	La Madera Canyon Overlook
Sandia	Trailhead	Cienega
Sandia	Trailhead	Wolf Spring
Sandia	Trailhead	Doc Long- Sulphur
Sandia	Trailhead	Bill Spring
Sandia	Trailhead	10K
Sandia	Trailhead	Tecolote
Sandia	Trailhead	Crest
Sandia	Trailhead	Agua Sarca
Sandia	Trailhead	Trail 246 Spring Creek
Sandia	Trailhead	Del Agua
Sandia	Trailhead	Strip Mine
Sandia	Trailhead	Tramway
Sandia	Trailhead	Jaral Cabin
Sandia	Trailhead	Cienega Equestrian
Sandia	Trailhead	Pino- Elena Gallegos
Sandia	Trailhead	Chamisoso
Sandia	Picnic Site	Doc Long Reservation Site
Sandia	Trailhead	Canoncito
Sandia	Trailhead	Mars Court
Sandia	Trailhead	Big Block
Sandia	Complex	Cienega
Sandia	Picnic Site	Error Balsam Glade
Sandia	Trailhead	Bear Canyon
Sandia	Trailhead	Cedro
Sandia	Picnic Site	Cole Springs
Sandia	Campground	Deadman Flat
Sandia	Picnic Site	Doc Long
Sandia	Picnic Site	Dry Camp
Sandia	Trailhead	Ellis
Sandia	Cua Trailhead	Embudito
Sandia	Trailhead	Embudo
Sandia	Cua Trailhead	Canyon Estates
Sandia	Trailhead	Otero
Sandia	Trailhead	Piedra Lisa- North
Sandia	Trailhead	Piedra Lisa- South
Sandia	Picnic Site	Pine Flat
Sandia	Trailhead	Three Gun Springs
Sandia	Trailhead	Tunnel Canyon
Sandia	Interpretive Site (Major)	Sandia Crest

Table A8 Communities Within The Cibola National Forest Counties

	Census Population			% Decade Growth	
	1980	1990	2000	1980-90	1990-2000
MAGDALENA RANGER DISTRICT					
Catron	2,720	2,563	3,543	-6	38
Reserve village	439	319	387	-27	21
Sierra	8,454	9,912	13,270	17	34
Elephant Butte city	.	.	1,390		
Truth or Consequences city	5,219	6,221	7,289	19	17
Williamsburg village	433	456	527	5	16
Socorro	12,566	14,764	18,078	17	22
Alamo CDP	.	.	1,183		
Magdalena village	1,022	861	913	-16	6
Socorro city	7,173	8,159	8,877	14	9
MOUNTAINAIR RANGER DISTRICT					
Lincoln	10,997	12,219	19,411	11	59
Capitan village	762	842	1,443	10	71
Carrizozo town	1,222	1,075	1,036	-12	-4
Corona village	236	215	165	-9	-23
Ruidoso village	4,260	4,600	7,698	8	67
Ruidoso Downs village	949	920	1,824	-3	98
Torrance	7,491	10,285	16,911	37	64
Edgewood town	.	.	1,893		
Encino village	155	131	94	-15	-28
Estancia town	830	792	1,584	-5	100
Manzano CDP	.	.	54		
Moriarty city	1,276	1,399	1,765	10	26
Mountainair town	1,170	926	1,116	-21	21
Tajique CDP	.	.	148		
Torreon CDP (Torrance County)	.	.	244		
Willard village	166	183	240	10	31
Valencia	61,115	45,235	66,152	-26	46
Belen city	5,617	6,547	6,901	17	5
Bosque Farms village	3,353	3,791	3,931	13	4
Casa Colorada CDP	.	.	56		
El Cerro-Monterey Park CDP	.	.	5,483		
Jarales CDP	.	.	1,434		
Los Chaves CDP	.	3,872	5,033		30
Los Lunas village	3,525	6,013	10,034	71	67
Los Trujillos-Gabaldon CDP	.	1,841	2,166		18
Meadow Lake CDP	.	1,590	4,491		182
Peralta CDP	.	3,182	3,750		18
Rio Communities CDP	2,089	3,233	4,213	55	30
Rio Communities North CDP	.	.	1,588		
Tome-Adelino CDP	.	1,695	2,211		30
Valencia CDP	.	3,917	4,500		15

Table A8 Communities Within The Cibola National Forest Counties, Continued

MT. TAYLOR RANGER DISTRICT					
Cibola	30,346	23,794	25,595	-22	8
Acomita Lake CDP	.	273	312		14
Encinal CDP	.	.	200		
Grants city	11,439	8,626	8,806	-25	2
Laguna CDP	.	434	423		-3
Mesita CDP	.	627	776		24
Milan village	3,747	1,911	1,891	-49	-1
North Acomita Village CDP	.	.	288		
Paguate CDP	.	492	474		-4
Paraje CDP	.	622	669		8
Pinehill CDP	.	.	116		
Seama CDP	.	403	333		-17
Skyline-Ganipa CDP	.	946	1,035		9
McKinley	56,449	60,686	74,798	8	23
Black Rock CDP	.	858	1,252		46
Brimhall Nizhoni CDP	.	.	373		
Church Rock CDP	.	.	1,077		
Crownpoint CDP	1,134	2,108	2,630	86	25
Crystal CDP	.	.	347		
Gallup city	18,161	19,154	20,209	5	6
Mexican Springs CDP	.	242	.		
Nakaibito CDP	.	.	455		
Navajo CDP	.	1,985	2,097		6
Pueblo Pintado CDP	.	.	247		
Ramah CDP	.	.	407		
Rock Springs CDP	.	.	558		
Thoreau CDP	1,099	.	1,863		
Tohatchi CDP	1,011	661	1,037	-35	57
Tse Bonito CDP	.	.	261		
Twin Lakes CDP	.	.	1,069		
Yah-ta-hey CDP	.	.	580		
Zuni Pueblo CDP	.	5,857	6,367		9
Sandoval	34,799	63,319	89,908	82	42
Algodones CDP	.	.	688		
Bernalillo town	3,012	5,960	6,611	98	11
Cochiti CDP	.	434	507		17
Corrales village	2,791	5,453	7,334	95	34
Cuba village	609	760	590	25	-22
Jemez Pueblo CDP	1,503	1,301	1,953	-13	50
Jemez Springs village	316	413	375	31	-9
La Jara CDP	.	.	209		
Pena Blanca CDP	.	300	661		120
Placitas CDP	.	1,611	3,452		114
Ponderosa CDP	.	.	310		
Pueblo of Sandia Village CDP	.	.	344		
Regina CDP	.	.	99		
Rio Rancho city	9,985	32,551	51,765	226	59
San Felipe Pueblo CDP	1,465	1,557	2,080	6	34
Santa Ana Pueblo CDP	.	476	479		1
Santo Domingo Pueblo CDP	2,082	2,866	2,550	38	-11
San Ysidro village	199	233	238	17	2
Torreon CDP (Sandoval County)	.	.	297		
Zia Pueblo CDP	.	637	646		1

Table A8 Communities Within The Cibola National Forest Counties, Continued

SANDIA RANGER DISTRICT					
Bernalillo	419,700	480,577	556,678	15	16
Albuquerque city	331,767	384,736	448,607	16	17
Carnuel CDP	.	.	872		
Cedar Crest CDP	.	.	1,060		
Chilili CDP	.	.	113		
Isleta Village	.	.	496		
Los Ranchos de Albuquerque village	2,702	3,955	5,092	46	29
North Valley CDP	13,006	12,507	11,923	-4	-5
Paradise Hills CDP	5,096	5,513	.	8	
Sandia CDP	5,288	6,742	.	27	
Sandia Heights CDP	.	3,519	.		
South Valley CDP	38,916	35,701	39,060	-8	9
Tijeras village	311	340	474	9	39
CIBOLA NF COUNTIES	**644,637**	**723,354**	**884,344**	12	22
CIBOLA NF PLACES	**495,535**	**615,544**	**740,698**	24	20
NM STATE	**1,303,303**	**1,515,069**	**1,819,046**	16	20

US Bureau of the Census, Decennial Census for 1980, 1990, and 2000