3 - Affected Environment

CHAPTER 3
AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the physical, biological, social and economic characteristics of the Planning Area that influence the resolution of planning issues or that affect or are affected by the alternatives described in Chapter 2. This description of the affected environment serves as a baseline for analyzing and determining the effects on resources from various alternatives. The information in this chapter is also contained in the Analysis of the Management Situation (AMS). The AMS is available for review at Carlsbad and Roswell Field Offices.

In this chapter, resources are discussed in the context of the Planning Area. Socio-economic factors are discussed in the context of the Chaves, Eddy, Lea and Roosevelt counties and the communities adjacent to the Planning Area to permit assessment within the regional economy.

RESOURCES

Physiography and Topography

The Planning Area consists of the broad high plains east of the Pecos River below the escarpment known as the Caprock. Most of this area consists of sandy plains and sand dunes that slope to the west. Outside the sand dunes, the topography generally consists of slopes less than 10 percent. The area contains no perennial streams, and the only bodies of water are ephemeral playas.

Climate

The climate in Planning Area is an arid to semiarid continental climate with mild winters and hot summers. Average annual precipitation ranges from 10 to 16 inches. Over half the yearly precipitation falls during July, August, and September, when moist air masses move into the region from the Gulf of California. Fall, winter, and spring are relatively dry seasons.

The average annual temperature is 62 F. Maximum temperatures average 92 F in July, although temperatures more than 100 F are frequent. Minimum temperatures average 28 F in January, although temperatures do occasionally dip below 0 F. The average growing season is 220 days in the eastern plains.

Wind speeds average about 12 mph with the spring months of March through May being the windy season. Dry, gusty winds, predominately from the west, may exceed 50 mph. These winds, blowing across dry soils, occasionally cause severe afternoon dust storms.

Lands and Realty

The Bureau of Land Management's (BLM) lands and realty program provides for land use authorization, acquisition, use, disposal, and adjustment of land resources and maintains historic records for these ownership transactions. Some of the primary facets of the program are outlined below.

Rights-of-Way (ROWs)

The ROW program is the most active portion in terms of the number of cases processed. These existing ROWs are primarily for oil/gas related land use actions. Pipelines, oil/gas lease roads, and electric line ROWs are the most common authorizations. Land referred to as split-estate, Federally-owned surface and private/State-owned subsurface, also

require a ROW for land use authorizations. The Planning Area also has numerous communications site ROWs. These communication site ROWs include cellular telephone, paging, radio repeaters, microwave transmission, and seismograph monitoring sites.

Leases, Permits, and Easements

Section 302 of the Federal Land Policy and Management Act of 1976 (FLPMA) provides the BLM authority to issue, at its discretion, leases, permits, and easements for the use, occupancy, and development of public land. Any use not specifically authorized under other laws or regulations and not specifically forbidden by law may be authorized under this section of FLPMA. Uses which may be authorized include residential, agricultural, industrial, and commercial, and uses that cannot be authorized under the primary ROW authorities. Some specific examples of uses authorized under this authority include commercial filming, equipment storage sites, and ski resorts. Section 507 of FLPMA, rather than Section 302, is the only authority for land use authorizations for other Federal agencies.

Land Classification

A land classification is a process required by law for determining the suitability of BLM public land either for certain types of disposal or lease under the public land laws or for retention under multiple-use management.

Land Acquisition

Acquisitions via exchange, purchase of land and easements, or donation are important components of the BLM's land management strategy. The agency acquires land when it is in the public interest and consistent with approved land use plans. The BLM's land acquisition program is designed to:

- Improve management of natural resources through consolidation of public, State trust, and other Federal lands where agencies have compatible land management missions;
- Secure key property necessary to protect endangered species, promote biological diversity, increase recreational opportunities, enhance wildlife habitat, provide access to public waters and public land, and preserve archaeological and historical resources; or
- Implement specific acquisitions authorized by Acts of Congress by acquiring minimal non-Federal lands or interest in lands.

Exchanges: Public land may be exchanged by the BLM for lands owned by corporations, individuals, State and local governments, or other legal entities legally capable of holding title to and conveying land. Except for those exchanges that are Congressionally mandated or judicially required, exchanges are voluntary and discretionary transactions with willing landowners that serve as a viable tool for the BLM to accomplish its goals and mission. The lands to be exchanged must be of equal monetary appraised value and located within the same State. Exchanges must also be in the public interest and be in conformance with applicable BLM land use plans.

Purchases and Donations: The BLM has the authority to purchase land or interests in land. Purchase is not as widely used as exchange to acquire fee title to non-Federal lands. However, the agency does occasionally purchase non-Federal lands to acquire key natural resources or to acquire legal ownership to land which enhances the management of existing public land and resources. The primary funding authority for these purchases is the Land and Water Conservation Act. Funding is Congressionally limited to specific project areas.

The BLM also occasionally receives gifts (donations) of land or interests in land where an entity elects not to receive the market value for the interests being conveyed.

Sales

The BLM's general sale authority for public land is Section 203 of FLPMA (1976). However, the agency does not offer much land for sale. FLPMA requires that public land be retained in public ownership, unless, as a result of land use planning, disposal of certain parcels is warranted. Also, tracts of land that are designated in BLM land use plans as potentially available for disposal are more likely to be conveyed out of Federal ownership through a sale rather than an exchange. Public land must be sold at not less than fair market value and meet the very specific sale criteria of FLPMA. Public land proposed for sale generally has low resource value.

Minerals

Fluid Minerals

The fluid minerals program provides opportunities for leasing, exploration, and development of oil and gas resources while protecting other resource values. Land is available through a leasing process for competitive and noncompetitive leases.

The public land and Federal mineral estate in the Planning Area are available for orderly and efficient development of mineral resources. All mineral leases are issued with needed restrictions to protect the environment from releases of hazardous, toxic, and waste materials.

Stipulations to minimize the impacts that oil and gas operations may cause to other resources, uses, and users are attached to oil and gas parcels at the time of lease issuance.

Currently, the BLM New Mexico State Office holds four competitive oil and gas lease sale auctions a year. The Competitive Oil and Gas Lease Sale Notice comprises Federal minerals nominated for inclusion in a sale by entities interested in leasing the oil and gas rights, or Federal minerals offered through Bureau motion (unleased Federal minerals subject to drainage, or included within a communitization or unit agreement).

Since 1975, approximately 23,455 wells have been drilled on all ownerships in southeast New Mexico. Of that number approximately 10,122 well drilled on Federal mineral estate during that time period. (See Appendix 7, Reasonable and Foreseeable Development.)

In the Planning Area approximately 72 percent of the Federal mineral estate is currently under lease for oil and gas development. There are approximately 3,514 oil and gas leases (see Map 2-1, Leasing) and approximately 11,230 wells (see Map 2-2, Well Data) in the Planning Area.

Saleable Minerals

The salable minerals program provides opportunities for exploration and development of sand, gravel, caliche and other lower value mineral materials while protecting other resource values.

The Planning Area is open to the sale of mineral materials. Sales are considered on a case-by-case basis. Stipulations to protect important resource values are based on interdisciplinary review and analysis of individual proposals. Stipulations to minimize the impacts that operations may cause on other land resources, uses, and users are placed in advance of each mineral sale.

Stipulations pertaining to prevention and mitigation of hazardous material releases and compliance with applicable Federal, State, and local hazardous materials and safety regulations are required.

Solid Leasables

All public land would be open for the leasing of solid minerals, except those lands identified otherwise.

Management objectives for non-energy leasable minerals would be to continue to keep land available to leasing as necessary while maintaining important environmental values.

All land would be open to leasing with the applicable standard stipulations which are taken to prevent adverse environmental impacts to the environment and to minimize damage to public health and safety.

Lands requiring protection such as recreation areas, specially designated areas, and withdrawals shall remain closed to leasing or until such time as the areas or withdrawals are terminated.

In general, there are no known commercial deposits of the subject minerals within the Roswell Field Office Area. However the potential for a commercial deposit to be discovered does exist. The Roswell area has had prospecting permits for sulfur in the past.

The portions of the 497,000-acre potash area open to future leasing for oil and gas would continue to be leased with the Potash Stipulation (see Map 3-3). Generally, the Potash Stipulation allows drilling for oil and gas if the drilling does not interfere with potash mining, does not create undue waste of potash, and does not create a hazard. In abandoning wells drilled under the stipulation, infiltration of oil, gas or water into potash deposits, mines or workings must be prevented. Lease notices would be used to alert lessees to potential special requirements on exploration, drilling or production. Lease notices covering protection of potential cave or karst areas, protection of threatened or endangered or sensitive plant or animal species, and the use of the Alkali Lake and Hackberry Lake OHV areas would remain in use. Additional lease notices would be developed as needed.

Future increases in commodity prices with a corresponding increase in demand could allow some deposits to become economic. Similarly improvements in mining technologies could have the same effect. For most deposits though, deposits of significantly greater potential are known to exist in the Carlsbad Field Office and would likely be developed in response to demand before their deposits in the Roswell Field Office. Areas with high potential which are located adjacent to roadways, and developed areas should be kept open for development.

Coal Leasing

The public land in the Planning Area is not within a designated coal production region and coal leasing and development is not an issue for this document. If an application for a coal lease is received in the future, an appropriate land-use and environmental analysis, including the coal screening process, would be conducted to determine whether or not the coal areas applied for are acceptable for development and for leasing consideration. The RMP would be amended as needed.

Alternative Energy

In February 2003, the Departments of Energy and the Interior released the report, “Assessing the Potential for Renewable Energy on Public Land.” This report can be viewed and downloaded at www.nrel.gov/docs/fy03osti/33530.pdf.

The report weighed factors for producing energy from concentrated solar power (CSP), photo-voltaic (PV), wind, biomass, and geothermal facilities. The report indicates the potential for producing energy from biomass and geothermal resources is low in southeast New Mexico and the Planning Area.

The report indicates the potential for producing wind energy in the Planning Area is poor to fair. Poor is defined as Class 2 with wind speeds of 12.5 to 14.3 miles per hour measured at an altitude of 50 meters. Fair is defined as Class 3 with wind speeds of 14.3 to 15.7 miles per hour measured at an altitude of 50 meters. Approximately 80 percent of the public land within the Planning Area falls within the Class 2 category.

The report indicates the potential for CSP and PV in the Planning Area are good, with between 5.5 to 6.5 kWh/m^2/day (kilowatt hour per square meter per day) on average.

Soils

Soils are affected by vegetation, geology, wind erosion, and water erosion. Factors that currently affect soils include livestock grazing management, oil and gas development, recreational use, and brush control treatments.

Soils within the Planning Area are mostly level with sandy textures and high concentrations of calcium carbonate in the substratum. These sandy soils are highly susceptible to wind erosion. Wind action has produced an undulating topography with frequent dunes. Areas of steep rocky soils and gypsum soils are also present. The Gypsum Complex soils are highly susceptible to erosion. Once disturbed, these gypsum soils are extremely difficult to re-vegetate due to their high salt content and the frequent droughts in the region. Detailed information on soils in the Roswell and Carlsbad Field Office areas is available in the Soil Survey of Chaves County, N.M. Northern Part; Soil Survey of Chaves County, N.M. Southern Part (SCS 1980); Soil Survey of Lea County, N.M. (SCS 1974); and Soil Survey of Eddy Area N.M. (SCS 1971).

Water Resources

Surface waters within the Planning Area are influenced by geology, precipitation, and water erosion. Factors that currently influence surface water resources include livestock grazing management, oil and gas development, recreational use, and brush control treatments. Surface waters within the Planning Area are located in ephemeral streams, ephemeral springs, ephemeral playas, and stock tanks. Water quality impaired streams are not presently found within the Planning Area (2004-2006 State of New Mexico Integrated Clean Water Act 303(d) and 305(b) Report).

Groundwater within the Planning Area is influenced by geology and precipitation. Factors that influence groundwater resources include livestock grazing management, oil and gas development, groundwater pumping, and possible impacts from brush control treatments. Groundwater within the Planning Area can be obtained from groundwater aquifers located within the Rustler, Castile, Tansill, Yates, Seven Rivers, Queen, Grayburg, Artesia, Ogallala, Chinle Formation, Capitan and San Andres Limestones, Glorieta and Santa Rosa Sandstones, and the Dockum Group. Most of the groundwater occurs as unconfined aquifers. Groundwater occurs as confined aquifers in the San Andres Formation under artesian conditions. The depth to shallow unconfined groundwater varies from 1 foot to depths of 400 feet throughout the Planning Area (New Mexico Office of the State Engineer data). The depth to confined groundwater can occur at depths greater than 400 feet.

Most of the groundwater in the Planning Area is used for industrial, rural, domestic, and livestock purposes.

Floodplains

One hundred-year floodplains or floodplains within the Planning Area are located in ephemeral playa lakes and ephemeral streams.

The legal locations for floodplains located in ephemeral playas are:

TWN	RNG	Section	Aliquot Portion
5 S	29 E	Section 35	SW NE (pot and sod)
6 S	29 E	Section 35	NW SE
6 S	30 E	Section 3	SE SW (pot and sod)
		Section 11	S NW
			SE SW
8 S	30 E	Section 5	SE NW , E SE , SW SE
		Section 8	E NE
		Section 18	NE
		Section 7	SE
16 S	30 E	Section 5	SW NW , NW SW ,
		Section 6	SE NE , NE SE
		Section 18	SW NE , NW SE
		Section 13	SE SW
		Section 24	NE NW
17 S	29 E	Section 26	S SW
		Section 35	NW
17 S	30 E	Section 21	W
		Section 25	SW SW
		Section 26	SE SE
		Section 35	NE NE
17 S	31 E	Section 6	SE
		Section 19	SE SW , N NW
18 S	29 E	Section 13	NW
		Section 24	SE SW
18 S	30 E	Section 3	E NW , W NE
		Section 6	W SE
		Section 22	SE SE
		Section 23	SW SW
		Section 27	NE NE
		Section 26	NW NW
		Section 26	SE

The legal locations for floodplains located in ephemeral streams are:

TWN	RNG	Section	Aliquot Portion
	Taylor Draw		
17 S	31 E	Section 1	SE
		Section 12	E
		Section 13	N , SW
		Section 14	SE
		Section 23	N , N S
		Section 22	E
		Section 27	N , NW SW
		Section 28	SE
		Section 32	SE
		Section 33	N , NW
18 S	30 E	Section 1	SE SE
18 S	31 E	Section 5	N , NW
		Section 6	S
	Bear Grass Draw		
18 S	29 E	Section 14	W SW
	Un-named draw		
15 S	29 E	Section 6	S S

Air Quality

Current air quality conditions are good in the Planning Area. The air quality meets State or Federal ambient air quality standards. Factors that currently affect air quality include dust from livestock herding activities, dust from recreational use, dust from construction activities, dust from use of roads for vehicular traffic, pollution emission sources from industrial facilities, pollution emission sources from oil and gas development, and chemical odors.

Standards for Public Land Health and Guidelines for Livestock Grazing

BLM recently amended the Carlsbad and Roswell Field Office RMP to incorporate the *New Mexico Standards for Public Land Health and Guidelines for Livestock Grazing Management* (Jan 2001), which established standards for public land health and guidelines for livestock grazing management in New Mexico. The standards describe conditions needed for healthy, sustainable public rangeland and relate to all uses of public land. The livestock grazing guidelines are management practices that are applied if it has been determined that grazing practices are responsible for non-achievement of a Standard. They are designed to improve public land health and are to be implemented at the watershed, allotment, or pasture level. Based on discussions in the above-mentioned document, it is expected that about 20 percent of grazing allotments State wide may not meet one or more of the standards, which could lead to 20 percent reduction in animal unit months (AUMs). It was also assumed that of those not meeting a standard, 22 percent would no longer use the Federal permit, due to increased regulation and operating costs to the ranch.

To date, between the two Field Offices, approximately 400,000 acres of assessments within the entire Pecos District have been completed. Of these acres, about 2 percent were found to not meet a standard. While assessments are just starting within the Planning Area, similar results are expected.

Vegetation

Vegetation within the Planning Area is influenced by soil type, temperature, amount, and timing of precipitation, elevation, topographic position, and human impacts. Human impacts include livestock grazing management, oil/gas development, recreational use, and brush control treatments. Several distinct vegetative community types can be found associated with shinnery oak distinguished primarily by different combinations of bluestems, dropseeds, gramas, three-awns, witchgrass, and various forb and yucca species. A mix of shinnery oak, tall grasses such as sand or little bluestem, dropseeds and forbs is indicative of good to excellent range condition. When shinnery oak is found with midgrasses, including various grama, dropseed, and three-awn species, and forbs, range condition is typically fair to good. In the deeper sandhill areas, where shinnery oak dominates and there are few grasses and forbs, range condition generally ranges from poor to fair.

The northern portion of the Planning Area falls within the Southern High Plains (HP) and Pecos-Canadian Plains and Valleys (CP) Major Land Resource Areas (MLRAs), while the southern portion is within the Southern Desertic Basins (SD) MLRA. The grass component of the HP and CP areas is dominated by bluestems and gramas, while that of the SD area is mostly dropseeds and threeawns. Vegetative characteristics of the Planning Area can be found in the Roswell Resource Area Draft RMP/Carlsbad Resource Area RMPA (September 1994). Descriptions relative to the Carlsbad Field Office can be found on pages 3-9 and 3-10, while those dealing with the Roswell Field Office can be found on page 3-41 and Appendix 11.

Using the desired plant community (DPC) descriptions from the Roswell Field Office, the three major vegetative communities within the Planning Area are the grassland community, shinnery oak-dune community, and the mixed desert shrub community. The grassland and shinnery oak-dune communities make up the largest portion of the Planning Area. The grassland community can be broken down into several subtypes, with the grass rolling upland and mesquite grassland types being the most common. These DPCs were adopted by and described in the 1997 Roswell RMP.

Vegetation management is based on DPC descriptions for the Roswell Field Office and Natural Resources Conservation Services (NRCS) Ecological Site Descriptions (ESD) for the Carlsbad Field Office. For the Roswell Field Office, DPC is a plant community that provides the vegetation attributes required to meet or exceed RMP vegetation objectives. The DPC must be within the ecological site's capability to produce these attributes through natural succession, management action, or both.

These vegetative communities described for the Roswell Field Office DPC were derived from the NRCS ESD. Ecological Site Descriptions and their corresponding vegetative community can be found at BLM or NRCS offices in Roswell and Carlsbad or at http://www.nm.nrcs.usda.gov/technical/fotg/section-2/ESD.html. From this site, specific information can be found by clicking on the relevant MLRA tab, such as CP-2 or SD-3.

Within the Planning Area, both Field Offices have over 20 years of rangeland monitoring data collected at permanently established study plots. This data provides information about range condition, amount of annual vegetative production, composition and cover of vegetation, utilization amounts, and precipitation. In general terms, this data indicates that range condition is in the high fair to low good class and trend data is static to slightly upward. When the vegetative composition monitoring data for the Planning Area is summarized in terms of DPC, the grass component falls within the objectives, the forb component is low, and the shrub component is high. This is expressed numerically as:

GRASSLAND COMMUNITY			
	Grasses	**Forbs**	**Shrubs/Trees**
DPC	30-85%	10-15%	1-10%
Monitoring	65%	8%	27%
SHINNERY OAK-DUNE COMMUNITY			
	Grasses	**Forbs**	**Shrubs/Trees**
DPC	50-70%	10-15%	25-40%
Monitoring	50%	5%	45%
MIXED DESERT SHRUB COMMUNITY			
	Grasses	**Forbs**	**Shrubs/Trees**
DPC	55-75%	10-20%	15-20%
Monitoring	58%	9%	33%

For Fiscal Year (FY) 2006, approximately 47,000 acres of land are scheduled for brush control treatments. Of this, about 32,000 acres are public land. The primary target is mesquite, with some broom snakeweed targeted as well. The intent of these treatments is to move towards the attributes of DPC described above.

Non-Native and Invasive Species

One of the greatest impacts on the maintenance of healthy communities is the rapid spread of invasive, non-native weeds. These invasive weeds are very aggressive and have the ability to out-compete native plant communities. Severe, extensive, and often permanent degradation frequently results. While it is very important to control existing infestations, the most effective and economical weed management technique is to prevent weed spread. Weeds can easily be spread by a wide variety of activities BLM conducts or authorizes. Furthermore, weeds frequently thrive when land is disturbed.

Of the weeds listed on the Noxious Weed List for the State of New Mexico (NMDA,

1999), those of immediate concern to the BLM are African rue (*Peganum harmata*) Class B, malta starthistle (*Centaurea melitensis*) Class B, yellow starthistle (*Centaurea repens*) Class A, Russian knapweed (*Acroptilon repens*) Class B, and saltcedar (*Tamarix ramosissima*) Class C. These species have invaded public land within the Planning Area, mainly along oil/gas lease roads, on oil/gas pads, and along pipeline and power line routes.

Within the Planning Area, approximately 200 acres per year are treated for noxious weeds. African rue has been the main target, accounting for about 150-175 acres per year. Small populations of starthistles and Russian knapweed have also been treated. Costs average 100 dollars per acre for African Rue control, 50 dollars per acre for knapweed control, and 30 dollars per acre for thistle control.

Wildlife

The BLM wildlife program is responsible for the management of wildlife habitat on public land to ensure wildlife populations that depend upon that habitat are sustainable for future generations. Management of wildlife populations is the responsibility of the New Mexico Department of Game and Fish (NMDGF). The lead for management of migratory and Federally listed threatened, endangered and proposed species is the U.S. Fish and Wildlife Service (USFWS).

The overall wildlife objective is to manage habitats on public land for the conservation and rehabilitation of fish, wildlife, and plant resources consistent with multiple use management principles. Wildlife habitat within the Planning Area is affected by numerous variables.

Standard Habitat Sites and Features

Wildlife within the Planning Area is associated with specific habitat sites or features as identified by the BLM. These standard habitat sites (SHSs) and features are grouped according to the vegetation type, landforms, soil types, and specific habitat niches that are critical for species survival. The SHSs correspond to the vegetation types presented in the Vegetation Section of this document and in Table 3-1.

TABLE 3-1
VEGETATION TYPES CORRESPONDING TO STANDARD HABITAT SITES

VEGETATION TYPE	SHS
Grasslands	Playas Short grass prairie Mid grasslands Tall grasslands
Shinnery oak dune	Shinnery flats Shinnery dune Shinnery dune/Blowouts Sand sage shrubland
Mixed desert shrub	Mesquite grasslands Escarpment shrubland

SOURCE: Roswell RMP, 1997 and Roswell East EIS, 1979.

Big Game

Big game species that occur within the Planning Area are desert mule deer (*Odocoileus hemionus),* pronghorn (*Antilopcapra americana*), javelina (*Dicotyles tajacu*), and mountain lion (*Felis concolor*). All species can be found throughout the Planning Area; however, mule deer tend to reside more commonly within the shinnery oak dune country and the Caprock escarpment. Pronghorn utilize the prairie grasslands and frequent the shinnery oak dune habitats. Javelinas prefer the mixed desert shrub or mesquite grasslands community around Carlsbad, but have been found farther north towards Kenna utilizing shinnery oak dune habitat. There have been confirmed reports and occasional sightings of mountain lions within the mesquite grasslands, shinnery oak dune and the Caprock escarpment of the Planning Area.

Small Game

Small game species occurring within the Planning Area include scaled quail (*Callipepla squamata*), mourning dove (*Zenaidura macroura*), and occasionally bobwhite quail (*Colinus virginianus*). All of these species occupy the various vegetation types with some species preferring a denser shrub component. Scaled quail is an opportunistic feeder and is reliant upon insects as a food source, particularly during nesting and juvenile periods. Population levels for all small game bird species fluctuate depending in part on precipitation. Black-tailed jackrabbit (*Lepus californicus*) and desert cottontail (*Sylvilagus audubonii*) are common throughout the area and can be found in all vegetation communities.

Amphibians and Reptiles

According to "Amphibians & Reptiles of New Mexico" dated 1996, a total of 10 amphibians and 31 species of reptiles are known to occur within the Planning Area. See Table 3-2.

Birds

There are approximately 60 species of birds that occur or have the potential to occur within the habitat types of the Planning Area. See Table 3-3.

Mammals

There are approximately 43 species of mammals that occur or have the potential to occur within the habitat types of the Planning Area. See Table 3-4.

Fish

There are no fish species or habitat available to support fish within the Planning Area.

Special Status Species

Under the Endangered Species Act (ESA), the Bureau is mandated to conserve and protect threatened and endangered (T&E) species and designated critical habitat on public land.

BLM policy for special status species is contained in BLM Manual 6840. Species proposed for listing as T&E shall be managed with the same level of protection as listed species. With candidate species, the BLM shall carry out management consistent with the principles of multiple-use for the conservation of these species and their habitat. The BLM must ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered, and that BLM actions do not adversely affect the likelihood of recovery of any T&E species. Protection and management of all special status species is a high priority and coordinated with other programs and activities as needed to meet management objectives.

BLM systematically gathers data on candidate species and forwards it the USFWS. Inventory/monitoring for Federal candidate and State listed species are conducted sporadically as funding and man-power permits. Where monitoring finds threats to these populations, actions are taken to protect the species and its habitat. Management actions for special status species are conducted on split-estate land where BLM authorizes an activity to ensure compliance with the ESA.

When revising or developing resource activity plans, specific objectives and actions stated in the recovery plans would be incorporated.

The BLM shall carry out management for the conservation of State-listed species. State laws protecting these species apply to all BLM programs and actions to the extent

that they are consistent with FLPMA and other Federal laws.

Any Federally-authorized, funded, or implemented actions that "may affect" a Federally listed threatened or endangered species or proposed species must undergo Section 7 consultation with the USFWS on a case-by-case basis under ESA.

TABLE 3-2
AMPHIBIANS AND REPTILES OCCURRING OR POTENTIALLY OCCURRING IN THE PLANNING AREA

COMMON NAME	SCIENTIFIC NAME
Tiger Salamander	*Ambystoma tigrinum*
Couch's Spadefoot	*Scaphiopus couchii*
Plains spadefoot	*Spea bombifrons*
New Mexico spadefoot	Spea multiplicata
Barking frog	*Hylactophryne augusti*
Great plains toad	*Bufo cognatus*
Green toad	*Bufo debilis*
Plains leopard frog	*Rana blairi*
Ornate box turtle	*Terrapene ornata*
Yellow mud turtle	*Kinosternon flavescens*
Collared lizard	*Crytaphytus collaris*
Greater earless lizard	*Cophosaurus texanus scitulus*
Lesser earless lizard	*Holbrookia maculata*
Texas Horned Lizard	*Phrynosoma cornutum*
Round-tail horned lizard	*Phrynosoma modestum*
Sand-dune lizard	*Sceloporus arenicolus*
Prairie lizard	*Sceloporus undulatus*
Side-blotched lizard	*Uta stansburana*
Chihuahuan spotted whiptail	*Cnemidophorus exsangus*
Checkered whiptail	Cnemidophorus grahamii
Texas spotted whiptail	*Cnemidophorus gularis*
Little striped whiptail	*Cnemidophorus inormatus*
Six-lined racerunner	Cnemidophorus sexlineatus
Western whiptail	*Cnemidophorus tigris*
Many lined skink	*Eumeces multivirgatus*
Great plains skink	*Eumeces obsoletus*
Texas blind snake	*Leptotyphlops dulcis*
Glossy snake	*Arizona elegans*
Western hognose snake	*Heterodon nasicus*
Night snake	*Hypsiglena torquata*
Common king snake	*Lampropeltis getula*
Milk snake	*Lampropeltis triangulum*
Coachwhip	*Masticophis flagellum*
Bull snake (gopher)	*Pituophis melanoleucus*
Longnose snake	*Rhinocheilus lecontei*
Ground snake	*Sonora semiannulata*
Plains black-headed snake	*Tantilla nigriceps*
Checkered garter snake	*Thamnophis marciauns*
Western diamondback rattlesnake	*Crotalus atrox*
Western rattlesnake	*Crotalus viridis*
Massasauga	*Sistrurus catenatus*
SOURCE: Roswell Field Office Database, 2004.	

TABLE 3-3 AVIAN SPECIES OCCURRING OR POTENTIALLY OCCURRING IN THE PLANNING AREA			
COMMON NAME	**SCIENTIFIC NAME**	**COMMON NAME**	**SCIENTIFIC NAME**
Turkey vulture	*Cathartes aura*	Brown-headed cowbird	*Molothrus ater*
Coopers hawk	*Accipter striatus*	Barn swallow	*Hirundo rustica*
Northern harrier	Circus cyaneus	Verdin	*Auriparus flaviceps*
Rough-Legged hawk	Buteo lagopus	Bewicks wren	*Thryomanes bewickii*
Ferruginous hawk	Buteo regalis	Cactus wren	*Campylorhynchus brunneicapillus*
Red-Tailed hawk	Buteo jamaicensis	Western bluebird	*Sialia mexicana*
Swainsons hawk	Buteo swainsoni	Cedar waxwing	*Bombycilla cedrorum*
Harris hawk	*Parabuteo unicinctus*	Loggerhead shrike	*Lanius ludovicianus*
Golden eagle	Aquila chrysaetos	Eastern meadowlark	*Sturnella magna*
American kestrel	*Falco sparverius*	Western meadowlark	*Sturnella neglecta*
Common barn owl	*Tyto alba*	Pyrrhuloxia	*Cardinalis sinuatus*
Western sreech owl	*Otus kennicotti*	Lark bunting	*Calamospiza melanocorys*
Great horned owl	*Bubo virginianus*	House finch	*Carpodacus mexicanus*
Burrowing owl	*Athene cinicularia*	Spotted towhee	*Pipilo maculatus*
Scaled quail	*Callipepla squamata*	Horned lark	*Eremophila alpestris*
Northern bobwhite	*Colinus virginianus*	Lark sparrow	*Chondestes grammacus*
Lesser prairie-chicken	*Tympanuchus pallidicintus*	Grasshopper sparrow	*Ammodramus savannarum*
White-winged dove	*Zenaida asiatica*	Black-throated sparrow	*Amphispiza bilineata*
Mourning dove	*Zenaida macroura*	Sage sparrow	*Amphispiza belli*
Greater roadrunner	*Geococcyx californianus*	Brewers sparrow	*Spizella breweri*
Common nighthawk	*Chordeiles minor*	Cassins sparrow	*Aimophila cassinii*
Lesser nighthawk	*Chordeiles acutipennis*	Vesper sparrow	*Pooecetes gramineus*
Northern flicker	*Colaptes auratus*	White-crowned sparrow	*Zonotrichia leucphrys*
Ladder-backed woodpecker	Picoides scalaris	White-throated sparrow	*Zonotrichia albicollis*
Scissor-tailed flycatcher	Tyrannus forficatus	Bairds sparrow	*Ammodramus bairdii*
Ash-throated flycatcher	Myiarchus cinerascens	Killdeer	*Chardrius vociferus*
Says phoebe	Sayornis saya		
Western kingbird	Tyrannus vertucalis		
Brown thrasher	*Toxostoma rufum*		
Curve-billed thrasher	*Toxostoma curvirostre*		
Crissal thrasher	*Toxostoma crissale*		
Sage thrasher	*Oreoscoptes montanus*		
Northern mockingbird	*Mimus polyglottus*		
Chihuahuan raven	*Corvus cryptoleucus*		
SOURCE: Roswell Wildlife Database, 2004			

TABLE 3-4 MAMMALS OCCURRING OR POTENTIALLY OCCURRING IN THE PLANNING AREA.	
COMMON NAME	**SCIENTIFIC NAME**
Cave myotis	*Myotis velifer*
Small-footed myotis	*Myotis ciliolabrum*
Townsends big-eared bat	*Corynorhinus townsendii*
Pallid bat	*Antrozous pallidus*
Long-legged myotis	*Myotis voluns*
Raccoon	*Procyon lotor*
Black-tailed prairie dog	*Cynomys ludovivianus*
Striped skunk	*Mephitis mephitis*
Hognose skunk	*Conepatus mesoleucus*
Coyote	*Canis letrans*
Swift fox	
Kit fox	*Vulpes macrotis*
Mountain lion	*Puma concolor*
Bobcat	*Lynx rufus*
Badger	*Taxidea taxus*
Plains pocket gopher	*Geomys bursarius aernarius*
Silky pocket mouse	*Perognathus flavus*
Hispid pocket mouse	*Chaetodipus hispidus*
Plains pocket mouse	*Geomys bursarius aeernarius*
Desert pocket mouse	*Perognathus penicillatus*
Nelsons pocket mouse	*Perognathus nelsoni*
Plains harvest mouse	*Reithrodontomys montanus*
House mouse	*Mus musculus*
Cactus mouse	*Peromyscus eremicus*
Deer mouse	*Peromyscus maniculatus*
Western harvest mouse	*Reithrodontomys megalotis*
Northern grasshopper mouse	*Onychomys leucogaster*
Gray shrew	*Notiosorex crawfordi*
Ords kangaroo rat	*Dipodomys ordii*
Merriams kangaroo rat	*Dipodomys merriami*
White-throated woodrat	*Neotoma albigula*
Southern plains woodrat	*Neotoma micropus*
Mexican ground squirrel	*Spermphilus mecicanus*
Thirteen-lined ground squirrel	*Spermphilus tridecemlineatus*
Spotted ground squirrel	*Spermphilus spilosoma*
Rock squirrel	*Spermphilus variegatus*
Black-tailed jackrabbit	*Lepus californicus*
Desert cottontail	*Sylvilagus audubonii*
Porcupine	*Erethizon dorsatum*
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Pronghorn antelope	*Antilocapra americana*
Javelina	*Dicotyles tajacu*
SOURCE: Roswell Wildlife Database, 2004	

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The following are species that may occur or potentially occur within the counties of which the Planning Area is located in, but due to soils, vegetation, absence of perennial water, and other ecosystem variables within the Planning Area, these species are not known to occur within the Planning Area. The Federally endangered species are the northern aplomado falcon, interior least tern, Pecos gambusia, black-footed ferret, Kuenzler's hedgehog cactus, Sneed pincushion cactus, Koster's springsnail, Pecos assiminea snail, Roswell springsnail, and Noel's amphipod. Federally threatened species includes the bald eagle, Mexican spotted owl, Pecos bluntnose shiner, Pecos sunflower, gypsum wild-buckwheat, and Lee pincushion cactus. Federal candidate species include the Texas hornshell mussel.

The bald eagle is described as occupying the entire State of New Mexico, however no nesting activity is known to occur and the area may potentially be used as a flyover according to some databases.

The extreme southern portion of the Planning Area has been identified as being within the historic range of the aplomado falcon. However, no recent sightings or known nesting has occurred. Therefore no impacts are to be expected to this species.

Emphasis Species

The following describes the status, distribution and habitat of emphasis species: lesser prairie-chicken, sand dune lizard.

Both the sand dune lizard and lesser prairie-chicken are currently warranted for listing under the ESA and are the primary emphasis for this planning effort. Historical practices did not take into account the habitat requirements for these species and did not adequately address the significance of habitat fragmentation and other adverse impacts.

Lesser Prairie-chicken (*Tympanuchus pallidicinctus*)

Status: For the lesser prairie-chicken, a candidate species, the earliest systematic survey in Texas was conducted in 1940. At that time, the range of the lesser prairie-chicken encompassed portions of 20 counties. In addition to those counties, researchers reported that museum specimens existed for five additional counties, although there is uncertainty whether two of the five specimens were actually Greater Prairie-chicken and Attwater's prairie-chicken. Researchers considered the occupied range at that time to be a reduction from the historical range.

Description of the Species: Bailey (1928) describes the lesser prairie-chicken as follows:

Adult male: Head with a slight soft crest, neck with inflatable air-sacs, yellow on breeding season; upper-parts pale brownish, black barred in sets of threes, a wide brown bar enclosed by two narrow dusky bars, similarly barred. Adult female: Similar but neck tufts rudimentary. Young: Underparts yellowish-brown, feathers with conspicuous white shaft streaks and large black blotches; underparts yellowish-white, with grayish brown bars.

Distribution:

New Mexico

In New Mexico, in the 1920s and 1930s, the former range of the lesser prairie-chicken was described as all of the sandhill rangeland of eastern New Mexico, from Texas to Colorado, and west to Buchanan in De Baca County. Presently, the New Mexico Department of Game and Fish (NMDGF) reports that lesser prairie-chicken are known in portions of seven counties, and that they have apparently been extirpated from 3,346 square kilometers (1,292 square miles) of its original 22,390 square kilometer (8,645 square mile) range.

In New Mexico the lesser prairie-chicken is an upland game bird, although the hunting season has been closed since 1996. Estimates of occupied range in New Mexico over the last century suggest a pattern of decline and increase, including reoccupation of former range. In the 1950s, the population was estimated at 40,000 to 50,000, and by 1972, at 6,000 to10,000 individuals. No recent estimates of population size are available. However, survey data from 1971 through 1997 analyzed by the New Mexico Natural Heritage Institute show a clear and substantial population decline after 1988, particularly in the southern periphery of their range.

Chaves, Eddy, Lea and Roosevelt Counties

Lesser prairie-chicken populations south of Highway 380 (Eddy and Lea County) in New Mexico on BLM properties and surrounding areas are rare, however, there have been sightings of scattered small groups and individuals. Intensive spring 2001 through 2005 lek surveys in the Carlsbad BLM Field Office area detected one active lek in 2001, 2002, 2003 and 2005 and two active leks in 2004.

Habitat: In southeastern New Mexico, lesser prairie-chickens exist in the shrub-dominated High Plains Bluestem Subtype by using mixed stands of tall grass and shinnery oak (Riley et al. 1992). The climax vegetation in these areas was probably dominated by mid and tall grasses, including sand bluestem, big bluestem, little bluestem, yellow Indian grass, prairie sandreed (*Calamovilfa longifolia*), and grama grasses, with smaller amounts of yucca (Yucca spp.), Harvard oak, sand sagebrush, mesquite (Prosopis spp.), and fragrant sumac (*Rhus aromatica*) (Morrissey, 1995). Lesser prairie-chickens in shinnery oak eat mostly plant material except in summer, when insects, mainly grasshoppers predominate. An absence of acorns in the diet probably relates less to preference and more to the variability of shin-oak acorn production. Autumn diets primarily consist of shinnery oak acorns, short-horned grasshoppers (*Acrididae*), broom groundsel (*Senecio spartioides*) leaves, and insect galls from shinnery oak. Foods consumed in the winter primarily consist of shinnery oak acorns with lesser amounts of green vegetation and insects (Riley, Davis, and Smith, 1993).

Sand Dune Lizard **(***Sceloporus arenicolus*)

Status: The Center for Biological Diversity and Chihuahuan Desert Conservation Alliance petitioned the USFWS on May 28, 2002 to list the sand dune lizard as an endangered species under the ESA. Recognizing the severity of the threats to the sand dune lizard, the USFWS recently made it a candidate for listing, giving it the highest priority for action a species can receive.

Description of the Species: The sand dune lizard is a small, light brown (often yellowish brown) lizard lacking dorsal pattern except for faint grayish brown dorso-lateral stripe on each side extending from head to tail, that buries itself in sand to avoid predators and regulate its body temperature. Lizards are active from 0800 until dusk during May, June, and July (Sena, 1985), but confined their activity during midday (1200-1400) to shaded areas beneath vegetation. Individuals are extremely wary, and are quick to seek shelter in burrows, beneath leaf litter or by burrowing in loose sand. Sand dune lizards feed upon ants and their pupae, small beetles (including ladybirds) and their larvae, crickets, grasshoppers, and spiders. Most feeding appears to take place within or immediately adjacent to patches of shinnery oak habitat.

Distribution:

Range-Wide/New Mexico

The sand dune lizard has the second smallest range of any lizard endemic to

North America, only occurring in a narrow crescent shaped area of southeastern New Mexico and in Andrews, Crane, Gaines, Ward and Winkler Counties of western Texas.

Within Chaves, Eddy, Lea and Roosevelt Counties

It has been found mainly on the Mescalero Sands, which extend in a broad arc from the vicinity of San Juan Mesa in northeastern Chaves County southward and eastward through eastern Eddy County and southern Lea County (Sena, 1985).

Habitat: The sand dune lizard is restricted to the vicinity of active and semi-stabilized sand dunes within the Planning Area (Sena, 1985), an area of rolling dunes in southeastern New Mexico found on lands administered by State, Federal and private entities. These dunes occur to an elevation of 1190 m above sea level and support scattered stands of shinnery oak (*Quercus havardii)* and sand sage (*Artemisia filifolia*) as co-dominant plant species (Sena, 1985). Significant reductions of lizard population sizes are associated with surface disturbance and removal of shinnery oak due to activities such as oil and gas development and herbicide treatments and ROWs.

Livestock Management

The grazing history of the Planning Area is similar to that of much of the southwestern United States prior to the mid-twentieth century. A small number of ranchers used intermixed private and public land to support livestock grazing within the Planning Area. The Federal grazing program in the Planning Area was initiated with the implementation of the Taylor Grazing Act in 1934. The program has since been administered by BLM (previously the Grazing Service and the Division of Grazing).

Within the Planning Area, livestock grazing occurs on approximately 850,000 acres and includes all or parts of 114 grazing allotments (see Map E-2 and Appendix 9). Allotments consist of a combination of private, State trust, and public land. Cattle and horses are authorized to graze on public land within these allotments. Occasional unauthorized grazing occurs from private properties that are adjacent to public land but are not part of a grazing allotment.

In pastures that are regularly grazed yearlong, there is often a shift away from perennial grass species such as bluestems, switch grass, side-oats grama, and giant dropseed towards a greater abundance of annual forbs and annual grasses (sandbur, purple sand grass, fringed signal grass, false buffalo grass) and a different mix of perennial grasses. Unlike other shrubs, shinnery oak does not spread rapidly into grassland areas when grass cover declines. However, high stocking densities of cattle may effectively transform some areas from grass-shrub co-dominance to systems dominated by shinnery oak.

Livestock use on each allotment varies each year depending on current conditions and livestock management needs. Livestock use can be measured by the number of cattle or yearlings, or by animal unit months (AUMs). An AUM is the amount of forage needed by one animal unit (e.g., a 1,000 pound cow and calf) for one month. A total of 192,125 AUMs are permitted for use within the Planning Area and approximately 107,083 AUMs were authorized during the 2004-2005 grazing year. Fluctuations in annual use have occurred due to factors such as weather conditions and the price of livestock. Allotments vary in size from approximately 40 acres to over 100,000 acres, with grazing preferences ranging from less than 20 AUMs to nearly 38,000 AUMs. Currently, there are 35 “M” category (Maintenance) allotments, 28 “I” category

(Intensive) allotments, and 51 “C” (Custodial) allotments. These numbers may change due to combining or splitting allotments or other administrative actions. Almost all of the allotments are grazed year-round, with cattle on the allotment for the entire year. Most employ some type of rotational grazing. On a few allotments, cattle are moved rather frequently from one pasture to the next; however, the most common practice is to move cattle less regularly from pasture to pasture. Both methods allow for seasonal deferment, with the first method providing shorter but more frequent periods and the second providing longer but less frequent deferment times. Most permittees run a cow/calf operation, with calving generally during February and shipping from October to November. At times heifers are held over as replacement stock. Some permittees run a yearling operation with a period of use generally from May 1 to November 1. Yearlings are purchased either locally or out-of-state.

Grazing administration was discussed in the New Mexico Standards for Public Land Health and Guidelines for Livestock Grazing Management Draft Resource Management Plan Amendment/Environmental Impact Statement (Feb. 1999). Pages 4-1 through 4-6 discuss methodology for determining impacts and pages 4-19 through 4-20 describe impacts to the grazing program. Livestock use levels within the Planning Area are expected to reflect those in the New Mexico Standards for Public Land Health and Guidelines for Livestock Grazing Management Draft Resource Management Plan Amendment/ Environmental Impact Statement (Feb. 1999). Approximately 20 percent of the allotments were estimated to not meet the standards and in order to meet the standards a 20 percent reduction in AUMs on these allotments could be necessary. Based on these numbers, within the Planning Area, an initial reduction of 7,660 AUMs could occur.

Within the Planning Area, both Field Offices have over 20 years of vegetation monitoring data gathered at permanently established study plots. Overall, this data indicates that range condition, plant composition, and vegetative cover values have shown little change over this time period. Generally, range condition ratings have been in the mid-fair to mid-good classes and composition and cover values are in line with those described in the NRCS Range Site Descriptions. While the Roswell Field Office has just begun the Rangeland Health Standards assessment process within the Planning Area, the Carlsbad Field Office has completed assessments on about 15 percent of the allotments, mainly in conjunction with the grazing permit renewal process. These assessments indicate that the vast majority of the sites are meeting the Rangeland Health Standards. Information specific to individual allotments can be found in monitoring files in both field offices or at the Vegetation Monitoring and Analysis Program web site (http://nmso3web2/vmap/vmap_home.htm.).

As part of the grazing permit renewal process, adjustments were made to grazing permits/leases on eight allotments within the Planning Area. The adjustments were based on rangeland monitoring study plot data and Robel pole inventory data. Range Use Adjustment Agreements were used to place a total of 836 Animal Units (AUs or one cow yearlong) in voluntary non-use. After meeting to discuss the results of the monitoring data, the affected grazing permittees agreed to place these AUs in voluntary non-use. The adjustments occurred on some of the larger allotments, where the percentage of public land was high (75-90 percent). Seven of these eight allotments are in the Core Management Area (CMA) within the Roswell Field Office and represent the majority of the adjustments that would need to be made within the CMA. On several smaller allotments, with limited public land, cross fences were completed to create “public land” pastures. These pastures have been

deferred from livestock use during lesser prairie-chicken booming, nesting, and rearing seasons.

As part of the Range Use Adjustment Agreements, terms and conditions specific to lesser prairie-chicken management were added to the grazing permit or lease. These terms and conditions apply to specific pastures designated as lesser prairie-chicken pastures. They include:

1. Robel's vegetative monitoring methodology which has been approved by the Five State Lesser Prairie-chicken Interstate Working Group will be implemented to measure lesser prairie-chicken habitat requirements. Specific parameters include:

   Shrub coverage – 25 to 30 percent composition of entire vegetative community
   Forb coverage – 10 to 15 percent composition of entire vegetative community
   Grass coverage – 60 percent composition of entire vegetative community; 10 percent with a visual obstruction reading (VOR) greater than or equal to 3.0 decimeters (12 inches) and an average VOR of 1.0 decimeter (4 inches).

Note: It is important to understand that these parameters in certain pastures may not be met until the habitat has time to respond to the new grazing management practices. As long as improvement is being made in those pastures, then permanent changes should not be necessary. If lesser prairie-chicken habitat requirements are not being improved as a result of livestock grazing practices, permanent changes may be necessary.

2. Vegetative monitoring utilizing the Robel Pole would be conducted on an annual basis within those lesser prairie-chicken pastures that are in question of meeting habitat parameters. An adaptive grazing management approach would be taken to where annual changes in livestock numbers or use within pastures would fluctuate depending upon the range evaluation.

3. Additional livestock grazing management changes may be required as a result of periods of abnormal climatic patterns and the vegetative condition resulting from these climatic changes in cooperation.

Fire Management

The "Resource Management Plan Amendment for Fire and Fuels Management on Public Land in New Mexico and Texas" (September 2004) delineates three Fire Regime Condition Classes on public land in New Mexico. Fire Regime Condition Class is "a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure." The majority of the Planning Area is in Fire Regime Condition Class (FRCC) 2 with the remainder in FRCC 1.

Condition Class 1 is described as being within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated disturbances. Condition Class 2 is described as having moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated disturbances.

Hazardous Materials

Precautionary measures are used to prevent releases or spills into the environment on all BLM-authorized activities that involve hazardous materials or their use. The transportation, storage, and handling of hazardous materials are carried out in accordance with manufacturers'

specifications, applicable laws and regulations.

BLM-administered public land contaminated with hazardous materials are reported, secured, cleaned up or otherwise remedied according to applicable Federal and State regulations and contingency plans. Parties responsible for contamination are liable for cleanup and resource damage costs, as prescribed in Federal and State regulations. If at all possible, the responsible parties bear the financial burden of cleanup and resource damage costs.

If hazards are identified on public land, the BLM provides appropriate warnings and establish precautions for safety hazards associated with the use of this land.

Cultural Resources

The cultural resources program encompasses both proactive and regulatory activities. Proactive elements include public education such as presentations and moveable archeological displays as well as site stabilization and protection. No Traditional Cultural Properties or Sacred Sites have been identified by Native American tribes in the Planning Area.

The primary focus of the cultural resource program for both the Carlsbad and Roswell Field Offices is to protect archeological and historic sites from damage during the construction of projects that fall under BLM jurisdiction. Federal law prohibits impacting eligible and potentially eligible archeological and historic sites as a result of permitting Federal undertakings without prior data recovery. Identification and avoidance of eligible and potentially eligible cultural resources are accomplished through contracted cultural inventory surveys. Generally, sites must be avoided by 100 feet. In some cases, BLM has approved projects where 100 foot avoidance is reduced, but where fencing or construction monitoring is required. There are cases where cultural surveys are not required. The criteria to be met are listed below.

- Previous ground disturbance has modified the surface greatly.
- Human activity within the last 50 years has created a new land surface.
- Existing Class 2 (sample survey) or equivalent inventory data are sufficient to indicate that the environmental situation did not support human occupation.
- Availability of Class 3 (intensive survey) information of the area has been fully documented.
- Presence of a geomorphic situation that does not enhance preservation.
- A large number of negative surveys in close proximity to each other.
- Absence of criteria listed in “criteria for survey”.

National Register eligibility is based upon the following criteria:

1. site(s) that are associated with events that have made a significant contribution
2. to the broad patterns of our history; or

3. that are associated with the lives of persons significant in our past; or

4. that embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

5. that has yielded, or may be likely to yield, information important in prehistory or history.

Generally, archeological and historic sites, if eligible, are found to be eligible under criterion (d). Many sites are considered undetermined as to eligibility and so must

be protected or archeologically treated prior to surface disturbance.

The Planning Area encompasses approximately 847,491 acres of public land plus an additional 298,000 acres of Federal minerals. Within the Roswell Field Office jurisdiction, there are close to 400 archeological and historic sites recorded on public land including Federal mineral estate. Historic sites number around 20. Roswell Field Office records also show approximately 60 archeological and historic sites recorded on private and State trust lands within the Planning Area. The Carlsbad Field Office records show 2,334 archeological and historic sites recorded on BLM public land within the Carlsbad Field Office jurisdiction, including Federal mineral estate. Historic sites number 27 with 1,449 sites identified as prehistoric, 104 sites as multi-component, and 754 sites with an unknown cultural time period within the prehistoric era.

There are a variety of site types within the Planning Area. The majority of the historic sites recorded are single event trash dumps. A few homesteads have been recorded. Prehistoric sites represent the vast majority of the cultural resources recorded. Cultural resources date from the earliest Paleoindian through Ceramic or Formative periods. The majority of these sites are comprised primarily of stone artifacts. It is common to find burnt caliche cobbles, pottery sherds and sandstone food grinding implements in association with the stone artifacts. There are areas where pit house structures are likely. See the Carlsbad Field Office Special Management Areas (SMAs) in the 1988 Carlsbad RMP.

Paleontological Resources

The paleontological resources (fossils) program encompasses both proactive and regulatory activities. Proactive elements include public education such as presentations and moveable paleontological displays as well as site stabilization and protection. The primary focus of the paleontological resource program for both the Carlsbad and Roswell Field Offices is to protect paleontological resources sites from damage during the construction of projects that fall under BLM jurisdiction. The goal is to locate, evaluate, and classify the paleontological resources on public land to ensure that they are given full consideration in all aspects of public land management. Fossils are non-renewable and (except for microfossils and those that make up the energy minerals) relatively rare resources with significant scientific, educational, commercial and recreational values. Fossils on Federal land are managed for their scientific, educational and where appropriate, recreational values.

Two Federal laws currently target the illegal collection or destruction of fossils. The Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa-470mm (ARPA), authorizes penalties for illegal collections of paleontological resources. However, ARPA applies only to paleontological resources that were found in an archaeological context. The Federal Cave Resources Protection Act of 1988, 16 U.S.C. 4301-4309 (FCRPA), authorizes misdemeanor-level penalties for illegal collections of paleontological resources from significant caves. Because these authorities address a limited subset of fossils, laws penalizing the theft or depredation of government property (18 U.S.C. 641 and 1361) now offer the primary protection for fossils on Federal land. Identification and avoidance of significant paleontological resources are accomplished through contracted cultural inventory surveys. Generally, paleontological sites must be avoided by 100 feet. In some cases, BLM has approved projects where 100 foot avoidance is reduced, but where fencing and/or construction monitoring is required.

Public land is classified at the field level according to their potential for noteworthy occurrences of fossils. Classification uses any available sources of information,

including data banks, maps, knowledge of local residents, and data from paleontologists. Classification ranks the public land as follows:

- **Condition 1:** Areas that are known to contain fossil localities. Consideration of paleontological resources is necessary if available information indicates that fossils are present in the area.
- **Condition 2:** Areas with exposures of geological units or settings that are likely to produce fossils. The presence of geological units from which fossils have been recovered elsewhere requires an assessment of these same units if they occur in the area of consideration.
- **Condition 3:** Areas that are extremely unlikely to produce fossils, based on their surface geology.

Paleontological resources are addressed in environmental analysis processes to ensure adequate protection.

In areas classified as Condition 1 or Condition 2, where potential impacts exist from proposed surface disturbing activities, the following procedures are employed:

- A qualified paleontologist conducts a literature review and records survey to identify areas where fossils are known to occur in the general area of the proposed action.
- A qualified paleontologist conducts a field survey whenever a literature review and records survey indicate that vertebrate or other noteworthy occurrences of fossils are or may be present.
- A report of findings is prepared following the completion of the field survey, literature review and records survey.

In areas determined to have noteworthy occurrences of fossils, mitigation of surface disturbing activities are considered. A mitigation and monitoring plan based on a report of finding is prepared recommending the types of mitigation and intensity of monitoring needed. Mitigation may include:

- Avoiding fossils by redesigning or relocating a proposed project
- Complete or partial salvage of the fossil(s) under a permit
- Obtaining representative samples of the fossils from the project area under a permit

Management of paleontological resources includes making them available for uses such as scientific collection and research, educational and interpretive activities, and recreation.

The Planning Area encompasses approximately 847,491 acres of public land plus an additional 298,000 acres of Federal minerals. Within the Roswell Field Office and Carlsbad Field Office jurisdiction, there have been several paleontological sites recorded on BLM managed land including Federal mineral estate. The paleontological sites recorded in the Roswell Field Office and the Carlsbad Field Office jurisdiction have consisted of vertebrate fossils of the late Pleistocene and early Holocene. The vertebrate fossils from the various fossil sites were identified as Columbian Mammoth, Camel, and several extinct species of deer. These vertebrate fossil sites are of great significance because of their relative rarity and scientific importance.

Recreation

A recreation opportunity spectrum (ROS) was completed for the Planning Area as part of the 1997 Roswell RMP. Under this evaluation, the bulk of the Planning Area was determined to be “rural” with pockets of “roaded natural” areas (see Glossary). These designations are still valid.

Elements of public land users enjoy watching wildlife. Birdwatchers and photographers visit lek areas during booming season for the purpose of

obtaining photographs and observing the Lesser Prairie-chickens engage in mating rituals.

Currently, there are three special recreation management areas (SRMA) within the Planning Area. These SRMAs are the Mescalero Sands North Dune Off-Highway Vehicle (OHV) Area, the Mescalero Sands Area of Critical Environmental Concern (ACEC), and the Hackberry Lake Intensive Off-Road Vehicle (ORV) Area. See Map NAA-1 for the locations of the SRMAs.

The Mescalero Sands North Dune OHV Area is currently covers 562 acres and the 1997 Roswell RMPA calls for expanding the area to approximately 1,674 acres. The objective of the OHV area is to provide outdoor recreation opportunities for public land users who recreate with OHVs, such as quad runners, dune buggies, and motorcycles. The OHV area is the only area designated "open" to OHV uses within the Roswell Field Office.

The Hackberry Lake Intensive ORV Area covers 55,800 acres with the objective of providing outdoor recreation opportunities for OHV ricers. Hackberry Lake ORV Area is used annually by the Desert Rough Riders hosting the Carlsbad 100 Desert Race. Approximately 22,673 acres of the Hackberry Lake ORV Area is located within the Planning Area.

Within the Planning Area, there is an undesignated, unnamed dune complex located approximately 2-3 miles east of the dune complex at Hackberry Lake ORV Area. This dune complex is also heavily used throughout the year by OHV enthusiasts.

Effective August 5, 2004, the Planning Area is under Interim Management pending the RMPA/EIS. Under Interim Management, all land in the Planning Area within the Carlsbad Field Office that is currently designated as open to OHV use is temporarily designated as limited to existing roads, trails, or ways. An exception in Carlsbad Field Office is the Hackberry Lake Intensive ORV area which continues to be designated as open to OHV use.

- Bear Grass Draw - All Special Management Area (SMA) acreage within the Planning Area is designated "Limited to designated routes"

- Laguna Plata - 120 acres designated "Closed" to OHV use; 2,240 acres designated "Limited to designated routes"

- Maroon Cliffs - All SMA acreage within Planning Area designated "Limited to designated routes"

- Poco Site - 51 acres designated "Limited to designated routes"

Visual Resources

Visual Resource Management Classes have been previously identified and delineated for the Roswell Field Office in the 1997 Roswell RMP and for the Carlsbad Field Office in the 1988 Carlsbad RMP. See the Glossary for a definition of the Visual Resource Management Classes.

Special Management Areas (SMAs)

Roswell Field Office

The 1997 Roswell RMP documents three SMAs within the Planning Area: the Mathers Research Natural Area (RNA), the Mescalero Sands North Dune OHV Area, and the Mescalero Sands ACEC. The Roswell RMP designates the OHV area and the ACEC as SRMAs. All three areas are entirely within the Planning Area.

- Mathers Instant Study Area (ISA)

The Mathers RNA contains 242 acres and is the same as the Mathers Instant Study Area (ISA). The ISA is the result of New Mexico

BLM's 1991 Wilderness Study Report. BLM determined the ISA was of insufficient size for wilderness preservation, bisected by a major improved road, and lacks outstanding opportunities for solitude and primitive recreation. The report mistakenly listed the ISAs size as 362 acres based on an original designation of the area as a Natural Area. Research into the original documents revealed the original Mathers Natural Area designation as 242 acres. Henceforth, the Mathers RNA and ISA are listed as 242 acres.

As designated in the 1997 Roswell RMP the Mathers RNA is closed to new oil and gas leasing, withdrawn from mineral entry, closed to solid mineral leasing, closed to the disposal of mineral materials, designated as a ROW exclusion area, and closed to OHV use.

Mescalero Sands North Dune OHV Area

The Mescalero Sands North Dune OHV is the only area designated as open to OHV use in the Roswell Field Office. The OHV area is described in the Recreation section of this chapter.

Mescalero Sands ACEC

The Mescalero Sands ACEC is separate from the OHV area with a similar name and contains approximately 7,888 acres of public land. The ACEC management goal is to protect the biological, archeological and scenic qualities of the ACEC, with emphasis on the preservation of a portion of the shinnery oak-dune community to enhance the biodiversity of the ecosystem. As designated in the 1997 Roswell RMP, the Mescalero Sands ACEC is closed to new oil and gas leasing, withdrawn from mineral entry, closed to solid mineral leasing, closed to the disposal of mineral materials, and designated as a ROW exclusion area. Approximately 2,478 acres of the ACEC are closed to OHV use and the remainder is designated as limited to designated roads and trails.

Carlsbad Field Office

The 1988 Carlsbad RMP established 23 SMAs, four of which are entire or partially within the Planning Area.

Bear Grass Draw

Bear Grass Draw consists of 1,780 acres, of which 1,280 acres are within the Planning Area. This area contains a high density of prehistoric sites within a developed oil and gas field. Sites encompass the Archaic time period (5,000 B.C.) through the Formative (1,450 A.D.). Many of these sites have subsurface potential to yield in situ cultural materials, including pit house structures. The management objective for this Cultural Resource Management Area is to protect and preserve the important and sensitive cultural resource values for research. The 1998 Carlsbad RMP designates this SMA as limited to OHV use.

Laguna Plata

The Laguna Plata Archeological District contains 3,360 acres of public land and is located entirely within the Planning Area. This is another area of high density prehistoric sites covering a long expanse of time (Archaic – Formative). There is cultural depth to many of the sites and the likelihood of finding pit houses. The management goal is to protect and preserve the important and sensitive cultural resource values for research.

As designated in the 1988 Carlsbad RMP, the Laguna Plata Archeological District has a no surface occupancy (NSO) stipulation applied to oil and gas leases, is a ROW avoidance area, closed to solid mineral leasing (except potash), closed to mineral material disposal, and designated 1,120 acres closed to OHV use and 2,240 acres as limited to OHV use.

Maroon Cliffs

The Maroon Cliffs Archeological District originally contained 11,783 acres of public land. The 1997 Carlsbad RMP Amendment increased the size of the district to 17,720 acres of which approximately 4,760 acres are within the Planning Area. Archeological sites date to the Archaic and Formative periods with pit structures likely. The high site density and in situ subsurface cultural deposits are important factors in this archeological district. The management goal is to protect and preserve the important and sensitive cultural resource values for research.

As designated in 1998 Carlsbad RMP and 1997 Carlsbad RMPA the Maroon Cliffs Archeological District has a NSO stipulation applied to oil and gas leases covering 6,840 acres, no new oil and gas leasing on 10,880 acres, is a ROW avoidance area, closed to mineral material disposal, and designated as limited to OHV use.

Poco Site

The Poco Site contains 51 acres and is entirely within the Planning Area. This site dates from approximately 600 A.D. to approximately 1375 A.D. based on ceramic types. There is the potential for finding pit structures. Subsurface in situ cultural deposits are present. The management goal is to protect and preserve the important and sensitive cultural resource values for research. The area is designated as limited to OHV use.

Hackberry Lake ORV Area

The Hackberry Lake ORV Area contains 55,800 acres of public land of which approximately 21,440 acres are within the Planning Area. The management objective is to manage the area as an intensive ORV use area and avoid conflicts with other land uses.

There are no designated Wild and Scenic Rivers or Wilderness Areas present in the Planning Area, nor are there any other kinds of Congressional designated units, such as National Conservation Areas or National Historic or Scenic Trails. There are no cave/karst issues within the Planning Area.

Environmental Justice

While New Mexico is one of four states in the Nation in which minorities are the majority of the State's population, the Planning Area does not encompass communities of minorities or communities made up of low-income residents. The current management prescriptions and policies do not place a disproportionate share of negative environmental consequences on such populations and communities adjacent to the Planning Area. See the Glossary for a definition of environmental justice.

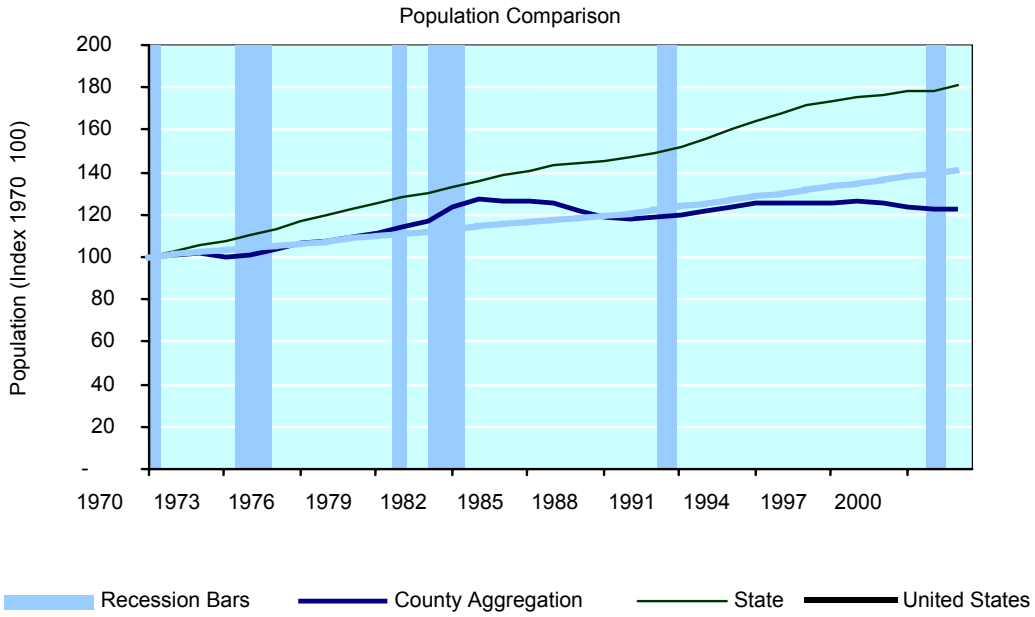
Social and Economic Values

Demographics

The Planning Area covers parts of four counties in southeast New Mexico, Roosevelt, Chaves, Eddy and Lea. While the Planning Area itself is rural in nature, it is surrounded by these communities: Portales and Elida in Roosevelt County; Roswell, Dexter, Hagerman and Lake Arthur in Chaves County; Artesia, Carlsbad and Loving in Eddy County; and Jal, Eunice, Hobbs, Lovington and Tatum in Lea County.

Over the past 30 years, the populations of all four counties have grown. See Table 3-5 and Figure 3-1. This growth, however, in Eddy, Lea and Roosevelt was less than the population growth of State of New Mexico and the Nation as a whole. Only Chaves County posted population growth greater than the State of New Mexico, but less than population growth in the nation as shown in Tables 3-6.

FIGURE 3-1 POPULATION COMPARISON



SOURCE: Bureau of Economic Analysis, REIS, Table CA30

TABLE 3-5 COUNTY POPULATION CHANGES			
COUNTY	**POPULATION**		
	1970	**2002**	**Growth Rate, 1970-2002**
Chaves	44,929	61,148	40%
Eddy	41,013	51,264	11%
Lea	49,647	55.613	25%
Roosevelt	16,531	18,024	9%
TOTAL	152,120	186,049	23%
SOURCE: Bureau of Economic Analysis, REIS, Table CA30			

TABLE 3-6 CURRENT POPULATION			
Community	**Population**	**Community**	**Population**
Artesia	10,692	Jal	1,996
Carlsbad	25,625	Tatum	683
Eunice	2,562	Elida	183
Hobbs	28,657	Dexter	1,235
Lovington	9,471	Hagerman	1,168
Portales	11,131	Lake Arthur	432
Roswell	45,293	Loving	1,326
SOURCE: Census 2000, SF1 Table P12			

Most residents of these counties live in the larger towns of Roswell, Artesia, Carlsbad, Hobbs and Lovington. For example, the 2000 Census indicated the population of Roswell at about 46,000. That leaves about 15,000 people living in the other communities and unincorporated areas of Chaves County surrounding those communities. See Table 3-6.

Within these counties, roughly 70 percent of population classifies itself as white (which includes some Hispanic or Latino) while approximately 40 percent identify themselves as Hispanic or Latino of any race. This compares with 67 percent white and 42 percent Hispanic or Latino of any race within the State of New Mexico.

The population of the area has gotten older during the past 10 years. In 1990 the median age was 31.4 year which increased to 34.4 years in 2000. The largest age category is the 15 to 19 years old with nine percent of the population. The fastest growing age group is the 45 to 49 years old category which makes up two percent of the population.

Economics

Historically, cattle ranching and petroleum development have played a significant role in economic development. In a very real sense, the identity of the residents, their sense of place, culture, architecture, and fashion have been shaped by these industries. These industries, however, have not been a significant source of new jobs or personal income in the last 30 years. This does not mean that cattle ranching or petroleum development should disappear. They are an important part of an increasingly diverse economy. In some communities and for some families, they will continue to be important. As Table 3-10 and Table 3-11 illustrate, other sectors of the economy are growing faster and comprise a relatively larger share of the economy.

Virtually all official sources of economic data use the Standard Industrial Classification (SIC) System. For simplicity in presentation, this document combines some of the SIC categories. The categories used are Farm & Agricultural Services; Mining (which includes oil and gas employment); Manufacturing; Construction; Government (all levels) and Services & Professional.

The Services & Professional category includes transportation and public utilities; wholesale trade; retail trade; finance, insurance and real estate; and health, legal, business and other services.

While agriculture and petroleum development are viewed as the main source of employment in southeast New Mexico, a review of Bureau of Labor Statistics, Bureau of Economic Analysis, Bureau of Census and other Department of Commerce information indicates this is not entirely correct. The largest employment category in the four counties is Services & Professional and has been for the past 30 years. See Table 3-7. The next largest category of employment is Government. Interestingly, within this category, the largest growth has been in State and Local government employment. Federal employment has remained level.

During the past 30 years, approximately 30,000 new jobs have been created in the four counties. About 71 percent of these jobs have been in the Services & Professional category, making it the fastest growing category. Services & Professional gained the largest share of total employment, rising from 17.3 percent in 1970 to 24.8 percent in 2000. The largest loss, in regards to number of jobs, during this time has been the Farm component of Farm & Agricultural Services at over 1,000 jobs. Employment in the Mining category, which includes Oil/Gas employment, lost the largest share of the total during this 30-year period, shrinking from 15.5 percent in 1970 to 10.7 percent in 2000.

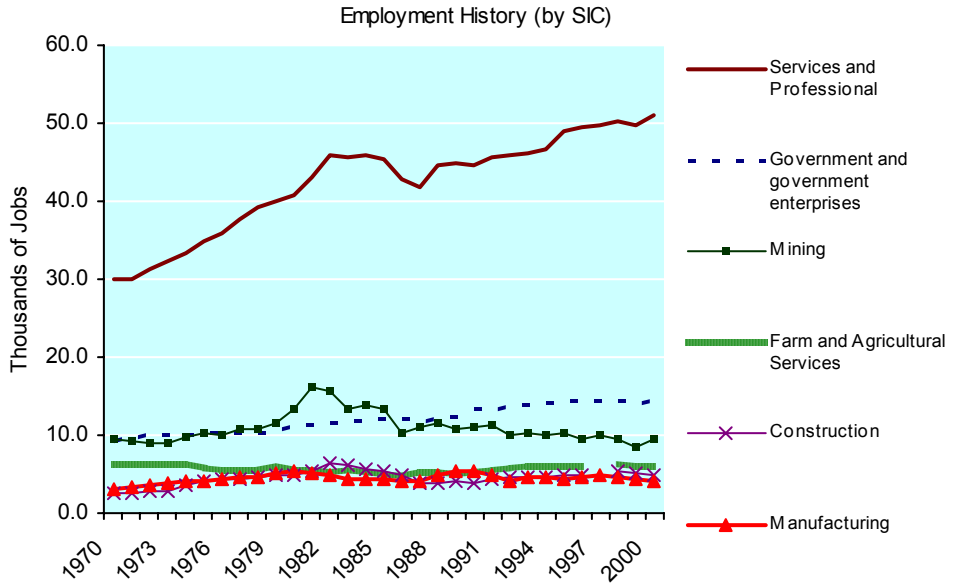
The aggregate trends in employment in the four counties are displayed in Figure 3-2. During the past 30 years employment in Agriculture, Construction and Manufacturing has remained steady. Mining, which includes petroleum development, shows a peak in the 1980s but declined slightly in 1990s.

The employment described above generates personal income. Two ways to measure the quality of the jobs are per capita income and average earnings per job. See Table 3-8. Per capita income is calculated by dividing the total income by the total population. Average earnings per job are calculated by dividing total income by the number of workers (including part-time employees). The per capita income in all four counties ranks below the State of New Mexico and the Nation. For average earnings per job, all four counties are at or just below the average for the State of New Mexico, but well below the average for the Nation.

Sources of personal income use the same categories found in Standard Industrial Classification (SIC) System with the addition

TABLE 3-7 COUNTY EMPLOYMENT BY INDUSTRY								
INDUSTRY	CHAVES COUNTY		EDDY COUNTY		LEA COUNTY		ROOSEVELT COUNTY	
	1970	2000	1970	2000	1970	2000	1970	2000
Total Employment	17,142	28,017	16,188	25,530	21,061	28,469	6,243	7,800
Wage & Salary Employment	13,623	21,754	13,318	20,350	17,623	23,071	3,762	5,641
Proprietors' Employment	3,619	6,263	2,870	5,180	3,438	5,398	2,481	2,159
Farm & Ag Services	1,975	2,204	1,233	1,171	1,217	1,091	1,851	1,448
Farm	1,745	1,561	1,092	817	1,088	855	1,745	1,263
Ag Services	230	643	141	354	149	236	106	185
Mining	639	1,094	3,595	3,029	5,071	5,410	69	49
Manufacturing	1,468	2,342	679	997	723	490	282	262
Services & Professional	9,289	16,104	7,838	15,236	10,577	16,162	2,419	3,558
Transportation & Public Utilities	1,069	926	845	2,017	2,131	1,423	244	467
Wholesale Trade	604	995	454	586	1,014	1,281	191	212
Retail Trade	3,015	5,608	2,536	4,593	3,362	4,642	887	1,374
Finance, Insurance & Real Estate	1,368	1,642	710	1,252	837	1,408	367	352
Health, Legal, Business & Other	3,233	8,933	3,293	6,788	3,233	7,408	730	1,153
Construction	768	1,351	559	1,451	1,039	1,578	147	422
Government	3,003	4,922	2,284	3,646	2,434	3,738	1,475	2,061
SOURCE: Bureau of Economic Analysis, REIS, 2002 CD Table CA 25								

FIGURE 3-2 EMPLOYMENT BY STANDARD INDUSTRIAL CATEGORY



Source: Bureau of Economic Analysis, REIS, 2002 CD Table CA 25

of the Non-Labor Income category. See Table 3-9. Non-Labor Income is defined as income derived from dividends, interest, rent, and transfer payments. Transfer payments include retirement, disability, Medicare, welfare and other payments.

The largest source of personal income in the four counties is Non-Labor Income at 37 percent of the total personal income.

Services & Professional is the second largest source of personal income.

Non-Labor is also ranked as the fastest growing source of personal income, its share increasing from 22.9 percent in 1970 to 37 percent in 2000.

The aggregate trend of personal income sources in the four counties is depicted on Figure 3-3, which has been adjusted for inflation.

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TABLE 3-8 CHANGES IN INCOME BY COUNTY

COUNTY	PER CAPITA INCOME		AVERAGE EARNINGS PER JOB	
Adjusted for inflation	1970	2002	1970	2002
Chaves	14,281	22,727	27,203	32,370
Eddy	15,111	23,763	31,251	34,095
Lea	15,792	22,503	31,691	33,096
Roosevelt	13,228	23,792	25,956	29,835
New Mexico		24,823		33,461
United States		30,906		40,758

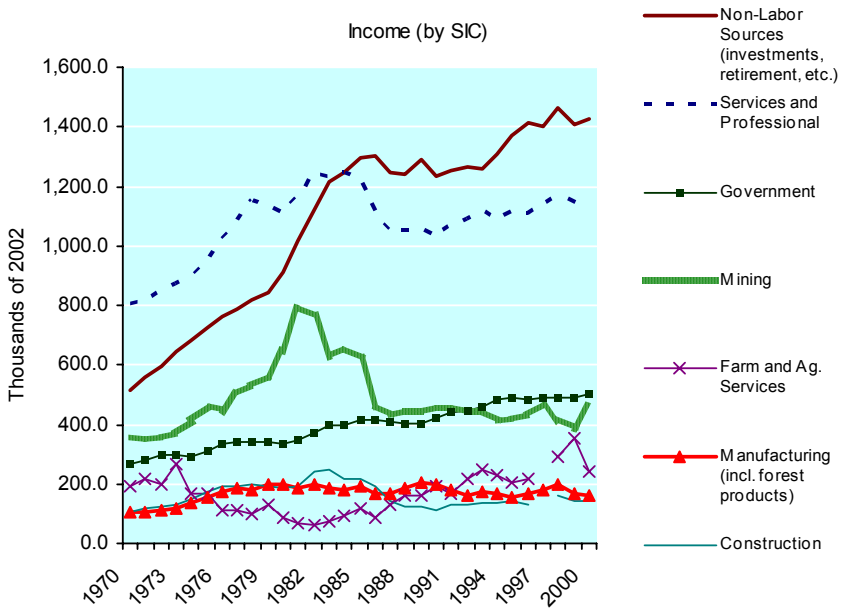
SOURCE: Bureau of Economic Analysis, REIS, Table CA30

TABLE 3-9 SOURCES OF PERSONAL INCOME BY COUNTY

INCOME SOURCE (MILLIONS OF DOLLARS)	CHAVES COUNTY		EDDY COUNTY		LEA COUNTY		ROOSEVELT COUNTY	
All figures in millions of 2000 dollars	1970	2000	1970	2000	1970	2000	1970	2000
Total Personal Income	625.0	1,218.0	820.0	1,107.0	784.0	1,153.0	219.0	359.0
Farm & Ag Services	56.0	121.0	42.0	25.0	36.0	34.0	62.0	62.0
Farm	48.0	104.0	39.0	21.0	33.0	29.0	60.0	60.0
Ag Services	7.2	16.5	2.5	4.0	3.1	5.0	1.4	2.3
Mining	19.0	54.8	147.1	173.0	185.3	229.2	1.1	1.8
Manufacturing	41.0	88.0	25.0	49.0	31.0	16.0	6.0	8.0
Services & Professional	235.0	330.0	203.0	364.0	323.0	406.0	47.0	70.0
Transportation & Public Utilities	40.0	34.0	31.0	104.0	93.0	81.0	10.0	20.0
Wholesale Trade	26.0	28.0	13.0	21.0	44.0	48.0	3.0	5.0
Retail Trade	70.0	91.0	58.0	72.0	82.0	77.0	18.0	20.0
Finance, Insurance & Real Estate	26.0	29.0	16.0	24.0	19.0	29.0	5.0	4.0
Health, Legal, Business & Other	72.0	148.0	85.0	143.0	86.0	171.0	11.0	21.0
Construction	27.0	39.0	24.0	47.0	51.0	46.0	5.0	9.0
Government	88.0	174.0	65.0	144.0	71.0	123.0	40.0	61.0
Non-Labor Income	191.0	482.0	144.0	409.0	126.0	396.0	54.0	137.0
Dividends, Interest & Rent	119.0	224.0	79.0	180.0	74.0	169.0	29.0	58.0
Transfer Payments	72.0	259.0	65.0	229.0	53.0	227.0	25.0	79.0

SOURCE: Bureau of Economic Analysis, REIS, 2002 CD Table CA 05

FIGURE 3-3 SOURCES OF PERSONAL INCOME BY STANDARD INDUSTRIAL CATEGORY



Source: Bureau of Economic Analysis, REIS, 2002 CD Table CA 05

A diversified economy is healthier than an economy based on a single industry. Diversified economies are better able to withstand market fluctuations than economies based on a single industry. In a diversified economy, downturns in a particular industry or category tend to be masked by the other industries or categories. Below are two ways to depict the economic diversity and display the aggregate of the four counties.

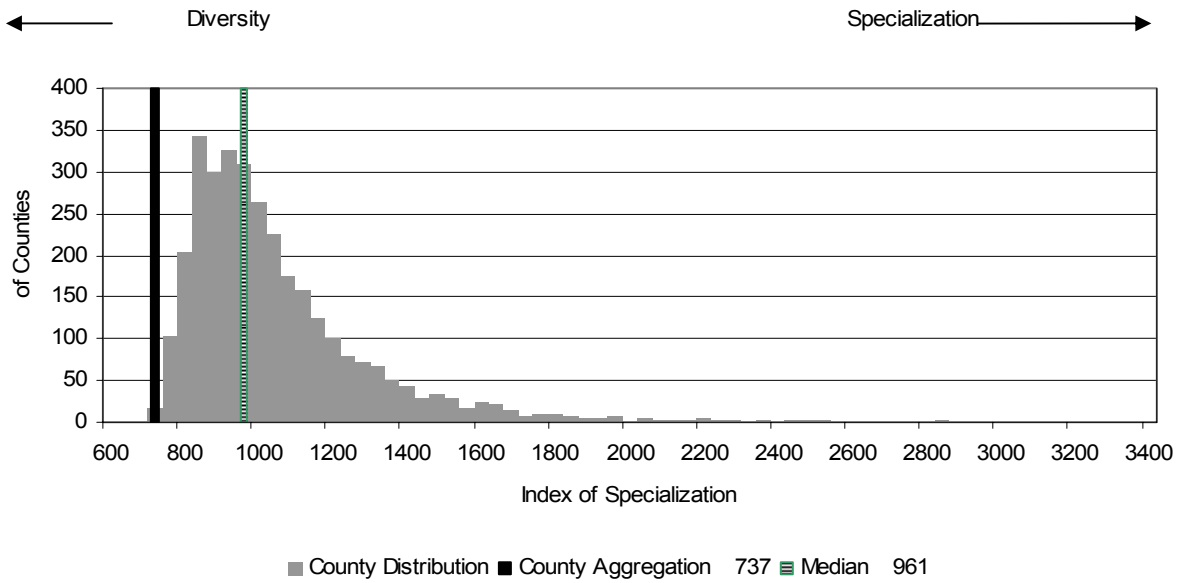
Figure 3-4 depicts the Index of Specialization for the four-county area. The degree of specialization index depicts how dependant a county or area is on a particular industry or employer. As counties approach the right side of the graph, the more specialized their employment. As counties approach the left side of the graph, the more diverse their employment. The solid black line in the above graph is the aggregate of Chaves, Eddy, Lea and Roosevelt Counties. Median refers to that mythical county that has the median degree of employment specialization of all counties in the United States. What the graph depicts is the economy of the four counties is more diverse than the median (an index of 737 versus 961).

Another way is to look at the employment share by industry in the four counties as compared to the United States as a whole. Figure 3-5 depicts the data on which the Index of Specialization is based. The data indicates that no one category dominates the economy of the four counties.

The unemployment rate in the four counties has generally run higher than the unemployment rate for New Mexico and the nation. See Figure 3-6. In 2003, the unemployment rate in the four counties was 6.4 percent compared to 6.4 percent for New Mexico and 6.0 percent for the nation.

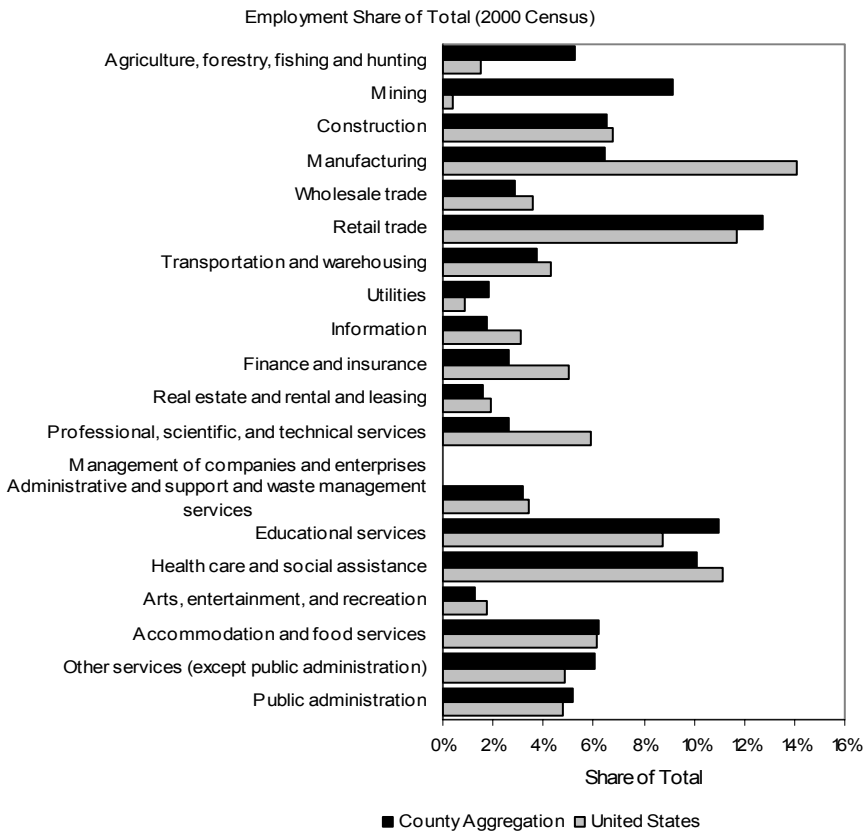
Income distribution is an indicator of the health of the economy. In Figure 3-7 is it important to note that in 1989 for every household making more than 100,000, there were 30.8 households making under 30,000. In 1999, this improved to 10.6 households. This information has not been adjusted for inflation. Inflation has had some influence on this improvement but is not the sole cause of this improvement.

FIGURE 3-4 ECONOMIC INDEX OF SPECIALIZATION



Source: Census 2000, SFS Table P49

FIGURE 3-5
EMPLOYMENT SHARE BY NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM



Source: Census 2000, SFS Table P49

Another important trend over the last 10 years is a dramatic increase in the number of households making between 45,000 and 100,000 per year.

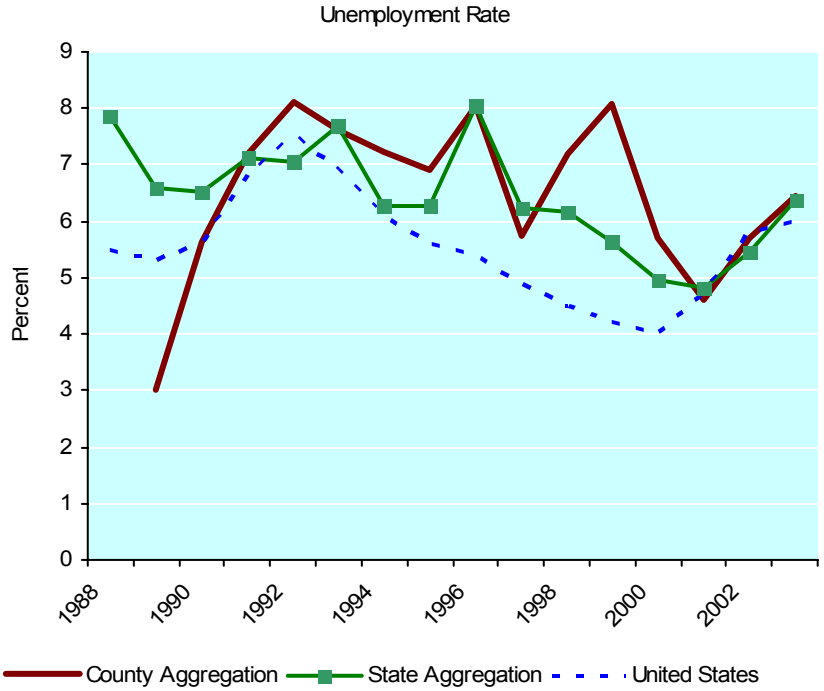
Table 3-10 shows the Housing Affordability Index for the four counties. In the 1990s housing became more affordable in the four counties with the index moving from 180 to 209. [The housing affordability figures assume a 20 percent down payment and that no more than 25 percent of a family's income goes to paying the mortgage. It is based on an interest rate of 10.01 percent in 1990 and 8.03 percent in 2000.]

While the economy of the four counties is diverse and the housing is affordable, the per capita income and the average earnings per job lag behind New Mexico and the nation. One reason may be the education level of workers in the four counties. See Table 3-11. The education levels in the four counties lag behind New Mexico and New Mexico lags behind the national levels. New Mexico also lags behind the Western states and the Mountain Division (Arizona, Colorado, Idaho, Montana, New Mexico, Utah and Wyoming).

TABLE 3-10
HOUSING AFFORDABILITY INDEX

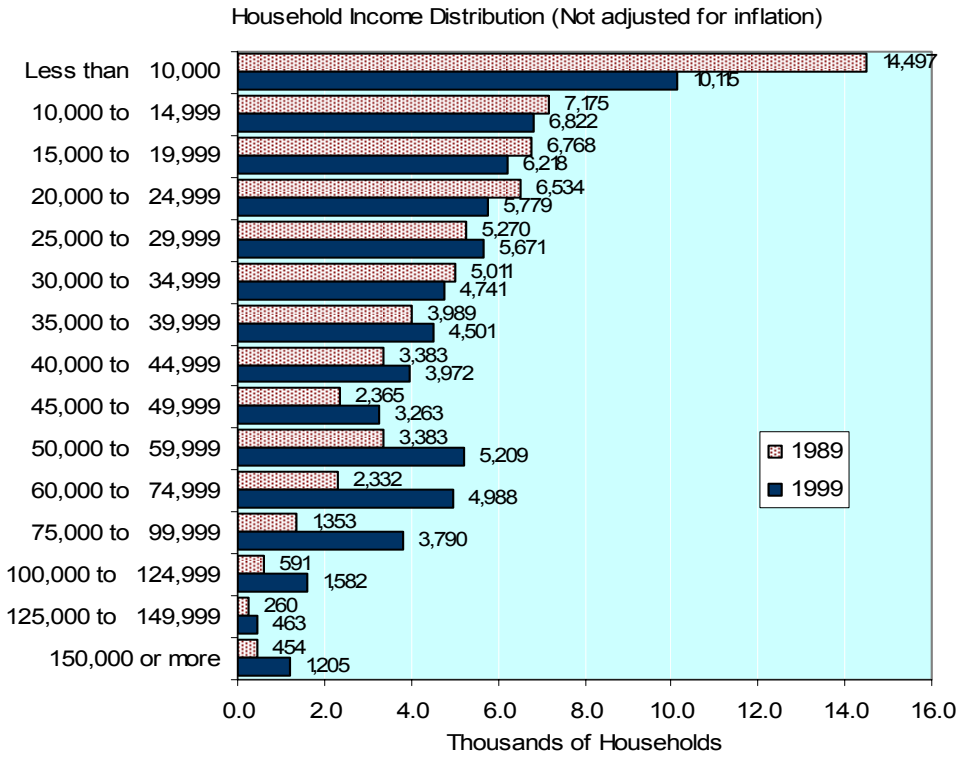
OWNER OCCUPIED	1990	2000
Specified owner-occupied housing units: Median value (Adjusted for Inflation in 2000 's)	56,258	58,600
% of median income necessary to buy the median house	14%	12%
Income required to qualify for the median house	18,974	16,559
Housing Affordability Index: (100 or above means that the median family can afford the median house.)*	180	209
Source: Census 1990 and 2000		

FIGURE 3-6 UNEMPLOYMENT RATES



Source: Bureau of Labor Statistics

FIGURE 3-7 INCOME DISTRIBUTION



Source: Census 1990 and 2000

TABLE 3-11 HIGH SCHOOL EDUCATION LEVELS					
PERCENTAGE OF ALL WORKERS					
EDUCATION LEVEL	**CHAVES, EDDY, LEA & ROOSEVELT COUNTIES**	**NEW MEXICO**	**WESTERN REGION**	**MOUNTAIN DIVISION**	**UNITED STATES**
Less than High School	29	21	20	16	20
High School Diploma	28	27	23	23	29
Some college, college and advanced degrees	43	52	57	61	51
Source: Census 2000					