




ANALYSIS OF THE MANAGEMENT SITUATION

for the

Bureau of Land Management

Carlsbad Field Office

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CHAPTER 1.

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1.1 OVERVIEW

The Analysis of the Management Situation (AMS) is a working document that has been prepared as an initial step in the planning process for the U.S. Department of the Interior (USDI), Bureau of Land Management (BLM) Carlsbad Field Office (CFO) Resource Management Plan (RMP) revision and Environmental Impact Statement (EIS). The AMS and RMP/EIS will address the management of public lands in Eddy and Lea Counties, and a portion of Chaves County, in southeast New Mexico.

As part of the RMP revision process, the CFO conducted an AMS for the CFO planning area. The AMS is part of the RMP planning process as described in 43 Code of Federal Regulation (CFR) 1600 and planning program guidance in the Land Use Planning Handbook (BLM Handbook H-1601-1). The AMS provides baseline information for the RMP revision and associated EIS.

This summary compiles, in one location, important information about existing resource conditions, current management practices, and issues and concerns identified to date. Preliminary planning issues and criteria have been identified and will be used to guide the identification and development of management alternatives. These preliminary issues and criteria are not final. They may be added to or refined during public scoping. The BLM is requesting your help in identifying additional issues and concerns, management alternatives, or other ideas to be considered in the planning effort.

1.1.1 Purpose of and Need for the Resource Management Plan

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA) and the National Environmental Policy Act of 1969 (NEPA), the BLM is responsible for managing public lands and their associated resources based on the principles of multiple use and sustained yield. As required by FLPMA and BLM policies, the public lands must be managed in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; preserves and protects certain public lands in their natural condition, where appropriate; provides food and habitat for fish and wildlife and domestic animals; provides for outdoor recreation and human occupancy and use; and recognizes the nation's need for domestic sources of minerals, food, timber, and fiber from public lands by encouraging collaboration and public participation throughout the planning process. Land use plans are one of the primary mechanisms for guiding BLM activities to achieve the mission and goals outlined in the USDI Strategic Plan (USDI 2009). If an RMP is found to be inadequate in these respects, one of two document preparations can be implemented as a remedy: 1) revision of the existing RMP or 2) amendment of the existing RMP.

The purpose for the RMP is to establish updated and new guidance, objectives, and adaptive management actions for the planning area. Adaptive management, also known as adaptive resource management, is a structured, iterative process of optimal decision making in the face of uncertainty, with an aim to reduce uncertainty over time via system monitoring. In this way, decision making simultaneously maximizes one or more resource objectives and, either passively or actively, accrues information needed to improve future management. Adaptive management is often characterized as learning by doing. The RMP will be comprehensive in nature and will address issues within the planning area. In the document, BLM staff will discuss the current management situation, desired future conditions to be maintained or achieved, and management actions necessary to achieve objectives. Following the completion of the RMP, agency staff will develop an implementation plan.

In 2010, a formal land use plan evaluation was completed for the planning area. Findings from the plan evaluation indicated that activities related to mineral extractive uses will continue to increase in the Permian Basin. The plan revision will need to examine and more fully develop new decisions and guidance for other resources in response to changing land use conditions, taking into account new technology, such as horizontal drilling methods. Subsequent changes in resource demands in the planning area have resulted in the need to update the existing RMP through a plan revision and associated EIS.

1.1.1.1 Purpose of the Analysis of the Management Situation

The purpose of the AMS is to conduct a deliberate assessment of the current situation as it relates to natural resource management and resource use on public lands within Eddy and Lea Counties and a portion of Chaves County (Map 1.1).

There are three terms used in this AMS to describe the areas addressed: planning area, decision area, and study area. The planning area encompasses the entirety of Eddy and Lea Counties and a portion of Chaves County regardless of jurisdiction or ownership. The decision area for the majority of resources or resource uses refers to public lands (i.e., land administered by the BLM) in Eddy and Lea Counties and portions of Chaves County. In addressing federal minerals and the decision whether to lease these minerals, the decision area was extended to split estates (areas where BLM administers federal subsurface minerals, but the surface is owned by private or state entities). For some resources and resource uses, the term study area also is used. This term is used to describe resources potentially affected by activities within the planning area (such as air quality and socioeconomics) whose impacts may affect areas outside the planning area.

The AMS is not a compilation of all available data, but rather includes information appropriate and commensurate with the planning issues identified during scoping from June through August 2010. The issues and concerns discussed in this document do not comprise an exhaustive list of issues and concerns, nor do the issues included at this time represent conclusions or decisions. Rather, the identified issues and concerns are intended to stimulate public discussion and input during scoping. Some information that is not related to the planning issues may be summarized or referenced.

The BLM uses available data when preparing the AMS and may contract or seek additional data as needed during the RMP revision process. Where possible, the discussion and maps included in this AMS illustrate data for the entire planning area; however, data outside the BLM's decision area were not readily available for all resources. Likewise, in limited cases, data within the BLM's decision area may not have been readily available for all resources. Therefore, the discussion and maps presented in this AMS were developed from available data and represent an inventory of available information.

The majority of the data was provided by the CFO from federal, state, county, and local agencies, including but not limited to the U.S. Geological Survey (USGS), U.S. Fish and Wildlife Service (USFWS), New Mexico Department of Game and Fish (NMDGF), other state agencies, counties, and other public and private sources. The data include published and unpublished reports, maps, and data in digital format (geographic information system [GIS]). The data compiled represent a level of detail appropriate for and commensurate with the programmatic nature of the RMP/EIS. Where data were lacking, they were interpreted from the best available sources.

GIS has been used extensively to capture, manage, analyze, and display the geographic data for this AMS. In particular, GIS was used to execute certain complex spatial analyses. There are differences between areal data estimated for the 1988 RMP and 1997 Resource Management Plan Amendment (RMPA), and the more recent GIS data. For the purposes of this RMP/EIS, the more up-to-date GIS data have been used.

1.1.1.2 General Description of the Planning Area, Geographic Scope, and Resource Programs

The CFO manages the public lands located in southeastern New Mexico. The planning area for the RMP revision encompasses 6,257,412 acres, not all of which are public lands. This acreage includes all of Eddy and Lea Counties and a portion of Chaves County (Map 1.1). The planning area covers approximately 8% of the state's land. The RMP decision area, which includes only the public lands managed by the CFO, consists of 2.2 million surface acres and 4.1 million acres of federal mineral estate (1.9 million acres is split estate). CFO surface lands fall within three ecoregions, the Chihuahuan Desert, Arizona/New Mexico Mountains, and High Plains. The RMP study area is the area potentially affected by

activities within the planning area. For resources such as air resources, the study area often extends beyond the planning area boundary.

The distribution of public lands is another important influence on land management options. The public lands in the CFO are fairly well consolidated in Eddy County and the western half of Lea County with state and private inholdings scattered throughout. A more interspersed ownership pattern predominates the southwest portion of Chaves County, eastern Lea County, and lands along the Pecos River.

1.1.1.3 Key Findings of the Analysis of the Management Situation

Based on the current management, data collected so far, and an analysis of the opportunities for alternative ways of managing the resources and resource uses in the planning area, several common themes are apparent. These commonalities will be considered through development and completion of the RMP.

Several important inventories will be updated during the development of the RMP (e.g., visual resource inventory, travel and trails inventory) and will contribute to the knowledge base used to develop management alternatives. Also, existing special area designations will be evaluated based on resource values to determine if those areas should be designated as Areas of Critical Environmental Concern (ACECs) or if they should be identified for special management consideration under the RMP. There may be a need to designate new ACECs and/or identify new areas with resource values for special management consideration. Constraints on the management of resources and resource uses stem primarily from the regulatory framework provided by federal law and BLM policy.

Natural Resource Management—For many of the natural resources managed by the BLM, desired outcomes or goals for future conditions will be evaluated and refined. Developing desired outcomes in the RMP process will provide the CFO with guidance for managing these resources at a watershed level, consistent with *New Mexico Standards for Public Land Health and Guidelines for Livestock Grazing Management* (Standards and Guidelines) (BLM 2001a). The establishment of desired outcomes also could provide opportunities for adaptive management in the future.

Resource Uses—Many of the resource uses are guided by specific decisions about whether and where an activity can take place. These decisions provide the overall management framework for resource uses in the decision area. Trends in Permian Basin oil and gas development, along with the reasonable foreseeable development (RFD) scenario, suggest a steady increase in this type of use demand. The BLM can establish criteria through this RMP process, which will guide future management of resources and their interface with the various uses.

Population growth, especially in Eddy and Lea Counties, is expected to increase pressures on public land for recreation, community expansion, extractive uses (e.g., mining, oil and gas), land use authorizations (e.g., rights-of-way [ROWs]), transportation, and access. The BLM can establish criteria and allocate resources uses through this RMP process to guide the agency with future actions related to the various forms of use described above. For example, the agency could develop land disposal (e.g., sales and exchanges) criteria. Establishing such criteria will add to the overall framework guiding the use of public land resources and providing opportunities for adaptive management in the future.

Cooperation and Coordination with Other Agencies—As many of the resources or uses can be affected by management actions of other jurisdictions or agencies, the BLM will need to coordinate efforts with these agencies for ongoing management of public land in all three counties. Although cooperation and coordination does not require a decision within the RMP, it will continue to be an important component of public land management in the planning area.

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2.1 RESOURCES

2.1.1 Soils

Profile

Soils in the planning area are diverse. There can be great differences in soil properties within short distances. The distribution of soils is dependent on a number of factors, including the interaction of relief (slope), parent material (geology), living organisms, climate, and time. These variables create complex and diverse soil patterns that influence the use and management of the soil resource. Stable and productive soils provide the foundation for other resources and resource uses. Soils are also a living system that is linked to nutrient and hydrologic cycles, energy flows, and other ecological processes. Soils are affected by a variety of surface uses that loosen topsoil and damage or remove vegetation or other ground cover, which may result in accelerated erosion.

2.1.1.1 Indicators

Indicators are key soil characteristics that are sensitive to change in the environment. Indicators of soil resource condition (quality) can be categorized into four general groups: visual, physical, chemical, and biological. Visual indicators are those that are related to changes caused by environmental factors such as wind or water. Physical indicators are related to the arrangement of solid particles and pores. The soil's chemical condition affects soil-plant relations, water quality, buffering capacities, availability of nutrients and water to plants and other organisms, mobility of contaminants, and some physical conditions, such as the tendency for crust to form. Biological indicators reflect activities of living organisms and their influence on soil health. Examples of these indicators are:

- **Erodibility:** sensitivity of the soil structure to the effects of wind and water and/or susceptibility of soil to erosion
- **Reclamation potential:** ability of the soil to regain vegetative cover, once the cover has been lost
- **Visual:** exposure of subsoil, change in soil color, ephemeral gullies, ponding, runoff, plant response, weed species, blowing soil, plant roots exposed, and deposition
- **Physical:** depth, bulk density, porosity, aggregate stability, texture, crusting, and compaction. Physical indicators primarily reflect limitations to root growth, seedling emergence, infiltration, or movement of water within the soil profile
- **Chemical:** pH, salinity, organic matter, cation-exchange capacity, nutrient cycling, and the concentrations of elements that may be potential contaminants or those that are needed for plant growth and development
- **Biological:** measurements of micro and macro-organisms, their activity, or byproducts

These indicators for soil resources, generally the first three, are used in the planning area to determine soil and site stability. This is usually done as part of the Standards for Rangeland Health assessment process. A checklist is followed, using both visual observations for factors including flow patterns and gullies and measurements for things such as percent bare ground and depth of soil horizons.

2.1.1.2 Current Condition

The planning area's soils are grouped geographically by Land Resource Regions (LRRs) and Major Land Resource Areas (MLRAs) for descriptive purposes. The planning area lies within regions LRR D (Western Range and Irrigated Region), LRR G (Western Great Plains Range and Irrigated Region), and LRR H (Central Great Plains Winter Wheat and Range Region) in MLRAs 39, 42, 70D, and 77D. MLRA 39 (Arizona and New Mexico Mountains) is an area of gently dipping sedimentary rocks eroded into plateaus, valleys, and deep canyons. The dominant soil orders are Inceptisols (weakly developed subsurface horizons), Mollisols (grassland soils), Alfisols (slightly leached soils with clay in the subsurface), and Entisols (soils with little or no development). Most have a mesic, or moderately moist, soil temperature regime. Most of the soils are shallow or very shallow over a layer of hardened lime or bedrock, and are well drained and loamy.

MLRA 42 (Southern Desertic Basins, Plains, and Mountains) is an area of desert basins and broad valleys between mountain ranges. The dominant soil orders are Aridisols (dry soils with lime), Entisols, Mollisols, and Vertisols (clay soils). Most have a thermic (warm) soil temperature regime, an aridic (dry) soil moisture regime, and carbonatic (limy) or mixed mineralogy. The soils generally are moderately deep to very deep, well drained, and loamy or clayey. Some of the soils are shallow or very shallow over a petrocalcic horizon or bedrock.

MLRA 70D (Southern Desert Foothills) is an area of nearly level to rolling or steep limestone hills with intermittent drainageways. The dominant soil orders are Aridisols, and Mollisols. These soils have a thermic soil temperature regime, an aridic soil moisture regime, and carbonatic or mixed mineralogy. They are mostly shallow, well drained, and loamy-skeletal.

MLRA 77D (Southern High Plains, Southwestern Part) is characterized by large areas of open plains on an elevated plateau. The dominant soil orders in this area are Aridisols and Entisols. The soils in the area dominantly have a thermic soil temperature regime, an aridic soil moisture regime, and mixed or siliceous mineralogy. They are very shallow to very deep, well drained, and generally loamy or sandy.

General soils information for the planning area was obtained from the U.S. General Soils Map (Natural Resources Conservation Service [NRCS] 2006a), which is designed primarily for regional, multi-state, river basin, state, and multi-county resource planning, management, and monitoring. The database is intended to give a general overview of soils distribution in the planning area and is not suitable for site-specific evaluations. More detailed Information is available from the Soil Survey Geographic Database (SSURGO) for soil surveys within the planning area. Over 100 general map units, representing many unique soil series, are present in the planning area. A soil series consists of those soils that have similar horizons from the surface down and developed from related materials under the influence of common climate and vegetation. However, 10 map units comprise approximately 44% of the soils in the planning area. Soils can be broadly described as loamy (243,391 acres of public land), sandy (999,797 acres of public land), shallow (692,941 acres of public land), or gypsum (see Map 2.1 General Soils). Dominant soil surface textures are loams and fine sands. Soil depth classes are mainly shallow (10–20 inches deep) to very deep (greater than 60 inches deep). These soils are generally well drained, low in organic matter, and have a moderate permeability. When undisturbed, soils in the planning area generally are in good condition, capable of producing forage and maintaining watershed integrity and surface water quality.

Based on descriptions from the soil surveys, about 60% of the soils are uneroded or slightly eroded, 30% are slight to moderately eroded, and 10% are moderately to severely eroded. All soils need good management to maintain a vegetative cover adequate to protect them from erosion and all are subject to erosion if the vegetative cover is lost. Once this cover is lost, reclamation potential is low due to high temperatures and undependable rainfall.

Detailed soils information is available from SSURGO for the individual soil surveys within the planning area. These individual soil surveys include the Soil Survey of Eddy Area, New Mexico; the Soil Survey of Lea County, New Mexico; and the Soil Survey of Chaves County, New Mexico, Southern Part. These soil surveys were performed by the NRCS according to National Cooperative Soil Survey (NCSS) standards and policies and procedures, and were conducted at the second and third order of detail. This detailed soils information is used to determine soils suitability and limitations for an applied management action.

2.1.1.3 Trends

Rangeland health assessments indicate that most of the planning area is maintaining long-term soil productivity. In general, reclamation techniques have proven successful after several growing seasons, allowing surface-disturbing activities to continue. Although much of the reclamation success depends on the timing and amount of precipitation, vegetative cover on disturbed sites has improved as a result of limiting the initial disturbance, completing interim reclamation, and following detailed final reclamation plans. No long-term soil impacts have been identified as a result of fire suppression activities or the use of prescribed fire.

2.1.1.4 Forecast

Increased mineral development, recreational activities, and the continued dependence on other natural resources would place an increased demand on public lands and the soil resource. Extraction of minerals generally involves surface-disturbing activities and impacts to soil resources can be long term. Disturbance is associated with activities such as pipeline installation, power line construction, seismic exploration, or exploratory drilling.

Localized impacts on soil resources may develop as a result of livestock grazing, cross-country motorized vehicle use, development of recreation facilities such as trails or campgrounds, development of ROWs, fire suppression activities, and the use of prescribed fire. Livestock grazing can result in a loss of vegetative cover leading to increased soil erosion. Livestock can congregate around water sources, increasing soil compaction and soil disturbance. Fence building or installation of livestock watering facilities can also cause soil disturbance. The use of off-highway vehicles (OHVs) has the potential to damage vegetative cover resulting in soil rutting, concentration of runoff, and increased soil erosion. Building roads, campgrounds, or recreational facilities can result in long-term soil disturbance.

The development of ROWs can include a number of surface-disturbing activities such as road building, trenching, and clearing of construction sites. All of these activities have the potential to create both short- and long-term impacts to soils. Fire results in a temporary removal of vegetative cover and can result in increased soil erosion. The use of vehicles and heavy equipment to suppress wildland fires can create surface disturbance, concentrated surface runoff, and increased soil erosion. The cumulative amount of surface disturbance or vegetative manipulation that can be supported by soils in the planning area has not been determined. A threshold value for disturbance in any given watershed in semiarid regions, such as the planning area, has not been accurately determined. However, it is widely recognized that there is a limit to the amount of disturbance that can accumulate in any watershed before natural flow conditions are significantly affected.

The effects of climate change on the soil resource may be subtle and could be difficult to detect until a change threshold has been crossed. Land uses, particularly those with surface disturbance, when combined with warmer temperatures and changes in rainfall and runoff, and the resulting shifts in vegetative communities, could result in greater impacts to the soil resource. Key Features

Important features of soils in the planning area include soils with low reclamation potential, highly erodible soils, and areas with steep slopes. Successful reclamation efforts are critical in maintaining an effective multiple-use land management program. Nearly all authorizations for surface-disturbing actions are based upon the assumptions that an area can, and ultimately will be, successfully reclaimed. Reclamation suitability criteria are based on soil resilience, which is the inherent ability of the soil to recover from impacts. Areas of low reclamation potential should be identified using the best available data and on-site evaluations. Authorized surface-disturbing activities would be subject to an evaluation to develop mitigation (if necessary), apply best management practices (BMPs), and plan for reclamation. Authorization would be denied for activities on areas where erosion cannot be effectively controlled or mitigated and reclamation to BLM standards is likely to be unsuccessful.

The Southern Gypsum Soil Area comprises about 62,800 acres. These gypsum soils are broken, eroded exposures of gypsiferous rocks and earths or shallow loams over these gypsiferous materials. The organic matter content is low and the vegetative cover is sparse. Runoff is rapid to very rapid, water-holding capacity is very low to low, and plant roots are limited by the salinity and the gypsiferous layer close to the surface. These soils are subject to severe erosion if the vegetative cover is lost.

Open duneland makes up about 3,300 acres of public land. These areas are made up of wind-drifted sands that shift and blow freely. Keeping a good vegetative cover and avoiding surface disturbance are key to preventing active dunes from forming. Once plant cover is lost, revegetation is unlikely due to low rainfall.

The major soil resource concerns in the planning area are wind and water erosion where the ground cover has deteriorated (USDA Agriculture Handbook 296; NRCS 2006a). Wind erosion is the movement

of soil particles due to wind direction and speed, which results in the displacement or loss of topsoil in some areas, increased sediment deposition in other areas, and impacts to ambient air quality from elevated dust levels. Water erosion is the detachment and removal of soil material by water. Impacts to the soil resource from erosion include changing the capacity of the soil to function and restricting its ability to sustain future uses. Soil landscape position, steepness of slope, physical properties (including texture and structure), and chemical properties contribute to susceptibility to wind and water erosion.

Soils in the planning area are susceptible to wind or water erosion, especially once the vegetative cover has been lost. As a result of high summer temperatures, undependable rainfall, low soil fertility, and shallow depth of topsoil, revegetation can be difficult if the native vegetation becomes seriously depleted.

Demands are placed on soil resources through the development of other resources. The most significant regional or national demand placed on soils in the planning area results from the development of fluid and non-fluid mineral resources. Locally, soils are also impacted by a variety of surface uses such as livestock grazing, cross-country motorized vehicle use, development of recreation facilities such as trails or campgrounds, development of ROWs, fire suppression activities, and the use of prescribed fire. Soil disturbance can result from actions such as oil and gas development, mining operations, livestock grazing, fire suppression, prescribed fire, and cross-country motorized vehicle use. The initial disturbance creates the larger impact, while over the long term these disturbance values diminish due to the estimated results of BMPs such as interim reclamation and Restore New Mexico over the life of the plan.

2.1.1.5 Current Management

The 1998 Carlsbad RMP identified the following management actions that are applied to proposed actions through NEPA documents such as environmental assessments (EAs):

- Activities would be managed to maintain soil productivity and minimize erosion.
- Surface-disturbing projects would be analyzed to determine suitability of soils to support and sustain such projects.
- Projects on suitable soils would be designed to minimize soil loss.
- Projects proposed on unsuitable soils may be denied, modified to mitigate soil erosion, or moved to a suitable site.
- Surface-disturbing activities on slopes greater than 30% would be allowed only after considering site-specific conditions and the degree of anticipated disturbance.
- Reclamation of disturbed sites in sensitive areas may include, in addition to standard procedures, the following special procedures, as appropriate:
  - Special site-specific seed mixtures
  - Removal of caliche or other surfacing material
  - Soil amendments, soil treatments, and fertilizers
  - Planting trees and shrubs
  - Mulching
  - Watering
  - Erosion control and land treatments
  - Fencing
  - Special seedbed preparation and seeding methods

The 1997 Carlsbad RMPA also identified management actions that are applied to proposed actions through EAs. These include:

- As a standard practice, ephemeral and perennial drainages and wetland/riparian areas would be avoided as locations for oil- and gas-related facilities, including drilling locations, production facilities, roads, and pipelines.
- Whenever possible, facilities would be confined to existing alignments or locations, minimizing width requirements and maximizing occupancy.
- Revegetation of disturbed areas would be required.
- Reclamation techniques, such as deeper rips, different seed mixtures, mulching, and the application of fertilizer may be used to enhance the reclamation of pits, roads, and pads to provide for maximum groundwater and surface water protection.

- The ripping or removal of caliche from roads and pads could be required to enhance reclamation efforts. Waiver of this requirement would be considered if diligent attempt to revegetate a site have failed and the Authorized Officer determines that further attempts would be futile.
- Unless otherwise authorized, surface use or occupancy would be excluded in the 25,600-acre East Guadalupe Escarpment Habitat Management Area for slopes over 30% or over 20% on extremely erodible soils.
- Surface disturbance would not be allowed on slopes over 30%. Exceptions would be considered for authorized mineral material extractions sites and designated OHV areas, for the installation of projects designed to enhance or protect renewable natural resources, or if a plan of operations and development that provides for adequate mitigation of impacts was approved by the Authorized Officer. Occupancy or use of fragile soils would be considered on a case-by-case basis.

2.1.1.6 Management Opportunities

More specific management could be provided to maintain soil productivity and minimize erosion, including limited pad size to a maximum area and not allowing surface occupancy on gypsum soils or open dunes.

Surface disturbance or development on slopes greater than 20% could be prohibited, unless individual site plans meet requirements such as providing engineered drawings for construction that include site drainage design and final rehabilitation contours with a written rationale describing how the proposed controls would prevent slope failure and erosion, while maintaining viable topsoil for final reclamation. Site plans could be required to include a timeline identifying the actions that would be applied during the construction, production, and rehabilitation phases of the plan so appropriate monitoring protocols could be developed by the BLM to ensure that the plan is meeting the objectives.

Facility locations could be prohibited within 200 meters of ephemeral and perennial drainages and wetland and riparian areas. Roads and pipelines crossing drainages could be required to have mitigations to minimize surface disturbance and reduce or eliminate erosion.

2.1.2 Microbiotic Soil Crusts

Profile

Microbiotic soil crusts (MSCs) are complex living communities. MSCs are diverse and formed by small living organisms and their byproducts, which result in a crust of soil particles bound together by organic materials. MSCs are made up of mats, or filaments, of cyanobacteria (e.g., blue-green algae), lichens, mosses, microfungi, and other bacteria and are located in bare soil spaces between vascular plant communities (BLM 2001b). They are unique and markedly different from chemical and physical crusts, which are inorganic features, such as a salt crust or platy surface crust, and are commonly formed through trampling (compaction). MSCs are very important to the development and maintenance of a healthy ecosystem. They fill previously unknown roles in the environment, such as providing nutrients to plant communities, adding to species diversity of ecosystems, and protecting soil from erosion.

Structurally, MSCs are a rough, uneven “carpet” or “skin” of low stature (0.4–3.9 inches in height). Below ground, root-like structures form a matrix that binds soil particles together (Belnap 1995). Horizontally, soil crusts occupy the nutrient-poor zones between vegetation clumps in many types of arid land vegetation.

MSCs exist in all hot, cool, and cold arid and semiarid regions. They may constitute up to 70% of the living cover in some plant communities (Belnap 1994). In many arid and semiarid communities, there are commonly many more species associated with the MSC at a given site than there are vascular plants (Rosentreter 1986; Ponzetti et al. 1998). The planning area is a warm, low-elevation desert that supports a host of common and rare MSCs.

2.1.2.1 Indicators

Rangeland managers in North America have historically used key indicator plants, such as sideoats, black, and blue grama and various dropseeds, for determining the ecological trend and health of vegetation (USDA 1937; Stoddart et al. 1943) and as indicators of ecological health. More recently, MSCs have also begun to be used as indicators of ecological trend and health of the land, along with indicating abiotic factors, such as the presence of calcareous (calcium carbonate containing) soils. Currently, only the presence or absence of MSCs and general classes, such as lichen, mosses, or cyanobacterial, are being used as indicators. No assessments on the condition of these populations have been conducted.

2.1.2.2 Current Condition

No formal inventory or monitoring system is currently in place. Current conditions for MSCs within the planning area are little known, although some of the permanent rangeland monitoring plots have recorded the presence of these species.

In the loamy, shallow, and gypsum soil areas, where disturbance has been minimal, there seems to be healthy populations of MSCs. Throughout the entire planning area, there are 243,391 acres of loamy soils, 692,941 acres of shallow soils, 156,479 acres of gypsum soils, and 999,797 acres of sandy soils on public lands. Loamy soils average 15% cover, shallow soils about 10%, and gypsum soils have approximately 20% MSC cover. In sandy soils, few crusts have been observed, and those found are generally cyanobacteria. The potential to find MSCs in actively moving, unvegetated sand is low, and there is only a slightly higher potential for them to be found in sandy soils where vegetation cover reduces the movement of sand. This loss of interspacial MSCs could have been a result of natural processes, such as the windblown shifting and deposition of sandy soils that bury and kill MSCs by prohibiting photosynthesis. These losses could have also resulted from disturbance. In areas of MSC loss, trampling during historic livestock grazing and wildlife herd migration along with current day energy exploration and potash development may have resulted in crust compaction or burying. However MSC loss is caused, it leads to reduced soil productivity, decreased plant cover and vigor, and increased wind and water erosion.

Many of the vegetative communities found in the planning area have evolved with the presence of MSCs. The hot, desert climate provides for stable soils, moderate annual precipitation, and many sunny days that would allow for soil temperatures to rarely go below freezing, supporting MSC communities to develop in undisturbed native vegetative communities.

2.1.2.3 Trends

Within the planning area, more inventories are needed to show what areas have MSCs present and monitoring in areas of concern is essential to understanding any population trends. Generally, unlike vascular plants, crustal organisms are not greatly influenced by short-term climatic conditions. However, MSCs, and lichens in particular, respond to environmental factors differently from and on separate, longer time scales than vascular plants (McCune and Antos 1982). This characteristic may make MSCs ideal indicators of long-term ecosystem health, as each community component can provide information that may complement, explain, or indicate something about a site's characteristics and disturbance history.

2.1.2.4 Forecast

While little information exists within the planning area, and most of this is simply noting the presence of MSCs, it is anticipated that as surface-disturbing activities continue, loss of MSCs populations would occur.

As part of the New Mexico Standards for Rangeland Health assessment process, more areas of MSCs are expected to be identified and studied within the planning area. Additionally, unique MSC species and populations could be found as assessment activities continue.

2.1.2.5 Key Features

The Yeso Hills and Seven Rivers Hills areas are two locations, made up mostly of gypsum-based soils, which have unique MSC cover. The Yeso Hills area covers about 7,500 acres of public land and the Seven Rivers Hills area includes about 460 acres of public land. The precipitation, soil composition, and vegetative components in these areas are conducive to forming ideal habitat for crusts. The low soil fertility and lack of organic material create habitat where fewer vascular plants can survive but create a unique opportunity for MSCs to thrive. Where MSCs require significantly less moisture to live, they make up a large portion of the species diversity of these two areas.

Although little data exist about these MSC populations, energy exploration is expanding into these areas. Protecting the integrity of MSCs and minimizing surface disturbance may be critical to keeping these populations intact.

2.1.2.6 Current Management

The 1988 Carlsbad RMP and subsequent amendments did not specifically address MSCs; however, using the general soil management guidance would apply to management of MSCs.

2.1.2.7 Management Opportunities

See management opportunities listed under the Soils section.

2.1.3 Water Resources

Profile

Water resources are typically described by the following four categories: surface water quantity, surface water quality, groundwater quantity, and groundwater quality. In the planning area, the BLM collects some streamflow and water quality data for surface water bodies. At this time, no data are collected for groundwater by the BLM; however, other federal and state agencies have primary responsibility for New Mexico's water quantity and quality data. These agencies include the USGS, the New Mexico Office of the State Engineer (NMOSE), the New Mexico Water Quality Control Commission (NM WQCC), the New Mexico Environment Department (NMED), and the New Mexico Oil Conservation Division (NMOCD). These agencies collect most of the data for water resources.

2.1.3.1 Indicators

The following indicators are used when discussing water quantity and quality.

- Surface Water Quantity: Surface Water Flows and Volume – Each system should have flows and volumes appropriate to meet its beneficial uses, such as irrigation, recreation, or wildlife habitat.
- Surface Water Quality: Listing of a reach as impaired under the Clean Water Act (CWA) Section 303(d). The goal of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 United States Code [USC] 1251(a)). Under Section 303(d) of the CWA, states are required to develop lists of impaired waters. The term "303(d) list" is short for the list of impaired and threatened waters (e.g., stream/river segments, lakes) that all states are required to submit for EPA approval during even-numbered years.
- Groundwater Quantity: Groundwater Elevations and Well Capacities – Natural fluctuations in groundwater elevations are normal from year to year and with seasonal use; however, long-term downward trends in groundwater indicate overuse and negatively affect groundwater quantity. As the amount of water available in a given well (well capacity) decreases, it can also indicate that overall usable groundwater quantity is diminishing.
- Groundwater Quality: Although groundwater quality varies naturally throughout the planning area, certain uses of groundwater, such as agriculture and mining, can artificially increase concentrations of nitrates or salt. Disposal of produced water via injection wells have the potential

to diminish groundwater quality through equipment failures or other means if the produced water is mingled with usable natural groundwater. Groundwater quality is important because it is the main source of water by municipalities, private homes, and ranchers in the planning area.

2.1.3.2 Current Condition

Surface Water Quantity

The planning area contains a variety of surface waters, from springs and seeps to lakes, playas, rivers, and ephemeral drainages and draws. There are approximately 273 miles of streams and rivers, 75 springs, 901 acres of lakes, and 62,058 acres of playas in the planning area. The CFO manages lands in 12 watersheds, shown by the hydrologic unit codes (HUCs) in Table 2.1-1 and Map 2.2 Hydrologic Subbasins and Riparian Areas. Four major streams or rivers are within the planning area (Table 2.1-2), and three major lakes are surrounded by BLM-managed lands (Table 2.1-3). Waters from spring developments, reservoirs or streams, and stream diversions within the planning area are used primarily for irrigation, livestock, and wildlife. No surface waters used for domestic purposes originate on BLM-managed land. Diversions on BLM-managed lands support private land crop irrigation and stock water needs. The BLM does not maintain records of streamflow in the area; however, the USGS maintains 20 streamflow gages in the planning area. The names of the sites are listed in Table 2.1-4. Nine gages are positioned on the Pecos River, two are located on the Black River, and one is on the Delaware River. The other eight stations are located on springs, tributaries to the Pecos River, and irrigation diversions from the Pecos River. An example hydrograph from the USGS streamflow data is shown in Figure 2.1-1.

Table 2.1-1. Watersheds in the Planning Area

Watershed Name	Watershed Hydrologic Unit Code
Rio Felix	13060009
Upper Pecos - Long Arroyo	13060007
Rio Peñasco	13060010
Upper Pecos - Black	13060011
Salt Basin	13060004
Delaware	13060002
Lower Pecos - Red Bluff Reservoir	13070001
Landruth - Monument Draws	13070007
Monument - Seminole Draws	12080003
Mustang Draw	12080004
Sulfur Springs Draw	12080006
Lost Draw - Yellow House Draw	12080001

Table 2.1-2. Major Streams and Rivers in the Planning Area

Name	Miles (BLM-managed lands)
Pecos River	28
Black River	4.5
Delaware River	9.0
Rio Peñasco	4.4

Table 2.1-3. Major Lakes Bordering the Planning Area

Name	Acres
Avalon Reservoir	498
Red Bluff Reservoir	400
Conoco Lake	3

Table 2.1-4. USGS Streamflow Gages in the Planning Area

Site Name	Site Number
Pecos River near Artesia, NM	08396500
Rio Peñasco at Dayton, NM	08398500

Site Name	Site Number
Pecos River (Kaiser Channel) near Lakewood, NM	08399500
Fourmile Draw near Lakewood, NM	08400000
South Seven Rivers near Lakewood, NM	08401200
Pecos River below Brantley Dam, NM	08401500
Rocky Arroyo at Hwy BRD near Carlsbad, NM	08401900
Pecos River at Damsite 3 near Carlsbad, NM	08402000
Carlsbad Main Canal at Head near Carlsbad, NM	08403500
Pecos River below Avalon Dam, NM	08404000
Dark Canyon Draw near Whites City, NM	08405105
Dark Canyon at Carlsbad, NM	08405150
Pecos River below Dark Canyon at Carlsbad, NM	08405200
Blue Springs above Diversions near Whites City, NM	08405450
Black River above Malaga, NM	08405500
Black River at Malaga, NM	08406000
Pecos River near Malaga, NM	08406500
Pecos River at Pierce Canyon Crossing, NM	08407000
Pecos River at Red Bluff, NM	08407500
Delaware River near Red Bluff, NM	08408500

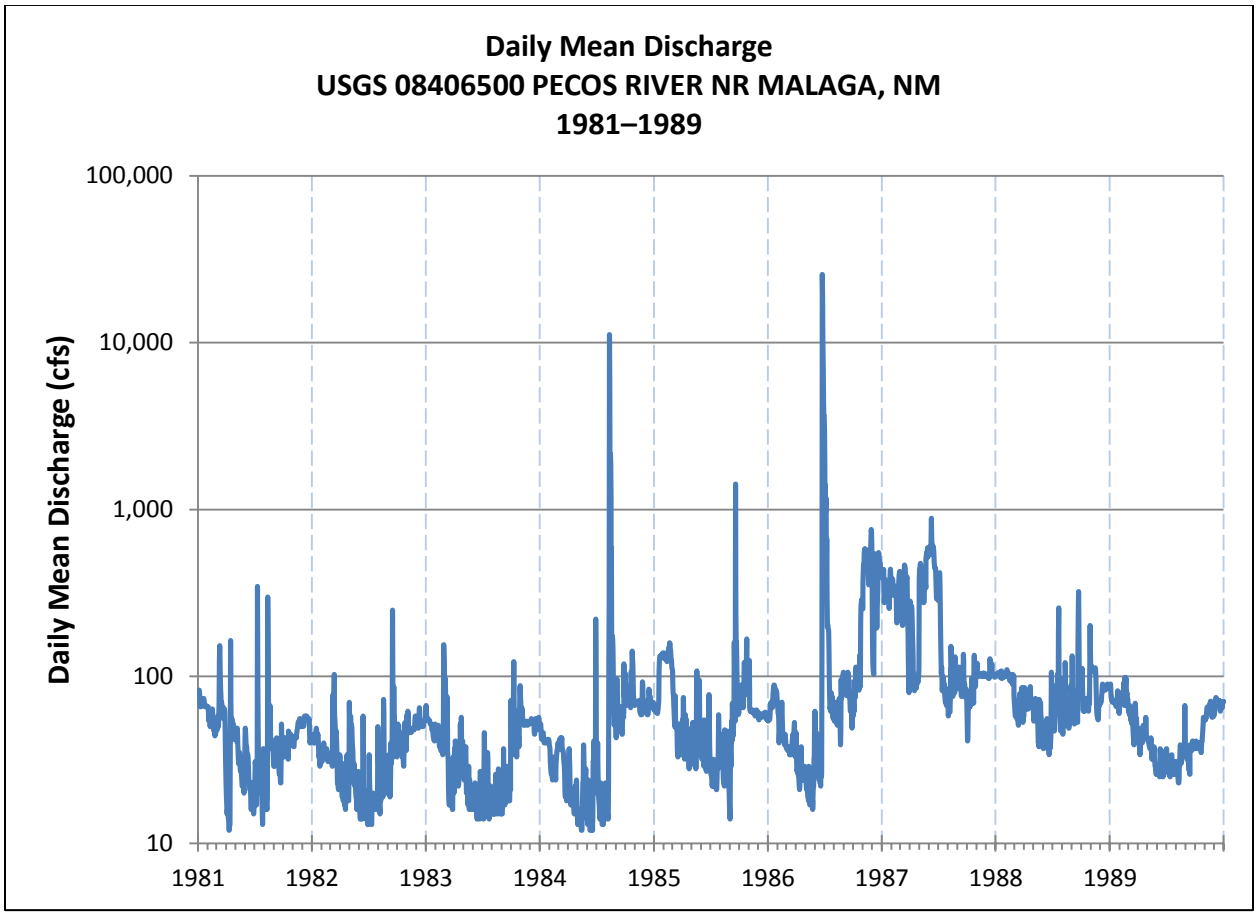

Figure 2.1-1. Example of a Hydrograph from USGS Streamflow Data

Other surface waters found on BLM-managed lands include shoreline and open water habitat on lakes, reservoirs, ponds, and playas. Some of these are seasonally dry and others are fed by regional

groundwater flows. Within the planning area, streams and other surface waters are found within a wide variety of elevations, topographic settings, and landscapes. Several rivers and other surface water features in the area are created or affected by the karst terrain underlying the region. Karst terrain develops when underground soluble rocks are dissolved, resulting in topographic and subsurface solution features.

The majority of the perennial rivers in the planning area were developed by a dam and reservoir, irrigation diversions, or a combination of these. Stream and river conditions vary widely, from completely undisturbed river and vegetative communities in the mountainous highlands, to deep, erodible soil banks at lower elevations where livestock, recreationists, and other public users have access to stream and riverbanks.

Regionally, large volumes of water in reservoir storage and irrigation distributions are available within the planning area. According to the NMOSE, over 84,000 acre-feet of surface water in Eddy County and 135,371 acre-feet in Lea County were diverted for irrigation in 2005. The southwest portion of Chaves County in the planning area uses the Peñasco River for irrigation, but since the NMOSE reports statistics by county, a value for that area alone is not readily available. Recharge to the planning area's largest groundwater source, the Capitan Aquifer, results in part from seepage of surface water used for irrigation and stream and canal losses. However, the loss of water to the atmosphere is high because of high rates of evaporation on surface waters and high transpiration rates in adjacent riparian areas. The NMOSE estimates 19.5% of the surface water budget for Eddy County is lost to evaporation.

Surface Water Quality

Water quality in streams flowing on BLM-managed land is influenced by both natural water quality with regard to salinity content and the intensity of human and industrial activity in the watershed. For example, water quality may be vastly different in a remote mountain spring creek than in waters with natural brine discharge, or where there are human impacts due to urban, farming, ranching, or industrial activity. Chemistry samples of surface water in the planning region are needed in order to establish a baseline chemistry data for the waters. Variances in baseline chemistry can indicate water quality changes attributable to land use development.

The dominant legislation affecting national water quality and BLM compliance with New Mexico water quality requirements is the CWA or Federal Water Pollution Control Act. The primary goal of the CWA is to restore and maintain the chemical, physical, and biological integrity of national waters. The CWA includes the Federal Facilities Pollution Control section, which states that all federal agencies shall comply with all federal, state, and local water quality and environmental requirements. Currently, the most significant water quality requirements affecting the BLM's land management activities comes from the water quality standards and implementation plans section (also known as Section 303[d]) of the CWA, and U.S. Environmental Protection Agency (EPA) regulations (130.2 [J], 130.740 [40 CFR 130 et seq.]) where individual states were given authority to determine which waters do not meet water quality standards or have impaired beneficial uses. These waters are commonly referred to as water quality limited or 303(d)-listed streams. Section 303(d) also requires states to determine total maximum daily loads (TMDLs) for their 303(d)-listed streams. The TMDL determination process requires coordination of federal, state, and private entities, through watershed area groups, to work on sub-basin assessments for each HUC, analyze the pollutant load for each listed stream, and allocate a maximum load of each pollutant to that stream. Once complete, the TMDL determination affects federal agencies through subsequent HUC-specific implementation plans, which define how land management agencies would reduce pollutant inputs to the listed streams.

Within the planning area, TMDL determinations are not in place for any of the watersheds with 303(d)-listed streams. The most common pollutants for waters in the planning area are sediment and mercury. Beneficial uses listed for these waters are industrial water supply, irrigation storage, livestock watering, recreation, warm water fishery, and wildlife habitat.

The CFO manages about 30.3 miles of stream banks of the 2008 Section 303(d)-listed streams, which is approximately 66% of the 45.9 total miles of Section 303(d)-listed streams in the planning area. Table

2.1-5 lists the 2008 303(d)-listed streams in the planning area and their pollutants; Table 2.1-6 lists the Section 303(d)-listed lakes and their pollutants. Avalon Reservoir is the only lake completely surrounded by BLM-managed lands. Map 2.2 in Appendix A displays these streams and the watersheds in the planning area.

Table 2.1-5. Section 303(d)-Listed Water Quality-Limited Streams and Their Pollutants in the Planning Area

Watershed/ HUC	Water Body	Reach	Pollutant	Total (miles)	BLM Length (miles)
Upper Pecos-Black/ 13060011	Pecos River	Brantley Lake to Rio Peñasco	PCBs in fish tissue, DDT	13.5	0
		Black River to Tansil Lake	PCBs in fish tissue	19.2	5.3
		TX Border to Black River	PCBs	30.2	20.6
Rio Peñasco/ 13060010	Aqua Chiquita	Headwaters to Rio Peñasco	Benthic macroinvertebrates macroassessments	13	0
	Rio Peñasco	Headwaters to Hwy 24	Sedimentation	45.7	0
		Hwy 24 to Pecos River	Sedimentation	63.7	4.4

PCB = polychlorinated biphenyl; DDT – dichlorodiphenyltrichloroethane.

Table 2.1-6. Section 303(d)-Listed Water Quality-Limited Lakes and Their Pollutants in the Planning Area

Watershed/HUC	Water Body	Pollutant	Total (acres)	BLM-area
Upper Pecos-Black/ 13060011	Brantley Reservoir	Mercury in fish tissue	3059	0
	Avalon Reservoir	Mercury in fish tissue	498	498
	Lower Tansil Lake	Mercury in fish tissue, PCBs in Fish Tissue	136	0

PCB = polychlorinated biphenyl.

Groundwater Quantity

Groundwater in the planning area exists in shallow, unconsolidated sediment along streams and valleys, as well as in deeper limestone and alluvial sediments. Groundwater flow under BLM-managed lands is generally toward the Pecos River, which flows through the central part of Eddy County. The main source for municipal water supply in the planning area is groundwater. The main aquifers used in the area are the Capitan Aquifer, a limestone reef complex that forms the northern border of the Delaware Basin; the Ogallala Aquifer, a buried ancient alluvial fan in the High Plains region; and, to a lesser extent, the groundwater from the Rustler, Dewey Lake, and Santa Rosa formations that are used for ranching and industry in the lesser-populated areas of the Delaware Basin area.

Groundwater levels typically rise and fall annually in response to precipitation, recharge, and pumping. Across the Delaware Basin, water levels are usually highest from October to March and lowest in July and August where areas are irrigated with groundwater. As shown in Figure 2.1-2, groundwater data in the only well monitored in real-time by the USGS in Eddy County from 1963 to 2010 show annual water level fluctuations ranging about 15 feet. Recharge to the aquifer from average annual precipitation over the regional groundwater system was estimated to be less than 1% of precipitation due in part to high rates of water evaporation and plant transpiration, which is the loss of water vapor through leaves and pores. The groundwater system is recharged from infiltration of precipitation and from leakage into the aquifer from rivers, streams, and associated irrigation canals and ditches. It is not unusual for surface flows in the planning area to either evaporate or infiltrate completely into the ground, not reaching a larger stream such as the Pecos River.

Important areas of recharge to the aquifers include playas, sinkholes, caves, and other karst features. Karst terrain covers over one million acres of the planning area, encompassing almost one-third of its area. Buried caliche layers can prevent precipitation from directly penetrating into buried aquifers, even after infiltrating the vadose zone. However, the karst features in the area provide a direct conduit, through the caliche layers, to allow recharge into the aquifers.

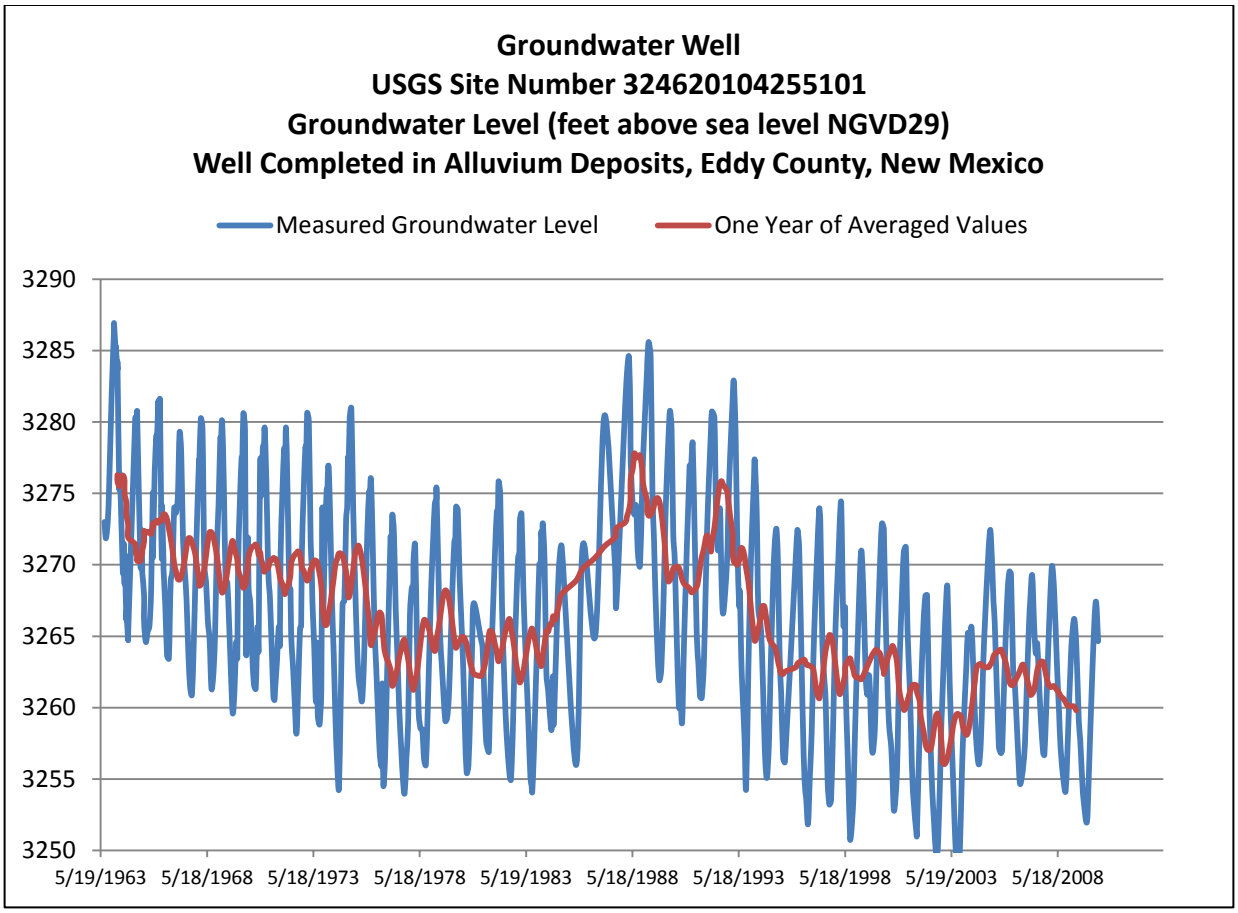

Figure 2.1-2. Measured Groundwater Levels in Eddy County from 1963 to 2010

Aquifer discharge consists largely of spring flows throughout the region, surface flow contributions to rivers, and well pumping.

The Capitan Aquifer is the main source of drinking water for Carlsbad and is shown along with the Ogallala Aquifer on Map 2.3 Regional Aquifers in Appendix A. The Capitan Aquifer is a karst aquifer and is capable of providing large quantities of fresh water. Currently a Wellhead Protection Program[1] is located southwest of Carlsbad, near the foothills of the Guadalupe Mountains in Sheep Draw, although the entire Guadalupe Mountain complex is recognized as the recharge area for this aquifer. Transmissivity is the term used to quantify the flow of water through an aquifer. The Capitan Aquifer has transmissivities that have been measured averaging 0.0624 square feet per second (Gates et al. 1980) and as high as 0.1872 square feet per second (Reed 1965).

The Ogallala Aquifer is the leading aquifer in the High Plains aquifer system and is used by Lea County as its primary source of drinking water. It is an unconfined aquifer made up of alluvial sediments. All recharge comes from precipitation that falls over the aquifer's area and recharge rates vary by precipitation rates, soil type, and type and amount of vegetation. Average rates of recharge for the High Plains aquifer system are less than 1 inch per year. This aquifer is at risk of being depleted from overuse. Results of investigations by the NMOSE report that groundwater levels have dropped in this aquifer as much as 97 feet from predevelopment levels (1914–1954). Rates of depletion have been calculated to be as much as 0.88 feet per year (Tillary 2008).

[1] The National Wellhead Protection Program (WHPP) was established by the Safe Drinking Water Act in 1986. It mandated that states develop WHPPs to protect groundwater supplies from contamination.

Less is known about the groundwater found in the Rustler, Dewey Lake, and Santa Rosa formations in the planning area. The usable groundwater in these formations is found mainly in discontinuous channel sands scattered throughout the sparsely populated portions of Eddy and Lea Counties. Use of this source of groundwater is mainly for stock watering, although industrial use of this water has been proposed and is currently being evaluated. The extent and quality of the Rustler, Dewey Lake, and Santa Rosa formations are still being explored, though it is known that these aquifers are less continuous, have smaller yields, and exhibit varying water quality compared to the Capitan and Ogallala Aquifers. The CFO is currently overseeing studies of these waters in Lea County.

The CFO does not currently monitor groundwater levels in the planning area, nor does it perform pump tests to measure regional aquifer properties or individual well production. In 2011, some shallow groundwater monitoring wells were installed along the Pecos and Delaware Rivers to further delineate surface water and groundwater relationships. There are a few wells on BLM-managed lands used for stock watering purposes. Currently, a GIS database of groundwater elevations is being developed using USGS water level information in Eddy, Curry, and Lea Counties. Some of the wells in this database have multiple measurements through time, which would be helpful in establishing baseline groundwater elevation data and forecasting groundwater level trends in the aquifers. However, many land management practices employed by the BLM are geared to reduce erosion and stimulate ground cover growth, both of which help aquifer recharge by increasing infiltration and decreasing overland flow and flooding.

Groundwater Quality

Groundwater quality on BLM-managed lands throughout most of the planning area is variable. Some of this variability is due to groundwater salinity from the dissolution of rocks. Chemistry data on groundwater can be found in scientific literature, in state water resource planning documents, and at local water treatment facilities. The main water quality issues, besides natural variability, are due to historical and modern industrial development of oil and gas wells and potash mining that have accidently or purposefully discharged brine or supersaturated industrial wastewater directly or indirectly into the groundwater. Irrigated agriculture in the CFO area is also a concern for groundwater quality, because the irrigated water can return to recharge the groundwater carrying dissolved nitrates from fertilizer or salt from overlying soil. Over time, these increases in salt and nitrates can diminish groundwater quality.

2.1.3.3 Trends

Surface Water Quantity

Streamflow and lake volumes can vary based on climatic conditions (wet and dry cycles), upstream surface water diversions, and groundwater pumping that induces surface water leakage. In general, recent drought cycles have resulted in stream flows that are below historical averages. Overall, the current trend in surface water quantity is a slight reduction in flow resulting primarily from both drought cycles common to the southwestern United States.

Historical practices such as overgrazing have also affected surface water quantity. The vegetation in the watersheds changed from primarily grasslands prior to cattle grazing in the late 1800s to primarily woody shrubs such as mesquite and creosotebush in the present. This change in vegetation has led to more surface runoff from rainfall and less infiltration to groundwater. In turn, this has resulted in more flash flooding and surface water declines. As the science of healthy watersheds is studied and hydrological processes are better understood and defined through scientific research, current land management practices that restore grasslands and healthy watersheds positively affect surface water flows. Many acres adjacent to the Delaware River have been chemically treated to favor grasslands, and since that time, flows in the Delaware River have been restored and also increased.

Surface Water Quality

Identifying a trend for changes in listed 303(d) streams is difficult due to limited existing data on these waters. This lack of information is limiting the ability to predict changes in trends due to site-specific impacts of unknown future actions.

Groundwater Quantity

Over the region, groundwater elevations have declined with use as a result of urban population growth, industrial uses, and increased groundwater use for irrigation. Water use from the aquifers exceeds recharge rates, which is leading to groundwater-level declines. The rates of decline vary depending on the aquifer. Since 1963, 43 years of data collection on the alluvium well in Eddy County by the USGS shows a 10-foot decline in water levels (USGS 2012). The city of Hobbs in Lea County has had significant declines in its water supply, the Ogallala Aquifer (USGS 2012).

Groundwater Quality

The CFO has not directly investigated groundwater quality in this area. In general, groundwater quality is vulnerable to pollution, whether it is an unconfined aquifer or a confined aquifer, because of the widespread karst terrain in the region. Water and pollutants can travel significant distances in short periods of time and are very difficult to clean up once released into the environment. More study is needed to ascertain travel paths and times in these unique karst regions, especially where industry is developing in sensitive areas.

2.1.3.4 Forecast

Surface Water Quantity

Since surface water flow relies primarily on daily precipitation events for short-term flow increases and on cumulative seasonal precipitation for longer-term sustained flows, a slight decrease in streamflows and surface water volumes is likely in the near future based on continued regional weather patterns of declining precipitation.

Surface Water Quality

Although not enough data have been gathered at this time to establish a trend for surface water quality, past and present riparian-wetland exclosure and pasture projects, better road maintenance, reassessment of grazing allotments through the Standards and Guidelines (via Rangeland Health Evaluation Summary Worksheets), and necessary grazing management changes (e.g., adjusting livestock numbers and season of use) has improved riparian functioning condition. However, even when riparian-wetland vegetation responds and improves habitat values, a longer time frame is usually required before stable and covered stream banks are realized and water quality is improved, particularly with regard to water temperatures. Even with improved stream bank condition and reduced pollutant loading on BLM-managed reaches, other land uses upstream along mixed ownerships can continue to impair beneficial uses. Overall, continued improvements in surface water quality parameters are predicted as riparian functioning condition, streambank stability, and grassland restoration continue to improve.

Groundwater Quantity

Groundwater elevations would likely continue to decline in areas of past elevation reductions and remain static in most of the highly remote wells. If increased irrigation or industrial wells and pumping are allowed, or other groundwater withdrawals are made, groundwater elevations in wells would likely exhibit reductions in water levels.

Groundwater Quality

Groundwater quality over the planning area is dependent on responsible industrial practices in the oil and gas and potash industries and responsible urban development. Water quality safeguards in these industries continue to improve, but need continuous revision as technologies change and improved safety practices are developed.

2.1.3.5 Key Features

The primary aquifer for the planning area is the Capitan Aquifer (842,351 acres). The planning area also includes portions of the Roswell Basin aquifer system, and the High Plains aquifer system, which include

the Ogallala Aquifer, which all provide drinking water for the municipalities in the area. These local aquifers also provide water sources for irrigation, livestock, and industry. Table 2.1-7 lists the amount of declared groundwater in acres by water basin.

Table 2.1-7. CFO Underground Water Basins Declared Groundwater

Water Basin	Acre/ft.
Capitan	1,009,231
Carlsbad	1,526,312
Lea County	1,715,397
Jal	9,364
Peñasco	135,212
Roswell	1,775,254

Source: NMOSE (2012).

Water Rights

New Mexico's water law, managed by the NMOSE, is based on the doctrine of prior appropriation or "first in time, first in right." All waters in New Mexico are declared to be public and subject to appropriation for beneficial use. In order to satisfy delivery obligations under the Pecos River Compact, New Mexico purchases water rights from appropriators on the Pecos River. The purchased water, instead of being used for irrigation, is allowed to flow downstream into Texas.

2.1.3.6 Current Management

The 1998 Carlsbad RMP identified the following management actions that are applied to proposed actions through NEPA documents such as EAs:

- Water quality would be maintained or improved in accordance with applicable state and federal pollution control laws and regulations. Federal laws include the CWA, Executive Order (EO) 11752 (December 1973), and EO 11988 (May 1977). Requirements include consultation with state agencies on proposed projects that could significantly affect water quality.
- Flood hazards would be evaluated in planning for facilities, land disposals, and other proposals to reduce the risks of flood loss. If there are suitable alternatives, floodplain sites would be avoided (BLM Manual 7221, Floodplain Management EO 11988, CWA, Public Law [PL] 95-217, 33 USC 466). Construction activities in rivers, wetlands, or streams require a Section 404 permit from the U.S. Army Corps of Engineers.
- Water rights would continue to be acquired or perfected as necessary to carry out public land management through state law and administrative claim procedures, except as otherwise specifically mandated by Congress.

The 1997 Carlsbad RMPA also identified management actions that are applied to proposed actions through EAs. These include:

- As a standard practice, ephemeral and perennial drainages and wetland/riparian areas would be avoided as locations for oil and gas related facilities, including drilling locations, production facilities, roads, and pipelines.
- Whenever possible, facilities would be confined to existing alignments or locations, minimizing width requirements and maximizing multiple occupancy.
- Produced water disposal pits on public lands would not be allowed west of the Pecos River. Additionally, these pits would not be allowed within up to 200 meters of 100-year floodplains, drainages, playas, water wells, or springs throughout the planning area. In all other areas of the planning area, disposal of produced water in lined pits may be permitted on public lands. Produced water disposal would be managed in accordance with Onshore Oil and Gas Order No. 7.
- Various oil and gas development activities have occurred within the watershed of these lakes, which encompasses approximately 22,000 acres. These activities have included 130 acres of disturbance for well pad development and approximately 160 acres for road, pipeline, and power line development. Standard operating procedures, Conditions of Approval (COAs), and/or

stipulations have kept federal wells and most pipelines out of any and all drainage systems that feed into the salt lakes. However, some roads cross the drainage systems, including Eddy County Road 793, which runs parallel to the Salt Lake approximately 3 miles to the east. Additional roads and pipelines run from well pad to well pad. No information or data are available on the amount of sediment entering these lakes from the associated watershed.

- The Carlsbad Resource Area (CRA) Wetland-Riparian Habitat Management Plan (HMP) prescribes various management approaches for all riparian areas within the planning area. This includes those portions of the Pecos River administered by the BLM. Management along these portions of the river includes livestock adjustments, fencing, and oil and gas leasing stipulations. These management approaches are not strictly focused on bald eagle management, but on overall riparian area management. Livestock adjustments occur based on Allotment Management Plans (AMP)/Carlsbad RMP development and subsequent implementation of grazing systems, which are prescribed within that plan. For instance, Allotments 7031 and 7036, which are Pecos River allotments, have implemented prescribed grazing systems including deferred rotation and seasonal grazing respectively. Allotment 8097 has yearlong grazing occurring thus, portions of the Pecos River on that allotment have been fenced to exclude livestock. Six of the other seven allotments associated with the Pecos River contain scattered parcels of BLM-administered land, which makes any management less effective due to the continued impacts on the adjoining private and/or state land. Refer to the "Grazing Program" section, and the "Riparian Habitat" section of the 1997 RMPA for further baseline information on the Pecos River.
- On oil and gas leases issued since 1988 that are along the Pecos River, are in somewhat close proximity to the river, or are within a drainage leading to the river, a No Surface Occupancy (NSO) stipulation is attached. For leases issued prior to 1988 or leases held by a producing well, moving away from the river or drainage system is authorized through 43 CFR 3101.1-2, which allows for a 200-meter offset or 60-day delay for development and/or drilling. Since 1989, the BLM has not authorized any wells within drainages leading to the Pecos River or within the floodplain of the Pecos.
- Blue Spring, which contains the only Carlsbad Resource Area population, is currently protected by an NSO lease stipulation, which alleviates potential negative impacts to the species from oil and gas development. The surface surrounding Blue Spring is under private ownership and only the mineral estate is administered by the BLM; thus, the BLM has no authority for the grazing management and/or other resource management.
- Currently, the three known populations of gypsum wild-buckwheat [*Eriogonum gypsophilum*]) are protected from oil and gas development through leasing stipulations such as NSO and management direction for Ben Slaughter Spring, which is outlined in the Wetland-Riparian HMP developed in 1989. All population locations are also closed to OHV activity as designated through the RMP, and are designated as either critical or essential habitat.
- In 1991, the BLM acquired a 3-mile stretch of the upper Black River in Eddy County. This area has been designated a Special Management Area (SMA) with protective measures and management techniques focused on riparian habitat maintenance and protection, including no livestock grazing.
- Within the planning area designated critical habitat for the Pecos bluntnose shiner (*Notropis simus pecosensis*) occurs from the Chaves/Eddy County line to the Avalon Reservoir just north of Carlsbad. Along this stretch of the Pecos River, approximately 2 miles of river bank are administered by the BLM, and it has been designated as an SMA with an NSO stipulation tied to oil and gas leasing. Management on this small stretch of the Pecos River is negligible compared to the entire length of the critical habitat. Oil and gas wells administered by the BLM that are not directly associated with the river (no NSO stipulation), but could potentially affect the river (e.g., development in drainages leading to the Pecos River) are dealt with on a case by case basis.

The following actions from the 1997 RMPA were completed:

- The Delaware River is currently being acquired through a land exchange. This area is located on the New Mexico/Texas state line and contains a good representation of native riparian vegetation. Two grazing allotments are associated with this area, and grazing is not allocated on any portion

of the river within either of these allotments. Officially, grazing would be excluded once the acquisition is complete, a plan is developed, and the prescribed fence is built.

2.1.3.7 Management Opportunities

Currently erosion and sedimentation effects to surface water features are mitigated by controlling proximity to water features and managing erosion on-site with berms. However, more mitigation could be enforced on access roads to these facilities. Better enforcement of proper road construction and maintenance of new roads and older roads heavily trafficked by oil and gas companies should be considered, since many of these roads have erosion gullies forming on the edges, which engenders increased erosion and sedimentation rates, impacting water quality.

Infrastructure could be required to be placed a minimum of 200 meters away from ephemeral and perennial drainages and wetland/riparian areas.

Road and pipeline crossings could be allowed to cross drainages with mitigations to minimize surface disturbance, reduce or eliminate erosion, and protect these areas. Surface pipelines could be prohibited from crossing drainages unless they carry fresh water.

The Delaware River is prone to flashflood events that damage fences that are meant to protect it from cattle on both sides of the state line. Fences in the floodplain may need to be either moved or checked frequently after flood events. Flood events can be remotely monitored using the USGS website that provides real-time data of flow on the river where it crosses Highway 285.

Vehicle traffic in the riparian areas could be eliminated entirely on the Delaware River. There are roads to the river and traffic is able to drive across the shallow gravelly parts of the river. This impacts water quality by damaging stream banks, exposing the river to oil and grease, and increasing sedimentation in the river. If grazing and vehicle traffic is eliminated entirely from the riparian areas on the Delaware River, riparian health and water quality would increase.

Fenced riparian areas that are known to be susceptible to damage should be regularly checked on a frequent enough basis that ensures protection of the riparian resource.

The BLM could consider a buffer for controlled burning in or near the floodplain with the purpose of protecting the water resource from excessive sedimentation from bare ground. If a buffer of 30 to 50 feet is used, that vegetation could slow down or stop unchecked sediment from burned areas if precipitation events occur before the vegetation grows back.

Saltcedar (*Tamarix* sp.) sprouts occasionally return after major removal efforts. Along the portions of the Pecos River where saltcedar has been removed, native vegetation has mixed success in reclaiming the banks. Increased seeding efforts with willows (*Salix* sp.), cottonwoods (*Populus* sp.), or even alkali sacaton (*Sporobolus airoides*) grass could help areas that seem to have limited success recovering desirable vegetation.

Karst areas could be more clearly defined and recognized as a fragile landscape and specific protection measures developed for activities that may cause adverse impacts to groundwater recharge quality and quality.

2.1.4 Karst Resources

Profile

Karst is a landform produced by the dissolution of soluble rock types such as limestone, dolomite, marble, gypsum, or salt. Features often associated with karst terrains include sinkholes or closed depressions, caves, dry valleys, sinking streams, and resurgences or springs. Karst resources affect other resources such as groundwater hydrologic systems and biological communities. Groundwater recharge in karst

areas often occurs rapidly as surface water enters karst features and is quickly transported through open conduits to either shallow or deep aquifers. This water can then remain underground or emerge back to the surface in springs, seeps, or wells resulting in riparian areas or sources of water for domestic livestock.

The planning area includes over one million acres of karst terrain. This acreage is nearly equally divided between gypsum and limestone karst. Many significant limestone karst features such as sinkholes, fractures, and fissures, as well as unique geological features including extensive systems of joints and lineaments, indicate that many more cave systems exist with no currently known extensions to the surface under BLM lands. The Capitan Aquifer, the main domestic water source for the city of Carlsbad, is recharged primarily via the cave and karst features located in the Guadalupe Mountains.

Gypsum karst, primarily found north, east, and southeast of the cities of Carlsbad and Artesia, contains the longest gypsum cave systems on federal lands in the United States. The karst features within these areas are responsible for the rapid recharge of several widespread shallow freshwater aquifers and springs. These water sources are used both by rural ranching communities and by wildlife.

These caves and karst features, like their limestone counterparts, provide habitat that supports a very diverse ecosystem. Several cave-adapted species are found within gypsum caves, as well as in the riparian areas created by cave waters resurging onto the surface.

A cave is defined as any naturally occurring void, cavity, recess, or system of interconnected passages occurring beneath the surface of the Earth large enough to permit an individual to enter, whether or not the entrance is naturally formed or human-made (Federal Cave Resources Protection Act of 1988 [FCRPA], 16 USC 63 § 4301 et seq.). A cave resource is any resource occurring within a cave. Cave resources can be biological, geological, mineralogical, paleontological, cultural, hydrologic, or another attribute specific to a certain cave.

Caves are complex because they are associated with many values such as cultural, geologic, paleontological, and recreation. Caves are also extremely sensitive ecosystems due to the delicate balance between the cave-adapted biological communities and the influences from the surface. Additionally, subterranean ecosystems require a great length of time to respond to changes in their condition.

The limestone karst regions west and southwest of the city of Carlsbad are known worldwide for their cave resources. Once a living reef on the edge of an old and stormy inland sea, the Guadalupe Mountains are home to over 500 known limestone caves ranging from a few feet long up to 130 miles of surveyed passage in length and up to 1,600 feet in depth. Around 50 limestone caves are intensively managed by the CFO. Many of these caves occur in clusters, such as on McKittrick Hill, where there are 12 known caves in roughly 2 square miles of land. Several of these cave areas comprise SMAs or Research Natural Areas (RNAs), or are within Wilderness Study Areas (WSAs). Carlsbad Caverns National Park, home to over 115 known caves, including Carlsbad Cavern and Lechuguilla Cave, is bordered by BLM-managed lands.

2.1.4.1 Indicators

The following indicators are used to determine the condition of karst resources:

- **Quality and quantity of associated groundwater:** Measurements in both quantity and quality of water within caves, at cave resurgences, and at springs and wells within karst areas help assess impacts of surface and subsurface activities on cave environments. These impacts can include change in surface flow patterns that increase or decrease subsurface flow, introduction or remediation of contaminants, and changes to natural recharge of karst aquifers.
- **Health of associated riparian areas:** Since many riparian areas in the planning area are results of karst groundwater discharge, the overall health of these riparian areas can be indicators of the current conditions of their associated karst system.

The following indicators are used to determine the condition of caves:

- **Human visitation of the cave:** Visual inspection of caves, when combined with results of past inspections, can be used to determine both subtle and significant changes within a cave environment. The most effective means of visual inspection combined with documentation is photo monitoring. Photo monitoring of specific cave resources and areas within caves allow observation of several indicators over time. Some indicators of level and type of human visitation include change in width and intensity of designated trails, broken speleothems, modifications of cave passages, presence of human-influenced materials such as trash or mold, and disturbances to cultural or paleontological resources found within caves. The presence, intensity, or absence of certain bacteria usually associated with the presence of humans can be an indicator of the impact of human visitation on a cave's microbiota in certain areas.
- **Health of biological communities:** Monitoring of cave biology can help determine trends for both the health of the cave ecosystem itself and the environment immediately around it. Two communities of interest are bats and invertebrates. Both bats and cave invertebrates are sensitive to disturbances and therefore provide a good indicator of changes within a cave environment. Bat population monitoring, for example, can indicate that management activities such as cave gate design, visitor use and seasonal closures, or surface use around a cave entrance may need to be adjusted.

2.1.4.2 Current Condition

The planning area contains 1,017 documented cave features. Prior to the mid-1970s, the majority of the caves were recognized, explored, surveyed, and studied by various caving enthusiasts belonging to a variety of grottos, or caving clubs, organized under the National Speleological Society. Three caves had been visited by Euro-Americans since the late 1800s. Several of the caves on McKittrick Hill were subject to early mining claims for the purpose of harvesting speleothems to sell as curios at nearby White's City. As a result of these activities, three major caves sustained heavy vandalism prior to the creation of the BLM, and certainly before the BLM's recognition of the need for protection of cave resources.

Calm post-development environments have allowed for most of the limestone caves to develop extensive speleothem (cave formation) displays. The spectrum and variety of speleothems is immense. Massive 100-foot-tall column formations are present, as well as delicate selenite needle formations as thin as a human hair and sometimes several feet long. The aesthetic value associated with these speleothems draws cavers from all over the world to explore wild caves, as well as thousands of tourists who come to visit the speleothem-filled chambers of Carlsbad Caverns National Park. Current conditions of speleothems within CFO caves are mostly linked to a cave's discovery date or remoteness. Recently discovered caves (within the last 30 years) were quickly gated and managed to protect their sensitive resources. These caves remain relatively pristine with few broken or missing speleothems. Remote caves, such as those located in CFO WSAs also fit into this category. More accessible caves that have been well known for some time have suffered heavy vandalism in terms of speleothem breakage.

Parks Ranch Cave is the most well-known gypsum cave in the planning area. It falls within the Chosa Draw Area of Critical Environmental Concern (ACEC) south of White's City. At over 4.5 miles long, Parks Ranch Cave is the longest gypsum cave on federal lands in the United States. It is also the most visited cave in the planning area and offers recreational caving, scientific research, and educational opportunities. Although heavily visited and open to anyone without an entry permit, Parks Ranch Cave has remained relatively pristine. It does not have the delicate speleothems found within limestone caves. One extensive case of vandalism by spray paint was quickly restored by volunteers.

Cultural evidence found in and around both limestone and gypsum caves in the planning area suggests long-running and significant usage by both Native Americans and Euro-Americans. Native Americans in the area used caves for food storage and processing areas, water sources, shelter, religious and ceremonial sites, and burial. Euro–Americans used caves in the Guadalupe Mountains for shelter, livestock pens and watering areas, tourist attractions, trash dumps, recreation, and illegal alcohol distilleries.

Some caves in the planning area have functioned as natural faunal traps for several thousand years. These caves have produced a unique stratified record of past Guadalupian mammal populations extending back through the Pleistocene era. Some caves have yielded bones of mammals that are now extinct or no longer common in the Guadalupe Mountains.

Most caves in the CFO that still contain cultural or paleontological resources within them have been gated. This has allowed these resources to remain in relatively pristine condition. Several excavations have occurred with resources being removed and documented. Looting has occurred in several sites that are not restricted resulting in loss of invaluable data.

Bat population monitoring has indicated an overall increase in population size. This can be greatly contributed to proactive management in limiting disturbance during roosting times and altering cave gates to be bat friendly. However, some roosts remain vulnerable due to the unrestricted access. One large roost as of writing has failed to return during the spring. Signs of increased human disturbance are visible outside this cave entrance. As of yet, White Nose Syndrome has not been detected within any bat roosts within the planning area.

A comprehensive study on the cave invertebrates of the CFO has not been accomplished. However, many studies have been conducted on individual caves within the Guadalupe Mountains. Good baseline data are needed in many of the larger gypsum karst areas within the CFO.

Riparian areas associated with karst water discharge are currently meeting riparian properly functioning condition (PFC) standards.

Ongoing groundwater sampling and measurements are collecting useful information within karst areas of the CFO's jurisdiction. Although variable by area, the general assessment is that water associated with karst areas in the planning area is protectable by State of New Mexico standards. The Capitan Reef Aquifer, a limestone karst aquifer, is primarily recharged through karst processes in the Guadalupe Mountains. This aquifer is the main municipal water source for the city of Carlsbad. Constant monitoring of this water shows seasonal changes in quality. A pilot dye tracing project within the CFO has showed positive connection between lost circulation zones encountered during oil and gas drilling in certain karst areas and area springs, seeps, rivers, caves, and water wells. This study does not measure quality or quantity of groundwater.

2.1.4.3 Trends

General interest in caves and cave resources has steadily increased within the area. The formation of Carlsbad Caverns National Park in the 1930s gave Carlsbad area an international reputation as being a "cave area." Media attention has also drawn focus to the cave resources located here. Large media production companies such as National Geographic and the British Broadcasting Company have produced documentaries on the caves of the Guadalupe Mountains that have aired internationally.

Human visitation to caves has increased as more awareness of the existence of these resources has been brought to public attention. However, since the placement of gates and the implementation of a cave entry permit system in 1976, visitation numbers have remained fairly steady on caves that fall under that system. Registers placed in non-gated caves that are easily accessible show regular visitation, while those that are more remote show less visitation.

Visitation to caves containing sensitive bat roosts has essentially been cut in half as a result of the closure of these caves during roosting times.

Project caving activities and volunteerism within the cave program has remained steady since the 1960s. Large-scale projects including cave restoration, exploration, surveying, cartography, and documentation are ongoing. Partnerships with various groups such as local caving grottos and the Southwestern Region of the National Speleological Society continue to be renewed. These projects have helped reverse some of the negative impact from excessive or irresponsible human use. A slow but steady increase of commercial visitors is apparent in the numbers of Special Recreation Permits (SRPs) issued.

Increased visitation has resulted in impacts to karst resources. Impacts can be defined as speleothem breakage, trail wear and spread, mud, dust, or silt tracking, litter, graffiti, etc. However, restoration efforts and permitting adjustments (frequency, limit, etc.) have helped curb these impacts. Caves that have uncontrolled access do show impact signs from increased visitation.

The occurrence of industrial activities related to oil and gas drilling and production within the planning area's karst areas has dramatically increased in the last two decades. The discovery of hydrocarbons in these areas has led to the drilling of new wells in addition to re-entry of previously abandoned wells. The presence of roads, power lines, pipelines, tank batteries, and other related facilities and equipment has also increased. The CFO is reviewing oil and gas lease parcel nominations containing karst concerns in almost every lease sale review. The majority of karst areas within the planning area have already been leased. Studies elsewhere have shown the ease in which karst aquifers can be contaminated due to leaks and spills. Dye trace studies within the CFO have shown a positive connection between lost circulation zones encountered during drilling and karst aquifers. The project, conducted by James Goodbar, involved the inclusion of distinct dyes in drilling fluids. These dyes were successfully detected in charcoal packets placed in caves, rivers, springs, and water wells within a significant karst area in the southern portion of the CFO. The contamination of these aquifers may affect all users of these water sources, including riparian and in-cave biological communities.

2.1.4.4 Forecast

Under current management, significant caves and karst areas would continue to receive recognition and protection in the planning area.

Trends indicate a continued increase in interest in cave and karst resources. Educational outreach stressing the importance of these resources would continue. Cave visitation numbers would remain steady for caves under the cave permit system since access is controlled. Resources within these caves should remain in current condition, if not improve due to restoration activities. As caves become more popular, visitation numbers to non-permitted caves is likely to increase. Without proper education, negative impacts to these resources could also increase.

Cave closures due to the possible introduction and spread of White Nose Syndrome, a disease proving detrimental to bat populations, has dramatically cut visitation to certain caves on a temporary basis.

Project caving activities would continue under the supervision of the CFO. Protection of the resource and the public would continue to be a goal while still allowing for these activities to occur. Restoration projects would continue to improve the condition of caves impacted by past visitation. Volunteers would still be used to carry out many important aspects of the cave program.

Oil and gas production in sensitive karst areas will increase. Impacts to cave and karst resources will be mitigated as individual project applications are received. However, it is likely that cumulatively, these projects will have a negative impact on karst and related resources. Increased development is occurring in sensitive karst areas such as the Hay Hollow area. Without plans of development, cumulative impacts would affect not only karst, but related resources such as groundwater and biological communities. Older wells with eroding or improperly sealed reserve pits will continue to have impacts on karst resources. These impacts include groundwater contamination and hydrocarbon releases into cave atmospheres, which causes dangerous conditions. The continued leasing of sensitive karst areas will provide for potential negative impacts to karst resources and karst groundwater aquifers.

2.1.4.5 Key Features

In the planning area, 350 documented cave features have been designated as significant under the FCRPA. Other caves have not yet been evaluated for significance determination. Per BLM policy, caves not yet evaluated are managed as significant until determined otherwise (BLM 8380 Manual [Cave and Karst Resources Management]). Significance criteria can be found in detail in the FCRPA.

Several key karst areas occur with the CFO. They can largely be divided into two karst types: limestone and gypsum. The great majority of limestone caves within the CFO belong to the limestone members of the Capitan Reef. Because of their unique sulfuric acid speleogenesis, or development, the limestone caves of the Guadalupe Mountains have been and continue to be intensely studied by speleologists, hydrologists, and geologists. Being free of the erosional effects often associated with caves formed by flowing water, the caves offer scientists the opportunity to clearly study the Capitan Reef from the inside out. The Capitan Reef is recognized as the best example of a Permian-aged fossil reef in the world. Areas within the Capitan Reef displaying exceptional caves include McKittrick Hill, Dark Canyon, Serpentine Bends, Jurnigan Canyon, and Fence Canyon.

There are several significant gypsum karst areas located within the CFO. The Castile Formation, located in the southwestern portion of the planning area is one of the densest gypsum karst areas in the world. The caves in this area provide great recreational opportunities, as well as wildlife habitat and groundwater recharge. Several springs and Black River occur as a result of karst discharge in this area. Burton Flats and Sinkhole Flats, located in the gypsum units of the Rustler Formation, contain caves that enter freshwater aquifers and are home to unique cave adapted invertebrates.

Key features within these resources include items of hydrologic, paleontologic, geologic, biologic, mineralogic, and cultural importance. Aesthetic and recreational values are also key features possessed by many of the caves in the planning area. As such, karst and its associated resources are considered nonrenewable.

Unique mineralogy, the absence of organics, and isolation from surface influence in some of the deeper caves have allowed the formation of extremophile microbial colonies in the planning area that are of great interest to microbiologists. Many of the microbial communities found by researchers have only been discovered within these caves.

2.1.4.6 Current Management

The 1998 Carlsbad RMP identified 480 acres of land within the Chosa Draw Caves Complex ACEC for acquisition. The landowner was not interested in selling or exchanging those lands with the BLM. While that land is currently owned by a different landowner, new attempts at acquiring the land have not been made.

The 2000 Minerals Withdrawal (*Federal Register* Notice January 14, 2000, Vol. 65, no 10, pg. 2423) identified 8,200 acres of state land for exchange. This has not occurred.

The 1988 Carlsbad RMP implemented an oil and gas lease stipulation preventing surface disturbance within 300 feet of a known cave entrance or passage. The 1997 RMPA expanded the distance to 200 meters.

The 1998 Carlsbad RMP indicated that protection requirements for subsurface voids encountered during oil and gas drilling operations were being developed by a joint BLM/Industry Work Group and would be implemented when they were determined feasible. The BLM adopted these measures…

The 1988 Carlsbad RMP identified 19 caves within nine cave management units to be protected and intensively management through a Cave Resources Special Recreation Management Area (SRMA). This designation and the management identified for the SRMA were mostly implemented. Guidance to close 3,245 acres to mining claim was only partially implemented. Management under Visual Resource Management (VRM) Class II and III has also only had partial implementation.

Following direction from the 1988 Carlsbad RMP, an activity plan for Chosa Draw ACEC and Recreation Area Management Plan (RAMP) for the Cave Resources SRMA were completed.

The 1997 Carlsbad RMPA closed 10,120 acres within Cave Protection Zones, 2,820 acres in Chosa Draw ACEC, and 5,240 acres on McKittrick Hill to future leasing. The majority of the Chosa Draw ACEC

was leased two months prior to the signing of the Record of Decision (ROD). Furthermore, portions of the ACEC have been leased after these areas were closed to future leasing with the signing of the ROD.

The 1997 Carlsbad RMPA stated, “Surface disturbance will not be allowed within up to 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features.” It is difficult to assess the implementation of this action as differing interpretations of the meaning of “within up to” have resulted in inconsistent application (BLM 1997).

The 1997 Carlsbad RMPA directed the CFO to maintain a map of cave or karst potential to provide the public with current information about the likelihood of the presence of cave or karst resources. The map was to identify three zones indicating the potential for an area to contain a cave or karst resources: low, medium, or high. A fourth zone, critical potential, was added in order to further inform the public about cave potential. A map showing the estimated depths of karst occurrence zones was also created in order to comply with the 1997 Carlsbad RMPA. Map 2.4 in Appendix A depicts karst occurrence zones in the planning area.

The 1997 Carlsbad RMPA directed the lease notice “Potential Cave or Karst Occurrence Area” to be applied to leases when all or part of the lease is located in a high or medium potential cave or karst occurrence area. Currently, lease notices are only applied to parcels containing high or critical cave or karst zones.

The 1997 Carlsbad RMPA identified a number of surface mitigation measures to be applied to projects to mitigate potential impacts to cave and karst resources. Most of them are included as standard COAs for drilling in high or critical karst potential zones. In addition, the State of New Mexico’s “Pit Rule” has made one of those measures, use of closed systems or steel tanks, standard throughout the planning area. As technology has increased, newer techniques for subsurface mitigation have been used. Subsurface mitigations are now being added to Applications for Permit to Drill (APDs). These COAs have been refined over the past three years.

In certain critical karst areas dye is being added to the spud drilling fluid and to the preflush fluids for the surface casing. Dye receptors are maintained at karst springs and domestic water wells. This is to document the connectivity between drilling activities and karst groundwater supplies.

Constant monitoring of drilling operations, as directed by the 1997 Carlsbad RMPA, is not being implemented because bit drops and lost circulation are generally not being reported by companies. Annual pressure testing is also not being implemented.

2.1.4.7 Management Opportunities

Areas in the Cave Resources SRMA could be evaluated for ACEC designation. Some of the areas could be expanded due to new discoveries or better understanding of resources in the area. Some management prescriptions for these areas that would help protect karst resources could include closed or NSO for future leases, ROW exclusion areas, limitations on surface disturbing activities, withdrawal from solid mineral entry under the 1872 mining law, closed to mineral material disposal and sales, etc. ROW avoidance areas could be changed to ROW exclusion areas to protect sensitive karst resources. In addition, areas could be closed to future mineral entry subject to valid existing rights.

The revised RMP could address new technologies and COAs for oil and gas drilling and production in karst areas. Closed loop systems could be required in high and critical karst zones. Closed loop could also be required in other areas if deemed necessary through NEPA process to protect karst resources.

2.1.5 Vegetative Communities

Upland Vegetation

2.1.5.1 Profile

The BLM is committed to ecosystem and interdisciplinary resource management. Consequently, in 1995, state directors were required, by the USDI final rule for Grazing Administration (outlined in 43 CFR 4180.1), to develop state or regional standards and guidelines for grazing administration. These were to be developed in consultation with numerous cooperators including the public. The BLM New Mexico State Office in turn developed the Standards and Guidelines.

Although the Standards and Guidelines were developed specifically for grazing administration, they have broader applications as they include standards for public land health and are intended for incorporation into the BLM's management goals and objectives. Standards consist of goals for the desired condition of biological and physical components and characteristics of public land that are measurable and attainable. They also must comply with federal and state statutes, policies, and directives applicable to BLM-managed lands. Guidelines are management approaches, methods, and practices that are intended to achieve a standard. Guidelines typically identify and prescribe methods of influencing or controlling specific BLM-managed land uses, are developed and applied consistent with the desired condition and within site capability, and may be adjusted over time.

The three standards that rangeland sites should meet are:

- **Upland Sites Standard:** Upland ecological sites are in a productive and sustainable condition within the capability of the site. Upland soils are stabilized and exhibit infiltration and permeability rates that are appropriate for the soil type, climate, and landform. The kind, amount, and pattern of vegetation provide protection on a given site to minimize erosion and assist in meeting state and tribal water quality standards.
- **Biotic Communities Standard:** Biotic communities include native, endangered, threatened, and special status species. Ecological processes such as hydrologic cycle, nutrient cycle, and energy flow support productive and diverse native biotic communities. Desired plant community goals include maintaining and conserving productive and diverse populations of plants and animals within the capability of the ecological site, which sustain ecological functions and processes.
- **Riparian Sites Standard:** Riparian areas are in a productive, properly functioning, and sustainable condition, within the capability of that site. Adequate vegetation of diverse age and composition is present that would withstand high stream flow, capture sediment, provide for groundwater recharge, provide habitat, and assist in meeting state and tribal water quality standards.

The standards listed above represent the conditions the BLM strives to meet in planning and management of resources and resource uses.

The following information is used to characterize current conditions within Chaves, Eddy, Lea, and Otero Counties:

- NRCS MLRAs descriptions (as included in BLM 2000)
- Ecological site descriptions (NRCS 2006b)

2.1.5.2 Current Condition

Major Land Resource Areas

MLRAs in the planning area classify nearly homogeneous areas in terms of land use, elevation, topography, climate, water resources, potential natural vegetation, and soils (see Map 2.5 Major Land Resource Areas). These coarse-scale descriptions are based on aggregations of geographically associated areas derived from State of New Mexico soil geographic database map unit boundaries and

include the known plant community types that could potentially be present (BLM 2000). Information specific to each MLRA, including physiography, geology, climate, water, soils, biology, and land use, can be found in USDA Handbook 296 (USDA 2006).

The planning area is classified within six MLRAs as described by the NRCS (2006b) shown in Table 2.1-8 (see Map 2.5 in Appendix A).

Table 2.1-8. MLRAs in the Planning Area

Major Land Resource Areas	BLM Surface	
	Acres	Percent
Arizona and New Mexico Mountains	671	0.03
Central New Mexico Highlands	59,574	2.8
Southern Desert Foothills	626,709	29.3
Southern Desertic Basins, Plains, and Mountains	1,447,448	67.6
Southern High Plains, Southern Part	81	0.004
Southern High Plains, Southwestern Part	5,771	0.3

Arizona and New Mexico Mountains

This area includes grasslands on the deeper soils; mixed shrub-grasslands on shallow, rocky soils; and timber on soils that are shallow to bedrock. Ponderosa pine (*Pinus ponderosa*) inhabits the largest portion of the intermediate elevations in the area. At the higher elevations, spruce and fir dominate. Areas at the highest elevations, above 11,000 feet, support alpine vegetation. At the lower elevations, ponderosa pine transitions into stands of piñon-juniper on north-facing slopes and woodland of mixed oak (*Quercus* sp.), pine (*Pinus* sp.), and juniper (*Juniperus* sp.) on south-facing slopes. The principal grasses are fescues (*Festuca* sp.), bluegrasses (*Poa* sp.), brome (*Bromus* sp.), and muhly (*Muhlenbergia* sp.) at the higher elevations; needlegrass (*Achnatherum* sp.), western wheatgrass (*Pascopyrum smithii*), bottlebrush squirreltail (*Elymus elymoides*), and muttongrass (*Poa fendleriana*) at intermediate elevations; and grama (*Bouteloua* sp.) grasses, spike muhly (*Muhlenbergia wrightii*), Junegrass (*Koeleria* sp.), cane bluestem (*Bothriochloa barbinodis*), and needlegrass at the lower elevations.

Central New Mexico Highlands

The soils at the higher elevations are in areas of juniper-piñon savanna and piñon-juniper woodland. They have a diverse understory dominated by sideoats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), little bluestem (*Schizachyrium scoparium*), bottlebrush squirreltail, western wheatgrass, piñon ricegrass (*Piptochaetium fimbriatum*), Bigelow sagebrush (*Artemisia bigelovii*), and winterfat (*Krascheninnikovia lanata*). The soils at the lower elevations are characterized by a mixed grassland prairie of little bluestem, grama grasses, western wheatgrass, galleta (*Pleuraphis* sp.), and New Mexico feathergrass (*Hesperostipa neomexicana*). They also support sand sagebrush (*Artemisia filifolia*) and sumac (*Rhus* sp.). Alkaline soils support fourwing saltbush (*Atriplex canescens*), winterfat, and alkali sacaton. The drainageways at the higher elevations are dominated by giant sacaton (*S. wrightii*), and those at the lower elevations are dominated by western wheatgrass. Fourwing saltbush, winterfat, and alkali sacaton also are prevalent in the drainageways.

Southern Desert Foothills

This area supports natural prairie vegetation characterized by sideoats grama, black grama (*Bouteloua eriopoda*), blue grama, green sprangletop (*Leptochloa dubia*), tridens (*Tridens* sp.), Metcalfe muhly (*Muhlenbergia rigida*), and a diversity of shrubs, such as mariola (*Parthenium incanum*), sumac, catclaw (*Uncaria tomentosa*), stool (*Dasylirion wheeleri*), agave (*Agave* sp.), and fourwing saltbush. Drainageways are dominated by Apache plume (*Fallugia paradoxa*), New Mexico walnut (*Juglans major*), desertwillow (*Chilopsis linearis*), brickellbush (*Brickellia* sp.), littleleaf sumac (*Rhus microphylla*), hackberry (*Celtis occidentalis*), and a few cottonwoods.

Southern Desertic Basins, Plains, and Mountains

This area supports desert grass-shrub vegetation. Giant dropseed, mesa dropseed (*Sporobolus flexuosus*), and scattered shrubs, such as sand sagebrush and yuccas (*Yucca* sp.), grow on the sandier soils. Creosotebush (*Larrea tridentata*), tarbush (*Flourensia cernua*), and catclaw grow on gravelly, calcareous soils on footslopes. Giant sacaton, vine mesquite (*Panicum obtusum*), desertwillow, and brickellbush grow in drainageways and depressions. The dominant grass species include blue, black, and sideoats grama on prairie grasslands and mountain footslopes. Juniper, piñon, and scattered ponderosa pine are on the upper mountain slopes.

Southern High Plains, Southern Part

The northeastern part of this area supports dominantly short- and mid-prairie grasses and sparse trees and shrubs. Fine-textured soils on broad, nearly level plains support a plant community of shortgrasses and a few midgrasses. The most common species are blue grama and buffalograss (*Bouteloua dactyloides*); blue grama is dominant. In areas of moderately fine-textured soils on very gently to moderately sloping plains, the plant community consists of mixed short- and midgrasses and sideoats grama is the dominant species.

The southwestern part of this area primarily supports mixed prairie grasses and sparse trees and shrubs. Moderately fine-textured and moderately coarse-textured soils on nearly level to gently sloping plains and gently to strongly sloping sandhills are characterized by a mixture of tall and midgrasses and lesser amounts of shortgrasses. On loamy soils, midgrasses tend to dominate and sideoats grama is the dominant species. Woody shrubs, particularly yucca, catclaw, and sand sagebrush, make up 5% or less of the plant community. On sandy soils, nearly half of the grasses in the plant community are tall grasses, such as little bluestem and sand bluestem (*Andropogon hallii*). Woody shrubs, specifically sand sagebrush, shinnery oak (*Quercus havardii*), and skunkbush (*Rhus trilobata*), make up 20% to 30% of the plant community on the sandy soils.

Southern High Plains, Southwestern Part

The northeastern portion of the Southern High Plains (Southwestern Part) area, dominantly supports short- and mid-prairie grasses. Broad, nearly level plains dominated by fine-textured soils are characterized by a plant community of shortgrasses with a few midgrasses. The most common species are blue grama and buffalograss; blue grama is dominant. In areas of moderately fine-textured soils on very gently sloping to moderately sloping plains, the plant community is characterized by a mixture of short and midgrasses and sideoats grama is the dominant species.

The southwestern part of this area supports mixed prairie grasses. This part of the area is on nearly level to gently sloping plains and gently sloping to strongly sloping sandhills. The moderately fine-textured and moderately coarse-textured soils are characterized by a mixture of mid- and tall grasses and lesser amounts of shortgrasses. On loamy soils, midgrasses tend to dominate and sideoats grama is the dominant species.

Woody shrubs, particularly yucca, catclaw, and sand sage, make up 5% or less of the plant community. On sandy soils, nearly half of the grasses in the plant community are tall grasses, such as little bluestem and sand bluestem. Woody shrubs, specifically sand sagebrush, shinnery oak, and skunkbush, make up 20% to 30% of the plant community on the sandy soils.

Ecological Site Descriptions

Each MLRA is broken down further into Land Resource Units (LRUs). LRUs serve as the basic units for state land resource maps. They typically extend over the same areas as the state general soil map units, but some general soil map units are subdivided into LRUs because of significant geographic differences in climate, water resources, or land use. (NRCS 2006b)

The LRUs are broken down further into ecological site descriptions (NRCS 2006b). An ecological site, as defined for rangeland, is a “distinctive kind of land with specific physical characteristics that differs from

other kinds of land in its ability to produce a distinctive kind and amount of vegetation" (NRCS 2006b). The ecological sites for the planning area are listed below (Table 2.1-9). Each ecological site has an ecological site description (ESD), which defines the key characteristics of that site. There is a large number of ESDs within the planning area, which can be found in the NRCS Field Office Technical Guide (NRCS 2012). State and transition models associated with ecological sites specify indicators of ecological resilience and thresholds. Ecological sites are currently being updated to include state and transition models in New Mexico. The BLM uses state and transition models as guides to manage vegetative communities in a manner that would result in a stable or desired state.

Table 2.1-9. Ecological Sites within Grazing Allotments in the Planning Area

Ecological Sites	BLM Surface	
	Acres	Percent
Bottomland	41,653	2.15%
Breaks	355	0.02%
Deep Sand	398,377	20.56%
Gravelly	26,506	1.37%
Gyp Hills	8,053	0.42%
Gyp Upland	33,245	1.72%
Limestone Hills	468,992	24.20%
Limy	2,049	0.11%
Loamy	274,514	14.17%
Salty Bottom Land	5,834	0.30%
Sand Hills	230,534	11.90%
Sandy	195,002	10.06%
Shallow	161,008	8.31%
Very Shallow	75,770	3.91%
Not assigned	4,912	0.83%

2.1.5.3 Monitoring

Three types of quantitative monitoring studies are conducted in the planning area: condition, trend, and utilization. These studies were established and conducted in accordance with the Public Rangelands Improvement Act of 1978. There are approximately 574 active range studies on grazing allotments in the planning area. Rangeland Health Assessments (RHAs) are also performed on grazing allotments within the planning area. An RHA is a qualitative assessment that looks at key indicators relating to the attributes of rangeland health, and a rating is given for each, showing departure from what it expected for each site. The attributes of rangeland health used in a RHA are, soil/site stability, hydrologic function, and biotic integrity.

These two types of monitoring, quantitative vegetation and qualitative RHAs, are used in combination to determine rangeland trend within the planning area each fiscal year. The results for the last five years are displayed below (Table 2.1-10). The results for this trend are displayed as a degree of similarity of the current vegetation found to that of the potential climax plant community.

Table 2.1-10. Rangeland Trend*

Year	Percent Total Acres Inventoried	Potential Natural Community	Late Seral	Mid Seral	Early Seral	Total
2010	98	8	58	34	0	
2009	98	5	53	41	0	
2008	98	5	50	44	1	
2007	98	5	50	44	1	
2006	98	4	52	42	2	

* Expressed in a degree of similarity of present vegetation to the potential natural, or historic climax, plant community: Potential Natural Community (excellent condition, 76%–100%), Late Seral (51%–75%), Mid Seral (26%–50%), Early Seral (poor condition, 0%–25%)

2.1.5.4 Trends

Trend is determined for vegetation in the planning area using a combination of the CFO's quantitative vegetation monitoring and qualitative RHAs, as discussed above. A general overview of this data (see Table 2.1-10) shows the rangeland health and vegetative makeup to be stable, and, in some instances, improving.

The improving trend in rangeland health within the planning area has been proven to be, in many instances, a direct effect of the Restore New Mexico project. This project includes several types of vegetation manipulation activities that have been administered on a large scale by the CFO since the completion of the 1988 Carlsbad RMP. These include herbicide application, prescribed fire, and woodland thinning or mastication.

2.1.5.5 Forecast

For the current trend of stable and improving rangeland health to continue, properly implemented management actions based on monitoring results and sufficient precipitation to allow vegetation to respond after being disturbed would be required. The BLM would continue to collect monitoring data, similar to historical efforts and in accordance with the Standards and Guidelines. These data would be analyzed and used to make management decisions. Future trends in vegetation would be dependent on a number of changing environmental variables as well as management direction. Based on existing monitoring data, the stable to slightly improving trend, and the ongoing Restore New Mexico program occurring in the planning area, the forecast is for continued improvement in public land health.

2.1.5.6 Key Features

Key features for vegetative resources include shinnery oak areas that provide habitat for special status species such as lesser prairie-chickens (*Tympanuchus pallidicinctus*) and dunes sagebrush lizard (*Sceloporus arenicolus*); Restore New Mexico acreage that has been treated, targeted for treatment, or managed to maintain treatment; areas that support or provide potential habitat for populations of sensitive, threatened, or endangered species such as Kuenzler's hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*) or gypsum wild-buckwheat; and riparian areas that would be managed to protect or improve the unique resources of each system.

2.1.5.7 Current Management

The 1988 Carlsbad RMP and subsequent amendments provided the following management direction for upland vegetation:

- Growing season rest for two years after a brush control treatment would be required, unless a different time period, longer or shorter, is deemed a necessary tool to achieve habitat requirements.
- Livestock use would be deferred for a minimum of two growing seasons following herbicide application. A site-specific EA would be prepared prior to vegetation treatments to determine the impacts.
- Native, deciduous tree species in all plant communities, such as hackberry, black walnut (*Juglans nigra*), New Mexico walnut, and desertwillow, would be protected from vegetation treatments and surfaced disturbance to the extent possible.

The implementation of this management is ongoing.

In addition, implementation of the Standards and Guidelines is ongoing within the planning area.

2.1.5.8 Management Opportunities

The revised RMP could address maintenance or upkeep of existing range improvements that have been damaged by oil and gas traffic. This would benefit upland vegetation by maintaining the existing effective grazing systems.

The revised RMP could address ways to improve lands in poor ecological condition by prioritizing treatments in areas with a low percentage of oil and gas leasing or within sand dune lizard and lesser prairie-chicken habitat (Appendix A Maps 2.7 Lesser Prairie Chicken Habitat and 2.8 Dunes Sagebrush Lizard Habitat Areas).

Riparian Areas and Wetlands

2.1.5.9 Profile

Riparian areas are located adjacent to rivers, creeks, lakes, springs, and wetlands. They are a transition zone between the upland and aquatic ecosystems. Riparian areas occur where water is perennial, intermittent, or ephemeral.

Wetlands occur in spaces between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water (Cowardin et al. 1979). Wetlands must have one or more of the following three attributes:

- At least periodically, the land supports predominantly hydrophytes,
- The substrate is predominantly undrained hydric soil, and
- The substrate is nonsolid is saturated with water or covered by shallow water at some time during the growing season of each year.

Several important features including soil, water conditions, and vegetation type distinguish wetlands from all other ecosystems.

Both riparian areas and wetlands are composed of aquatic vegetation with unique soil characteristics that developed under the influence of perennial water. The increased moisture found in these areas produces unique plant communities that differ noticeably from the surrounding upland vegetation.

Properly functioning riparian areas and wetlands perform the following functions:

- Purify water by removing sediments and other contaminants
- Lessen excessive erosion
- Perform carbon sequestration
- Diminish the impact of floods
- Preserve perennial stream flow
- Recharge groundwater
- Provide corridors for flora and fauna
- Provide critical habitat for birds, wildlife, fish, and other aquatic organisms
- Produce abundant, high quality forage for livestock and wildlife

2.1.5.10 Indicators

The BLM uses PFC, a qualitative method for assessing the condition of riparian areas and wetlands. PFC refers to both the assessment process and the on-the-ground condition of a riparian areas and wetlands. PFC, the assessment process, consists of an approach that considers the hydrology, vegetation, and erosion/deposition attributes of the area. PFC, the on-the-ground condition, refers to how well the physical processes are functioning. This condition is a state of resiliency that allows a riparian area or wetland to hold together during high-flow events with a high degree of reliability. This resiliency allows an area to then produce desired values over time, including fish habitat, neotropical bird habitat, or forage. Riparian areas and wetlands that are not functioning properly cannot sustain these values.

A riparian area or wetland is considered to be in PFC when adequate vegetation and landforms are present to:

- Dissipate stream energy associated with high water flow, thereby reducing erosion and improving water quality
- Filter sediment, capture bedload, and aid floodplain development

- Improve flood water retention and groundwater recharge
- Develop root masses that stabilize stream banks against cutting action
- Support greater biodiversity

If a riparian area or wetland is not in PFC, it is placed into one of the following three categories:

- **Functional-At Risk:** Riparian areas and wetlands are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.
- **Nonfunctional:** Riparian areas and wetlands are not providing adequate vegetation or landforms to dissipate stream energy associated with high flows, and thus are not maintaining or improving the condition of the area.
- **Unknown:** Sufficient information on which to make any determination for riparian areas and wetlands is lacking.

2.1.5.11 Current Condition

Riparian areas and wetlands support the greatest diversity of plant and animal life of all habitat types. Plants found in riparian areas and wetlands in the planning area are contained in Table 2.1-11. Riparian areas and wetlands are important to a large number of wildlife migrants, as well as to a diverse population of seasonal residents. Most terrestrial animal and insect life depends on riparian or wetland areas as sources of water, forage, and cover. Riparian areas and wetlands comprise less than 1% of the land mass in New Mexico. It has been estimated that 80% of all wildlife in New Mexico spends at least some portion of its life cycle in riparian areas or wetlands. For management purposes, the BLM separates riparian areas and wetlands into those associated with flowing water, lotic, or those associated with non-flowing water, lentic (Table 2.1-12).

Table 2.1-11. Riparian-Wetland Habitat and Community Types for Lotic and Lentic Sites within the Planning Area

Scientific Name	Common Name
Atriplex canescens	Fourwing saltbush
Baccharis glutinosa	Seepwillow
Bouteloua eriopoda	Black grama
Celtis laevigata	Netleaf hackberry
Chilopsis linearis	Desert willow
Cynodon spp.	Bermudagrass
Dasyochloa pulchella	Low woollygrass
Elaeagnus angustifolia	Russian olive
Fallugia paradoxa	Apache plume
Juglans microcarpa	Little walnut
Limonium spp.	Sea-lavender
Panicum obtusum	Vine mesquite
Populus fremontii	Fremont cottonwood
Prosopis glandulosa	Honey mesquite
Rhus microphylla	Littleleaf sumac
Salix exigua	Coyote willow
Salix gooddingii	Goodding's willow
Sapindus saponaria	Western soapberry
Scirpus spp.	Bulrush
Setaria vulpisteta	Plains bristlegrass
Sporobolus airoides	Alkali sacaton
Tamarix ramosissima	Saltcedar
Typha angustifolia	Narrowleaf cattail

Table 2.1-12. Riparian-Wetland Inventory Data

Reach	Type	Miles	Riparian Acres
Pecos River-All	Lotic-Perennial	28	408
Black River SMA	Lotic-Perennial	3.5	900
Black River Non-SMA	Lotic-Perennial	1	30
Delaware River	Lotic-Perennial	9	1,000
Ben Slaughter Spring	Lotic-Perennial	0.5	1.8
Big Canyon Seep	Lentic-Intermittent	N/A	0.25
Bogle Seep	Lentic-Intermittent	N/A	0.25
Cottonwood Spring	Lotic-Perennial	1.25	4.5
Hackberry Spring	Lentic-Intermittent	N/A	1.8
Light Spring	Unknown	UNK	Unknown
Owl Springs	Lotic-Perennial	0.25	2.7
Owl Springs-East	Lotic-Perennial	0.25	1.7
Owl Springs-West	Lentic-Perennial	N/A	1
Preservation Spring	Lotic-Perennial	0.375	1.4
Stetson Seep	Lentic-Intermittent	N/A	0.25
Wadcutter Spring	Unknown	UNK	Unknown
Walt Spring	Lotic-Intermittent	1	2
Yeso Spring	Lentic-Perennial	N/A	0.25
Alkali Lake	Lentic-Intermittent	N/A	3
Conoco Lake	Lentic-Perennial	N/A	3
Hackberry Lake	Lentic-Intermittent	N/A	35
Horseshoe Lake	Lentic-Intermittent	N/A	30
Laguna Gatuna	Lentic-Intermittent	N/A	300
Laguna Plata	Lentic-Intermittent	N/A	1,200
Laguna Quatro Complex	Lentic-Perennial	N/A	600
Laguna Tonto	Lentic-Intermittent	N/A	160
Laguna Toston	Lentic-Perennial	N/A	760
Laguna Tres	Lentic-Perennial	N/A	120
Lindsey Lake Complex	Lentic-Perennial	N/A	550
Queen Lake	Lentic-Intermittent	N/A	118
Red Lake	Lentic-Intermittent	N/A	40
Walters Lake	Lentic-Intermittent	N/A	10
Williams Sink	Lentic-Perennial	N/A	880
Adobe Tank	Lentic-Intermittent	N/A	0.25
China Tank	Lentic-Intermittent	N/A	3
Hayfield Tank	Lentic-Intermittent	N/A	3
Indian Tank	Lentic-Intermittent	N/A	2
Park Lake Tank	Lentic-Intermittent	N/A	2
School Section Tanks	Lentic-Intermittent	N/A	3
Brushy Draw #1	Lotic-Intermittent	0.5	10
Brushy Draw #2	Lotic-Intermittent	1.5	74
Martin Playa #1	Lentic-Intermittent	N/A	5
Martin Playa #2	Lentic-Intermittent	N/A	5
XT Draw-East	Lentic-Intermittent	N/A	3
XT Draw-West	Lentic-Intermittent	N/A	3

Generally a riparian-wetland area in a physically non-functioning condition does not provide quality habitat conditions. A riparian-wetland area that has recovered to a PFC would either be providing quality habitat conditions or would be moving in that direction if recovery is allowed to continue. A riparian-wetland area that is functioning-at-risk would likely lose any habitat that exists in a 25- to 30-year flow event. Table 2.1-13 displays the PFC for riparian areas and wetlands in the planning area.

Table 2.1-13. Riparian/Wetland Functioning Condition Status

Habitat Types	Proper Functioning Condition	Functional-at-Risk			Nonfunctional	Unknown	Total
		Trend Up	Trend Not Apparent	Trend Down			
Riparian-Lotic (miles)A	15	6.5	21	0	4.625		47.125
Wetland-Lentic (acres)	1,025	0	0	0	760	3,057.05	4,842.05

A Only BLM-managed miles

2.1.5.12 Trends

In riparian areas, native species such as cottonwoods and willows have been significantly encroached on by non-native invaders such as saltcedar and Russian olive (*Elaeagnus angustifolia*). After restoration activities, fragmented stands of cottonwoods or willows are now found on streambanks. Mature tree crowns of cottonwoods and willows form the canopy in the riparian area. Beneath the canopy lies an understory of woody plant species. Agricultural development, livestock grazing, and flood control have imposed both structures and management resulting in severe disruptions of natural regeneration of the floodplain cottonwood stands. Dams have prevented or limited natural flooding, which has eliminated the sediments and hydrologic regime required for the germination and establishment of the cottonwood and willow species.

Field data from PFC studies compiled throughout the planning area since 1998 indicate that overall trends in riparian and wetland habitats have been improving. Reducing the duration of livestock grazing and changing the emphasis of grazing to more cool season use has resulted in substantial improvements in riparian and wetland condition. Some areas have been excluded from livestock grazing altogether.

The riparian areas associated with the Pecos, Black, and Delaware Rivers have been the focus of a saltcedar eradication program. With the removal of saltcedar, areas that were once inaccessible to cattle are now easily accessible. Cattle congregate within riparian areas. They favor riparian forage, water availability, and shade during warm months. Excessive grazing and trampling impacts by cattle causes mechanical damage to shrubs and small trees, reduction or elimination of woody seedlings and saplings, exposed soils, and a shift of herbaceous species from native species to weedy or exotic species with root systems that have lesser soil-holding capabilities and encasement of stream channels. With the increased accessibility to the previously mentioned river systems recreation usage such as equestrian use has increased. When horses are allowed free access to riparian areas, they can deposit manure on the bank or directly in the water.

2.1.5.13 Forecast

Overall, the current trend of improvement is likely to continue, provided that reduction of hot-season livestock grazing in riparian areas and wetlands continues and that grazing seasons in riparian areas and wetlands continue to be of short duration. It is pertinent that riparian pastures are established. The trend of decreased distribution and abundance of invasive species and noxious weeds is likely to continue as they are moderated by control efforts. Oil, gas, and mineral extraction on state and private lands pose a threat to the health and productivity of riparian areas and wetlands on BLM-managed land because there are no protective measures in place. Vehicle, OHV, and equestrian use within riparian areas, if left unmanaged, may cause areas of vegetation to be completely denuded and lead to overall degradation of riparian habitats. Horse manure may cause elevated levels of nutrients and/or microbes in water. Also, non-native invasive species may be introduced or spread through horse manure. This would be of particular concern in water bodies that are classified as impaired. If unmanaged recreation continues, the associated actions would contribute as limiting factor for the health of the riparian areas.

Saltcedar maintenance treatments are scheduled continue along with riparian plantings. Stream bank stabilization projects would need to continue. As the overall health of riparian areas increases, there would be the opportunity to reintroduce native species to this waterway. A riparian monitoring program

would be implemented. Monitoring and analysis of restoration efforts are essential to ensure continued progress in restoration planning and implementation.

2.1.5.14 Key Features

Riparian areas along the Delaware and Black Rivers provide keystone habitat for riparian obligate and dependent avian species Riparian areas provide avian migration stopover sites. Long-distance migration requires exceptional energy reserves, and migratory birds must rest and replenish fat reserves while traveling between wintering and breeding areas. Riparian areas contain trees and shrubs that are required for roosting or foraging by most riparian birds. Riparian forests support a greater diversity of wildlife than nearly all non-aquatic areas or upland forests. Mammals depend on the vegetation found within riparian areas for food and shelter. The increased humidity of riparian areas makes them important habitat for amphibians, snakes, and turtles.

Fishes in riparian stream areas in the Southwest are intimately linked to the habitat afforded to them. Vegetation rooted at the water's edge provides escape cover, shade, and food for fish. This is especially critical along intermittent streams where remnant summer pools provide refugia for fish.

Riparian areas are crucial to the protection and enhancement of the water resources of the United States. They are extremely complex ecosystems that help provide optimum food and habitat for stream communities, as well as being useful in mitigating or controlling nonpoint source pollution.

2.1.5.15 Current Management

The CFO has developed an aquatic/riparian HMP for all perennial water sources and associated riparian communities on BLM-managed lands in the planning area. Riparian standard habitat sites are intensively managed to assure water and vegetative quality for associated wildlife resources. Ephemeral and perennial drainages and wetland/riparian areas are avoided as locations for oil- and gas-related facilities and surface disturbance is not allowed within up to 200 meters of the sources of a spring or seep, or within downstream riparian areas created by flows from the source or resulting from riparian area management. Surface disturbance is not be allowed within up to 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks. Exceptions to this requirement are considered for the installation of habitat or rangeland projects designed to enhance the spring or seep or downstream flows.

2.1.5.16 Management Opportunities

Livestock exclosures could be built along the Delaware River to prevent cattle from accessing the riparian areas.

Instead of avoiding wetland and riparian area for oil and gas development, those areas could be excluded from development.

2.1.6 Fish

The BLM is responsible for managing aquatic habitat, while authority for the fish and aquatic life is the responsibility of the NMDGF. The fisheries contained within the planning area are all warm water fisheries. Warm water fisheries support groups of fishes that thrive and reproduce in water temperatures warmer than 80 degrees Fahrenheit. The preferred temperature range for these fishes is between 70 and 85 degrees Fahrenheit.

2.1.6.1 Indicators

Stream habitat conditions are closely tied to riparian conditions and water quality. Riparian vegetation moderates water temperatures, increases bank stability, supports insects used as important food source, filters sediment, provides stream habitat for fish, and provides organic material for aquatic insects. Indicators of the health of fish populations and their habitat are population numbers, water quality and

quantity, bank cover, insect populations, habitat quality, habitat gains or losses, and listing as threatened or endangered or BLM special-status species.

The habitat requirements for fish include a healthy, functioning aquatic ecosystem consisting of essential components of an aquatic community, as well as the proper physical and chemical attributes. The aquatic community consists of three main components:

- Aquatic plants (phytoplankton, periphyton, and rooted vascular macrophytes)
- Bacteria and fungi
- Consumers (invertebrates and fish, birds, mammals, amphibians)

Physical and chemical attributes influencing fish abundance include water quality, water temperature, streamflow, water velocity, cover, substrate, energy flow and stream productivity, and riparian vegetation.

Aquatic Macroinvertebrates

Invertebrates are useful for assessing and monitoring riparian and stream health because they are closely linked to the biotic and abiotic characteristics of their habitat. The rapid generation time and small home range of many invertebrates makes them ideal for biomonitoring. EPT is a summary of the taxonomic richness and abundance within the insect Orders Ephemeroptera (Mayflies), Plecoptera (Stoneflies), and Trichoptera (Caddisflies). These orders are commonly considered sensitive to pollution.

2.1.6.2 Current Condition

Fish are typically classified as game or non-game, as well as native and non-native species.

The NMDGF identifies approximately 41.5 miles of river habitat on BLM-managed lands that could support fish. In addition, the CFO manages an estimated 540 surface acres of springs and seeps. Fish species utilizing aquatic habitats include, but are not limited to, the following families and/or species:

- Salmonidae (rainbow trout [*Oncorhynchus mykiss*])
- Clupeidae (gizzard shad [*Dorosoma cepedianum*])
- Cyprinidae (red shiner [*Cyprinella lutrensis*], common carp [*Cyprinus carpio*], fathead minnow [*Pimephales promelas*])
- Catostomidae (river carpsucker [*Carpiodes carpio*], blue sucker [*Cycleptus elongates*])
- Characidae (Mexican tetra [*Astyanax mexicanus*])
- Ictaluridae (black bullhead [*Ameiurus melas*], channel catfish [*Ictalurus punctatus*])
- Cyprinodontidae (Pecos pupfish [*Cyprinodon pecosensis*])
- Cyprinodontidae (Gulf killifish [*Fundulus grandis*])
- Poeciliidae (western mosquitofish [*Gambusia affinis*])
- Centrarchidae (green sunfish [*Lepomis cyanellus*], spotted bass [*Micropterus punctulatus*], largemouth bass [*Micropterus salmoides*])
- Percidae (greenthroat darter [*Etheostoma lepidum*], bigscale logperch [*Percina macrolepida*])

There also may be other fish present as a result of “bait-bucket” introductions. This is a result of unused bait released live into the water or on shore. The introduction of non-native animals resulting from their release as bait has been documented throughout the nation. Although most of these introductions were inadvertent, many have caused unexpected damage. Bait bucket introductions of non-native aquatic species, especially exotic fishes and crayfishes, have contributed to the loss of important habitats, changes in aquatic food webs, loss of native species, and the spread of pathogens. Non-native introductions include, but are not limited to, the following families and/or species:

- Lepisosteidae (longnose Gar [*Lepisosteus osseus*])
- Anguillidae (American eel [*Anguilla rostrata*])
- Fundulidae (plains Killfish [*Fundulus zebrinus*], Rainwater Killfish [*Lucania parva*])
- Atherinidae (inland silverside [*Menidia beryllina*])
- Moronidae (white bass [*Morone chrysops*])

Fish inhabiting systems that contain permanent flowing or standing water may not show much in the way of specialized adaptations to desert environments because the physical and chemical conditions of these large water masses are stable and well within the normal limits of fish tolerances. On the other hand, springs or small ponds may be subject to extreme daily and seasonal fluctuations of dissolved oxygen, temperature, and salinity. Under such conditions, specialized adaptations are required to ensure the survival of the fish population. Desert fishes must endure low quantities of oxygen dissolved in their water.

Pecos River

The Pecos River runs from north to south through the resource area covering approximately 105 miles. Of the 105 miles, the BLM manages approximately 29 miles: 4 miles north (including a portion of Avalon Lake) and 25 miles south of Carlsbad. Several dams exist on this river within Eddy County, including Brantley, Avalon, and Six-Mile, which are primarily used for irrigation. Second to irrigation and water rights, recreation and wildlife and fisheries habitat are important values of the river system. Downstream from Malaga bend, there exists a geologic structure known as the salt dome. At this point in the river, the downstream water course experiences an increase in salinity. As a result, native vegetation re-establishment efforts would be ineffective. Information about the riparian health of the Pecos River can be found in Riparian section 2.1.6.

An emerging problem on the Pecos River is the impact from golden-algal blooms caused by *Prymnesium parvum*, a species that thrives in brackish water. Fish kills caused by golden algae may last for days, weeks, or months and can change locations daily. Affected locations within a river or reservoir may change rapidly; sometimes only a portion of the reservoir or river is affected. All species of fishes may be affected, as well as freshwater mollusks, crayfish, gilled amphibians such as tadpoles, and certain plankton species.

Black River

The river consists of a series of spring-fed pools connected by a shallow, narrow stream with a mean flow rate of about 10 cubic feet per second (cfs). A small diversion dam is located along the river. The Black River is a tributary of the Pecos River. Surface runoff from the Guadalupe Mountains in southwestern Eddy County charges an aquifer that discharges at five springs, forming most of the stream flow in Black River. Geyser Spring, the headwaters of the river, maintains about 2 miles of perennial flow. A dry streambed separates Geyser Spring from upper Black River, which begins at an unnamed spring on the Washington Ranch, about 4 miles downstream. This spring formerly supplied a small flow into upper Black River. It presently is diverted for use at Carlsbad Caverns National Park.

Lower Black River has two perennial spring-fed tributaries, Blue Spring Creek and Castle Spring Creek. Blue Spring is the major discharge point of groundwater in the Black River Basin. Blue Spring Creek traverses about 2.5 miles before entering the Black River. The lower half of Blue Spring Creek is periodically dry when spring flow is diverted for irrigation. Castle Spring Creek, originating in Black River Village, is lowest in elevation of the major springs. Black River drains into the Pecos River about 1.2 miles northeast of the town of Malaga. Information on the riparian health of the Black River can be found in the Riparian section (see Section 2.1.6).

EPT values range from 0 to 12, with high values indicating less organic pollution. EPT are most diverse in natural streams and decline with increasing watershed disturbance. The mean EPT for the Upper Black River is a three. This ranking indicates that this system is “moderately impacted.”

Delaware River

The Delaware River is located south of the Black River near the border with Texas. The river is fed by a series of lesser drainages originating from the limestone foothills of the Guadalupe Escarpment in Texas and empties into the Pecos River. The river is usually narrow and slow moving with an average flow rate of 3.1 cfs at its mouth. The Delaware River shows the attributes of a degraded system that suffered from major disturbances resulting in bank erosion and riverbed degradation. Restoration of the Delaware River in New Mexico began in the 1990s. Restorations efforts have focused on removing invasive vegetation,

including saltcedar, and planting native riverine flora. Currently, the entire river course has undergone restoration efforts. The effects of the restoration activities have included an increase of availability of water for native flora. Restoration efforts have also decreased water salinity and sedimentation in the river. In addition, the river is several feet below the historical river bank. The current floodplain is a narrow strip several yards wide through most of the river course. Effects of livestock use are apparent. Information on the riparian health of the Delaware River can be found in Section 2.1.3.

EPT values range from 0 to 12, with high values indicating less organic pollution. EPT are most diverse in natural streams and decline with increasing watershed disturbance. The mean EPT for the Delaware River is an eight. This ranking indicates that this system is "slightly impacted."

2.1.6.3 Trends

According to reports from other states and recent trends in New Mexico, most fish kills caused by golden algae occur during the winter and spring months. This is the time of year when environmental conditions such as cooler temperatures and limited nutrients are not favorable to other algae, and it appears to give golden algae an advantage. However, the exact environmental conditions favoring toxic algal blooms are not clear, and even though factors such as water temperature and salinity are somewhat helpful in predicting future blooms, there are many exceptions that have been reported.

2.1.6.4 Forecast

Current management provides protection from permitted surface-disturbing activities within up to 200 meters of the Federal Emergency Management Agency (FEMA) 100-year floodplain. However, management does not provide protection from impacts caused by livestock or OHV use. Some fish species live in habitats that are physically small, which makes these habitats much more susceptible to catastrophic disturbance due to irrigation and other human activities. The land area around the Pecos, Black and Delaware Rivers are experiencing a high level of oil and gas development, and current forecasts are predicting a further increase in oil and gas activities. These activities can increase the potential of further impacts to the river's watersheds. Also there are several heavily used river crossings. These crossings have the potential for contributing to catastrophic traffic accidents due to commercial transport of chemical products (e.g., produced brine water, raw and refined petroleum products, and toxic chemicals) across the river courses. An accidental spill of contaminates would pollute surface waters of the rivers and threaten all aquatic species.

Recent riparian restoration efforts have resulted in reduced water salinities, which may provide more suitable habitat. Restoration of native species is a goal of the BLM. Native species are an integral part of ecosystem function and thus are necessary and needed components. The re-establishment of native populations can also decrease the possibility of further up-listings at the state and federal levels.

2.1.6.5 Key Features

The key features for fish and aquatic habitat are the watersheds. Also critical to health an abundance of fish resources are wetlands, riparian-wetland habitats, perennial and intermittent streams, and springs. Riparian areas need to be in properly functioning condition to provide for the vegetative, hydrologic, and soil-stability attributes needed to create and maintain quality aquatic habitats.

2.1.6.6 Current Management

Surface disturbance is not to be allowed within up to 200 meters of the outer edge of 100-year floodplains to protect the integrity of those floodplains.

2.1.6.7 Management Opportunities

Introduce native fish species.

Develop and implement stream habitat enhancement projects.

2.1.7 Wildlife

Wildlife

The BLM wildlife program is responsible for the management of wildlife habitat on BLM-managed land to ensure wildlife populations are sustainable for future generations. Management of wildlife populations is the responsibility of the NMDGF. The lead for management of migratory and federally listed threatened, endangered, and proposed species is the USFWS. Species that are considered as special-status species by the BLM or threatened or endangered species by the USFWS is discussed in the *Special-Status Species* section (2.1.8).

The CFO manages 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, including water availability, vegetation, topography, and human development.

2.1.7.1 Profile

Indicators

Relevant wildlife indicators include:

- **Habitat quality**
  Habitat is monitored using the Rangeland Health Assessment and Robel surveys. The Robel value often is used as a measure of intensity of grazing by livestock, with lower values indicating high usage, and the technique is recommended for evaluation of habitat of lesser prairie-chickens (Mote et al. 1999). The device used to obtain Robel values is a pole (Robel pole) marked in 1-inch increments with a pointed rod at one end that could be pushed into the soil. To begin each transect, 10 steps are taken from a central point of origin. The pointed end of the Robel pole is shoved into the ground at the place where the toe of the boot is positioned on the tenth step. Four readings of the Robel pole are taken in a circle around the pole. The readings are taken from a distance of 4 meters (158 inches) and a height of 1 meter (39 inches); distances are measured by a rope attached to the pole. The four readings are averaged to give a value for each point; the procedure is repeated 25 times and values are averaged to give a value for each transect.
- **Loss or gain of habitat**
  Approximately 83% of public land managed by the CFO is leased and opened to oil and gas exploration. During FY2009–FY2011, approximately 2,000 oil/gas locations were approved. Associated with the locations is infrastructure that supports these actions. Infrastructure consists of access roads, overhead power lines, surface flow lines, compressor stations, and frac ponds. These actions not only contribute to loss of habitat but to the fragmentation of the landscape. An ongoing restoration effort under the Restore New Mexico Program does contribute to the quality and productivity of habitat.
- **Wildlife surveys**
  Presence-absence surveys are used to monitor changes in wildlife distributions.

Current Condition

Vegetation Communities Habitat Cover Type

Sand Shinnery Communities (approximately 1,148,069 acres)

Sand shinnery communities comprise the nation's largest stand of oak. The stand is made up of ancient plants, most of them hundreds or thousands of years old. A shinnery oak forest is only 1 to 4 feet tall. The visible shrubs are mostly the short-lived twigs of massive underground stem systems, which slowly spread under areas up to 2 acres or more. Sand shinnery is defined by shinnery oak, also called Havard oak, midget oak, and sand shinnery oak. Sand shinnery communities extend across the southern Great Plains occupying sandy soils in portions of north and west Texas, west Oklahoma, and southeast New Mexico. Portions of Eddy, Lea, and Chaves

Counties consist largely of sand shinnery habitat and are intermixed with areas of mesquite to a lesser degree. The characteristic feature of these communities is co-dominance by shinnery oak and various species of grasses. Currently the shinnery oak communities are healthy; however, there are areas experiencing mesquite encroachment.

Chihuahuan Desert (approximately 617,400 acres)

A high mid-continental plateau, the Chihuahuan Desert extends from southeastern Arizona and southern New Mexico through west Texas and into Mexico. In New Mexico, Chavez and Eddy Counties, west of the Pecos River, consist largely or entirely of Chihuahuan Desert habitat type. The indicator plant species is lechuguilla (*Agave lechuguilla*). Most of the precipitation is received in the form of summer monsoonal storms that move inland from the Gulf of Mexico. The rains nourish plant species such as ocotillos (*Fouquieria splendens*), agaves, and yuccas. Areas throughout the planning area are experiencing an increased component of catclaw, which may decrease the fire adaptability of this ecosystem.

Transitional Scrub Zone (approximately 32,561 acres)

There is a transition zone separating the Chihuahuan Desert (west) from the sand shinnery community (east) habitat type. This habitat is primarily dominated by mesquite scrublands intermixed with various grasses. This mesquite scrubland community extends across the southern Great Plains, occupying portions of north and west Texas, western Oklahoma, and southeast New Mexico. Portions of Eddy and Lea Counties consist of mesquite scrublands to a lesser degree. The characteristic feature of the mesquite scrubland community is co-dominance by various species of grasses and cacti.

Riparian (approximately 4,500 acres)

Riparian areas are located adjacent to rivers, creeks, lakes, springs, and wetlands. They are a transition zone between the upland and aquatic ecosystems. Both riparian areas and wetlands are composed of aquatic vegetation with unique soil characteristics that developed under the influence of perennial water. The increased moisture found in these areas produces unique plant communities that differ noticeably from the surrounding upland vegetation. The riparian areas throughout the planning area have undergone extensive saltcedar removal and restoration efforts are ongoing.

Piñon-Juniper (approximately 294,824 acres)

The three major tree species found in New Mexico within the piñon-juniper woodland are twoneedle piñon (*Pinus edulis*), oneseed juniper (*Juniperus monosperma*), and Alligator juniper (*J. deppeana*) (Little 1950; Lanner 1975, 1981; Pieper 1977; Springfield 1976). Piñon-juniper vegetation form a mosaic pattern with trees interspersed with open grassland areas between the trees. Several oak species (*Quercus arizonica*, *Q. grisea*, *Q. emoryi*, and *Q. oblongifolia*) are important understory shrubs. Mountain mahogany (*Cercocarpus montana*) and Wright's silk tassel (*Garrya wrightii*) are also important browse species in this habitat cover type (Boeker et al. 1972; Short et al. 1977).

Game Species

Game species include big game, small game, upland birds, migratory waterfowl, and protected furbearers. The NMDGF collects and compiles considerable data regarding game population levels and habitat, as these species populations are monitored to track their supportable harvest. Table 2.1-14 summarizes games species and their associated habitat types.

Big Game

Big game species within the planning area consist of mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), elk (*Cervus canadensis*), collared peccary (*Peccari tajacu*), and wild turkey (*Meleagris gallopavo*). Established population size objectives guide management strategies for each big game herd unit. These objectives are established by the NMDGF and are set at a biologically sustainable and acceptable level.

Mule deer occur throughout the entire planning area in all habitat types. They can be found in the Chihuahuan desert scrub, semi-desert grassland, shinnery oak sand dune complex, and riparian areas. Cover, food, and water are the core elements of mule deer habitat and many individuals will utilize more than one habitat type, or areas where habitat types are interspersed, to obtain these elements. They are primarily browsers, with a majority of their diet comprising forbs and browse (e.g., leaves, twigs, woody shrubs). However, succulent vegetation is very important for lactating females.

Pronghorn are commonly found in association with grasslands and sagebrush communities. Within the planning area they can be found in the semi-desert grassland, shinnery oak sand dunes, and occasionally in the Chihuahuan desert scrub habitat types. Habitats appear to be selected based on availability of adequate forage, cover, water, and visibility. Pronghorn diets are composed largely of various species of browse, forbs, and cacti throughout most of the year. Grasses may only be an important food source during the spring when new growth provides high protein content. Distance from water is a critical component of pronghorn ranges during the summer and fall. Distances usually do not exceed 5 miles from a water source, while pronghorn kidding sites usually do not exceed a distance of 2 miles from a reliable water source.

Elk are not very abundant in the planning area, but they can be found in the south Guadalupe Escarpment area and to the south of Dunken, New Mexico. Elk spend the summer months in higher elevation habitat consisting of mountain meadows and mixed coniferous forests. These habitat types are occupied by elk in the adjacent Lincoln National Forest and Guadalupe Mountains National Park. In the winter, elk move to lower elevation habitat consisting of shrub/grass mixtures and piñon-juniper woodlands. The south Guadalupe Escarpment area consists of Chihuahuan desert scrub interspersed with juniper. Some of the elk from the surrounding areas mentioned above utilize this area as wintering grounds and can occasionally be seen during other times of the year. The area south of Dunken consists of foothill terrain with a larger juniper woodland aspect than the Guadalupe Escarpment.

Collared peccaries, also commonly known as javelina, are found throughout the planning area in every habitat type. They are known to occupy the Chihuahuan desert scrub, mesquite grasslands, shinnery oak sand dune complexes, and riparian areas. Peccaries commonly utilize habitat along dry washes or arroyos that contain dense thickets of prickly pear (*Opuntia* sp.), mesquite (*Prosopis* sp.), and other Chihuahuan desert scrub. These thickets provide a vital source of food and moisture, and a place to bed down during the midday sun. The crevices and channels of the arroyos provide retreats from predators. Peccaries are mostly herbivorous and feed heavily on prickly pear, mesquite beans, sotol, and lechuguilla. They often push around sandy surface soils to expose chunks of roots and cacti.

Wild turkeys occupy the riparian areas along both the Black and Delaware Rivers. They inhabit the brushy areas along streams and rivers, and utilize this habitat as a source of food and cover. Large trees are sought after as roosting sites during the winter months, but they will also use human-made structures such as power lines and oilfield tanks. Turkeys are omnivorous, feeding on both vegetation and insects when available. Nuts, berries, and other annual mast serve as a major food source for wild turkey. Green vegetation, such as grasses and young forbs, are an important food source when available during the spring months. The diet of juvenile turkey consists almost entirely of insects for the first few months of their lives. Habitat quality for these species is very much dependent on precipitation. Current anthropogenic activities would contribute to habitat degradation and fragmentation.

Small Game

Small game includes both mammals, such as squirrels, and upland game birds. Scaled quail (*Callipepla squamata*) are the most numerous of the upland game birds, but northern bobwhite quail (*Colinus virginianus*) are also present in some areas and few observations of Montezuma quail (*Cyrtonyx montezumae*) have also been reported. Scaled quail can be found in numerous habitat types throughout the planning area, while bobwhites have only been observed utilizing the

habitat directly related to the shinnery oak sand dune complexes. Very few Montezuma quail observations have been made within the planning area, and they were restricted to the higher elevation piñon-juniper habitat type.

Scaled quail's distribution is limited to the Chihuahuan desert and the adjacent semi-desert grasslands. Throughout the planning area, they can be found in a multitude of different habitat types. They occupy habitat within the Chihuahuan desert scrub, transitional scrub zone and shinnery oak sand dunes. Preferable habitat contains a combination of annual weeds, shrub, and/or cactus ground cover, and available surface water. Brush is utilized as a source of food, cover, and shade, but too dense of brush is avoided as it may prevent escape by running. Scaled quail are largely herbivorous and feed heavily on the seeds of various weeds, grasses, and shrubs. Insects can make up a large portion of the quail's diet when they are available. Habitat quality for these species is very much dependent on precipitation. Current anthropogenic activities would contribute to habitat degradation and fragmentation. Wildlife surveys are limited, and as a result no population trend can be determined.

Furbearers

The NMDGF considers numerous species within the planning area as protected furbearer species. These species may be harvested with a permit during their respective open season. Protected furbearers consist of raccoon (*Procyon lotor*), badger (*Taxidea taxus*), long-tailed weasel (*Mustela frenata*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), ringtail (*Bassariscus astutus*), and bobcat (*Lynx rufus*). These animals occupy a large variety of habitats throughout the planning area, many of them utilizing more than one habitat type. Habitat quality for these species is very much dependent on precipitation. Current anthropogenic activities would contribute to habitat degradation and fragmentation.

Waterfowl

Various species of waterfowl utilize habitat in the planning area at certain times of the year. Although the planning area may not contain important breeding or nesting ground, it is located within the Central Flyway. The open surface water of the Pecos River, its reservoirs, and other water bodies provide important resting areas during migration for a variety of waterfowl species. These include, but are not limited to, ruddy ducks (*Oxyura jamaicensis*), canvasback (*Aythya valisineria*), mallard (*Anas platyrhynchos*), northern shoveler (*A. clypeata*), American wigeon (*A. americana*), and Canada geese (*Branta canadensis*). Agricultural fields within the planning area also provide waterfowl with important foraging habitat to restore energy during the long migration.

Table 2.1-14. Game Species and Their Associated Habitat Types

Game Species	Sand Shinnery	Chihuahuan Desert	Transitional Scrub Zone	Riparian	Aquatic	Piñon-Juniper
Mule deer	X	X	X	X		X
Pronghorn	X	X				
Elk						X
Wild turkey				X		
Waterfowl				X	X	
Furbearers	X	X	X	X		X
Scaled quail	X	X	X	X		X
Bobwhite quail	X	X	X			
Montezuma quail						X

Non-Game Species

Non-game species include raptors, neotropical migrants, reptiles, amphibians, and mammals not discussed above. Such species are numerous and diverse, especially given the range of habitats present in the planning area. Only a few of these species or groups are addressed. Table 2.1-15 summarizes non-game species and their associated habitat types.

Raptor species (i.e., eagles, hawks, owls, and falcons) occurring or potentially occurring in the planning area include golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*B. jamaicensis*), rough-legged hawk (*B. lagopus*), Harris's hawk (*Parabuteo unicinctus*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), barn owl (*Tyto alba*), western burrowing owl (*Athene cunicularia hypugaea*), great horned owl (*Bubo virginianus*), western screech owl (*Otus kennicotti*), American kestrel (*Falco sparverius*), prairie falcon (*F. mexicanus*), peregrine falcon (*F. peregrinus*), and aplomado falcon (*F. femoralis*). Raptors are sensitive to environmental disturbance and occupy an ecological position at the top of the food chain, acting as biological indicators of environmental quality. Several of these species are further discussed under the Special Status Species Wildlife section. Raptors are found throughout the planning area. Some areas do have increased populations and/or species richness.

Most species have specific nest site requirements, which are key factors in nest site selection and reproductive success. These generally include nesting structures, available prey base, and nest site disturbance. Nests can occur in a myriad of habitats, including steep cliffs and rock ledges, trees and shrubs, and on the ground. Individual raptors, tolerant of human activity, may nest on human-made structures such as barns, utility poles, and tanks. The nesting and reproductive season is considered the most critical period in the raptor life-cycle since it determines population productivity, short-term diversity, and long-term trends.

Generally, raptors in the planning area will build their nests in trees or large brushes and use this stratum for nesting year after year, often adding to the previous year's nest. Most species utilize trees (e.g., cottonwood, hackberry, soapberry [*Sapindus* sp.]), large brushes (e.g., mesquite, catclaw), and larger cacti (e.g., cane cholla [*Cylindropuntia imbricata*], soaptree yucca [*Yucca elata*]) as nesting strata. These species include, but are not limited to, red-tailed hawk, Swainson's hawk, Harris's hawk, and great horned owl. Some species, such as golden eagle and great horned owl, are also known to build their nests on steep cliffs or rock ledges. Smaller raptors, such as American kestrel and aplomado falcon, build their nests in the cavities of trees, power poles, or larger cacti. Burrowing owls utilize small dens in the ground as their nesting sites, either excavated by themselves or abandoned by a small burrowing mammal such as a ground squirrel or badger.

Neotropical migrants include shorebirds, water birds, and songbirds. A myriad of these species are found throughout the planning area. Every vegetation community type in the planning area supports various bird species. The riparian and wetland community typically has the most diverse array of species. Habitat quality for these species is very much dependent on precipitation. Current anthropogenic activities would contribute to habitat degradation and fragmentation.

Mammals

Non-game mammals occurring within the planning area include desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), ground squirrels, mice, rats, shrews, and bats. These animals fill an important ecological niche as prey for many predators, and as predators of many different types of insect. Mammals are found in habitats throughout the planning area. Habitat quality for these species is very much dependent on precipitation. Current anthropogenic activities would contribute to habitat degradation and fragmentation.

Bats

The CFO is known to have 17 bat species under its jurisdiction. The planning area contains a very large concentration of limestone caves, and many of these caves serve as important roosting and nursery habitat for several different species of bats. In New Mexico, bats are the primary predators of night-flying insects. A few eat nectar or prey on small animals. Throughout New Mexico, bats are on the decline, often due to habitat destruction, pesticides, and obliteration of colonies by vandals. The following list is composed of non-status bats found within the planning area: big brown bat (*Eptesicus fuscus pallidus*), California myotis bat (*Myotis californicus*), western small-footed myotis bat (*M. ciliolabrum melanorhinus*), Mexican free-tailed bat (*Tadarida brasiliensis*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), hoary bat

(*Lasiurus cinereus*), eastern red bat (*L. borealis*), pallid bat (*Antrozous pallidus*), and western pipistrelle bat (*Pipistrellus hesperus*). Habitat quality for these species is very much dependent on precipitation. Current anthropogenic activities would contribute to habitat degradation and fragmentation. Wildlife surveys are limited, and as a result no population trend can be determined.

Reptiles and Amphibians

There are numerous species of reptiles and amphibians that occur within the planning area. Some of these species include western diamondback rattlesnake (*Crotalus atrox*), coachwhip (*Masticophis flagellum*), desert kingsnake (*Lampropeltis getula*), bull snake (*Pituophis melanoleucus*), Texas horned lizard (*Phrynosoma cornutum*), side-blotched lizard (*Uta stansburana*), checkered whiptail (*Cnemidophorus grahamii*), collared lizard (*Crytaphytus collaris*), ornate box turtle (*Terrapene ornata*), plains leopard frog (*Rana blairi*), Great Plains toad (*Bufo cognatus*), New Mexico spadefoot (*Spea multiplicata*), Couch's spadefoot (*Scaphiopus couchii*), and the tiger salamander (*Ambystoma tigrinum*). There are no estimates of population size available, and little is known about the distribution of these species within the planning area.

Table 2.1-15. Non-Game Species and Their Associated Habitat Types

	Sand Shinnery	Chihuahuan Desert	Transitional Scrub Zone	Riparian	Aquatic	Piñon-Juniper
Raptors	X	X	X	X	X	X
Neotropical Migrants	X	X	X	X	X	X
Small mammals	X	X	X	X		X
Bats	X	X	X	X		X
Reptiles and amphibians	X	X	X	X	X	X

Trends

The diversity and abundance of wildlife within a given area is directly related to maintaining habitat diversity, availability, and quality. Many wildlife species within the planning area have experienced declines or fluctuations in population due to human-induced habitat degradation and fragmentation. This type of habitat loss can largely be contributed to livestock grazing, fire suppression, oil and gas development, and other human development. However, current habitat management and restoration programs are working towards increasing the amount of available quality habitat and decreasing the detrimental effects to habitat caused by anthropogenic effects. Naturally occurring phenomena such as drought, fire, and floods also play a large role in the fluctuations in population of numerous wildlife species. These phenomena can deplete critical elements from the habitat such as forage and cover availability, and can be detrimental to the local population if they occur during nesting or birthing. Similarly, predatory animal populations are affected by the fluctuations of their prey base populations.

Forecast

Continuing threats to native ecosystems and species diversity in the planning area include fragmentation and loss of critical or important habitat due to human activities. The cumulative impact from all disturbances is of concern, particularly for those species with specialized habitat requirements. Additionally, invasive species may continue to displace native vegetation, which indirectly impacts the distribution and populations of wildlife species.

Restore New Mexico was initiated in 2005 as a partnership to restore the state's grasslands and riparian areas to a healthy and productive condition. Other objectives include preventing the listing of candidate species, improving health and biological diversity of the land after energy development has taken place, removing invasive species such as saltcedar from waterways, increasing natural biodiversity of riparian areas, and reintroducing fire to the landscape. These goals are being accomplished by treating invasive

brush species using aerial herbicide application and prescribed fire, and by the reclamation of areas impacted from oil field development. These efforts have already successfully restored approximately 615,000 acres within the planning area, and many more acres have been defragmented. This has led to larger areas of suitable habitat for special status species, as well as numerous other wildlife species.

The BLM, in cooperation with Southeastern New Mexico Wildlife, Inc., has used Sikes Act funding to create 174 wildlife watering units throughout the planning area. These units are designed to catch and store rain and to provide supplementary water strictly for the use of wildlife. Most of the watering units have a 1-acre exclosure to prevent livestock from utilizing the unit. This group is also responsible for 16 other habitat improvement projects within the planning area. These projects consist mostly of fencing exclosures to keep livestock away from sensitive areas (e.g., fencing off playas, ground-nesting sites). This effort has enhanced the suitability of habitat within the planning area for a multitude of different wildlife species and would continue to do so.

Key Features

Limestone and Gypsum Caves

The planning area contains a very large concentration of limestone and gypsum caves. Many of these caves serve as important roosting and nursery habitat for several different species of bats. The management and protection of these caves is imperative in the protection and conservation of these bat species within the planning area.

Sand Shinnery Oak Communities

Sand shinnery communities comprise the nation's largest stand of oak and occupy 5 to 7 million acres of the southern Great Plains, extending from northern Texas and western Oklahoma southward into Chihuahuan Desert scrubland. The stand is made up of ancient plants, most of them hundreds or thousands of years old. This oak forest is only 1 to 4 feet tall. The visible shrubs are mostly the short-lived twigs of massive underground stem systems, which slowly spread under areas up to 2 acres or more. The oaks co-dominate the community with mid and tall grasses that are usually taller than themselves. Sand shinnery is defined by shin-oak, also called Havard oak, midget oak, and sand shinnery oak. Shin and shinnery are Louisiana French from chêne and chênière, which mean oak and oak woodland. Other shinneries cover millions of acres from Louisiana to central Texas and Oklahoma, but they are dominated by oak species that are small trees, rather than co-dominated by oak-shrubs and grasses as is sand shinnery.

Riparian Areas

Riparian areas and their associated river systems and springs provide keystone habitat for riparian obligate and dependent avian species. Riparian areas provide avian migration stopover sites. Long-distance migration requires exceptional energy reserves, and migratory birds must rest and replenish fat reserves while traveling between wintering and breeding areas. Riparian areas contain trees and shrubs that are required for roosting or foraging by most riparian birds. Riparian forests support a greater diversity of wildlife than nearly all non-aquatic areas or upland forests. Mammals depend on the vegetation found within riparian areas for food and shelter. The increased humidity of riparian areas makes them important habitat for amphibians, snakes, and turtles.

Riparian areas are crucial to the protection and enhancement of the water resources of the United States. They are extremely complex ecosystems that help provide optimum food and habitat for stream communities as well as being useful in mitigating or controlling nonpoint source pollution.

Escarpment Faces

Particular areas of the planning area have an increased richness of escarpments. This habitat feature provides birds of prey ideal nesting sites. Raptors have perfected the art of soaring to reduce the amount of energy they expend during their search for food on the fly. For example, air currents rising up the side of a canyon walls and escarpment faces create updrafts that birds can ride for extra altitude. The

technique is called ridge lift or slope soaring. Raptors and other birds also use two common techniques known as thermal soaring and dynamic soaring. The escarpment faces and canyon walls provide the structure for the previous mentioned activity.

Heronries

Well established heronries such as the Phantom Banks Heronries may be occupied for decades or even centuries due to the habitat conditions which are favorable for reproductive success (Bent 1963). The protection of established heronries and associated feeding areas is critical to ensure the stability of breeding populations of herons and egrets (Family*: Ardeidae*). Herons are especially vulnerable to human disturbance and habitat degradation during the breeding season when large numbers of birds are concentrated in a moderately confined area.

2.1.7.2 Current Management

The CFO has not prepared several HMPs identified in the 1988 Carlsbad RMP. These include HMPs for raptors and other bird species.

The CFO has implemented several measures from the 1997 RMPA, including:

- Not allowing surface disturbance within up to 200 meters of active heronries or by delaying activity for up to 120 days, or a combination of both;
- Not allowing surface disturbance within know prairie dog towns; and
- Requiring operators to evaluate avian and bat use of project areas and designing projects to minimize or mitigate the potential for bird and bat strikes.

2.1.7.3 Management Opportunities

Management opportunities for wildlife include the following:

- Investigate species-specific buffers for development activities.
- Working with the NMGFD, identify areas for re-introduction of historical native species.
- Require the burial of power lines within habitat areas for lesser prairie-chickens
- Require the burial of power lines.
- Reduce cattle animal unit months (AUMs) for allotments that are experiencing increased levels of disturbance.
- Require all pump jacks to be mufflered.
- Establish of wildlife corridors for the purpose of emigration and immigration of species.
- Establish of riparian bird-banding stations.
- Pre-set a limit of percent disturbance of leases.
- Eliminate roads within riparian areas.
- Reduce the feral hog population.

2.1.8 Special Status Species

The CFO Special Status Species Program focuses on protecting and enhancing the habitats of threatened, endangered, and other special status species to ensure their continued existence. BLM special status species are:

- Species listed or proposed for listing under the Endangered Species Act of 1973 (ESA). The ESA provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing ESA are the USFWS and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The USFWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.
- Species designated as sensitive by the BLM State Director that require special management consideration to promote their conservation and reduce the likelihood and need for future listing

under the ESA. All federal candidate species, proposed species, and species delisted for five years or less are considered BLM sensitive species.

According to the ESA, an endangered species is any species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Species proposed for listing as threatened or endangered are managed with the same level of protection as listed species. BLM policy for candidate species is contained in BLM Manual 6840. The BLM carries out management consistent with the principles of multiple-use for the conservation of candidate 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 would not adversely affect the likelihood of recovery of any threatened or endangered species. Protection and management of all special status species would continue to be a high priority and coordinated with other programs and activities as needed to meet management objectives.

Collaborative conservation activity plans would be written on any federally listed species not presently covered by a recovery plan. When revising or developing resource activity plans, specific objectives and actions stated in the recovery plans would be incorporated.

2.1.8.1 Indicators

A species is added to the list when it is determined to be endangered or threatened because of any of the following factors: the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its survival.

The BLM is mandated to carry out management consistent with the principles of multiple use, for the conservation of special status species and their habitats, and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered (BLM Manual 6840.06).

Some important habitat features are vertical and horizontal structure, moisture, sunlight, and temperature. If only one of these conditions is inappropriate, a species may not be able to survive. Some species are dependent on more than one habitat type and need a variety of habitats near each other to survive. It must be emphasized that habitat does not have to be completely eliminated to lose its usefulness to an organism.

Habitat Quality

Habitat quality is monitored using Rangeland health assessment and Robel surveys.

The Robel value often is used as a measure of intensity of grazing by livestock, with lower values indicating high usage, and the technique is recommended for evaluation of habitat of lesser prairie-chickens (Mote et al. 1999). The device used to obtain Robel values is a pole (Robel pole) marked in 1-inch increments with a pointed rod at one end that could be pushed into the soil. To begin each transect, 10 steps are taken from a central point of origin. The pointed end of the Robel pole is shoved into the ground at the place where the toe of the boot is positioned on the tenth step. Four readings of the Robel pole are taken in a circle around the pole. The readings are taken from a distance of 4 meters (158 inches) and a height of 1 meter (39 inches); distances are measured by a rope attached to the pole. The four readings are averaged to give a value for each point; the procedure is repeated 25 times and values are averaged to give a value for each transect.

Loss or Gain of Habitat

Approximately 83% of public land managed by the CFO is leased and opened to oil and gas exploration. During FY2009–FY2011, approximately 2,000 oil/gas locations were approved. Associated with the locations is infrastructure that supports these actions. Infrastructure consists of access roads, overhead

power lines, surface flow lines, compressor stations, and frac ponds. These actions not only contribute to loss of habitat but to the fragmentation of the landscape. An ongoing restoration effort under the Restore New Mexico Program does contribute to the quality and productivity of habitat.

Wildlife Surveys

Presence-absence surveys are used to monitor changes in wildlife distributions.

2.1.8.2 Current Condition

Table 2.1-16 and Table 2.1-17 identify the current status of special status fish, wildlife, and plant species that may occur within the planning area.

Vegetation Communities Habitat Cover Type

Sand shinnery communities comprise the nation's largest stand of oak. The stand is made up of ancient plants, most of them hundreds or thousands of years old. A shinnery oak forest is only 1 to 4 feet tall. The visible shrubs are mostly the short-lived twigs of massive underground stem systems, which slowly spread under areas up to 2 acres or more. Sand shinnery is defined by shinnery oak, also called Havard oak, midget oak, and sand shinnery oak. Sand shinnery communities extend across the southern Great Plains occupying sandy soils in portions of north and west Texas, west Oklahoma, and southeast New Mexico. Portions of Eddy, Lea, and Chaves Counties consist largely of sand shinnery habitat and are intermixed with areas of mesquite to a lesser degree. The characteristic feature of these communities is co-dominance by shinnery oak and various species of grasses. Currently the shinnery oak communities are healthy; however, there are areas experiencing mesquite encroachment.

Chihuahuan Desert (approximately 617,400 acres)

A high mid-continental plateau, the Chihuahuan Desert extends from southeastern Arizona and southern New Mexico through west Texas and into Mexico. In New Mexico, Chavez and Eddy Counties, west of the Pecos River, consist largely or entirely of Chihuahuan Desert habitat type. The indicator plant species is lechuguilla. Most of the precipitation is received in the form of summer monsoonal storms that move inland from the Gulf of Mexico. The rains nourish plant species such as ocotillos, agaves, and yuccas. Areas throughout the planning area are experiencing an increased component of cat claw, which may decrease the fire adaptability of this ecosystem.

Transitional Scrub Zone (approximately 32,561 acres)

There is a transition zone separating the Chihuahuan Desert (west) from the sand shinnery community (east) habitat type. This habitat is primarily dominated by mesquite scrublands intermixed with various grasses. This mesquite scrubland community extends across the southern Great Plains, occupying portions of north and west Texas, western Oklahoma, and southeast New Mexico. Portions of Eddy and Lea Counties consist of mesquite scrublands to a lesser degree. The characteristic feature of the mesquite scrubland community is co-dominance by various species of grasses and cacti.

Riparian (approximately 4,500 acres)

Riparian areas are located adjacent to rivers, creeks, lakes, springs, and wetlands. They are a transition zone between the upland and aquatic ecosystems. Both riparian areas and wetlands are composed of aquatic vegetation with unique soil characteristics that developed under the influence of perennial water. The increased moisture found in these areas produces unique plant communities that differ noticeably from the surrounding upland vegetation. The riparian areas throughout the planning area have undergone extensive saltcedar removal and restoration efforts are ongoing.

Piñon-Juniper (approximately 294,824 acres)

The three major tree species found in New Mexico within the piñon-juniper woodland are Rocky Mountain piñon, oneseed juniper, and Alligator juniper (Little 1950; Lanner 1975, 1981; Pieper 1977; Springfield 1976). Piñon-juniper vegetation form a mosaic pattern with trees interspersed with open grassland areas

between the trees. Several oak species (*Quercus arizonica*, *Q. grisea*, *Q. emoryi*, and *Q. oblongifolia*) are important understory shrubs. Mountain mahogany and Wright's silk tassel are also important browse species in this habitat cover type (Boeker et al. 1972; Short et al. 1977).

Table 2.1-16. Listed Plant Species Potentially Occurring in the Planning Area

Common Name	Scientific Name	Status
Gypsum wild-buckwheat	*Eriogonum gypsophilum*	Federal: T State NM: E
Kuenzler's hedgehog cactus	*Echinocereus fendleri* var. *kuenzleri*	Federal: E State NM: E
Lee's pincushion cactus	*Coryphantha sneedii leei*	Federal: T State NM: E
Pecos sunflower	*Helianthus paradoxus*	Federal: T State NM: E
Scheer's pincushion cactus	*Coryphantha scheeri scheeri*	Federal: SoC State NM: E
Sneed's pincushion cactus	*Coryphantha sneedii sneedii*	Federal: E State NM: E
Tharp's blue-star	*Amsonia tharpii*	Federal: SoC State NM: E

T=Threatened
E = Endangered
SoC= Species of Concern

Table 2.1-17. Listed Animal Species Potentially Occurring in the Planning Area

Common Name	Scientific Name	Status
Birds		
Aplomado falcon	*Falco femoralis septentrionalis*	Federal: E (10-J), State NM: E
Arctic peregrine falcon	*Falco peregrinus tundrius*	Federal: USFWS SoC, State NM: T
Baird's sparrow	*Ammodramus bairdii*	Federal: USFWS SoC, NMSO, State NM: T
Bald eagle	*Haliaeetus leucocephalus*	State NM: T
Bell's vireo	*Vireo bellii*	Federal: USFWS SoC, State NM: T
Black tern	*Chlidonias niger surinamensis*	Federal: USFWS SoC , NMSO
Brown pelican	*Pelecanus occidentalis carolinensis*	State NM: E
Burrowing owl	*Athene cunicularia hypugaea*	Federal: USFWS SoC, NMSO, State NM: SGCN
Common black-hawk	*Buteogallus anthracinus anthracinus*	State NM: T
Common ground-dove	*Columbina passerina pallescens*	State NM: E
Elegant trogon	*Trogon elegans canescens*	State NM: E
Least tern	*Sterna antillarum athalassos*	Federal: E State NM: E
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	Federal: C, NMSO, State NM: SGCN
Mexican spotted owl	*Strix occidentalis lucida*	Federal: T
Mountain plover	*Charadrius montanus*	Federal: USFWS SoC, State NM: S
Northern beardless tyrannulet	*Camptostoma imberbe ridgwayi*	State NM: E
Northern goshawk	*Accipiter gentilis*	Federal: USFWS SoC, NMSO, State NM: SGCN
Piping plover	*Charadrius melodus circumcinctus*	Federal: T, State NM: T
Southwestern willow flycatcher	*Empidonax traillii extimus*	Federal: E, State NM: E
Thick-billed kingbird	*Tyrannus crassirostris*	State NM: E
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Federal: C
Fish		
Blue sucker	*Cycleptus elongatus*	NMSO, State NM: E
Gray redhorse	*Moxostoma congestum*	State NM: T

Common Name	Scientific Name	Status
Greenthroat darter	*Etheostoma lepidum*	State NM: T
Headwater chub	*Ictalurus lupus*	NMSO
Pecos bluntnose shiner	*Notropis simus pecosensis*	Federal: T, State NM: E
Pecos gambusia	*Gambusia nobilis*	Federal: E, State NM: E
Pecos pupfish	*Cyprinodon pecosensis*	State NM: T
Peppered chub	*Macrhybopsis tetranema*	NMSO, State NM: T
Rio Grande shiner	*Notropis jemezanus*	NMSO
Amphibians and Reptiles		
Dune sagebrush lizard	*Sceloporus arenicolus*	Federal: C, NMSO, State NM: E
Gray-banded kingsnake	*Lampropeltis alterna*	State NM: E
Plainbelly water snake	*Nerodia erythrogaster transversa*	State NM: E
Sacramento Mountain salamander	*Aneides hardii*	Federal: USFWS SoC, NMSO, State NM: T
Invertebrates		
Koster's springsnail	*Juturnia kosteri*	Federal: E, State NM: E
Noel's amphipod	*Gammarus desperatus*	Federal: E, NMSO, State NM: E
Ovate vertigo snail	*Vertigo ovata*	Federal: USFWS SoC , State NM: T
Paper pondshell	*Utterbackia imbecillis*	State NM: E
Pecos assiminea snail	*Assiminea pecos*	Federal: E , State NM: E
Pecos springsnail	*Pyrgulopsis pecosensis*	Federal: W, NMSO, State NM: T
Roswell springnail	*Pyrgulopsis roswellensis*	Federal: E, State NM: E
Texas hornshell	*Popenaias popeii*	Federal: C, State NM: E
Mammals		
Arizona black-tailed prairie dog	*Cynomys ludovicianus arizonensis*	Federal: USFWS SoC, NMSO State NM: SGCN
Big free-tailed bat	*Nyctinomops macrotis*	NMSO
Black-tailed prairie dog	*Cynomys ludovicianus ludovicianus*	Federal: USFWS SoC, State NM: SGCN
Cave myotis bat	*Myotis velifer incautus* (NM); *brevis* (NM,AZ)	NMSO
Fringed myotis bat	*Myotis thysanodes thysanodes*	NMSO
Guadalupe pocket gopher	*Thomomys bottae guadalupensis*	Federal: USFWS SoC, NMSO
Long-legged myotis bat	*Myotis volans interior*	NMSO
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	Federal: C, NMSO, State NM: E
Pale Townsend’s big-eared bat	*Corynorhinus townsendii pallescens*	Federal: USFWS SoC, NMSO, State NM: S
Pecos River muskrat	*Ondatra zibethicus ripensis*	Federal: USFWS SoC, NMSO
Peñasco least chipmunk	*Neotamias minimus atristriatus*	Federal: USFWS SoC, State NM: E
Spotted bat	*Euderma maculatum*	NMSO
Swift fox	*Vulpes velox velox*	Federal: USFWS SoC, State NM: S
Western small-footed myotis bat	*Myotis ciliolabrum melanorhinus*	NMSO
Yuma myotis bat	*Myotis yumanensis yumanensis*	NMSO

T = Threatened
E = Endangered
SoC = Species of concern
SGCN = Species of greatest conservation need
NMSO = BLM Sensitive
W = Warranted but precluded
C = Candidate
S=Sensitive

Endangered Species

Northern Aplomado Falcon (Falco femoralis septentrionalis)

The northern aplomado falcon once extended from Trans-Pecos Texas, southern New Mexico, and southeastern Arizona in the United States, south through Chiapas and the northern Yucatán along the Gulf Coast of México, and along the pacific slope of Central America north of Nicaragua (Howell 1972). According to a historical distribution map of 1900 contained in the recovery plan for this species (Hector 1990), the falcon once inhabited the southern third of the planning area, although this species is now very rare in New Mexico. In 2001, 2002, and 2003, falcon nesting was documented south of Deming, New Mexico. Previously, the last documented falcon nest in New Mexico was in 1952. Mainly due to recovery projects such as controlled releases, sightings of birds are increasing in the southwestern United States. Sightings in New Mexico have increased in recent years, with several observances across the western half of planning area in the last five years. Although breeding populations are known to exist in Mexico less than 214 miles from the U.S. border, successful release projects in Texas and New Mexico have increased the potential for breeding pairs to occupy nests in the United States (Montoya et al. 1997).

The aplomado falcon is a long-tailed falcon. The size of the falcon is intermediate between the American kestrel and prairie falcon. The back and dorsal side of the wings are blue-gray with a pronounced white trailing edge across the wing. The upper breast is white to creamy with variable amounts of black streaking, depending on the sex. There is a distinct broad dark or blackish band on the lower breast, which at close range may show faint white barring. The lower abdomen and undertail feathers are rufous (red), the tail striped. Unique to this falcon and useful to field identification is a pronounced white stripe above the eye.

Falcons appear to be year-long residents across most of their northern range where populations currently exist in Mexico. Nesting primarily occurs from March to June in northern Chihuahua, Mexico. Falcons typically use stick nests constructed by other large birds such as Swainson's hawks, white-tailed hawks, red-tailed hawk, Chihuahuan ravens (*Corvus cryptoleucus*), and possibly white-tailed kites (*Elanus leucurus*). Nests are usually situated in soaptree yuccas (Montoya et al. 1997), the tops of mesquite trees, human-made structures, or any other structure tall enough to avoid predation from animals such as coyotes and skunks. As such, nests are typically found at a height greater than 5 feet.

Prey species of the falcon vary from small birds to insects (Hector 1985). Avian prey species include meadowlark (*Sturnella neglecta*), common nighthawk (*Chordeiles minor*), northern mockingbird (*Mimus polyglottos*), western kingbird (*Tyrannus verticalis*), brown-headed cowbird (*Molothrus ater*), Scott's oriole (*Icterus parisorum*), mourning dove (*Zenaida macroura*), cactus wren (*Campylorhynchus brunneicapillus*), and pyrrhuloxia (*Cardinalis sinuatus*). Migratory bird numbers in New Mexico and the Chihuahuan Desert as a whole have declined, and the Hope Study Area, located in the northwestern portion of the CFO, is no exception. Native brush encroachment and agricultural development, including pesticide contamination, account for much of the declining condition of desert grasslands and coastal prairies within the former range of the falcon. Within the historic falcon range in the planning area, brush encroachment is mainly due to two main factors: historical overgrazing and wild fire suppression. Within the Hope Study Area, long-term efforts to reduce the density of native brush and restore historic grasslands have occurred and are planned to continue.

On July 26, 2006, a new ruling concerning the falcon was published in the *Federal Register* (Vol. 71, No. 143, pg. 42298). The designation will further the conservation of the listed species. The notice also defines the falcon status on BLM-managed lands as "threatened" under the ESA for the purposes of Section 9 (Prohibited Acts).

Currently the northern aplomado falcon habitat contained within the CFO boundary is experiencing minimal disturbance.

Interior Least Tern (Sterna antillarum athalassos)

Least terns are robin-sized birds about 8 inches long with a wingspan of 20 inches. The sexes are alike, characterized in the breeding plumage by a black crown, white forehead, grayish back and dorsal wing

surfaces, snowy white undersurfaces, yellow legs, and black-tipped yellow bill (*Federal Register* Vol. 46, No. 12).

Preferred tern habitat is associated with riverine areas where the birds use the sparsely vegetated sand and gravel bars within a wide river channel or salt flats along lake shorelines for nesting. This species is a colonial nesting shorebird and although it is associated with water, it spends most of its time on sand bars, playas, or snatching its food from the surface of the water. The riverine nesting areas of the tern are sparsely vegetated sand and gravel bars within a wide, unobstructed river channel or salt flats along lake shorelines.

This species is presently known in Chaves County along the Pecos River within the Bitter Lake National Wildlife Refuge. It would only be considered an accidental migrant to Eddy, Lea, and Roosevelt Counties, and the remainder of Chaves County. Since 2008, a small population has occasionally been observed around the Brantley Reservoir in Eddy County.

The interior least tern was listed as endangered on May 28, 1985, without critical habitat (*Federal Register* Vol. 46, No. 12). It is also listed by the NMDGF.

Currently all known nesting sites are located on Bureau of Reclamation–managed land. Nest locations have the potential of being impacted by upstream water discharges.

Kuenzler's Hedgehog Cactus (Echinocereus fendleri var. *kuenzleri)*

Kuenzler's hedgehog cactus has conical-shaped stems that usually grow solitarily or few in a cluster. The species generally stands between 4 and 6 inches high and approximately 2.5 to 4 inches wide. The stems contain seven to 12 tuberculate ribs, and each areole contains 4 to 5 spines radially clustered. The spines are fairly thick, usually white to gray in color, and have a dark longitudinal line. The lack of a central spine is one of the key identification characteristics used to distinguish this species from other similar species. The fleshy parts of the plant are dark green in color and fairly soft and flabby. In May it produces a large magenta flower, up to 11 cm in length and diameter.

Kuenzler's cactus occurs in specialized habitat that consists of rocky limestone benches and ridge tops between 5,200 and 6,900 feet in elevation (see Map 2.6 Special Status Species Aquatic and Plants). It is generally found on gentle south-facing slopes and often grows wedged against rocks, within grass clumps, or beneath shrub canopies.

Kuenzler's hedgehog cactus has a distribution that is limited to the Sacramento and Guadalupe Mountains of southern New Mexico. Presently, the only known populations of this cactus species occur in these mountain ranges of Eddy, Chaves, Lincoln, and Otero Counties. The largest known population within the planning area occurs northwest of Carlsbad on Texas Hill.

The Kuenzler's hedgehog cactus was listed as endangered on October 26, 1979 (*Federal Register* Vol. 46, No. 12). This species is also listed as endangered under the New Mexico Endangered Plant Species Act.

Currently disturbance within the habitat model for the species remains minimal. However, the area does experience an increased frequency of wildfire activity.

Pecos Gambusia (Gambusia nobilis)

The Pecos gambusia is a live-bearing fish and is similar to the killifish and topminnow family (Cyprinodontidae). The species is about 2 inches in length when fully grown. This Pecos gambusia has a dark lateral strip and a metallic gray-blue color.

The Pecos gambusia is most common in heads and runs of springs, where it uses such cover as aquatic vegetation for refuge (Bednarz 1975, 1979). The fish associates in loose schools that spend much of the time near the surface, typically near the edges of any body of water. The Pecos gambusia inhabits shallow areas of alkaline waters with aquatic vegetation for cover.

The springs and gypsum sinkholes on Bitter Lake National Wildlife Refuge near Roswell and Blue Spring and its outflow near White's City are the only known areas of regular occurrence of Pecos gambusia in New Mexico (Bednarz 1979; Echelle and Echelle 1980). The largest population is at Blue Spring, where many thousands of these fish occur (Koster 1957). The state's other, much smaller, population occupies the limestone sinks and associated areas on Bitter Lake National Wildlife Refuge. In Blue Spring, Pecos gambusia were common in headwaters and diminished in abundance in the spring run as it flowed to its confluence with Black River (Bednarz 1979; Echelle and Echelle 1980). Within ponded habitats and gypsum sink holes on Bitter Lake National Wildlife Refuge and Blue Spring, the Pecos gambusia appears stable.

The Pecos gambusia was federally listed as endangered on October 13, 1970 (*Federal Register* Vol. 46, No. 12) and listed as endangered in 1975 by the State of New Mexico (19 New Mexico Annotated Code [NMAC] 33.1).

The identified population of the species occurs on privately owned land

Sneed's Pincushion Cactus (Coryphantha sneedii var. *sneedii)*

This plant species occupies rocky, limestone soils, steep slopes, and broad alluvial fan communities. All known populations are located in Doña Ana and El Paso Counties, New Mexico and Texas, respectively (*Federal Register* Vol. 46, No. 12). Sneed's pincushion cactus is known from the northern Chihuahuan Desert east of Las Cruces, New Mexico, in Doña Ana County. It was discovered in 1921 and has been sought by collectors since that time, even though the plant can be propagated in cultivation (*Federal Register* Vol. 46, No. 12). No survey data exists for this species for the CFO planning area; therefore, it is unknown whether the species is present within CFO boundaries.

Sneed's pincushion cactus was listed as an endangered species on November 7, 1979 (*Federal Register* Vol. 46, No. 12). Currently disturbance within the habitat boundary for the species remains minimal.

Threatened Species

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is a large hawk-like bird that is 3 feet long and has a wingspan of 6 to 7 feet (*Federal Register* Vol. 46, No. 12). Adults have a white head, neck and tail, a curved yellow beak and unfeathered feet.

Bald eagles are generally associated with medium to large perennial streams, rivers, and other water bodies that provide an adequate prey base and appropriate nesting or roosting habitat. Outside the major river corridors (e.g., Rio Grande, Pecos), the bald eagle has been observed to be a migrant only due to the lack of appropriate habitats.

Bald eagles ranged throughout the contiguous United States, Canada, and northern Mexico (*Federal Register* Vol. 46, No. 12). Historically this species was not very abundant in the southwestern United States. This species occupies New Mexico primarily as a migrant and winter resident (*Federal Register* Vol. 46, No. 12). Bald eagles are known to nest at only one site in Southern New Mexico, Caballo Reservoir in Sierra County (BLM 1996). No known nesting has been documented within Chaves, Eddy, Lea, or Roosevelt Counties.

In July 1994, the USFWS proposed to reclassify the bald eagle from endangered to threatened in the lower 48 states, including the southwestern region and Mexico. The bald eagle was reclassified on August 11, 1995 (*Federal Register* Vol. 46, No. 12). This species is also listed as threatened by the State of New Mexico.

The bald eagle population is in an upward trend throughout the United States, where breeding pairs have increased from 417 in 1963 to 5,750 in 1998 (Biota Information System of New Mexico [BISON-M] 2010). The largest populations are found in Alaska and Canada, as well as significant populations in Washington, Oregon, Minnesota, Wisconsin, and Michigan (*Federal Register* Vol. 46, No. 12).

Reports of species presence are uncommon; this may be a result of infrequency of surveys for the species.

Mexican Spotted Owl (Strix occidentalis lucida)

The Mexican spotted owl is a medium-sized owl with large dark eyes and no ear tufts that closely resembles the barred owl (*Federal Register* Vol. 58, No. 49, pg. 14248–14271). Plumage is brown with numerous white spots. The length is about 17 inches and wingspan is 3.3 feet.

The Mexican spotted owl occupies mountainous areas, with its preferred habitat consisting of dense, multi-storied forests with moderately closed to closed canopies. In addition, these owls have been found in canyon systems with little or no tree cover and appear to provide the same or similar microclimate as dense multi-storied forests (*Federal Register* Vol. 58, No. 49, pg. 14248–14271).

The range for the Mexican spotted owl extended from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah southward through Arizona and New Mexico, and far western Texas, through the Sierra Madre Occidental and Oriental, to the mountains at the southern end of the Mexican Plateau (*Federal Register* Vol. 58, No. 49, pg. 14248–14271).

In New Mexico, the owl has been recorded in all montane regions from the San Juan, Jemez, and Sangre de Cristo Mountains in the north, to the Guadalupe and Animas Mountains in the south. The largest concentration occurs in the Mogollon and Sacramento Mountains. Other records exist for Navajo Lake, Mountainair, the lower San Francisco Valley, Estancia, Grants, Hurley, the Burro Mountains, Carlsbad Caverns National Park, and San Andres National Wildlife Refuge (*Federal Register* Vol. 58, No. 49, pg. 14248–14271).

The Mexican spotted owl was listed as threatened on March 16, 1993 (*Federal Register* Vol. 58, No. 49, pg. 14248–14271). This species is currently not listed by the State of New Mexico. No critical habitat has been designated by the USFWS on any BLM-managed land within the planning area; however, this species is only known to occur within the Guadalupe Mountains (U.S. Forest Service [USFS]) and Carlsbad Caverns National Park (*Federal Register* Vol. 58, No. 49, pg. 14248–14271).

Pecos Bluntnose Shiner (Notropis simus pecosensis)

The Pecos bluntnose shiner is a relatively small, moderately deep-bodied minnow, rarely exceeding 3 inches. Females release non-adhesive, semi-buoyant eggs in the water column and males immediately fertilize them (NMDGF 2004). After fertilization, the eggs drift with the current. Development of eggs is rapid and larvae hatch in 24 to 48 hours (NMDGF 2004).

Hatch et al. (1985) reported that Pecos bluntnose shiner may live three years, but most individuals probably survive less than two years. Most growth occurs in the first year of life. Maturity is attained by year 1.

The Pecos bluntnose shiner is endemic to the Rio Grande and the Pecos River in New Mexico and the El Paso/Cuidad Juarez area of Texas and Chihuahua (Gilbert 1980; Chernoff et al. 1982). The species historically occupied the Pecos River from near Santa Rosa downstream to the vicinity of Major Johnson Springs, now inundated by Brantley Reservoir (Hatch et al. 1985). Currently, this shiner is found only in the Pecos River from about the U.S. 60 Highway Bridge near Fort Sumner downstream to Artesia, and seasonally within the inflow area of Brantley Reservoir (see Map 2.6 Special Status Species Aquatic and Plants). Within the planning area, designated critical habitat occurs from the Chaves/Eddy County line to Highway 82 running east from Artesia.

The Pecos bluntnose shiner was listed by the State of New Mexico as threatened (19 NMAC 33.1) in 1976 (USFWS 1987). The species is listed as endangered in Texas (Texas Parks and Wildlife Department 1993) and the Republic of Mexico (Mexico Ministry of Social Development 1991). Abundance of the Pecos bluntnose shiner has declined considerably in the past 50 years (NMDGF 2004).

Pecos bluntnose shiner critical habitat is divided into two separate reaches designated as upper and lower critical habitat (USFWS 1987). Lower critical habitat is a 37-mile reach extending from Hagerman to Artesia. The lower critical habitat is within the CFO boundaries. This area was chosen for critical habitat designation because of permanent flow and populations of the Pecos bluntnose shiner.

Gypsum Wild-Buckwheat (Eriogonum gypsophilum)

This member of the knotweed family is a small, erect, herbaceous perennial, which measures about 8 inches high. It is a perennial herb with a branching flower stalk arising from a cluster of basal leaves (USFWS 1984). Gypsum wild-buckwheat grows in gypsum soils under semiarid conditions.

Gypsum wild-buckwheat has a distribution that is limited to only Eddy County, New Mexico. It is only known to occur in three locations: Seven Rivers Hills, Black River south, and Ben Slaughter Draw (see Map 2.6 Special Status Species Aquatic and Plants). BLM-administered land in the Seven Rivers Hills area has been designated as critical habitat for the species. Gypsum wild-buckwheat was first collected in 1908 southwest of Lakewood, New Mexico (Wooten and Standley 1913).

On January 19, 1981, gypsum wild-buckwheat was designated as threatened with critical habitat (USFWS 1984).

Seven Rivers Hills

The population of gypsum wild-buckwheat is not continuous across the gypsum outcrop and the density within patches can vary from 0.004 to 1.22 plants per square meter (Knight 1993). The use of different methods to estimate the population over the years has produced varying results, but the final estimate by Knight (1993) was approximately 11,000 individuals. The original acreage estimate of 109 acres of occupied area was used as the basis for the recovery criterion to maintain a population of 10,000 plants, yet it was an overestimation due to new mapping techniques that resulted in the delineation of 40.3 acres actually occupied by gypsum wild-buckwheat (USFWS 2007).

Currently this is a multi-use area that is primarily used for cattle grazing, oil and gas leasing, and OHV recreation. The Seven River Hills also has the potential for increased oil and/or gas extraction.

Black River

A combination of average density estimates (Knight 1993) of 0.14 plant per square meter and Tonne's map (Tonne 2005) showing 29.5 acres of habitat (compared to the previously thought 80 acres) results in a minimum population number of 16,660 plants (USFWS 2007).

Since 1988 when the population was discovered, much of the area has been fenced to not allow accessibility to OHV traffic or grazing, yet numerous oil and gas wells exist in the surrounding area coupled with access roads. Most of the disturbance from activities within the population is on and adjacent to private land, but gas pipelines and roads also bisect the population elsewhere. There are 15 active gas wells, two water wells, and one abandoned well within a 1-mile radius of the occupied habitat, with three leased parcels for oil and gas encompassing a majority of the area.

Ben Slaughter Draw

As of 2005, the occupied area of gypsum wild-buckwheat is approximately 154.1 acres consisting of a population estimate of 18,720 plants (USFWS 2007).

Current land use in this area consists primarily of livestock grazing due to an abundant water source, which has allowed movement of cattle through gypsum wild-buckwheat habitat. Some management measures have been made to limit the disturbance in the population areas. NSO stipulations have been placed in some areas due to the land use in the areas; populations are located on leased parcels for oil and gas. To date, no development has occurred.

Lee's Pincushion Cactus (Coryphantha sneedii var. *leei)*

The Lee's pincushion cactus forms tight clumps of as many as 100 stubby, club-shaped stems, 0.6 to 7.5 inches tall and 0.4 to 1.2 inches in diameter. Stems are densely covered with white spines, giving each plant the appearance of a mass of white-spined balls. Pink-tipped central spines are clustered six to 17 per areole; radial spines are clustered 35 to 90 per areole.

This species generally occurs on north-facing slopes in limestone hills at elevations ranging from 4,100 to 5,900 feet. They grow in shallow soils on stair-step limestone cracks and shelves of broken terrain and steep slopes in Carlsbad Caverns National Park. Vegetation ranges from short grassland brush to piñon-juniper. Similar habitat occurs on BLM lands surrounding the park (see Map 2.6 Special Status Species Aquatic and Plants).

This cactus is known from 10 populations in Carlsbad Caverns National Park. In 1982 and 1983, BLM biologists conducted extensive field surveys but did not discover any new populations outside the park boundary. In 1998, the New Mexico Natural Heritage Program conducted surveys in Serpentine Bend, north of Carlsbad Caverns National Park, and found a single specimen. In 1999, the BLM continued its survey efforts and found approximately 75 additional plants.

Lee's pincushion cactus was first listed as a threatened species on October 25, 1979.

Tharp's Blue-Star (Amsonia tharpii)

Tharp's blue-star is a suffrutescent herb that stems from a woody rootstock. The perennial herb grows small, star-shaped greenish-white or pale blue flowers and narrow, dense leaves. This species occurs in limestone and gypsum hills in Chihuahuan desert scrub communities. It is generally found at an elevation range between 3,100 and 3,500 feet.

The entire distribution of Tharp's blue-star is restricted to Eddy County and adjacent Pecos County, Texas. All three of the presently known New Mexico populations occur in Eddy County (see Map 2.6 Special Status Species Aquatic and Plants).

Tharp's blue-star is listed by the state of New Mexico as endangered, while it is considered a species of concern by the USFWS.

Candidate Species

Lesser Prairie-Chicken (Tympanuchus pallidicinctus)

The lesser prairie-chicken is a medium-sized, grayish brown grouse with a total length of 14 to 16 inches (Johnsgard 1983; Olawsky 1987). The sexes are similar and plumages are similar throughout year. In adults, most of body is barred with alternating dark (brown) and light (buffy white) bands. Dark bands on upperparts are complex, including black and cinnamon tones; light bands on upperparts range from buff to white. Upperparts are therefore darker and more richly colored than under parts; the chin and throat are largely unmarked. The tail is short, rounded, and brownish black. Males display bright yellow eye-combs above the eyes and dull red esophageal "air sacs" on the side of neck during courtship (Copelin 1963; Sutton 1977; Johnsgard 1983). Males also have a tuft of elongated feathers (pinnae) on each side of the neck; these are held erect during courtship display. Females have shorter pinnae. Juveniles are similar to adults, but more richly colored, especially on the throat.

In New Mexico, the lesser prairie-chicken formerly occupied a range that encompassed the easternmost third of the state, extending to the Pecos River and 30 miles west of the Pecos near Fort Sumner. This covered about 14,672 square miles by the beginning of the twentieth century, and populations still existed in nine eastern counties: Union, Harding, Chaves, De Baca, Quay, Curry, Roosevelt, Lea, and Eddy. Currently, populations exist only in parts of Lea, Eddy, Curry, Chaves, and Roosevelt Counties, comprising about 23% of the historical range.

Lesser prairie-chickens are found throughout dry grasslands that contain shinnery oak or sand sage. Currently, they are most commonly found in sandy-soiled, mixed-grass vegetation, sometimes with short-grass habitats with clayey or loamy soils interspersed. They are occasionally found in farmland and smaller fields, especially in winter. Shinnery oak shoots are used as cover and produce acorns, which are important food for the species. The current geographic range of shinnery oak is nearly congruent with that of the lesser prairie-chicken, and these species sometimes are considered ecological partners. Population densities of lesser prairie-chicken are greater in shinnery oak habitat than in sand sage habitat.

Lesser prairie-chickens use a breeding system in which males form display groups. These groups perform mating displays on arenas called leks. During mating displays male vocalizations, called booming, attract females to the lek. Leks are often on knolls, ridges, or other raised areas; however, leks are just as likely to be on flat areas in New Mexico such as roads, abandoned oil drill pads, dry playa lakes, or at the center of wide, shallow depressions. Leks may be completely bare, covered with short grass, or have scattered clumps of grass or short tufts of plants. An important physical requirement for location of leks is the visibility of surroundings, but the most important consideration is ability to hear male vocalizations.

In 1987, there were 35 documented active booming grounds known to exist in the planning area. Survey data from 1971 through 1997 analyzed by the New Mexico Natural Heritage show a clear and substantial decline in population after 1988, particularly in the southern periphery of their range. Intensive spring lek surveys in the planning area in 2001 detected only one remaining active lek occupied by two males. Recent surveys found small, scattered groups of birds around historic areas and lek sites. Lesser prairie-chicken populations on BLM-managed lands and surrounding areas south of Highway 380 in Eddy and Lea Counties are very near extirpation.

In June 1998, the USFWS issued a statement regarding their status review of the lesser prairie-chicken. It stated, “Protection of the lesser prairie-chicken under the Federal Endangered Species Act (ESA) is warranted but precluded which means that other species in greater need of protection must take priority in the listing process.” Given the current federal candidate status of this species, the BLM is mandated to carry out management consistent with the principles of multiple use, for the conservation of candidate species and their habitats, and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered (BLM Manual 6840.06).

The Isolated Population Area consists of 597,953 acres of land in which 93% of it has been leased for mineral exploration.

Dunes Sagebrush Lizard (Sceloporus arenicolus)

The dunes sagebrush lizard is a small light brown spiny lizard with only stripes on the body. The species has a limited geographic range including parts of Chaves, Eddy, Lea, and Roosevelt Counties of southeastern New Mexico and four counties in Texas. The dunes sagebrush lizard is a habitat specialist, found exclusively in association with shinnery oak dune complexes. These complexes are patchworks of shinnery oak and scattered sand sage interspersed with areas of open sand and wind-created sandy blowouts. These complexes create ideal habitat for the dunes sagebrush lizard. Within the planning area, dunes sagebrush lizards have been found primarily in the Mescalero Sands, which extend through eastern Eddy and southern Lea Counties. Significant reductions of dunes sagebrush lizard population sizes are associated with the removal of shinnery oak due to oil and gas development and herbicide spraying.

The USFWS was petitioned on May 28, 2002, by the Center for Biological Diversity and Chihuahuan Desert Conservation Alliance to list the dunes sagebrush lizard as an endangered species under the ESA. In May 2005, the USFWS issued a statement regarding its status review of the dunes sagebrush lizard. On December 14, 2010, the USFWS proposed to list the dunes sagebrush lizard as endangered under the ESA. If the USFWS finalizes the rule as proposed, it would extend the ESA’s protections to the dunes sagebrush lizard. Critical habitat has been deemed prudent, however, not determined. On June

14, 2012, the USFWS withdrew the dunes sagebrush lizard for federal listing under the ESA. The species remains a BLM sensitive species.

Texas Hornshell (Popenaias popei)

The Texas hornshell is a bivalve mollusk, meaning it looks like a clam with two hard shells. The outer shell surface appears olive green to dark brown. They may grow as long as 7 inches. Inside there is a muscular foot for movement, siphons for water exchange, gills, and the viscera.

This mussel occurs in sand and sand-cobble accumulated in travertine bedrock cracks and at the base of large boulders at depths of 0.8 to 4.5 feet and at flow rates of 0.78 to 29.5 inches per second, often in colonies and at the head or lower end of travertine runs (Carmen 2007). The species imbeds itself in softer bottoms, exposing only the siphonal areas in such situations. In rocky sites, it lodges itself in cracks and crevices. In the latter situation, the species is probably immobile, whereas it undoubtedly moves about in substrates such as mud and sand.

Historically, the Texas hornshell occurred in the lower Pecos River of New Mexico, downstream throughout the lower Rio Grande (Brownsville, Texas) and major tributaries in Texas, southward to the Río Pánuco drainage of San Luis Potosí, México (Metcalf 1982). In New Mexico, this species was common in the lower Pecos River from North Spring River near Roswell in Chaves County (Cockerell 1902), including the Black and Delaware Rivers, Eddy County (Metcalf 1982). The hornshell has declined notably throughout its historic range.

This species was listed as a candidate species on October 30, 2001. Status assessment of the Texas hornshell throughout its historic range is ongoing with inventory efforts being coordinated between the USFWS, the NMDGF, the Texas Parks and Wildlife Department, and private land stewards.

2.1.8.3 Trends

Special status species diversity and abundance is directly related to maintaining habitat availability, diversity, and quality. The species of major concern, listed above, all have their own specialized habitat requirements. Much of these habitat types have been drastically altered or reduced from their historic native ranges.

The three populations of gypsum wild-buckwheat are fenced in order to protect the populations from motorized traffic. Fencing would contribute to eliminating a considerable threat to all three gypsum wild-buckwheat populations.

Habitat degradation in the form of historic overgrazing, oil and gas development, and brush encroachment have reduced the quality of the shinnery oak grasslands and dune complexes. This has been a large contributing factor to the decline of lesser prairie-chicken and dunes sagebrush lizard populations in the planning area. Disruptive human activity and noise disturbance (e.g., drilling rigs, pipeline compressors, pumpjacks, highways) may also be a contributing factor to the decline in less prairie-chicken populations. Male lesser prairie-chickens rely on using vocalization to attract a mate, and such noise disturbances may inhibit the female's ability to hear these calls. Perhaps the largest contributing factor to the decline of dunes sagebrush lizards has been habitat fragmentation from oil and gas development. Pipeline rights-of-way, access roads, and other surface disturbances act as barriers and may potentially isolate populations from preferable habitat and other populations of dunes sagebrush lizard. The northern aplomado falcon's preferred habitat of native desert grasslands have drastically declined due to brush encroachment and agricultural development, including pesticide contamination.

The forms of habitat degradation mentioned above may have also had an adverse affect on the habitat of other special status species within the planning area.

2.1.8.4 Forecast

Continuing threats to native ecosystems and species diversity in the planning area include fragmentation and loss of critical or important habitat due to human activities. The cumulative impact from all disturbances is of concern, particularly for those species that are shinnery oak grassland and sand dune complex obligates. Additionally, invasive species may continue to displace native vegetation, which indirectly impacts the distribution and populations of wildlife species.

Restore New Mexico was initiated in 2005 as a partnership to restore the state's grasslands and riparian areas to a healthy and productive condition. Other objectives include preventing the listing of candidate species, improving health and biological diversity of the land after energy development has taken place, removing saltcedar from waterways and increasing natural biodiversity of riparian areas, and reintroducing fire to the landscape. These goals are being accomplished by treating invasive brush species using aerial herbicide application and prescribed fire and by decreasing habitat fragmentation areas impacted from oil field development. These efforts have already successfully restored over 615,000 acres within the planning area and many more acres have been defragmented. This has led to larger areas of suitable habitat for special status species and for numerous other wildlife species.

In 2008, a Candidate Conservation Agreement/Candidate Conservation Agreement with Assurances was initiated by the BLM, the USFWS, and the Center of Excellence for Hazardous Materials Management. These organizations are working in cooperation with industry and landowners in support of conservation measures for the lesser prairie-chicken and dunes sagebrush lizard. The agreements allow the parties to work cooperatively on habitat restoration projects exclusively in areas identified as significant to these species.

The CFO is currently working on a multitude of management practices in attempt to minimize habitat degradation from other resource uses. With the implementation of current rangeland conservation practices, the effects of cattle grazing would not likely lead to further habitat degradation. CFO staff members are working closely with industry representatives to use BMPs and locate projects away from areas and resources of concern. This has minimized the impacts to multiple special status species. Several other BMPs, stipulations, and restrictions (e.g., less prairie-chicken timing stipulations) have also been created in attempts to further minimize the adverse effects from human activity on special status species and their habitat.

2.1.8.5 Key Features

Key features in the planning area consist of specific geographic areas and habitats associated with special status species. The protection and management of these key habitat features is very important to the protection and conservation of the species; some has even been deemed as critical habitat. Critical habitat is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that would be needed for its recovery. These key features are further described within the species profiles of the Current Condition section (2.13.2). The most critical features in the planning area, and their associated special status species, consist of the following habitats:

- Hope Grasslands – northern aplomado falcon
- Blue Spring – Pecos gambusia
- Mescalero Sands – lesser prairie-chicken, dunes sagebrush lizard
- Seven Rivers Hills – gypsum wild-buckwheat
- Serpentine Bends – Lee's pincushion cactus
- Texas Hill – Kuenzler's hedgehog cactus

Sand Shinnery Oak Communities

Sand shinnery communities comprise the nation's largest stand of oak and occupy 5 to 7 million acres of the southern Great Plains, extending from northern Texas and western Oklahoma southward into

Chihuahuan Desert scrubland. The stand is made up of ancient plants, most of them hundreds or thousands of years old. This oak forest is only 1 to 4 feet tall. The visible shrubs are mostly the short-lived twigs of massive underground stem systems, which slowly spread under areas up to 2 acres or more. The oaks co-dominate the community with mid and tall grasses that are usually taller than themselves. Sand shinnery is defined by shin-oak, also called Havard oak, midget oak, and sand shinnery oak. Shin and shinnery are Louisiana French from chêne and chênière, which mean oak and oak woodland. Other shinneries cover millions of acres from Louisiana to central Texas and Oklahoma, but they are dominated by oak species that are small trees, rather than co-dominated by oak-shrubs and grasses as is sand shinnery.

Riparian Areas

Riparian areas and their associated river systems and springs provide keystone habitat for riparian obligate and dependent avian species. Riparian areas provide avian migration stopover sites. Long-distance migration requires exceptional energy reserves, and migratory birds must rest and replenish fat reserves while traveling between wintering and breeding areas. Riparian areas contain trees and shrubs that are required for roosting or foraging by most riparian birds. Riparian forests support a greater diversity of wildlife than nearly all non-aquatic areas or upland forests. Mammals depend on the vegetation found within riparian areas for food and shelter. The increased humidity of riparian areas makes them important habitat for amphibians, snakes, and turtles.

Riparian areas are crucial to the protection and enhancement of the water resources of the United States. They are extremely complex ecosystems that help provide optimum food and habitat for stream communities as well as being useful in mitigating or controlling nonpoint source pollution.

2.1.8.6 Current Management

All actions conducted in the CFO must comply with the ESA.

Special Status Species are managed as per the Special Status Species RMPA 2008.

The CFO will continue to implement the Candidate Conservation Agreement for the dunes sagebrush lizard and lesser prairie-chicken.

The CFO will continue to implement BLM Manual 6840-Special Status Species Management.

2.1.8.7 Management Opportunities

No mineral pits, overhead power lines, or wind projects within lesser prairie-chicken habitat areas.

Eliminate cattle grazing within lesser prairie-chicken habitat areas and remove associated pasture fences.

2.1.9 Noxious Weeds and Invasive Species

Profile

Invasive plants disrupt or have the potential to disrupt or alter the natural ecosystem function, composition, or diversity of the site it occupies. These species can complicate the use of local natural resources and may interfere with management objectives for the site. Noxious weeds are native or non-native plants that are unwanted in a particular area at a particular time, as designated by the New Mexico Department of Agriculture (NMDA), pursuant to the Noxious Weed Management Act of 1998. Although noxious weeds are usually non-native, a distinction is made in this document because they can and do include undesirable native plants.

Invasive plants are widespread and can cause damage to crops, affect entire industries, and harm the environment and public health. For centuries, people have moved plants, animals, and microbes around the world. Most countries now rely on plants and animals from other regions of the world in order to meet

their dietary needs. Organisms that have been moved from their native habitat to a new location, especially from a different country, are typically referred to as non-native.

On BLM-managed lands, the degree of impact from invasive plants depends on the growth characteristics of that species, density, size of infestation, land cover type being invaded, resources threatened, potential economic impacts, and cost of control or eradication of the invader.

2.1.9.1 Indicators

Indicators include the presence of a noxious weed or invasive plant population, the size of the population, acres of treatment completed to control these populations, and success of the control treatment.

While no formal inventory of noxious weed or invasive plant populations has been conducted, a continual inventory is the result of reports by all field-going BLM personnel. In addition, public land users, such as grazing permittees, oil and gas operators, recreationists, and others often report the location of these populations. Once a population is found, the BLM coordinates with various land users to plan and implement treatment methods to remove or control the population.

2.1.9.2 Current Condition

In the planning area, invasive plant infestations begin as small patches in disturbed areas such as pipeline and utility corridors, roads, oil and gas locations, undeveloped vehicle trails, range improvement projects, and mining operations. Other means of invasive plant establishment come from plant and seed transport with purchased forage and hay for winter livestock feeding. Invasive species seeds are unknowingly transported to disturbed areas where they can out-compete native vegetation.

The State of New Mexico places designated invasive plants into four categories:

- **Class A:** Currently not present in New Mexico or has limited distribution.
- **Class B:** Limited to portions of the state. In areas with severe infestations, management should be designed to contain the infestation and stop any further spread.
- **Class C:** Widespread. Management decisions for these species should be determined at the local level based on feasibility of control and level of infestation.
- **Watch List:** Species of concern with the potential to become problematic. More data are needed to determine if these species should be listed.

Table 2.1-18 lists the State of New Mexico's designated invasive plants and invasive plants declared on the Eddy County designated list. Lea and Chaves Counties use the New Mexico Noxious Weed List.

Table 2.1-18. New Mexico and Eddy County Noxious Weed List

Common Name	Scientific Name	Life Cycle	New Mexico Category	Eddy County
Alfombrilla	*Drymaria arenariodes*	P	Class A	
African rue	*Peganum harmala*	P	Class B	X
Black henbane	*Hyoscyamus niger*	A/B	Class A	X
Bull thistle	*Cirsium vulgare*	B	Class C	X
Camelthorn	*Alhagi pseudalhagi*	P	Class A	X
Canada thistle	*Cirsium arvense*	P	Class A	X
Cheatgrass	*Bromus tectorum*	A	Class C	
Chicory	*Cichorium intybus*	B/P	Class B	
Crimson fountaingrass	*Pennisetum setaceum*	P	Watch List	
Dalmation toadflax	*Linaria dalmatica*	P	Class A	X
Diffuse knapweed	*Centaurea diffusa*	B	Class A	
Dyer's woad	*Isatis tinctoria*	A/B/P	Class A	
Eurasian watermilfoil	*Myriophyllum spicatum*	P	Class A	
Giant cane	*Arundo donax*	P	Watch List	

Common Name	Scientific Name	Life Cycle	New Mexico Category	Eddy County
Giant salvinia	*Salvinia molesta*	P	Class A	
Goldenrod	*Bigelowia* spp.	P		X
Halogeton	*Halogeton glomeratus*	A	Class B	
Hoary cress	*Cardaria* spp.	P	Class A	
Hydrilla	*Hydrilla verticillata*	P	Class A	
Jointed goatgrass	*Aegilops cylindrica*	A	Class C	
Leafy spurge	*Euphorbia esula*	P	Class A	X
Malta starthistle	*Centaurea melitensis*	A	Class B	X
Meadow knapweed	*Centaurea pratensis*	P	Watch List	
Musk thistle	*Carduus nutans*	B	Class B	X
Oxeye daisy	*Leucanthemum vulgare*	P	Class A	
Pampas grass	*Cortaderia selloana*	P	Watch List	
Parrotfeather	*Myriophyllum aquaticum*	P	Class A	
Perennial pepperweed	*Lepidium latifolium*	P	Class B	
Poison hemlock	*Conium maculatum*	B	Class B	X
Purple loosestrife	*Lythrum salicaria*	P	Class A	
Purple starthistle	*Centaurea calcitrapa*	A/P	Class A	X
Quackgrass	*Elytrigia repens*	P	Watch List	
Ravenna grass	*Saccharum ravennae*	P	Class A	
Russian knapweed	*Acroptilon repens*	P	Class B	X
Russian olive	*Elaeagnus angustifolia*	P	Class C	X
Sahara mustard	*Brassica tournefortii*	A	Watch List	
Saltcedar	*Tamarix* spp.	P	Class C	X
Scotch thistle	*Onopordum acanthium*	B	Class A	X
Siberian elm	*Ulmus pumila*	P	Class C	X
Spotted knapweed	*Centaurea biebersteinii*	B/P	Class A	X
Teasel	*Dipsacus fullonum*	B	Class B	X
Tree of heaven	*Ailanthus altissima*	P	Class B	
Yellow starthistle	*Centaurea solstitialis*	A	Class A	X
Yellow toadflax	*Linaria vulgaris*	P	Class A	X

Note: A = Annual, B = Biennial, P = Perennial
Source: Eddy County Coordinated Weed Management Group 2007; NMDA 2009.

A complete invasive plant inventory has not been conducted in the planning area. In some areas, efforts have resulted in substantial control and reduced the spread of certain species, such as saltcedar. Other species, especially African rue (*Peganum harmala*) and Malta starthistle (*Centaurea melitensis*) have continued to expand their populations and the number of infested acres is increasing. In addition, one new weed species, Russian knapweed (*Acroptilon repens*), has been reported in a limited area in the southern portion of the planning area.

The CFO controls invasive plant species on BLM-managed lands through cooperative agreements with the Chaves, Eddy, and Lea County Coordinated Weed Management Groups. In addition to county agencies, the CFO works in cooperation with other federal and state agencies, private landowners, and energy production companies. The CFO also addresses invasive plant management by incorporating prevention and control measures in realty, wildlife, range, recreation, oil and gas, and other mineral-related actions. Generally speaking, county agencies, as well as pesticide use proposals from resource users, have not been able to meet all the weed control needs in the planning area.

The primary species targeted for treatment on BLM-managed lands include African rue, Malta starthistle, Russian olive, and saltcedar. In a few areas, these plants have moved out of the disturbed areas and into the rangelands. The present goal is to contain and reduce densities of invasive species populations to levels that are considered manageable. Table 2.1-19 lists the invasive plants that have been treated recently in the planning area. Map 2.9 shows the noxious weed treatement areas.

Table 2.1-19. Number of Acres Treated for Invasive Plants in the Planning Area

Species	2007	2008	2009	2010
African rue	717	1,462	3,078	989
Malta starthistle	3,293	809	1,106	1,356
Saltcedar	1,200	1,964	932	170
Goldenrod	0	0	0	216

Source: BLM 2007, 2008, 2009, 2010.

2.1.9.3 Trends

Observations indicate some invasive plants are spreading or increasing in density in some parts of the planning area, especially in oil and gas fields, interstate corridors, and some watersheds. Typically, as ground disturbance increases in areas of known populations, the likelihood that invasive plants would move into this disturbance goes up. On average, about 5,000 acres of surface disturbance occurs annually due to oil and gas activities within the planning area. Focused efforts, such as Restore New Mexico and regular, routine treatments by oil and gas companies, have limited the spread and reduced the size of invasive plant populations in localized areas.

Two non-native species, the perennial forb African rue and the annual Malta starthistle, have populations that occupy mainly disturbed areas and have steadily increased, invaded nearly every soil type, and received the bulk of the control treatments. These plant species are very competitive with native plants for soil nutrients and available water. Using currently approved available herbicides and methodologies, control has been achieved where these species have been treated. It has not been feasible to initiate large-scale control efforts on African rue and Malta starthistle at this time. However, from 2005 through 2012, treatment to control these two species has been done on 23,026 acres.

Progress has been made on saltcedar control in most of the planning area. Through an aggressive combined effort, with partners contributing funding, equipment, manpower, or a combination of these, the majority of the once-infested riparian areas were treated. Over the last eight to 10 years, BLM-managed lands along the Pecos, Black, and Delaware Rivers have had nearly all the saltcedar removed. Currently, maintenance treatments to keep these areas free of saltcedar are ongoing. Additionally, many of the drainages that feed these rivers are being treated to control or remove saltcedar. From 2005 through 2012, saltcedar treatment has been done on 17,682 acres.

Although federal, state, county, and private entities are working to control a majority of the invasive plant species, invasive control objectives are not being fully met because of the scale of infestations and lack of resources.

2.1.9.4 Forecast

Invasive plant species are expected to continue to spread. The degree to which these species spread is directly correlated to human activities and control efforts in the area. Some of these species, such as African rue and Malta starthistle, are very invasive and readily transported to non-infested areas. Surface-disturbing activities and vehicular travel mainly contribute to weed proliferation, although natural elements, such as wind and wildlife, could also contribute. Range animals, livestock and horses, also increase the opportunities for invasive plant species to spread and become established.

The potential for invasive plant expansion is very high in areas of oil field development due to the amount of ground disturbance. The potential for establishment is high in newly disturbed areas, especially near existing populations. Without some control treatment, the infestation can move into undisturbed lands. This infestation would contribute to the loss of rangeland productivity due to competition for water and nutrients, increased soil erosion, reduced water quantity and quality, reduced structural and species diversity, and loss of wildlife habitat. Invasive plants would continue to serve as fuel and post-fire invaders, interfere with recreational opportunities, and be hazardous to human health and welfare. This would result in economic and public safety impacts and degradation to rangelands and riparian areas.

While it is difficult to predict future introductions of other listed invasive species, the most likely areas for introduction are those where new disturbances occur. Historical evidence would indicate that new invasive species would be introduced in the planning area and become established if not eradicated immediately.

Control of invasive plants, such as African rue and Malta starthistle, would be dependent on the cost and feasibility of available treatment methods. Resource management strategies, such as minimizing surface disturbance and surface-disturbing activities, prompt reclamation of these disturbed areas, reducing traffic through infested areas, and fire suppression tactics would all contribute to maintaining current levels or reducing the expansion of these species. Research continues in developing new herbicide formulations and the existence and effectiveness of biological agents, including pathogens, to serve as future tools in controlling invasive plant species that create a threat of spreading into and out-competing native plant communities.

2.1.9.5 Key Features

Any vegetative community is susceptible to invasive plants, but sites that are especially vulnerable include areas where soils have been disturbed and the native plant community has been displaced or destroyed. Road corridors are vulnerable as vehicles can transport seeds from other locations. Riparian corridors also provide the perfect growing medium, including nutrient-rich soils, ample moisture, and remote locations. Other areas that can easily be invaded include areas of overgrazing, recreation, active mining, mineral development, and areas that have experienced wildland fires.

Key features for invasive species include areas of known infestations identified on County Weed and Pest Maps, as well as areas of potential infestations including oil and gas facilities and associated developments, riparian zones, and transportation and utility corridors.

2.1.9.6 Current Management

The 1997 and 2008 RMPAs provided the following guidance for management of noxious weeds and invasive species in the planning area. Implementation of these actions is ongoing.

- The holder shall be responsible for weed control on disturbed areas within the limits of the site. The holder is responsible for consultation with the Authorized Officer and/or local authorities for acceptable weed control methods, which include following EPA and BLM requirements and policy.
- There would be no primary or secondary noxious weeds in the seed mixture.
- Application of herbicides is in conformance with BLM. Manual 9220 and the State of New Mexico and EPA standards. Only those herbicides authorized by the EPA, the NMDA, and the USDI are proposed for use, and must be registered by the EPA and NMDA. NMDA restricted use regulations are consulted prior to any herbicide application.
- The BLM Roswell Field Office and CFO conduct noxious weed control via a Memorandum of Understanding between various federal, state, county, and city agencies and private entities. These populations should be aggressively controlled to eliminate them or keep them small. Priority ranking for treatment of known populations is based upon the class ranking of the species on the state List, the likelihood of the population to expand, the availability of funding and manpower, and time of year. High priority populations would be treated first, with Class A weeds having the highest priority for treatment, followed by Class B, then Class C.
- Control methods can be chemical, mechanical, fire, biological, or some combination.
- Noxious weeds would be controlled at all times. In some situations an operator would be required to control weeds on disturbed lands, which include the roads, pads, and associated pipelines, and on adjacent lands affected by the establishment of weeds. All equipment and vehicles should be cleaned with either high pressure water or air prior to entering the site for maintenance and administration of the access roads, well pad, and resulting well.
- The BLM would determine the size and density of the noxious weed infestations requiring implementation of a control program.

- Mechanical, chemical, biological, or other methods approved by the BLM would be used to control infestations of noxious weed in disturbed areas.
- The operator would include provisions for noxious weed prevention and treatment in the SUPO. These may include removal of weed sources that could be picked up and transported by passing vehicles.

2.1.9.7 Management Opportunities

The revised RMP could require all surface-disturbing activities to have a plan for the control of noxious weeds and invasive species. It could also extend the requirement for integrated pest management plans to all surfacing-disturbing activities.

Documentation of compliance with management for noxious weeds and invasive species could be required in the form of photographs or invoices for weed or pest management activities.

The 2005 Programmatic EIS for Wind Energy Development contains several requirements for weed treatment and management that could be applied to all surface-disturbing activities in the planning area.

Priority areas could be established for treatment based on criteria such as size of infestation, species to be treated, and impacts to other resources.

2.1.10 Wildland Fire and Fuels Management

Wildland Fire Management

2.1.10.1 Profile

The CFO fire management program seeks to protect public safety, life, and property while focusing on two types of wildland fire: wildfire (unplanned) and prescribed (planned). Objectives include reducing hazardous fuels, maintaining or improving watershed conditions, controlling noxious and invasive species, and incorporating the role of wildland fire as an essential ecological process and natural change agent into the planning process. Firefighter and public safety are the highest priority in every fire management activity.

Both wildfire and prescribed fire can be used as management tools to achieve predetermined objectives established by the land use plan and the Carlsbad Field Office Fire Management Plan (FMP). The fire program objectives are to concentrate fire suppression efforts in areas containing high resource or human values, as well as those with intermingled land ownership patterns, and to use prescribed fire and other fuel treatments to meet the objectives of other programs.

The Response to Wildland Fire (RWF) is based on values to be protected from or enhanced by wildland fire. The RWF is based on ecological, social, and legal consequences of fire. The circumstances under which a fire occurs, and the likely consequences on firefighter and public safety and welfare, natural and cultural resources, and values to be protected, dictate the response to fire. The RWF takes into consideration all resource values and concerns across jurisdictional boundaries.

2.1.10.2 Current Condition

Wildfire

A wildfire is one that burns outside the parameters defined in land use and fire management plans for that location under current and expected conditions. Wildfires include fires burning in areas where fire is specifically excluded; fires that exhibit burning characteristics (intensity, frequency, and seasonality) that are outside prescribed ranges, including fires expected to produce severe fire effects; unauthorized human-caused fires (e.g., arson, escaped campfires, and equipment fires); and fires that occur during periods of high fire danger.

Unplanned fires are not the same as unscheduled fires. For example, the timing of a lightning-caused fire is not known; however, a lightning-caused fire could still be managed to meet fuels and ecosystem management objectives. This might happen if that type of fire is expected within the parameters of an approved plan; the fire is burning within the parameters for the area; the fire is not causing, or does not have the potential to cause, unacceptable impacts; and funding and resources to manage the fire are available.

Since the 2000 fire season, the Pecos Zone averages 351 wildfires with an average of 115,804 acres burned per year. The lowest recorded number of fires and acres burned in a single year was 2004, with 139 fires burning 104 acres. The highest recorded number of wildland fires was 2011, with 766 fires burning 625,253 acres. The Pecos Zone consists of the Lincoln National Forest and lands managed by the BLM (CFO and Roswell Field Office), the USFWS (Bitter Lake National Wildlife Refuge), the Bureau of Indian Affairs (Mescalero Agency), the National Park Service (NPS) (Big Bend, Guadalupe Mountains, and Carlsbad Caverns National Parks), and the New Mexico State Forestry Division (Capitan District).

Fire occurrence in the planning area has been marked by cycles of intense wildfire activity followed by periods of minimal wildfire activity. Since 2001, 401 wildfires have burned 151,892 BLM acres within the planning area. Lightning is the ignition source for approximately 35% of the fires and accounted for 48% of the burned acreage. Human-caused fires are usually from equipment use (e.g., vehicles, machinery, welding, grinding), power lines, and negligence. Human-caused fires accounted for 65% of fires and 52% of the burned acreage.

Table 2.1-20 shows the number of fires and acres burned on BLM lands within the planning area between the 2001 and 2011 fire seasons. Prior to 2001, CFO and Roswell Field Office fires were not separated by field office. Fires whose point of origin was on another agency's land and burned onto BLM land may not have been included.

Table 2.1-20. Wildfires on Public Land

Year	Lightning Caused		Human Caused		Total	
	Number	Acres	Number	Acres	Number	Acres
2001	12	249	6	5	18	254
2002	1	0	6	0	7	1
2003	3	10	16	89	19	99
2004	2	2	6	8	8	10
2005	6	96	15	19	21	115
2006	1	24	18	7	19	31
2007	1	5,500	7	364	8	5,864
2008	39	5,552	8	18,695	47	24,247
2009	19	19,349	43	8,386	62	27,735
2010	31	28,879	60	9,846	91	38,725
2011	27	13,382	74	41,429	101	54,811
Total	***142***	***73,043***	***259***	***78,848***	***401***	***151,892***
Average per year	***13***	***6,640***	***24***	***7,168***	***37***	***13,808***

Source: Southwest Coordination Center 2012.

Wildland fires that occur in areas having relatively little BLM-managed land or that are within highway rights-of-ways are often suppressed by county firefighting resources. These fires are often not reported to the BLM or the Alamogordo Interagency Dispatch Center and, therefore, are not included in BLM fire data. The BLM estimates that, within the planning area, an annual average of 50 wildland fires burning 1,000 acres are not included in the data.

Prescribed Fire

Prescribed fire is applied under specific fuel and environmental conditions to achieve resource objectives, such as improving habitat and plant community health and reducing hazardous fuels. The fire program in

the planning area has been managed to protect public safety, life, and property using fuels treatments. Fire and fuels treatments are management tools used to maintain or increase age-class diversity within vegetation communities; rejuvenate fire-dependent vegetation communities; maintain or increase vegetation productivity, nutrient content, and palatability; and maintain or improve wildlife habitat and watershed condition. Fire is considered a management tool for disposal of slash, reduction of hazardous fuels, rangeland health improvement, grazing management, and thinning.

2.1.10.3 Indicators

National fire policy requires current and desired resource conditions related to fire management to be described in terms of three condition classes and five fire regimes. The Fire Regime Condition Classification (FRCC) system (www.frcc.gov) classifies existing ecosystem conditions to determine priority areas for treatment as mandated by national direction.

Fire regime is an indicator of the role fire plays in an ecosystem. A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention but including the possible influence of aboriginal fire use (Agee 1993; Brown 1995). The BLM uses five historic fire regimes based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. The historic fire regimes are shown in Table 2.1-21.

Table 2.1-21. Historic Fire Regimes Definitions

Fire Regime	Frequency	Severity
I	0–35 years	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory
II	0–35 years	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35–200 years	Generally mixed severity; can also include low-severity fires
IV	35–200 years	High-severity fires
V	200 plus years	Generally replacement severity; can include any severity type in this frequency range

Source: www.frcc.gov.

The majority of the planning area is within historic fire regime IV (mixed severity). Historic fire regime II (stand replacement) covers much of the remainder of the planning area. Fire regime III (mixed severity) is in the northern portion of the planning area. Fire regime I (low severity) is found along the western periphery of the planning area. Figure 2.1-3 shows the historic natural fire regimes throughout the planning area and New Mexico (BLM 2004).

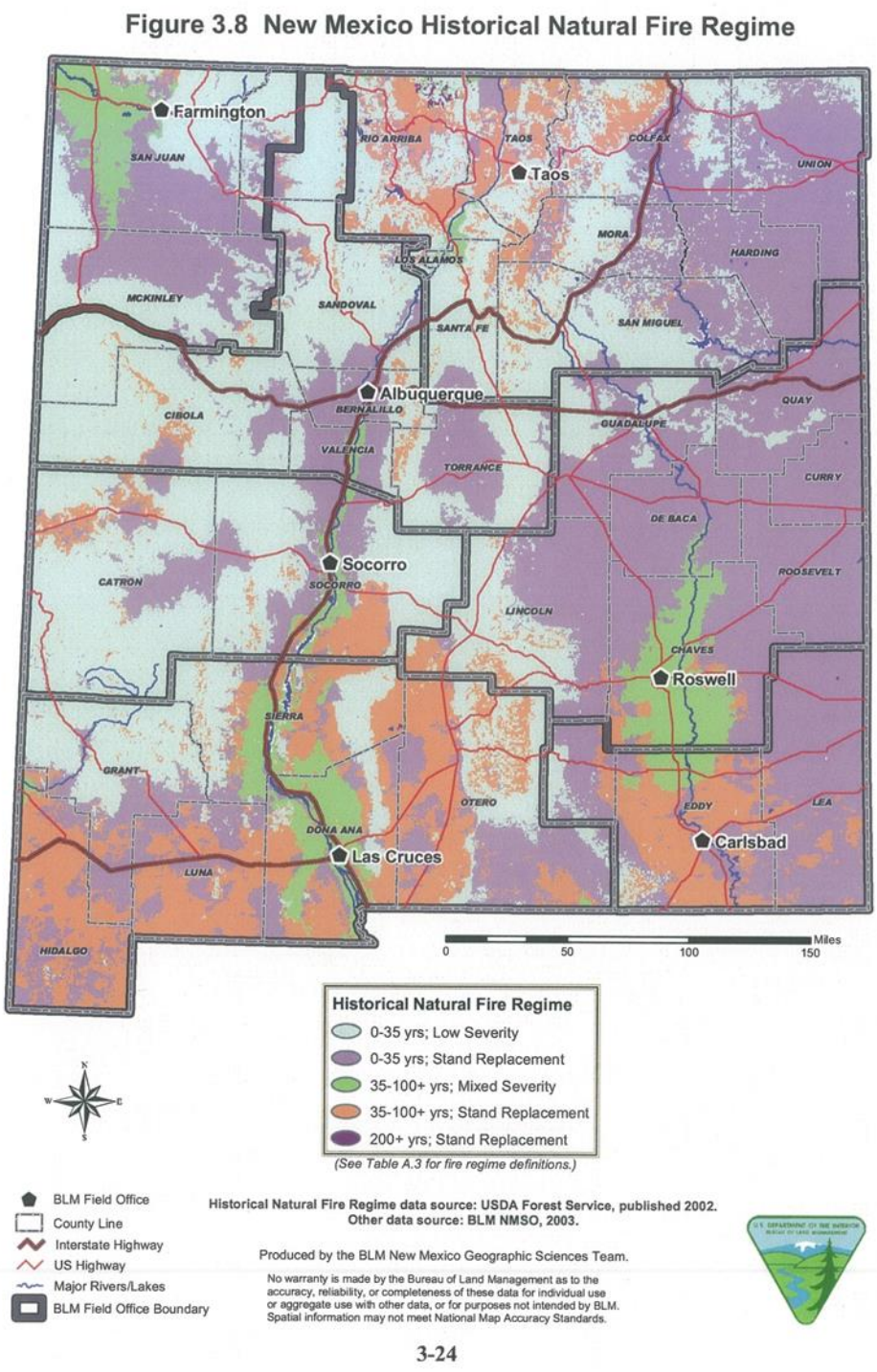

Figure 2.1-3. Historic Fire Regimes in the Planning Area and New Mexico

The FRCC reflects the current degree of departure from the modeled reference conditions (Hann and Bunnell 2001). The classification describes the degree of departure in terms of fire regime (frequency and severity) and associated vegetation. This information can be used to document possible changes to key ecosystem components. Examples include vegetation characteristics (species composition, structural stage, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other

associated disturbances, such as insect and disease mortality, grazing, and drought. Common causes of departure include advanced succession, effective fire suppression, livestock grazing, introduction and establishment of exotic plant species, and introduced insects and disease (Brown and Smith 2000; Schmidt et al. 2002; Brown et al. 2004; Hood and Miller 2007; Tausch and Hood 2007; Stambaugh et al. 2008; Keane et al. 2009).

The three fire regime condition classes as defined by Schmidt et al. (2002) are shown in Table 2.1-22.

Table 2.1-22. Fire Regime Condition Class Descriptions

Condition Class	Condition Class Attributes
1	Fire regimes are within or near a historical range (<33% departure) and there is low risk of losing key ecosystem components due to fire occurrence. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Areas are considered to be healthy and functioning.
2	Fire regimes have been moderately altered (33%–66% departure) from their historical range by either increased or decreased fire frequency and at a moderate risk of losing key ecosystem components. Areas are considered to be unhealthy and their rate of deterioration is expected to increase moderately to rapidly.
3	Fire regimes have been significantly altered (>66% departure) from their historical range and the loss of key ecosystem components is high. Areas are considered to be unhealthy and nonfunctioning.

Currently, data available for defining FRCCs are at low resolution and are focused on forests rather than shrublands and grasslands (BLM 2004). The Historical Natural Fire Regime and Fire Regime Condition Class are shown in Figure 2.1-3 and Figure 2.1-4 with the caveat that this data are extrapolated from nationwide LANDFIRE mapping efforts and is a general representation for the area (www.landfire.gov).

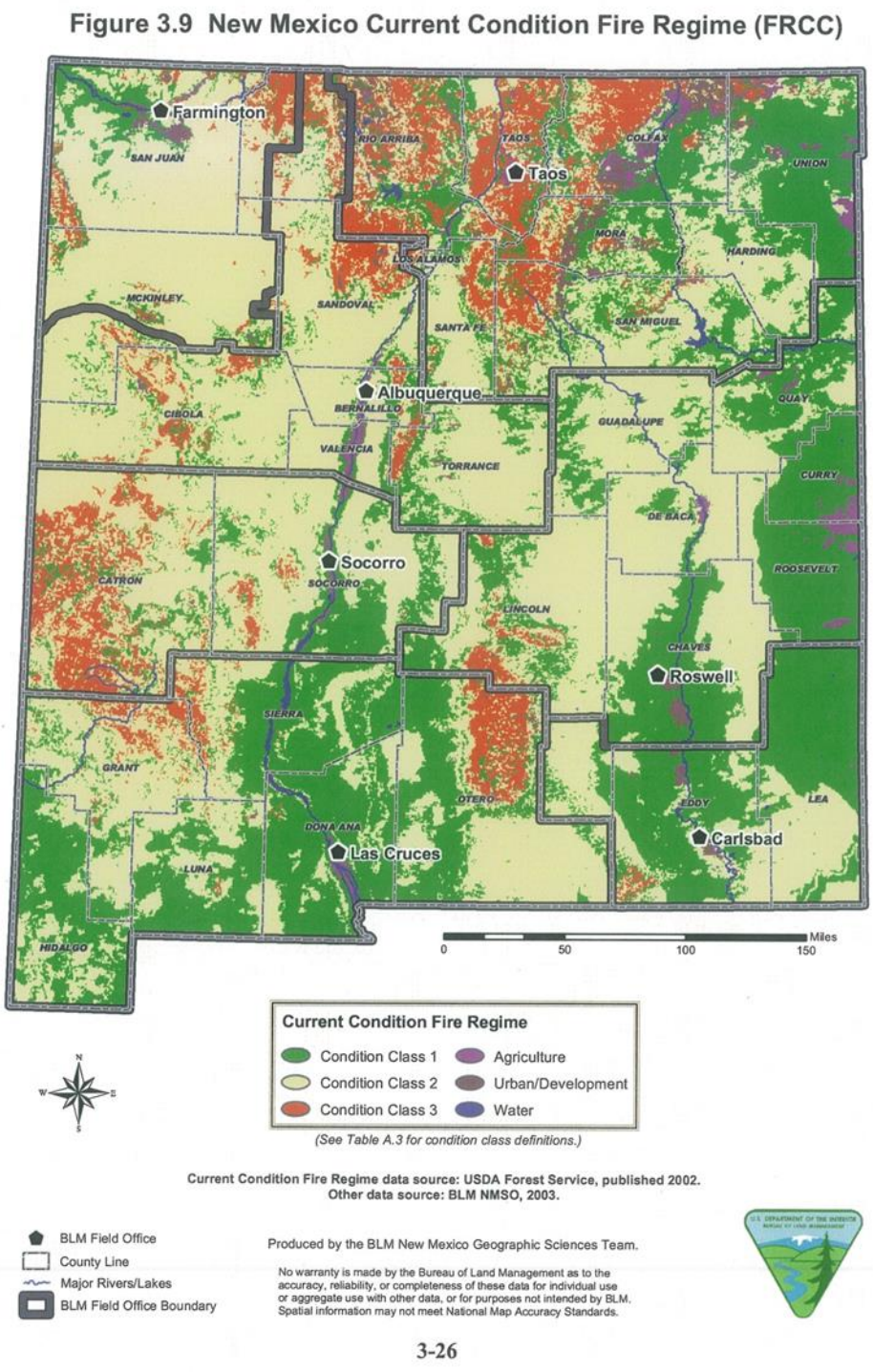

Figure 2.1-4. New Mexico Current Fire Regime

FRCC is not an appropriate indicator for wildland urban interface (WUI) areas since they may be maintained in an altered vegetative state to protect life and property.

2.1.10.4 Current Condition

Wildfire Management

The protection of human life is the single overriding priority for the fire management program. Other priorities include protection of communities, property and improvements, natural and cultural resource values, human health and safety, and the costs of suppression. Each wildland fire would receive management actions selected after comprehensive consideration of the local situation, risk to firefighter and public safety, current and forecast weather, land and resource management objectives, threats and values to be protected, cost efficiencies, external concerns, and land use concerns necessary to accomplish specific objectives for the individual fire. The management actions available include one or more of the following actions:

- **Monitor:** Monitor the fire to track the fire's spread, intensity, and characteristics.
- **Confine:** Action taken when the fire is not likely to have benefits, but threats from the fire do not require a costly deployment of large numbers of suppression resources.
- **Monitor plus Contingency:** Fire is monitored but contingency actions are prepared to ensure adequate preparation for possible undesirable developments.
- **Monitor plus Mitigation:** Fire is monitored, yet poses real, but not necessarily immediate, threats. These fires are monitored, but plans are developed and implemented to delay, direct, check fire spread, or contain fire, and to ensure public safety.
- **Initial Attack:** Suppress the fire to protect people or resource values at risk. A combination of tactics such as direct attack, indirect attack, and confinement by natural barriers are used to accomplish protection objectives.
- **Control and Extinguish:** Actions taken using direct attack. Sufficient resources are assigned to achieve control of the fire, minimizing acres burned.

No wildland fire is automatically categorized as having a lower priority than others. A wildland fire may be concurrently managed for one or more objectives, and objectives can change as the fire spreads across the landscape. Objectives are affected by changes in fuels, weather, topography; varying social understanding and tolerance; and involvement of other governmental jurisdictions having different missions and objectives.

Initial action on human-caused wildfire is to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety.

The construction of a fire line with heavy equipment (e.g., bulldozers or maintainers) on public land is employed only:

- To protect property and public health and safety;
- In exceptional cases (such as previously disturbed areas);
- With the approval of the CFO Manager; and
- With the appropriate resource advisors on the scene.

Protection of riparian areas includes playas larger than 20 acres, springs and seeps, and other riparian areas from surface disturbance and the effects of chemical fire retardant by prohibiting the use of heavy equipment and retardant drops in these areas. No retardant drops are used within 300 feet of riparian areas, livestock water sources (i.e., open storage tanks and troughs), and wildlife guzzlers. The use of engines is allowed, keeping off-road use to the minimum needed to suppress the fire.

Protection of cave and karst areas includes caves, cave resources, and karst features from surface disturbance by prohibiting the use of bulldozers and other heavy equipment to construct a fire line within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features.

Slopes greater than 30% are susceptible to slumping or accelerated erosion when the surface is disturbed. Surface-disturbing activities on these slopes are allowed only after considering site-specific conditions and the degree of anticipated disturbance.

Aquatic invasive plants and animals pose a risk to the environment and firefighting equipment. Prevention and sanitation can prevent the spread of these organisms to other environments and help ensure that firefighting equipment remains operational. Steps have been developed to reduce the potential of introducing invasive plants and animals to waterways.

New demands are being placed on public lands due to accelerated growth in and around communities in the planning area. Growth has changed the way communities relate to surrounding public lands and has changed the expectations of communities. Effective management of public lands must address issues of public health and safety through the use of effective hazardous fuels treatments and strategic fire suppression actions in WUI areas. The Firewise program is pivotal in working with private landowners to reduce the amount of fuels in and around structures within the WUI. A collaborative effort among landowners, the BLM, and Firewise is necessary to ensure that private property is less susceptible to damage from wildfires.

All three counties within the planning area have completed Community Wildfire Protection Plans (CWPPs), an important step in addressing fuels management actions regardless of land ownership or jurisdiction. The Eddy and Lea County CWPPs were completed in 2008 and the Chaves County CWPP was completed in 2010. The CWPPs assess the level of wildfire risk to communities and establish priorities for fire mitigation and protection within the counties. The areas of concern are prioritized based on fuel hazards, risk from wildfire, infrastructure, and other values such as watersheds.

The Eddy County CWPP identifies three communities as being at high risk to wildland fire. Of the named communities, the BLM has significant land resources close to White's City. Among values at risk, the CWPP identifies oil and gas infrastructure, municipal water supplies, communication towers, watersheds, major highways, and railroads.

The Lea County CWPP identifies eight communities as being at high risk to wildland fire. Of the named communities, the BLM has significant land resources close to Maljamar and Jal. The CWPP identifies cell towers, repeater sites, electrical transmission sites, gas plant lines, a carbon dioxide (CO_2) pipeline, and large propane storage tanks as critical human infrastructure at risk of wildfire.

The Chaves County CWPP maps hazardous fuels as low, medium, and high hazard and identifies urban and WUI communities throughout the county. Detailed community specific assessments of risk associated with wildland fire, fuels, and community/property values are provided for 15 areas or WUI communities. The Chaves County CWPP identifies four communities as being at high risk to wildland fire. Of the named communities, the BLM has significant land resources in proximity to Peñasco Valley. The CWPP lists municipal watersheds and communication sites as high priority values at risk.

The BLM is a partner in the New Mexico Joint Powers Master Agreement for Interagency Wildland Fire Protection (JPA). This is an agreement among federal wildland fire management agencies and the New Mexico State Forestry Division to coordinate wildland fire management activities. Under the JPA, New Mexico is divided into initial attack areas. In each of these areas, one agency assumes the lead in providing initial attack protection to all lands, regardless of ownership. This provides an equitable exchange of protection and workload, and allows the use of the "closest forces" concept for fire suppression. The net result is a more efficient and effective interagency suppression organization throughout the state.

The planning area contains 20 rural volunteer fire departments that are eligible for rural fire assistance grant funding. From 2001 to 2010, 32 grant requests were filled for a total of $299,316. This funding goes to the departments to enhance their abilities to fight wildland fires on BLM and adjacent lands and is typically used for wildland firefighting equipment and training.

The BLM works with local rural fire departments to reduce the risk of wildland fire in communities, thereby protecting homes and adjacent public lands. The BLM provides wildland firefighter training and assists with CWPP development and implementation. BLM personnel provide public education through programs including Smokey Bear and fire education programs in schools, as well as Firewise programs.

Prescribed Fire

Prescribed fire and other types of fuel reduction projects have become increasingly important as a tool to manage natural fuels buildup and to achieve habitat and rangeland health management objectives. There are many factors that impact the success of managed fire, including weather conditions that are outside BLM control. Although prescribed fires are most often implemented successfully, fires can become uncontrolled due to a number of factors, including unanticipated weather changes.

The goal of prescribed fires is to reduce hazardous fuel accumulation, diversify age class structures, and rejuvenate areas where vegetation has become decadent. Prescribed fire can be used to open juniper encroached areas so that more grasses and forbs are available and areas are open sufficiently to be used by wildlife. The success of fire as a management tool is very much a function of the precipitation timing and amounts following the fire. Post-fire grazing management needs to be flexible and a function of on-the-ground conditions on a site-specific basis.

The locations of prescribed fires are primarily selected so that fire would improve watershed conditions while secondarily targeting areas of hazardous fuel loadings. Project area boundaries are established to enable appropriate containment and control of the prescribed fires. There are locations and fuels situations that are not appropriate for fire treatment, such as areas with high potential for erosion or weed infestation.

Fuels treatments use various tools, such as prescribed fire, mechanical treatments, and herbicides, to reduce hazardous fuel loadings and achieve resource objectives. The Decision Record and RMP Amendment for Fire and Fuels Management on Public Land in New Mexico and Texas (BLM 2004) contain a goal of annually treating 28,789 acres in the planning area with prescribed fire and non-fire treatments. Actual prescribed fire accomplishments vary greatly from year to year due to weather patterns, while actual mechanical and herbicide treatment accomplishments tend to be based on annual budget allocation.

Prescribed fire activities occur year round in the planning area. The majority of pile burning takes place during the monsoon season. Grassland and shrubland broadcast burns take place before green-up in mid-spring through early summer. Piñon-juniper woodland broadcast burns take place during late spring and summer and have the tightest windows for opportunity, as they require the warmest and driest parameters to meet objectives.

Approximately three to four mechanical fuels treatment projects for a total of 200 to 400 acres are planned each year, primarily as maintenance within existing riparian projects across the planning area. In addition to mechanical treatments, chemical treatments are used for fuels reduction. Saltcedar is treated with the herbicide Imazypyr. Creosotebush and juniper are treated with the chemical Tebuthiron to reduce encroachment onto historical grasslands. Mesquite is treated with the chemicals Clopyralid and Triclopyr to reduce encroachment onto historical grasslands. These treatments are being monitored and evaluated to determine if they are effective tools for fuels reduction in the future.

Since 2003, the CFO has conducted prescribed fires on 64,503 acres. Drought conditions and wildfire activity curtailed planned projects in 2003, 2004, and 2007. Fuels treatments since FY 2003 are summarized in Table 2.1-23.

Table 2.1-23. Acres of Vegetation Treatments on BLM-Managed Land in the Planning Area

Year	Prescribed Fire	Chemical Acres	Mechanical Acres
2003	820	4,580	574
2004	61	10,600	1,063
2005	3,231	6,598	653
2006	6,118	27,854	812
2007	1,863	10,300	1,111
2008	10,515	826	1,095
2009	11,057	13,592	40
2010	12,650	9,655	1,250

Year	Prescribed Fire	Chemical Acres	Mechanical Acres
2011	18,188	24,000	400
Total	***64,503***	***108,005***	***6,998***

2.1.10.5 Trends

Wildfire

All wildfires within the planning area are managed using suppression actions consistent with the resource management objectives identified in the CFO FMP, current national policy, and land use plans.

Wildfire use for resource benefit has not been implemented to date. Coordination and planning steps need to be taken to allow wildfire use for resource benefit in areas where fire would benefit vegetation and habitat resources. The decision to allow natural fire requires a complete analysis of the potential negative environmental impacts, as well as any potential benefit. Firefighter and public safety is always the first priority.

The number and size of wildfires is heavily dependent on environmental factors that are variable over time. Fuel characteristics, climate, topography, and suppression activities all interplay to create the dynamics of wildland fire.

Impacts from these occurrences include an increased spread of invasive and noxious weeds, damaged oil and gas infrastructure, and loss of forage base and damaged infrastructure for livestock operations. Associated with the impact on livestock grazing are the negative consequences associated with modification or closure of grazing allotments and the resulting economic impact on grazing permittees and related regional socioeconomics.

Prescribed Fire

The number of fuels and restoration projects within the planning area is increasing in order to address watershed health. Projects within the fuels program have focused on achieving two goals: reducing the fire hazard with an emphasis on WUI areas and restoring or improving the FRCC.

2.1.10.6 Forecast

Wildfire

National fire policy is continually evolving with changes in objectives, on-the-ground conditions, funding, and science. General goals, standards, and objectives would most likely remain the same:

- Use fire to meet land health standards, maintain and promote greater diversity within plant communities, and improve habitat for key wildlife species.
- Maintain and protect air quality to meet or exceed applicable federal and state standards and regulations.
- Use RWF in fire suppression actions to protect public health and safety, public infrastructure and resource values, and public and private property, as well as to enhance landscapes through the use of wildland fire.
- Mitigate and reduce hazardous fuels within the WUI areas.

Restore New Mexico and other vegetation treatments have increased the number of burnable acres substantially. These treatments have converted areas that previously had little to no fine fuels into areas that would sustain fire spread. Fuel loading in untreated desert shrub vegetation is generally low and is primarily dependent on the moisture received during the current or preceding year. In grass fuel types, the number and size of unplanned fires is primarily dependent on the current year environmental conditions. Discounting effects of significant changes in climate over the next 10 years, the BLM expects that both the number and size of fires would be greater than the previous 10-year period.

RWF would be made for each burnable acre giving the flexibility to place wildland firefighting resources where they are most needed and would benefit other resources, allowing fire in fire-dependent ecosystems while reducing large fire suppression efforts and costs. The potential of fire causing negative environmental impacts such as increased erosion, loss of wildlife habitat, and increased potential for invasive species would be considered.

Human development continues to expand in all portions of the planning area. There needs to be continued emphasis on preparation of cooperative and collaborative fuel reduction projects, as well as fire mitigation education for property owners in the WUI.

Prescribed Fire

It is desired that the FRCC be improved from FRCC 2 or 3 to FRCC 1 or 2. Accomplishing this is dependent on funding and the ability to implement projects while working cooperatively with affected publics that may have conflicting interests and goals. It is assumed that base-level funding for maintaining a fuels management program would decrease within this period. Funding for projects may become scarcer as budgets are reduced and there is greater competition for funding nationally.

Broadcast prescribed fire on public land in the planning area is likely to increase over the next 10 years. This is necessary to maintain or continue to improve current Restore New Mexico and other fuels projects in their existing conditions. The BLM would likely implement eight to 10 broadcast prescribed fires covering an average of 25,000 acres annually. Most of the broadcast burns would include non-federal lands, which are expected to constitute 30% to 50% of the acreage treated annually.

The majority of the fuels treatment acres would transition from non-fire treatments (herbicide) over the next 10-year time period. There is the potential for significantly increased use of prescribed burning if large-scale planning efforts are completed, cooperative agreements with livestock grazing permittees are put into place to allow proper recovery directly after burn treatments, and long-term grazing management allows maintenance of healthy ecological communities. In some cases, rest prior to prescribed-burn treatment may be necessary to allow a buildup of fine fuels necessary to carry fire.

2.1.10.7 Key Features

Wildfire

Key features for the fire program are structures, oil and gas fields and related facilities, communication sites and related facilities, cultural sites and historic structures, power lines, communities, important wildlife habitat, and lands having intermingled public, state, and private ownership where there are currently no agreements for using wildfire to meet resource management tool, as well as other areas identified through continued public involvement in fire planning efforts.

Prescribed Fire

Fire management would focus on two key features, fuels treatments and fire suppression, for firefighter and public safety reasons. Fuels treatments would focus on maintaining or continuing to improve Restore New Mexico projects with prescribed fire and moving FRCC 2 and 3 acres towards FRCC 1.

Emergency Stabilization and Rehabilitation

Profile

The Burned Area Emergency Stabilization and Rehabilitation Plan (ESR) is an interdisciplinary response to protecting natural resources and threats to human health and safety. The guidelines for development of this plan are outlined in BLM Handbook H-1742-1.

An active ESR program exists within the planning area. The size of the ESR program is in proportion to the severity of the wildfire season. Emergency stabilization is defined as “planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life and

property resulting from the effects of the fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources" (620 DM 3.3E). These actions must be taken within one year following containment of a wildfire. The objective of emergency stabilization is "to determine the need for and to prescribe and implement emergency treatments to minimize threats to life or property or to stabilize and prevent unacceptable degradation to natural and cultural resources resulting from the effects of a fire" (620 DM 3.4E).

Rehabilitation is defined as "efforts undertaken within three years of containment of a wildland fire to repair or improve fire damaged lands unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by fire" (620 DM 3.3M). The objectives of rehabilitation are 1) to evaluate actual and potential long-term post-fire impacts to critical cultural and natural resources and identify those areas unlikely to recover naturally from severe wildland fire damage; 2) to develop and implement cost-effective plans to emulate historical or pre-fire ecosystems consistent with approved land management plans, or, if that is not feasible, to restore or establish a healthy, stable ecosystem in which native species are well represented; and 3) to repair or replace minor facilities damaged by wildland fire (620 DM 3.4B).

Restoration is the continuation of post-fire rehabilitation beyond the initial three years following a wildfire and is outside the scope of the ESR program (620 DM 3.3N).

Indicators

All wildfires are analyzed for the need to implement an ESR plan after the fire is contained. Key indicators of the need for an ESR plan are significant areas of high severity fire, steep terrain, high probability of proliferation of noxious weeds after the fire, and threats to human health and safety, or loss of infrastructure. Very few fires require a plan.

Current Condition

Fires throughout the West have become larger and more intense and have threatened the natural integrity of the burnt ecosystem, as well as becoming a threat to human health and safety. The recovery of burnt landscapes, especially large, landscape-level fires, sometimes requires actions to maintain the integrity of the natural resources and the safety of adjacent communities. The need for stabilizing and rehabilitating burnt areas has become increasingly important. Some areas do not successfully recover with native vegetation and become dominated by noxious weeds and non-native species. Many communities adjacent to wildfires are threatened by significant erosion of bare soil, loss of public infrastructure, and contamination of water resources.

Most rehabilitation actions are directed at infrastructure damage resulting from fire. ESR plans were first developed for wildland fires in the planning area in 2008. Increased need for ESR plans has corresponded with the increase in larger fires. Table 2.1-24 shows ESR plans for the planning area.

Table 2.1-24. CFO ESR Plans and Treatments, 2008–2011

Fire Name	Fiscal Year	Treatment Category	Funding Source[1]	Treatment
Rocky	2008	Facilities/Improvements	R	6 miles
		Closure	R	23,800 acres
Picacho	2009	Noxious weeds	S	8,281 acres
		Fence repair	R	6 miles
		Cultural protection	S/R	8,281 acres
		Fence	S/R	2 miles
Four Mile	2009	Noxious weeds	–	16,928 acres
		Fence	–	5.5 miles
		Facilities	–	9 miles

Fire Name	Fiscal Year	Treatment Category	Funding Source[1]	Treatment
New	2010	Noxious weeds	R	3,317 acres
		Fence	R	2 miles
		Facilities	R	1 wildlife water enclosure
Acrey	2011	Fence	S	3.75 miles
		Fence	R	1 mile
		Pipeline	R	2.25 miles
Crooked Creek Complex	2011	Fence	S/R	3.2 miles
Flying H	2011	Fence	S/R	3.25 miles
		Pipeline	R	2.5 miles
Last Chance	2011	Noxious weeds	S/R	16,682 acres
		Fence	S/R	19.3 miles
		Pipeline	R	6 miles
Loop	2011	Noxious weeds	S/R	14,018 acres
		Fence	S/R	26 miles
		Pipeline	R	6.2 miles
Tom's Canyon	2011	Fence	S/R	10.25 miles
		Noxious weeds	R	6,708 acres
		Pipeline	R	4 miles

[1]S = Emergency stabilization; R = Burned Area Rehabilitation.

Trends

The trends of the stabilization and rehabilitation program correspond with those of wildfire, increasing with larger and more intense fires and longer fire seasons. A small percentage of the wildland fires in the planning area have required varying degrees of rehabilitation consisting primarily of rebuilding fences and replacing livestock waterlines damaged by wildfire.

Forecast

The forecast of the stabilization and rehabilitation program correspond with those of wildfire, increasing with larger and more intense fires and longer fire seasons. The BLM expects to complete four formal ESR plans per year over the next 10 years.

Key Features

Wildfire size and severity and lengths of fire seasons are the key features for emergency stabilization along with funding for rehabilitation activities.

2.1.10.8 Current Management

The 2004 New Mexico Fire and Fuels RMPA provides direction for fire and fuels management in the planning area.

2.1.10.9 Management Opportunities

The 2004 New Mexico Fire and Fuels RMPA refers to outdated policies and terminology that could be updated in the revised RMP. General management guidance may be best as issues such as Fire Management Units could change over time based on future conditions. Current management units for the planning area are depicted in Figure 2.1-5.

The revised RMP could identify priority areas for hazardous fuels treatments and encourage cooperation between federal, state, and local managers to manage fuels.

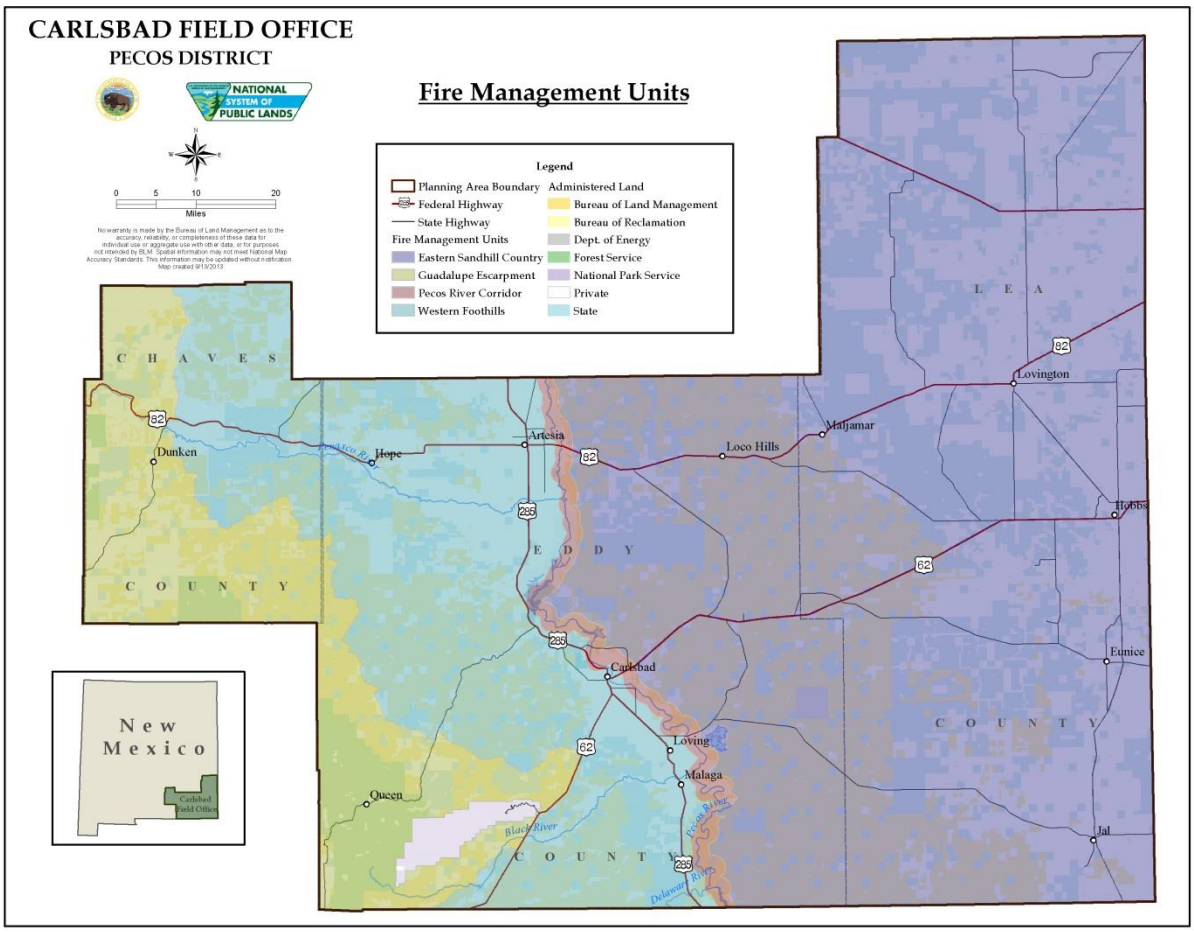

Figure 2.1-5. Fire Management Units

2.1.11 Cultural Resources

Archeologists, anthropologists, ethnographers, historians, and other researchers study the remains of the past in an effort to identify the forces that have shaped human history and to define how cultures originate, develop, and interact with the environment. Cultural resources, particularly in the form of trails, rock art, historic structures, or sacred sites can provide people with visible links to their past and are reminders of their ancestral heritage. In turn, this can help to foster a sense of belonging and pride in our cultural and historical backgrounds.

Cultural resources are afforded protection based on their eligibility for listing on the National Register of Historic Places (NRHP). The NRHP is the official list of the nation's historic places worthy of preservation and is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources (http://www.nps.gov/nr/).

Cultural resources receive an eligibility determination of not eligible, undetermined, or eligible. This determination involves examining three criteria:

- **Age:** Is the property old enough to be considered historic (generally at least 50 years old)?
- **Integrity:** Does the property still look much the way it did in the past?
- **Significance:** Does the resource have significance in American history, architecture, archeology, engineering, and culture? Is the resource present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and

association? The resource is eligible when it meets any one or any combination of the four NRHP Criteria for Evaluation:

- **Criterion A:** Associated with events that have made a significant contribution to the broad patterns of our history.
- **Criterion B:** Associated with the lives of significant persons in or past.
- **Criterion C:** Embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D:** Yielded or may be likely to yield, information important in history or prehistory.

The majority of the cultural resources in the planning area that have been determined to be eligible for listing on the NHRP are the physical remains of past human occupation meeting Criterion D.

Resources determined to be not eligible are not managed. Resources that have not been formally determined eligible or not eligible remain in an unknown status and must be managed as an eligible property until a formal determination of eligibility can be conducted.

2.1.11.1 Indicators

All cultural resources are recognized as fragile, irreplaceable resources with potential scientific, public, and traditional uses until they have been formally recorded and evaluated, after which those that are eligible for listing on the NRHP are protected and managed by the BLM. Most of the resources in the planning area are the physical remains of past human occupation and adaptation that can yield information important in history or prehistory. Ground-disturbing activities, both authorized and unauthorized, and natural forces have the potential to disturb or destroy these resources. The indicators below address the physical condition of cultural resources in the planning area:

- The amount and distribution of natural ground cover such as plants, plant litter, and biological crusts in the vicinity of cultural resource localities are sufficient to support soil stability.
- Monitoring of land use authorizations to ensure avoidance as a method of mitigation of direct impacts to cultural resources is effective and that there is no indirect impacts such as illegal collection of artifacts or unauthorized damage occurring.
- The amount of survey conducted in an area.

2.1.11.2 Current Condition

Cultural resources derive their significance and eligibility to the NRHP through the physical properties of integrity and through the scientific and historic information potential they might provide about people and processes of the past. Traditional Cultural Properties (TCPs) derive their significance to the NRHP and for a traditional community through the physical properties of integrity and the role the property plays in a community's beliefs, customs, and practices. Therefore, the indicators for cultural resources and TCPs are those natural and anthropogenic conditions that would impact those characteristics that contribute to the significance of a historic property and qualify it as eligible to the NRHP, or that diminishes the value and meaning of that property to a traditional living community. The following indicators can predict the integrity and significance of cultural resources and TCPs:

- The amount and distribution of vegetative ground cover sufficient to support soil stability and potential buried cultural deposits;
- The amount of past and current commercial development within an area;
- The amount and adequacy of inventory conducted in an area; and
- The results of monitoring sites that were avoided as an effective measure to mitigate direct, indirect, and cumulative effects to cultural resources from land use authorizations.

The vast majority of cultural resources inventory in the planning area is driven by National Historic Preservation (NHPA) Section 106 compliance for the oil and gas industry. As a multiple-use agency, the BLM also authorizes land uses associated with cattle ranching, utility corridors, transportation routes, and recreational activities.

Between the late 1970s and 2012, over 20,000 cultural resource inventories had been conducted and over 12,000 historic properties recorded in the planning area (Railey 2012). These numbers include private property and other federal and state agencies whose lands are encompassed within the greater planning area (Table 2.1-25 and Table 2.1-26). The BLM is most often the lead agency for permitting land use authorizations across these jurisdictions and in those cases is responsible for the identification and protection of eligible and undetermined sites.

Table 2.1-25. Surveyed Space by Land Ownership in the Carlsbad Field Office Region

Land Ownership	Acres	Percentage of Total Acreage
BLM	397,395.6	56.9
Private	171,291.7	23.5
New Mexico State Land Office	86,356.7	12.4
USFS	31,245.3	4.5
NPS	2,045.7	0.3
NMDGF	2,990.3	0.4
Bureau of Reclamation	4,862.4	0.7
U.S. Department of Energy	713.7	0.1
New Mexico State Parks	306.1	0.0
Other federal agencies	1,039.9	0.1
Totals	***698,247.4***	***100.0***

Note: Percentage may not sum exactly due to rounding.
Adapted from Railey 2012:16.

Table 2.1-26. Archaeological Sites by Land Ownership in the Carlsbad Field Office Region

Land Ownership	Archaeological Sites	
	N	Pct.
BLM	7,178	59.5
Private	1,969	16.3
New Mexico State Land Office	1,592	13.2
USFS	775	6.4
NPS	203	1.7
NMDGF	143	1.2
Bureau of Reclamation	91	0.8
U.S. Department of Energy	62	0.5
New Mexico State Parks	41	0.3
Other federal agencies	0	0.0
Totals	***12,054***	***100.0***

Note: Percentage may not sum exactly due to rounding.
Adapted from Railey 2012:16.

The majority of recorded sites are prehistoric or historic Native American artifact scatters with burned rock, worked lithic material, ceramics, and thermal features with deposits (hearths). The informational level at which most of the sites has been recorded can be characterized as minimal. The standards of survey and recording in the first years of cultural resource management were largely unregulated as the discipline struggled to get established, technology was relatively primitive, and the work was being conducted by many contractors operating by their own standards and level of training. As a result of the boom years of energy exploration, 64% of sites were given an eligibility of "undetermined," as there was possibility of information potential. Twenty-six percent were assigned the category of "eligible under Criterion D, information potential." Both determinations were used primarily on prehistoric artifact scatters, with or without dateable features, effectively placing 90% of sites recorded in the planning area in a protected status. The most expedient mitigation for these sites was to move the project, thereby instituting the widespread practice of "flag and avoid." While this did protect the sites in the short term, it was an ineffective management tool over time as industrial development increased and cultural

management resources failed to formulate better field practices that would determine a site's significance or mitigation strategies that would account for indirect and cumulative effects of oil and gas development.

As BLM policies became more developed, the primary mitigation strategy remained avoidance; however, other mitigation options have become available, such as data recovery. The CFO instituted site recording standards in 2012, specific to the site types in this area, which require contractors to use subsurface testing to determine the extent of natural deposition and the potential for cultural material, such as dateable charcoal from thermal features. This enables them to make an informed determination of either eligible under Criterion D, or not eligible, and avoid the undetermined category.

The CFO cultural resources department reviews more than 1,000 oil and gas related projects a year. Just over half of these are through NHPA Section 106 processes of pedestrian survey and reporting. The remainder are administered through the Permian Basin Programmatic Agreement. In 2002, the U.S. Department of Energy (DOE) funded the Preferred Upstream Management Processes Grant Program (PUMP) III Project, an investigation of cultural resource adaptive management practices for the oil and gas fields of New Mexico and Wyoming. Several recommendations resulted from this project, including moving away from "flag and avoid," providing archeological sensitivity information to industry to use in planning decisions, a shift to electronic processing of cultural compliance, and a focus on cultural resources during lease sales and initial plans of development.

The Energy Policy Act of 2005 provided special funding for the creation of Pilot Energy Offices within the BLM. The CFO became one of these offices and was able to begin implementation of many of the PUMP III ideas. In May 2008, the BLM entered into the Permian Basin Memorandum of Agreement, an alternative form of compliance with Section 106 of the NHPA. Now a Programmatic Agreement, the program allows industry access to site locations through GIS data so they can initially plan projects on BLM-administered and private land that would avoid known archeological sites. The affected area comprises a 1.1-million-acre subsection of the CFO's jurisdiction (28 quadrangles), known as the Mescalero Sands, which is heavily used for oil and gas exploration.

Instead of contracting for a pedestrian survey of the project area, participants contribute a set amount of funds, based on the size and scope of their project, into a BLM account that is used to conduct off-site mitigation. This program allows the CFO to retrieve information from targeted sites that otherwise would remain unknown, either because the natural environment will eventually destroy it, or because surficial recordings cannot provide the true information potential. The Permian Basin Programmatic Agreement is managed by a dedicated staff member of the CFO cultural resource program and is additionally supported by a consortium of professional archaeologists in the region who review proposed projects and provide program guidance. Projects are put up for bid to companies that have been accepted on the Blanket Purchase Agreement. Successful bidders are chosen by the CFO cultural resources staff through a ratings system provided in technical proposal reviews. To date, 12 large-scale research projects have been contracted and have been either completed or are ongoing (Table 2.1-27).

Table 2.1-27. Investigations Carried Out under the Permian Basin Mitigation Program

Task No.	Task Description	Year Awarded	References	Status
1	Synthesis of Excavation Data	2009	Railey et al. 2009	Completed
2	Archaeological Inventory of Unsurveyed Areas	2009	McCormack et al. 2010	Completed
3	Ethnographic and Archaeological Inventory with the Mescalero Apache Tribe	2009	Brown et al. 2010	Completed
4	Data Comparability Workshop	2010	Railey 2010	Completed
5	Laguna Plata Site Excavations and Analyses	2010	Brown 2010	Completed
6	Boot Hill Site Excavations and Analyses	2010	Brown 2011	Completed
7	Burro Tanks Site Intensive Documentation	2010	Bandy 2011	Completed
8	Delaware River Inventory for Recording Historic-Era Resources	2011	–	Ongoing

Task No.	Task Description	Year Awarded	References	Status
9	Historic Context for Oil and Gas Development in Southeastern New Mexico	2011	–	Ongoing
10	Landscape Testing Project: Analysis of Feature Samples	2013	Cummings and Kováčik 2013	Completed
11	Understanding Local Lithic Sources	2012	Kremkau et al. 2013; Vierra et al. 2013	Completed
12	LiDAR Study of Burned Rock Middens	2013	–	Ongoing

Public Archaeology and Outreach

The Permian Basin Programmatic Agreement has significantly enhanced the archaeological knowledge of southeast New Mexico and has provided educational materials for the public. One goal of the BLM is for each research project funded by the Permian Basin Programmatic Agreement to have an educational component, such as a booklet written for the general public that explains the project and provides an interpretation of the results in plain language. The *Permian Basin Quarterly* is a newsletter published by the CFO that describes current and proposed research and is provided to the oil and gas companies that participate in the program, as well as many other individuals and organizations. Many of the Permian Basin Programmatic Agreement projects have been presented at professional conferences and meetings. All projects are published online at the Digital Archaeological Record website (https://www.tdar.org).

The CFO also assists in coordinating the local Site Watch groups in Carlsbad and Hobbs. Site Watch is a state-sponsored program of volunteers trained in cultural resource monitoring on public lands. These volunteers assist in historic preservation by monitoring the conditions at sites vulnerable to vandalism, looting, or natural degradation. The groups report on their sites quarterly to the State Historic Preservation Office (SHPO).

2.1.11.3 Trends

The effectiveness and results of the Permian Basin Programmatic Agreement are reviewed every three years by the SHPO, the New Mexico Oil and Gas Association, and the BLM, and is currently extended until 2016. The exploration and production of oil and gas in southeast New Mexico is projected to continue and likely increase in the near future. Since 2008, the program has averaged 554 projects for review a year (see Table 2.1-28 for trends since May 2008). The cultural program will continue to promote the Permian Basin Programmatic Agreement within the 28 quadrangles and use the mitigation funds for projects that will further archaeological knowledge in this region. As industry more intensely extracts natural resources through closer spacing, large-scale seismic projects, and new technologies and practices, alternative forms of compliance with Section 106 of the NHPA, such as the Permian Basin Programmatic Agreement, may become more commonplace.

Table 2.1-28. Permian Basin Programmatic Agreement Use Since 2008

Year	Projects Reviewed	Contribution Amount in Dollars
5/01/2008–9/30/2008	178	229,109.00
2008–2009	370	541,641.00
2009–2010	452	936,613.00
2010–2011	684	2,006,476.00
2011–2012	671	1,396,325.00
2012–2013	628	2,755,051.00
2013–3/31/2014	341	981,399.00
Totals	***3,324***	***8,846,614.00***

Outside the Permian Basin Programmatic Agreement, the BLM would continue to work with the SHPO and archaeological contractors to enhance the methods and results of Section 106 survey and site recording. Since 2008 there have been an average of 830 reports submitted for review, with an average of 332 newly recorded sites and 336 sites updated (see Table 2.1-29 for trends since May 2008). As this practice continues, more sites would be initially recorded with enough information to make a determination, and previously recorded sites would be updated with better methods. This would result in more effective management of sites overall. The BLM would also continue to explore better mitigation methods that would both preserve information for future research and more effectively protect the site from cumulative impacts of energy exploration projects.

Table 2.1-29. Trends of Survey and Site Recording within the Carlsbad Field Office Region*

Year	Projects Reviewed	New Sites	Updated Sites
5/01/2008–9/30/2008	178	303	200
2008–2009	370	209	205
2009–2010	452	311	208
2010–2011	684	97	247
2011–2012	671	434	451
2012–2013	628	595	579
2013–3/31/2014	341	47	129
Totals	***3,324***	***1,996***	***2,019***

*Includes state and private lands.

2.1.11.4 Forecasts

As the demand for production of federally owned minerals increases, there will be an increased demand to identify and manage significant cultural resources. As roads are improved, increased access to areas will be available to other recreation activities such as OHV use, horseback riding, and hunting. This increased access may indirectly result in damage to cultural resources through unauthorized collection or vandalism, which could change an eligibility determination from eligible to not eligible. Grazing or any range improvement activity that removes vegetation or leads to soil erosion can cause impacts to cultural resources. Livestock concentration areas (such as those that form near water sources, supplemental feeding areas, and fence corners) and livestock trail formation may result in impacts to cultural resources.

As part of the eligibility determination, the site condition is assessed. Site condition can change over time due to activities such as erosion, grazing, unauthorized collection, and vandalism. Since the condition of a site can readily change, monitoring of site condition is necessary. Due to the recent increased emphasis on energy development, the CFO has had little time to focus on tasks other than permitting. Very little site condition monitoring has been performed. Assuming that the emphasis on energy permitting in the planning area will continue for several years, it is likely that thousands of new sites will be discovered over the next 10 to 20 years and the resources staff may not be available to perform follow-up monitoring to assess site condition after the permitting process is completed. Implementation of the Permian Basin MOA and the resulting contributions from industry will enable the CFO to gather information about the cultural resources managed and enable better eligibility recommendations. This will ensure that attention is focused on a smaller population of eligible properties.

Moreover, where the Permian Basin MOA does not apply, the new standards for site recording and evaluation will result in the management of significant cultural resources.

2.1.11.5 Key Features

Alluvial deposits and colluvial deposits typically have a high potential to contain intact buried cultural resources. The Pecos River corridor and its tributaries, including Black River, the Delaware River, Pierce Canyon, Nash Draw, Dark Canyon, Seven Rivers, Rocky Arroyo, and lesser intermittent waterways, are areas of high potential for both surface and subsurface archaeological sites due to their location in relation to reliable water sources. In addition, areas of deposition in the vicinity of playas, such as Laguna

Plata, retain high potential for intact subsurface cultural materials. Depositional areas along the western face of the Llano Estacado also have potential for buried deposits. Finally, the numerous rock shelters and caves found in the canyons and foothills of the Guadalupe Mountains often have potential for buried cultural deposits. These areas have limited access and are less likely to be vandalized; however, monitoring of these sites is hampered due to the workload of managing over 9,500 properties.

Areas containing high to moderate potential for buried cultural resources are key features that must be considered during the planning process. Buried archeological sites are nearly impossible to locate during a standard Class III surface inventory. When a federal undertaking is permitted in an area with a high potential for buried cultural material, archeological monitoring is often included as a condition of approval. Construction monitoring is performed by a qualified archeologist working in unison with construction crews. If buried cultural resources are located by the archeologist, construction is halted and the BLM consults with the SHPO relating to eligibility determinations and mitigation or avoidance.

2.1.11.6 Current Management

Cultural Resource Management Plans (CRMPs) identified in the 1998 Carlsbad RMP for designated Cultural Resource Management Areas (CRMAs) were not developed.

2.1.11.7 Management Opportunities

CRMPs with achievable goals could be required for CRMAs.

NSO stipulations could be added to new or reissued oil and gas leases in the Poco Site and unique archaeological sites and areas of importance to Native American tribes, such as the Delaware River area, Boyd's Cave, Burnett Cave, Merchant Site, and Sheep Draw, in order to protect heritage resources.

Mineral materials pits in Maroon Cliffs could be closed and reclaimed with archaeological monitoring stipulations.

Sensitive cultural areas that were previously ROW avoidance areas could become ROW exclusion areas.

NRHP nominations could be completed for Maroon Cliffs, the Delaware River, the Pecos River/Canyons Complex, the Poco Site, and Boyd's Cave.

A site monitoring schedule should be established to ensure that significant sites are inspected. Sites with evidence of looting or vandalism should be signed or fenced as appropriate and monitored.

Standards for survey and site recording could be revised and upgraded, including the elimination of the option for a site to have an "undetermined" status for eligibility to the NRHP.

2.1.12 Paleontological Resources

Paleontology is a biologic and geologic scientific discipline involving the study of fossil materials. Paleontological resources include the bones, teeth, body remains, traces, or imprints of plants and animals that have been preserved in the Earth's crust since some past geologic time. All fossils can offer scientific information, but not all fossils offer significant scientific information. Among paleontologists, fossils are generally considered scientifically significant if they are unique, unusual, rare, diagnostic or important, or add to the existing body of knowledge in a specific area of science.

The BLM is legally mandated to identify, evaluate, and manage paleontological resources as part of its multiple-use management practices. Management of paleontological resources on BLM-managed lands is aimed at protecting scientifically significant fossils for the benefit of the public. *Significant fossils* are defined by BLM policy to include all vertebrate fossil remains (i.e., body and trace fossils) and those plant and invertebrate fossils determined to be scientifically unique on a case-by-case basis.

Fossils are important because they provide information about the relationships of living and extinct organisms, their evolution, and their distribution. Progressive changes seen in fossil lineages provide critical information on the evolutionary process and the ways that new species arise and organisms adapt or fail to adapt to changing environmental circumstances.

Fossils also serve as important guides to the ages of the rocks in which they are found. They are useful in determining the temporal relationships of rock units from one area to another and in identifying the timing of geologic events. Time scales established by fossils provide chronological frameworks for geologic studies of all kinds. Fossils can also provide clues regarding the depositional environments of the sedimentary rocks in which they are preserved, can be important indicators of ancient climates, and can help document climatic change. Management of paleontological resources on BLM-managed lands is aimed at protecting significant fossils for the benefit of the public as a whole.

Fossils found on BLM-managed lands are considered part of our national heritage and afforded protection. Vertebrate fossils or other noteworthy occurrences of invertebrate and plant fossils are considered significant by the BLM. Invertebrate and plant fossils are typically more abundant, and the BLM does not ordinarily consider them to be of significance. Indicators for the condition of paleontological resources are as follows:

- Type of fossil resource present (i.e., vertebrate, invertebrate, or plant)
- Prevalence of the fossil resource in the area
- Geologic formations in the planning area likely to contain fossils
- Physical condition of the fossil
- Scientific, educational, and/or recreational merit of the resource

Geologic formations are the basic units of geology, indicating a discrete rock type and representing a certain depositional environment or method of development. Paleontological resources are closely tied to the geologic formations containing them; different aged rocks contain different types of fossils. A basic tenet in paleontology holds that if fossils are found in a formation elsewhere, they could also occur in the same formations within the planning area.

A classification scale, termed the Potential Fossil Yield Classification (PFYC), is a system for categorizing the probability of geologic units to contain scientifically significant paleontological resources or noteworthy fossil occurrences. This system has been developed to estimate the potential for discovering significant fossils during any surface-disturbing activity in specific geologic formations. The PFYC has five levels or classes, with Class 1 applied to geologic units that are not likely to contain significant fossils through Class 5 for geologic formations that have a high potential to yield scientifically significant fossils on a regular basis (see BLM Instruction Memorandum No. 2008-009, and Map 2.11 Paleontological Potential Fossil Yield Classifications). This classification does not reflect rare or isolated occurrences of significant fossils or individual localities, only the relative occurrence on a formation- or member-wide basis. Any rare occurrences may require additional assessment and mitigation if they fall within the area of anticipated impacts.

Table 2.1-30 summarizes management concerns by PFYC.

Table 2.1-30. Management Concerns by Potential Fossil Yield Classification

PFYC	Level of Concern	Management Concerns
1	Very low	Management concern for paleontological resources in Class 1 units is usually negligible or not applicable. Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.
2	Low	Management concern for paleontological resources is generally low. Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.
3	Moderate or unknown	Management concern for paleontological resources is moderate or cannot be determined from existing data. Surface-disturbing activities may require field assessment to determine appropriate course of action.

PFYC	Level of Concern	Management Concerns
4	High	Management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action. A field survey by a qualified paleontologist is often needed to assess local conditions. Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered.
5	Very high	Management concern for paleontological resources in Class 5 areas is high to very high. A field survey by a qualified paleontologist is usually necessary prior to surface-disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. Official designation of areas of avoidance, special interest, and concern may be appropriate.

2.1.12.1 Current Condition

Fossil resources are part of the geologic formation in which they occur. Most fossils occur in sedimentary rock formations, where they may be distributed extensively both vertically and horizontally throughout the formations or occur in discontinuous pockets. Few geologic formations are uniformly rich in fossils throughout, and some are richer in fossils than others. Although experienced paleontologists can predict which formations will contain fossils and, in general, what types of fossils will be found based on the age of the formation and its depositional environment, predicting the exact location where fossils will be found without field surveys is not possible. Development of the PFYC is based in part on known fossil occurrences, and geology (see Map 2.11 in Appendix A). Acreages of each class can be expected to change as more data are collected from ongoing field surveys and inventories.

Within the planning area, PFYC Class 2 makes up approximately 3,802,986 acres, and Class 3 geologic formations account for approximately 2,444,882 acres, including all ownerships. PFYC Class 4 formations comprise only 8,083 acres of the planning area. Currently, no PFYC Class 5 is identified for the planning area.

In addition to the PFYC, four map provinces can be used to discuss the geology and paleontology of the planning area. Map 2.10 in Appendix A shows the physiographic provinces.

Guadalupe Mountains

The Guadalupe Mountains, located within the planning area, contains limestone, dolomite, and evaporate rocks that represent depositional environments ranging from a barrier reef complex to a marine shelf, shelf margin, and basin. These rocks formed during the middle Permian (258 million years ago) when southeastern New Mexico was located near the equator and along the margin of a large continent.

The limestone outcrops of the Capitan Formation contain algae and abundant barrier reef complex invertebrates. Invertebrates represented include sponges, gastropods, bivalves, cephalopods, bellerophontids, brachiopods, crinoids, and corals. The rock units have been classified as PFYC 3 due to a moderate potential for fossils to be present.

The sedimentary rocks of the Tansill and Seven Rivers Formation represent sediments deposited behind the reef in lagoon environments where diversity and number of invertebrates decreases. These rock units have been classified as PFYC 2 due to the low potential for paleontological resources beginning present.

Since limestone, dolomite, and evaporates create excellent opportunities for caves to develop, the Guadalupe Mountains are known for cave resources. Some of these caves have documented vertebrate fossils of Pleistocene age (Harris 2005; Lucas et al. 2005).

Pecos Valley

The Pecos Valley, located in the planning area, contains sediments that record the evolution of surface drainage systems associated with the ancestral and modern day lower Pecos River. Pleistocene and

younger alluvium and terraces are found throughout this section, primarily associated with the Pecos, Black, and Delaware Rivers and smaller drainages. In addition to Pleistocene and recent alluvial processes, dissolution of subsurface Permian evaporates and resulting collapse structures have preserved Cretaceous, Miocene, and younger sediments locally (Adams 1993; Webster 2006) documented Cretaceous bivalves, gastropods, and echinoids in isolated slabs proposed to be remnants of an accumulation of debris in a solution pit. The solution pit has long since eroded away.

Occurrences of Ice Age animals such as mammoths, mastodons, extinct bison, and others are found in these deposits. Such occurrences have been documented in the planning area and can be discovered by archeologists conducting cultural resource surveys. The CFO has records of such discoveries and the New Mexico Museum of Natural History and Science (NMMNHS) documents several localities collected and curated at the NMMNHS and other institutions (Lucas and Hunt 2005). Units within the Pecos Valley Section are given a Class 2 PFYC rating.

Mescalero Plain

This area is also in the planning area and consists of a broad undulating surface locally covered by sand sheet deposits, Mescalero Sands, and disrupted by solution-subsidence features situated between the Pecos Valley Section and the Southern High Plains-Llano Estacado (Hawley 1993; Hall 2006). Pliocene, Miocene, Triassic, Cretaceous, and Permian sedimentary rocks with thin soil veneers in denuded areas and as erosional remnants may be exposed in the area (Hawley1993; Hall 2006).

Late Pleistocene spring and pond deposits of the Tahoka Formation have produced mammalian bone fragments and aquatic and land snails. (Lucas and Zidek1993; Hall 2006) Gary Morgan, Paleontology Curator at NMMNHS, has collected Pleistocene horses, camels, and bison from exposures of this formation found in the planning area.

There is a documented locality in the Cretaceous Tucumcari Shale where invertebrates (bivalves) were collected (Kues 1993). No Miocene localities are known from the planning area. The Miocene Ogallala Formation has produced vertebrate fossils (e.g., elephants, weasels, large cats) from exposures in the Texas panhandle that define a specific interval of geologic time (Clarendonian) in the Miocene (Tedford 2004) and similar material could be discovered in the planning area.

Pleistocene, Pliocene, and Permian rocks in this area are classified as PFYC 2 because they typically are alluvial units that are not differentiated on a 1:500,000-scale geologic map. Miocene and Cretaceous sedimentary rocks in the planning area are given a PFYC 3.

There are isolated exposures of Triassic (240 million years ago) sedimentary rocks exposed in this area and are classed as PFYC 4. This high level of potential is based important vertebrate fossils produced from outcrops further north in New Mexico (NMMNHS database) and east in Texas (Lucas and Anderson 1993). Lucas and Anderson (1993) suggested that previous mapping of the geologic units exaggerated the extent of these units in the southeastern part of New Mexico. Lucas identified two areas in Lea County where Triassic sedimentary rocks are exposed: the Maroon Cliffs and Custer Mountain.

The Southern High Plains begins where the Mescalero Plain gives way to a fairly continuous surface called the Llano Estacado and is capped by the Ogallala Formation (Pliocene to Miocene, 3–10 million years ago). There are no documented localities in the Ogallala Formation in the planning area but, as mentioned above, it has produced important fossils in other places.

2.1.12.2 Trends

Fossil-rich formations found within the planning area have been and continue to be visited by researchers and educational institutions. There are currently BLM-permitted paleontological studies of fossils found within the caves of the planning area. Caves resources and surface exposures can lend themselves to study of climate change. There could be increased interest to use geologic and paleontological resources in climate change studies.

Another important trend in management is the application of GIS in land use decisions. Since the PFYC model is an application of GIS, maintaining the data-sharing partnership with the NMMNHS is important to updating and maintaining a key component of the PFYC. These data along with other GIS layers can be used internally to make informed decisions about land use decision.

2.1.12.3 Forecast

As the public lands within the planning area become subject to more use for a variety of purposes, significant fossil resources might be more likely to be affected from the use. The increase of uses within key areas would require additional measures to be taken in order to manage these resources according to BLM policy and laws. The scientific, educational, and recreational value of any discovered or known paleontological resource should be determined by careful examination and evaluation by a paleontological resource specialist.

2.1.12.4 Key Features

There are key features in the planning area where fossil-bearing units are well exposed at the earth's surface, along canyon walls and cliff faces. Exposure of the rock at the surface allows for easier viewing and discovery of these resources. Where thin soils cover older sedimentary rocks, surface disturbance may encounter fossil-bearing units. Some important known localities would require monitoring and more intense management to conserve and management these resources according to BLM policy.

A case-by-case assessment of proposed actions that expose fossil bearing units or occur near or on key features would follow current BLM policy and provide for management of paleontological resources.

Guadalupe Mountains

Key features within the Guadalupe Mountains area include limestone units representing the reef complex where abundant invertebrates, algae, and sponges occur. Caves in the section are known to contain vertebrate fossils (Harris 1993, 2005; Morgan and Lucas 2006) and are considered a key feature of the section.

Pecos River Valley

Key features within the area are known localities and any new discoveries of Ice Age fauna.

Mescalero Plain

Key features within the Mescalero Plain area are spring, cienega, and pond deposits exposed in large blowouts and along some stream banks in the eastern half of the sand sheet. These deposits formed when the water table was higher during the Wisconsinan glacial period (Hall 2006) and are light olive gray sands.

Outcrops of older sedimentary rocks of possible Triassic, Cretaceous, and Miocene periods should be considered key features on a case-by-case basis when assessing site-specific projects.

Southern High Plains-Llano Estacado

Key features in this area are exposed bedrock that would create an opportunity to assess and monitor for any newly exposed paleontological resources.

2.1.12.5 Management Opportunities

Develop an interpretive site at Mammoth to protect the resource rather than closing the site to the public.

Protect crinoid fossils in Dark Canyon from unauthorized collection and surface disturbance by restricting access.

2.1.13 Wilderness Characteristics

Profile

Lands with wilderness characteristics are parcels that meet a size requirement of 5,000 acres (or exception criteria) and contain naturalness and either outstanding opportunities for solitude or primitive and unconfined recreation. In addition, they may also possess supplemental values (e.g., ecological, geological, or other features of scientific, educational, scenic, or historical value). They are identified through a process described in BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands and considered in the land use planning process under BLM Manual 6320 – Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process (BLM 2012a).

Naturalness is a measure of the degree to which the area appears to have been affected primarily by the forces of nature, and the degree that human work is substantially unnoticeable. Examples of human-made features that may be, in certain cases, considered substantially unnoticeable are trails, trail signs, trail bridges, fire breaks, fire pre-suppression facilities, pit toilets, fire rings, water quantity and quality measuring devices, research monitoring markers and devices, air quality monitoring devices, fencing, spring developments, occasional ways, and small reservoirs.

Solitude exists in areas where the sights, sounds, and evidence of human activity are rare or infrequent, and where visitors can be isolated, alone, or secluded from others (BLM 2012a). Solitude is commonly present in landforms of rugged relief or vegetation that may provide screening from other visitors, as well as the ability to enjoy the area without experiencing frequent contact with, or evidence of, other visitors.

Primitive and unconfined recreation occurs where there are minimal or no developed recreational facilities. Areas that offer opportunities for primitive recreation are marked by the absence of developed recreational facilities, are large enough to allow these types of outdoor recreational uses, and may contain features or attractions that lend themselves to primitive and unconfined types of recreational uses.

Outstanding opportunities for solitude or primitive and unconfined recreation means that the opportunities must stand out among others of their kind. An area does not have to possess outstanding opportunities for both elements, nor does it need to have outstanding opportunities on every acre, so long as these opportunities are identified somewhere within the area.

In order for an area to have wilderness characteristics, the area must be of a large enough size to allow for management of those characteristics, typically 5,000 acres or more.

2.1.13.1 Current Condition

Wilderness characteristic resources in the planning area were inventoried using the BLM Wilderness Inventory Handbook (BLM 1978) between 1978 and 1980 and were updated for acquired lands between 1986 and 1994. Areas identified as possessing wilderness characteristics in 1979 were designated as WSAs and are currently being managed under Manual 6330 – Management of Wilderness Study Areas (BLM 2012b) until Congress either designates these WSAs as wilderness or releases them from further study. Please see Section 4.17 for additional information related to WSAs.

The BLM is required to keep a current inventory on all resources on public lands, including lands with wilderness characteristics. Thus, the CFO will analyze and inventory lands with wilderness characteristics inventory as part of the revision for the Carlsbad RMP.

2.1.13.2 Current Management

The 1988 Carlsbad RMP and following amendments did not address any management actions for lands with wilderness characteristics in the planning area. Lands with wilderness characteristics will be inventoried and analyzed for land use planning according to BLM policy.

2.1.13.3 Management Opportunities

BLM is directed through FLPMA Section 201 to inventory public land resources and other values, including wilderness characteristics. Wilderness characteristics may be considered in land use planning when BLM determines those characteristics are reasonably present, of sufficient value and need, and are practical to manage. Should the CFO identify lands with wilderness characteristics, the RMP revision would analyze a range of alternatives for management of such lands.

2.1.14 Visual Resources

2.1.14.1 Indicators

The CFO is entrusted with the care of scenic landscapes and for ensuring that scenic values are considered before allowing uses that may have negative visual impacts. The BLM's VRM system (BLM Manual 8400, Visual Resource Management) provides direction in identifying and evaluating scenic values to determine the appropriate levels of management. It also provides a way to analyze potential impacts to visual resources and apply visual design techniques to ensure that surface-disturbing activities harmonize with their surroundings. The BLM VRM system consists of three stages—Visual Resource Inventory (VRI), assignment of VRM classes, and subsequent site-specific analysis through a Visual Contrast Rating. The inventory, performed in the planning area in 2012 and displayed on Map 2.12 Visual Resource Inventory Classes, identifies the visual resources of a specific area and assigns them to inventory classes based on scenic quality, sensitivity, and distance zones. The process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points (BLM Handbook H-8410-1, Visual Resource Inventory). The results of the VRI and visual sensitivity are considered throughout the RMP process along with other resource concerns, and an area's visual resources are assigned to management classes with established objectives. These classes are generally based on the level of change that should be visible within an assigned management class.

During the RMP development process, the area's visual resources are assigned to one of the following VRM classes (see Map 2.13 in Appendix A):

- **Class I:** The level of change to the characteristic landscape should be very low and must not attract attention. Class I provides for natural ecological changes; however, it does not preclude very limited management activity.
- **Class II:** The level of change to the characteristic landscape should be low. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the landscape.
- **Class III:** The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer.
- **Class IV:** The level of change to the characteristic landscape can be high. Management activities may dominate the view and be a major focus of the viewer's attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating basic elements of form, line, color, and texture found in the predominant natural features of the landscape.

The degree of visual modifications allowed is specific for each VRM class. The goal of VRM, however, is to minimize the visual impacts of all surface-disturbing activities regardless of the class in which they occur.

The VRM system also provides objectivity in determining whether potential visual impacts from proposed actions and surface-disturbing activities or developments would meet the management objectives established for the area, or whether design adjustments would be required. A visual contrast rating process is used, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture. This process is described in detail in BLM Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986). Once every attempt is made to reduce visual impacts, BLM managers can decide whether to accept or deny project proposals.

Managers also have the option of attaching additional mitigation stipulations to bring the proposal into compliance.

2.1.14.2 Current Condition

The original VRM classes were identified on the ground in the late 1970s as part of a Roswell District Office initiative. The 1978–1979 baseline inventories were undertaken to evaluate the visual characteristics of land, water surface, vegetation, and structures. This results in the delineation of scenic quality rating units, sensitivity level rating units, and distance zones. The delineations were not included in any management framework plans, but VRM classes and acreages were identified in the 1988 RMP (Table 2.1-31). Inventory and assessment techniques have improved and the need for an updated VRI was identified. The CFO completed a new VRI as part of the RMP planning effort in 2012. The best available VRM class data available are based on the 1988 RMP and is reflected in current GIS database layers.

Table 2.1-31. Visual Resource Management Classes in the Planning Area

Area	Acres
VRM Class I	
Lonesome Ridge WSA	2,990
Mudgetts WSA	2,142
VRM Class II	
Zone 1 of the Guadalupe Escarpment Scenic Area	8,820
Cave management units	6,620
Pecos River Corridor SRMA	4,500
Dark Canyon Scenic Area and ACEC (includes 1,200 acres of Mudgetts WSA, which is managed as VRM Class I	3,220
Pecos River Canyons Complex ACEC	4,100
Seven Rivers Hills Area	540
Dispersed areas not included in SMAs	10,670
VRM Class III	
Guadalupe Escarpment Scenic Area	40,750
Dark Canyon SMA	1,808
Dispersed areas not included in SMAs	227,990
VRM Class IV	
Remaining areas not designated above	1,853,780

VRM Class I

VRM Class I is assigned to highly scenic areas that need special management attention. The 2,990-acre Lonesome Ridge WSA is managed as VRM Class I.

VRM Class II

VRM Class II areas include the Guadalupe Escarpment Scenic Area Zone 1 (8,820 acres), seven cave management units (6,220 acres), the Pecos River Corridor SRMA (4,500 acres), Dark Canyon Scenic Area and ACEC (3,220 acres, which also includes approximately 1,200 acres of the 3,342-acre Mudgetts WSA), the Pecos River/Canyons Complex ACEC (4,100 acres), the Seven River Hills Area (540 acres), and several other areas located outside SMAs (10,670 acres).

VRM Class III

The VRM Class III areas in the planning area include 48,170 acres within seven SMAs and an additional 227,990 acres located outside SMAs. The majority of VRM Class III designated lands within SMAs are in the Guadalupe Escarpment Scenic Area (40,750 acres), Mudgetts WSA (2,142 acres), and the Dark Canyon SMA (1,808 acres). NSO and other seasonal drilling stipulations also exist on much of this land

to protect visual quality and sensitivity and reduce adverse visual impacts during the high-use season at nearby Carlsbad Caverns National Park. The Guadalupe Escarpment Scenic Area also carries a "limited" OHV use designation.

VRM Class IV

VRM Class IV is designated on 1,853,780 acres of BLM-managed land parcels within the planning area.

2.1.14.3 Trends

BLM-managed lands in the planning area include vast scenic areas (including natural waterways and massive geological formations), diverse industrial uses, developed communities, and rural ranches in southeast New Mexico. The landscape is experiencing a high degree of human modification (e.g., infrastructure development) as a result of industrial development and agricultural growth. Fluid mineral extraction, including associated infrastructures, alternative energy development such as wind and solar energy, and potash mining operations are other modifiers of the landscape on BLM-administered lands and adjacent private lands.

Buffers around landscapes with higher scenic quality may be insufficient or non-attainable. This allows major surface-disturbing activities in or adjacent to areas where the level of change to the characteristic landscape may be conflicting. Adverse impacts to scenic vistas and natural settings could continue to increase due to management of multiple resources on public lands and from activities on adjacent state or private lands. Growing pressure is being placed on visual resources as a result of activities such as oil and gas production, potash mining, wind energy proposals, wildland fire, recreation, land use authorizations (e.g., utility corridors, communication sites, and road and trail development for authorizations), and livestock grazing management (e.g., pipelines, roads for herding and trailing livestock, and water tanks). These activities could adversely affect scenic values. Locations that are currently pristine and undeveloped could eventually be crisscrossed with developments such as pump jacks, tank batteries, pad scars, pipelines, water lines, open pit reservoirs, power lines, roads, utility corridors, and OHV trails. An updated VRI is needed to assess the current condition of visual resources adjacent to local communities or population centers, major transportation and utility corridors, and other scenic viewsheds to assist in management decisions related to sensitive viewsheds and corridors.

2.1.14.4 Forecast

Assuming increasing oil and gas development, potash mining, caliche mining, commercial and agricultural development, wind/solar potential, and motorized recreation use, a higher concentration of long-term visual impacts are likely to occur. Changes in recreation use, resource conflicts, population, and the WUI would be contributing factors to future ratings of visual resource values.

2.1.14.5 Key Features

Key features include areas of high public use and visibility, such as the Guadalupe Escarpment Scenic Area, Cottonwood Day Use Area, Pecos River Corridor, Shugart Dunes, Livingston Ridge, Maroon Cliffs, and Guadalupe Backcountry Byway. Adjacent lands with high sensitivity for scenic resources include Carlsbad Caverns National Park, Guadalupe Mountains National Park, the Living Desert State Park, Brantley Lake State Park, and Lincoln National Forest.

2.1.14.6 Management Opportunities

Scenic ACECs could be managed as VRM Class II.

The BLM could develop an activity plan for the Dark Canyon Scenic Area.

The BLM could consider managing the corridor along U.S. Highway 62/180 leading to Carlsbad Cavern National Park as VRM Class II.

Scenic portions in the upper northwest area of the planning area could be managed as VRM Class II, including the corridor along Picacho Road and loop off of New Mexico Highway 13.

The BLM could consider managing undeveloped scenic areas around Texas Hill as VRM Class II

Lands with wilderness characteristics could be reviewed that do not meet size requirements (5,000 roadless acres or more) but contain high scenic value and preserve natural scenic quality through VRM. The BLM could establish graduated VRM buffer zones in highly scenic areas where necessary to prevent clustered development along boundaries (for example, VRM Class IV located right next to VRM Class II might promote development along the VRM Class II boundary that may diminish scenic value through cumulative impacts).

2.1.15 Air Resources

Air Quality

2.1.15.1 Profile and Indicators

The Clean Air Act of 1970, as amended (CAA) (42 USC 85 §§ 7401 et seq.), is the comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. Congress passed the CAA to protect human health and the environment, as well as visibility in sensitive areas. The NMED has the primary responsibility to carry out the requirements of the CAA in New Mexico. The CAA authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. Air quality indicators include criteria pollutants and air quality–related values (AQRVs), such as visibility.

Criteria Pollutants

The CAA defines the NAAQS as levels of criteria pollutants above which detrimental effects on human health and welfare may result. The EPA established NAAQS for the following six criteria pollutants (EPA 2009):

- **Carbon monoxide (CO):** CO is essentially inert to plants and materials but can have significant effects on human health because it combines readily with hemoglobin, reducing the amount of oxygen transported in the bloodstream. At low levels, CO can exacerbate cardiovascular disease. At high levels, it can damage the central nervous system. At extremely high levels, CO is poisonous and can cause death. Most CO emissions come from vehicle use. CO is not considered a major pollutant in the region and will not be included as an indicator.
- **Nitrogen dioxide (NO_2):** The high diversity, mobility, and reactivity of NO_2 enables this pollutant to contribute to numerous environmental problems such as acid rain, climate change, deteriorated water quality, ground-level ozone (O_3), air toxics, and particulate matter. NO_2 can also cause damage to respiratory airways. On-road vehicles, such as trucks and automobiles, are the major sources of NO_X; however, vehicle manufacturers have been required to reduce NO_X emissions since the 1970s.
- **Ozone (O_3):** O_3 is a powerful oxidant that can reduce lung function, aggravate asthma, increase chances for respiratory illness, and lead to permanent lung damage. It can also damage plant tissue, kill plants, and reduce farm yields. O_3 is not a direct emission; it is formed in the air through reactions of NO_X, volatile organic compounds (VOCs) (e.g., chemicals emitted from paints and lacquers), and atmospheric air in the presence of sunlight.
- **Lead:** The primary historical source of lead emissions has been the use of leaded gasoline in motor vehicles and certain industrial sources. Because leaded gasoline has been phased out of use, the processing of metals containing trace amounts of lead is now the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturing plants. The effects of lead exposure include brain or nervous system damage. Children exposed to lead are especially at risk. Lead is not considered a pollutant of concern in the region and will not be included as an indicator.

- **Sulfur dioxide (SO_2):** SO_2 can aggravate respiratory illness and heart and lung disease. SO_2 sources are few and localized because these pollutants come primarily from large industrial sources.
- **Particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}) and fine particulates with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$):** All particles smaller than PM_{10} pose a great health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than $PM_{2.5}$ are referred to as fine particles. Sources of fine particles include all types of combustion (e.g., motor vehicles, power plants, wood burning) and some industrial processes. Particles with diameters between $PM_{2.5}$ and PM_{10} are referred to as coarse. Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads. Both fine and coarse particles are associated with numerous health effects. Coarse particles can aggravate respiratory conditions such as asthma. Exposure to fine particles is associated with several serious health effects, including premature death. Adverse health effects have been associated with exposures to particulate matter over both short periods, such as a day, and longer periods of a year or more. The PM_{10} standard has been in effect since 1987 and historically has been the particulate size of concern. However, $PM_{2.5}$ is receiving increasing attention.

Another pollutant of concern is hydrogen sulfide (H_2S). H_2S gas is produced as a component of some oil and natural gas production and is toxic to humans. H_2S monitoring takes place on-site for worker health and safety; however, there are no data on oil and gas well emissions or general pollution levels and no monitoring network. The BLM maintains a database of thousands of oil and gas wells with high levels of H_2S in the gas stream, but this does not indicate if gas is leaking to the atmosphere. H_2S has an unpleasant odor and can be smelled by the public at many locations in the planning area. The odor could be considered a public nuisance even if the H_2S concentrations are not at high enough levels to be a health risk. There is the potential for the public to be exposed to higher levels of H_2S if they venture onto well pads. These well pads are signed as H_2S risks, but access is rarely restricted. A recent study by the USFWS has indicated that H_2S emissions may be impacting wildlife around oil and gas wells (Lusk 2010).

Total suspended particles (TSPs) refer to all airborne particles less than 100 microns in size. New Mexico has established ambient air quality standards for TSPs; however, there is currently no monitoring of TSPs in the region.

The NAAQS and New Mexico Ambient Air Quality Standards (NMAAQS) are provided in Table 2.1-32.

Table 2.1-32. NAAQS and NMAAQS

Criteria Pollutant	Averaging Period	NAAQS	NMAAQS
CO	8-hour	9 ppm[b] ($10 mg/m^3$)[c]	8.7 ppm
	1-hour	35 ppm ($40 mg/m^3$)[c]	13.1 ppm
H2S	1-hour	–	0.010 ppm[c,d]
	½-hour	–	0.10 ppm[e]
	½-hour	–	0.30 ppm[f]
Lead	Quarterly	1.5 $\mu g/m^3$	–
NO2	Annually	0.053 ppm ($100 \mu g/m^3$)	0.050 ppm
	24-hour		0.10 ppm
O3	1-hour	0.12 ppm[g]	–
	8-hour	0.075 ppm[h]	–
PM2.5	Annually	15 $\mu g/m^3$ [i]	–
	24-hour	35 $\mu g/m^3$ [j]	–
PM10	Annually	50 $\mu g/m^3$ [k]	–
	24-hour	150 $\mu g/m^3$ [c]	–
SO2	Annually	0.03 ppm	0.02 ppm
	24-hour	0.14 ppm	0.10 ppm
	3-hour	0.50 ppm	–

Source: NMED 2012.
[a] micrograms per cubic meter.
[b] parts per million.
[c] Not to be exceeded more than once per year.
[d] For the state, except for the Pecos-Permian Basin Intrastate Air Quality Control Region (AQCR).
[e] For the Pecos-Permian Basin Intrastate AQCR.
[f] For within 5 miles of the corporate limits of municipalities within the Pecos-Permian Basin AQCR.
[g] The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is one day or less. The 1-hour NAAQS will no longer apply to an area one year after the effective date of the designation of that area for the 8-hour ozone NAAQS. The effective designation date for most areas is June 15, 2004 (40 CFR 50.9; see *Federal Register* of April 30, 2004 [69 *Federal Register* 23996]).
[h] To attain this standard, the three-year average of the fourth-highest daily maximum 8-hour average O_3 concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
[i] To attain this standard, the three-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
[j] To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3.
[k] To attain this standard, the expected annual arithmetic mean PM_{10} concentration at each monitor within an area must not exceed 50 µg/m^3.

The EPA assigns classifications to geographic areas with respect to air quality conditions. When an area is considered for classification, there are three possible outcomes of the designation process for each of the criteria pollutants:

- **Attainment:** Any area that meets the NAAQS for the pollutant.
- **Non-attainment:** Any area that does not meet, or that contributes to ambient air quality in an area that does not meet, the national or secondary standard for the pollutant.
- **Unclassified:** Any area that cannot be classified based on available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

When an area exceeds an ambient air quality standard, it may be designated as a non-attainment area (NAA). It is possible for a geographic area to be an attainment area for one criteria pollutant and an NAA for another. Air monitoring networks determine whether an area meets the ambient air quality standard. If an area falls into NAA status, the NMED is required to prepare a state implementation plan to describe how the area will be brought into attainment. Attainment areas are further classified as Class I, II, or III and are subject to the Prevention of Significant Deterioration (PSD) program.

Air Quality Index

The air quality index (AQI) is a national index for each of the major criteria air pollutants. It uses a 500-point scale, with the worst pollutant determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (<50), moderate (50–100), unhealthy for sensitive groups (100–150), unhealthy (>150), very unhealthy (>200), and hazardous (>300).

Air Quality-Related Values

AQRVs include atmospheric deposition, visibility, light pollution, and noise pollution.

- **Atmospheric deposition:** Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems. Deposition levels in the CFO are low relative to the United States in general and are not a major concern in the CFO. Most deposited pollutants originate outside of the CFO and changes in management would have little impact on the process. Therefore, atmospheric deposition will not be discussed further in this document.
- **Light pollution:** There is currently no monitoring of light pollution in the CFO and light pollution will not be further analyzed in this document.
- **Noise pollution:** Noise is defined as unwanted sound. Noise has long been accepted as a byproduct of urbanization, but only recently has it received much social attention as a potential environmental hazard. Excessive or saturated noise can contribute to both temporary and permanent physical impairments, such as hearing loss and increased fatigue, as well as stress,

annoyance, anxiety, and other psychological reactions in humans. Noise can also have a detrimental effect on wildlife, degrading habitat or interfering with communication or mating rituals. The impact of noise on wildlife varies with the type of noise, the intensity, and by specific animal species affected (BLM 2009).

There are currently no data on noise pollution in the planning area, nor is there any ongoing monitoring; however, oil and gas equipment, construction activities, heavy truck traffic, and OHV use are potential sources of concern.

- **Visibility:** Visibility in the CFO is largely determined by outside factors, i.e., pollution from outside the region. As management of pollution inside the CFO will have little effect on visibility, it will not be included in this analysis.

2.1.15.2 Current Condition

Criteria Pollutants

The primary air quality monitoring network in New Mexico is the State and Local Air Monitoring System (SLAMS), operated by the NMED, which monitors for air quality compliance. In addition, the Clean Air Status and Trends Network (CASTNET), operated by the EPA and the NPS, focuses on atmospheric deposition.

The State of New Mexico divides the state into 12 air quality control regions (AQCRs). The planning area lies in AQCR 155 (NMED 2012). The Pecos-Permian Intrastate Basin AQCR 155 is composed of Chaves, Curry, De Baca, Eddy, Lea, Quay, and Roosevelt Counties. Generally, it includes the areas known as the Southern High Plains and the Middle Pecos River Drainage Basin (NMED 2012).

Within AQRC 155, the NMED has air quality monitoring stations in Artesia, Carlsbad, and Hobbs (Table 2.1-33). The EPA has a monitoring station in Roswell in addition to an ozone-monitoring site located at Carlsbad Caverns National Park. There are no CASTNET stations in AQCR 155; however, data can be interpolated from existing stations in eastern Arizona and Texas.

Table 2.1-33. Monitoring Site Locations

Location	Parameters Measured
Artesia	Meteorology, NO, NO_2, SO_2
Carlsbad	Meteorology, O_3, NO, NO_2, $PM_{2.5}$
Hobbs	Meteorology, O_3, NO, NO_2, $PM_{2.5}$, PM_{10}
Roswell	Meteorology, $PM_{2.5}$, PM_{10}
Carlsbad Caverns	Meteorology, O_3

Source: NMED 2012; EPA 2009.

Eddy, Chavez, and Lea Counties satisfy all NAAQS and NMAAQS for monitored pollutants and are classified as attainment areas for those pollutants. These counties are not in non-attainment for any pollutants and are unclassified with regard to those pollutants that are not monitored in those counties. Lead and CO are not expected to be issues in rural areas. Background levels of pollution as provided by the NMED are listed in Table 2.1-34. These are the background levels of pollution that naturally exist in the environment. Table 2.1-35 provides current levels of criteria pollutants in Lea, Chaves and Eddy Counties.

Table 2.1-34. Ambient Background Levels of Criteria Pollutants in New Mexico

Criteria Pollutant	($\mu g/m^3$)
CO	NA
NO_2	NA
PM_{10}	20
$PM_{2.5}$	7.3
SO_2	NA

Source: NMED 2012.

Table 2.1-35. Mean Annual Levels of Criteria Pollutants in Lea, Chaves, and Eddy Counties, 2008

Criteria Pollutant	Averaging Period[1]	NAAQS	Site				
			Artesia	Carlsbad	Carlsbad Caverns National Park	Hobbs	Roswell
O_3 (ppm)	4th max (8-hour)	0.0075	–	0.067	0.071	0.067	–
$PM_{2.5}$ ($\mu g/m^3$)	2nd max (24-hour)	35	–	–	–	14.6	14.8
	Annual mean	15.0	–	–	–	6.85	6.48
PM_{10} ($\mu g/m^3$)	98th pct (24-hour)	150	–	–	–	39	59
	Annual mean	50	–	–	–	18	19
SO_2 (ppm)	2nd max (24-hour)	0.14	0.001	–	–	–	–
	Annual mean	0.030	0.001	–	–	–	–

[1] See the EPA air pollutants website for guidance on how these standards are calculated (http://www.epa.gov/air/airpollutants.html) (EPA 2009).

Mean AQI values for the region are generally in the good range (AQI<50) (Table 2.1-36).

Table 2.1-36. Mean and Max AQI Values, 2008

County	Mean AQI	Max AQI
Chavez	19	79
Eddy	44	100
Lea	42	80

Source: EPA 2009.

Table 2.1-37 provides the 2008 emissions of criteria pollutants for Eddy, Lea, and Chavez Counties.

Table 2.1-37. Annual Emissions[1] of Criteria Pollutants in Eddy, Lea, and Chavez Counties, 2008

Criteria Pollutant	Type of Emission Source					Total Emissions
	Point Sources	Area Sources	On-Road Mobile	Non-Road Mobile	Biogenic	
CO	14,481	8,892	28,777	8,749	32,122	93,020
NO_x	37,766	3,063	3,086	835	5,921	50,670
$PM_{2.5}$	1,856	8,686	59	72	0	10,673
PM_{10}	2,175	76,513	91	76	0	78,885
SO_x	15,478	46,694	35	49	0	61,956
VOC	6,280	6,166	2,483	970	160,938	176,836

Source: BLM 2010a.
[1] tons per year.

There are three Class I areas in or adjacent to AQCR 155: Salt Creek Wilderness, Carlsbad Caverns National Park, and Guadalupe Mountains National Park. The following areas are classified as sensitive Class II areas by the State of New Mexico (NMED 2012):

- Bitter Lake National Wildlife Refuge
- Fort Sumner State Monument
- Grulla National Wildlife Refuge
- Harry McAdams State Park
- Living Desert State Park
- Oasis State Park
- Sumner Lake State Park
- Ute Lake State Park

Smoke

Smoke from wildland fires, both natural and prescribed fire, emit CO, O_3, and particulate matter, and can contribute to air pollution in the planning area. The CFO stays within NMED Smoke Management Program regulations (20.2.65 NMAC) for all prescribed fire. For more information, see the Wildlands Fire section.

2.1.15.3 Trends

Reasonably Foreseeable Development

An Air Resources Technical Support Document (ARTSD) was prepared for activities associated with Amigos Bravos wells in the CFO. This report provides the details and methodologies for how the emissions inventory was developed into an Excel-based calculator using several emissions calculation data sources including Central Regional Air Planning Association (CenRAP) and Texas Commission on Environmental Quality (TCEQ) oil and gas emissions inventory Documents developed specifically for Permian Basin oil and gas activities.

Criteria Pollutants

O_3 is the criteria contaminant of most concern in the planning area. Eddy County exceeded the 8-hour O_3 standard once in 2002 and once in 2006, with levels of 0.076 ppm[2] (EPA 2009); however, it did not violate the three-year moving average. No other violations of air quality standards have occurred. Although no trends in the data were observed, O_3 levels are close to the regulatory limit (EPA 2009).

There are no significant trends in $PM_{2.5}$ levels or in the levels of any other monitored criteria pollutants (EPA 2009).

Although the AQI in the region has reached the level considered unhealthy for sensitive groups several times in the last decade, there are no patterns or trends to the days AQI exceeded 100 (Table 2.1-38). The AQI only exceeded the unhealthy threshold in the years identified in the table (EPA 2009).

Table 2.1-38. Number of Days Unhealthy for Sensitive Groups (AQI 101–150)

County	2002	2003	2005	2006	2009
Lea	–	1[1]	3	3	3
Eddy	4	1	–	6	–
Chavez	–	1	–	–	–

Source: EPA 2009.
[1] This day was indicated as unhealthy for all groups (AQI > 150).

Over the past decade, Lea County shows a small upward trend in AQI. Eddy and Chavez Counties show no significant trend in AQI (Figure 2.1-6, Figure 2.1-7, and Figure 2.1-8).

[2] The NAAQS for O_3 is 0.075 ppm.

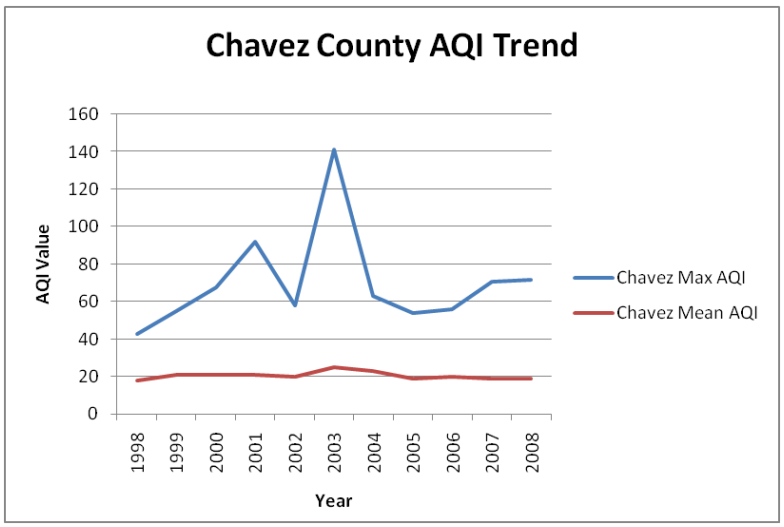

Figure 2.1-6. Chavez County AQI Trend

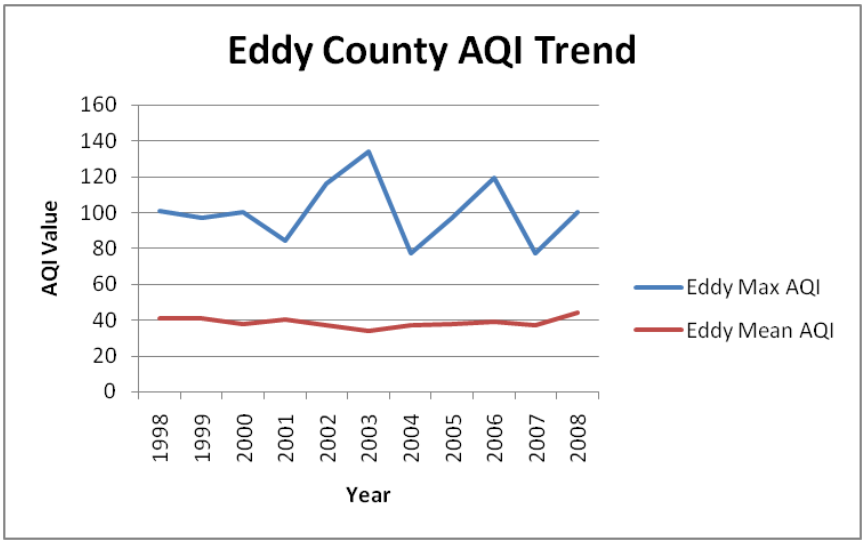

Figure 2.1-7. Eddy County AQI Trend

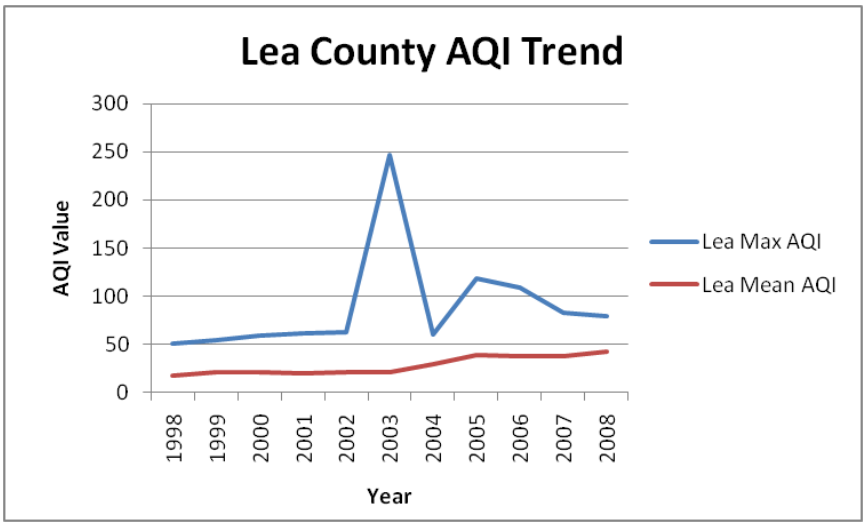

Figure 2.1-8. Lea County AQI Trend

Air Quality-Related Values

Noise Pollution

Noise is a concern near generators, pump jacks, and during construction and drilling operations. Traffic is also a major source of noise. The CFO has several noise stipulations in place to protect wildlife, in particular the lesser prairie-chicken.

2.1.15.4 Forecast

Predicting future air pollution levels is difficult as local weather conditions play a large role; however, it is reasonable to assume that air quality will decrease in proportion to population growth and industry development. From 2010 to 2035, Eddy County is expected to experience population growth of 13.8%, Chavez County is expected to experience a 14.8% growth rate, and Lea County is expected to grow by 24.3% (Bureau of Business and Economic Research 2008). Although it is difficult to predict future pollution levels, in general, air pollution in the region can be expected to increase over the same period. A contract for zone modeling is currently underway that will model future VOCs and O_3 concentrations. The contract will also model future GHG emissions in the CFO.

The EPA is currently in the process of circulating new NAAQS for $PM_{2.5}$ and PM_{10} (EPA 2010). The EPA is also reviewing the NAAQS for O_3. The new standards may push the planning area into non-attainment for these pollutants.

2.1.15.5 Key Features

The CAA establishes a national goal of preventing any further degradation or impairment of visibility within federally designated attainment areas. There are different permissible increments for criteria pollutants for different areas, or classes (Table 2.1-39). The classes are defined as follows:

- **Class I:** Attainment areas including International Parks, National Parks larger than 6,000 acres, National Memorial Parks larger than 5,000 acres, and National Wilderness Areas (WAs) larger than 5,000 acres which were in existence on August 7, 1977. Class I areas afford the highest protection to air quality by restricting the level of further degradation allowed.
- **Class II:** Attainment areas that do not meet Class I or Class III designations.
- **Class III:** Attainment areas that allow maximum industrial growth while maintaining compliance with NAAQS.

Table 2.1-39. Prevention of Significant Deterioration Increments

Criteria Pollutant	PSD Increment Class I	PSD Increment Class II
NO_2	2.5 $\mu g/m^3$	25 $\mu g/m^3$
PM_{10}	4 $\mu g/m^3$	17 $\mu g/m^3$
	8 $\mu g/m^3$	30 $\mu g/m^3$
SO_2	2 $\mu g/m^3$	20 $\mu g/m^3$
	5 $\mu g/m^3$	91 $\mu g/m^3$
	25 $\mu g/m^3$	512 $\mu g/m^3$

Key features of the air quality region include Class I areas, areas with sensitive populations, and locations where pollutants may be concentrated. There are three Class I areas in or near AQCR 155: Carlsbad Caverns and Guadalupe Mountains National Parks and Salt Creek Wilderness. Sensitive populations are those who are more at risk from air pollution. These include children, the elderly, people with existing health conditions, and those with high exposure such as those who work extensively outdoors. Areas with sensitive populations include schools, nursing homes, assisted living centers, hospitals, and medical centers.

Locations where pollutants may be concentrated include airports, transportations corridors, and well pads with high levels of H_2S in the gas steam.

2.1.15.6 Current Management

The 1988 Carlsbad RMP and subsequent amendments did not make decisions for air resources (BLM 1988).

2.1.15.7 Management Opportunities

Areas with high H_2S could be closed to public use and access. Stipulations could be developed for oil and gas development in areas at risk for H_2S.

Haze may increase in Carlsbad Caverns and Guadalupe Mountains National Parks. Increased use of BMPs, efforts to reduce traffic on dirt roads, and a regional haze stipulation could address this issue. In addition, light pollution may be affecting the dark skies in the parks. Mitigation measures or stipulations could be developed to address light pollution.

2.1.15.8 Climate and Greenhouse Gases

Profile

Indicators

Climate

Climate encompasses the statistics of temperature, humidity, atmospheric pressure, wind, rainfall, atmospheric particle count, and numerous other meteorological elements in a given region over long periods of time. The climate of a location is affected by its latitude, terrain, altitude, and ice or snow cover, as well as nearby water bodies and their currents. Indicators discussed include temperature and precipitation. Climate is different than weather, which is the state of the atmosphere with respect to wind, temperature, cloudiness, moisture, and pressure at a given point in time (i.e., daily or weekly) (National Weather Service [NWS] 2009). Climate is generally defined as the composite, or generally prevailing, weather conditions of a region, throughout the year, averaged over a series of years (NWS 2009). Climate also includes statistics other than the average, such as the magnitudes of day-to-day or year-to-year variations.

Climate change is defined as a non-random change in climate that is measured over several decades or longer (NWS 2009). This change may be due to natural or human-induced causes (NWS 2009). Climate change indicators focus on temperature and precipitation, particularly with regard to any long-term trends. Issues of concern with respect to climate change include how climate change may affect resources. Substantial scientific evidence indicates that an increase in the global average temperature of more than 3.6°F above pre-industrial levels (i.e., those that existed prior to 1860) poses risks to natural systems and human health and well-being (Union of Concerned Scientists 2007).

Greenhouse Gases

Greenhouse gas (GHG) emissions provide a useful indicator for climate change. Ongoing scientific research has identified the potential effects of GHG emissions on global climate. These emissions include CO, CO_2, methane (CH_4), nitrogen oxides (NO_X), water vapor, and several other trace gasses. The Intergovernmental Panel on Climate Change (IPCC) stated that most of the observed increase in average global temperatures since the mid-twentieth century is very likely a result of the observed increase in human-caused GHG concentrations (IPCC 2007). Through complex interactions on a regional and global scale, these GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although GHG levels have varied for millennia, with corresponding variations in climatic conditions, recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations, the benchmark GHG emission, to increase, and have been shown to contribute to overall global climatic changes.

Certain BLM-authorized activities within the planning area produce pollutants considered to be GHGs, particularly CO_2. Oil and gas development, construction activities, vehicle travel, the use of motorized tools, and prescribed burning for vegetation and wildlife habitat manipulation generate CO_2 and CH_4. These activities contribute to GHGs primarily through carbon emissions (Zahniser et al. 2009). Activities, programs, and projects initiated by the BLM, as well as operator-initiated activities and projects authorized by the BLM, have the potential to affect or be affected by climate and climate change. Some BLM-authorized activities may help sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as carbon sinks. Underground carbon sequestration projects, where CO_2 is pumped into subsurface geologic formations, are also a possibility.

Current Condition

Climate

The CFO has a mild, arid or semiarid continental climate characterized by light precipitation totals, abundant sunshine, low relative humidity, and a relatively large annual and diurnal temperature range relative to other regions of the United States. A climate summary for Carlsbad, New Mexico, is presented in Table 2.1-40 (Western Regional Climate Center [WRCC] 2010). In January, the coldest month, average daytime high temperatures are in the mid to upper 50s (°F), and, even though minimum temperatures below freezing are common, it is rare that temperatures fall below 0°F. The coldest temperature on record at Carlsbad was -18°F on January 11, 1962. June and July are the warmest months, with average daytime highs averaging in the upper 90s (°F), and occasionally exceeding 100°F. The hottest temperature recorded at Carlsbad was 113°F and occurred both in June 1994 and July 1995.

Table 2.1-40. Monthly Climate Summary for Carlsbad, New Mexico (Federal Aviation Administration Airport)

	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Total Precipitation (inches)	Average Total Snowfall (inches)
January	57.8	29.4	0.34	1.4
February	62.9	33.3	0.40	1.6
March	70.4	39.2	0.41	0.6
April	79.4	47.7	0.47	0.3
May	88.0	57.1	1.18	0
June	95.6	65.2	1.23	0
July	95.6	68.7	1.75	0
August	93.7	67.3	1.95	0
September	87.1	60.5	2.28	0
October	78.0	48.9	1.10	0
November	65.9	36.9	0.52	0.7
December	58.4	29.9	0.48	1.8
Annual	***77.7***	***48.7***	***12.12***	***6.4***

Source: WRCC 2010.
Period of Record: 9/1/1942 to 12/31/2009.

Statewide average annual precipitation ranges from less than 10 inches over much of the southern desert to more than 20 inches at higher elevations in the state. A wide variation in annual precipitation totals is characteristic of arid and semiarid climates and is illustrated by annual extremes of 2.95 and 33.94 inches in Carlsbad during a period of more than 71 years. In the Pecos River valley, summer rains fall almost entirely during brief, but frequently intense, thunderstorms. The general southeasterly circulation from the Gulf of Mexico brings moisture for these storms into the state, and strong surface heating causes upward-moving air currents and subsequent cloud formation. July and August are the rainiest months in the proposed project area. Precipitation during the warmest six months of the year, May through October, adds up to about 80% of the annual total in the Carlsbad area.

Winter precipitation is caused mainly by frontal activity associated with the general movement of Pacific Ocean storms across the country from west to east. As these storms move inland, much of the moisture is precipitated over the coastal and inland mountain ranges of California, Nevada, and Arizona. Much of the remaining moisture falls on the western slope of the Continental Divide and over northern high mountain ranges. The southeastern plains of New Mexico receive, on average, only about half an inch of precipitation each month from November through April (BLM 2010a).

Greenhouse Gases

The carbon dioxide equivalent emission (CO_2e) is a standard measure of GHG emissions that takes into account the different global warming potentials of different gasses. For instance CH_4 has a global warming potential 21 times that of CO_2. One ton of CH_4 is equal to 21 tons of CO_2e.

In 2000, approximately 83 million metric tons (MMt) of (CO_2e) were released in New Mexico (NMED 2006). This accounts for about 1.2% of gross U.S. GHG emissions during the same time period. Eighty-two percent of the New Mexico emissions came from the combustion of fossil fuels in power plants, vehicles, buildings, and industries; 13% came from the release of CO_2 from oil and gas production, coal mines, agriculture, and waste management; and 5% came from other sources (NMED 2006).

One major source of GHG emissions on BLM-managed land in the planning area is oil and gas production. Nationally, natural gas and petroleum systems accounted for 30.5 teragrams (Tg) of CO_2 and 125.5 Tg CO_2e of CH_4 or 0.5% of national CO_2 emissions and 22% of national CH_4 emissions (Hoadley and Speilman 2010).

Table 2.1-41 provides an estimate of direct emissions that occur during exploration and production of oil and gas in the New Mexico portion of the Permian Basin (including parts of Eddy, Lea, and Chavez counties). These numbers were derived from a top down national GHG emissions inventory and contain a high level of uncertainty with regard to specific locations. This phase of emissions represents a small fraction of overall emissions of CO_2e from the life cycle of oil and gas developments. For example, acquisition (i.e. drilling and development) of petroleum is responsible for only 8% of the total CO_2e emissions, whereas transportation of petroleum to refineries represents about 10% of the emissions, and final consumption as a transportation fuel represents fully 80% of emissions (DOE National Energy Technology Laboratory 2008; Hoadley and Speilman 2010).

Table 2.1-41. Oil and Gas Field Production Emissions, 2008

Permian Basin (metric tons CO_2e)	Oil		Gas		Total Oil and Gas Production	% U.S. Total GHG Emissions
	CO_2	CH_4	CO_2	CH_4		
	6,651	337,765	69,639	115,518	569,573	0.01

Source: NMED 2012.

A study is currently under way that gives a bottom up estimate of GHG emissions in the Permian Basin. The study estimates that in 2007, oil and gas production activities in Chaves, Eddy, and Lea Counties accounted for 152,375 tons of CO_2 and 110 tons of CH_4 (BLM 2010a). This estimate is incomplete and does not include all emission sources.

Non-combustion emissions of GHGs from oil and gas production in the United States account for less than 1% of total U.S. emissions. Emissions from federal leases administered by the BLM in New Mexico account for approximately 0.02% of total GHG emissions for the United States (Hoadley and Speilman 2010).

2.1.15.9 Trends

Climate

Mean annual temperatures have risen across New Mexico and the southwestern United States since the early twentieth century (Shepperd et al. 2002). The Southwest has exceeded the global warming averages by nearly 50% since the 1970s (Gutzler and Garfin 2006). In New Mexico, mean annual

temperatures have increased 0.6°F per decade, with an overall increase of 1.8°F since 1976 (Lenart and Crawford 2007). Mean winter temperatures are most responsible for this rise, yet springtime temperatures have also risen rapidly (Gutzler and Garfin 2006). Precipitation, on average, has increased slightly across the state since the mid-1970s. However, the long-term tree-ring record shows severe droughts and multi-decadal megadroughts to be part of the natural climate variability of the southwestern United States (Grissino-Meyer and Swetnam 2000; Cook et al. 2004; Woodhouse 2004). During the twentieth and early twenty-first centuries, shorter-term, yet severe, droughts occurred in the 1950s and the early 2000s (Enquist and Gori 2008).

New Mexico has experienced mean annual temperature increases of at least 1.8°F in nearly a quarter of the state between 1991 and 2005, with less than 1% of the state showing increases of over 3.6°F. Between 2000 and 2005, 60% of the state experienced mean annual temperature increases of over 1.8 °F and 4% of the state had increases of 3.6°F or more.

In contrast, precipitation changes have been more variable geographically and temporally. For example, over half the area of New Mexico experienced precipitation increases between 1991 and 2005, although most of the increases (82%) were small (increased by less than 10%). Between 2000 and 2005, three-quarters of the state experienced drier conditions. Nearly half (49%) of these precipitation decreases had a 10% or greater decrease in precipitation as compared to the average precipitation during 1961–1990 (Enquist and Gori 2008).

The planning area mainly consists of lower-elevation grassland and desert habitats in eastern New Mexico. Even during the recent drought, most grasslands experienced wetter and less variable conditions compared to other habitat types. Lower-elevation locations generally experienced lower climate exposure (i.e., smaller increases in temperature coupled with small decreases or increased precipitation) and these habitats may be among the least vulnerable and best adapted to climate change in the state (Enquist and Gori 2008).

Greenhouse Gases

New Mexico's gross GHG emissions have increased steadily since 2000, reaching 89 MMt CO_2e in 2010, 8% above 2000 levels. The increase between 2000 and 2010 is less than New Mexico's 21% increase in GHG emissions between 1990 and 2000 (NMED 2006).

Although specific New Mexico data are unavailable, emissions from oil and gas production have been declining nationally. The EPA reports that emissions from natural gas systems in 2008 have decreased from 1990 levels by 20% for CO_2. This decrease is attributed to improved management practices, technology, and replacement of older equipment. Increasing emissions reduction through participation in the Natural Gas Star Program is thought to have contributed to recent decreases in CO_2 emissions as well. For petroleum systems, CO_2 emissions have declined by 19% due to industry efforts to reduce emissions, as well as declines in domestic oil production (EPA 2010; Hoadley and Speilman 2010).

Although GHG emissions from the oil and gas industry have decreased nationally, they have increased in New Mexico slightly since 1990. This is consistent with rapid increases in gas production through the mid-1990s followed by a slow decline. Statewide oil production has shown a steady decline since the mid-1980s (Hoadley and Speilman 2010; New Mexico Energy, Minerals and Natural Resources Department Oil Conservation District 2010).

2.1.15.10 Forecast

Future projections estimate mean annual temperature increases of at least 5°F by the late twenty-first century in New Mexico (Gutzler and Garfin 2006). Additionally, numerous future climate projections for the Southwest predict both warming and drying trends (Diffenbaugh et al. 2005; Seager et al. 2007; Hoerling and Eischeid 2007; Enquist and Gori 2008). By 2020, New Mexico GHG emissions are expected to climb 14% over 2010 levels to 102 MMt CO_2e, a total increase of 23% above 2000 levels (NMED 2006).

The current state of climate science prevents the association of specific actions with specific climate-related effects, so it is not possible to analyze the climate-related effects of BLM actions or determine the significance of these potential effects (Zahniser et al. 2009). However, the contributions to climate change or the mitigation of climate change can be accounted for and disclosed.

Based on these current assumptions for climate change, the planning area could experience effects to water quantity, quality, and seasonal availability; agriculture and grazing; disease and pest outbreaks; shifting of seasons; shifts in plant and animal population, range, species diversity, and migration patterns; forest quality; and frequency, duration, and location of extreme weather events. There may be local variations in the effects across the planning area.

In 48 cases of recently observed ecological changes that may be linked to climate change from across New Mexico and the southwestern United States, over half involved population declines in species, with shifts in species' geographical distribution accounting for nearly a quarter of the remaining examples. Changes in the timing of life history events, species adaptations, and increases in invasive species comprised the remainder. Most of these cases were from higher-elevation sites where recent climate exposure has been particularly extreme (i.e., warmer and drier conditions). Climate change is likely to exacerbate the effects of natural and altered disturbance regimes, including wildfire, insect outbreaks, flooding, and erosion, across all of New Mexico's habitat types and may prompt abrupt ecological changes. This is particularly true in ecosystems such as grasslands, riparian areas, and forests where the effects of past management and land use change are substantial (Enquist and Gori 2008).

2.1.15.11 Key Features

Key features include areas that are particularly sensitive to the effects of climate change, including high altitude ecosystems and drought susceptible ecosystems

The impact of climate change on BLM resources is dependent on the location of the affected resource, its vulnerability and resiliency to change, and its relationship to the human environment. There will be positive and negative impacts of climate change, even within a single region. For example, warmer temperatures may bring longer growing seasons in some regions, benefiting farmers who can adapt to new conditions, but potentially harming native plant and animal species. In general, the larger and faster the changes in climate are, the more difficult it will be for human and natural systems to adapt.

Most of the planning area is desert and semi-desert, regions that may be best adapted for higher temperatures and less rainfall (Price et al. 2007). However, lower-elevation grasslands and riparian-wetland areas are still subject to potentially serious climate change impacts, exacerbated by the large amount of human development and disturbance that has occurred in these regions. Grasslands are affected by two known climate change effects, changes in the timing of precipitation (from summer- to winter-dominated rainfall) and increased CO_2 concentrations (Brown et al. 1997; Morgan et al. 2007). Not only do these factors favor the encroachment of woody shrubs and loss of perennial grass cover, but they may act in concert with human-linked land use changes in grasslands and elsewhere to increase the effect (Hansen et al. 2002; Peters et al. 2004; Burkett et al. 2005; Jetz et al. 2007; Enquist and Gori 2008). In addition, increasingly high temperatures produce greater evaporative demands on soils, plants, streams, rivers, and reservoirs in every season. For riparian areas and grasslands, added stressors include surface water diversions, groundwater pumping, intensive grazing regimes, fire suppression, non-native species invasions, atmospheric feedbacks (e.g., nitrogen deposition from urban areas), and habitat fragmentation associated with residential, commercial, and energy development (Enquist and Gori 2008).

2.1.15.12 Current Management

The 1988 Carlsbad RMP and subsequent amendments did not make decisions for GHGs (BLM 1988).

2.1.15.13 Management Opportunities

Stipulations and BMPs to reduce ozone emissions could be developed for oil and gas development. The CFO could work with the NMED to develop a region-wide plan to reduce ozone levels. Venting and flaring

policies should be reviewed with regard to minimizing emissions. GHG emission estimates could be developed for projects in the planning area.

2.2 RESOURCE USES

2.2.1 Minerals

Minerals are classified into three main categories: leasable, locatable, and salable. In the CFO the minerals most commonly found by category are:

- **Leasable** - potassium, sodium and oil and gas;
- **Salable** - caliche, sand, gravel, fill dirt, and building stone; and
- **Locatable** - gold, copper, gypsum, selenite.

The laws establishing the parameters for mineral development began with the General Mining Law of 1872 (as amended). This law allows for the location of lode and placer mining claims, as well as a prescription for patents. A mineral patent moratorium, effective October 1, 1994, was imposed by Congress on acceptance or processing of mineral patent applications.

In addition to the General Mining Law of 1872, an assortment of laws governs mineral activity:

- **Mineral Leasing Act of 1920 as amended:** Under this federal law, the BLM issues leases for developing deposits of coal, phosphates, potassium, sodium, uranium, petroleum, natural gas, and other hydrocarbons on public domain lands and lands having general reserved minerals.
- **Materials Act of 1947:** Under this federal law, the BLM (under rules and regulations prescribed by the Secretary of the Interior) is authorized to dispose of mineral and vegetative materials through a contract or a free-use permit. These materials commonly include the salable minerals such as sand and gravel, pumice, pumicite, cinders, clay, petrified wood, and other common varieties of stone and vegetative materials (including but not limited to yucca, manzanita, mesquite, cactus, and timber or other forest products) on public lands of the United States.
- **Mineral Leasing Act for Acquired Lands of 1947 as amended:** This federal law states that the leasing of all deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulfur owned by the United States on lands legally acquired by the United States may be leased under the same conditions as contained in the leasing provisions of the federal mineral leasing system.
- **The Geothermal Steam Act of 1970 as amended:** This law authorized the rights to develop and utilize geothermal resources in land subject to these regulations under the federal leasing laws. The BLM and the USFS have prepared a joint Programmatic ROD for the expedited leasing of BLM and USFS administered lands with high potential for geothermal resources.
- **Mining and Minerals Policy Act of 1970:** This law declares that it is the continuing policy of the federal government in the national interest to foster and encourage private enterprise in the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries enterprise in the development of a stable domestic minerals industry, and the orderly and economic development of domestic mineral resources.
- **Secretarial Order *Federal Register* Vol. 77 Issue 233, Order No. 3324:** Establishes the rules for concurrent operations in prospecting for and development and production of oil and gas and potash deposits owned by the United States within the designated Potash Area (Map 3.6 Secretary's Order for Potash Area 2012, Appendix A) and for revising the designated Potash Area to which the provision of this Secretarial Order are applicable.

The mineral resource potential of the planning area is classified using the stem outlined in BLM Manual 3031. Under this system, occurrence potential ratings are strictly based on the geologic likelihood of the mineral to be present in the area and do not address the economic feasibility of development of the resource. These ratings address the accumulation of mineral resources and certainty of data. Mineral occurrence potential refers to the potential of the mineral to occur at a specific location or geologic environment.

The certainty level refers to the quality of data that is available to determine the occurrence of a particular mineral resource. In other words, an area may exhibit characteristics judged as favorable for an occurrence of a particular mineral resource. The level of certainty would be predicted upon the nature and extent of the evidence for occurrence actually being present (e.g., sample results, geologic mapping, or direct knowledge of geologic process or genesis).

The potential for development of each mineral resource is projected for the life of the RMP, which is estimated to be 20 years, and is rated as high, moderate, or low. The likelihood of development is based on communication with industry experts and government officials familiar with the specific resources, current of past activities, as well as considerations such as mineral occurrence potential, historic development, commodity price and demand, and other factors. The projected development may be directly affected by planning decisions that restrict or preclude mineral exploration and/or development activity. The development rating is also affected by the ownership status of the land in which the commodity is found (See Map 3.2 Split Estate Mineral Ownership). Resources found in national parks, national monuments, recreational areas, wilderness areas, and WSAs are generally not available for mineral development, except in a few areas where there may be valid existing rights. For that reason, these areas are considered to have a low development potential.

2.2.1.1 Leasable Minerals

Oil and Gas

Profile

Current Level and Location of Use

Oil and gas resources are often found in the pore spaces of sedimentary rocks, such as sandstone and limestone, having migrated there from source rocks rich in organic material, such as marine shales. When rocks containing this organic material are subjected to heat and pressure, the organic compounds break down over time, resulting in oil and natural gas. As the oil and gas are generated, they migrate through the pore spaces of the rock or along fractures until they encounter a structural or stratigraphic trap with an impermeable seal.

New Mexico ranks sixth in the United States in the production of oil; more than 57,000 wells produced 61.2 million barrels of oil in 2009. In the planning area, approximately 57.5 million barrels of oil were produced in 2009 (DOE 2010a).

New Mexico ranks fourth in the United States in the production of natural gas; more than 57,000 wells produced 1.4 trillion cubic feet of natural gas in 2009. In the planning area, approximately 426 billion cubic feet (Bcf) were produced in 2009 (DOE 2010b).

Leasing

The BLM reviews and approves nominations from companies to lease federal minerals and Sundry Notices (Notices of Intent) that further exploration, development, and production of oil and gas on federal minerals. As of October 1, 2008, federal oil and gas leases covered approximately 676,647 acres in the planning area (see Map 3.1 Oil and Gas Leases and Federal Minerals in Appendix A) (BLM 2010b). By county, the number of leases and total number of acres under lease are included in Table 2.2-1.

Table 2.2-1. Number of Oil and Gas Leases by County in the Planning Area

County	Number of Leases	Acres Under Lease
Chaves	58	72,814
Eddy	771	402,307
Lea	420	201,526

Source: BLM (2000).

Exploration

Oil and gas reservoirs can be discovered by either direct or indirect exploration methods. Direct methods include mapping of surface geology, observing seeps, and gathering information from drill cuttings during the drilling process. Indirect methods, such as gravity, magnetic, and seismic surveys, are used to delineate subsurface features that may contain oil and gas that are not directly observable. The petroleum industry uses 2D, 3D and 4D seismic technology to gain subsurface stratigraphic information to aid them in searching for oil and gas reserves. Seismic technology uses explosives in drilled shot holes as source points along linear survey lines (or vibroseis) or shakers, trucks, or buggies as source points in a grid pattern over a large area that can cover hundreds of square miles. Since 2004, 575,000 acres have been surveyed in the CFO planning area boundary using this seismic technology.

Applications for Permits to Drill

After the BLM approves an APD, the developing company may proceed with drilling in accordance with the conditions of the permit's approval, after receiving like approval from the NMOCD.

The CFO has approved on average approximately 700 APDs per year since 2006.

Completion and Production

Once a well has been drilled to the desired depth and casing has been installed and cemented in place the next step is to perforate the casing and fracture the formation with fluid to allow oil and gas to flow from the pore space to the wellbore, this is known as the completion phase. After completion the well is ready to produce oil and gas. Well completions have historically been steady in the planning area, typically following the trend of oil and gas prices. Since 2006, the percentage of wells drilled horizontally has increased substantially. Recompletions, or completing a well in a different producing horizon, in the area are higher than may be expected in a typical oil field due to the large number of producing formations. This does affect the number of wells plugged or put into temporary abandonment status. In many cases, a well will be drilled and completed, and subsequently plugged when the economic limit is reached. In southeast New Mexico, a well will frequently be temporarily abandoned and evaluated for uphole potential. Downhole commingling has extended the life of wells that are not economically viable when producing from a single formation. Surface commingling and multiple wells from single pads have increased, resulting in a reduction of surface disturbance.

Table 2.2-2 displays the oil and gas production for Eddy and Lea Counties in 2009. There were no active wells in Chavez County.

Figure 2.2-1 displays oil and gas production for southeast New Mexico between 1970 and 2009. Eddy and Lea Counties and responsible for the majority of this production. Gas production in Eddy and Lea Counties had a period of decline until 1986, when production increased until 2000. Oil production has had an overall decline since 1970.

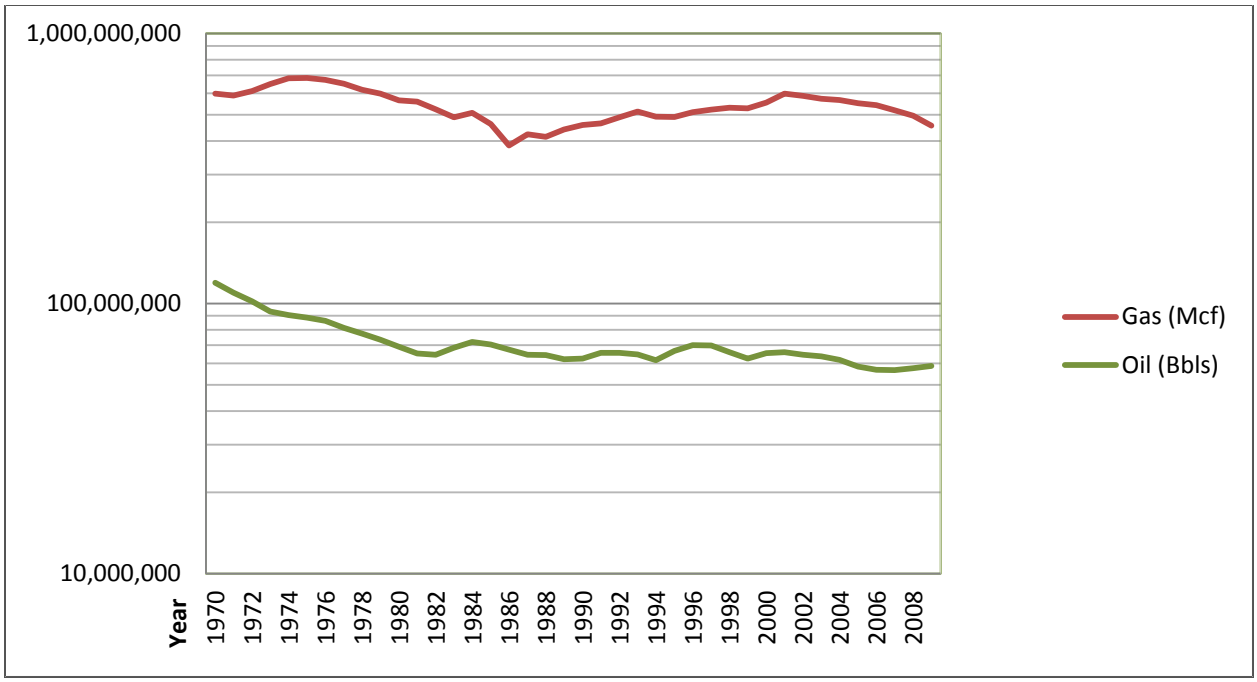

Figure 2.2-1. Oil and Gas Production for Southeast New Mexico, 1970–2009 (NMOCD 2010a)

Table 2.2-2. Oil and Gas Production for Eddy and Lea Counties, 2009

County	Oil (Barrels)	Natural Gas (Bcf)
Eddy	24,500,000	223.6
Lea	33,000,000	202.8

Source: Go-Tech 2010a.

Produced Water Disposal

Water is usually a by-product of oil and gas production and is disposed of via injection into a geologic formation. Two types of wells are used for this disposal. An injection well is used to pump water into the reservoir and drive oil and gas to an offset producing well. A disposal well is needed when there is no other use for the produced water. The number of disposal and injection wells continues to increase in the planning area. In 2009, Eddy and Lea Counties produced 58 million barrels of oil and 616 million barrels of produced water. Currently, there are 1,405 total wells injecting produced water in Eddy and Lea Counties.

Plug and Abandonment

A well is plugged when there is no longer any capability to produce in paying quantities. This entails setting cement and cast iron bridge plugs to separate producing formations and isolate water zones, potash, and cave/karst resources. Figure 2.2-2 displays oil and gas plugging for Eddy and Lea Counties for the years 1999 through 2009. Chavez is not included in the figure due to the lack of activity. Well plugging has increased since the institution of a program that monitors temporarily abandoned and shut-in wells in the CFO. Over the last 11 years, oil and gas wells in the planning area have been plugged at an average rate of 451 wells per year, with a minimum of 168 wells in 1999 and a maximum of 619 wells in 2002. Table 2.2-3 provides well statistics for the Eddy and Lea County.

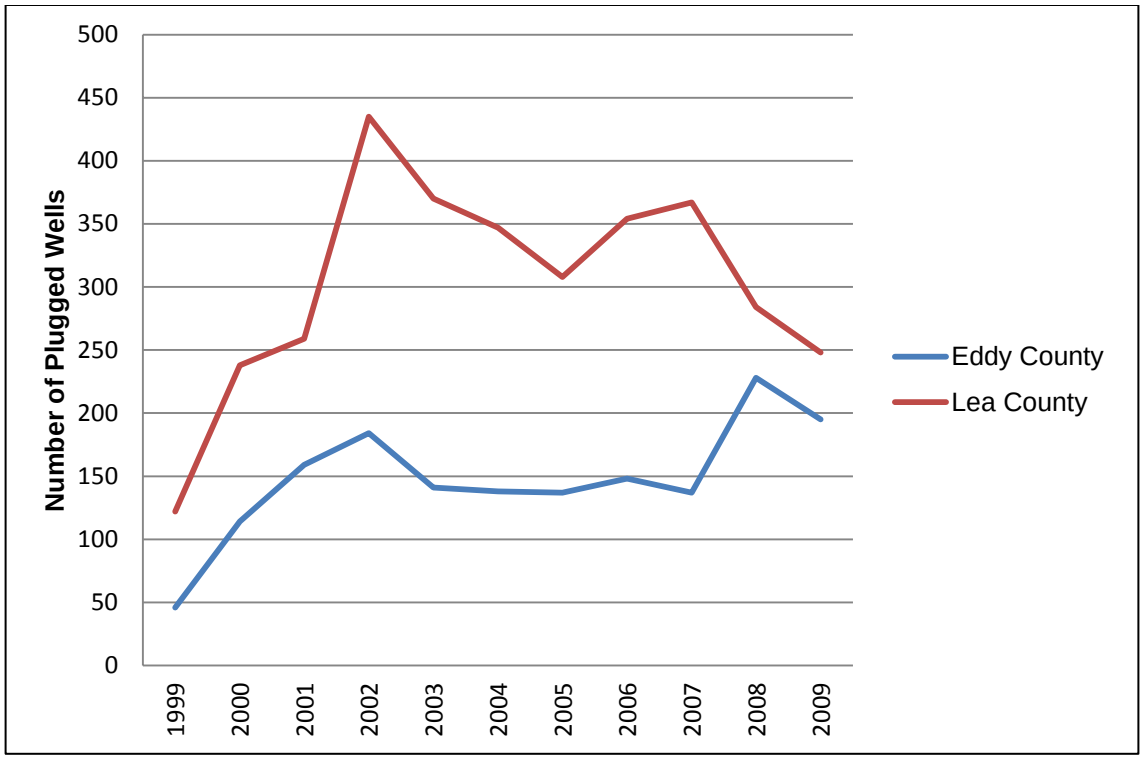

Figure 2.2-2. Well Plugging for Eddy and Lea Counties, 1999-2009 (Source: NMOCD 2010b)

Table 2.2-3. Well Statistics for Eddy and Lea Counties, 2009

	Federal	Fee or State	Total
Eddy County			
Total plugged and abandoned wells	2,664	3,060	5,724
Total inactive wells	202	185	387
Total injection/disposal wells	798	258	1,056
Total wells	6,577	4,458	11,035
2009 statistics			
Number of completions	265	194	459
Number of APDs	440	210	650
Number of plugged wells	119	76	195
Lea County			
Total plugged and abandoned wells	2,687	8,058	10,745
Total inactive wells	117	334	451
Total injection/disposal wells	607	1,892	2,499
Total wells	4,161	10,555	14,716
2009 statistics			
Number of completions	133	338	471
Number of APDs	185	134	319
Number of plugged wells	109	141	250

Source: NMOCD 2010c; Go-Tech 2010b; BLM (AFMSS).

Forecast

The United States consumed, on average, 20.65 million barrels of liquid fuels, 5.10 million of which were from domestic crude oil production, and 59.34 Bcf of gas each day in 2006 (DOE 2008). Based on the *Annual Energy Outlook 2008*, total energy consumption in the United States is projected to increase over the next 25 years. Total consumption of liquid fuels, including both fossil liquids and biofuels, is projected to grow from 20.7 million barrels per day in 2006 to 22.8 million barrels per day in 2030. Natural gas consumption is projected to increase from 21.7 trillion cubic feet in 2006 to 23.8 trillion cubic feet in 2016, then decline to 22.7 trillion cubic feet in 2030 (DOE 2008).

An increase in the demand for oil and gas resources is also expected in the planning area based on the projected increases in prices for oil and gas and the rising national demand for energy. The National Energy Policy Act of 2005 influenced the demand on federal oil and gas leases in the planning area.

Leasing

The majority of the federal minerals managed by the CFO are currently leased. Currently all of the planning area is open to leases except for certain areas that have been withdrawn from leasing, due to significant concerns like the Waste Improvement Pilot Project (WIPP) Site and the Gnome Site.

Exploration

Current exploration techniques are expected to continue throughout the planning area.

Applications for Permits to Drill

The BLM expects approximately 600 to 800 APDs per year to be submitted in future years, depending on economic circumstances. It is predicted that improved drilling and completion techniques will give opportunity for further development in areas that were previously overlooked.

Completion and Production

Well completions are expected to remain stable with a potential to increase if gas prices climb. Although not all APDs become drilled and completed wells, the correlation between them is expected to remain. The development of the Bone Spring Avalon Shale Play may result in additional horizontal well completion. As drilling technology advances and the need to reduce surface disturbance in sensitive areas grows, an increase in horizontal wells is expected, which could reduce the overall number of wells drilled and completed.

Produced Water Disposal

The number of disposal wells is increasing as a result of the increase in horizontal drilling. The benefit to drilling a horizontal well is that it reduces surface disturbance and increases the production. However, the production from one horizontal well is equivalent to that from multiple vertical wells. Therefore, this results in a need for additional disposal wells. Injection wells are being added to mature fields to aid in recovering oil that would otherwise remain in the reservoir.

Plug and Abandonment

Taking into consideration the amount of mature fields in the area, the number of wells plugged per year is predicted to remain constant.

Key Features

Concurrent development of oil, gas, and potash resources within the 1986 Secretary's Order for the Potash Area have an effect on oil and gas drilling and leasing. Wells must be drilled at a safe distance from existing mine workings in order to prevent damage to the mines and also to prevent damage to the wellbore from subsidence due to mining. Oil and gas wells are also limited to locations that would pose minimal impacts to potash reserves.

Current Management

Please see the 1988 RMP and 1997 and 2008 amendments for current management. Current leasable mineral allocations for BLM-administered surface and subsurface lands are shown on Maps 3.16 and 3.17 of Appendix A.

Management Opportunities

Disposal options for produced water need to be reviewed and evaluated. Potential management includes developing closed loop systems in areas within the Capitan Reef or ACECs, excluding disposal pits in the planning area; using treated produced water for oil and potash development items such as drilling mud, fracking fluids, and water floods; and developing an education program that includes a no tolerance policy for illegal discharge of produced water. Management should take into account potential damage to subsurface waters.

Advances in technology could allow additional areas to be leased with an NSO stipulation.

2.2.1.2 Solid Minerals

Profile

Current Level and Location of Use

The solid leasable minerals that fall under the Mineral Leasing Act of 1920, as amended, are phosphate, coal, sodium, oil shale, potassium, some Gilsonite, and some sulfur. The planning area contains potassium, sodium, and sulfur.

Potassium (Potash)

A potassium (potash) deposit is located approximately 11 to 43 miles east of Carlsbad. Potash, like sodium, lies within the Ochoan series of Permian age (see Map 3.6, Secreatary's Order for Potash Areas 2012). The Ochoan series includes three formations: Castile, Salado, and Rustler, in ascending order. The three formations have a combined thickness of about 4,300 feet. The composition consists largely of anhydrite and rock salt, but dolomite, limestone, and magnesite are present in moderate to small amounts. Both the Castile and Rustler formations are distinctly poorer in rock salt and richer in anhydrite and carbonate rock than the Salado and they correspond in large measure to the lower and upper stages in a crude tripartite vertical transition from limestone and anhydrite, through rock salt and associated potash deposits, to anhydrite and dolomite.

Of all the Ochoa evaporates, the Salado Formation is by far the most complex lithologically and structurally. Particularly characteristic of the formation is a coarse and fine layering of anhydrite, halite, and claystone, which depicts the cycles of flooding and desiccation during the deposition of the Salado. The Salado Formation contains the McNutt Member, which contains potash ore, namely sylvite and langbeinite.

On average, approximately 900,000 tons of ore are mined every month from the three potash mines in the planning area.

Sodium

Sodium (halite or salt) is found throughout most of the planning area and is located within the Salado Formation at the approximate and varying depth of 680 feet at the top of the formation and 2,625 feet at the bottom. No natural mineable deposits are found on the surface. The largest accumulations of salt are found in the Permian-age Salado Formation (see Map 3.3 Subsurface Salt). This deposit was formed by the evaporation of sea water in the Permian Basin. The Salado Formation is part of the Ochoan Series of the Upper Permian age. The Salado Formation is up to a maximum of 2,450 feet thick in the thickest part of the Permian Basin. In the planning area, the deposit ranges in thickness between 0 to 1,500 feet and is found at depth between 400 feet and

1,800 feet. The deposit dips to the southeast at about 3 degrees. The deposit also thickens in the same direction, towards the center of the Permian Basin.

Sodium has been mined in the area by pumping fresh water down a well bore into the salt formation, letting it saturate and then forcing the water back to the surface as new water is added to the cavity. The brine produced is sold for use in the oil field as an additive to drilling fluid. Drilling fluid saturated with salt is needed when drilling through the Salado Formation to inhibit the dissolution of the salt surrounding the well bore.

Sodium is also mined as a precipitate formed from the evaporation of the waste stream of potash mining. The commercial salt deposits are found in playas used for tailings water disposal. The brines are placed in evaporation ponds and after the water is evaporated, the remaining salt is harvested with scrapers. It is then washed, screened, and dried. The bulk of the salt is sold as road salt. The remainder (higher value product) is made into salt products such as water softener salt, mineral blocks for cattle feed, and other specialty products. Laguna Grande de la Sal is the largest such deposit and is mined by two companies, United Salt and New Mexico Salt. No table salt (salt for human consumption) is currently produced in the planning area.

One other company sells salt brine from mine tailings to the oil field for drilling fluid additive. The tailings water was place into the playa Laguna Toston in the 1980s through 2004. Water lost to evaporation and brine sales is replenished through rainfall. Eventually the salt will be all mined.

Sulfur

Sulfur is found in the southern portion of the planning area. The biogenic native sulfur deposits are found in altered carbonate and evaporate strata of Ochoa age. The deposits are associated with narrow, northeast-trending grabens and normal faults that disrupt the gently tilted, east-dipping Upper Permian evaporate succession of the western Delaware Basin. The ore bodies are restricted to geologic traps in the fractured and dissolution-modified down faulted blocks of the grabens. Other parallel, regionally distributed grabens and normal faults are commonly the sites of non-commercial sulfur deposits and genetically related secondary replacement limestone bodies. Sulfur occurs within vuggy bioepigenetic limestone that is overlain by a clay-rich unit that probably acted as an important seal for the sulfur generating system. These sulfur zones occur at or near the base of the Castile Formation.

No sulfur has been mined in the planning area; however, extensive exploration activities occurred in the past. Sulfur has been extensively mined to the south of the planning area in Culberson County, Texas. The Culberson deposit is one of the largest commercial sulfur concentrations in the world and is believed to contain in excess of 60 million tons of recoverable sulfur.

Forecast

Potassium (Potash)

The demand for potash products is anticipated to gradually increase over time, but local production from each mine is not anticipated to increase greatly. New mining operations are expected to arise over the next 20 to 30 years. Two projects are currently proposed and in progress, the HB In-Situ Project and the Ochoa Project. New competitive leases are anticipated to sell in the near future; Mosaic Potash is expected to expand into the Noranda leases (approximately 8,281 acres), and Intercontinental Potash Corporation is expected to obtain preference right leases and eventually begin early mining operations. The Ochoa mine is projected to yield a base case production of a total 843,000 tons per year, with a mine life of 100 years or more. The mine life of the HB In-Situ Project is expected to be a minimum of 28 years.

Sodium

The production of sodium varies with the economy and the weather. The weather plays a vital role since the largest use of salt from the planning area is for road deicing. The general volume of

solid salt sales has been increasing over the past few years. Currently, there are two active mines (United Salt and New Mexico Salt).

Sulfur

Sulfur production is not a forecasted development.

Key Features

Potassium (Potash)

Potash mining is currently authorized within the Permian Delaware Basin under the 2012 Secretary's Potash Order (Secretarial Order *Federal Register* Vol 77. Issue 233, Order No. 3324) (see Map 3.6 Secreatary's Order for Potash Areas 2012). The two present operational mines' surface operations are approximately 5 to 6 miles apart within the Secretary's Order. Polyhalite mining will be located outside of this boundary, proposed to be centralized in T24S R35 E, just north of New Mexico Highway 128 toward Jal (see Map 3.5 Potash Leases).

Potash deposits in the planning area are found in basin topography and tend to have karst features overlying portions of the deposit. The producing mines maintain leases within the boundary of the Known Potash Leasing Area (KPLA), and their mining, processing, and tailings are housed within the leases. Presently, two ore minerals are produced in the KPLA: sylvite and langbeinite. The Permian Basin is the only area worldwide that produces langbeinite ore.

Sodium

The production of sodium is currently focused in the tailings areas of the potash mines with the exception of a few sodium leases that facilitate extraction via brine wells.

Current Management

The 1988 Carlsbad RMP and subsequent amendments identify numerous management actions for leasable mineral development. These include areas available and unavailable for leasable mineral development and stipulations for such development. In general, these actions are ongoing as leasable mineral development is permitted in the planning area and appropriate stipulations are applied to development activities.

Most potash management actions are defined by the Secretary's Potash Order, which applies to the KPLA (Secretarial Order *Federal Register* Vol 77 Issue 233, Order No. 3324). All management not found in the Secretary's Order is drawn from the applicable CFR. Potash management outside the KPLA would be defined in the future as the need arises.

The 1988 Carlsbad RMP identifies seasonal stipulations to be attached to leases on 982 acres, but does not specify where those acres are located. It is unknown whether these stipulations were attached as intended. Current leasable mineral allocations for BLM-administered surface and subsurface lands are shown on Maps 3.16 and 3.17 of Appendix A.

Management Opportunities

Fluid mineral stipulations and COAs in the 1997 RMPA could be revisited as some of them do not adequately address sensitive areas. For example, playas, floodplains, and dunal features could be addressed. Stipulations could be performance based, focus on the desired resource outcomes as a result of APD development, rather than prescriptive.

The revised RMP could consider options for the disposal of produced water to ensure subsurface waters are not impacted. The revised RMP could also require the use of treated produced water for leasable mineral development activities such as drilling mud, fracking fluids, and water floods. This could reduce the consumption of fresh water and the need to dispose of produced water or mine process water.

The revised RMP could consider venting and flaring policies to address gas emissions.

Due to advances in technology, the revised RMP could consider leasing more areas with an NSO stipulation to mitigate potential resource conflicts.

Stipulations may be added to new potassium leases outside the Secretary's Potash Area requiring new mines to adhere to gassy mine standards outlined by Mine Safety and Health Administration regulations.

Stipulations for solid and fluid minerals could be standardized where applicable.

Management and reclamation of tailings produced from solid leasable operations should be addressed.

All operators functioning under solid mineral leases, regardless of location, would be required to maintain a current mine and reclamation plan to be updated every five years and modified by submittal of a mining plan modification when necessary. A mining plan modification is required when any process at any mine facility is changed from the current mine plan or any new disturbance is created. Maintenance does not require a mine plan modification. Maintenance is considered to be the upkeep of property or equipment. It is not considered to be new surface disturbance, upgrades or changes to different equipment types or facilities, or changes in chemical compounds used for processing.

2.2.1.3 Locatable Minerals

Profile

Locatable minerals (metallic and nonmetallic) are those that are open to mining claim location under the General Mining Law of 1872. Public lands that are not withdrawn from mineral activity are available for location. Unlike other mineral resources such as leasable (e.g., oil and gas, potash) or salable minerals (e.g., caliche, sand, and gravel), withdrawal of land is the only management prescription available for controlling where locatable mineral development can occur. While the surface management regulations contained is 43 CFR 3809 give the BLM opportunity to manage the surface to prevent unnecessary or undue degradation, surface-disturbing activities affecting less than 5 acres are classified as notice-level operations and do not require BLM authorization. However, regardless of the amount of surface disturbance, the BLM may apply various mitigations and restrictions such as seasonal closures for wildlife or archaeological stipulations in order to prevent unnecessary or undue degradation. Such management prescriptions cannot materially interfere with the claimant's right to mine or explore for minerals.

Current Level and Location of Use

The occurrence of locatable minerals in the planning area is limited. The main mineral mined in the planning area under the 1872 Mining Law is crystalline gypsum (selenite). Other minerals of limited extent and minimal use are gold, uranium, copper, and turquoise. One mining claim has a Mine Plan of Operations filed for gypsum (Crystalline Phoenix Mine, an unpatented lode claim). The principle use of the gypsum mined from this claim is for specimens in mineral collecting. The mining claim is found along a gypsum outcrop in the southwestern part of the planning area approximately 3 miles north of the Texas state line.

One mining claim exists for turquoise and is located 10 miles east of Artesia. There are no active claims for gold or uranium in the planning area. Past activities for these minerals consisted of exploration with no commercial deposits being developed. Copper was commercially mined in a limited capacity on state lands in the planning area in the past but in limited quantities. The copper was found in a small deposit of malachite mineralization (Golden Eagle Mine) about 5 miles west of Carlsbad. The mine is located along an anticlinal feature trending approximately parallel to the reef front. No other mining operations are currently ongoing or planned.

Forecast

The mining and production of locatable minerals in the planning area is expected to remain at the levels experienced today. The demand for mineral specimens and jewelry will vary with the economic cycles of the country; however, it is not expected to have a significant increase over current production levels. Gypsum and turquoise mines in the planning area have a cyclic history of production and shut down. This

cycle is expected to continue. The development of new small-scale mines for uranium and copper is not anticipated in the planning area even though the commodity price for these metals has significantly increased. The deposits in the area are very small and the nature of the occurrence of these minerals does not lend itself to large commercial deposits.

Key Features

The Crystalline Phoenix selenite/gypsum mine is an unpatented lode claim adjacent to mile marker 7 on U.S. Highway 62/180 (commonly known as the National Parks Highway). It is a small surface operation that requires no processing or refining, only extraction and transportation. It is active and well maintained.

Claims have been staked for gold, uranium, turquoise, and copper in the past, but none proved to be a discovery. Aside from the Crystalline Phoenix, there are no claims being actively mined in the planning area.

Current Management

The 1988 Carlsbad RMP identified 2,682,167 acres as open to mineral entry and mining claim development and 11,680 acres as withdrawn from locatable mineral development. In addition, the 1988 Carlsbad RMP was to initiate protective withdrawals to segregate an additional 23 areas totaling 15,498 acres from mineral entry under the 1872 mining laws. When implemented, the withdrawals would increase the total acres closed to mining claim location to 27,178. To date, only lands in the Caves SMA were withdrawn, totaling 3,245 acres. Current locatables mineral allocations for BLM-administered surface and subsurface lands are shown on Maps 3.18 and 3.19 of Appendix A.

Management Opportunities

Locatable mineral extraction is very minute in the planning area. Claims that may be staked in the future will be expected to adhere to all applicable regulations. If a claim is staked over sensitive lands, then a validity examination by a certified mineral examiner or certified review mineral examiner should be performed in order to determine if a discovery has been found.

2.2.1.4 Salable Minerals

Profile

Current Level and Location of Use

Salable minerals or mineral materials, termed common variety minerals, require very little or no processing and generally are sold by the ton or loose cubic yard. In the planning area, salable minerals include caliche, sand, gravel, clay, and building stone. In Fiscal Year 2010, the CFO issued about 500 contracts for the extraction of salable minerals (mainly caliche, some fill dirt). Gravel deposits are in the form of limestone cobbles found along stream beds generally at the foot of the Guadalupe Mountains. Massive limestone has been mined from the limestone deposits of the Guadalupe Mountains. This material is used for riprap for construction projects in the area.

The main use of mineral materials in the planning area is in support of the oil and gas and mining industries. The largest commodity purchased is caliche, which is used to surface roads, oil and gas well locations, and other construction activities. Gravel is mined from stream bed deposits or mined and crushed from limestone formations and is used to make crushed gravel products. The main use of gravel is as an aggregate for concrete and asphalt.

Sand comes from two sources, as a by-product of the mining of gravel and from wind-blown deposits (blow sand). Sand has a wide variety of uses in the area. The main uses are as a surfacing material when roads are oiled, as fill material in the reclamation of reclaimed sites, and other general projects.

Montmorillonite clay is found in several places in the area, but only one is of a quality and quantity that is mineable. Wallach Sand and Gravel is mining this deposit in Lea County.

Building stone is found in the western portion of Eddy County. The rock is composed of limestone or lime sandstone. The rock is used for landscaping, stone walls, and other building projects.

There are numerous sites available for mining mineral materials in the planning area. The sites are classified as community pits, negotiated pits, exclusive use pits, and common use areas (Map 3.4 Mineral Materials Sites, Appendix A). A community pit is established based on a particular type of commodity in a given area, and there is no limitation on pit size. When opening a community pit, the following is required:

- Preparation of an EA if more than 50,000 cubic yards or more than 5 acres of disturbance is anticipated during mining;
- A mining and reclamation plan;
- A case file and serial number;
- Advertisement to the public concerning the opening of the pit;
- Signage depicting the pit boundary;
- Legal platting of the pit;
- Physical preparation of the pit for use; and
- Mineral material appraisal every two years to determine fair market value.

A common use area is like a community pit with a few exceptions:

- No mine and reclamation plan is required;
- Usually no physical preparation is required;
- Special stipulations are applied;
- No public advertisement is required prior to the opening of the area; and
- Signage is not required, although it is helpful.

An exclusive use pit is defined by the purchaser having exclusive right to materials and sole responsibility for development and reclamation of the site. This includes negotiated, competitive, and free use situations. A free use pit is for government and non-profit organization use, limited to 5,000 cubic yards over the course of 12 consecutive months. An EA is required for the area if sales exceed 50,000 cubic yards or more than 5 acres of disturbance.

A negotiated pit is for non-competitive sales and requires a written request for materials specifying the area of proposed disposal type and the volume of material needed along with an approximate time frame for removal of the material. During Fiscal Year 2010, approximately 500 mineral material contracts were written for all commodities. As an area is mined out, the pit is closed and reclaimed and, when needed, a new pit is opened.

The distribution of the pit types in the planning area are listed in Table 2.2-4. Table 2.2-5 identifies the number of mineral material sales contracts in the planning area for Fiscal Year 2010.

Table 2.2-4. Number of Mineral Materials Pits by Type

Mineral Material	Community Pits	Negotiated Pits	Free Use Pits	Exclusive Use Pits	Common Use Areas
Caliche	64	87	0	39	0
Gravel	0	0	0	6	0
Sand	6	0	0	0	0
Clay	0	0	0	1	0
Building stone	1	0	1	0	1
Total	***71***	***87***	***1***	***46***	***1***

Table 2.2-5. Mineral Materials Sales Contracts for Fiscal Year 2010

Mineral Material	Community Pits	Negotiated Pits	Free Use Pits	Exclusive Use Pits	Common Use Areas
Caliche	259	175	12	0	0
Gravel	0	0	0	2	0
Sand	18	0	0	0	0

Mineral Material	Community Pits	Negotiated Pits	Free Use Pits	Exclusive Use Pits	Common Use Areas
Clay	0	0	0	1	0
Fill/Borrow	0	11	0	0	0
Building stone	0	0	0	1	11
Total	***277***	***186***	***12***	***4***	***11***

Forecast

The use of mineral materials has increased in the past few years and is expected to increase over the next 20 to 30 years. Caliche is the largest type of mineral material mined and sold in the planning area. Oil and gas exploration activities are the driver of caliche demand. The numbers of well pads and the connecting roads have been increasing each year. This increase, as described in the RFD scenario, requires caliche for construction of the pads and continual maintenance of the roads.

Demand for the other commodities (sand, gravel, clay, and building stone) is driven by economic growth in the surrounding area. Oil and gas production and potash mining are expected to increase or at least remain stable for the life of the RMP. This economic stimulating activity will create more demand for mineral minerals.

The volume of sand produced in the last few years has increased. The main uses for sand are as bedding material for oil and gas pipelines and as backfill for reclamation projects. Borrow material (dirt) is included in this category.

The use of gravel in the recent past has also increased. Several large highway construction projects have been completed or are currently ongoing. General construction activity has also increased. Construction projects utilizing concrete consume large quantities of gravel.

The quantity of building stone used is unpredictable. Most of the building stone mined in the planning area is used for residential construction. The use of building stone in homes is highly variable and since the total quantity of material is fairly small, one relatively large contract will skew the trend. The number of contracts for building stone varies between three and 12 per year.

Key Features

Mineral material pits are located throughout the planning area. The pits are established mainly on lands where BLM manages both the surface and minerals estates. The pits are generally located no more than 5 miles apart and at most 10 miles. The distance between pits is kept a minimum to reduce transportation cost related to moving the material. An earnest attempt is made to locate pits where no other resources are adversely affected.

Gravel pits are located in the area west of the Pecos River along the base of the Guadalupe Escarpment. Gravels are generally concentrated in stream beds or in stream bed deposits. Most of the areas where gravel has concentrated are on private minerals and surface. Gravel deposits on BLM-managed lands are very limited. There are several areas where solid limestone deposits could be mined and crushed for gravel. These areas are west of the Pecos River and North of Dark Canyon. Areas south of Dark Canyon are limited due to visual resources and the proximity to the Carlsbad Caverns National Park. Wallach Construction has a gravel pit along the edge of the caprock in Lea County. This material is not a very good quality, but is the best in the local area.

Sand pits are located east of the Pecos River and currently all are in Eddy County. There may be other suitable locations in Lea County. Since the majority of Lea County is private surface and minerals, most pits are privately operated. An attempt is made to situate pits in Lea County on lands where the surface and mineral estates are federally held. In areas where there is no federal surface, pits are located on private surface and federal minerals when a landowner's agreement can be obtained.

Current Management

The 1988 Carlsbad RMP identifies areas available and unavailable for salable mineral development. This included direction to permit new caliche pits only when existing pit locations are not close enough to support multiple-use needs. In addition, the 2008 RMPA prohibited salable mineral sites in specific areas of lesser prairie-chicken habitat. These allocations are ongoing. Current salables mineral allocations for BLM-administered surface and subsurface lands are shown on Maps 3.20 and 3.21 of Appendix A.

Management Opportunities

Mineral material pits can be subject to trespass, and large numbers of pits make monitoring difficult. Measures could be taken to address the high occurrence of trespass in the CFO, e.g., fencing, monitoring, camera installation. The BLM also has an opportunity to better its reclamation efforts through cradle to grave planning efforts on a pit by pit basis. Monitoring will be a key feature of improving reclamation of mineral material pits.

A system can be established to track reserves in each pit based on volumes sold on a contract to contract basis. Surveys could be conducted annually to verify reserve estimates in each pit. This would also aid in estimating theft volumes. It would also allow the Authorized Officer to better predict when a pit is ready for closure.

A product verification program for salable minerals needs to be established and maintained by the CFO or a third party.

2.2.2 Land Use Authorizations

Profile

2.2.2.1 Current Level and Location of Use

Major focus areas for the lands and realty program in the CFO are ROWs associated with numerous oil and gas permitting actions, communication sites, and other land use authorizations. Wind and other renewable energy resources are permitted by ROWs through the lands and realty program.

The CFO processes approximately 500 to 600 ROW actions annually. These include ROW applications for new facilities (e.g., roads, power lines, pipelines, compressor sites, saltwater injection facilities, fiber optic lines, telephone lines, communication sites, and water facilities) as well as amending, assigning, renewing, or relinquishing existing ROW grants. The CFO administers approximately 10,200 authorized ROWs (Table 2.2-6) that occupy approximately 306,000 acres of BLM-managed land (BLM 2014). All resource values and uses are considered and environmental impacts analyzed prior to the issuance of grants and permits.

Table 2.2-6. Existing ROWs in the Planning Area

Type	Number of Authorizations	Acres[1]
Roads[2]	1,159	15,700
Pipelines/sites[3]	6,626	50,985
Power lines/sites	2,117	12,473
Telephone/fiber optic cables	94	1580
Water facilities, ditches, and reservoirs	196	146,898
USFS easements/grants	1	2
Other	8	12,239
Total	***10,201***	***239,877***

Source: BLM LR2000 database (BLM 2014).

1 ROW miles were not calculated because there are significant numbers of existing supplemental uses within the grant information. LR2000 totals do not reflect these supplemental uses and therefore, would not be accurate. As a result, the acres were calculated to provide an accurate calculation of actual surface disturbances.

2 Includes railroad and stations; federal highway and material sites under Sec. 317.

2 Mostly oil and gas related.

The CFO currently administers four temporary land use permits involving about 2 acres of BLM-managed lands (BLM 2014). These permits are issued for a term of up to three years and are for the temporary use of public lands

Five ROW corridors are designated in the 1998 RMP (Map 3.9 ROW Corridors), and attempts are made to group compatible facilities. These 1-mile wide corridors total 185 miles in length and cover approximately 118,400 acres. Because ROW activity associated with oil and gas development typically occurs outside designated corridors, these corridors do not meet all ROW needs in the planning area. These activities are permitted based on the type and need of proposed facilities and lack of conflicts with other resource values and uses.

The CFO currently manages 37,361 acres as ROW avoidance areas; 34,241 acres of ROW avoidance are within the 23 SMAs and 3,120 acres are outside the SMAs. There are currently no areas identified as exclusion areas in existing land use plans, although development is restricted in specially designated areas such as ACECs and WSAs.

The CFO currently administers 46 ROWs or leases associated with communication sites and maintains five Communication Site Management Plans. Communication uses within the planning area include television, FM radio, microwave, cellular, personal communication system, two-way radio, global positioning system (GPS), and paging services.

It is the policy of the BLM to keep the public lands open for public use and enjoyment. There are conditions that warrant the removal or withdrawal of certain BLM-managed lands from general use. Through withdrawal of these lands, public safety is guaranteed or integrity of special uses is assured. For instance, saleable minerals can be sold only from lands unencumbered by mining claims. In some cases, the minerals under a Mineral Material Sale Area may be withdrawn to protect the sale area. The other typical use of mineral withdrawals in the CFO is to protect values within SMAs. Mineral estate is discussed in Section 2.1.1.

The CFO currently uses eight types of withdrawals. Table 2.2-7 identifies the apportionment of withdrawals in the planning area. The miscellaneous withdrawals include a variety of purposes but usually protect an ACEC, SMA, or other facility that would otherwise be adversely affected.

Table 2.2-7. Types of Withdrawals by Planning Unit

Type of Withdrawal	Cases	Acres
Public Water Reserve	1	40
BLM-Special Designation	1	3,365
BLM-Miscellaneous	2	10,231
Reclamation	2	280
USFS–National Forests	4	6,621
USFS-Miscellaneous	1	27,299
Department of the Army	1	721
Department of Treasury	1	1,921
Total	***13***	***50,478***

There are two separate orders described below, Secretarial Orders and EOs. There are also lands that have been transferred by public law. These areas are described as follows:

Secretarial Orders have been used in the planning area to withdraw BLM-managed lands from general use by transferring management responsibility to other USDI agencies, such as the Bureau of Reclamation. Executive Orders have been used to transfer management responsibility to agencies outside the USDI, such as the U.S. Department of Defense and the USFS. BLM-managed lands have been transferred by Public Law 102-579 to the DOE for the purpose of locating the WIPP, by Public Law 103-169 for the purpose of protecting cave/karst resources under the Lechuguilla Cave Protection Area, and by Public Law 88-249 to establish the boundaries of Carlsbad Caverns National Park. In some cases, both the lands and responsibility for their management are transferred out. In other cases MOUs are in

place outlining the management responsibilities between agencies (e.g., mineral lease management, grazing management).

In an effort to keep as much BLM-managed land open to the widest variety of uses, the CFO reviews all existing withdrawals on a periodic basis. Such reviews ensure that the reasons for the restrictions are still valid and that the smallest acreage possible is included in withdrawal status. The need for new withdrawals of public land within the planning area should continue to decrease in the future. Most BLM-managed lands containing resources that need to be protected by withdrawals already have such protection in place.

2.2.2.2 Forecast

Based on past trends, the BLM anticipates that requests for land use authorizations such as ROWs would continue, with the greatest proportion of requests from oil and gas field development (RFD Scenario for the B.L.M. New Mexico Pecos District, 2011). It is expected that this trend would continue, as most of these actions are industry driven. As production ends on older oil fields, increased enforcement is needed to ensure aging ROW infrastructure is decommissioned correctly. As the need for land access and land use authorizations increase, more trespass could occur on BLM-managed lands resulting in an increase of unauthorized actions.

The increasing need for commercial or off-lease produced-water disposal or injection wells could require more ROW authorizations. As demand for this use increases, potential for conflicts with other resources and multiple-use proposals may arise.

Demand for fresh water is expected to increase with more hydraulic fracturing in the future. These operations typically require temporary surface water lines. As need for this type of land use increases, conflicts with other users of BLM-managed land could arise.

BLM-managed lands in the planning area provide opportunities for wind energy development. A 2003 study by the BLM and the DOE found several locations of “good” to “superb” wind energy potential, generally located on higher elevations in the western portion of the planning area (BLM and DOE 2003). Private companies have expressed interest in developing potential sites in Eddy and Chaves Counties and are currently testing areas within the planning area under site testing and monitoring authorizations to determine suitability. No development permits have been issued.

The forecast for renewable energy sites is hard to determine. Several authorizations for wind testing and monitoring have been permitted in the planning area with one proposal for full development in suspension. Limitations due to proximity to transmission lines seem to be the major constraint for proponents seeking viable areas for renewable development projects. More renewable energy sites may be developed, requiring additional ROWs from the BLM. Additional discussion on the demand for renewable energy sites is included in Section 2.2.3, Renewable Energy.

There is also the potential for the development of solar energy resources in the planning area, although no applications have been received.

2.2.2.3 Key Features

Currently, under BMPs ROW holders are encouraged to use existing disturbed corridors and coordinate with other authorized users for construction, maintenance, or reclamation activities. Areas of high potential for future development include BLM-managed lands identified for disposal, designated corridors, existing utility alignments, ROWs, existing communication sites, and existing renewable energy sites.

2.2.2.4 Current Management

Refer to the 1988 Carlsbad RMP Right-of-Way Corridors and Avoidance Areas for information on ROW corridors and ROW avoidance areas.

2.2.2.5 Management Opportunities

Corridors established in 1988 Carlsbad RMP are not commensurate with the trend of development. Corridors could be revised to match geospatial trends with development taking into account sensitive resource concerns. Recently constructed (within the last five years) major petroleum product pipelines, could serve as starting points in identifying alignments for ROW corridors.

Currently, restrictions on surface pipelines are applied to oil and gas development. This management should be extended to surface lines related to potash mining activities. Considerations should be given to designated areas where burial in not necessarily feasible due to terrain or soil conditions. State safety regulations for buried and surface pipelines should be factored into decisions.

Companies have not been cooperative with the Power Line Removal Credit Program established in the 2008 RMPA, mainly due to the fact that they have no credits banked away in core management areas or primary population areas that would allow them to participate regularly in this program. Instead of utilizing this program, power lines should be required to be buried is certain areas. BMPs could be established where off-site remove or idle or abandoned power poles could be encouraged through site-specific projects.

BLM should work closely with pipeline and hazardous material safety administration and the New Mexico public regulatory commission pipeline safety division to ensure consistency between their regulations and requirements set forth in the RMP, to make sure that the operator is not put in a position where it cannot comply with one set of requirements without being out of compliance with another set.

Pipelines often cross trails in recreation areas. Burial of pipelines in motorized recreation areas could be required.

2.2.3 Renewable Energy

On August 8, 2005, President Bush signed the National Energy Policy Act of 2005 (42 USC 149 § 15801 et seq.). The legislation promotes dependable, affordable, and environmentally sound production and distribution of energy for America's future. Section 211 of the National Energy Policy Act calls for the Secretary of the Interior to have approved non-hydropower renewable energy projects located on public lands with a generation capacity of at least 10,000 megawatts by 2015.

In some locations within the planning area, it may be economical to produce renewable energy (e.g., wind, biomass, solar, and geothermal). Where feasible, BLM policy is to make possible environmentally sound development of renewable energy projects. Applications for commercial renewable energy projects are processed as ROW authorizations under Title V of FLPMA and under 43 CFR 2800.

The wind energy and solar energy figures below were developed using data from the National Renewable Energy Laboratory (NREL), which is operated by the Alliance for Sustainable Energy, LLC, for the DOE. The maps show the renewable energy potential for solar and wind power in the CFO.

In the planning area, the forecast for biomass resources is very slim because of the scarcity of densely vegetated areas; however, potential could exist for the construction of biomass facilities for processing and burning. Virtually no areas within the planning area contain biomass resources for energy production; as a result of arid conditions, biomass may not be as sustainable in the planning area as in other areas. Due to the low potential biomass l resources are not discussed further.

Potential for geothermal resources in the planning area are virtually the same as that of biomass. The nationwide Geothermal Resources Leasing Programmatic EIS and ROD (BLM 2008) amended the CFO 1988 RMP and allocated approximately 186,375 acres within the planning as open to geothermal leasing (see Map 3.8, Geothermal Potential). There has been no interest expressed in geothermal leasing within the planning area since the programattic decisions were promulgated, and there are very little data that suggest the area will see any interest in leasing, due to the lack of oil and gas wells within the potential area showing positive signs of significant geothermal heat.

Wind Energy

2.2.3.1 Profile

Current Level and Location of Use

In October 2003, the BLM initiated the preparation of a Wind Energy Development Programmatic EIS to address the impacts of the future development of wind energy resources on public lands. The NREL assisted the BLM in the preparation of the Programmatic EIS and provided an inventory assessment of wind energy resources on BLM-managed lands in the western United States. Appendix B of the Final Programmatic EIS contains CFO Boundaries Maps (B-89), which show wind resources consistent with utility-scale production (BLM 2005). The majority of the CFO jurisdiction is categorized as having marginal to fair potential for wind energy, with some localized larger areas that are categorized as having good to superb potential (NREL Wind Resource Potential Map of the U.S., January 23, 2008) Map 3.7 Wind Resources Potential, Appendix A. The majority of this good to superb potential area is west of Carlsbad, along the ridge of the Guadalupe Mountains in western Eddy County, as well as in a small portion of southwestern Chaves County known as the "boot heel."

Wind resources are classified based on the wind power density in units of watts per square meter of surface land area. Wind power is dependent on the height of the wind turbine above ground level. The current commercial standard is 150 feet. Effective NREL wind power classes range from lowest (Class 1) to highest (Class 7). Wind power is considered economic for large utilities-scale turbines at Class 4 and higher for short-term operation and Class 3 and higher for long-term operation, although a small non-commercial turbine can be viable at Class 1.

A report prepared by the DOE and the BLM identified lands within the planning area as having minimum acreage with high-potential wind power density (BLM and DOE 2003). The majority of the planning area falls into wind power density Class 2 (marginal) and Class 3 (fair), but there are a few high-elevation sites that fall into Class 5 (excellent), Class 6 (outstanding), and class 7 (superb) (NREL Wind Resource Potential Map of the U.S., January 23, 2008).

The DOE and BLM survey of topographic and historical wind conditions identified locations in the planning area where wind resources are available for development Map 3.7, Appendix A. The criteria for selecting those locations include the following:

- The wind resources are limited to areas in wind power density Class 3 and higher.
- The site is within 25 miles of transmission lines of 69- to 345-kilovolt (kV) capacity.
- The site is within 50 miles of a major road or railroad.
- The land use is compatible with BLM management of other resources.

Currently the CFO administers two site testing and monitoring authorizations for wind energy. This type of permit allows companies to construct meteorological towers to collect wind and other weather data to determine if an area has potential for wind development. In addition, this type of authorization allows proponents to identify parcels of land for a project area and that area is included as part of the site testing and monitoring grant to be tested for wind resource development potential. Parcels are defined by aliquot part in the grant and preclude the identified area from other wind applications during the three-year term of the authorization. There are no commercial wind energy facilities currently on BLM-managed lands within the planning area.

Forecast

There are no commercial wind energy facilities on BLM-managed lands in the planning area, but there are private commercial operations proposed in Lea County. Commercial wind operations exist outside the planning area to the northeast, near the eastern border of New Mexico. Several companies have expressed interest in possible wind energy development projects and two companies currently hold authorizations for site testing and monitoring. An increased interest in the wind energy resource is forecasted. Future wind energy resource use is dependent on cost of installing and operating wind energy

development facilities and proximity to existing transmission line systems. Technological advances may decrease costs for equipment and facilities, making this resource economically competitive with non-renewable resources. Requests for ROW permits for wind energy development facilities in some areas may conflict with other resources, such as visual resources.

Key Features

Areas with the highest wind resource classification, crests and slopes of mountains, highlands, mesa tops, and the eastern plains areas contain high potential for wind energy resources. The majority of the planning area falls into the marginal wind power density class, with locations along the flank of the Guadalupe Escarpment in the western and northwestern portion of the planning area containing key features. These areas are within the excellent to superb wind power density classes.

2.2.3.2 Current Management

The 2005 Wind Energy Development Programmatic EIS amended the 1998 Carlsbad RMPA. This programmatic EIS provides direction for wind energy development in the planning area, including areas restricted to development. No wind energy development projects have occurred in the planning area.

2.2.3.3 Management Opportunities

The revised Carlsbad RMP should continue to use BMPs established in the 2005 Programmatic EIS, while incorporating new policies and BMPs as appropriate. For example, terminology such as restricted areas should be changed to excluded areas.

Wind energy development should occur where it is appropriate and where it does not degrade public land use values. A long review and study time could be required to determine impacts of wind turbines on raptors, migratory birds, bats, and where impacts may occur on the ground.

Consideration should be given to possible impacts of renewable projects on existing use. Some projects could have an adverse impact on oil and gas operations if magnetic currents are generated. These currents could pose corrosion concerns with not only pipelines but also with casing integrity. The best available science should be used to foster concurrent development.

Areas near established WAs, ACECS, and national and state parks should be excluded from renewable energy development; present utility corridors should be used for renewable energy and consolidated where possible.

Solar Energy

2.2.3.4 Profile

Current Level and Location of Use

The report prepared by the DOE and the BLM identified lands within the planning area as having large acreage with high potential concentrations of solar power or photovoltaic sites (BLM and DOE 2003). Solar energy is a renewable energy resource that has excellent potential for generating electricity in the planning area. Solar energy resources are classified based on the amount of solar radiation that contacts the ground surface in a specified area. Solar radiation is measured in units of kilowatt-hours per square meter per day. The amount of solar energy available at a specific location varies with latitude, season, and time of day. The energy output also depends on the type of solar energy collector being used. Two types of collectors are considered for renewable solar energy generation: concentrating solar power (CSP) and photovoltaic (PV).

CSP plants are large systems that use mirrors to focus sunlight to create high temperatures. The high temperatures generated by focused sunlight heat fluid to generate electricity. Facilities include a solar collection system, a system for transferring the collected energy to a working fluid or to a storage system,

and a system for converting the thermal energy such as a turbo-generator. Figure 2.2-3 depicts the potential for concentrating solar resources for the state of New Mexico.

PV is a solar energy collection system consisting of flat plates of solar-energy-collecting PV cells. The collection system may be equipped to track the sun throughout the day. The PV cells are connected to storage batteries that are charged during daylight hours.

Solar energy values in the planning area range from 5.6 to 6.5 kilowatt-hours per square meter per day for PV collection systems and 5.5 to 7.5 kilowatt-hours per square meter per day for CSP collection systems (NREL statewide solar maps, see Figure 2.2-3 and Figure 2.2-4). There are no commercial solar energy facilities currently on public lands within the planning area. Very small-scale PV systems exist as part of other infrastructure (e.g., water storage systems, communication towers) where power needs are minimal and distance to other power sources is not economical.

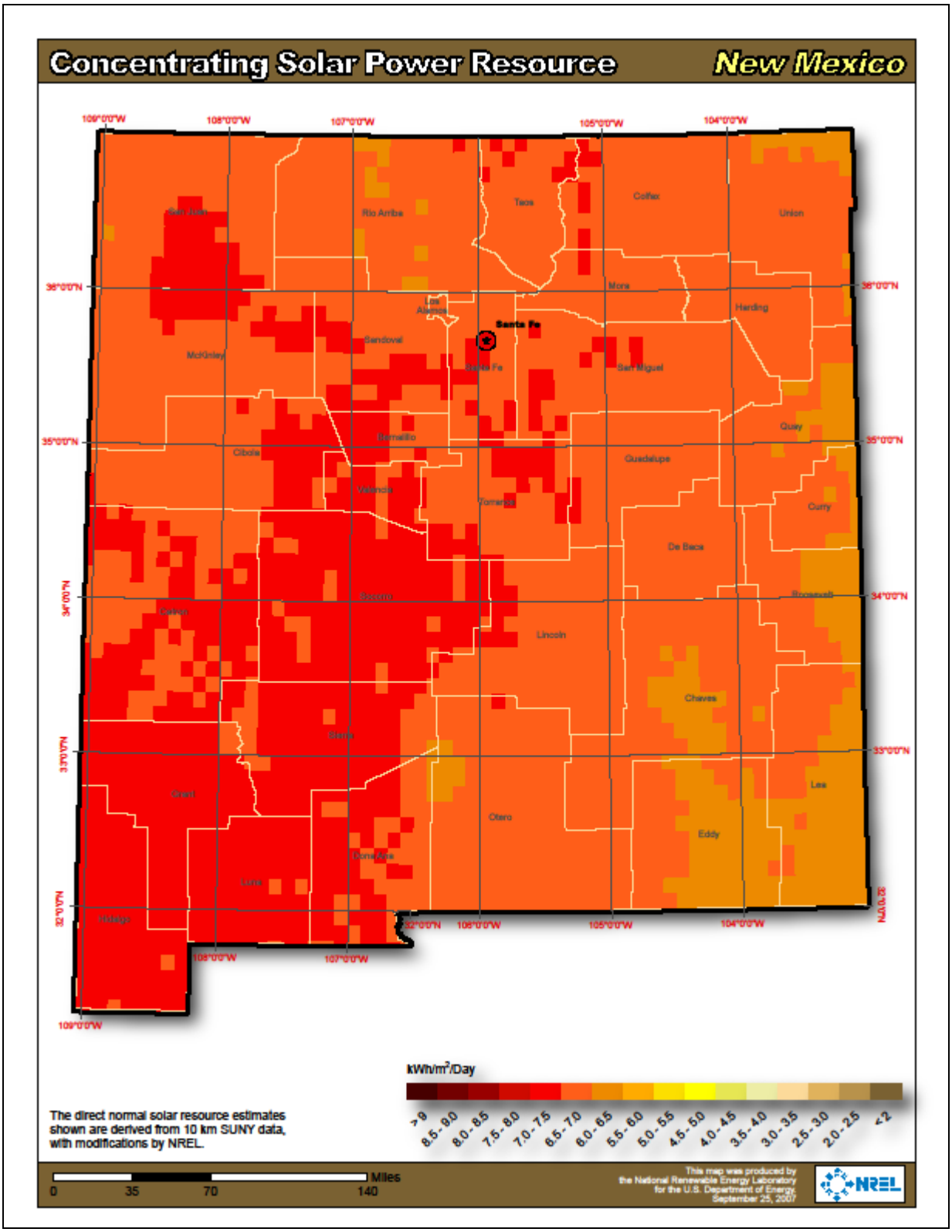

Figure 2.2-3. Potential for Concentrating Solar Power Resources for the State of New Mexico

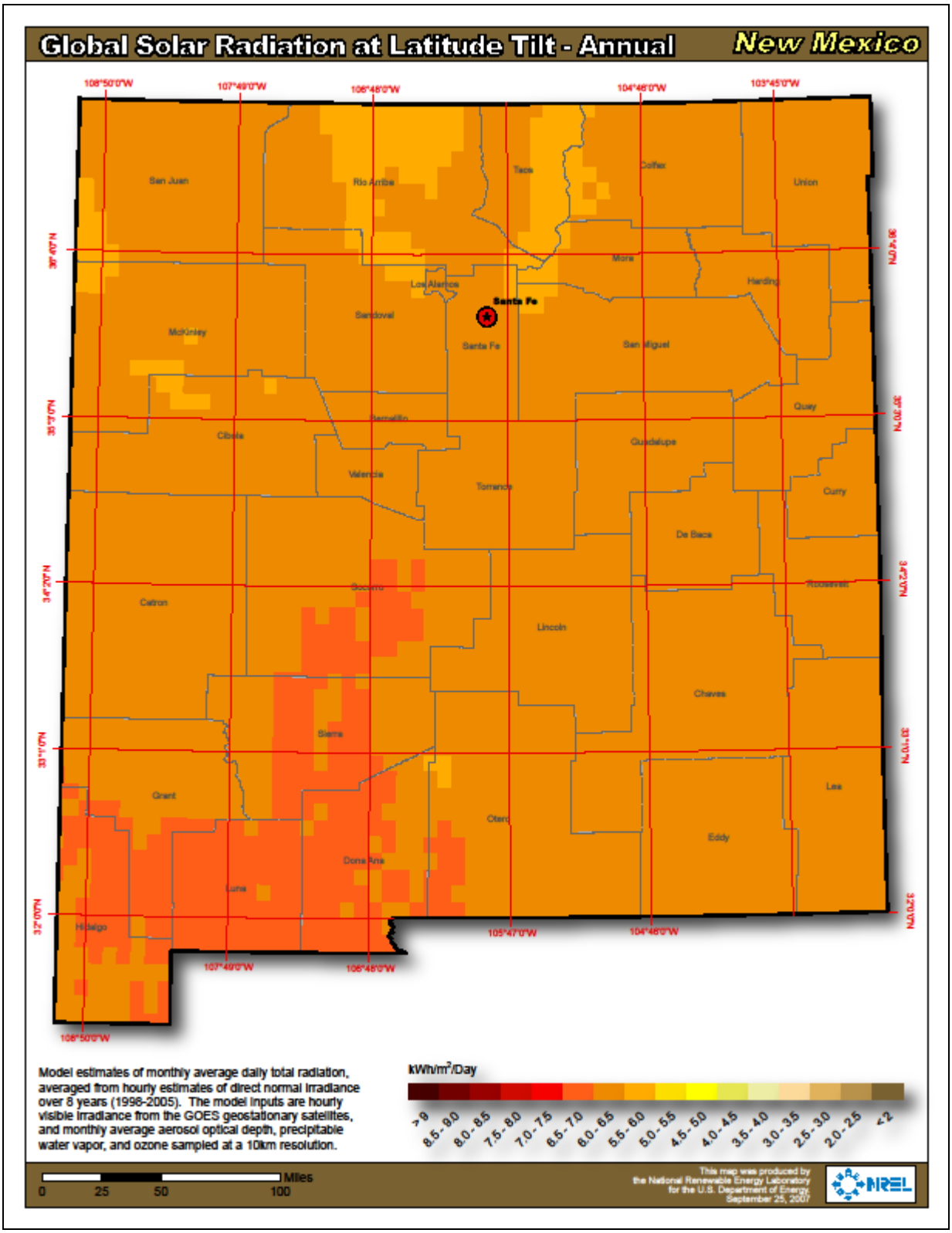

Figure 2.2-4. Global Solar Radiation for the State of New Mexico

Forecast

The development forecast for the development of solar resources in the planning area is directly tied to solar technology cost, suitable areas for development, and the availability of transmission corridors. With technological advances and mass production of solar collection equipment, costs should decrease in the long term. Cost increases for non-renewable energy resources will make solar energy more competitive in the future market. Limited interest has been expressed, but no applications have been received.

Key Features

New Mexico, including the planning area, receives a large amount of annual sunshine. The planning area is well located for development of PV and CSP solar energy resources as shown on the NREL statewide solar maps in Figure 2.2-3 and Figure 2.2-4 above.

2.2.3.5 Current Management

The 1988 Carlsbad RMP encouraged location of new facilities within designated ROW corridors. Facilities have been authorized outside these corridors, as allowed under the 1988 Carlsbad RMP based on the type and need of the proposed facility and the lack of conflicts with other resource values and uses.

The CFO required burial of oil and gas exploration pipelines greater than 4 inches in nominal diameter, all injection lines, and gas line with a pressure greater than 125 pounds per square inch (psi) as directed in the 1988 Carlsbad RMP.

Utility corridors for major projects such as interstate electric transmission lines, pipelines, and communication lines for interstate use were designated as directed in the 2008 RMPA.

2.2.3.6 Management Opportunities

The revised Carlsbad RMP should look to use BMPs, while incorporating new policies and BMPs as appropriate. Solar energy development should occur where it is appropriate and where it does not degrade public land use values or pre-existing resource uses. A long review and study time could be required to determine impacts of commercial solar facilities on raptors, migratory birds, bats, and where impacts may occur on the ground.

Consideration should be given to possible impacts of renewable projects on existing use. Some projects could have an adverse impact on oil and gas operations due to the large acreages needed to develop solar commercially. The best available science should be used to foster concurrent development.

Areas near established WSAs, ACECs, and national and state parks should be exluced from renewable energy development; present utility corridors should be used for renewable energy and consolidated where possible.

2.2.4 Livestock Grazing

Profile

The BLM is responsible for managing livestock grazing on BLM-managed lands in the planning area. Livestock grazing includes the grazing of domestic cattle, sheep, goats, and horses. Livestock grazing in the planning area is governed under either Section 3 or Section 15 of the Taylor Grazing Act. Section 3 concerns issuing grazing permits on federal lands within the original grazing district boundaries that were established by the Taylor Grazing Act of 1934; the BLM sets the livestock numbers for all lands (federal, state, private, etc.) within these allotments. Section 15 deals with those lands that fall outside that boundary; the BLM only determines livestock numbers for federal acreage within these allotments. The amount of forage required by one animal unit (cow with calf pair) for one month is called an AUM.

2.2.4.1 Current Level and Location of Use

Animal Unit Month Allocations

The CFO manages livestock grazing on 1,947,890 federal acres, 88% of the planning area (Appendix A Map 3.10 Leased Grazing Use). This acreage incorporates 199 Section 3 grazing permits and 66 Section 15 grazing leases, authorizing approximately 367,656 active AUMs of livestock forage in 265 grazing allotments (Table 2.2-8). An active AUM is defined as all AUMs listed within a grazing permit or lease, including both actual use and temporary non-use. Permitted AUMs are attached to a base property on BLM allotments; base property is defined as "water that is suitable for consumption by livestock and is available and accessible, to the authorized livestock when the public lands are used for livestock grazing" (43 CFR 4110.0-5). These lands are located in Eddy, Lea, and Chaves Counties. The CFO manages a small number of Section 15 allotments in Otero County, and the new CFO land use plan would make decisions concerning grazing for these lands; however, this county would not be mentioned with other resources because it falls outside of the CFO boundaries.

Table 2.2-8. AUMs Allocated to Livestock in the Planning Area

Livestock Type	Active AUMs
Section 3 permits	349,525
Section 15 leases	18,131
Total	***367,656***

Source: BLM 2010c.

Almost all livestock grazing within the planning area is permitted for year-round use. Permitted livestock numbers for each allotment are set at levels that provide for plant recovery to enhance rangeland health. These levels have been determined by quantitative measurements of forage present. When rangelands are not meeting resource objectives, changes in grazing management are implemented, including adjusting permitted livestock numbers, adding additional waters and fences, or providing rest in certain pastures during the growing season. The actual use on CFO grazing allotments for the last 10 years is listed below (Table 2.2-9). Actual use is defined as the number of AUMs actually using the public lands, which may change from year to year.

Table 2.2-9. Actual Use AUMS in the Planning Area

Year	Section 3 Allotments	Section 15 Allotments	Total Actual Use AUMs
2000	189,829	12,902	202,731
2001	174,476	12,574	187,050
2002	174,092	15,233	176,625
2003	162,028	13,062	175,090
2004	158,697	13,310	172,007
2005	184,959	13,762	198,721
2006	190,933	13,861	204,794
2007	204,907	14,125	219,032
2008	218,853	14,156	233,009
2009	225,806	14,053	239,859
2010	255,157	15,049	270,206
2011	268,187	15,277	283,464
2012	260,867	15,128	275,995

Selective Management Categorization

The BLM recognizes that AUM production on its rangelands can only be sustained with proper management of livestock grazing activities. To evaluate rangeland health and keep AUM production sustainable, the BLM complies with the Standards and Guidelines (BLM 2001a). In 1985, all allotments were placed in categories established by BLM range management policies. These categories included Improve (I), Maintenance (M), and Custodial (C). The BLM uses this classification to categorize

allotments according to the greatest potential for resource improvement and the greatest economic return for applied management. Factors used in the categorization process include BLM-managed land acreage, estimated range condition and trend, resource conflict or concerns, existing grazing systems, range suitability, production potential, wildlife habitat values, land patterns and acreages, and range improvement needs. Allotments containing larger-acreage tracts of BLM-managed land and the lowest potential were placed in the I and M categories and allotments containing smaller acreage tracts of BLM-managed land were placed in the C category. Priority for range improvement funds and monitoring are given to the I category allotments followed by the M category allotments and then the C category allotments. Table 2.2-11, Table 2.2-12, Table 2.2-13 and Table 2.2-14 lists each allotment in the planning area with current allotment categorization, AUMs, season of use, type of management, active preference, suspended use, and kind of livestock.

In the 1980s, the BLM developed classification criteria to assist field offices in identifying management priorities by allotment. Allotments are placed in one of three selective management categories based on the criteria in Table 2.2-10.

Table 2.2-10. Allotment Selective Management Category Criteria

Criteria	Category		
	Maintain (M)	Improve (I)	Custodial (C)
Present range condition	Satisfactory	Unsatisfactory	Not a factor
Resource production potential	Moderate to high; producing near potential	Moderate to high; producing at low to moderate levels	Low; producing at low to moderate levels
Resource use conflicts	None	Serious	Limited
Opportunities for positive economic return from public investment	Yes	Yes	No
Present management	Satisfactory	Unsatisfactory	Opportunities for change
Management objective	Maintain current satisfactory ecological condition	Improve unsatisfactory ecological condition and resolve resource conflicts through intensive management	Prevent resource degradation

Source: BLM 2001c.

Selective management categorization provides a system for establishing priorities for implementing changes in grazing management based on the need for improved management and the potential for improved ecological condition, with consideration for cost effectiveness. Selective management categories can be changed as additional resource data becomes available. Changes in categories would result in management changes appropriate to the new category, consistent with the objectives of the approved RMP. The number of allotments and their category for the CFO are listed below (Table 2.2-11 and Table 2.2-12).

Table 2.2-11. CFO Allotments by Management Category

Category	Number of Allotments	Acres
Custodial	107	133,302
Improve	62	767,114
Maintain	100	1,047,474

Table 2.2-12. Grazing Allotments in the Planning Area

Allotment Number	Allotment Name	Management Plan	Public Acres
76008	Querecho Plains	Allotment	9,562
76020	Lea Townsite	Allotment	15,426
76022	Laguna Toston	Allotment	2,705
76023	Bilbry Basin	Allotment	4,837

Allotment Number	Allotment Name	Management Plan	Public Acres
76028	Swag	Allotment	8,767
76033	E. Rattlesnake Flat	Allotment	17,009
76035	Medlin-Wells	Cooperative	10,280
76037	Red Tank	Allotment	20,576
76038	Fairview	Allotment	25,374
76039	Bobcat Draw	Allotment	10,601
76040	Penn Tank	Allotment	6,700
76043	Javelina Basin	Allotment	13,282
76045	Cotton Place	Allotment	5,886
76046	Goedeke Grazing	Cooperative	7,935
76051	Andrews Flat	Allotment	11,184
76052	Mexico Wells	Cooperative	14,846
76053	Ruth Ross Place	Cooperative	10,426
76120	Lea Townsite II	Allotment	306
76128	Swag II	Allotment	1,280
76137	Red Tank II	Allotment	2,120
77003	Taylor Peak	Allotment	3,790
77007	Sand Hill	Allotment	4,641
77008	Cedar Lake	Cooperative	14,622
77012	Twin Wells North	Allotment	120,456
77013	Clayton Basin	Allotment	50,448
77014	Burton South	Allotment	5,965
77015	Angell Draw	Allotment	12,374
77026	Quahada Ridge	Allotment	2,773
77031	Brushy Knob	Allotment	24,280
77032	Antelope Ridge	Allotment	66,350
77036	Pierce Canyon	Allotment	22,795
77040	Phantom Banks	Allotment	53,560
77042	Twin Wells	Allotment	36,694
78011	Tumbleweed Draw	Cooperative	2,658
78049	Collier Tank	Allotment	24,976
78050	Texas Hill	Allotment	43,103
78062	Little Box Canyon	Allotment	8,844
78064	Cawley Draw	Allotment	22,257
78087	Big Hackberry Draw	Allotment	11,582
78095	Kelly Well	Cooperative	1,680
78097	Willow Lake	Cooperative	3,436
78103	Tecolate Peak	Cooperative	7,363
78106	Cottonwood Springs	Cooperative	11,330
78107	Hay Hollow	Cooperative	8,583
78109	Lobo	Cooperative	9,406
78144	C P Hill	Cooperative	21,029
78146	Rain Springs	Cooperative	6,728
79001	Eagle Creek	Allotment	12,959
79002	Feliz	Allotment	13,158
79017	Flying H	Allotment	1,465
79024	Cuevo East	Allotment	5,743
79025	Cuevo West	Allotment	1,187
79026	Elkins, Sam	Allotment	7,122
79028	Pretty Bird Hills	Allotment	38,056
79030	Encino Draw	Allotment	17,825
79031	Acres Lake	Allotment	8,652

Allotment Number	Allotment Name	Management Plan	Public Acres
79045	Bear Canyon	Allotment	4,158
79048	Upper Segrest Draw	Allotment	5,977
79049	Upper Packsdale Canyon	Allotment	1,580
Total Acres			***918,707***

Table 2.2-13. CFO Current Allotment Categorization

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
76001	Collum	Cattle	1	3/1	2/28	12	100
76002	Gladiola	Cattle	1	3/1	6/30	4	100
76004	Sand Trap	Cattle	28	3/1	2/28	336	100
76006	Pumpjack South	Cattle	248	6/1	2/28	1,758	79
76007	Maljamar South	Cattle	178	3/1	2/28	1,452	68
76008	Querecho Plains	Cattle	115	3/1	2/28	1,339	97
76009	Buckeye North	Cattle	4	3/1	2/28	48	100
76010	Golf Course	Cattle	4	3/1	2/28	48	100
76011	Laguna Tonto	Horse	12	3/1	2/28	85	59
76011	Laguna Tonto	Cattle	288	3/1	2/28	2,039	59
76011	Buckeye South	Horse	4	3/1	2/28	34	70
76011	Buckeye South	Cattle	408	3/1	2/28	3,427	70
76011	Salt Lake	Horse	10	3/1	2/28	100	83
76011	Salt Lake	Cattle	620	3/1	2/28	6,175	83
76012	Monument Draw	Cattle	1	3/1	4/30	2	100
76013	Record	Cattle	3	3/1	2/28	36	100
76014	White Breaks	Cattle	3	3/1	2/28	36	100
76015	Nadine	Cattle	25	3/1	2/28	300	100
76016	Jones City - North	Cattle	6	3/1	2/28	72	100
76017	Eunice	Cattle	20	3/1	2/28	240	100
76018	S. Monument Draw	Cattle	5	3/1	2/28	60	100
76019	Monument - SW	Cattle	10	5/1	2/28	100	100
76020	Lea Townsite	Cattle	466	3/1	3/15	172	75
76020	Lea Townsite	Cattle	466	5/15	2/28	3,332	75
76021	Halfway	Horse	4	3/1	2/28	40	83
76021	Halfway	Cattle	359	3/1	2/28	3,576	83
76022	Laguna Toston	Cattle	67	3/1	2/28	804	100
76022	Laguna Toston	Horse	3	3/1	2/28	36	100
76023	Bilbry Basin	Cattle	75	3/1	2/28	792	88
76024	Jones City	Cattle	1	3/1	2/28	12	100
76025	Oil Center North	Cattle	25	3/1	2/28	300	100
76026	Oil Center South	Cattle	11	3/1	2/28	132	100
76027	San Simon	Cattle	158	3/1	2/28	1,896	100
76028	Swag	Cattle	160	3/1	2/28	1,805	94
76029	Playa Dunes	Cattle	131	3/1	2/28	1,163	74
76030	Deep Wells	Cattle	70	3/1	2/28	647	77
76031	East Rattlesnake Can	Cattle	1	3/1	8/31	6	100
76032	Jal – Northwest	Cattle	4	3/1	2/28	48	100
76033	E. Rattlesnake Flat	Horse	4	3/1	2/28	36	75
76033	E. Rattlesnake Flat	Cattle	296	3/1	2/28	2,664	75
76035	Medlin-Wells	Cattle	180	3/1	2/28	1,771	82
76036	Ochoa - Northwest	Cattle	1	3/1	6/30	4	100
76037	Red Tank	Cattle	830	3/1	2/28	3,685	37

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
76038	Fairview	Cattle	363	3/1	2/28	3,703	85
76038	Fairview	Horse	7	3/1	2/28	71	85
76039	Bobcat Draw	Cattle	113	3/1	2/28	1,112	82
76039	Bobcat Draw	Horse	7	3/1	2/28	69	82
76040	Penn Tank	Cattle	80	3/1	2/28	883	92
76041	Old Baldy	Cattle	7	3/1	2/28	84	100
76042	Tobosa Flats	Cattle	92	3/1	2/28	927	84
76043	Javelina Basin	Cattle	310	3/1	2/28	2,269	61
76043	Javelina Basin	Horse	10	3/1	2/28	73	61
76045	Cotton Place	Horse	1	3/1	2/28	8	67
76045	Cotton Place	Cattle	53	3/1	2/28	426	67
76046	Goedeke Grazing Cell	Cattle	92	3/1	2/28	894	81
76047	Monument-Jal Oilfield	Cattle	32	3/1	2/28	384	100
76048	San Simon Swale	Cattle	66	3/1	2/28	792	100
76049	Hart Ranch	Cattle	117	3/1	2/28	379	27
76050	Cerca	Cattle	1	3/1	2/28	12	100
76051	Andrews Flat	Cattle	200	3/1	2/28	2,040	85
76052	Mexico Wells	Horse	10	3/1	2/28	110	92
76052	Mexico Wells	Cattle	160	3/1	2/28	1,766	92
76053	Ruth Ross Place	Horse	1	3/1	2/28	9	78
76053	Ruth Ross Place	Cattle	184	3/1	2/28	1,722	78
76054	Southeast Jal	Goat	5	3/1	2/28	12	100
76055	West Jackson	Cattle	3	3/1	2/28	36	100
76056	Brookin West	Cattle	10	3/1	2/28	120	100
76056	Brookin West	Cattle	2	3/1	2/28	24	100
76057	Jackson East	Cattle	10	3/1	2/28	120	100
76057	Jackson East	Cattle	2	3/1	2/28	24	100
76058	Eddy 13	Cattle	58	3/1	2/28	633	91
76060	Ironhouse Draw	Cattle	1	3/1	6/30	4	100
76061	Sand Dune	Cattle	50	3/1	2/28	600	100
76063	Main Canal	Cattle	10	3/1	2/28	66	55
76064	Avalon Hills	Cattle	22	3/1	2/28	150	57
76104	Sand Trap II	Cattle	7	3/1	2/28	84	100
76106	Pumpjack South II	Cattle	4	3/1	2/28	48	100
76107	Maljamar South II	Cattle	2	3/1	2/28	24	100
76120	Lea Townsite II	Cattle	5	3/1	2/28	60	100
76128	Swag II	Cattle	7	3/1	2/28	84	100
76137	Red Tank II	Cattle	29	3/1	2/28	348	100
77001	Seco Snake	Cattle	45	3/1	11/30	252	62
77002	Lake Arthur East	Cattle	4	3/1	2/28	48	100
77003	Taylor Peak	Cattle	75	3/1	2/28	567	63
77004	Loco Hills	Cattle	175	3/1	2/28	1,806	86
77005	Johnson Draw	Cattle	33	3/1	2/28	277	70
77006	Chalk Bluff	Cattle	65	3/1	2/28	655	84
77007	Sand Hill	Cattle	85	3/1	2/28	714	70
77008	Cedar Lake	Cattle	225	10/1	2/28	871	78
77008	Cedar Lake	Cattle	225	3/1	3/31	179	78
77008	Cedar Lake	Cattle	80	4/1	9/30	375	78
77009	Burton North	Cattle	8	3/1	2/28	96	100
77010	Hiline	Cattle	20	3/1	2/28	204	85

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
77011	Dipper Allotment	Cattle	160	3/1	2/28	922	48
77012	Twin Wells North	Cattle	1195	3/1	2/28	11,615	81
77012	Twin Wells North	Horse	5	3/1	2/28	49	81
77013	Clayton Basin	Cattle	985	3/1	2/28	10,047	85
77013	Clayton Basin	Horse	15	3/1	2/28	153	85
77014	Burton South	Cattle	105	3/1	2/28	970	77
77015	Angell Draw	Cattle	151	3/1	2/28	1,595	88
77015	Angell Draw	Horse	4	3/1	2/28	42	88
77016	Dagger Draw	Cattle	106	3/1	2/28	1,272	100
77016	Dagger Draw	Horse	4	3/1	2/28	48	100
77017	Avalon	Cattle	8	3/1	2/28	96	100
77018	Railroad	Cattle	36	3/1	2/28	432	100
77019	Keystone	Horse	1	3/1	2/28	7	55
77019	Keystone	Cattle	19	3/1	2/28	125	55
77020	Alkali Lake	Cattle	236	3/1	2/28	2,634	93
77020	Alkali Lake	Horse	4	3/1	2/28	45	93
77021	West Bilbry	Cattle	121	3/1	2/28	1,176	81
77022	Maroon Cliffs	Cattle	208	3/1	2/28	1,972	79
77024	Alacran Hills	Cattle	14	3/1	2/28	69	41
77025	Indian Flats	Cattle	78	3/1	2/28	636	68
77025	Indian Flats	Horse	3	3/1	2/28	24	68
77026	Quahada Ridge	Cattle	50	3/1	2/28	564	94
77027	Livingston Ridge	Horse	20	3/1	2/28	178	74
77027	Livingston Ridge	Cattle	710	3/1	2/28	6,305	74
77028	Old Indian Draw	Horse	2	3/1	2/28	20	85
77028	Old Indian Draw	Cattle	128	3/1	2/28	1,306	85
77031	Brushy Knob	Cattle	280	3/1	2/28	2,890	86
77032	Antelope Rigdge	Cattle	950	3/1	2/28	9,576	84
77033	Nash Draw	Cattle	150	3/1	2/28	1,422	79
77034	Remuda Basin	Cattle	110	3/1	2/28	752	57
77036	Pierce Canyon	Cattle	177	3/1	2/28	1,997	94
77037	Rustler Breaks	Cattle	281	3/1	2/28	3,102	92
77038	La Huerta	Cattle	2	3/1	2/28	12	50
77039	Sun Wells	Cattle	230	3/1	2/28	2,429	88
77040	Phantom Banks	Cattle	670	3/1	2/28	7,477	93
77041	Lower Tucker Draw	Cattle	150	3/1	2/28	756	42
77042	Twin Wells	Cattle	710	3/1	2/28	6,646	78
77043	Little Lake	Cattle	80	3/1	2/28	691	72
77044	Burton Flats	Cattle	60	3/1	2/28	698	97
77045	Lindsey Lake	Cattle	100	3/1	2/28	924	77
77046	East Tell Talebluff	Cattle	30	3/1	2/28	68	19
77047	Harroun Crossing	Cattle	31	3/1	10/31	60	24
77048	Fenton Draw	Cattle	69	3/1	2/28	811	98
77049	Mimosa	Horse	1	3/1	2/28	11	90
77049	Mimosa	Cattle	255	3/1	2/28	2,754	90
78001	Crooked Canyon	Cattle	32	3/1	2/28	261	68
78001	Crooked Canyon	Sheep	1,135	3/1	2/28	1,852	68
78001	Crooked Canyon	Horse	5	3/1	2/28	41	68
78001	Feliz River	Cattle	292	3/1	2/28	1,717	49
78001	Cottonwood	Cattle	678	3/1	2/28	2,604	32
78001	Squaw Canyon	Sheep	2,400	3/1	2/28	2,362	41

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
78001	Squaw Canyon	Horse	14	3/1	2/28	69	41
78001	Squaw Canyon	Cattle	361	3/1	2/28	1,776	41
78001	Ox Yoke	Cattle	160	3/1	2/28	1,171	61
78001	Ox Yoke	Sheep	4,800	3/1	2/28	7,027	61
78001	Feliz River North	Cattle	523	3/1	2/28	4,205	67
78003	El Rancho Grande	Cattle	59	3/1	2/28	326	46
78004	Cottonwood Acres	Cattle	22	3/1	2/28	214	81
78006	Cottonwood Creek	Cattle	260	3/1	2/28	1,373	44
78007	Brangus Ranch	Cattle	118	3/1	2/28	623	44
78009	Crow	Cattle	38	3/1	2/28	287	63
78011	Tumbleweed Draw	Cattle	12	3/1	2/28	144	100
78011	Tumbleweed Draw	Cattle	105	3/1	2/28	416	33
78012	Dry Chaparral	Cattle	65	3/1	2/28	538	69
78013	Road Bend	Cattle	80	3/1	2/28	797	83
78014	West Catclaw	Cattle	133	3/1	2/28	1,277	80
78016	West Johnson Draw	Cattle	154	3/1	2/28	665	36
78017	Hope Canal	Cattle	45	3/1	2/28	459	85
78020	Cottontail	Cattle	50	3/1	2/28	540	90
78020	Cottontail	Horse	5	3/1	2/28	54	90
78020	Cottontail	Sheep	400	3/1	2/28	864	90
78024	Atoka	Cattle	3	3/1	2/28	36	100
78025	Dayton	Cattle	6	3/1	2/28	72	100
78026	Antelope Sink	Horse	2	3/1	2/28	18	76
78026	Antelope Sink	Cattle	234	3/1	2/28	2,134	76
78027	Rock Tank	Cattle	4	3/1	2/28	48	100
78028	Hope Hill	Cattle	21	3/1	2/28	252	100
78031	North Hope	Cattle	1	3/1	10/31	8	100
78036	Penasco River Farm	Cattle	3	3/1	2/28	36	100
78038	East Hope	Cattle	15	3/1	2/28	135	75
78040	Sinkhole Flat	Horse	2	3/1	2/28	19	78
78040	Sinkhole Flat	Cattle	134	3/1	2/28	1,254	78
78041	Siegrest Draw	Horse	5	3/1	2/28	29	49
78041	Siegrest Draw	Cattle	950	3/1	2/28	5,586	49
78042	Gardener Draw	Cattle	17	3/1	2/28	204	100
78043	McKittrick Draw	Cattle	49	3/1	2/28	465	79
78043	McKittrick Draw	Horse	4	3/1	2/28	38	79
78046	Seven Rivers North	Horse	2	3/1	2/28	17	69
78046	Seven Rivers North	Cattle	93	3/1	2/28	770	69
78048	Deer Canyon	Cattle	438	3/1	2/28	4,573	87
78048	Deer Canyon	Horse	6	3/1	2/28	63	87
78048	Deer Canyon	Goat	150	3/1	2/28	313	87
78048	Deer Canyon	Sheep	5	3/1	2/28	10	87
78049	Collier Tank	Cattle	297	3/1	2/28	3,208	90
78050	Texas Hill	Horse	10	3/1	2/28	101	84
78050	Texas Hill	Cattle	715	3/1	2/28	7,207	84
78050	Texas Hill	Sheep	1,950	3/1	2/28	3,931	84
78051	Box Canyon	Horse	1	3/1	2/28	9	77
78051	Box Canyon	Sheep	5	3/1	2/28	9	77
78051	Box Canyon	Goat	10	3/1	2/28	19	77
78051	Box Canyon	Cattle	231	3/1	2/28	2,134	77

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
78052	Black Muhley	Cattle	275	3/1	2/28	1,518	46
78053	Seven Rivers South	Cattle	52	3/1	2/28	393	63
78054	Gyp Waterhole	Cattle	65	3/1	2/28	390	50
78055	Seven Rivers Hill	Horse	4	3/1	2/28	28	59
78055	Seven Rivers Hill	Cattle	184	3/1	2/28	1,303	59
78056	Brantley Dam	Cattle	8	3/1	2/28	96	100
78057	Three Twins North	Cattle	55	3/1	2/28	541	82
78058	Rock House	Cattle	105	3/1	2/28	1,159	92
78060	Wadcutter Draw	Horse	2	3/1	2/28	18	77
78060	Wadcutter Draw	Cattle	153	3/1	2/28	1,414	77
78061	Indian Basin	Cattle	223	3/1	2/28	2,382	89
78061	Indian Basin	Horse	2	3/1	2/28	21	89
78062	Little Box Canyon	Cattle	180	3/1	2/28	1,858	86
78062	Little Box Canyon	Horse	8	3/1	2/28	83	86
78062	Little Box Canyon	Goat	10	3/1	2/28	21	86
78063	Burro Hill	Cattle	370	3/1	2/28	3,996	90
78064	Cawley Draw	Cattle	460	3/1	2/28	4,858	88
78065	Indian Hills	Horse	1	3/1	2/28	10	81
78065	Indian Hills	Cattle	369	3/1	2/28	3,587	81
78066	Rocky Arroyo	Cattle	15	3/1	2/28	131	73
78068	Three Twins	Cattle	150	3/1	2/28	1,152	64
78069	Golden Eagle	Horse	4	3/1	2/28	7	15
78069	Golden Eagle	Cattle	71	3/1	2/28	128	15
78070	Soapberry Draw	Cattle	1	3/1	2/28	12	100
78071	Dolomite	Horse	1	3/1	2/28	3	25
78071	Dolomite	Cattle	55	3/1	2/28	165	25
78073	Hackberry Hills	Cattle	55	3/1	2/28	310	47
78075	Airport	Cattle	95	3/1	2/28	559	49
78075	Airport	Horse	5	3/1	2/28	29	49
78076	Gopher Hills	Horse	6	3/1	2/28	50	69
78076	Gopher Hills	Cattle	56	3/1	2/28	464	69
78077	McGruder Hill	Cattle	120	3/1	2/28	1,310	91
78077	McGruder Hill	Sheep	25	3/1	2/28	55	91
78077	McGruder Hill	Horse	8	3/1	2/28	87	91
78079	Beardon Canyon	Cattle	150	3/1	2/28	1,476	82
78079	Beardon Canyon	Horse	4	3/1	2/28	39	82
78079	Beardon Canyon	Sheep	130	3/1	2/28	256	82
78080	Azotea Mesa	Sheep	845	3/1	2/28	1,541	76
78080	Azotea Mesa	Cattle	120	3/1	2/28	1,094	76
78080	Azotea Mesa	Horse	10	3/1	2/28	91	76
78081	Three Forks Canyon	Cattle	1,140	3/1	2/28	8,071	59
78081	Three Forks Canyon	Horse	10	3/1	2/28	71	59
78082	Bandanna Point	Cattle	156	3/1	2/28	1,498	80
78082	Bandanna Point	Horse	2	3/1	2/28	19	80
78083	Kuykendall Draw	Cattle	285	3/1	2/28	2,770	81
78084	Dark Canyon	Horse	10	3/1	2/28	70	58
78084	Dark Canyon	Sheep	25	3/1	2/28	35	58
78084	Dark Canyon	Cattle	422	3/1	2/28	2,937	58
78084	Lower Guad Ridge	Cattle	167	3/1	2/28	1,623	81
78086	Cass Draw	Cattle	5	3/1	2/28	60	100

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
78087	Big Hackberry Draw	Cattle	285	3/1	2/28	1,676	49
78088	Harkey Crossing	Cattle	120	3/1	2/28	317	22
78089	Threemile Draw	Cattle	60	3/1	2/28	475	66
78090	Blue Spring	Cattle	6	3/1	2/28	72	100
78091	Forehand Crossing	Horse	2	3/1	2/28	24	100
78091	Forehand Crossing	Cattle	28	3/1	2/28	336	100
78092	Flume Draw Hills	Cattle	20	3/1	2/28	194	81
78094	China Draw	Cattle	47	3/1	2/28	564	100
78095	Kelly Well	Cattle	39	3/1	2/28	215	46
78096	Salt Draw	Horse	5	3/1	2/28	10	16
78096	Salt Draw	Cattle	170	3/1	2/28	326	16
78097	Willow Lake	Cattle	44	3/1	2/28	290	55
78098	Otis	Cattle	7	3/1	2/28	84	100
78099	Herradura Bend	Cattle	19	3/1	2/28	228	100
78100	Mosley Canyon	Cattle	119	3/1	2/28	643	45
78100	Mosley Canyon	Cattle	2	3/1	2/28	24	100
78101	Red Bluff Draw	Cattle	6	3/1	2/28	72	100
78102	Lower Reed Well	Horse	2	3/1	2/28	21	89
78102	Lower Reed Well	Cattle	63	3/1	2/28	673	89
78103	Tecolote Peak	Cattle	110	3/1	2/28	1,056	80
78103	Tecolote Peak	Horse	5	3/1	2/28	48	80
78104	Cottonwood Hills	Cattle	145	3/1	2/28	1,549	89
78106	Cottonwood Springs	Cattle	163	3/1	2/28	1,584	81
78106	Cottonwood Springs	Horse	1	3/1	2/28	10	81
78107	Hay Hollow	Cattle	125	3/1	2/28	1,200	80
78108	Jumping Springs	Cattle	190	3/1	2/28	1,801	79
78109	Lobo	Cattle	196	3/1	2/28	1,576	67
78110	Nuevo Canyon	Horse	2	3/1	11/30	15	85
78110	Nuevo Canyon	Cattle	44	3/1	11/30	338	85
78111	White City	Cattle	40	3/1	2/28	202	42
78112	Ewing Place	Cattle	17	3/1	2/28	192	94
78113	Upper Jurnigan Draw	Burro	5	3/1	2/28	36	60
78113	Upper Jurnigan Draw	Cattle	10	3/1	2/28	72	60
78115	Serpentine Bends	Cattle	68	3/1	2/28	571	70
78115	Serpentine Bends	Horse	2	3/1	2/28	17	70
78116	Last Chance Canyon	Horse	1	3/1	2/28	11	90
78116	Last Chance Canyon	Cattle	279	3/1	2/28	3,013	90
78117	West Hess Hills	Cattle	23	3/1	2/28	276	100
78118	Hackberry Canyon	Cattle	26	3/1	2/28	312	100
78119	Rattlesnake Canyon	Cattle	45	3/1	2/28	373	69
78120	Black River	Cattle	25	3/1	2/28	174	58
78121	Double Canyon	Cattle	75	3/1	2/28	513	57
78121	Double Canyon	Horse	1	3/1	2/28	7	57
78122	Grapevine Draw	Cattle	95	3/1	2/28	650	57

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
78124	Stetson Seep	Cattle	198	3/1	2/28	1,188	50
78126	Lower Double Canyon	Cattle	4	3/1	7/31	20	100
78126	Lower Double Canyon	Cattle	21	3/1	2/28	239	95
78130	Grapevine Spring	Cattle	6	3/1	2/28	72	100
78130	Grapevine Spring	Horse	7	3/1	2/28	84	100
78131	Thurman Draw	Cattle	110	3/1	2/28	792	60
78136	Lazy U T Springs	Cattle	235	3/1	2/28	2,312	82
78138	Slaughter Canyon	Cattle	66	3/1	2/28	404	51
78138	Slaughter Canyon	Horse	4	3/1	2/28	24	51
78141	Lower Delaware River	Cattle	70	3/1	2/28	538	64
78142	Delaware River-West	Cattle	42	3/1	2/28	504	100
78144	C P Hill	Cattle	290	3/1	2/28	2,993	86
78145	Pecos River	Horse	5	4/1	10/31	14	40
78146	Rain Springs	Cattle	135	3/1	2/28	1150	71
79001	Eagle Creek	Cattle	543	3/1	2/28	3,258	50
79001	Eagle Creek	Horse	7	3/1	2/28	42	50
79001	Eagle Creek	Sheep	5	3/1	2/28	6	50
79002	Feliz	Sheep	1,910	3/1	2/28	2,613	57
79002	Feliz	Horse	5	3/1	2/28	34	57
79002	Feliz	Cattle	100	3/1	2/28	684	57
79005	Salt House Draw	Cattle	350	3/1	2/28	2,520	60
79005	Salt House Draw	Cattle	3	3/1	2/28	36	100
79005	Salt House Draw	Sheep	1650	3/1	2/28	2,376	60
79007	Manning Dome	Cattle	32	3/1	2/28	384	100
79008	Browning Canyon	Cattle	20	3/1	2/28	240	100
79010	Telephone Canyon	Cattle	7	3/1	2/28	84	100
79011	Burnt Canyon	Cattle	16	5/1	11/30	113	100
79012	Sixteen Springs	Cattle	6	3/1	2/28	72	100
79013	McDonald Flats	Cattle	52	3/1	2/28	624	100
79016	Penasco Canyon	Sheep	100	3/1	2/28	240	100
79016	Penasco Canyon	Cattle	26	3/1	2/28	312	100
79017	Flying H	Cattle	262	3/1	2/28	503	16
79018	Cherry Flat	Sheep	100	3/1	2/28	240	100
79018	Cherry Flat	Cattle	10	3/1	2/28	120	100
79019	Penasco River	Sheep	3,065	3/1	2/28	3,237	44
79019	Penasco River	Horse	12	3/1	2/28	63	44
79019	Penasco River	Cattle	210	3/1	2/28	1,109	44
79020	Big Cherry Canyon	Cattle	42	3/1	2/24	498	100
79021	Penasco School	Cattle	202	3/1	2/28	1,091	45
79022	Penasco	Cattle	55	3/1	2/28	660	100
79023	Cherry Allotment	Cattle	5	3/1	2/28	60	100
79024	Cuevo East	Cattle	275	3/1	2/28	1,980	60
79025	Cuevo West	Cattle	35	3/1	2/28	420	100
79026	Elkins, Sam	Cattle	340	3/1	2/28	2,407	59
79027	Penasco East	Cattle	100	3/1	2/28	1,200	100
79028	Pretty Bird Hills	Cattle	1,334	3/1	2/28	9,125	57
79028	Pretty Bird Hills	Horse	1	3/1	2/28	7	57
79028	Pretty Bird Hills	Sheep	100	3/1	2/28	137	57

Allotment	Allotment Name	Livestock Kind	Livestock #	Begin Date	End Date	AUMs	Public Land %
79029	Sixteen Tank	Cattle	267	3/1	2/28	2,179	68
79030	Encino Draw	Sheep	2,160	3/1	2/28	3,629	70
79030	Encino Draw	Cattle	103	3/1	2/28	865	70
79030	Encino Draw	Horse	5	3/1	2/28	42	70
79031	Acres Lake	Cattle	423	3/1	2/28	4,061	80
79032	Long Canyon	Cattle	550	3/1	2/28	5,214	79
79032	Long Canyon	Sheep	200	3/1	2/28	379	79
79032	Long Canyon	Horse	10	3/1	2/28	95	79
79033	Buckhorn	Cattle	127	3/1	2/28	991	65
79033	Buckhorn	Horse	4	3/1	2/28	31	65
79034	South Long Canyon	Cattle	17	3/1	2/28	204	100
79036	Woodland	Cattle	80	3/1	2/28	470	49
79037	4 Mile Canyon	Cattle	9	3/1	2/28	108	100
79038	North Long Canyon	Cattle	12	3/1	2/28	144	100
79039	Champion Canyon	Cattle	115	3/1	2/28	635	46
79040	Sixteen Mile Draw	Cattle	493	3/1	2/28	2,189	37
79041	Pinon	Cattle	11	3/1	2/28	132	100
79042	Barclay Draw	Cattle	35	3/1	2/28	420	100
79043	Juniper	Cattle	21	3/1	2/28	252	100
79044	Wright Well Draw	Cattle	74	3/1	2/28	506	57
79045	Bear Canyon	Cattle	165	3/1	2/28	1,386	70
79046	Crooked Creek	Cattle	485	3/1	2/28	4,190	72
79046	Crooked Creek	Horse	10	3/1	2/28	86	72
79048	Upper Segrest Draw	Cattle	159	3/1	2/28	1,584	83
79049	Upper Packsaddle Can	Cattle	24	3/1	2/28	288	100
79050	Cherry Canyon	Cattle	26	3/1	2/28	312	100
79051	Thimble Canyon	Cattle	32	3/1	2/28	384	100
79054	Stevens Draw	Cattle	1	3/1	2/28	12	100
79054	Stevens Draw	Sheep	12	3/1	2/28	29	100
79054	Stevens Draw	Horse	1	3/1	2/28	12	100
79056	Rim	Sheep	85	3/1	2/28	204	100
79109	Crooked Canyon - II	Cattle	10	3/1	2/28	120	100
79127	Cox Canyon - II	Cattle	4	3/1	2/28	48	100
79129	4 Mile Canyon - II	Cattle	2	3/1	2/28	24	100
79225	Cox Canyon	Cattle	37	3/1	2/28	444	100
79226	Cox Canyon - E	Cattle	27	3/1	2/28	324	100
79228	4 Mile Canyon - E	Cattle	25	3/1	2/28	300	100

Table 2.2-14. CFO Suspended AUMs by Allotment

Allotment	Allotment Name	Suspended AUMs
76001	Collum	0
76002	Gladiola	1
76004	Sand Trap	22
76006	Pumpjack South	593
76007	Maljamar South	0
76008	Querecho Plains	116

Allotment	Allotment Name	Suspended AUMs
76009	Buckeye North	0
76010	Golf Course	42
76011	Laguna Tonto	78
76012	Monument Draw	1
76013	Record	38
76014	White Breaks	17

Allotment	Allotment Name	Suspended AUMs
76015	Nadine	0
76016	Jones City - North	122
76017	Eunice	0
76018	S. Monument Draw	59
76019	Monument - SW	17
76020	Lea Townsite	0
76021	Halfway	0
76022	Laguna Toston	96
76023	Bilbry Basin	16
76024	Jones City	11
76025	Oil Center North	217
76026	Oil Center South	53
76027	San Simon	788
76028	Swag	456
76029	Playa Dunes	0
76030	Deep Wells	0
76031	East Rattlesnake Can	85
76032	Jal – Northwest	166
76033	E. Rattlesnake Flat	72
76035	Medlin-Wells	2
76036	Ochoa - Northwest	2
76037	Red Tank	31
76038	Fairview	0
76039	Bobcat Draw	1,399
76040	Penn Tank	648
76041	Old Baldy	0
76042	Tobosa Flats	0
76043	Javelina Basin	0
76045	Cotton Place	0
76046	Goedeke Grazing Cell	0
76047	Monument-Jal Oilfield	16
76048	San Simon Swale	0
76049	Hart Ranch	34
76050	Cerca	0
76051	Andrews Flat	264
76052	Mexico Wells	1,152
76053	Ruth Ross Place	917
76054	Southeast Jal	0
76055	West Jackson	24
76056	Brookin West	6
76057	Jackson East	12
76058	Eddy 13	0
76060	Ironhouse Draw	4
76061	Sand Dune	0
76063	Main Canal	0
76064	Avalon Hills	0
76104	Sand Trap II	0
76106	Pumpjack South II	0
76107	Maljamar South II	24
76120	Lea Townsite II	0
76128	Swag II	0
76137	Red Tank II	0

Allotment	Allotment Name	Suspended AUMs
77001	Seco Snake	118
77002	Lake Arthur East	0
77003	Taylor Peak	0
77004	Loco Hills	0
77005	Johnson Draw	0
77006	Chalk Bluff	0
77007	Sand Hill	0
77008	Cedar Lake	458
77009	Burton North	0
77010	Hiline	143
77011	Dipper Allotment	0
77012	Twin Wells North	1,963
77013	Clayton Basin	0
77014	Burton South	0
77015	Angell Draw	0
77016	Dagger Draw	0
77017	Avalon	0
77018	Railroad	0
77019	Keystone	0
77020	Alkali Lake	19
77021	West Bilbry	145
77022	Maroon Cliffs	31
77024	Alacran Hills	2
77025	Indian Flats	0
77026	Quahada Ridge	0
77027	Livingston Ridge	0
77028	Old Indian Draw	0
77031	Brushy Knob	0
77032	Antelope Rigdge	366
77033	Nash Draw	531
77034	Remuda Basin	5
77036	Pierce Canyon	1,562
77037	Rustler Breaks	0
77038	La Huerta	0
77039	Sun Wells	528
77040	Phantom Banks	145
77041	Lower Tucker Draw	63
77042	Twin Wells	165
77043	Little Lake	242
77044	Burton Flats	14
77045	Lindsey Lake	0
77046	East Tell Talebluff	0
77047	Harroun Crossing	0
77048	Fenton Draw	0
77049	Mimosa	0
78001	Feliz River	0
78003	El Rancho Grande	0
78004	Cottonwood Acres	0
78006	Cottonwood Creek	0
78007	Brangus Ranch	0
78009	Crow	0
78011	Tumbleweed Draw	0

Allotment	Allotment Name	Suspended AUMs
78012	Dry Chaparral	0
78013	Road Bend	0
78014	West Catclaw	0
78016	West Johnson Draw	0
78017	Hope Canal	0
78020	Cottontail	0
78024	Atoka	0
78025	Dayton	0
78026	Antelope Sink	0
78027	Rock Tank	0
78028	Hope Hill	0
78031	North Hope	0
78036	Penasco River Farm	0
78038	East Hope	0
78040	Sinkhole Flat	0
78041	Siegrest Draw	0
78042	Gardener Draw	0
78043	McKittrick Draw	0
78046	Seven Rivers North	0
78048	Deer Canyon	0
78049	Collier Tank	0
78050	Texas Hill	0
78051	Box Canyon	0
78052	Black Muhley	0
78053	Seven Rivers South	0
78054	Gyp Waterhole	0
78055	Seven Rivers Hill	0
78056	Brantley Dam	0
78057	Three Twins North	0
78058	Rock House	0
78060	Wadcutter Draw	0
78061	Indian Basin	0
78062	Little Box Canyon	0
78063	Burro Hill	0
78064	Cawley Draw	0
78065	Indian Hills	0
78066	Rocky Arroyo	0
78068	Three Twins	0
78069	Golden Eagle	0
78070	Soapberry Draw	0
78071	Dolomite	0
78073	Hackberry Hills	0
78075	Airport	0
78076	Gopher Hills	0
78077	McGruder Hill	0
78079	Beardon Canyon	0
78080	Azotea Mesa	0
78081	Three Forks Canyon	0
78082	Bandanna Point	0
78083	Kuykendall Draw	0
78084	Dark Canyon	0
78086	Cass Draw	0
78087	Big Hackberry Draw	0
78088	Harkey Crossing	0
78089	Threemile Draw	0
78090	Blue Spring	0
78091	Forehand Crossing	0
78092	Flume Draw Hills	0
78094	China Draw	0
78095	Kelly Well	0
78096	Salt Draw	0
78097	Willow Lake	0
78098	Otis	0
78099	Herradura Bend	0
78100	Mosley Canyon	0
78101	Red Bluff Draw	0
78102	Lower Reed Well	0
78103	Tecolote Peak	0
78104	Cottonwood Hills	0
78106	Cottonwood Springs	0
78107	Hay Hollow	0
78108	Jumping Springs	0
78109	Lobo	0
78110	Nuevo Canyon	0
78111	White City	0
78112	Ewing Place	0
78113	Upper Jurnigan Draw	0
78115	Serpentine Bends	0
78116	Last Chance Canyon	0
78117	West Hess Hills	0
78118	Hackberry Canyon	0
78119	Rattlesnake Canyon	0
78120	Black River	0
78121	Double Canyon	0
78122	Grapevine Draw	0
78124	Stetson Seep	0
78126	Lower Double Canyon	0
78130	Grapevine Spring	0
78131	Thurman Draw	0
78136	Lazy U T Springs	0
78138	Slaughter Canyon	0
78141	Lower Delaware River	0
78142	Delaware River-West	0
78144	C P Hill	0
78145	Pecos River	0
78146	Rain Springs	0
79001	Eagle Creek	0
79002	Feliz	766
79005	Salt House Draw	0
79007	Manning Dome	0
79008	Browning Canyon	0
79010	Telephone Canyon	0
79011	Burnt Canyon	0
79012	Sixteen Springs	0

Allotment	Allotment Name	Suspended AUMs
79013	McDonald Flats	0
79016	Penasco Canyon	0
79017	Flying H	0
79018	Cherry Flat	0
79019	Penasco River	0
79020	Big Cherry Canyon	0
79021	Penasco School	0
79022	Penasco	0
79023	Cherry Allotment	0
79024	Cuevo East	0
79025	Cuevo West	0
79026	Elkins, Sam	0
79027	Penasco east	0
79028	Pretty Bird Hills	356
79029	Sixteen Tank	0
79030	Encino Draw	1,269
79031	Acres Lake	0
79032	Long Canyon	0
79033	Buckhorn	0
79034	South Long Canyon	0
79036	Woodland	0
79037	4 Mile Canyon	0

Allotment	Allotment Name	Suspended AUMs
79038	North Long Canyon	0
79039	Champion Canyon	0
79040	Sixteen Mile Draw	0
79041	Pinon	0
79042	Barclay Draw	0
79043	Juniper	0
79044	Wright Well Draw	0
79045	Bear Canyon	0
79046	Crooked Creek	0
79048	Upper Segrest Draw	0
79049	Upper Packsaddle Can	168
79050	Cherry Canyon	0
79051	Thimble Canyon	0
79054	Stevens Draw	0
79056	Rim	0
79109	Crooked Canyon - II	0
79127	Cox Canyon - II	0
79129	4 Mile Canyon - II	0
79225	Cox Canyon	0
79226	Cox Canyon - E	0
79228	4 Mile Canyon - E	0

2.2.4.2 Forecast

Implementation of Standards and Guidelines (BLM 2001a) has helped to improve rangeland condition in the planning area. The standards and guidelines, along with an active rangeland monitoring program, ensure that the rangelands in the planning area remain healthy or are making progress towards achieving standards. When allotments are not meeting standards or resource objectives, AUMs or grazing systems may be adjusted to improve rangeland health. Drought conditions and rangeland wildfire would continue to threaten rangeland health.

The future livestock grazing management would be determined according to precipitation and the corresponding condition of native and desirable upland and riparian species, riparian PFC, and overall biotic health. Increased demand from other resources may result in new challenges and opportunities in grazing management. These new demands may arise from the decrease of forage available for livestock use originating from expanded mineral development or from the need to meet habitat requirements for special-status species. Demand can also come from the expansion of recreation areas to meet the needs of a growing population or another unforeseen development.

2.2.4.3 Key Features

Approximately 10% of the BLM-managed grazing allotments in the planning area are assessed annually. Where livestock grazing has been identified as contributing to an allotment not meeting the rangeland health standards, allotment-specific guidelines are implemented to improve rangeland condition. The goal is to continue sustainable livestock use on public lands while maintaining healthy watersheds and providing habitat for wildlife.

Standards address the health, productivity, and sustainability of the BLM-managed rangelands and represent the minimum acceptable conditions for the public rangelands. Their application would be determined as resource-specific guidelines are developed. Standards are synonymous with goals and are observed on a landscape scale. They describe healthy rangelands rather than important rangeland byproducts. The achievement of a standard is determined by observing, measuring, and monitoring

appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles.

RHAs are used to take a qualitative look at the indicators of rangeland health. The three indicators that are assessed are hydrologic function, soil/site stability, and biotic integrity. The RHAs are used to provide a general view of current conditions and are not used as a sole source of information in determining management decisions. An RHA is performed along with BLM grazing permit renewals and brush management projects, giving the CFO a snapshot of rangeland health every year. On average, approximately 80% to 90% of these assessments show the land to be meeting the standards of rangeland health.

Range improvement projects are implemented to assist in achieving management goals. Those developed prior to the 1960s were financed by the grazing lessees. Later, the BLM contributed money toward projects and in some cases completely financed them. These primarily consist of reservoirs and fences. In recent years, the BLM has sought and participated in cost-shared projects with other agencies and private organizations to achieve mutual goals on public and private lands.

The CFO began running vegetation studies in 1980. These studies were set up with cooperation from the New Mexico State Land Office, the New Mexico Grazing Task Force, the BLM, the Grazing Advisory Board, and ranchers. There are currently 574 range studies within the planning area. Completion of vegetation studies measuring trend, condition, and utilization has typically coincided with each allotment's grazing permit renewal. These data have been used to show the amount of livestock an allotment can support (i.e., carrying capacity).

The type of ecological range sites in the area are influenced by soils, precipitation, and temperature. Each range site is capable of producing a certain kind of vegetative community. The amount of forage available to sustain a viable grazing operation is directly related to the type of vegetative community at each site. Section 2.8, Vegetation—Upland Vegetation and Habitats, details vegetation information and acreages for the planning area. Grazing allotment information for all 269 allotments within the planning area is shown in Appendix B.

Allotments within the "I" category would be considered key features, as additional management activities are required to improve the public land health in these areas.

2.2.4.4 Current Management

The 1988 Carlsbad RMP identified 50 Cooperative Management Plans (CMPs) and 12 AMPs to be developed to cover 420,000 acres in the planning area. Currently, 59 CMPs or AMPs addressing 918,707 acres are implemented on grazing allotments in the planning area.

2.2.4.5 Management Opportunities

Continued development of CMPs and AMPs should be promoted to ensure rangeland health standards are being met; however, no specific number of plans should be included in the revised RMP.

Grazing allotments categorized as Improve (I) should take first priority in receiving rangeland improvement funds to improve ecological condition on poor and fair rangelands.

Four-strand barbed wire should be used in place of any net wire fence for new or replaced fences. This decision would be of great benefit to the wildlife resource.

Locations for livestock removal should be re-evaluated with any changes in designated ACECs in regard to management for the relevant and important values for those ACECs.

Permitted AUMs may need to be adjusted on grazing allotments where other resource uses, oil and gas, recreation, mining, etc., have greatly affected the amount of forage available to livestock.

2.2.5 Transportation and Travel Management

Profile

Travel management is the proactive management of public access in compliance with travel-related regulations and according to the best land use management principles. It is an interdisciplinary approach to travel and transportation planning that addresses resource uses and associated access requirements to public lands and waters, including motorized, non-motorized, mechanical, and animal-powered modes of transportation.

Travel and transportation decisions include allowable types of travel and appropriate modes and conditions of travel on public lands. Pivotal to the BLM strategy for managing public lands is maintaining and improving on the BLM transportation system, which includes roads, bridges, trails, and related facilities in a manner that enhances accessibility, connectivity, and safety, while addressing public needs, preserving ecological functions, and fostering economic development.

A well-functioning transportation system is essential for resource extraction, energy production, and other land management necessities and recreational activities on BLM-administered public lands. In addition to allowing the BLM to achieve its agency goals—sustaining the health, diversity, and economic vitality of our public lands—transportation planning enables ongoing contributions to the regional and national economies.

2.2.5.1 Regional Context

The planning area is crossed by several primary highways and secondary roadways that connect communities, as well as a series of County Roads that provide the general public access to remote locations. The planning area has no interstate highways. U.S. Highway 62/180 is the principal east-west four-lane highway that serves as the primary route from Hobbs, New Mexico, to El Paso, Texas. It is a very popular route for tourists and other visitors to reach Carlsbad Caverns and Guadalupe Mountains National Parks.

New Mexico Highway 285 runs north and south between Santa Fe, New Mexico, and Fort Stockton, Texas. Other frequently traveled roads in Eddy County include Highways 137, 31, 360, 176, 128, 18, 529, and 396; U.S. Refinery Road; Illinois Camp Road; Hagerman Cutoff 217; and Red Road. Numerous temporary roads are continuously being constructed and reclaimed as the result of ongoing oil and gas operations. The County Road system is made up of 802.1 miles of paved roads and 437.3 miles of unpaved roadway.

The CFO currently maintains 68 miles of roadways within the planning area: State Line (34 miles), Hat Mesa (20 miles), Gnome Road (10 miles), and TA Mayes Road (4 miles). The larger network of unimproved, two-track, and industrial roads is continuously changing and most of these roads are not maintained by the BLM. Much of the existing transportation system is associated with industrial use, including mineral extraction and oil and gas development, and many are managed under rights-of-way.

2.2.5.2 Forecast and Trends

The combined effect of population growth in the western United States, technological advances in recreational vehicles, and increases in the recreational use of OHVs in the planning area has generated increased social conflicts and resource impacts on public lands related to motorized recreation.

Indiscriminate use of OHVs continues to increase, creating unauthorized pioneered trails. These trails can scar landscapes, dissect vital wildlife habitats, degrade cultural and paleontological resources, and cause increased erosion to fragile soils.

OHV use is expected to increase as the vehicles become more affordable and as motorized recreation appeals to a wider segment of the population, some of whom may not have the physical capability to enjoy traditional recreational activities such as hiking or backpacking. The population in the regional area

is projected to continue at approximately a 1% growth rate over the next decade (University of New Mexico Bureau of Business and Economic Research 2012), with an expected resultant increase in both motorized and non-motorized recreation. OHV designations on BLM-managed lands focus on balancing recreational opportunities and administrative access with environmental protection.

The most popular OHV usages in the planning area are four-wheel-drive sport utility vehicles, dune buggies, all-terrain vehicles (ATVs), and motorcycles. In addition, OHV use provides access for hunters and non-motorized recreational purposes such as fishing, boating, hiking, caving, mountain biking, horseback riding, and primitive camping opportunities.

OHVs are also used for a variety of administrative purposes, including livestock management, survey work, and other land management activities. Employees of government agencies, ranchers, energy companies, and utility providers are permitted users who may be allowed to use OHVs for the continued operation and maintenance of their facilities. The BLM uses OHVs for range inspections, vegetation treatments, surveys, maps, inventories, monitoring, fire suppression, project construction, and maintenance.

OHV users are creating new trails in the planning area every year, especially during the hunting season. The BLM objective is to improve a selective public lands transportation system that will contribute to a safe and adequate network of roads and trails to improve public access while protecting sensitive resources and reducing environmental impacts. Meeting current OHV management challenges will require the BLM to gather more accurate geospatial data on the transportation network and to estimates of levels of use. The BLM will also need to coordinate with partners and adjacent land managing agencies to improve consistency in transportation planning procedures. Areas classified as "limited to designated" will undergo a site-specific planning effort to designate routes through the NEPA process, with opportunities for public involvement. Final implementation will include provision of updated transportation information (e.g., maps and public documents) and on-the-ground signage depicting travel management decisions.

2.2.5.3 Key Features

Certain areas in the CFO are more likely to attract OHV use, including areas with readily available public access, existing loop trails, sandy soils or dunes, and large parcels of federal land allowing for long-distance rides coupled with varied terrain. These popular areas include Hackberry Lake, Alkali Lake, Square Lake, and game management units. Areas with high concentrations of OHV use could be heavily impacted by unregulated motorized recreation. Adverse impacts include increased soil erosion, habitat fragmentation, stream sedimentation, physical damage to vegetation, and damage to vegetative communities due to the spread of invasive plant species. Environments that are more susceptible to OHV damage include fragile karst areas, special-status species habitat, wildlife breeding areas, riparian habitats, and areas with steep slopes or sensitive soils.

In BLM-administered areas where there are unique circumstances, high levels of visitation or user conflicts, or complex resource considerations, a Travel Management Area (TMA) may be delineated to address particular concerns and prescribe specific management actions for a defined geographic area. The RMP will analyze travel management designations and delineate appropriate TMAs for the field office.

The vast majority of the CFO (2.01 million acres, or 92.6%) is currently designated as "open" to OHV use. According to BLM Manual 1626 – Travel and Transportation Management,

> technological advances in OHVs and the volume of motorized recreation on public lands have required a shift in policy where the designation or retention of large areas open to unregulated cross-country travel is no longer a viable management strategy. Open areas will be limited to a size that can be effectively managed and geographically identifiable to offer a quality OHV opportunity for participants. Expansive open areas allowing cross-country travel, without a corresponding and identified user need or demand will not be designated in RMP revisions or new travel management plans. (BLM 2011)

Approximately 153,299 acres (7%) of the planning area is designated as "limited to existing" roads and trails. This limited use designation was originally intended to allow OHV use without increasing the number of acres disturbed. Recreational users within "limited" areas cannot travel off roads and trails except during the performance of "necessary tasks," such as for game retrieval or campsite selection. Motorized off-road travel to perform administrative tasks, which includes activities such livestock management and casual use to accommodate energy related exploration, is currently allowed. However, OHV users can sometimes perceive random single passes created by necessary tasks as existing routes. This trend creates an increase in established roads and trails. In areas where vehicle use is limited to existing roads and trails, it is difficult to manage user-created routes because subsequent users can legally operate on non-designated routes.

Nearly 6,000 acres (0.3%) are closed to motorized vehicle use. Table 2.2-15 lists the travel designations within the planning area.

Table 2.2-15. Travel Designations in the Planning Area

Designation	Acreage
Open areas: vehicle travel is permitted both on and off roads if the vehicle is operated responsibly in a manner unlikely to cause significant undue damage to the environment	2,011,506
Closed areas: travel by vehicles is prohibited	5,943
Limited areas: use is limited to existing roads and vehicle routes in existence as of 1988	153,299
Total	***2,170,748***

Source: BLM 1988.

The route network within the planning area is composed of County Roads, BLM-maintained roads, primitive two-track routes, and OHV trails. The maintenance and use of these travel routes has become an integral part of BLM travel management, as these roads are used for both recreational and non-recreational purposes. The BLM manages approximately 150 miles of OHV trails in the CFO.

2.2.5.4 Current Management

Partially due to the large acreages currently classified as open, travel management planning has historically been a low priority within the CFO. A Travel Management Plan has not yet been developed within the planning area. The OHV designations assigned in the current RMP do not adequately address OHV issues and resource concerns within the planning area.

2.2.5.5 Management Opportunities

The majority of the CFO is in need of current route inventories. Route inventories completed to date include lands within all proposed ACECs in the planning area.

New guidance will likely limit the acreage designated in open areas and increase the acreage in the limited to designated category. Travel Management Plan development and implementation would include evaluation of OHV designations and delineation of TMAs. Once adequate data on transportation resources have been collected, routes in limited to designated areas would be analyzed for inclusion in the travel network.

The BLM would collaborate with local organizations and stakeholders throughout the travel management process. Each TMP would include additional public comment periods for site-specific NEPA actions. Authorized uses (i.e., uses under a permit, such as a grazing permit, or for mineral development) may be stipulated under the programs managing for the type of administrative use, in consideration of other resource values. Routes that are redundant, unnecessary, or unsustainable may be closed and reclaimed. Some routes may be authorized specifically for administrative use and closed to public or recreational use. Designated routes would be numbered and signed as TMPs for individual areas are completed.

2.2.6 Recreation and Visitor Services

Profile

As one of the USDI four primary missions, recreation is an important BLM program. The objectives of the BLM outdoor recreation program are to 1) provide a broad spectrum of resource-dependent recreational opportunities to meet the needs and demands of visitors to public lands, 2) foster agency-wide efforts to improve service to the visiting public, 3) maintain high-quality recreation facilities to meet public needs and enhance the image of the agency, and 4) improve public understanding and support of the BLM by effectively communicating the agency's multiple-use management programs to the recreation visitor.

Recreation planning seeks to produce opportunities for visitors to experience certain physical and social outcomes. Recreational values are considered in management through the understanding that settings provide opportunities for experiences created by visitors and that a diversity of settings provides the basis for quality recreation experiences. The responsibility for managing for various types of settings lies with the land management agency. Settings are composed of a variety of attributes such as biophysical (human-induced and natural environment), social (visitor type and density), and managerial (regulations and recreation facilities). By providing a diversity of settings with varying attributes across the planning area, and making visitors aware of those opportunities, public land managers could ensure that visitors could produce quality experiences (McCool et al. 2007). Decisions for the recreation program should be responsive to past changes and adaptive to future changes in technology, sources of information, demographics, and population dynamics. Recreation use is managed to protect natural and cultural resource values, promote public use and enjoyment of public lands, and promote educational opportunities related to public lands.

Land use planning decisions for public lands establish desired outcomes (goals and objectives) and allowable uses and actions anticipated to achieve those outcomes. The CFO may designate appropriate parcels as Recreation Management Areas (RMAs) for managing recreation and visitor services and classify these as either an SRMA or an Extensive Recreation Management Area (ERMA). Both types of areas are recognized as producing quality recreation opportunities and offering beneficial outcomes for recreation participants, recreation-tourism partners, visitor service providers, and communities.

Recreation and visitor services objectives in RMAs are recognized as a primary resource management consideration, and specific management is required to protect the recreation opportunities. The RMA designation is based on recreation demands and issues, recreation setting characteristics (RSCs), resolving use/user conflicts, ensuring compatibility with other resource uses, and addressing resource protection needs.

The majority of BLM-administered lands in the planning area consider recreation as a component of multiple-use management, thus the planning area will predominately consist of public lands outside RMAs. Such lands are managed to meet basic recreation and visitor services and resource stewardship needs. Recreation is not emphasized on these lands; however, recreation activities may occur, except on those lands closed to public use.

However, several key areas have been identified for exceptional or quality recreational opportunities and identified for analysis in the RMP as SRMAs or ERMAs.

1. SRMAs: An SRMA is an administrative unit where existing or proposed recreation opportunities and RSCs are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation. An SRMA is managed to protect and enhance a targeted set of activities, experiences, benefits, and desired RSCs. The RMP may subdivide an SRMA into recreation management zones (RMZs) to further delineate specific recreation opportunities. Within an SRMA, recreation and visitor services management is recognized as the predominant RMP focus, where specific recreation opportunities and RSCs are managed and protected on a long-term basis.

2. ERMAs: An ERMA is an administrative unit that requires specific management consideration in order to address recreation use, demand, or recreation and visitor services program investments. An ERMA is managed to support and sustain principal recreation activities and associated qualities and conditions. Management of ERMAs is commensurate with the management of other resources and resource uses. While generally unnecessary, ERMAs may be subdivided into RMZs to ensure recreation and visitor services are managed commensurate with other resources and resource uses.

2.2.6.1 Current Level and Location of Use

Public recreational opportunities located in southeastern New Mexico exist on lands managed by the BLM, NPS, USFS, Bureau of Reclamation, New Mexico State Parks Division, and local governments. Predominant uses within the planning area include dispersed uses such as hunting, camping, hiking, and recreational OHV use.

The Recreation Management Information System (RMIS) is the official record for outdoor recreation information on public lands managed by the BLM and tracks a wide variety of recreation use statistics, including visitor use, program trends, Special Recreation Permits (SRPs), and partnerships at the field level. In Fiscal Year 2011, the CFO had approximately 109,696 visitors for a total of approximately 91,616 visitor days.[3] Table 2.2-16 identifies areas within the planning area for which visitor use is entered into the RMIS.

Table 2.2-16. Recreational Visits and Visitor Days, Fiscal Year 2011

Site	Site Type	Visits	Visitor Days
Management Areas			
Alkali Lake OHV Area	OHV area	580	292
Black River	Water access	6,995	3,381
Carlsbad Caves	Dispersed use	40	21
Chosa Draw	Cave	250	174
Cueva Escarpment	Cave	3	1
Dark Canyon SMA	Cave	2	1
Delaware River	Water access	550	293
Fence Canyon Cave Complex	Cave	10	9
Hackberry Lake OHV Area	OHV area	6,850	4,909
La Cueva Trails Area	Trailhead	390	172
McKittrick Hill	Cave	1	1
Parks Ranch Cave	Cave	255	53
Pecos River Corridor	Water access	2,850	2,230
Querecho Plains	Intensive use area	1,410	711
Yeso Hills Site	Campground	770	780
Dispersed Areas			
Dispersed	Dispersed use	88,700	78,567
Dispersed	Caves	40	21
Total		***109,696***	***91,616***

Landscape attributes that enhance opportunities for recreation and attract visitors to BLM-managed land include open spaces, diverse wildlife, diverse vegetation, riparian areas, scenic vistas, panoramic views, unique geology (including portions of the Permian Reef Complex), varied terrain (steep mountains, rolling hills, arroyos, canyons, and grasslands), waterways (lakes, rivers, and streams) and world-class caves. Landscape diversity within the planning area provides various opportunities for sightseeing, caving, wildlife viewing, plant viewing, hiking, backpacking, boating, swimming, picnicking, horseback riding, photography, sport shooting, hunting, fishing, rock climbing, biking, OHV use, geocaching, orienteering, camping, and solitude. Recreation activities on BLM-managed lands are widely varied and dispersed.

[3] One visitor day is equivalent to 12 hours spent in the planning area.

The CFO issues SRPs to authorize certain recreational uses of public lands and related waters managed by the BLM. Permits are issued for commercial use, competitive use, vending, special area use, and certain organized group activities or events. Organized groups and special area permits are usually issued in high use areas or where recreation use requires special BLM management. Commercial SRPs are also issued as a mechanism to provide a fair return to the United States for the commercial recreational use of public lands. The CFO administers approximately three SRPs annually for outfitter/guides and OHV events. COAs are attached, as appropriate, to assure compatibility of projects with recreation management objectives and the BLM's policy of multiple use. Recreational caving in certain caves is also subject to a permit system, and the CFO issues approximately 80 to 90 SRPs annually for recreational caving. Table 2.2-17 contains the SRPs issued during the 2009–2010 season.

Table 2.2-17. Special Recreation Permits, 2009–2010

Permit Holder	Type of Activity	Location
Desert Rough Riders	ATV and motocross racing	Hackberry Lake OHV Area
Runyan Ranch	Horseback rides	Hope
Brugman Outfitter/Guide	Hunting outfitter/guide	Carlsbad area

The 1988 Carlsbad RMP identified 12 areas with recreation values and opportunities that warrant special management attention. These 12 areas are located within the following SMAs: Dark Canyon, Lonesome Ridge, Pecos River Corridor, and nine Cave Management Units (see Section 2.1.4). Recreational caving occurs in the Dark Canyon SMA, Dry Cave RNA, Chosa Draw ACEC, Fence Canyon Cave Complex, Lonesome Ridge SMA, and McKittrick Hill Cave Complex (Maps 3.12, 3.14 and 3.15).

The planning area contains the following developed recreation areas and associated facilities:

- **Cottonwood Day Use Area of the Black River SMA:** two single picnic shelters, one group picnic shelter, pipe rail fencing, a wildlife viewing deck, trailhead kiosk, six picnic tables, a vault toilet, a semi-paved parking lot, a water fountain, and two trash receptacles.
- **Guadalupe National Backcountry Byway:** two picnic shelters, cable fencing, two kiosks, landscaping, three picnic tables, and graveled parking areas.
- **The La Cueva Non-Motorized Trail System:** graveled parking area and trail signage
- **Hackberry Lake Dunes Complex OHV Area:** nine single picnic shelters, two group picnic shelters, picnic tables, fire rings or grills, trash receptacles, pipe rail fencing, an informational kiosk, a graveled parking lot, a vault toilet, and site roads.
- **Hackberry Lake Trail System OHV Area:** two single picnic units, three group picnic units (units include a shelter, tables, a fire ring or grill, and trash receptacles), a kiosk, a vault toilet, a graveled parking lot, and site roads.

2.2.6.2 Forecast

Increased energy development and mining activities are expected to decrease the quality of recreational opportunities of BLM-managed lands currently popular for dispersed recreation. Key areas include riparian areas of the Pecos, Black, and Delaware Rivers; large, shifting sand dunes within the district (developed and undeveloped); the Guadalupe Escarpment Scenic Area; game management areas; caves; and OHV trails.

A gradual shift to developed or specially designated areas is anticipated for activities and events, including OHV activities, equestrian use, mountain biking, hiking, fishing, swimming, caving, geocaching, recreational shooting, picnicking, photography, and wildlife viewing. Hunting use would be closely related to the quality of adapted wildlife habitat as development occurs. The BLM has received recent requests from the public seeking development of equestrian trails and expansion of OHV areas.

2.2.6.3 Key Features

Key features in the planning area are areas that experience high visitation levels and/or public demand for dispersed or developed recreational uses and have the potential to accommodate such demand or provide unique recreational opportunities.

Black River Management Area and Cottonwood Day Use Area

The Black River Management Area consists of 1,260 acres of BLM-managed land at the headwaters of the Black River in southwestern Eddy County. The area was acquired by the BLM from the Nature Conservancy after the 1988 RMP was approved. The BLM currently manages more than 3 miles of the river and adjacent lands on both sides of the river. The CFO has developed specific management goals for this unique desert resource. Recreation developments facilitate opportunities such as environmental education, wildlife viewing, picnicking, fishing, swimming, and hiking. A fenced parking area, picnic tables, grills, shelters, vault toilet, accessible path, viewing deck, kiosk, and interpretive signage are provided for visitor convenience and enjoyment. Motorized vehicle use in the area is limited to designated routes and trails. A few isolated areas are closed to motorized vehicle use due to environmental concerns.

Hackberry Lake OHV Area

The Hackberry Lake OHV Area is located approximately 20 miles northeast of Carlsbad. Roughly 55,800 acres are designated for a variety of OHV uses. The designated area includes a single- and double-track vehicle trail system and a sand dune complex. Visitors can observe the natural desert scenery of rolling sand dunes, deep arroyos, and open desert plains. Various types of native wildlife and vegetation are found in the area. The Hackberry Lake OHV Area contains 53,572 acres of BLM-managed lands. Visitors frequent the Hackberry Lake OHV area from nearby population centers, including Carlsbad, Artesia, Hobbs, and Roswell. Out-of-state visitors are also common as the annual Desert Rough Riders ATV/motocross race attracts many regional competitors and spectators.

La Cueva Non-Motorized Trail System

The La Cueva Non-Motorized Trail System is partially located within the city limits of Carlsbad on the southwest side of the city. The trails were generally created by the local mountain biking community and have gained popularity with other users. Various recreational communities currently use the trails for hiking, mountain biking, and horseback riding.

This area was informally developed after the 1988 RMP and has not been designated as an RMA. The BLM acknowledged the use of the area and has collaborate with local user groups to develop and improve the area. Two National Public Lands Day activities have been hosted at the site to address a persistent public dumping problem. The International Mountain Bike Association Traveling Trail Crew visited the site twice and assisted with the design and maintenance of the trails. Grant funding provided trail maintenance by the Rocky Mountain Youth Corp in 2010 and 2011.

Current improvements include a designated parking area, a trailhead, and trail signs. Other partners in the development of the area are the Eddy County Road Department and the City of Carlsbad Chamber of Commerce. The site covers approximately 2,200 acres and contains 18 miles of existing trails. The trails wind through the rolling limestone foothills of the Guadalupe Mountains and the rugged Chihuahuan Desert environment. Abundant wildlife can be seen in the area. Populations that visit the multi-purpose trail system most often come from Carlsbad, Roswell, and Albuquerque, New Mexico, and El Paso, Lubbock, and Midland, Texas.

Pecos River Corridor

The Pecos River Corridor contains approximately 6,000 acres. It includes a 0.5-mile corridor of BLM-administered lands along the Pecos River, as well as lands surrounding the Red Bluff Reservoir. The area emphasizes water-based recreation along the free-flowing Pecos River. It provides for semi-primitive motorized recreation opportunities. Lands near Red Bluff Reservoir are used for day and overnight use,

including camping, picnicking, boating, fishing, horseback riding, and wildlife observation. Management objectives identified in the 1988 RMP provide protection for scarce water-based recreation, public access, and protection of natural values while allowing for semi-primitive motorized recreation and soil and vegetation restoration.

2.2.6.4 Current Management

Outdoor recreation resources and opportunities are documented in relevant EAs. Site-specific EAs analyze the significance of proposed projects in terms of effects on recreation resources. Stipulations are attached to appropriate land use authorizations to minimize conflicts with recreation management objectives. Such COAs are currently assigned in Hackberry Lake and La Cueva Trails areas. The existing SRMAs and ORV areas are shown on Map 2.14 in Appendix A.

Recreation facility development has historically occurred when an identified need cannot or is not being provided by the private sector.

2.2.6.5 Management Opportunities

Not all public demands for recreation are being met at this time. Equestrian trails have been proposed by the public and could be established in certain areas, such as La Cueva Hills and the Pecos River Corridor.

Travel management stipulations could be assigned to trails in developed areas such as the Hackberry Lake SRMA to minimize safety concerns in areas where motorized recreation, energy development, and mining activities interface.

Pasture rotation for livestock grazing could be considered in certain areas during hunting seasons and during special use OHV events in order to minimize user conflicts. The BLM would address permitting, identification, monitoring, and timely removal of “temporary” surface pipelines on land and water to prevent access issues that may result from cumulative impacts.

RAMPs would be prepared for all designated SRMAs and some ERMAs. The plans would establish measurable, outcome-focused objectives for SRMAs/RMZs. These objectives would define specific recreation opportunities (i.e., activities, experiences, and benefits derived from those experiences) and address levels and types of management actions necessary to achieve the recreation objectives in the approved RMP revision. Management objectives for the SRMAs would include facilities development and intensive visitor management. In ERMAs, the RMP revision would establish measurable objectives that define the recreation activities and associated qualities and conditions for recreation and visitor services management focus. On public land where recreation is not the principal management objective, management direction would provide for access, visitor information, and resource protection.

2.2.7 Land Tenure

Profile

2.2.7.1 Current Level and Location of Use

As mandated by FLPMA, BLM-managed lands are retained in federal ownership, with the exception of lands that have potential for disposal as identified in a land use plan. BLM-managed lands have potential for disposal when they are isolated or difficult to manage, or meet public objectives such as community expansion or economic development. BLM-managed lands classified as withdrawn, reserved, or otherwise designated are not available for sale or exchange. Most requests from private individuals to acquire BLM-managed lands involve lands surrounded by, or adjacent to, their private lands. These requests generally result as a matter of proximity (e.g., to farm operations, grazing, or residential properties) and the need to either expand operations or make operations more efficient.

The following are descriptions of land tenure adjustments as allowed under FLPMA:

- **Sale:** Sale of BLM-managed lands must meet the disposal criteria set forth in Section 203 of FLPMA. BLM-managed lands determined suitable for sale are offered on the initiative of the BLM and sold at not less than fair market value. These lands suitable for sale must be identified in the land use plan. A plan amendment must occur if the specific parcels to be disposed of by sale that are not identified in the current land use plan.
- **Acquisition:** Acquisition of private land, or interest in land, is pursued to facilitate various resource management objectives and is authorized under Section 205 of FLPMA. Acquisitions, including conservation easements, are generally completed through exchanges, purchases (including Land and Water Conservation Fund [LWCF]), donations, or receipts from the Federal Land Transaction Facilitation Act of 2000 (FLTFA) (43 USC 41 § 2301 et seq.).
- **Exchange:** Land exchanges, as authorized under Section 206 of FLPMA, are initiated either in direct response to public demand or by the BLM to improve management of the public lands. Public lands need to be identified as suitable for exchange in a land use plan. On a case-by-case basis, private and state lands are considered for acquisition through exchange of suitable public land, where the exchange is in the public interest, and where the lands acquired have higher resource or public values than the lands that are being exchanged.

BLM-managed lands that meet the retention criteria typically include large blocks of lands, but also may include areas in which there are high public values suitable for BLM management. Lands outside these management areas are generally available for the full range of land ownership adjustment opportunities including retention, exchange, sale, or transfer. Land ownership adjustment proposals in the planning area are analyzed in project-specific reviews. BLM-managed lands are fairly well consolidated in Eddy County, and a mixed-ownership land pattern predominates the majority of Lea County and the portion of Chaves County managed by the CFO.

Land tenure adjustments are important to state and local governments to consolidate ownership and make lands available for public purposes. Few land tenure adjustment actions are initiated in the planning area because of the amount of BLM-managed lands leased for oil and gas. The existing surface management pattern within the planning area is shown on Map 1.1 Carlsbad FO RMP Planning Area. The FLTFA allows for the proceeds from the disposal of BLM-managed lands to be used by the BLM to acquire inholdings and other lands that would improve resource management ability. The proceeds may also be used to complete appraisals and satisfy other legal requirements for the sale or exchange of BLM-managed land identified for disposal. This act applies to BLM-managed lands identified in current land use plans as suitable for disposal as of July 25, 2000. BLM-managed lands currently identified as available for disposal in the existing planning documents total 218,414.72 acres and are shown in Map 3.11 Land Tenure Disposal Zones.

Since the adoption of the 1988 RMP, several adjustments to surface ownership have occurred as the result of certain realty actions, mainly exchanges and sales. Lands transferred out of BLM management are not depicted as BLM-managed land on Map 1.1.

Since 1988, 13 land sales have occurred, totaling 6,016.95 acres (BLM 2014). The purpose of most of the sales was to resolve trespasses or accomplish sales through the FLTFA. The primary means of land ownership adjustment within the planning area has been through land exchanges. Four land exchanges within the planning area were completed since 1988. As a result of those actions, 57,132 acres left federal ownership and 3,515.69 acres came into federal ownership.

Public lands are fairly well consolidated in Eddy County and the western portion of Lea County; whereas, very little BLM-managed land exists in the eastern half of Lea County. A fragmented land pattern predominates the southwest corner of Chaves County managed by the CFO. The existing surface management pattern within the planning area is shown on Map 1.1.

2.2.7.2 Forecast

Land tenure adjustment could change the amount of BLM-managed land in the planning area; however, based on past trends, changes to land tenure would not significantly increase or decrease the amount of

land administered by BLM. The CFO recognizes the amount of private land in the planning area is limited, and that opportunities for growth or preservation may need to be accommodated through use of either federal or state trust land (see Map 1.1). As part of the lands and realty program, the BLM would continue to coordinate disposals with state, county, and local agencies, as appropriate, to maintain consistency with existing plans for the planning area. Opportunities to acquire non-federal land could be used to protect important resource values and meet objectives for SMA designations.

2.2.7.3 Current Management

The 1988 Carlsbad RMP identified areas available for land tenure transactions. Approximately, 220,700 acres were identified for disposal, including 4,000 acres east of Carlsbad for industrial development. Thirteen land sales have occurred for a total of 6,016.95 acres since 1988 (BLM 2014). The primary means of land ownership adjustment within the planning area have been through exchange. Four exchanges affecting federal and/or non-federal lands within the CFO decision area have been completed since 1988. Of those actions, 57,132 acres left federal ownership and 3,515.69 acres came into federal ownership. Public lands were to be available for exchange to accommodate the NPS's objective to acquire a private inholding within the Carlsbad Caverns National Park. This land tenure transaction has not occurred and the park has not expressed any interest in the BLM pursuing an exchange.

For private land acquisition, the 1988 Carlsbad RMP identified 1,080 acres of private land and 2,120 acres of state land in order to protect important resource values and meet objectives for SMAs. State land acquisition proposed in the Carlsbad 1988 RMP included the Laguna Plata Cultural Resource Management Area (1,280 acres) and Pecos River/Canyons Complex ACEC (840 acres). These acquisitions did not take place.

All areas identified for retention in the 1988 Carlsbad RMP are still under BLM management.

2.2.7.4 Management Opportunities

The 1988 Carlsbad RMP identifies large areas of public land and includes lands that may not reflect the CFO's current preference for areas available for sale or exchange. Rather than defining large regions as disposal zones, zones could be narrowed or specific tracts could be defined where there is public interest for purchase or exchange. The criteria for lands available for sale or exchange could be updated and refined. For example, the BLM may not consider land tenure transactions that would create split estate.

Lands not available for land tenure transactions should be identified. This could include lands such as those designated as ACECs.

2.2.8 Forestry and Woodland Products

There are no lands within the planning area that are managed for forestry or woodland products.

2.3 SPECIAL DESIGNATIONS

2.3.1 Areas of Critical Environmental Concern

Profile

An ACEC is defined in FLPMA as an area within the public lands where special management attention is required to protect and prevent irreparable damage to important historical, cultural, and scenic values; fish and wildlife and other natural systems or processes; and life and safety from natural hazards. The BLM prepared regulations for implementing the ACEC provisions of FLPMA. These regulations are found at 43 CFR 1610.7-2(b).

The ACEC designation indicates to the public that the BLM recognizes that an area has significant values and has established special management measures to protect those values. In addition, the ACEC designation also serves as a reminder that significant values or resources exist that must be accommodated for future management actions and land use proposals. The designation may also support a funding priority. Although federal, state, and private lands may be located within the boundaries of an ACEC, only BLM-managed lands are managed under the ACEC prescriptions.

The ACEC designation is an administrative designation that is accomplished through the land use planning process. It is unique to the BLM in that no other agency uses this form of designation. The intent of Congress in mandating the designation of ACECs through FLPMA was to give priority to the designation and protection of areas containing unique and significant resource values. ACECs differ from other special management designations, such as WSAs, in that ACEC designation by itself does not automatically prohibit or restrict uses. The one exception is that a mining plan of operation is required for any proposed mining activity within a designated ACEC.

An area meets the relevance criteria if it contains one or more of the following:

- A **significant historic, cultural, or scenic value** such as rare or sensitive archeological resources and religious or cultural resources important to Native Americans.
- A **fish and wildlife resource** such as habitat for endangered, sensitive, or threatened plant species, or habitat essential for maintaining species diversity.
- A **natural process or system** such as endangered, sensitive, or threatened plant species; rare, endemic, or relic plants; plant communities that are terrestrial, aquatic, or riparian–wetland; or rare geological features.
- **Natural hazards** such as areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs. A hazard caused by human action may meet the relevance criteria if it is determined that the hazard has become part of a natural process.

The value, resource, system, process, or hazard previously described must have substantial significance and values to satisfy the importance criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

- It has more than locally significant qualities that give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.
- It has a quality or circumstance that makes it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.
- It has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA.
- It has qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare.

Table 2.3-1 lists the ACECs within the CFO. Map 3.14 Areas of Critical Environmental Concern in Appendix A shows the existing ACECs within the CFO.

Table 2.3-1. Areas of Critical Environmental Concern

Name	Acres	Reason for Designation
Blue Springs	600	Riparian, federally listed fish species
Chosa Draw	2,200 1	Caves, riparian, sensitive soils, recreation, education, scientific studies
Dark Canyon	1,4802	Visual, natural resource values, caves, threatened and endangered plant species
Lonesome Ridge	2,990	Natural values, recreation, wildlife, scenic
Pecos River/Canyons Complex	5,190	Cultural, scenic, research opportunities, wildlife habitat

[1] The 1988 Carlsbad RMP identified 2,200 acres in the Chosa Draw ACEC; however, the subsequent management plan identified 2,260 acres (BLM 1988).
[2] The 1988 Carlsbad RMP identified 1,480 acres in the Dark Canyon ACEC; however, the subsequent management plan identified 1,550 acres (BLM 1988).

Blue Springs ACEC

This 160-acre ACEC was designated to protect the grasslands immediately adjacent to Blue Springs, which provides habitat for the only known remaining population of Pecos gambusia in New Mexico.

Chosa Draw ACEC

This ACEC contains 2,200 acres of hydrologically important gypsum karst. It has significant caves, sinking streams, springs, and numerous sinkholes. The area is sensitive to soil erosion and surface-disturbing activities. The cave resources provide recreational opportunities, as well as habitat for cave-adapted animal species and point sources for groundwater recharge. Primary management objectives are to protect the sensitive karst resources and fragile surface from subsurface interactions. Of primary importance is protection of this significant hydrologic area. Other management goals are to enhance cave-based recreation, education, and scientific use opportunities.

Dark Canyon ACEC

The Dark Canyon ACEC (1,480 acres) contains highly sensitive visual and natural resource values that include deep rugged canyons with sheer limestone cliffs, several significant and fragile caves, and threatened and endangered plant species. The area abuts the Carlsbad Caverns National Park WA. Management objectives for this ACEC are to emphasize protection of high visual and natural resource values and rare plant species while still providing for other multiple resource uses. All lands within the ACEC have been withdrawn from mineral entry and oil and gas leasing subject to prior existing rights.

Lonesome Ridge ACEC

This 2,990-acre area is part of the Capitan Reef Complex, considered the world's foremost example of a Permian-age fossil reef. The area displays spectacular rugged scenery with sheer limestone canyon walls over 1,500 feet high. The area contains relict Douglas-fir trees and other species of rare, state sensitive, and federally endangered plants and animals. Bigtooth maples add flares of fall color. The area provides for primitive non-motorized recreational opportunities, including cave exploration, hiking on semi-developed trails, hunting, and outstanding opportunities for wildlife and scenic photography. The primary objective for this SMA is to provide adequate protection of the area's outstanding natural values in an unaltered condition.

Pecos River/Canyons Complex ACEC

The Pecos River/Canyons Complex ACEC encompasses approximately 5,190 acres. Two large distinctive canyons, Pierce and Cedar, converging with one of the remaining free-flowing sections of the Pecos River provide a unique landscape in southeastern New Mexico. The close association of the canyons and river display a combination of values, including unique riparian habitat not elsewhere evident in the desert grassland of southeastern New Mexico; the convergence of many diverse soil types such as deep sands, gypsum soils, gravelly loam, loamy bottomlands, and active sand dunes; distinctive and virtually unspoiled scenic values, particularly in the two canyons; large and culturally complex

archaeological sites suggesting occupation over a long period of time (Archaic, Jornada, and Mogollon periods, 7,000 B.C.–A.D. 1350); and prime wildlife habitat for several endangered wildlife species. The canyons could provide vegetative habitats with high potential for supporting state-listed endangered plant species. Management objectives for this ACEC will emphasize protection of the sensitive and unique natural and cultural resources, as well as scenic qualities. It will also provide research opportunities while still allowing other compatible resource uses.

2.3.1.1 Current Management

Blue Springs ACEC

The Blue Springs ACEC was designated in the 1988 Carlsbad RMP to protect the grasslands immediately adjacent to Blue Springs, which provides habitat for the only known remaining population of Pecos gambusia in New Mexico. Private land within this Blue Springs ACEC was proposed for acquisition during the 1988 RMP. The acquisition of the land never occurred so the BLM only holds 160 acres of BLM surface acres of the land within the Blue Springs ACEC. The following management prescriptions were applied:

- Apply NSO stipulation to future oil and gas leases.
- Avoid future right-of-way actions through the riparian habitat areas.
- Withdraw from mining claim location and close to mineral material disposal and mineral leasing.
- Designate closed to OHV use and implement plan to enforce designations.
- Restrict fire suppression and geophysical operations to comply with OHV designations.
- Restrict surface disturbance including plant collections and camping within the area.
- Remove livestock from areas to allow rapid recovery of riparian habitat. Grazing management practices to enhance riparian habitat will be studied and implemented following initial recovery of the habitat areas.

Chosa Draw ACEC

The Chosa Draw ACEC was designated in the 1988 Carlsbad RMP. To protect and enhance the important gypsum karst, sinking streams, springs, and numerous sinkholes, the following management prescriptions were applied:

- Implement NSO stipulation to 1,160 acres for future oil and gas leases.
- Avoid future right-of-way actions within 1,160 acres.
- Restrict surface disturbance throughout the area to minimize erosion and impacts to cave and hydrologic resources.
- Close the entire area, including an additional 440 acres of private surface federal mineral estate, to solid mineral leasing and mineral material disposal.
- Withdraw 1,160 acres form mining claim location.
- Designate entire area limited to OHV use to designated routes.
- Restrict fire suppression and geophysical exploration to conform to OHV limitations.
- Attempt to acquire 480 acres of non-federal surface estate.
- Manage 720 acres to conform to VRM Class III guidelines and the remaining 1,480 acres under VRM Class IV guidelines.

Dark Canyon ACEC

The 1,480-acre Dark Canyon ACEC was designated in the 1988 Carlsbad RMP for its sensitive visual and natural resource values, which include deep rugged canyons with sheer limestone cliffs, several significant and fragile caves, and threatened and endangered plant species. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases on 3,220 acres.
- Avoid future right-of-way actions within 3,950 acres.
- Restrict surface disturbance to minimum visual and environmental impacts 3,950 acres.

- Apply seasonal drilling limitations on 730 acres within the ACEC to reduce visual impacts from Carlsbad Caverns National Park during the heavy visitor use season.
- Close to mineral material sales - 3,950 acres.
- Limit OHV use to designated routes.
- Restrict fire suppression and geophysical exploration to conform to OHV limitations.
- Manage 3,220 acres to conform to VRM Class II guidelines and 730 acres under Class III prescriptions.

Lonesome Ridge ACEC

The 2,990-acre Lonesome Ridge ACEC was designated in the 1988 Carlsbad RMP for being considered the world's foremost example of a Permian-age fossil reef. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases.
- Avoid future right-of-way actions.
- Withdraw from future mining claim location and close to solid mineral leasing and mineral material sales.
- Restrict surface disturbance that would diminish the area's natural and scenic values.
- Designate closed to OHV use and implement plan to enforce designations.
- Restrict fire suppression and geophysical exploration to conform to OHV closure.
- Manage under VRM Class I objectives.

Pecos River/Canyons Complex ACEC

The 5,190-acre Pecos River/Canyons Complex ACEC was designated for two distinctive canyons (Pierce and Cedar) converging with one of the remaining free-flowing sections of the Pecos River. This ACEC provides for a unique landscape in southeastern New Mexico. The following management prescriptions were applied:

- Implement NSO stipulation to 4,100 acres of future oil and gas leases.
- Avoid future right-of-way actions within 4,100 acres.
- Restrict surface disturbance throughout the ACEC to minimize environmental impacts and mitigate adverse effects to cultural resources through extensive excavation.
- Withdraw from mining claim location and close to solid mineral leasing 4,100 acres.
- Close the entire 5,190 acres to mineral material disposal.
- Attempt to acquire 960 acres of non-federal surface and 320 acres of non-federal minerals estate.
- Designate 1,215 acres closed to OHV use and the remaining 3,975 acres limited to designated routes. Implement plan to enforce designations.
- Restrict fire suppression and geophysical exploration to conform to OHV limitations.
- Remove livestock from 2,320 acres.
- Manage 4,100 acres to conform to VRM Class II guidelines with the remaining 1,090 acres under VRM Class III prescriptions.

2.3.1.2 Management Opportunities

Public and internal scoping comments included recommendations to increase the number of ACECs and modify existing ACECs. All nominated and existing ACECs, ONAs, RNAs, and SMAs will be evaluated for relevant and important values. Four ACEC nominations were submitted by the New Mexico Wilderness Alliance (Table 2.3-2). These nominations will be evaluated to determine relevant and important values.

Table 2.3-2. New Mexico Wilderness Alliance ACEC Nominations

Name	Acreage	Proposed Relevant and Important Values
Birds of Prey Grasslands	340,500	Wildlife

Name	Acreage	Proposed Relevant and Important Values
Carlsbad Chihuahuan Desert Rivers	103,800	Cultural, fish, wildlife, natural systems or process
Desert Heronries	48,500	Wildlife
Salt Playas	58,100	Cultural, wildlife

Boundaries will be identified for any ACEC nomination determined to have relevant and important values, and the area will be evaluated to determine if special management is necessary to protect those values. ACEC designations and any special management identified for them apply only to BLM-managed lands. In the event state or private land within the ACEC boundary is acquired, the acreage would be added to and managed as part of the ACEC.

2.3.2 Outstanding Natural Areas

Profile

The Outstanding Natural Area (ONA) designation was established by Congress primarily to protect unique scenic, scientific, educational, and recreational values. Recreation activities focus on education and interpretation of the ONA's unique resources (BLM 2012c).

2.3.2.1 Lonesome Ridge ONA

This 2,990-acre area is part of the Capitan Reef Complex, considered the world's foremost example of a Permian-age fossil reef. The area displays spectacular rugged scenery with sheer limestone canyon walls over 1,500 feet high. The area contains relict Douglas-fir trees and other species of rare, state sensitive and federally endangered plants and animals. Bigtooth maples add flares of fall color. The area provides for primitive non-motorized recreational opportunities, including cave exploration, hiking on semi-developed trails, hunting, and outstanding opportunities for wildlife and scenic photography. The primary objective for this ONA is to provide adequate protection of the area's outstanding natural values in an unaltered condition.

The BLM decision in the 1988 RMP is to manage 2,990 acres of the Lonesome Ridge area as an ONA. The ONA is managed to protect the area's scenic, wildlife, plant, geologic, and natural history values. Management includes closing the area to mining claim location and mineral material sales, controlling surface use on oil and gas leases, and closing the area to OHV use. The 1997 RMPA designated OHV use and implemented the plan as closed to OHV use.

2.3.2.2 Current Management

The Lonesome Ridge 2,990-acre ONA was designated in the 1988 Carlsbad RMP for being considered the world's foremost example of a Permian age fossil reef. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases.
- Avoid future right-of-way actions.
- Withdraw from future mining claim location and close to solid mineral leasing and mineral material sales.
- Restrict surface disturbance that would diminish the area's natural and scenic values.
- Designate closed to OHV use and implement plan to enforce designations.
- Restrict fire suppression and geophysical exploration to conform to OHV closure.
- Manage under VRM Class I objectives.

2.3.2.3 Management Opportunities

Lonesome Ridge will be evaluated to determine if it contains relevant and important values for possible ACEC designation. If the area contains relevant and important values, it will be assessed to determine if special management is appropriate.

2.3.3 Research Natural Areas

Profile

RNAs may be set aside to preserve and protect typical or unusual ecological communities, associations, phenomena, characteristics, or natural features or processes. Activities within these areas may only be allowed if they do not interfere with natural processes. Areas designated as RNAs may consist of diverse vegetative communities, wildlife habitat, unique geological formations, or cultural resources, and may have other values identified by physiographic province as outlined in state or agency natural heritage planning documents. RNAs from the 1998 CFO RMP are listed in Table 2.3-3 and depicted on Map 3.15 Research Natural Areas in Appendix A. To be designated as an RNA, an area must have one or more of the following characteristics:

- A typical representation of a common plant or animal association
- An unusual plant or animal association
- A threatened or endangered plant or animal species
- A typical representation of common geological, soil, or water features
- An outstanding or unusual geologic, soil, or water feature

Table 2.3-3. Research Natural Areas in the CFO 1988 RMP

Name	Acres	Reason for Designation
Dry Cave	420	Paleontological research
Little McKittrick Draw	10	Hydrological, federally proposed snail
Pecos River/Canyons Complex	5,190	Cultural, scenic, research opportunities, wildlife habitat
South Texas Hill Canyon	1,360	Protected plant species, habitat
Yeso Hills	560	Fragile soils, federally listed species

Dry Cave RNA

This 420-acre RNA is within the McKittrick Hill Cave area that that is part of the Cave Resources SMA. McKittrick Hill Cave is one of 19 known caves within nine cave management units that would be protected and intensively managed. This RNA was designated for paleontological research.

Little McKittrick Draw RNA

This 10-acre RNA is known habitat for the New Mexico Ramshorn snail (*Pecosorbis kansasensis*). This species is listed by the State of New Mexico as a species of greatest conservation need. The limestone canyon drainage provides ephemeral pool habitat for the snail. The main objective of this RNA is to enhance habitat for this species. This area would provide a focus of studies and data gathering pertaining to Chihuahuan Desert ecosystem functions for use in future management guidance.

Pecos River/Canyons Complex RNA

The Pecos River/Canyons Complex RNA encompasses approximately 2,320 acres. Two large distinctive canyons, Pierce and Cedar, converging with one of the remaining free-flowing sections of the Pecos River provide a unique landscape in southeastern New Mexico. The RNA would be managed for the primary purpose of conducting research and studies of natural ecological functions along and adjacent to the Pecos River.

South Texas Hill Canyon RNA

This 1,360-acre RNA is an excellent representative of deciduous woodland and grasslands within the Chihuahuan Desert ecosystem. It is composed of diverse wooded canyon habitat to desert grass uplands and has at least two state-listed plant species, according to the 1988 RMP, great sage (*Salvia summa*) and button cactus (*Epithelantha micromeris*), inhabiting limestone canyon walls. The main objective of this RNA is to protect and enhance this representative habitat as well as known and potential listed species in the area. This area would also provide a focus of studies and data gathering pertaining to Chihuahuan Desert ecosystem functions for use in future management guidance.

Under current listings from the State of New Mexico, great sage is listed as a species of concern and button cactus is no longer listed as rare or a species of concern.

Yeso Hills RNA

This 560-acre RNA is an excellent representative of the uniquely exposed Castile Formation within the Chihuahuan Desert ecosystem. The fragile gypsum soils are highly susceptible to wind and water erosion but also support a variety of unique, endemic gypsophiles including the federally listed candidate gypsum milkvetch (*Astragalus gypsodes*). The main objective of this RNA is to protect and enhance representative habitat as well as known and potential listed threatened and endangered species in the area. This area would provide a focus of studies and data gathering pertaining to Chihuahuan Desert ecosystem functions for use in future management guidance.

2.3.3.1 Current Management

Dry Cave RNA

Designated as an RNA for paleontological research.

Little McKittrick Draw RNA

- Avoid future right-of-way actions through the RNA.
- Withdraw from future mining claim location and close to mineral material disposal and solid mineral leasing.
- Designate closed to OHV use and implement plan to enforce designations.
- Restrict fire suppression and geophysical operations to comply with OHV designations.
- Restrict surface disturbance including plant collections and camping within the RNA.
- Remove livestock from the RNA except under conditions established for studies or research purposes.

Pecos River/Canyons Complex RNA

Management prescriptions will include no surface disturbance and removal of livestock grazing, except where beneficial for research purposes

South Texas Hill Canyon RNA

- Apply no surface occupancy stipulation to future oil and gas leases.
- Avoid future right-of-way actions through the RNA.
- Close to future mineral material disposal.
- Complete limited OHV designation and implementation plan to restrict vehicles to designated routes.
- Restrict fire suppression and geophysical operations to comply with OHV designations.
- Restrict surface disturbance including plant collections and camping within the area.
- Remove livestock from the area except under conditions established for studies or research purposes.

Yeso Hills RNA

- Apply no surface occupancy stipulations to future oil and gas leases.
- Avoid future right-of-way actions through the RNA.
- Withdraw from mining claim location and close to mineral material disposal and solid mineral leasing.
- Designate limited to OHV use and implement plan to restrict vehicles to designated routes.
- Restrict fire suppression and geophysical operations to comply with OHV designations.
- Restrict surface disturbance including plant collections and camping within the area.
- Remove livestock from the area except under conditions established for studies or research purposes.

2.3.3.2 Management Opportunities

RNAs would be evaluated to determine if they contain relevant and important values for possible ACEC designation. If these areas contain relevant and important values, they would be assessed to determine if special management is appropriate. If relevant and important values are not present or special management is not appropriate, management for the area would be determined in the revised RMP.

2.3.4 Special Management Areas

Profile

SMAs are locations with specialized management concerns or needs that do not necessarily warrant ACEC designation. Generally, SMAs contain resources or opportunities that require a level of management narrowly focused on a localized resource or resource use concern.

SMAs are considered land use authorization avoidance areas because they contain resource values that pose special constraints for, and can result in denial of, applications for land uses that cannot be designed to be compatible with management objectives and prescriptions.

A variety of supporting management activities may be used to implement the management prescriptions. These generally include posting boundaries, installing information signs, conducting inventory and monitoring of resources and their uses, acquiring access where appropriate, acquiring additional lands from willing parties as necessary to meet management objectives, and resolving unauthorized uses. Table 2.3-4 lists the designated SMAs and Map 3.12 Special Management Areas in Appendix A depicts their location within the planning area.

Table 2.3-4. Designated Special Management Areas

Name	Acres	Reason for Designation
Alkali Lake OHV Area	900	OHV area
Bear Grass Draw	1,780	Cultural
Bluntnose Shiner Habitat	200	Riparian, federally listed fish species
Cave Resources	8,450	8 caves, nonrenewable geologic, biological, paleontological, hydrologic, recreational, educational studies
Dark Canyon SMA (includes Dark Canyon Scenic Area)[1]	3,950	Visual
Guadalupe Escarpment Scenic Area	49,570	Visual
Hackberry Lake OHV Use Area	55,800	OHV
Laguna Plata	3,360	Cultural
Maroon Cliffs	11,783	Cultural
Pecos River Corridor	6,000	Riparian, recreation, sensitive Soils
Phantom Banks Heronries	?	Colonial bird habitat
Poco Site	51	Cultural
Pope's Well	40	Historical site

Name	Acres	Reason for Designation
Potash Bull Wheel (no longer exists)	4	Historical, site no longer exists
Seven Rivers Hills	540	Sensitive soils, sensitive plant species
Springs Riparian Habitat	524	Habitat, endangered species, riparian, hydrological

[1] The 1988 Carlsbad RMP identified 3,220 acres in the Dark Canyon Scenic Area; however, the subsequent management plan identified 3,550 acres.

Designation and management prescriptions apply only to BLM-managed lands and minerals activities on federally reserved mineral estate. Private lands within or adjacent to SMA boundaries are not affected by these designations or management prescriptions. Existing permittees and other authorized land uses are recognized as valid and rights are grandfathered to the extent applicable under the land use authorization.

Alkali Lake OHV Area

This area contains 900 acres of rolling and stabilized dune lands that receive heavy motorcycle use. The area is of interest to the local motorcycle club for use during events. The management goal for this area is to allow extensive motorcycle use while working closely with oil and gas interests to meet multiple-use objectives.

Bear Grass Draw

This 1,780-acre area includes several archaeological sites that may contain intact stratigraphic deposits. One site in particular is very large with various types of archaeological features that contain considerable subsurface cultural material. The SHPO has determined this site eligible for the NRHP. The management objective for this SMA is to protect and preserve the important and sensitive cultural resource values for research.

Bluntnose Shiner Habitat

This area consists of 200 acres of riparian habitat along the Pecos River. Although oil and gas development is present within the area, health of the riparian habitat is important to the protection of the federally threatened species Pecos bluntnose shiner. A saltcedar zone and grassland floodplain fall within the designated critical habitat for the shiner. The primary objective is to protect and enhance this critical habitat.

Cave Resources

The Cave Resources SMA includes eight cave areas encompassing 8,450 surface acres of BLM-managed land. These areas receive intensive recreational use and contain unique and nonrenewable geologic, biologic, paleontologic, and hydrologic resources. The caves are used for recreational, educational, and scientific purposes. Management objectives are to protect the scenic and other natural values of all cave resources while still allowing for recreation, education, and scientific uses.

Dark Canyon SMA

The Dark Canyon SMA contains 3,950 acres divided into two management areas, the Dark Canyon ACEC (1,480 acres) and the Dark Canyon Scenic Area (3,220 acres) includes the remaining acreage plus the VRM Class II lands within the ACEC. The SMA also contains 800 acres of split mineral estate with privately owned surface area. This area contains highly sensitive visual and natural resource values that include deep rugged canyons with sheer limestone cliffs.

Guadalupe Escarpment Scenic Area

This 49,570-acre area of contiguous public land generally parallels the Guadalupe Escarpment. It is a highly sensitive visual area because it is within the immediate visual foreground as viewed from several key observation points along U.S. Highway 62/180. It is a primary viewshed from the Carlsbad Caverns Wilderness and USFS scenic areas. Management of the area emphasizes the protection of visual

resource values associated with the Guadalupe Escarpment while still allowing for compatible multiple-use development.

Hackberry Lake OHV Use Area

This intensive OHV use area consists of 55,800 acres of rolling stabilized dune lands and cliffs. The area is used annually for competitive motorcycle events. It is also popular for motorcycle and other OHV use. The area is heavily developed for oil and gas. Coordination with the oil and gas industry to avoid specific routes and trails should pose no management problem. Management objectives are to manage as an intensive OHV use area and avoid conflicts with other land uses that would continue to be authorized.

Laguna Plata

The Laguna Plata Archaeological District has been declared eligible for the NRHP. The district contains 3,360 acres of BLM-managed land. The area is still essentially undisturbed despite some salt mining on the playa bottom and Mississippi Chemical Corporation's use of Laguna Plata for emergency brine water disposal. The district is a complex of many sites with surface and subsurface cultural materials demonstrating that the area was used repeatedly over a lengthy time period. Management objectives of this archaeological district are to protect and preserve the important and sensitive cultural resource values for research purposes.

Maroon Cliffs

This 11,783-acre area has been determined eligible for the NRHP as an archaeological district. The archaeological sites recorded thus far are open campsites dating from the Archaic period (5000 B.C.) to the Jornada Mogollon period (A.D. 900–1450). Pit house structures have been reported at Maroon Cliffs; however, excavation is required to confirm this report. The Maroon Cliffs area is topographically diverse, providing a variety of exploitable environments for prehistoric peoples. The Maroon Cliffs Archaeological District is an ideal laboratory for the study of human-environment adaptations in southeastern New Mexico. The main objective of this archaeological district is to protect and preserve the important and sensitive cultural resource values for research.

Pecos River Corridor

The Pecos River Corridor (6,000 acres) contains a 0.5-mile strip of BLM-managed land along the Pecos River and the area surrounding the Red Bluff Reservoir. The area emphasizes water-based recreation along the free-flowing Pecos River and provides semi-primitive motorized recreation opportunities. The area around Red Bluff Reservoir is developed for day and overnight use to include campsites, picnic sites, sanitation facilities, and a boat ramp. Public access is provided along the river. Management objectives provide protection for scarce water-based recreation, provide public access, and protect the natural values while allowing for semi-primitive motorized recreation. Management goals are to reduce soil erosion and vegetation destruction while still allowing leasable minerals and other resource development in the area.

Phantom Banks Heronries

This SMA consists of habitat areas for colonial birds and varies in description from salt lakes to wooded draws. There are currently seven known heronries supporting nesting habitat for great blue herons (*Ardea herodias*), black-crowned night-herons (*Nycticorax nycticorax*), little herons (*Egretta caerulea*), tricolored herons (*Egretta tricolor*), snowy egrets (*Egretta thula*), and cattle egrets (*Bubulcus ibis*). Maps and legal locations will not be provided for these areas since colony locations change and these species are very susceptible to human disturbance. Management objectives for these habitat areas are to protect and enhance habitat for colonial birds in southeast New Mexico.

Poco Site

This SMA consists of 51 acres and is a prehistoric multicomponent site that has retained much of its stratigraphic integrity and, until recently, has not suffered any significant disturbance from oil and gas development. Undisturbed stratified sites are rare in southeastern New Mexico and the information they

contain is critical to understanding the regional prehistory. In addition, the Poco Site may contain very rare pit house structures. Management objectives for this area are to protect and preserve the important and sensitive cultural resource values for research.

Pope's Well

This 40-acre historic site contains artesian well drill sites and stone remains of the army camp used by Captain John Pope in the mid-1850s. The camp and wells were constructed while trying to establish reliable water sources for the proposed southern route of the transcontinental railroad. This site is listed in the NRHP. Management objectives for this site are to protect and preserve the important and sensitive historic resources for research and education.

Potash Bull Wheel

The Potash Bull Wheel is an historic structure consisting of two wooden wheels connected by a wooden shaft. The structure itself was situated in a 4-acre protective buffer. This structure was used in the drilling of a 1925 well that failed to locate significant quantities of potash. This site was also determined eligible for the NRHP. Management objectives for this historic site were to interpret, protect, and minimize deterioration of the unique historic structure.

The Potash Bull Wheel was removed from its original location in September 1993. It was brought to the CFO and refurbished and was then moved into a mining history museum and interpretive center. This was done with partnerships between the potash industry, the BLM, the City of Carlsbad, and Eddy County. The Potash Bull Wheel is currently available for public viewing in the Pecos River Village Conference Center.

Seven Rivers Hills

This 540-acre area of bare gypsum hills was the only known habitat for gypsum wild-buckwheat for 90 years. This area is federally designated as critical habitat and is one of only three known populations of this species. This area also provides habitat for other unique and endemic vegetation existing on gypsum soils. Most of the area consists of bare steep slopes and deep eroded arroyos. The main objectives of this SMA are to protect and enhance habitat for gypsum wild buckwheat and other endemic plant species.

Springs Riparian Habitat

These six springs consisting of 524 acres support critical riparian habitat within the Chihuahuan Desert ecosystem. Bogle Flat, Preservation, Cottonwood, Owl, Ben Slaughter, and Blue Springs are primarily located within gypsum karst and drainage areas that flow into the Pecos River System. These areas provide habitat for listed endangered species as well as critical habitat for a variety of plants and animals. Management objectives for these areas are to protect and enhance ecological condition for the springs and associated riparian zones.

2.3.4.1 Current Management

Alkali Lake OHV Area

The Alkali Lake OHV Area was designated in the 1988 Carlsbad RMP. The management goal for this area is to allow extensive motorcycle use while working closely with oil and gas interests to meet multiple-use objectives. The following management prescriptions were applied:

- Implement special oil and gas stipulations to protect approved OHV trails and camping areas to all development authorizations within the area.
- Require special recreation permit authorizations for competitive or commercial motorcycle events.
- Manage for full fire suppression.

Bear Grass Draw

Bear Grass Draw was designated in the 1988 Carlsbad RMP. This 1,780-acre area includes several archaeological sites that may contain intact stratigraphic deposits. The management objective for this SMA is to protect and preserve the important and sensitive cultural resource values for research. The following management prescriptions were applied:

- Restrict surface disturbance and apply a special stipulation requiring the mitigation of adverse effects to sites through extensive excavation.
- Designate limited to OHV use to designated routes and implement plan to enforce designation.
- Restrict fire suppression and geophysical exploration to conform to OHV designation.

Bluntnose Shiner Habitat

Bluntnose Shiner Habitat was designated in the 1988 Carlsbad RMP. This area consists of 200 acres of riparian habitat along the Pecos River. The primary objective is to protect and enhance this critical habitat. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases.
- Avoid future right-of-way actions through the habitat area.
- Withdraw from future mining claim location and close to mineral material disposal and solid mineral leasing.
- Designate limited to OHV use and implement plan to restrict vehicles to designated routes.
- Restrict fire suppression and geophysical operations to comply with OHV designations.
- Restrict surface disturbance including plant collections and camping within the area.
- Remove livestock from the area except under conditions established for studies or research purposes.

Cave Resources

Cave Resources was designated in the 1988 Carlsbad RMP. The Cave Resources SMA includes eight cave areas encompassing 8,450 surface acres of BLM-managed land. Management objectives are to protect the scenic and other natural values of all cave resources while still allowing for recreation, education, and scientific uses. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases.
- Avoid future right-of-way actions through the cave areas.
- Withdraw from mining claim location and close to solid mineral leasing and mineral material disposal.
- Restrict surface disturbance to prevent impacts to cave resources.
- Designate either closed or limited to OHV use. Limited areas will restrict vehicular use to designated routes.
- Restrict fire suppression and geophysical exploration to comply with OHV restrictions. Restrictions on geophysical methods such as blasting will also be imposed to prevent damage to fragile cave formations.
- Attempt to acquire private surface estate having significant cave resources.
- Manage under VRM Class II, III and IV guidelines as identified for each cave unit.

Dark Canyon SMA

The Dark Canyon SMA was designated in the 1988 Carlsbad RMP. This area contains highly sensitive visual and natural resource values that include deep rugged canyons with sheer limestone cliffs. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases in the Dark Canyon Scenic Area (3,550 acres).
- Avoid future right-of-way actions on 3,950 acres.
- Restrict surface disturbance to minimum visual and environmental impacts on 3,950 acres.

- Apply seasonal drilling limitations on 730 acres within the ACEC to reduce visual impacts from Carlsbad Caverns National Park during the heavy visitor use season.
- Close to mineral material sales on 3,950 acres.
- Limit OHV use to designated routes.
- Restrict fire suppression and geophysical exploration to conform to OHV limitations.
- Manage the Dark Canyon Scenic Area (3,220 acres) to conform to VRM Class II guidelines and 730 acres under Class III prescriptions.

Guadalupe Escarpment Scenic Area

The Guadalupe Escarpment Scenic Area was designated in the 1988 Carlsbad RMP. Management of the area emphasizes the protection of visual resource values associated with the Guadalupe Escarpment while still allowing for compatible multiple-use development. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases on 11,700 acres.
- Restrict surface disturbance throughout the 49,570-acre scenic area by minimizing visual impacts through special stipulations applied on case-by-case basis.
- Close to solid mineral leasing and mineral material sales in Zone 1 of the SMA (11,700 acres).
- Designate limited to OHV use to designated roads and implement plan to enforce designation (49,570 acres).
- Restrict fire suppression and geophysical exploration to conform to OHV designation.
- Manage 8,820 acres to conform to VRM Class II guidelines and the remaining 40,750 acres under VRM Class III guidelines.

Hackberry Lake OHV Use Area

The Hackberry Lake OHV Use Area was designated in the 1988 Carlsbad RMP. Management objectives are to manage as an intensive OHV use area and avoid conflicts with other land uses that would continue to be authorized. The following management prescriptions were applied:

- Implement special oil and gas stipulations to protect OHV trails and camping areas applied to development authorizations within the area.
- Require special recreation permit authorizations for competitive or commercial motorcycle events.
- Manage for full fire suppression.

Laguna Plata

Laguna Plata was designated in the 1988 Carlsbad RMP. Management objectives of this archaeological district are to protect and preserve the important and sensitive cultural resource value for research purposes. The following management prescriptions were applied:

- Implement NSO stipulation on oil and gas leases
- Avoid future right-of-way actions
- Close to solid mineral leasing, except existing potash leases which require extensive excavation to mitigate the adverse effects to cultural resources.
- Close to mineral material disposal.
- Restrict surface disturbance to prevent impacts to cultural resources.
- Designate 1,120 acres closed and 2,240 acres limited (to designated routes) to OHV use and implement a plan to enforce designations.
- Restrict fire suppression and geophysical exploration to conform to OHV designations.
- Manage under VRM Class III objectives.
- Attempt to acquire 1,280 acres of state land.

Maroon Cliffs

Maroon Cliffs was designated in the 1988 Carlsbad RMP. The main objective of this archaeological district is to protect and preserve the important and sensitive cultural resource values for research. The following management prescriptions were applied:

- Implement NSO stipulation to 1,880 acres of future oil and gas leases.
- Implement special stipulation for solid mineral leasing: new leases or reissuance of existing leases will require mitigation of adverse effect to cultural resources through extensive excavation.
- Close to mineral material disposal.
- Restrict surface disturbance to prevent impacts to cultural resources.
- Designate limited to OHV use to designated routes and implement plan to enforce designation on 11,783 acres.
- Restrict fire suppression and geophysical exploration to conform to OHV designation.

Pecos River Corridor

The Pecos River Corridor was designated in the 1988 Carlsbad RMP. Management goals are to reduce soil erosion and vegetation destruction while still allowing leasable minerals and other resource development in the area. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases on 6,000 acres.
- Restrict surface disturbance throughout the area to reduce erosion and minimize impacts to riparian habitat.
- Close to solid mineral leasing and mineral material disposal on 6,000 acres.
- Withdraw 1,729 acres from mining claim location.
- Designate 120 acres around Red Bluff Reservoir closed to OHV use and the remaining 5,880 acres as limited to designated routes. Implement plan to enforce designations.
- Restrict fire suppression on 5,880 acres to conform to OHV limitation but conduct full fire suppression within the 120 acre Red Bluff Reservoir area.
- Restrict geophysical exploration to conform to OHV limitations.
- Remove livestock from the 120-acre Red Bluff Reservoir area.
- Manage 4,500 acres to conform to VRM Class II guidelines and the remaining 1,500 acres under VRM Class III prescriptions.

Phantom Banks Heronries

Phantom Banks Heronries was designated in the 1988 Carlsbad RMP. Management objectives for these habitat areas are to protect and enhance habitat for colonial birds in southeast New Mexico. The following management prescriptions were applied:

- Close to mineral material disposal within a 0.25-mile circumference of active heronry.
- Designate limited to OHV use and implement plan to protect active heronries through seasonal limitations to designated routes.
- Restrict geophysical operations to comply with limited OHV designations.
- Restrict surface disturbances, including hunting and camping activities.
- Apply seasonal restriction of oil and gas activities within a 0.25-mile radius of active heronry.

Poco Site

The Poco Site was designated in the 1988 Carlsbad RMP. Management objectives for this area are to protect and preserve the important and sensitive cultural resource values for research. The following management prescriptions were applied:

- Restrict surface disturbance and apply the special stipulation: no surface disturbance until a representative sample of the entire site is excavated.
- Designate limited to OHV use to designated routes and implement plan to enforce designation.
- Restrict fire suppression to conform to OHV designation.

Pope's Well

Pope's Well was designated in the 1988 Carlsbad RMP. Management objectives for this site are to protect and preserve the important and sensitive historic resources for research and education. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases.
- Designate closed to OHV use and implement plan to enforce designation.
- Restrict fire suppression and geophysical exploration to conform to OHV designation.

Potash Bull Wheel

The Potash Bull Wheel was designated in the 1988 Carlsbad RMP. Management objectives for this historic site were to interpret, protect, and minimize deterioration of the unique historic structure. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases.
- Close to mineral material disposal.
- Designate closed to OHV use.
- Apply full fire suppression to protect the structure from destruction.

Seven Rivers Hills

Seven Rivers Hills was designated in the 1988 Carlsbad RMP. The main objectives of this SMA are to protect and enhance habitat for gypsum wild buckwheat and other endemic plant species. The following management prescriptions were applied:

- Implement NSO stipulation upon all future oil and gas leases.
- Avoid future right-of-way actions throughout the SMA.
- Withdraw from mining claim location and close to mineral material disposal and solid mineral leasing.
- Complete limited OHV designation and implementation plan to restrict vehicles to designated routes.
- Restrict fire suppression and geophysical operations to comply with OHV designation.
- Restrict surface disturbance, including plant collections and camping, within the area.

Springs Riparian Habitat

The Springs Riparian Habitat was designated in the 1988 Carlsbad RMP. Management objectives for these areas are to protect and enhance ecological condition for the springs and associated riparian zones. The following management prescriptions were applied:

- Implement NSO stipulation to future oil and gas leases.
- Avoid future right-of-way actions through the riparian habitat areas.
- Withdraw from mining claim location and close to mineral material disposal and mineral leasing.
- Designate closed to OHV use and implement plan to enforce designations.
- Restrict fire suppression and geophysical operations to comply with OHV designations.
- Restrict surface disturbance, including plant collections and camping, within the area.
- Remove livestock from areas to allow rapid recovery of riparian habitat. Grazing management practices to enhance riparian habitat will be studied and implemented following initial recovery of the habitat areas.

2.3.4.2 Management Opportunities

These areas will be evaluated to determine if they contain relevant and important values for possible ACEC designation. If the areas contain relevant and important values, they will be assessed to determine if special management is appropriate. If relevant and important values are not present or special management is not appropriate, management for the area will be determined in the revised RMP.

2.3.5 Back Country Byways

Profile

The Guadalupe National Back Country Byway was designated on September 26, 1994, as a component of the National Scenic Byways Program of the Federal Highway Administration. The National Scenic Byways Program is an effort established to help recognize, preserve, and enhance selected roads throughout the United States. The Guadalupe National Back Country Byway stretches for 55 miles along New Mexico Highway 137, 30 miles of which are managed by the BLM. The byway is a paved two-lane road accessible in a passenger car. Low vehicle speeds are required in the winding canyons and on the steep Guadalupe Escarpment switchbacks.

The byway travels the transition from cholla cactus in the Chihuahuan Desert west of Carlsbad up into the pines of the dramatic Guadalupe Escarpment. Travelers can see mule deer, pronghorn, gray fox, scaled quail, mourning dove, a variety of songbirds, and small mammals. Geologically, the byway is situated along the Capitan Reef complex, which marks one edge of the Permian Basin. The BLM developed three pullouts along the byway with shelters, picnic tables, trash receptacles, cable fencing, and native landscaping. In addition, kiosks at the pullouts highlight the local petroleum industry, the geology of the ancient reef, and the area's caves. Activities along the byway include hiking, wildlife viewing, hunting, bird watching, geologic sightseeing, historic sites, plant viewing, scenic driving, educational interpretation, and caving.

2.3.5.1 Current Management

The Guadalupe Back Country Byway is currently being managed to promote the theme "Striking a Balance" between multiple uses. Interpretive signage has been developed to carry forward the theme along the byway.

2.3.5.2 Management Opportunities

Partnerships with groups, other agencies, and/or industry could be pursued to maintain, improve, and promote byway infrastructure.

2.3.6 Wild and Scenic Rivers

Profile

Congress enacted the Wild and Scenic Rivers Act (WSRA) (16 USC 1271–1287) on October 2, 1968, to address the need for a national system of river protection. As an outgrowth of a national conservation agenda in the 1950s and 1960s, the WSRA was a response to the dams, diversions, and water resource development projects that occurred on America's rivers between the 1930s and 1960s. The WSRA stipulates selected rivers should be preserved in a free-flowing condition and be protected for the benefit and enjoyment of present and future generations. Since 1968, the WSRA has been amended many times, primarily to designate additional rivers and to authorize the study of other rivers for possible inclusion.

Section 5 (d)(1) of the WSRA directs federal land management agencies to consider potential wild and scenic rivers in their land and water planning processes, stating, "In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas." To fulfill this requirement, the BLM evaluates river and stream segments to determine whether they might be eligible for inclusion in the National Wild and Scenic Rivers System (NWSRS) whenever it undertakes a land use planning effort such as an RMP.

Consideration of whether a river should be designated for inclusion in the NWSRS can be broken into three phases:

- **Determination of Eligibility:** Federal agencies conduct an evaluation of river features to determine which rivers qualify to be added to the NWSRS.
- **Determination of Suitability:** Most commonly, federal agencies conduct a review and then recommend to Congress which rivers should be protected.
- **Designation:** Congress designates a river as wild, scenic, or recreational.

2.3.6.1 Current Management and Management Opportunities

There are currently no eligible, suitable, or designated wild and scenic rivers in the planning area. The CFO conducted an eligibility report as part of the RMP process. Although all five river segments of the eligibility report met the free-flowing determination, there were only two river segments that met the eligibility determination: the Delaware and Black Rivers. The Black River's outstanding remarkable values that helped it meet eligibility were as follows: Scenic, Geologic, Fish, and Wildlife. The Delaware River's outstanding remarkable values that helped it meet eligibility were as follows: Fish, Wildlife, Cultural, and Paleontology listed under Other.

2.3.7 Wilderness and Wilderness Study Areas

Profile

In 1964, Congress passed the Wilderness Act, establishing a national system of lands for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. Until 1976, most land considered for, and designated as, Wilderness was managed by the NPS and USFS. With the passage of FLPMA in 1976, Congress directed the BLM to inventory, study, and recommend BLM-managed lands for Wilderness designation. To be designated as Wilderness, an area has to have the following characteristics:

- **Size:** roadless areas of at least 5,000 acres of public lands or of a manageable size.
- **Naturalness:** generally appears to have been impacted primarily by the forces of nature.
- **Opportunities:** provides outstanding opportunities for solitude or primitive and unconfined types of recreation.

In addition, areas often have special qualities, such as ecological, geological, educational, historical, scientific, and scenic values.

WSAs are areas determined to meet Wilderness eligibility requirements, but for which Congress has not acted on the managing agency's recommendation. They are managed in accordance to interim management guidelines to maintain the Wilderness characteristics until Congress acts. There are no Congressionally designated WAs within the planning area; however, there are four WSAs.

A New Mexico Statewide Wilderness Study Report was completed in 1991 by the BLM (BLM 1991a). In this study, the BLM described all WSAs in New Mexico. Each WSA was either recommended or not recommended for designation as WAs. Regardless of the BLM's recommendation, the BLM must manage each area as a WSA until Congress designates these areas a WA or releases them for other uses.

Currently, there is no designated Wilderness in the planning area. Table 2.3-5 identifies the four WSAs pending Congressional action and Map 3.13 Designated Wilderness Study Areas of Appendix A shows their location within the planning area.

Table 2.3-5. Designated Wilderness Study Areas

Name	Acres	Reason for Designation
Devil's Den Canyon	320	Erosive soils
Lonesome Ridge	3, 505	Visual, outstanding natural area, protection of natural values
McKittrick Canyon	200	Fragile soils
Mudgetts	2,941	Federally listed species, research opportunities, biological

Total	***3,461***	

A more complete description of each WSA and the evaluation of its Wilderness values are contained in the New Mexico Statewide Wilderness Study, Volume 3, Wilderness Analysis Reports (BLM 1988). The BLM's recommendations to Congress regarding which WSAs or portions of WSAs should be designated as Wilderness are described in the New Mexico Wilderness Study Report, Volume 1, WSA Recommendations (BLM 1991b) and the Statewide Summary (BLM 1991a). The recommendation for each area is stated following the description of each WSA. A majority of the acreages included have been derived from GIS data; some acreages are referenced from the best available information in previous documents.

Devil's Den Canyon WSA

The Devil's Den Canyon WSA contains 320 acres and is located in the southwestern corner of Eddy County, approximately 41 miles southwest of Carlsbad. The Devil's Den Canyon WSA encompasses not only the escarpment, but also the mouth of Devil's Den Canyon. This is an unusually deep canyon cutting through the western escarpment of the Guadalupe Mountains. Devil's Den Canyon carries water following heavy rains. The perennial Devil's Den Spring is located approximately 0.5 mile up the canyon from the WSA on USFS land.

Portions of the Devil's Den Canyon WSA were determined to have high Wilderness values, but were not recommended for Wilderness designation, as the contiguous Guadalupe Escarpment WSA was not itself recommended. The area is too small to be managed alone. In addition, the U.S. Geological Survey identified high oil and gas potential in Devil's Den Canyon WSA. There was also strong public opposition to designating this WSA as Wilderness, which was the primary reason for the recommendation not to designate Devil's Den Canyon as Wilderness.

Lonesome Ridge WSA

The Lonesome Ridge WSA contains 3,505 acres and is located in the southwestern corner of Eddy County, approximately 41 miles southwest of Carlsbad. The Lonesome Ridge WSA lies at the mouth of Big Canyon, a major drainage that cuts through the 2,000-foot Guadalupe Escarpment. Elevations range from 4,800 feet above sea level on the talus slopes to 6,825 feet at the ridge top. The spectacular topography of this WSA includes vertical limestone cliffs, serrated ridges, and deep canyons.

This WSA is not recommended for a Wilderness designation. This recommendation is based on the fact that the contiguous Guadalupe Escarpment WSA is not suitable for recommendation and the Lonesome Ridge area is too small to be managed alone, and because it lacks strong public support for a Wilderness designation.

The 1988 RMP designated 2,990 acres of the Lonesome Ridge WSA as an ACEC/ONA. The ACEC/ONA is managed to protect the area's scenic, wildlife, plant, geologic, and natural history values. Planned actions include closing the area to mining claim location and mineral material sales, controlling surface use on oil and gas leases, and closing the area to OHV use. The 1993 approved management plan designated OHV use and implemented the plan as closed to OHV use.

McKittrick Canyon WSA

The McKittrick Canyon WSA contains 200 acres and is located in the southwestern corner of Eddy County, approximately 45 miles southwest of Carlsbad. The WSA is contiguous with the USFS Guadalupe Escarpment WSA. The McKittrick Canyon WSA is almost entirely on the western slope of the Guadalupe Escarpment.

The 200-acre McKittrick Canyon WSA was determined to have low-quality Wilderness values and high potential for the existence of oil and gas. This WSA also had strong public opposition to designate it as Wilderness, which was the primary reason for the recommendation not to designate McKittrick Canyon WSA as Wilderness. This WSA is also not recommended for a Wilderness designation because the

contiguous USFWS Guadalupe Escarpment WSA is not suitable for recommendation and the WSA area does not meet minimum acreage requirements.

Mudgetts WSA

The Mudgetts WSA is located in Eddy County, approximately 19 miles southwest of Carlsbad. The WSA contains 2,941 acres of BLM-managed land. The southern boundary of the WSA is contiguous with a designated WA in Carlsbad Caverns National Park. The remainder of the WSA is delineated by a combination of roads and state or private boundaries.

The Mudgetts WSA is located on the northeastern edge of Guadalupe Ridge, which is a major eastern spur of the Guadalupe Mountains. Elevations range from 4,000 to 4,900 feet above sea level. Most of the area consists of steeply rolling hills, with steep cliffs on the western edge that drop as much as 500 feet to the floor of the Serpentine Bends of Dark Canyon. Dark Canyon and Crooked Creek drain the WSA. Both of these drainages carry water only as flash floods following heavy rains.

In accordance with a decision made in the 1988 RMP, 1,480 acres of the WSA were designated as the Dark Canyon ACEC. The Dark Canyon ACEC is managed to protect scenery, caves, and threatened and endangered plant species. Planned actions include closing the area to mineral material sales, limiting oil and gas leases to NSO, and limiting motorized vehicle use to designated routes.

The determination that the WSA has a high potential for oil and gas was made by BLM mineral specialists based on current production, initial well tests, and known geologic structure status near and within the WSA. The WSA is surrounded by natural gas production and most of the WSA is leased for oil and gas production.

The majority of the WSA could not be managed to preserve existing Wilderness values in the long term because of the presence of valid existing oil and gas leases. All six of the oil and gas leases in the WSA are held because there are oil wells in production.

2.3.7.1 Current Management

BLM policy and the 1988 Carlsbad RMP direct WSAs to be managed according to BLM Handbook 8550-1, Interim Management Policy for Lands under Wilderness Review until designated as Wilderness or removed from interim management by Congress. The 1988 Carlsbad RMP provided the following additional management to protect important multiple-use values while not affecting the ongoing Wilderness study process:

- Approximately 1,200 acres of the Mudgetts WSA would be included in the Dark Canyon ACEC. The remainder of the Mudgetts WSA (2,142 acres) would be managed according to Class III VRM objectives.
- The Devil's Den Canyon and McKittrick Canyon WSAs would be managed in accordance with Class II VRM objectives.

The 1988 Carlsbad RMP and 1997 RMPA specified management if the areas were released from Wilderness study; however, this management has not been implemented as none of the area has been released.

2.3.7.2 Management Opportunities

Decisions concerning Wilderness can only be made after Congress has designated a WA. Attention could be given to developing a WSA management and monitoring plan. This management and monitoring plan would more than likely need to be coordinated with the Lincoln National Forest to ensure that it was in compliance with current designations within the forest boundary. Also, the management and monitoring plan would need to be completed in part with the help of Carlsbad National Parks for the portions of the Mudgetts WSA to make sure there is some consistence in management practices between the two agencies. Discussion within the management plan would require analyzing potential impacts to all resources of concern. This would allow for a thorough evaluation of the WSA and ensure that proper

protections would be in place for the WSAs or areas of concerns. In order to complete this management plan, a follow-up monitoring plan would need to be in place to ensure that actions proposed in the management plan are actually implemented in the monitoring plan.

2.4 SOCIAL AND ECONOMIC FEATURES

2.4.1 Tribal Interests

Seven Native American tribes have interests in the planning area (Table 2.4-1).

Table 2.4-1. Native American Tribes with Interests in the Planning Area

Native American Tribe
Pueblo of Isleta
Mescalero Apache Tribe
Ysleta del Sur Pueblo
Apache Tribe of Oklahoma
Comanche Indian Tribe
Kiowa Tribe of Oklahoma
Hopi Tribal Council

The Mescalero Apache Tribe identified several TCPs located in the planning area during an ethnographic inventory conducted by TRC (2010). These areas of interest will be considered during the land use planning process. TCPs are properties that are both eligible for the NRHP and have traditional religious or cultural importance to a specific cultural group. There are unidentified TCPs in the planning area according to the Mescalero Apache, however, the tribe was not able to disclose those locations to the BLM at this time. Sacred sites are not necessarily eligible for the NRHP, but the American Indian Religious Freedom Act and Executive Order 13007 charge the agency with protecting these localities, consistent with other rights, and ensuring tribal access.

Table 2.4-2 lists the types of TCPs and their associated resources/points of recognition developed by TRC (2010) to guide field inventory.

Table 2.4-2. TCP Types and Their Associated Resources/Points of Recognition

TCP Type	Associated Resources/Points of Recognition
Nuclear center	Very broad areas with sufficient resources to provide, at least seasonally, for a moderate to large group. Nuclear centers would best be identified by Native American consultants.
Commemorative place	May overlap with mythic places or commemorate a non-supernatural event or person; historic period commemorative places may be associated with recorded settlements (Native and/or Euro-American). Best identified by Native American consultants.
Permanent/Reoccupied base camp	Have permanent or seasonally reliable water source(s), suitable prevailing wind (depending on season of use), and access to resources. Evidence of multiple structures (teepee rings), multiple hearths and re-use of hearths, and abundant debris ranging from tool making to cooking; there may be evidence of storage, and evidence of all genders and age groups.
Camp associated with a leader	Probably associated with permanent or seasonally reliable water; the camp may be a defensible location with a clear viewshed and little debris. Only Native American consultants (or historical record) can give a leader's name, but the size, gender and age composition, and nature of the camp should be reflected in the number and type of features and artifacts.
Plant resource gathering and processing camp	May be located near a particular plant growing area, near processing resources, and on suitable terrain. For example, mescal gathering and processing camps could be near mescal stands, with fuel and sufficiently deep soil for pits. The more limiting factor was likely to have been water (where reeds or cattails grew, which were used to cover the food before the pit was buried) and fuel. Agave was often carried long distances to be processed where the latter occur together. Evidence includes burned caliche ring middens and heaps, pits, and relatively fewer amounts of ground stone and debitage than at a permanent camp.

TCP Type	Associated Resources/Points of Recognition
Specific resource gathering camp	Located near the resource (c.f. piñon nuts, ochre, stone); c.f. piñon gathering: level area in piñon-juniper zone, if water is/was available, the camp is probably near it. Few features, but if area was reused, hearths may overlap. Archaeologically, evidence of the collected resource should be present at the site (in the case of plant materials, perhaps visible only through excavation).
Gathering areas	Areas where useful or ceremonial plants occur. These include food, medicinal and material plant supplies. May need help of biologists for past environment.
Hunting area	Locations depend on game species and traditional season of hunt. Identification of hunting areas is probably limited to larger game with consistent seasonal patterns.
Hunting camp (small)	Restricted visibility, but with clear view, in or near habitat of whatever is being hunted; may be near salt lick, reliable water source, or game trail. Small hearth(s), if any, flaking debris, rather ephemeral. May contain butchered bone and broken tools.
Hunting and processing camp (larger scale such as buffalo)	Within reasonable walking distance of the hunt area, but not visible from the hunt. Evidence of larger group (larger or more hearths, scattered but more abundant debris); may contain butchered and/or cooked bone.
Travel camp (reoccupied seasonally)	On or near trails/routes, probably at or near a water source, and spacing between such camps may be regular; archaeologically, multiple and often overlapping (or reused) hearths but debris will be less abundant than at a permanent encampment.
Trail or route	Rock art (or other terrain alteration) may be present along route; may follow game trails
Trade (or other planned interaction) location	May be near a common boundary; may be at (or in view of) a distinct landform. Archaeologically, the encampment should reflect the larger scale of a trade event, and deposits should contain materials from as well as from beyond the homeland.
Conflict location	May be traditional (Native American) or historic (Euro-American). Localities abutting other culture areas, constricted areas (such as canyons), or encampments (particularly camps associated with a leader). Conflict locations are probably best identified by Native American consultants.
Water	Permanent springs, lakes, rivers, seasonal springs, playas, and rivers. All have power and may be traditionally important.
Mythic place	Places of origin, places of creation or ceremony, and places of vision or power. May have meaning to all tribal members (part of the supernatural world) or to particular individuals or their extended family (place where one of their own found power). Visually distinctive landforms such as mountains, caves, sinkholes, and reliable springs (particularly hot springs). Could include phenomena such as noise, wind funneling, etc. May be accompanied by rock art, cairns, and/or offerings. Probably best identified by Native American consultants.
Contact period structure/area	Euro-American-oriented reservations, schools, farms, and churches that have become part of Native American identity. Locations best identified through archival research and Native American consultants.

Consultation with Native American tribes typically occurs four times a year during the quarterly oil and gas lease sale process when the BLM requests that a tribe identify any parcels that are in or near any areas of interest to the tribe. This early consultation allows the BLM to process the subsequent undertakings on those parcels for oil and gas and other similar projects. Consultation with tribes is undertaken for projects not related to oil and gas when proposals are received by the BLM such as data recovery plans, or changes in management strategies such as the Permian Basin MOA. In order to consult more meaningfully with tribes, the CFO conducted face-to-face meetings with all of the tribes during July and August 2012.

2.4.2 Socioeconomic Conditions

This report describes the existing social and economic conditions in the area most likely to be affected by alternatives being considered for the Carlsbad RMP revision. The CFO manages approximately two million acres of public lands under BLM jurisdiction in southeast New Mexico. This report is intended to

serve as a base document for the affected environment section of the EIS, which is being assembled by SWCA Environmental Consultants (SWCA).

Following the socioeconomic study area (SESA) definition, the report provides a brief regional history of the area, characterization of the local communities and demographic characteristics. The report also highlights the regional economic activity (employment, earnings, etc.), economic activities specifically related to CFO lands (recreation, mining, agriculture, etc.), and fiscal conditions. A brief review of local economic development plans is also provided. As set forth by EO 12898, the report also identifies potential environmental justice communities.

2.4.2.1 Socioeconomic Study Area

The CFO resource management planning area includes lands in all of Eddy and Lea counties and a portion on Chaves County. In order to capture the social and economic conditions, trends, and potential impacts of proposed BLM CFO management decisions on communities in and around the project area, the SESA for the Carlsbad RMP is composed of Chaves, Eddy, and Lea Counties (Figure 2.4-1). Reference to the CFO planning area refers specifically to the BLM lands within the CFO boundaries.

It is important to note that the SESA borders the state of Texas. Some of the social and economic conditions and indicators presented in this study may also apply to or be impacted by Texas border communities, or be influenced by cross-border factors such as commuting to or from Texas for employment within the SESA.

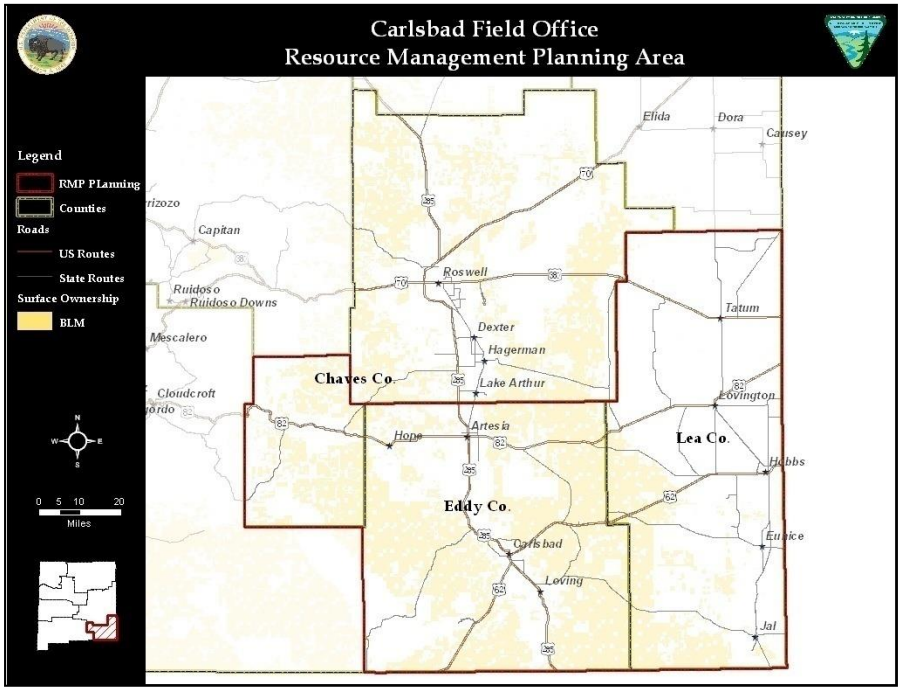

Figure 2.4-1. Carlsbad Field Office Resource Management Planning Area

2.4.2.2 Social and Economic Regional Context

In the mid-1800s, Anglo cattle ranchers and farmers began settling the area, now known as Chaves County. Farming and sheep and cattle ranching have been productive ways of life in the area due to the artesian wells located in the area. Chaves County is one of the largest milk and dairy producing counties in the nation. While the agricultural industry still remains an integral part of the local heritage and economy, oil and gas development has also been an important factor in the community since the 1930s (Chaves County 2009). Roswell is the county seat and the largest city in the county with a population of

48,336. The "Roswell Incident" of 1947, allegedly involving the discovery of remains of a flying saucer outside the city, provides unique community character and numerous tourists to the area during the annual UFO festival (Southeastern New Mexico Economic Development District [SNMEDD] 2011).

Cattle grazing along the Pecos River drew Anglo settlers in current-day Eddy County. In the late 1800s irrigation systems allowed for agricultural production in the area. Today, farming and ranching remains an important way of life and residents are interested in preserving farmland and water supply for future generations (Eddy County 2008). Natural resource extraction has been important to the economic development in Eddy County. The area is reported to contain oil and gas deposits and some of the largest potash deposits in the United States (SNMEDD 2011). Tourism became an economic driver for Eddy County as Carlsbad Caverns was declared a National Monument in 1923 and became a National Park in 1930. In recent years the National Park has drawn approximately 400,000 visitors annually. In addition to visiting Carlsbad Caverns, local residents enjoy recreation opportunities on and along the Pecos River, Living Desert Zoo, and Gardens State Park. Eddy County residents report valuing the "country feeling," temperate climate, low crime rates, and a "generally good quality of life" (Eddy County 2008). Carlsbad is the county seat and the most densely populated city in the county. Artesia, Loving, and Hope are other incorporated more densely populated areas within Eddy County.

Lea County, the southeastern-most county of New Mexico, was sparsely populated and connected by wagon trails to other communities until oil was discovered in the Hobbs oil field in 1928. While the county has been subject to numerous boom and bust cycles, it has consistently been one of the state's leading producers of oil and gas (Lea County 2009). Similar to the other counties in the SESA, agricultural activities such as ranching, farming, and the dairy industry also contribute to the Lea County economy (SNMEDD 2011). The state correctional facility is located in Lea County. Hobbs is the largest city in the county and serves as the commercial center of the county.

2.4.2.3 Social Organization/Communities of Interest

Natural resource development and use has shaped the social and economic landscape of the SESA over the last one hundred years. Ranching, oil and gas development, potash mining, and recreation have all been important factors in creating the current socioeconomic conditions in southeastern New Mexico. Based on their connection to land within the SESA, several stakeholder groups are identified below.

Ranchers

For over one hundred years ranchers and their families have been gazing livestock in the SESA. Eddy County reports that the amount of farms in the area peaked in 1997, but has since remained steady (Eddy County 2008). Grazing and farming generate economic activity for the area and also provides a unique way of life for residents in the SESA. Using the land for grazing and farming preserves the small town feeling of many communities and preserve the open space, which is of value to rural residents (Eddy County 2008).

Recreationists

Recreationists to the CFO planning area enjoy numerous opportunities for dispersed recreation. The most popular uses include OHV use, hunting, horseback riding, and geocaching (BLM 2011). These recreation opportunities often shape individual and community identities and contribute to the visitors' perceived quality of life. Based on the array of recreation opportunities and user groups who enjoy them, there is a potential for user conflict between groups. However, user conflicts between recreationists do not appear to be an issue of concern within the CFO's jurisdiction.

The motorized recreation user group enjoys OHV excursions on dirt roads, single-track trails, and cross-country travel over lands where no established trail exists. In February 2012 there were 3,830 registered OHVs (ATVs and motorcycles) in Lea, Eddy, and Chaves counties. This represents a 58% increase in registered use since 2005 when 1,596 were registered in the three-county area. It should be noted that a portion of the increase is attributed to the increase in patrols and enforcement of registering OHVs with the State of New Mexico (David Chester, NMDGF, personal communication with Laura Vernon, SWCA,

February 2012). The Hackberry Lake OHV area provides 55,000 acres of sand dunes and a variety of topographic features for OHV travel. The annual Carlsbad 100 Desert Race is held at the Hackberry Lake OHV area and attracts 80 to 200 riders annually.

Equestrian groups travel on lands within the CFO. The La Cueva Non-Motorized Trail System is used by horseback riders, mountain bikers, and hikers. Individuals within the equestrian group have expressed in interested in establishing a cross-country equestrian route and associated amenities including hitching posts, watering units, and horse camp areas (BLM, personal communication 2010).

Individuals Who Place a High Priority on Natural Resource Uses

Potash mining and oil and gas development have been intrinsic to shaping the communities within the SESA. Residents within the SESA have experienced the boom and bust cycles of natural resource extraction since the early 1900s. As of October 2011, there were 15,885 active oil and gas wells in the CFO planning area. There are currently two active potash mines within the CFO planning area and two proposed projects (HB In-Situ Solution Mine Project and Ocha Project) that are now going through the NEPA process. Tension between the oil and gas industry and the potash industry has been present for decades. The tension is due to the fact that both industries maintain competing economic interests for collocated resources and from concerns regarding potential safety and liability associated with concurrent development by both industries (BLM 2012d).

Individuals Who Place a High Priority on Resource Protection

Individuals and advocacy groups support the protection and restoration of lands with wilderness-like characteristics. These individuals and groups value the preservation of natural resources. While some of the stakeholders may engage in active recreation uses such as hiking or camping, others may find joy in more passive uses such as just knowing the undeveloped landscape is there or sharing stories or photographs of the area. Public scoping and workshop attendance indicate that the New Mexico Wilderness Alliance is interested in the protection of lands in and around the CFO.

2.4.2.4 Population

The SESA is rural in nature with approximately 13 persons per square mile (14,663 total square miles). The SESA had an estimated population of 184, if the state of New Mexico has been increasing at a higher rate for the same time period. Within the three counties in the SESA, the population of Lea County has grown the fastest in the recent decade (16.6%), after a slight decline from 1990 to 2000 (-0.5%). Eddy and Chaves counties have been growing steadily over the past two decades, with a slight lag in population growth for Eddy County in the more recent decade.

The populations of all of the cities within the subject area have grown since 1990. The population of Carlsbad increased at a higher rate from 1990 to 2000 (2.7%) than from 2000 to 2010 (2.0%). Hobbs experienced a slight drop in population from 1990 to 2000 (-1.6%) and then rebounded from 2000 to 2010 (19.1%). The population of Jal declined from 1990 to 2000 (-7.4%) but then increased slightly from 2000 to 2010 (2.6%). Artesia's population increased at a higher rate in the more recent decade (5.7) than it did from 1990 to 2000 (0.2%).

As shown in Table 2.4-3 below, the three counties in the subject area have experienced an approximate 9.3% population increase from 2000 to 2010.

Table 2.4-3. Population Data, 1990, 2000, 2010, and 2020

Area	Resident Population				Percent Population Change		
	1990 Census	2000 Census	2010 Census	2020 Projection	1990–2000 (Actual)	2000–2010 (Actual)	2010–2020 (Estimate)
New Mexico	1,515,069	1,819,046	2,059,179	2,540,145	20.1	13.2	19.0
Eddy County	48,605	51,658	53,829	58,284	6.3	4.2	8.2
Carlsbad	24,952	25, 625	26,138	N/A	2.7	2.0	N/A

Area	Resident Population				Percent Population Change		
	1990 Census	2000 Census	2010 Census	2020 Projection	1990–2000 (Actual)	2000–2010 (Actual)	2010–2020 (Estimate)
Artesia	10,610	10,692	11,301	N/A	0.8	5.7	N/A
Lea County	55,765	55,511	64,727	67,479	-0.5	16.6	4.2
Hobbs	29,115	28,657	34,122	N/A	-1.6	19.1	N/A
Jal	2,156	1,996	2,047	N/A	-7.4	2.6	N/A
Chaves County	57,849	61,382	65,645	66,933	6.1	6.9	1.9
Roswell	44,480	45,293	48,366	N/A	1.7	6.8	N/A
SESA	162,219	168,551	184,201	192,696	3.9	9.3	4.6

Source: U.S. Census Bureau 2000a, 2010a; Bureau of Business and Economic Research 2008.

The median age of population in the SESA has remained relatively unchanged from 2000 to 2010 with a very slight decrease from 34.9 to 34.7 (averaged over the three counties). Chaves and Lea counties' median age just slightly decreased over this time period, while Eddy County slightly increased from 36.4 to 37.8. Eddy County also has the highest median age of the three being 3.1 years higher than Chaves County and 6.1 years higher than Lea County.

Discussed more comprehensively in the Environmental Justice Section of this report, approximately 74% of the population within the SESA are identified as Caucasian. Approximately 2.5% identify themselves as African American and 1.3% identify themselves as American Indian/Alaskan Native. Nearly half of the residents in the three-county area (49%) identify themselves as Hispanic or of Latino origin. According to the U.S. Census Bureau, people who identify with the terms "Hispanic" or "Latino" are identifying their origin, heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States. Someone who identifies themselves as Spanish, Hispanic, or Latino can be of any race.

2.4.2.5 Housing

The 2010 Census data in Table 2.4-4 illustrate how housing stock has changed minimally over the past decade. In Eddy County there was a 1% increase in new housing units from 2000 to 2010 while the population increased 4.2% over the same period of time. Eddy County reports a shortage of single-family homes for middle-income workers and a scarcity of rental units in Carlsbad and Artesia (Eddy County 2008).

The City of Carlsbad completed a Housing Analysis and Strategic Plan in 2009 (City of Carlsbad 2009). The main findings of the housing analysis were that:

- Carlsbad is experiencing a housing shortage that affects the community's quality of life and hinders the expansion of the local economy.
- Young, working families and retirees comprise the primary market for housing. The greatest need is for multi-family rentals, particularly multi-bedroom units. A need also exists for single-family detached homes.
- Rehabilitation or replacement of older and poorly maintained housing is another identified need.
- There is an unmet demand for low-income housing.
- Constraints and impediments to the development of new housing in Carlsbad include the absence of utility (water, wastewater, and storm drainage) infrastructure in certain areas and difficulty in obtaining financing in the 2010 housing market.

Despite these constraints, some active residential subdivision construction activity is occurring in the Carlsbad community. Two single-family home subdivisions totaling 285 units have been approved and construction has commenced (City of Carlsbad 2009). In 2010 two other subdivisions received zoning approval; one is zoned for 200 apartment units and 100 single-family homes, the other is zoned for 185 apartments (BLM 2012d).

While Lea County's population has continued to grow over the last decade, due in large part to the surge in oil and gas development, their housing supply has not. As indicated in Table 2.4-4, the percent of vacant units decreased from 16% in 2000 to 11% in 2010. Vacancy rates in Hobbs and Lovington have fallen below 10% (Lea County 2011). Over the past decade many of the vacant homes in Hobbs, Lovington, and Tatum have been rehabilitated or demolished. However, the percent of vacant units within the county do include homes that are not suitable for occupation and require substantial rehabilitation. According to the Lea County Affordable Housing Plan, the county is currently enduring:

- An aging housing stock that has deteriorated during the "bust" periods of the oil and gas boom and bust cycles.
- An inadequate number of affordable homes and rentals.
- A stalled housing market in the communities outside Hobbs that has made new housing development difficult.
- Rapidly increasing housing costs and rental prices in Hobbs have been problematic for low-income residents who are finding themselves priced out of the local housing market (Lea County 2011).

Table 2.4-4. Available Housing Characteristics, 2000–2010

Area	2000 Number of Units	2000 Number of Vacant Units	2000 Percent Vacant	2010 Number of Units	2010 Number of Vacant Units	2010 Percent Vacant
New Mexico	780,579	103,608	13%	901,338	109,993	12%
Eddy County	22,249	2,870	13%	22,585	2,174	10%
Lea County	23,405	3,706	16%	24,919	2,683	11%
Chaves County	25,647	3,086	12%	26,697	3,006	11%

Source: U.S. Census Bureau 2000b, 2010b.
Note: All 2010 median numbers are from the 2008–2010 American Community Survey and reflect a three-year average estimate.

Housing values, mortgages, and rental costs in the three-county area are considerably lower than New Mexico as a whole (Table 2.4-5). While housing values increased over $40,000 in New Mexico from 2000 to 2010, values increased no more than $30,000 within the SESA. Median monthly rental costs in Eddy and Lea counties have outpaced the rental costs increases in Chaves County and New Mexico as a whole. This disproportionate increase may reflect the increase in demand and lack of availability in affordable rental units.

Chaves County reports a slight shortage in vacant housing units and affordable housing but this shortage does not compare to those in Eddy and Lea counties (Marlin Johnson, Planning and Zoning Director, Chaves County, personal communication with Laura Vernon, SWCA, February 2012).

Table 2.4-5. Housing Values and Costs, 2000–2010

Area	2000 Median Housing Values	2000 Average Monthly Mortgage Costs	2000 Median Monthly Rental Costs	2010 Median Housing Values	2010 Average Monthly Mortgage Costs	2010 Average Monthly Rental Costs
New Mexico	$108,100	$929	$503	$150,500	$1,202	$691
Eddy County	$64,200	$685	$394	$86,100	$958	$628
Lea County	$50,100	$607	$388	$81,800	$960	$661
Chaves County	$61,000	$618	$402	$80,800	$878	$571

Source: U.S. Census Bureau 2000b, 2010b.
Note: All 2010 median numbers are from the 2008–2010 American Community Survey and reflect a three-year average estimate.

2.4.2.6 Regional Economic Activity

Economic Output and Gross Regional Product

Economic output is a measure of the value of industry production over a given period of time and, for most sectors, reflects gross receipts. For example, in manufacturing, output is equal to sales plus/minus change in inventory; in service industries, output is equal to sales. Gross regional product (GRP) measures the overall size of the economy of a specified region and is defined as gross economic output minus intermediate inputs (purchases from other sectors). Each sector's contribution to GRP is called "value added." Thus the value added for each sector reflects that sector's economic output net of purchases of intermediate inputs.

The 2010 industry breakdown of output and value added for the SESA is shown in Table 2.4-6. In 2010, the sum of value added across all industries (the GRP for the SESA) was $7.6 billion. The mining sector contributed the most total value added to the SESA, accounting for 28% of GRP, followed by government (11% of GRP), real estate (9% of GRP), and manufacturing (7% of GRP).

Table 2.4-6. Output and Value Added (GRP) by Sector for the SESA, 2010

Sector	Output (dollars)	Value Added (GRP) (dollars)	Share of GRP
Agriculture, forestry, fishing, and hunting	862,140,554	287,208,296	3.8%
Mining	3,357,527,504	2,105,449,033	27.6%
Utilities	345,450,091	193,995,881	2.5%
Construction	792,529,301	348,023,790	4.6%
Manufacturing	4,005,791,619	542,885,980	7.1%
Wholesale trade	312,481,506	246,429,897	3.2%
Retail trade	584,280,890	380,665,123	5.0%
Transportation and warehousing	429,733,538	232,897,126	3.1%
Information	218,109,330	115,126,589	1.5%
Finance and insurance	636,942,392	273,824,282	3.6%
Real estate and rental	913,494,281	705,981,872	9.3%
Professional–scientific and tech. services	292,463,346	195,583,160	2.6%
Management of companies	29,623,791	13,285,382	0.2%
Administrative and waste services	421,212,060	268,680,542	3.5%
Educational services	31,918,325	9,370,473	0.1%
Health and social services	750,828,588	444,415,680	5.8%
Arts–entertainment and recreation	46,396,874	26,030,408	0.3%
Accommodation and food services	381,758,195	198,943,794	2.6%
Other services	360,065,240	197,656,501	2.6%
Government and non NAICS	947,645,321	832,094,100	10.9%
Total	***15,720,392,748***	***7,618,547,910***	***100%***

Note: NAICS = North American Industry Classification System.
Source: IMPLAN 2010.

Total Employment and Employment by Sector

Table 2.4-7 displays the number of jobs located in the SESA from 1970 to 2009. All three counties are similar in their total number of jobs and have generally experienced positive growth over the last three decades.

Table 2.4-7. Employment History by Place of Work, 1970–2009

Year	Chaves County		Eddy County		Lea County		New Mexico State Total	
	No. of Jobs	Average Annual Change	No. of Jobs	Average Annual Change	No. of Jobs	Average Annual Change	No. of Jobs	Average Annual Change
1970	17,142	–	16,188	–	21,061	–	398,899	–
1980	23,034	3.0%	21,651	3.0%	29,724	3.5%	597,040	4.1%
1990	26,928	1.6%	22,024	0.2%	27,298	-0.8%	761,396	2.5%
2000	27,733	0.3%	25,378	1.4%	28,290	0.4%	964,673	2.4%
2007	30,958	1.6%	29,136	2.0%	35,372	3.2%	1,100,589	1.9%
2009	30,951	0.0%	30,924	3.0%	35,245	-0.2%	1,072,999	-1.3%

Source: Bureau of Economic Analysis 2009a.

Total job growth in New Mexico from 2001 to 2009 was 11%. Growth in the SESA outpaced the state average at 13% in Chaves County, 20% in Lea County, and 23% in Eddy County. In Chaves County, over one-third of the new jobs added were in the mining and construction sectors. In Eddy and Lea counties, approximately half of the new jobs added were in the mining and construction sectors.

A more in-depth evaluation of 2009 employment conditions in the SESA is displayed in Table 2.4-8, which shows the share of jobs by industry in each county.

Table 2.4-8. Employment by Industry, 2009

Industry	Chaves County	Eddy County	Lea County	New Mexico State Total
Total employment (number of jobs)	30,951	30,924	35,245	1,072,999
Farm employment	4.3%	2.6%	2.1%	2.3%
Forestry, fishing, and related activities	1.0%	0.6%	N/A	0.5%
Mining	7.1%	15.9%	21.6%	2.7%
Utilities	0.3%	0.6%	0.8%	0.4%
Construction	4.9%	7.8%	8.5%	6.3%
Manufacturing	3.8%	3.1%	2.6%	3.3%
Wholesale trade	2.5%	2.0%	3.2%	2.5%
Retail trade	11.9%	9.9%	9.5%	10.5%
Transportation and warehousing	3.2%	3.0%	3.9%	2.2%
Information	0.9%	1.0%	1.0%	1.6%
Finance and insurance	3.3%	3.0%	2.6%	3.4%
Real estate and rental and leasing	2.7%	2.7%	2.8%	3.8%
Professional, scientific, and technical services	4.3%	4.5%	2.9%	7.6%
Management of companies and enterprises	0.2%	0.6%	0.4%	0.5%
Administrative and waste management services	2.9%	5.9%	5.4%	5.1%
Educational services	0.6%	0.4%	N/A	1.5%
Health care and social assistance	14.0%	9.8%	8.4%	11.0%
Arts, entertainment, and recreation	1.3%	0.7%	1.5%	2.2%
Accommodation and food services	9.9%	7.1%	6.3%	7.6%
Other services, except public administration	4.7%	5.5%	4.8%	4.8%
Government and government enterprises	16.2%	13.3%	10.9%	20.1%

Source: Bureau of Economic Analysis 2009a.

In both Eddy and Lea counties, the mining industry supports the most jobs (16% and 22%, respectively), followed by government (13% and 11%) and retail trade (10%). Government is the largest industry in Chaves County, supporting 16% of all jobs, followed by healthcare (14%) and retail trade (12%).

Additional details for the mining sector within the SESA as a whole are displayed in Table 2.4-9. Within the SESA, “mining and quarrying of nonmetallic minerals” was assumed to be primarily potash. Support activities for other mining were also assumed to be associated primarily with potash.

Table 2.4-9. Mining Sector Output, Value Added and Jobs within the SESA, 2010

Industry	Output (dollars)	Value Added (dollars)	Jobs
Oil and Gas			
Extraction of oil and natural gas	1,522,124,032	1,170,883,664	6,560
Drilling oil and gas wells	393,381,664	300,608,296	1,152
Support activities for oil and gas operations	1,151,085,952	443,353,418	6,145
Potash (and other nonmetallic minerals)			
Mining and quarrying other nonmetallic minerals	255,075,072	172,515,778	1,146
Support activities for other mining	19,542,594	9,255,532	50
Other Mining Activities			
Other mining and quarrying *	16,318,224	8,832,338	100

Note: Potash is the primary nonmetallic mineral in the study area. Support activities for other mining are assumed to be associated with potash.
*Includes mining coal, iron ore, copper, nickel, lead, zinc, gold, silver, and other metal ore, as well as quarrying stone, sand gravel, clay, and ceramic and refractory minerals.
Source: IMPLAN 2010.

The mining sector within the SESA is dominated by oil and gas activities, which account for 91% of mining-related output, value added, and employment. Potash mining and its support activities account for 8% to 9% of output, value added, and jobs in the mining sector.

Table 2.4-10 presents the five largest employers (both public and private) for the SESA counties.

Table 2.4-10. Major Employers

Employer Name	City	Estimated No. of Employees
Chaves County		
Eastern New Mexico Medical Ctr	Roswell	500–999
Wal-Mart Supercenter	Roswell	500–999
Leprino Foods Co	Roswell	500–999
New Mexico Military Institute	Roswell	250–499
Community Homecare	Roswell	250–499
Eddy County		
Washington Tru Solutions LLC	Carlsbad	500–999
Mosaic Potash Carlsbad	Carlsbad	500–999
Yates Petroleum Corp	Artesia	500–999
Eddy County Office	Carlsbad	250–499
Intrepid Potash	Carlsbad	100–249
Lea County		
Lea Regional Medical Ctr	Hobbs	500–999
Patterson-Uti DRILLING Co	Hobbs	500–999
B & H Maintenance & Constr Inc	Eunice	250–499
Key Energy Svc	Hobbs	250–499
Lin-Mar Inc	Hobbs	250–499

Source: Labor Analysis Statistics and Economic Research 2011.

Total Earnings and Earnings by Sector

Table 2.4-11 displays the average annual compensation per job[4] for workers in the SESA for selected years from 1970 to 2009. Compensation includes both wages and benefits and all estimates have been adjusted for inflation and are shown in 2011 dollars.[5] Although rural areas typically offer relatively low earnings, the SESA counties compare well to state averages.

[4] Compensation per job was calculated by dividing total compensation for the county (or state) by total jobs for that county (or state). The number of jobs, and average compensation per job, includes both full- and part-time jobs.
[5] Inflation adjustments were made according to the Bureau of Labor and Statistics Inflation Calculator.

Table 2.4-11. Earnings History

Year	Chaves County		Eddy County		Lea County		New Mexico State Total	
	Avg. Comp. per Job	Annual Change	Avg. Comp. per Job	Annual Change	Avg. Comp. per Job	Annual Change	Avg. Comp. per Job	Annual Change
1970	$34,303	–	$39,401	–	$41,730	–	$39,914	–
1980	$33,517	-0.2%	$41,388	0.5%	$46,840	1.2%	$40,240	0.1%
1990	$36,195	0.8%	$38,965	-0.6%	$35,575	-2.7%	$38,237	-0.5%
2000	$37,782	0.4%	$42,322	0.8%	$38,876	0.9%	$41,464	0.8%
2007	$43,310	2.0%	$53,417	3.4%	$50,220	3.7%	$45,593	1.4%
2009	$40,990	-2.7%	$54,765	1.3%	$49,753	-0.5%	$45,957	0.4%

Note: Compensation is adjusted for inflation and shown in 2011 dollars.
Source: Bureau of Economic Analysis 2009b.

All counties in the SESA witnessed wage escalation beyond New Mexico statewide averages between 2000 and 2007. After 2007, the economic downturn slowed wage growth in Eddy County and brought a slight decrease in real wage levels (net of inflation) in Chaves and Lea counties. The overall increase in average wages in Eddy and Lea counties from 2000 to 2009 reflects the growth of the mining and construction job sectors, which are typically high-paying industries.

Table 2.4-12 displays industry-specific detail of the earnings per job in 2009. Estimates are adjusted for inflation and shown in 2011 dollars.

Table 2.4-12. Earnings per Job by Industry, 2009

Industry	Chaves County	Eddy County	Lea County	New Mexico State Total
Farm employment	$42,844	$17,754	$21,885	$24,748
Nonfarm earnings	$40,907	$55,767	$50,350	$46,457
Private earnings	$38,240	$53,540	$50,039	$41,872
Forestry, fishing, and related activities	$51,076	$27,032	N/A	$21,433
Mining	$77,213	$94,390	$68,104	$72,461
Utilities	$86,040	$78,933	$104,456	$102,936
Construction	$38,766	$47,728	$59,918	$44,270
Manufacturing	$53,948	$96,028	$104,742	$62,762
Wholesale trade	$57,612	$68,341	$65,163	$56,394
Retail trade	$26,841	$26,814	$27,297	$30,112
Transportation and warehousing	$44,823	$61,906	$66,210	$53,685
Information	$42,246	$44,493	$48,857	$53,634
Finance and insurance	$35,827	$41,238	$38,291	$43,251
Real estate and rental and leasing	$10,210	$33,620	$26,063	$15,238
Professional, scientific, and technical services	$47,148	$52,335	$45,992	$68,565
Management of companies and enterprises	$124,866	$59,648	$51,034	$73,657
Administrative and waste management services	$18,176	$62,646	$39,886	$33,865
Educational services	$11,665	$16,210	N/A	$26,985
Health care and social assistance	$42,947	$47,043	$36,989	$46,297
Arts, entertainment, and recreation	$7,503	$4,307	$26,489	$12,965
Accommodation and food services	$17,172	$18,862	$19,018	$21,635
Other services, except public administration	$34,703	$32,076	$43,810	$35,321
Government and government enterprises	$53,996	$69,825	$52,846	$64,127

Note: Compensation is adjusted for inflation and shown in 2011 dollars.
Source: Bureau of Economic Analysis 2009b.

The manufacturing sector had the highest earnings per job in both Eddy and Lea counties. In Chaves County, management of companies and enterprises was the highest paying industry. Mining was one of the highest paying sectors in all three counties.

High demand and highly skilled labor positions in construction, transportation, and real estate, often associated with energy development, pay well within Eddy and Lea counties. However, professional services positions are paid below statewide averages.

Sources of Income and Net Commuting

Figure 2.4-2 shows the distribution of personal income between earnings (wages and salaries, supplements to wages and proprietors' income); dividends, interest, and rent; and net transfer payments for New Mexico and the SESA.

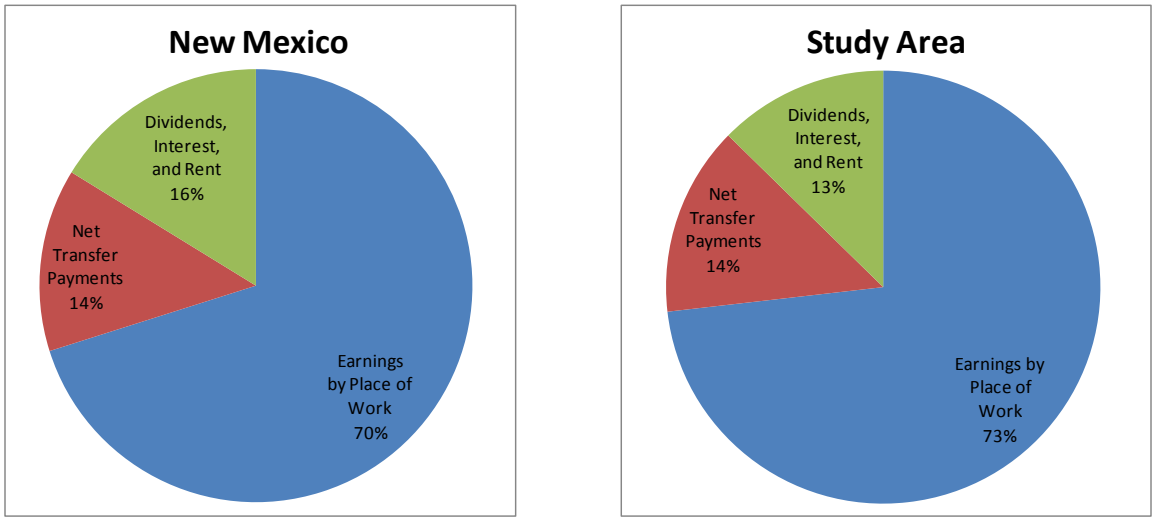

Figure 2.4-2. Sources of Income for New Mexico and the SESA, 2009
(Note: Earnings by place of work include wage and salary disbursements, supplements to wages and salaries, and proprietors' income. Net transfer payments represent transfer payments net of contributions for social insurance. Source: Bureau of Economic Analysis 2009b)

The personal income distribution in the SESA as a whole is very similar to the state of New Mexico. Within the SESA, Chaves County has a slightly lower share of earnings by place of work and higher share of net transfer payments. Overall, the distribution has changed little since 2001.

The Bureau of Economic Analysis also reports a net commuting adjustment, which indicates whether income flows into the area as a result of out-commuting of residents to jobs elsewhere or income flows out of the area as a result of net in-commuting by people who reside elsewhere. The positive adjustment for Chaves County (1.3%) indicates that the income earned by residents commuting to work outside the county exceeds that of income earned by non-residents commuting into the county. Conversely, Eddy (-2.3%) and Lea (-0.9%) counties have net in-commuting adjustments. The U.S. Census Bureau's Journey to Work and Local Employment Dynamics data confirm this commuting pattern (U.S. Census Bureau 2000d, 2009c).

Labor Force and Unemployment

The labor force of an area is the population of working-age residents that are currently employed or are unemployed but actively seeking work. It is important to note that "unemployed" is specifically defined and does not include the entire non-working population. The unemployment rate reflects the number of unemployed persons as a percent of the total labor force.

As a result of the economic recession that began in late 2008, unemployment in communities across the United States rose sharply and the SESA counties were no exception. In 2009, the U.S. unemployment rate rose to 9.3%, an increase of 3.5 percentage points over the previous year. In 2010 it rose again, though not as dramatically, to 9.6%. As shown in Figure 2.4-3, the unemployment rate in the SESA rose sharply in 2009, but stayed below the national average.

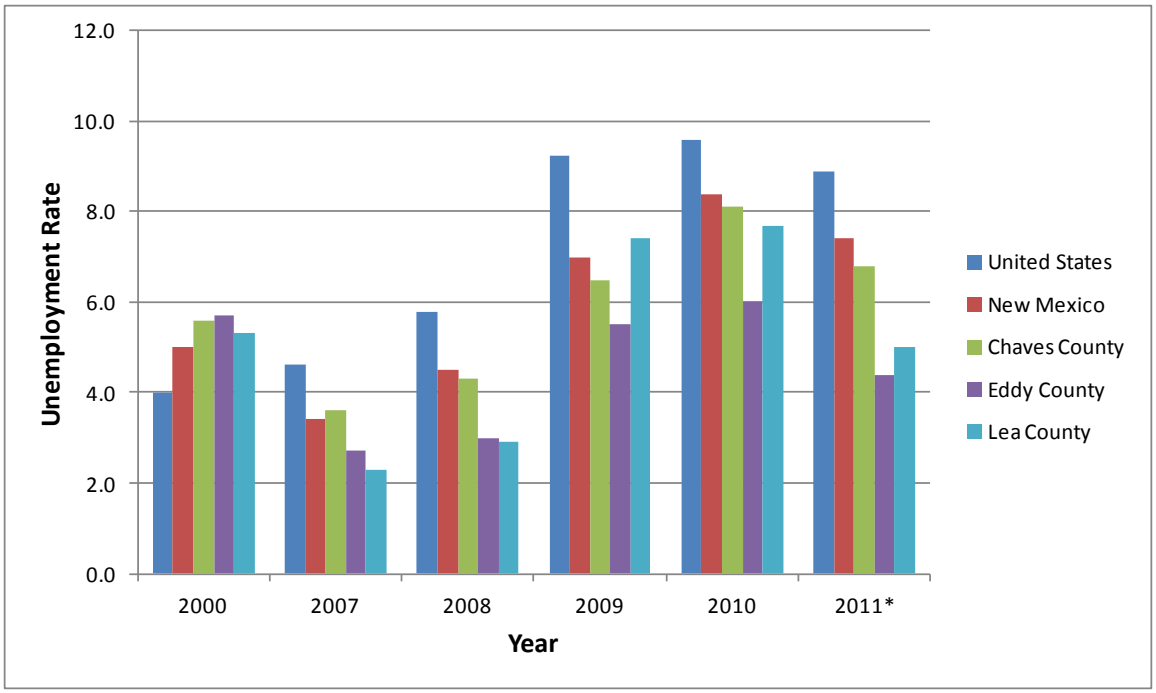

Figure 2.4-3. Unemployment Rates, 2000–2011
(Source: Bureau of Labor Statistics 2012; Note: 2011 numbers are preliminary)

Lea County experienced the most dramatic increase in unemployment, going from the lowest rate in the SESA in 2007 (2.3%) to the highest in 2009 (7.4%). Eddy County has maintained the lowest unemployment rate (6.0%) of the SESA in the wake of the economic crisis. Preliminary estimates for 2011 indicate that unemployment is decreasing in Chaves, Eddy and Lea counties.

Personal Income

Between 2000 and 2009, median household income in the United States decreased slightly when adjusted for inflation. However, income stayed flat or increased within the SESA (Table 2.4-13). In 2009 both Eddy and Lea counties had a median household income above the state average.

Table 2.4-13. Median Household Income, 2009

Area	2000	2007–2009	Average Annual Change
United States	$55,331	$54,327	-0.2%
New Mexico	$44,973	$45,198	0.1%
Chaves County	$37,568	$37,692	0.0%
Eddy County	$42,160	$49,698	1.8%
Lea County	$39,263	$46,733	2.0%

Note: Income is adjusted for inflation and is shown in 2011 dollars.
Source: U.S. Census Bureau 2000c, 2009a.

In general, household income statistics reflect many factors, including the number of persons per household, household age, and the number of workers per household. Table 2.4-14 provides additional income statistics for the SESA.

Table 2.4-14. Average, Median, and per Capita Income, 2009

Area	Household		
	Median	Average	Per Capita
United States	$54,327	$74,457	$28,660
New Mexico	$45,198	$61,436	$23,850
Chaves County	$37,692	$50,117	$18,867
Eddy County	$49,698	$68,061	$26,220
Lea County	$46,733	$59,288	$21,501

Note: Income is adjusted for inflation and is shown in 2011 dollars.
Source: U.S. Census Bureau 2000c, 2009a.

By all measures, income in Chaves County trails the rest of the SESA and the state of New Mexico as a whole. Eddy County residents have the highest incomes with a median household income 32% greater than Chaves County's corresponding statistic.

2.4.2.7 Current Economic Activities Specifically Related to Lands Managed by the BLM CFO

A wide spectrum of economic and social conditions in the SESA is influenced by the management and disposition of CFO lands. This portion of the report examines the economic activities most directly related to the management of CFO lands—livestock grazing, recreation, mineral extraction, and energy development. Unless otherwise indicated, the data in this section were provided by written communication with the CFO.

Livestock Grazing

Just over 200 livestock operators are permitted to graze livestock on federal lands managed by the CFO. Over half of these (125) are in Eddy County. The total allotments provided forage for approximately 260,000 AUMs in 2010. Ranchers pay the CFO $1.35 per AUM and over the past 10 years, annual AUM revenue for the CFO has averaged $340,000. Figure 2.4-4 shows the changes in AUMS from 2000 to 2010. The full preference offered is also displayed as a reference—if each operator ran full numbers, this would be the AUM count. Actual use has remained well below the full preference offered since 2000. As shown in Figure 2.4-5, the majority of AUM allotments are used for cattle.

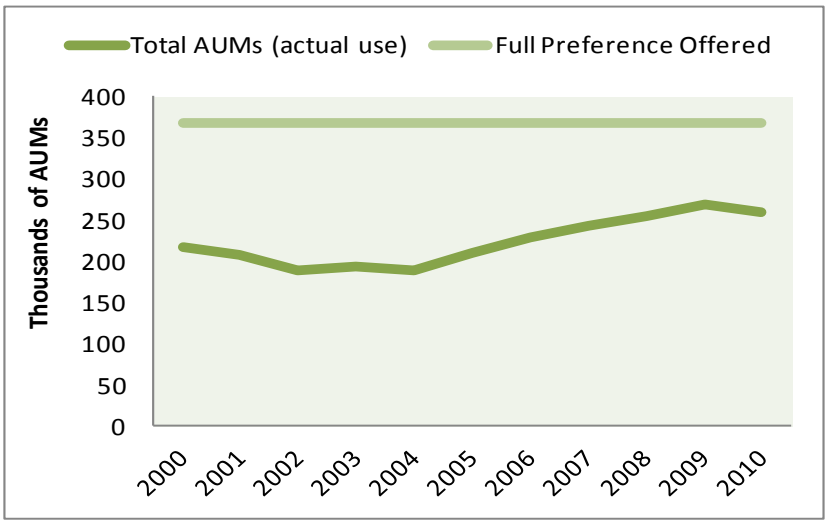

Figure 2.4-4. Animal Unit Months, 2000–2010 (Source: BLM 2011)

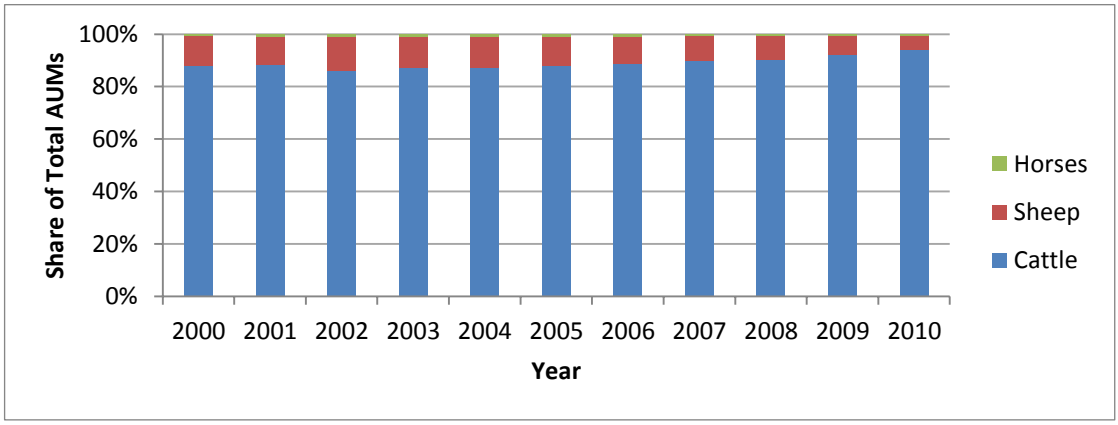

Figure 2.4-5. Distribution of AUMs by Livestock Type, 2000–2010. Source: BLM 2011.

According to the most recent Census of Agriculture, there were approximately 311,000 cattle and calves in the SESA in 2007, 58% of which were located Chaves County. The same year, 159,000 cattle and calves were sold in the SESA, for a total market value of about $96 million. The market value of dairy products in the SESA was $348 million (Census of Agriculture 2007).

Recreation and Tourism

BLM lands within the SESA offer many types of recreation opportunities. The diverse Chihuahuan Desert landscape attracts hikers, mountain bikers, equestrians, hunters, rock hounds, and a growing population of geocachers. Large sand dune areas are popular sites among recreationists and they are primarily found on BLM lands within the SESA. Wide open spaces, solitude, natural landscapes, Pecos diamonds, gypsum, trophy mule deer, elk, pronghorn, and Barbary sheep attract many visitors. BLM-managed areas along the Pecos, Black, and Delaware rivers also provide for public access to riparian areas not commonly found in southeast New Mexico and the Chihuahuan Desert. Parks Ranch Cave is the second longest gypsum cave in the United States and attracts many cavers and researchers. Additional caves in the CFO planning area provide diverse recreational and research opportunities. Equestrian groups are also active on CFO-managed lands and have expressed interest in cross-country equestrian route designations, amenities, and the future possibility endurance ride events that would attract participants nationwide. According to the CFO, BLM-managed lands provide excellent opportunity for OHV use. The Desert 100 Race, an annual two-day motocross event held in the CFO planning area at the Hackberry Lake OHV area, typically attracts 80 to 200 riders of all ages and expertise.

BLM lands are also widely used for hunting a number of different game species, including deer, Barbary sheep, elk, antelope, javelina, quail, pheasant, waterfowl (ducks, geese, cranes), dove, and mountain lion. The NMDGF establishes and regulates all hunting-related criteria, including the sale of hunting licenses. All or part of Game Management Units (GMUs) 30, 31, 32, 33, and 34 are included within the CFO planning area. According to the CFO, conflicts with other public land uses sometimes arise.

Recreation visits to CFO-managed lands averaged 99,393 annually between 2007 and 2011. Approximately 80% of all visits in 2011 were to dispersed areas. Of the remaining 20% of visits that were made to specific sites, the most popular sites were Black River (a water access site) and the Hackberry Lake OHV area.

Spending estimates for visitors to BLM lands were unavailable for the CFO planning area. However, the average visitor to nearby Lincoln National Forest spends approximately $55 per trip (USFS 2009). This includes both local and non-local visitors. If this spending profile is applied to BLM visits for the CFO, visitor spending averaged $5.4 million annually between 2007 and 2011. For comparison, Carlsbad Caverns National Park averaged 412,487 visits and $21 million in visitor spending from 2006 to 2009 (Stynes 2010).

Overall, the BLM estimated that recreation-related expenditures of visitors to New Mexico BLM lands supported approximately 1,372 direct jobs and 1,953 total jobs statewide in FY 2010 (USDI 2011). In FY 2010, the CFO accounted for approximately 4.7% of the visits to New Mexico BLM lands.

Minerals

Potash is the primary mineral mined in the CFO planning area, although both caliche and sodium are also actively mined on CFO lands. Both potash and sodium are leasable minerals and current operations—primarily potash—lease 143,832 acres of CFO lands.

Caliche is considered a salable mineral and permitted operators pay by volume extracted. Total caliche sales for the CFO planning area were $6.3 million in FY 2011 (BLM 2011).

United Salt, the only sodium operation in the CFO planning area, mines sodium from potash mine tailings, to produce animal feed, road salt, etc. Sodium mining employs approximately 75 full-time workers and produced approximately 380,000 short tons of sodium in 2010 (BLM 2011).

Potash is the common name for various mined potassium compounds and potassium-bearing materials. Sylvite and langbeinite are the two forms of potash mined within the CFO planning area. There are currently three active potash mines operating on of CFO lands. These current potash operations employ 1,194 full-time employees and 69 other employees. Table 2.4-15 displays the annual production of both sylvite and langbeinite within the CFO (BLM 2011).

Table 2.4-15. Potash Production, 2006–2010

Year	Sylvite		Langbeinite	
	Production (short tons)	Annual Change	Production (short tons)	Annual Change
2006	1,090,989	–	937,626	–
2007	1,208,097	11%	1,004,833	7%
2008	1,077,914	-11%	1,099,072	9%
2009	679,478	-37%	843,289	-23%
2010	1,013,958	49%	850,688	1%
5-year Average	1,014,087	–	947,102	–

Source: BLM 2011.

In addition to the three active potash mines, two future potash operations have been proposed and are currently in varying stages of the EIS process. The first, known as the HB In-Situ Solution Mine Project, proposes to construct and operate an in-situ solution mine in the abandoned HB Potash Mine. The HB In-Situ Project Draft EIS has been released and the public comment period ended on June 27, 2011. At the time this report was written, the BLM had not selected a preferred alternative and was seeking input from the public before making a selection in the Final EIS. The second future potash operation was proposed by IC Potash, who has leased 76,061 acres for the project. IC Potash has submitted its mine plan of operations for the Ochoa Project and is beginning the EIS process, which is expected to be completed in late 2013.

Oil and Gas

There is a long history of oil and gas development in the region, and much of this development occurs on CFO lands. As of October 24, 2011, there were 15,885 active oil and gas wells on the 2 million acres of CFO lands leased for oil and gas in the CFO planning area. Table 2.4-16 displays extraction and well detail for the CFO planning area from 2006 to 2010.

Table 2.4-16. Oil and Gas Activity, 2006–2010

Site	Units	2006	2007	2008	2009	2010
Oil and Gas Extraction						
Natural gas	Billion cubic feet	268.3	247.9	228.3	216.1	213.2
Crude oil	Million barrels	30.4	30.5	30.6	33.1	36.1

Site	Units	2006	2007	2008	2009	2010
Oil and Gas Extraction						
Oil and gas wells–drilled	Number	477	389	450	391	494

Source: BLM 2011.

Between 2006 and 2010, there was a slight decline in natural gas extraction but a slight increase in crude oil extraction. Overall the industry has remained fairly stable over the past five years.

In 2009, the 33 million barrels of oil extracted from CFO lands represented 57% of the SESA total and 54% of the state total. Natural gas extracted from CFO lands was 48% of the SESA total and 15% of the state total. In 2009, 1,234 oil and gas wells were drilled in New Mexico—32% were on CFO land.

Renewable Energy

Currently, no land managed by the CFO is leased for alternative energy development. Two proposals were submitted to the CFO for wind site testing and monitoring requests. Authorizations were granted for both proposals to erect meteorological towers and identified lands that would be tested for their feasibility for wind energy development. These authorizations give no rights to future development of a commercial wind farm; however, they do preclude other applicants from receiving a testing authorization for the same area. These types of authorizations are only granted for a period of three years, after which the company must propose a development project or remove the meteorological towers and reclaim any disturbances associated with their use.

2.4.2.8 BLM Expenditures and Employment

The direct operations and employment of the CFO also provide an economic contribution to the SESA. Non-salary-related expenditures, which include BLM program-related work such as ecosystem management, supplies/materials, travel, utilities, contracts, etc., averaged approximately $4.6 million annually from 2006 to 2010 (Table 2.4-17). The CFO employed an average of 113 full-time and 29 other than permanent employees per year, with a salary expenditure of $8 million per year from 2006 to 2011 (Table 2.4-18)

Table 2.4-17. CFO Budget Expenditures

Fiscal Year	Salary Expenditures	Non-salary Expenditures
2006	$6,191,943	$4,057,562
2007	$7,022,303	$3,979,544
2008	$7,541,861	$4,879,285
2009	$8,300,860	$5,916,379
2010	$9,975,104	$3,687,339

Source: BLM 2011.

Table 2.4-18. CFO Employment

Fiscal Year	Full-time Equivalent	Other Than Permanent
2006	95	31
2007	102	29
2008	118	33
2009	123	26
2010	120	31
2011	119	23

Source: BLM 2011.

Fiscal Conditions

The state of New Mexico, as well the counties and cities within the SESA, raises revenues from a variety of different sources. At the state level, income taxes and gross receipts tax (GRT) are the largest sources of revenue. New Mexico's GRT is broader in scope than most state's transaction taxes and includes

many inter-business transactions and sales to governments (New Mexico Taxation and Revenue Department 2011). At the local government level, GRT and property taxes are typically the largest sources of revenue for cities and counties. Since oil and gas development has the potential to be impacted by CFO planning decisions, oil and gas related taxes are also considered in this analysis. The historical tax revenues described in this section are as reported by official sources and are in nominal dollars (not updated for inflation to 2011 dollars).

State of New Mexico Revenues

The major components of general fund revenue in New Mexico include GRT, income taxes (both corporate and personal), and natural resource extraction revenues, which include severance taxes, rents, and royalties. Table 2.4-19 shows these revenue sources from 2007 to 2010.

Table 2.4-19. Major Components of General Fund Revenue, 2007–2010

Tax/Revenue	2007	2008		2009		2010	
	Revenue ($000)	Revenue ($000)	Annual Change	Revenue ($000)	Annual Change	Revenue ($000)	Annual Change
Gross Receipts Tax	1,840,489	1,835,572	0%	1,831,946	0%	1,634,367	-11%
Income Tax	1,640,161	1,601,955	-2%	1,110,577	-31%	1,081,660	-3%
Severance Taxes	486,564	623,656	28%	440,192	-29%	390,702	-11%
Rents and Royalties	551,534	656,267	19%	543,671	-17%	423,004	-22%
Percent of General Fund Revenue	***77%***	***77%***	–	***70%***	–	***68%***	–
Total General Fund Revenue	***5,848,563***	***6,128,696***	***5%***	***5,625,923***	***-8%***	***5,207,992***	***-7%***

Note: Severance tax includes the Oil and Gas School Tax, Oil Conservation, Resource Excise, and Natural Gas Processors.
Source: New Mexico Department of Finance and Administration 2010.

Fiscal effects of the recession can be seen in the decreasing revenue from each of these major components in 2009 and 2010. Total general fund revenue also fell in 2009 and 2010. GRT is the largest revenue source for the state and accounts for an average of 31% of total general fund revenue for the years shown.

Severance taxes, rents, and royalties include revenue from all natural resource extraction, but these figures are dominated by oil and gas related contributions. The full effect of oil and gas industry operations on the general fund goes beyond these categories and includes production taxes, royalties, bonuses, taxes on direct activities, and taxes on indirect activities. Incorporating all these sources, the New Mexico Taxation and Revenue Department estimated state general fund revenue from oil and gas operations to be approximately $1.275 billion or 27% of the general fund in FY 2010. The department also estimated the total state and local revenue from oil and gas operations to be $2.2 billion when including other state funds (Severance Tax Bonding Fund and Land Grant Permanent Fund) and local government revenues (Clifford 2011).

Local Government Revenues

GRT is also a major component of local government revenue. Table 2.4-20 depicts annual GRT distributions to the counties and communities within the SESA. The amount shown for the counties reflects the county government's share of GRT, not the total amount distributed to entities within the county.

Table 2.4-20. Gross Receipts Tax Revenue, 2007–2010

Area	2007	2008		2009		2010	
	Revenue	Revenue	Annual Change	Revenue	Annual Change	Revenue	Annual Change
Chaves County	$6,729,479	$7,479,647	11%	$6,760,754	-10%	$6,693,061	-1%
Roswell	$26,259,274	$28,006,269	7%	$26,812,785	-4%	$26,595,568	-1%
Dexter	$663,118	$626,067	-6%	$577,091	-8%	$526,567	-9%
Hagerman	$252,588	$267,580	6%	$322,853	21%	$309,703	-4%
Lake Arthur	$67,038	$40,937	-39%	$28,903	-29%	$42,612	47%
Eddy County	$8,779,960	$9,894,216	13%	$9,069,430	-8%	$9,021,423	-1%
Carlsbad	$18,438,072	$22,558,807	22%	$23,819,085	6%	$26,158,015	10%
Artesia	$14,299,036	$18,058,501	26%	$18,720,906	4%	$17,079,383	-9%
Hope	$22,614	$35,992	59%	$21,001	-42%	$9,339	-56%
Loving	$279,392	$366,803	31%	$424,164	16%	$459,392	8%
Lea County	$8,082,438	$10,162,595	26%	$8,021,284	-21%	$8,159,252	2%
Hobbs	$41,082,867	$47,285,732	15%	$37,260,098	-21%	$42,212,263	13%
Lovington	$5,461,709	$6,513,629	19%	$5,198,474	-20%	$4,919,845	-5%
Eunice	$3,028,552	$4,047,823	34%	$3,862,723	-5%	$3,555,137	-8%
Jal	$734,565	$746,078	2%	$717,549	-4%	$723,739	1%
Tatum	$414,337	$511,196	23%	$332,762	-35%	$349,359	5%

Note: Tax collections are distributed the second month after the accrual (business activity) month. Annual revenue shown reflects GRT distributions during that year.
Source: New Mexico Taxation and Revenue Department: Tax Analysis, Research and Statistics Office 2011.

For most SESA communities, GRT revenue increased between 2007 and 2008. However, in 2009 all SESA communities experienced a decrease or slowed growth in revenue, reflecting the fiscal effects of the recession.

Property taxes are another substantial source of revenue for the counties and municipalities in the SESA. Property tax obligations (revenue assuming 100% collection) are shown in Table 2.4-21.

Table 2.4-21. Property Tax Obligations, 2007–2009

Area	2007	2008		2009	
	Revenue	Revenue	Annual Change	Revenue	Annual Change
New Mexico	$1,280,550,278	$1,394,306,431	9%	$1,517,082,095	9%
Chaves County	$21,963,536	$24,303,165	11%	$27,396,335	13%
Roswell	N/A	$15,254,569	–	$16,501,198	8%
Dexter	N/A	$168,523	–	$107,956	-36%
Hagerman	N/A	$97,621	–	$177,828	82%
Lake Arthur	N/A	$25,387	–	$22,003	-13%
Eddy County	$48,561,419	$55,475,553	14%	$69,259,614	25%
Carlsbad	N/A	$7,278,520	–	$7,631,028	5%
Artesia	N/A	$5,199,909	–	$5,264,979	1%
Hope	N/A	$51,277	–	$42,079	-18%
Loving	N/A	$84,587	–	$91,870	9%
Lea County	$69,309,405	$75,219,144	9%	$97,759,538	30%
Hobbs	N/A	$11,790,030	–	$14,349,504	22%
Lovington	N/A	$1,753,772	–	$1,860,250	6%
Eunice	N/A	$1,072,913	–	$1,373,953	28%
Jal	N/A	$271,847	–	$309,721	14%
Tatum	N/A	$105,966	–	$129,619	22%

Source: New Mexico Taxation and Revenue Department: Tax Analysis, Research and Statistics Office 2009.

The total property tax obligation in Lea County is the highest of the SESA—over 250% higher than the tax obligation in Chaves County. Obligations in Lea County also increased faster than the rest of the SESA with annual growth at 30% from 2008 to 2009.

The counties in the SESA contain a substantial amount of federal land, which is exempt from property taxes. In order to offset such losses in property taxes, local governments receive federal payments based on the amount of nontaxable federal lands within their boundaries. These payments in lieu of taxes (PILT) are shown in Table 2.4-22 for the SESA counties and New Mexico as a whole.

Table 2.4-22. Payments in Lieu of Taxes, 2006–2010

Fiscal Year	Chaves County	Eddy County	Lea County	New Mexico
2006	$1,735,073	$1,918,813	$607,550	$22,808,415
2006	$1,735,073	$1,918,813	$607,550	$22,808,415
2007	$1,718,133	$1,906,665	$602,182	$22,742,930
2008	$2,730,693	$3,023,309	$957,240	$36,117,180
2009	$2,801,123	$3,098,106	$982,200	$37,013,334
2010	$2,837,827	$3,110,056	$1,002,942	$32,205,935

Source: USDI 2011.

Eddy and Chaves counties received the highest PILT in New Mexico in 2010. The SESA as a whole received $7 million in 2010, which was 22% of the total PILT to the state.

2.4.2.9 Economic Development Strategies

This section briefly reviews the economic development strategies in the SESA to provide additional context for the CFO planning area. As discussed previously, the historic economic base for the SESA—especially in Eddy and Lea counties—has been centered on extractive industries, such as oil and gas, potash, etc. In order to mitigate the risk of boom and bust cycles associated with these industries, the counties and communities within the SESA continue to highlight economic diversification in their development goals.

Eddy County's 2008 Comprehensive Plan acknowledges making strides in diversifying the local economy from traditional sectors to new sectors, in part due to the location of the Federal Law Enforcement Training Center and the Waste Isolation Pilot Plant in the county. Even so, the plan sets goals to address persistent economic challenges such as small business development, distribution of tourism dollars (concentrated near Carlsbad Caverns), quality job creation, workforce shortages/mismatches, and maintaining agricultural viability (Eddy County 2008).

Lea County, historically subject to boom and bust cycles, actively recruits new business to the area through the Economic Development Corporation of Lea County. The City of Hobbs identified the metal fabrication, energy, and food processing industries as targets for economic development and job growth in 2013 (New Mexico Economic Development Department [NMEDD] 2011).

Chaves County included the following economic goals in its 2004 Comprehensive Plan: promote the Roswell Industrial Air Center to strengthen existing business, attract new business development and encourage development of complementary industrial centers, promote foreign trade with Mexico, ensure that county permitting processes enhance economic development opportunities, and build workforce skills to help retain and attract business (Chaves County 2004). The City of Roswell identified aircraft manufacturing and services, homeland security, and renewable energy as target industries for job creation (NMEDD 2011).

Potential Environmental Justice Communities

EO 12898, dated February 11, 1994, established the requirement to address environmental justice concerns within the context of federal agency operations. Fundamental principles of environmental justice require that federal agencies:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations;
- Ensure the full and fair participation by all potentially affected communities in the decision-making process; and
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits of the project by minority and low-income populations.

Evaluation of environmental justice impacts requires identification of minority and low-income populations (including Native American tribes) within the SESA and evaluation of the potential for the alternatives to have disproportionately high and adverse impacts on such populations.

Terminology

A number of important terms are used in the evaluation of potential environmental justice issues. While there is some room for interpretation, the guidance on environmental justice terminology developed by the President's Council on Environmental Quality (CEQ 1997) is discussed below.

- Low-income Population. A low-income population is determined based on annual statistical poverty thresholds developed by the U.S. Census Bureau. A low-income community may include either a group of individuals living in geographic proximity to one another or dispersed individuals (such as migrant workers or Native Americans) where the group experiences a common effect or environmental exposure.
- Minority. Minorities are individuals who are members of the following population groups: American Indian, Alaskan Native, Asian, Pacific Islander, Black, or Hispanic.
- Minority Population Area. An area is defined as a minority population area if either the aggregate population of all minority groups combined exceeds 50% of the total population in the area or the percentage of the population in the area comprising all minority groups is meaningfully greater than the minority population percentage in the broader region. Like a low-income population, a minority population may include either individuals living in geographic proximity to one another or dispersed individuals experiencing a common effect or exposure.
- Disproportionately High and Adverse Environmental Effects. A disproportionate adverse effect is an impact on the natural or physical environment that significantly and adversely affects a minority or low-income population to a greater degree than the general population as a whole. Effects may include ecological, cultural, human health, economic, or social impacts interrelated to the impact on the natural or physical environment. A disproportionate impact on such populations is one that appreciably exceeds the impact on the general population or other appropriate comparison group (CEQ 1997).
- Comparison Population. For the purpose of identifying a minority population or a low-income population concentration, the comparison population used in this study is the state of New Mexico as a whole.

Populations of Interest

The following sections focus on the initial objective of the environmental justice evaluation—identifying populations of potential concern in terms of environmental justice issues. An evaluation of the potential for the alternatives to have a disproportionate adverse effect on these populations will be provided in the Environmental Justice Impacts Analysis.

Low-income Population

The most recent income and poverty data for the communities within the SESA is the 2005–2009 American Community Survey five-year estimates. Using this data set, Figure 2.4-6 depicts the proportion of the population living below the poverty level in the counties and communities located in the SESA. For comparison, the figure also includes the United States, New Mexico, and the SESA as a whole.

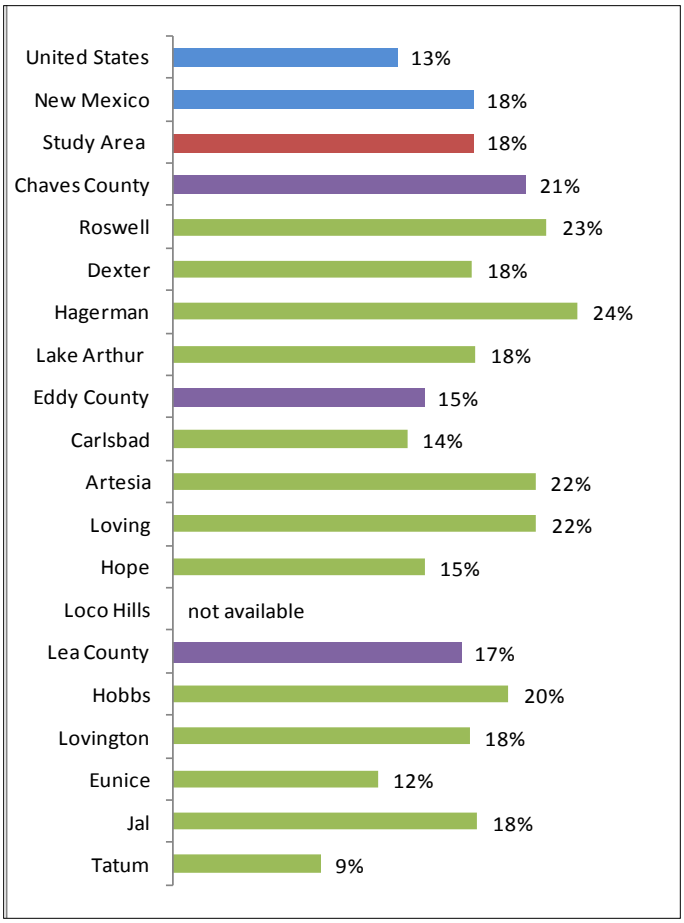

Figure 2.4-6. Proportion of the Population Living Below the Poverty Level, 2005–2009. Source: U.S. Census Bureau 2009a, 2009b.

The percent of the population living below the poverty level in the SESA as a whole is representative of the state—both at 18%—but is higher than the national average of 13%. Nearly one-quarter of the residents in Hagerman (in Chaves County) are living in poverty. Roswell, also located in Chaves County, has the second highest incidence of poverty (23%), followed by Artesia (22%), and Loving (22%). The poverty rates in each of these communities exceed the state average by at least four percentage points. Relative to the state of New Mexico, Hagerman, Roswell, Artesia, and Loving could be considered low-income communities.

The municipalities with the lowest proportions of the population living in poverty were Tatum (9%) and Eunice (12%). At the county level, Eddy County (15%) had the lowest proportion of residents living in poverty and Chaves County (21%) had the highest.

Minority Population

In 2010, minorities made up 60% of the population in the state of New Mexico compared to 36% in the U.S. as a whole (Figure 2.4-7 and Figure 2.4-8). While the proportion of minorities in the SESA (54%) substantially exceeded the United States, it was below the state average. At the county level, the population ranged from 48% minority in Eddy County to 57% in Lea County.

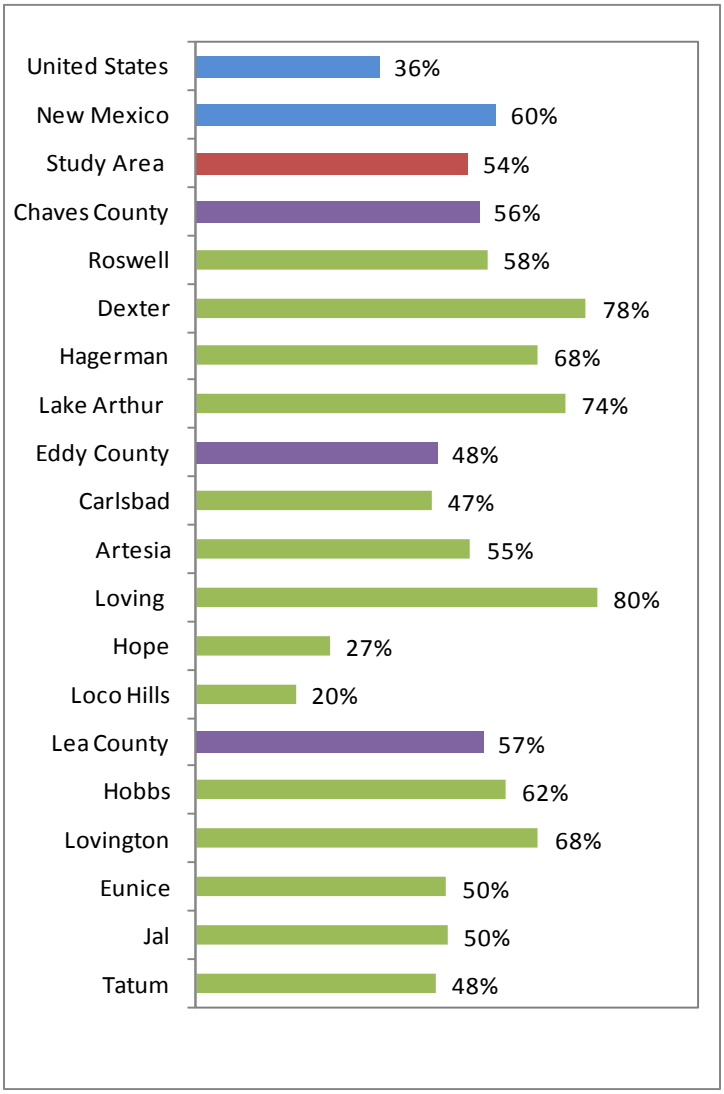

Figure 2.4-7. Percent Minority, 2010. Source: U.S. Census Bureau 2010b.

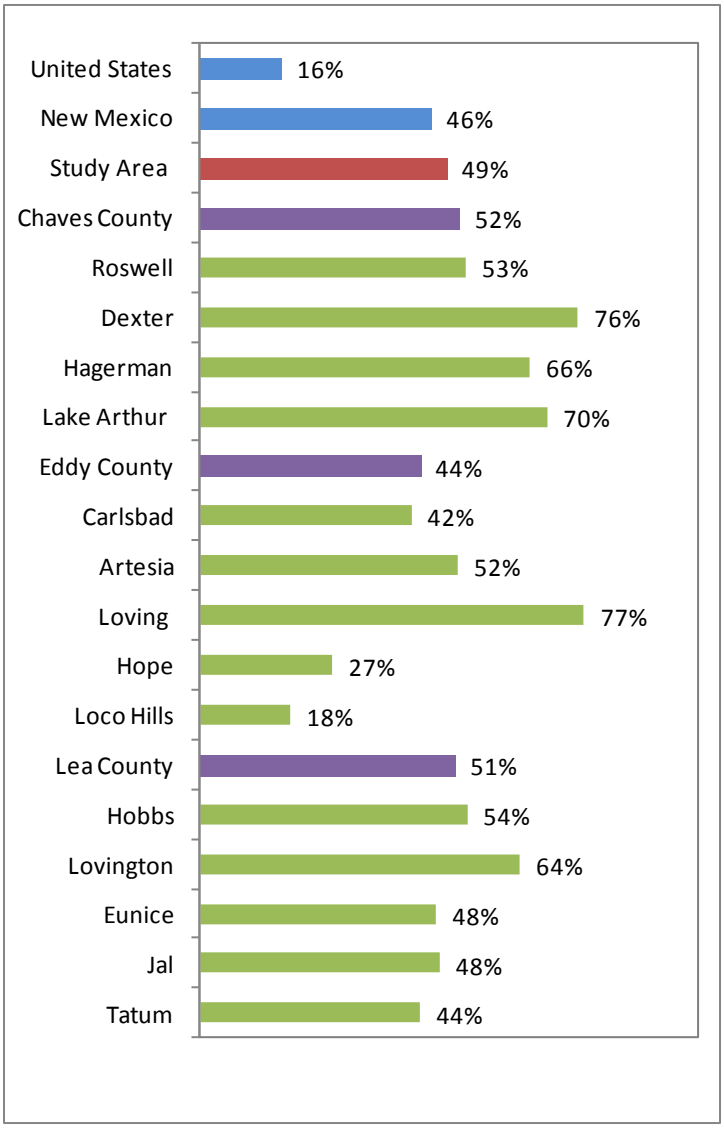

Figure 2.4-8. Percent Hispanic, 2010. Source: U.S. Census Bureau 2010c.

Based on the definition of a minority population area (minority residents exceed 50% of all residents), Roswell, Dexter, Hagerman, Lake Arthur, Artesia, Loving, Hobbs, Lovington, and Jal are all considered minority communities. The highest concentrations of minority populations are in Loving (80%), Dexter (78%), and Lake Arthur (74%)—all at least 20 percentage points higher than the SESA average.

As demonstrated by Figure 2.4-8, the minority population within the SESA in 2010 was driven by the Hispanic community. Hispanics made up 49% of the total population in the SESA and 91% of the minority population.

2.4.2.10 Summary of Existing Economic Conditions

- In general, this area is relatively affluent for a rural part of the state. Statewide income and wage averages are usually dominated by the major population centers (Albuquerque and Santa Fe in New Mexico), where wages and earnings are higher. But this region generally compares favorably to the statewide averages.

- The SESA economy is very much dominated by resource extraction. The percentage of jobs in the mining sector is very high, and—bearing in mind the relatively high multipliers associated with these types of jobs—the proportion of the economy supported by extractive industries is substantial. This type of situation is often associated with high wages (and strong fiscal conditions), but can sometimes result in a region also being quite vulnerable to "booms and busts."
- Of the activities occurring on CFO lands, cattle grazing and resource extraction have the most significant economic impact on the SESA. However, recreational opportunities—specifically hunting and OHV use—also provide important socioeconomic benefits for the SESA.
- The SESA as a whole has a high percentage of minorities, most of whom are Hispanic. The communities of Roswell, Dexter, Hagerman, Lake Arthur, Artesia, Loving, Hobbs, Lovington, and Jal all have minority populations over 50% and are thus considered "minority population areas" under environmental justice standards. Other potential environmental justice populations, determined by low-income status, are Hagerman, Roswell, Artesia, and Loving.

CHAPTER 3.

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3.1 SPECIFIC MANDATES AND AUTHORITY

The development of the Carlsbad RMP revision will follow all applicable laws, regulations, and policies. The discussion that follows lists the prominent mandates and authorities but is not comprehensive. The ID Team will continue to refine this list throughout the planning process. For more detail on what is required by these documents, please refer to the original document.

NEPA of 1969 (40 USC 4331 et seq.) and its implementing regulations (40 CFR 1500) apply to federal actions including those relating to resource management. This statute requires authorized officers of federal agencies to perform an environmental analysis and disclose the effects of their decisions on the quality of the human environment. The law further requires the federal authorized officers to identify and describe the significant environmental issues associated with their decisions and to develop alternative to proposed actions (including the alternative of no action). Authorized officers must disclose the direct, indirect, and cumulative effects of the decisions; adverse environmental effects that cannot be avoided; the relationship between short-term uses of the human environment and the maintenance of long-term productivity; and any irreversible or irretrievable commitments of resources made by the decision.

The BLM NEPA Handbook, H-1790-1 was developed to help the BLM comply with the requirements of NEPA, the CEQ's NEPA regulations (40 CFR 1500–1508), and the Department of the Interior NEPA manual. The handbook provides direction for using the "NEPA process," which means taking all measures necessary for compliance with the requirements of the Purpose (Section 2 of NEPA) and the Congressional Declaration of National Environmental Policy (Title 1 of NEPA).

FLPMA of 1976 (43 USC 1700, et seq.) and its implementing regulations (43 CFR 1600) define the principles for the management of public land and its resources. This act directs the Secretary of the Interior to develop, maintain, and, when appropriate, revise land use plans that provide for the use of public land managed on the basis of multiple use and sustained yield unless otherwise specified by law.

BLM Manual 1601, Land Use Planning, and BLM Handbook H-1601-1, Land Use Planning Handbook, provide direction for implementing the BLM land use planning requirements established by Sections 201 and 202 of FLPMA and the regulations found in 43 CFR 1600. The handbook provides direction for preparing, amending, and revising land use plan decisions through the planning process and for maintaining RMPs. The handbook also provides direction for developing implementation plans and program-specific decisions, as well as resource-specific decisions.

The Clean Air Act of 1970 (91 Stat. 685, 42 USC 7401 et seq.), as amended, provides that each state is responsible for ensuring achievement and maintenance of air quality standards within its borders so long as such standards are equal to federal standards established by the EPA.

The Clean Water Act of 1977 (30 USC 1251), as amended, establishes federal standards to restore, and maintain the chemical, physical, and biological integrity of the nation's waters.

Making federal minerals available for development is governed by the following laws:

- General Mining Law of 1872, as amended (30 USC 21)
- Mineral Lands Leasing Act of 1920, as amended (30 USC 181)
- Mineral Leasing Act for Acquired Lands of 1947
- Mining and Minerals Policy Act of 1970, as amended (30 USC 21)
- Surface Mining Control and Reclamation Act of 1977 (30 USC 1201)
- Federal Oil and Gas Royalty Management Act of 1982
- Federal Onshore Oil and Gas Leasing Reform Act of 1987

The management of vegetative resources and livestock grazing overlap and decisions regarding these two issues must conform to the following laws:

- Taylor Grazing Act of 1934, as amended (43 USC 315)
- Carlson-Foley Act of 1968
- Federal Noxious Weed Act of 1975 (7 USC 2801 et seq.)

- Public Rangelands Improvement Act of 1978 (43 USC 1901 et seq.)

Legislation, including FLPMA, the ESA, the Public Rangelands Improvement Act, and the Sikes Act, has directed the BLM to manage habitat to meet wildlife needs in the face of increasing demands for basic energy supplies, ranching, building materials, food products, and recreational opportunities. The BLM's responsibility is to recognize opportunities to maintain, improve, and expand wildlife habitat for both consumptive and non-consumptive use and identify critical wildlife resources deserving special attention. The BLM is also directed to assist state agencies in completing fish and wildlife conservation resource plans.

The Migratory Bird Treaty Act of 1918, as amended (16 USC 703 et seq.), established federal responsibility to protect international migratory birds and authorizes the Secretary of the Interior, through the USFWS, to regulate hunting of migratory birds. The North American Waterfowl Management Plan signed in 1986 between Canada and the United States further sets population goals and how to achieve them.

The Taylor Grazing Act requires cooperation with states and other groups interested in conservation and propagation of wildlife within established grazing districts and provides for fishing and hunting within those districts in accordance with applicable laws.

The Sikes Act of 1960, as amended (16 USC 670 et seq.), requires rehabilitation programs for fish and wildlife, including development of cooperative agreements with state fish and game agencies to carry out such plans. The act also provides for the protection of species listed by the state as threatened or endangered.

The ESA of 1973, as amended (16 USC 1531 et. seq.), requires the BLM to ensure that proposed actions do not jeopardize the continued existence of a threatened or endangered species or cause its critical habitat to be modified or destroyed.

FLPMA recognizes wildlife as a principal land use, requires consideration of wildlife objectives in commodity-oriented programs, and authorizes use of range betterment funds for enhancement of habitat for fish and wildlife.

The Public Rangelands Improvement Act directs that the condition of the public rangelands be improved so that they become as productive as feasible for wildlife habitat and other rangeland values. The act provides for on-the-ground funding of wildlife habitat protection, improvements, and maintenance projects

Other federal laws that may occasionally affect wildlife habitat management actions are the Mineral Leasing Act; the Water Resources Planning Act of 1962 (42 USC 1962 et seq.); the Water Pollution Act; the Watershed Protection and Flood Prevention Act of 1954, as amended (16 USC 1001 et seq.); the Safe Drinking Water Act, as amended (30 USC 1251); the Fish and Wildlife Coordination Act of 1965 (16 USC 661 et seq.); and the Soils and Water Resources Conservation Act of 1977 (16 USC 2001).

Any land use plan, such as the Carlsbad RMP revision, must protect cultural resources. The requirements for this protection and processes are described in the following laws:

- Antiquities Act of 1906 (16 USC 431-433)
- Historic Sites Act of 1935 (16 USC. 461 to 467)
- National Historic Preservation Act of 1966, as amended (16 USC 470)
- Archaeological and Historic Preservation Act of 1974 (16 USC 469)
- American Indian Religious Freedom Act of 1978 (42 USC 1996)
- Archaeological Resources Protection Act of 1979, as amended (16 USC 470 et seq.)
- Native American Grave Protection and Repatriation Act of 1990 (25 USC 301)

The handling, treatment, and disposal of hazardous materials, as well as public notification, are governed by the following laws:

- Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.)

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 USC 9601 et seq.)
- Hazardous and Solid Waste Amendments of 1984 (42 USC 9601 et seq.)
- Superfund Amendments and Reauthorization Act (SARA) of 1986 (42 USC 9601 et seq.)
- Emergency Planning and Community Right to Know Act (EPCRA) of 1986 (42 USC 11004 et seq.)
- Federal Facility Compliance Act of 1992 (42 USC 6901 et seq.)

Several laws enacted by Congress direct the BLM to inventory resources and land condition in regards to recreation on public land. Among those laws are:

- Recreation and Public Purposes Act of 1926, as amended (43 USC 869)
- Wilderness Act of 1964 (16 USC 1131 et seq.)
- National Trails System Act of 1968 (16 USC 1241–1251)
- Wild and Scenic Rivers Act of 1968, as amended (16 USC 1271 et seq.)
- Federal Cave Resources Protection Act of 1988 (16 USC 4301 et seq.)

The requirements of the laws listed above are formulated into the Code of Federal Regulations, known by the initials CFR. The regulations governing the BLM's management of public land generally can be found in Titles 40, 43, and 50 of the CFR. From these regulations, both the USDI and the BLM derive their manuals. Several BLM manual have handbooks to aid the implementation of the regulations. A list of BLM manuals and handbooks are included in Table 3.1- 1.

To meet changing conditions and emerging issues the BLM has developed programmatic plans and strategies that provide guidance for the development of plans, plan amendments, and plan revisions. The Carlsbad RMP revision will conform to the following plans and strategies:

- New Mexico Standards for Public Land Health and Guidelines for Livestock Grazing Management (January 2001)
- BLM National Off-Highway Vehicle Management Strategy (2001)
- BLM National Mountain Bicycling Strategic Action Plan (2002)
- Fire and Fuels Management on Public Land in New Mexico and Texas Resource Management Plan Amendment (2004)
- Wind Energy Programmatic Environmental Impact Statement (PEIS) (2005)
- BLM National Scenic and Historic Trails Strategy and Work Plan (2006)
- Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States PEIS (2007)
- Special Status Species Resource Management Plan Amendment and Record of Decision (2008)
- Westwide Energy Corridor EIS (2009)

As stated earlier in this section, FLPMA directs the Secretary of the Interior to develop land use plans for public land. FLPMA goes further directing the Secretary to coordinate land use planning with state agencies and local governments. FLPMA also directs the Secretary, to the extent practical, to keep apprised of state and local plans, and resolve inconsistencies between federal and non-federal plans.

The Secretary of the Interior has delegated these tasks to the BLM. In preparing to revise the Carlsbad RMP, the BLM notes Chaves County and Eddy County have adopted comprehensive county plans. Per the requirements of FLPMA, during the development of the revised Carlsbad RMP, the BLM will consider the goals in these plans regarding the management of public land.

Table 3.1- 1. BLM Manuals and Handbooks

BLM Manuals
BLM Manual 1610, Land Use Planning
BLM Manual 1613, ACECs
BLM Manual 1737, Riparian and Wetland Management
BLM Manual 1790, NEPA
BLM Manual 3031, Energy and Mineral Resource Assessment
BLM Manual 4180, Rangeland Health Standards
BLM Manual 6302, Consideration of Lands with Wilderness Characteristics in the Land Use Planning Process
BLM Manual 6500, Wildlife and Fisheries Management
BLM Manual 6525, Sikes Act Wildlife Programs
BLM Manual 6600, Fish, Wildlife, and Special Status Plant Resources Inventory and Monitoring
BLM Manual 6840, Special Status Species Management
BLM Manual 7000, Soil, Water, and Air Management
BLM Manual 8110, Identifying Cultural Resources
BLM Manual 8120 and Handbook H-8210-1, Tribal Consultation under Cultural Resources
BLM Manual 8160, Native American Coordination and Consultation
BLM Manual 8300, Recreation Management
BLM Manual 8270, Paleontological Resource Management
BLM Manual 8351, Wild and Scenic River Policy
BLM Manual 8400-1, Visual Resource Management
BLM Manual 9211, Fire Planning
BLM Handbooks
BLM Handbook H-1601-1, Land Use Planning Handbook
BLM Handbook H-1624-1, Planning for Fluid Mineral Resources
BLM Handbook H-1790-1, National Environmental Policy Act Handbook
BLM Handbook H-3070-2, Economic Evaluation of Oil and Gas Properties
BLM Handbook H-3600-1, Mineral Materials Disposal
BLM Handbook H-4120-1, Grazing Management
BLM Handbook H-4180-1, Rangeland Health Standards
BLM Handbook H-8120-1, General Procedural Guidance for Native American Consultation
BLM Handbook H-8410-1, Visual Resource Inventory Handbook
BLM Handbook H-8550-1, Interim Management Policy for Lands under Wilderness Review
BLM Handbook H-8270-1, Paleontological Resource Management
BLM Handbook H-9211-1, Fire Management Activity Planning
BLM Handbook H-9214-1, Prescribed Fire Handbook

CHAPTER 4.

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4.1 SUMMARY OF SCOPING REPORT

4.1.1 Scoping Meetings

Scoping is the term used to describe the early and open process for identifying the issues to be addressed in the planning process. A Notice of Intent (NOI) to prepare the Carlsbad RMP was published in the *Federal Register* on June 10, 2010. This notice served as the beginning of the BLM's formal scoping process for the RMP. The NOI included the following internally identified issues:

- Air Resources (Air Quality and Climate Change)
- Groundwater and Karst Aquifers
- Fluid and Solid Minerals Development
- Renewable Energy (e.g., solar, wind)
- Lands and Realty
- Recreation
- Transportation Management
- Special Designations
- Land Health
- Riparian Areas/Watersheds
- Visual Resources

The BLM hosted 10 public scoping meetings on five days between July 19 and July 27, 2010 (Table 4.1-1). Each meeting lasted three hours and was held from 1:00 p.m. to 4:00 p.m. and from 6:00 p.m. to 9:00 p.m. During these meetings, 71 people registered their attendance. The meetings included a formal presentation followed by an "open house" period. The presentation included an overview of the BLM and the CFO, the planning process, and the purpose of scoping and encouraged attendees to ask questions and provide comments. The open house included presentation boards and maps, as well as a GIS. CFO specialists were available to answer questions and take verbal comments. This format allowed CFO staff to interact with the public in a casual environment.

Table 4.1- 1. Public Meeting Attendance

Meeting Date	Meeting Location	Number in Attendance
July 19, 2010	Artesia High School Auditorium, Artesia	9
July 20, 2010	Pecos River Convention Center, Carlsbad	17
July 22, 2010	Hope Community Center, Hope	9
July 26, 2010	Jal Community Center, Jal	7
July 27, 2010	New Mexico Junior College, Hobbs	29
Total		***71***

An initial mailing list for this planning effort was compiled by updating a list of contacts maintained by the CFO. This list included individuals and companies that operate on federal lands, Special Recreation Permit holders, volunteers, public officials, and other interested parties. The CFO also used the mailing list compiled for the HB In-Situ Solution Mine EIS, an ongoing EIS in the CFO.

The CFO sent information explaining the planning and scoping processes to individuals on the mailing list on July 8, 2010, and posted it on the Carlsbad RMP website. A flyer announcing the scoping meetings was posted in communities in the planning area, including Artesia, Carlsbad, Hobbs, and Jal. Several other methods were used to advertise the open house meetings and the scoping period for the CFO RMP, described below.

The Carlsbad RMP/EIS public scoping process began with the publication of an NOI in the *Federal Register* on June 10, 2010. The NOI announced the BLM's intent to revise the RMP for the CFO, prepare an EIS, and conduct public scoping. It also included contact information for the CFO in order to enable the public to obtain more information about the process.

The BLM prepared a media release to introduce the project, announce the scoping meetings, and invite the public to provide input. The news release was issued to various New Mexico media, including the Carlsbad Current-Argus, Artesia Daily Press, and Associated Press. The Carlsbad Current-Argus and the Artesia Daily Press published stories on the RMP revision. The story was also carried on the Associated Press newswire.

The BLM established the Carlsbad RMP website on the CFO website in June 2010. The website is updated regularly and includes postings of all BLM news releases regarding the plan, information about the planning process, a planning schedule, a copy of the preparation plan, a schedule of the scoping meetings, a map of the planning area, the NOI, and other information as it becomes available. The BLM New Mexico State Office website also links to the Carlsbad RMP website.

4.1.1.1 Other Briefings and Coordination Efforts

Members of the ID Team and the CFO field managers have conducted briefings and presentations on the Carlsbad RMP for several groups. Many of these presentations provided regularly scheduled coordination meetings, but others were given at the group's request. The presentations and meetings included:

- Multiple use interface with ranching community, oil and gas and potash industry (Carlsbad, May 4, 2011)
- Socioeconomics strategies workshop (Carlsbad, November 15, 2011; Hobbs, November 16, 2011)
- Resource Advisory Council (RAC) meeting (January 18, 2012)
- Public workshops for VRM, travel, and special designations (Carlsbad, February 1, 2012; Artesia, February 2, 2012)
- Public Lands Advisory Council (Roswell, February 9, 2012)

Cooperating agency status provides a formal framework for government agencies to engage in active collaboration with a federal agency to implement the requirements of NEPA. Federal and state agencies and local and tribal governments may qualify as cooperating agencies if they have "jurisdiction by law or special expertise" (40 CFR 1501.6 and 1508.5). The BLM has invited the following agencies to participate as cooperating agencies:

- Bureau of Indian Affairs
- Bureau of Reclamation
- Carlsbad Irrigation District
- Carlsbad Soil and Water Conservation District
- Chaves County Commission
- City of Artesia
- City of Carlsbad
- City of Eunice
- City of Hobbs
- City of Jal
- City of Lovington
- Department of Energy
- Eddy County Commission
- Environmental Protection Agency
- Federal Highway Administration
- Lea County Commission
- Lea Soil and Water Conservation District
- Carlsbad Caverns National Park
- Guadalupe Mountains National Park
- Natural Resource Conservation Service
- New Mexico Department of Agriculture
- New Mexico Department of Cultural Affairs
- New Mexico Department of Game and Fish
- New Mexico Department of Transportation
- New Mexico Energy, Minerals and Natural Resource Department
- New Mexico Environment Department
- New Mexico State Land Office
- Office of the State Engineer
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geologic Survey

The following agencies expressed an interest in becoming cooperating agencies:

- Carlsbad Irrigation District
- Carlsbad Soil and Water Conservation District

- City of Eunice
- Department of Energy
- Carlsbad Caverns National Park
- Natural Resources Conservation Service
- New Mexico Department of Cultural Affairs – Historic Preservation Division
- New Mexico Department of Game and Fish
- Office of the State Engineer
- U.S. Fish and Wildlife Service

On September 24, 2010, the BLM hosted a meeting with these agencies to discuss the role of cooperating agencies in the RMP process. The BLM has signed seven memoranda of understanding with the following agencies formalizing the cooperating agency relationship:

- U.S. Department of Energy
- Carlsbad Irrigation District
- Carlsbad Soil and Water Conservation District
- City of Eunice
- City of Jal
- Lea County Water Users Association
- Natural Resources Conservation Service

The USGS and the NMED indicated they wish to be involved in the RMP process informally.

Although no scoping meetings were held specifically for agencies, the BLM has contacted key federal, state, and local agencies to initiate coordination and collaborative efforts that will continue throughout the RMP/EIS process. As described above, the BLM has invited key agencies to formally participate as cooperating agencies. The BLM will continue to reach out to and accept comments from any agencies that choose not to become cooperating agencies. The BLM will also complete all required consultations as described in Appendix C of the BLM Land Use Planning Handbook (H-1601-1).

A RAC is a committee established by the Secretary of the Interior to provide advice or recommendations to BLM management (BLM Land Use Planning Handbook H-1601-1). The BLM New Mexico RAC provides input on BLM decisions from local community members, concerned citizens, and government officials of all levels. The New Mexico RAC includes a panel of mixed expertise and balanced interests ranging from natural resources and Native American culture to energy and mineral development. The BLM New Mexico RAC has been inactive since 2008 and was reformed as District RACs. The CFO will brief the members of the Pecos District RAC about the RMP revision and seek input on the planning process. The CFO will provide updates to the RAC throughout the planning process.

4.1.1.2 Tribal Consultation

The following seven tribes have traditional uses in the planning area:

- Apache Tribe of Oklahoma
- Comanche Indian Tribe
- Hopi Tribal Council
- Kiowa Tribe of Oklahoma
- Pueblo of Isleta
- Mescalero Apache Tribe
- Ysleta del Sur Pueblo

On August 31, 2010, the BLM sent a letter to each of the tribes that invited and encouraged them to become cooperating agencies. The BLM followed up the letter with a telephone call and an invitation to meet in person. As of the publication of this report, none of the tribes have decided to become cooperating agencies. The invitation to become a cooperating agency will remain open throughout the planning process.

Summary of Public Comments

The BLM received comments from 30 individuals (Table 4.1- 2). Twelve individuals commented at public meetings and 18 letters were received by mail, email, or hand-delivered to the CFO. All scoping comment letters were read, revealing 345 specific comments that could be categorized into 11 issues and 18 subject categories.

Table 4.1- 2. Geographic Distribution of Commenters

City	Number of Commenters
Albuquerque	2
Artesia	2
Carlsbad	13
Denver	1
Eunice	1
Hobbs	1
Houston	1
Jal	3
Loving	1
Oklahoma City	1
Roswell	2
Santa Fe	1
Unknown	1

The Public Scoping Report for the Carlsbad Field Office Resource Management Plan Revision/ Environmental Impact Statement was released for public review on May 13, 2011, and is available at http://www.blm.gov/nm/st/en/fo/Carlsbad_Field_Office/carlsbad_rmp.html. The public comments do not necessarily represent the views of the BLM or guarantee that the BLM will take any particular action or choose any particular alternative.

The following is a sample the public comments made during the scoping period:

- Several commenters felt the BLM should consider the impacts of air quality in its planning process.
- One commenter suggested the BLM consider more carbon sequestration.
- One commenter urged that water for drilling operations be considered a temporary use. Commenters felt that groundwater and aquifers need to be closely monitored, and one recommended specific protection for the Capitan Aquifer.
- In particular, there was concern about the impacts of oil and gas development, including leaks and spills, on groundwater quality and quantity. The commenters felt that additional development would result in contaminated aquifers.
- A commenter believed surface retention ponds for mines and the proposed solution mining project pose just as significant, if not greater, potential harm to these resources.
- Several comments addressed the development of requirements for oil and gas development.
- Several commenters expressed concern over the proper disposal of produced water. One commenter was particularly concerned with illegal dumping of produced water and requested the BLM develop an education plan and no tolerance policy in the event a water hauler is discovered dumping toxic water.
- Another commenter expressed concern that potash was not adequately addressed in the Preparation Plan or NOI, “despite the fact that the planning area provides approximately 80% of the United States’ potash production and the United States imports 85% of the potash used by our nation’s farmers to grow the crops to feed this country.”
- One commenter asked, what additional management actions, best management practices, and mitigation measures are necessary to “enhance or protect” potash resource development in the Potash Area?
- One commenter asked, how should BLM facilitate potash and oil and gas development in the Potash Area while allowing for appropriate protection of public lands and resources?

- Commenters were generally supportive of renewable energy development. One commenter stated that the BLM should consider more wind and solar farms.
- One commenter worried about pipelines not respecting the current trails or providing for alternative routes when the pipelines cross trails in recreation areas.
- Several commenters were interested in preserving, designating, and increasing areas and public access for horseback riding. One commenter suggested that corridors for horseback riding be developed with limited intrusions.
- One commenter was especially interested in keeping the designated OHV areas open for public use and having a plan that will allow all users of public land to work together to protect each group's right to access public land.
- Another commenter felt that current boundaries for OHV designation should be maintained and not expanded, and another stated that the BLM needs to be more proactive in recreation.
- One commenter stated recreational and hunting access can result in a loss of forage and damage to private property.
- A commenter wanted discussion and stated planning needs to take place regarding problems related to the disposal of trash, vandalism of private property, and off-road driving.
- One commenter was concerned that non-consumptive plant and wildlife observation was not identified as a recreation opportunity and stated that the BLM should recognize the importance of healthy bird communities and the economic benefits of attracting birders and other nature observers to visit the area.
- One commenter expressed interested in transportation and potential impacts of motorized traffic on roads and trails within BLM-managed land as they relate to wildlife and habitat fragmentation.
- Several commenters were concerned about the open designation for cross-country motorized vehicle use and would like to see most of the planning area designated as limited to existing roads and trails. One commenter would like to see the Pecos and Delaware River corridors closed to cross-country motorized vehicle use.
- One commenter wanted all current ACECs to be carried forward. The commenter recommended that each of these sites be evaluated with an eye on biodiversity, disturbance threats, management problems, and presence of threatened and endangered species and other species of concern.
- A commenter stated areas considered for Wilderness protection should include the area at the mouth of Big Canyon, the BLM land to the north of Carlsbad Caverns National Park, and a sand hills area in eastern Eddy County.
- A commenter stated Pierce and Cedar Canyons should be designated as special use areas.
- A commenter proposed an ACEC for the Delaware watershed west of the Yeso Hills RNA. This proposal will include several springs and expanses of gypsum soils. The Delaware River-Yeso Hills ACEC proposal will include a large variety of plants and over 200 vertebrate species.
- A commenter stated the Delaware River should be nominated for inclusion into the NWSRS.
- A commenter stated the BLM should manage the salt lakes and dry playas east of Loving and north of the Carlsbad-Hobbs Highway as a single ACEC unit.
- One commenter stated all the desert heronry areas where great blue herons nest should be considered for ACECs.
- A commenter wanted the BLM to revisit the idea of a scenic byway through Dark Canyon.
- One commenter stated that the Conservation Reserve Program and Soil Bank's (precursors to the NRCS) policies decreased the lesser prairie-chicken habitat. To increase habitat, the BLM should plant seeds with nutrition (e.g., broom corn and mylow) and turn lose feral hogs so the lesser prairie-chickens can eat the hog scat.
- One commenter supported activities that will bring back and/or enhance native grasslands and riparian areas.
- Commenters were concerned with water quality. One commenter stated that riparian areas account for less than 1% of habitat in New Mexico, yet over 75% of endangered and threatened species in the state require such habitat for a major portion of their life cycle.

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6.1 GLOSSARY

ACQUIRED LANDS. Lands in Federal ownership which were obtained by the government through purchase, condemnation, gift, or exchange.

ACRE-FOOT (AC-FT). Volume of water that will cover one acre of land to a depth of one foot; equals 43,560 cubic feet or 325,851 gallons.

ACTIVE LESSER PRAIRIE-CHICKEN LEK SITE. A lek is considered active when, with sufficient annual surveys, two or more males have been seen strutting during the mating season at least one year out of the last five.

ADJUDICATION. A formal court proceeding which results in the determination of the validity and extent of a water right.

AERIAL PHOTOGRAPHY. Photographs taken of the earth's surface from an aircraft. Both color and infra-red aerial photos can be produced which show surface features. Photographs can indicate vegetation changes and water content associated with fractures where caves may be located.

AGGREGATE. Any of several hard, inert materials, such as sand, gravel, slag, or crushed stone, used for mixing with a cementing or bituminous material to form concrete, mortar, or plaster, or used alone, as in railroad ballast or graded fill.

AIR POLLUTION. The general term alluding to the undesirable addition of substances (gases, liquids, or solid particles) to the atmosphere that are foreign to the natural atmosphere or are present in quantities exceeding natural concentrations.

ALKALI LAKES. Shallow plate-like depressions in central portions of basins that drain internally, collect runoff and evaporate rapidly; salt playas.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLOTMENT CATEGORIES. Allotments were placed in one of three categories based on BLM criteria shown below. The criteria for each category were numerous and seldom would an allotment meet all criteria for a category.

I or "Improve" category:

- present range condition is unsatisfactory • allotments have a moderate or high resource production potential, and are producing at low to moderate levels
- serious resource-use conflicts/controversy exist
- opportunities exist for positive economic return from public investments
- present management appears unsatisfactory

M or "Maintain" category:

- present range condition is satisfactory
- allotments have a moderate or high resource production potential, and are producing near their potential (or trend is moving in that direction)
- no serious resource-use conflicts/controversies exist • opportunities may exist for positive economic return from public investments
- present management appears satisfactory

C or "Custodial" category:

- present range condition is not a factor • allotments have a low resource production potential, and are producing at low to moderate levels
- limited resource-use conflicts/controversy may exist

- opportunities for positive economic return on public investments do not exist or are constrained by technological or economic factors
- opportunities exist to achieve the allotments potential through changes in management

ALLOTMENT MANAGEMENT PLAN (AMP). A livestock grazing activity plan for a specific allotment based on multiple-use resource management objectives. The AMP considers livestock grazing in relation to other uses of the rangelands and in relation to renewable resources (i.e., watershed, vegetation and wildlife). An AMP includes the seasons of use, number of livestock permitted on the allotment, grazing system, and the rangeland developments needed. AMPs are prepared in consultation, cooperation and coordination with the permittee(s), lessee(s) or other involved affected parties.

ANIMAL UNIT MONTH (AUM). The amount of forage necessary for the sustenance of one cow with a nursing calf or its equivalent for a period of one month.

ANNUAL WATER YIELD. The total stream flow volume that passes a specified point in a watershed during a year. It generally equals total precipitation and irrigation, less evapotranspiration losses and deep seepage losses.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Areas within the public land where special management attention is needed to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and provide safety from natural hazards.

AUTHORIZED OFFICER. Any person authorized by the Secretary of the lnterior to administer regulations.

AVOIDANCE AREA. An environmentally sensitive area where rights-of-way would be granted only in cases where there is a prevailing need and no practical alternative location exists, and then only with appropriate provisions to protect the sensitive environmental components.

BENEFICIAL USE. The basis, the measure, and the limit of a water right. Agricultural, commercial, industrial, and recreational uses are all considered to be beneficial.

BERM. An embankment or mound of earth or other material. Examples of the use of a berm include use around a tank battery in an oil field to contain spilled fluids or as a barrier across a road or trail to prohibit travel by motor vehicles.

BEST MANAGEMENT PRACTICE (BMP). Methods, measures, or practices selected on the basis of site-specific conditions to ensure environmental quality will be maintained or restored to its highest practicable level. BMPs include, but are not limited to structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, or after activities to reduce or eliminate impacts to soil, air, water or vegetation resources.

BIODIVERSITY. Refers to the variety of life and its processes and includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

CALICHE. A brown or white material commonly found as a subsoil deposit in and or semi-arid climates which is composed largely of calcium carbonate.

CAVE. Any naturally occurring void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge (including any cave resource therein, but not including any vug, mine, tunnel, aqueduct, or other manmade excavation) and which is large enough to permit an individual to enter, whether or not the entrance is naturally formed or manmade. The term "cave" includes any natural pit, sinkhole, or other feature which is an extension of the entrance. Refer also to "Significant Cave."

CAVE EXPLORATION. The act of entering a naturally occurring void, cavity, recess or system of interconnected passages which occurs beneath the surface of the earth, ledge, or cliff to investigate, study or analyze contents, hazards and extent; to travel into new territories for adventure or discovery.

CLASSIFICATION OF LANDS. The process of determining whether the lands are more valuable or suitable for transfer or use under particular or various public land laws than for retention in federal ownership for management purposes.

COMMERCIAL USE. Defined as recreational use of the public lands and related waters for business or financial gain. When any person, group, or organization makes or attempts to make a profit, receive money, amortize equipment, or obtain goods or services, as compensation from participants in recreational activities occurring on public lands, the use is considered commercial. An activity, service, or use is commercial if anyone collects a fee or receives other compensation that is not strictly a sharing of, or is in excess of, actual expenses incurred for the purposes of the activity, service or use. Commercial use is also characterized by situations where a duty of care or expectation of safety is owed participants as a result of compensation. It may also be characterized by public advertising for participants.

Use by scientific, educational, and therapeutic institutions or non-profit organizations is considered commercial when the above criteria are met and subject to a permit when the above conditions exist. Non-profit status of any group or organization does not, in itself, determine whether an event or activity arranged by such a group or organization is noncommercial. Profit-making organizations are automatically classified as commercial, even if that part of their activity covered by the permit is not profit-making.

COMMUNITY. A group of plants and animals living together in a common area having close interactions.

COMMUNITY PIT. A site from which nonexclusive disposals of mineral materials can be made.

COMPETITIVE USE. Any organized, sanctioned, or structured use, event, or activity on public land in which two or more contestants compete and any of the following elements apply:

(1) Participants register, enter, or complete an application for the event; or
(2) A predetermined course or area is designated.

It also means one or more individuals contesting an established record such as speed or endurance.

CONDITION OF APPROVAL (COA). A requirement appended to a use authorization that must be met in order to be in conformance with the authorization. Conditions of approval may be standard practices that are routinely applied or may be special requirements developed through the NEPA process. Conditions of approval usually are applied to mitigate the impacts of an action. Conditions of approval do not modify any rights granted by a lease (e.g., an oil and gas lease). **CONSERVATION (ARCHAEOLOGY).** A level of management applied to cultural resources exhibiting uniqueness or relative scarcity of similar cultural properties; research potential that surpasses current state of the art; or singular historic importance or architectural interest.

COORDINATED RESOURCE MANAGEMENT PLAN. A plan for management of one or more grazing allotments that involve all the affected resources, e.g., range, wildlife, watershed, minerals, and recreation.

CORRIDOR. A linear strip of land forming a passageway between two points in which transportation and/or utility systems exist or may be located. A designated corridor is the preferred location for existing and future rights-of-way grants that have been identified by law, by secretarial order, through land use planning, or by other management decision.

CRITICAL HABITAT. Any air, land, or water area, including elements thereof, which have been determined (and published in the *Federal Register*) to be essential to the survival of wild populations of an endangered or threatened species or to be necessary for their recovery to a point at which the measures provided pursuant to the ESA are no longer necessary.

CULTURAL RESOURCE. The fragile and nonrenewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human events. These resources consist of physical remains, areas where significant human events occurred even though evidence of the event no longer remains, and the environment immediately surrounding the actual resource and oral history or ethnographic accounts of life ways and customs.

DESIGNATION. The official identification and naming of a general area or site on public land. Lands may be designated when they are either (1) withdrawn, (2) given special status by act of Congress, or (3) established by an approved land use plan.

DESIGNATED USES. Surface water uses specified by the Water Quality Control Commission for which water quality standards have been established. Designated uses apply whether or not they are being attained.

DESIRED PLANT COMMUNITY (DPC). The plant community which provides the vegetation attributes required for meeting or exceeding RMP vegetation objectives. The DPC must be within an ecological site's capability to produce these attributes through natural succession, management action, or both. A specific description of the vegetation needed to meet the vegetation objectives of a detailed activity plan or implementing action can be described as a desired plant community. Seeding mixtures under DPC would emphasize the use of native species and avoid noxious weeds and exotic species.

DISTRICT. The specific area of public land administered by a District Manager.

DIVERSION. A man-made construction that diverts water from its natural source to be put to beneficial use.

DIVERSITY. The relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit area.

DRAINAGE. A term used in oil and natural gas extraction meaning the pool of either resource is “drained” or removed either through existing pressure or pumping. These pools may extend beyond the surface ownership boundaries and a well drilled on one surface owner may drain the resource underneath an adjacent surface owner.

DRASTIC. A method developed by the U.S. Environmental Protection Agency for evaluating the potential for groundwater pollution. The name "DRASTIC" is an acronym for the seven hydro geologic factors that the method uses to produce the Drastic Index. The Index is a numerical value which helps prioritize areas with respect to groundwater contamination vulnerability. The factors are: Depth to water; Recharge; quifer media; Soil media; Topography (i.e., slope); Impact of the vadose zone; and, Conductivity (hydraulic) of the aquifer.

ECOLOGICAL SITE INVENTORY (ESI). The effort and documentation needed to establish realistic, achievable, and measurable vegetation management objectives.

ECOSYSTEM. A complex self-sustaining natural system which includes living and nonliving components of the environment and the circulation of matter and energy between organisms and their environment.

ENDANGERED SPECIES (FEDERAL). An animal or plant species whose prospects of survival and reproduction are in immediate jeopardy and in danger of extinction throughout all or a significant portion of its range, as defined by the USFWS under the authority of the Endangered Species Act of 1973, as amended. Whether a species is threatened or endangered is determined by the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) over utilization for commercial, sporting, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors. Also, see "Threatened Species (Federal)" in the Glossary.

ENDANGERED SPECIES (STATE). Any species or subspecies whose prospects of survival or recruitment in New Mexico are in jeopardy. Also, see "Threatened Species(State)" in the Glossary.

ENVIRONMENTAL ASSESSMENT (EA). The procedure for analyzing the impacts of some proposed action on a given environment and the documentation of that analysis. An EA is similar to an environmental impact statement (EIS) but is generally smaller in scope. An EA may be preliminary to an EIS.

ENVIRONMENTAL IMPACT STATEMENT (EIS). The procedure for analyzing the impacts (both beneficial and adverse) of a proposed action on a given environment, and the documentation of that analysis.

ENVIRONMENTAL JUSTICE). The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP). A voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land.

EPHEMERAL. A stream or portion of a stream that flows in direct response to precipitation, lasts for a short period of time, and is not influenced by ground water sources. Also pertains to playa lakes which can be intermittently wet.

EXCEPTION. Case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites within the leasehold to which the restrictive criteria apply.

EXCHANGE. A trading of public land (surface or subsurface estates) that usually does not have high public value, for lands in other ownerships which do have value for public use, management and enjoyment. The exchange may be for the benefit of other Federal agencies as well as the BLM.

EXCLUSION AREAS. Areas where future rights-of-way may be granted only when mandated by law.

EXTENSIVE RECREATION MANAGEMENT AREA (ERMA). Areas where recreation is unstructured and dispersed and where minimal recreation-related investments are required. ERMAs provide recreation visitors the freedom of choice with minimal regulatory constraint. These areas consist of the remainder of land areas not included in Special Recreation Management Areas within a District or Field Office area.

FEDERAL CAVE RESOURCES PROTECTION ACT (FCRPA) OF 1988. The purposes of this act are (1) to secure, protect, and preserve significant caves on Federal lands for the perpetual use, enjoyment, and benefit of all people; and (2) to foster increased cooperation and exchange of information between governmental authorities and those who utilize caves located on Federal lands for scientific, education, or recreational purposes.

FEDERAL LAND. Land owned by the United States and administered by the Federal government. Federal land includes public land (see Public Land in the Glossary).

FEDERAL LAND POLICY AND MANAGEMENT ACT (FLPMA) OF 1976. Public Law 94-579, gives the BLM legal authority to establish public land policy; to establish guidelines for administering such policy; and to provide for the management, protection, development, and enhancement of the public land. Often referred to and pronounced "flipma."

FEDERAL RESERVED WATER RIGHT. A water right which is reserved by the Federal government when land is withdrawn from the public domain for a particular purpose, such as National parks, forests, and monuments. The amount of water reserved is only that necessary to fulfill the intended purpose.

FIELD OFFICE. The smallest administrative subdivision of a BLM district. A Field Office is administered by a Field Manager and is the equivalent of a resource area.

FIRE MANAGEMENT UNIT (FMU). A land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, etc. that set it apart from the characteristics of an adjacent FMU. The FMU may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

FIRE REGIME CURRENT CONDITION CLASS (FRCC). A qualitative measure classified into three classes describing the relative degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings.

FLOODPLAIN. See "One Hundred-Year Floodplain" in the Glossary.

FLOWLINE. The surface pipe through which oil, water, or gas travels from a well to processing equipment or to storage.

FRAGILE SOIL. A soil that is easily damaged by use or disturbance. Examples include soils that are susceptible to compaction or other mechanic damage to their structure, or soils that are highly erodible when disturbed.

GEOGRAPHIC INFORMATION SYSTEM (GIS). Through the use of computer technology, GIS allows the input, storage, analysis, and display of a great volume and variety of physically locatable data (i.e., data which is known to exist at some specific place or area on the ground).

GRANT. A gift of public land either in quantity or in place. Also, the document or the action which conveys land or an interest in land.

GRAZING CAPACITY. The maximum livestock stocking rate possible without inducing damage to vegetation or related resources such as watershed. This incorporates factors such as suitability of the rangeland for grazing a well as the proper use which can be made on all of the plants within the area. Normally expressed in terms of acres per animal unit month (AC/AUM) or sometimes referred to as the total AUMs that are available in any given area, such as an allotment. Areas that are unsuitable for livestock use are not computed in the grazing capacity. Grazing capacity may or may not be the same as the stocking rate.

GRAZING DISTRICT. Means the specific area within which the public land are administered under Section 3 of the Taylor Grazing Act. Public land outside grazing district boundaries is administered under Section 15 of the Taylor Grazing Act.

GROUND WATER. Subsurface water contained in interconnected pores between soil or rock particles in a zone of saturation. Groundwater includes underground lakes and streams in karst areas.

HABITAT. The place where an animal or plant normally lives during its life cycle often characterized by dominant food, cover, water, and space (e.g., the stream habitat, the forest habitat).

HABITAT MANAGEMENT PLAN (HMP). A written and officially approved plan for a specific geographical area of public land which identifies wildlife habitat and related objectives, establishes the sequence of actions for achieving objectives, and outlines procedures for evaluating accomplishments.

HAZARDOUS MATERIAL. Any substance posing a threat to the health or safety of persons or the environment. These includes but is not limited to RCRA hazardous wastes, CERCLA and CWA hazardous substances, DOT hazardous materials, OSHA hazardous chemicals, SRA Title III toxics and extremely hazardous substances, and biological and disease-causing agents.

HISTORICAL USE. The average of the highest two use seasons in the preceding five-year period.

INFORMATION (ARCHAEOLOGY). A level of management applied to cultural resources. Most sites fall into this category and would be studied for the information that could be retrieved from them. The process of extracting information often destroys the site. These sites could be lithic scatters, campsites and other types of sites.

INTERMITTENT STREAM. A stream that does not flow year round but has some association with ground water for surface or subsurface flows.

KARST. A landform where the topography has been formed chiefly by the dissolving of rock. In some cases, the dissolving of rock may be extensive enough to form passages through which an individual could pass. Surface expressions include sinking streams, swalletts, springs and resurgences, and the presence of sinkholes and caves. Surface streams are few, with most of the drainage being underground. These features are important for groundwater recharge of karst systems.

LEASABLE MINERALS. See Mineral Materials.

LEASE. An authorization to possess and use public land for a fixed period of time (usually long-term). Also, any contract, profit-share arrangement, joint venture, or other agreement issued or approved by the United States Government under a mineral leasing law that authorizes exploration for, extraction of, or removal of oil and gas resources.

LEASE NOTICE. An attachment to an oil and gas lease that transmits information at the time of lease issuance to assist a lessee in submitting acceptable plans of operation, or to assist in administration of leases. A Lease Notice is used to disclose a situation or condition known to exist that could affect lease operations. Lease Notices are not a basis for denial of lease operations.

LEGAL ACCESS. In the context of access to public land, especially public land tracts that may be adjacent to or surrounded by land of other ownerships, legal access exists when a person can reach a given public land tract without trespassing, such as from a public road or highway, or from another tract of public land. (See "Physical Access.")

LENTIC. Pertaining to static, calm, or slow moving water or aquatic habitats, such as a marsh.

LEK. A specific area (also termed display, gobbling, booming or strutting grounds) where two or more prairie chicken cocks congregate, typically year after year, for courtship displays in early spring, and vary in size from one-eighth acre to several acres.

LOCATABLE MINERALS. Minerals subject to disposal and development through the Mining Law of 1872 (as amended). Includes all "valuable mineral deposits" including metallic and nonmetallic minerals such as gold, lead, barite, fluorspar or high calcium limestone. It also includes uncommon varieties of sand, stone, gravel, cinders, pumice, pumicite and clay. Also included are all valuable minerals that are not excluded under the leasable and salable minerals.

MANAGEMENT FRAMEWORK PLAN (MFP). A planning decision document now replaced by RMPs that establishes for a given planning area land use allocations, coordination guidelines for multiple use, and management objectives to be achieved for each class of land use or protection.

MINERAL MATERIALS. Minerals such as common varieties of sand, stone, gravel, pumice, pumicite and clay which are not obtainable under the mining or leasing laws but which can be obtained under the Materials Act of 1947, as amended. Also known as saleable minerals.

MODERN URBAN. Areas with recreation opportunities to experience affiliation with individuals and groups are prevalent as in the convenience of sites and opportunities. Experiencing the natural environment and the use of outdoor skills are largely unimportant. One of the six classes of the Recreation Opportunity Spectrum (ROS).

MODIFICATION. A fundamental change in the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exemption from or an alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites within the leasehold to which the restrictive stipulation applies.

MULTIPLE USE MANAGEMENT. Management of public land and their various resource values so they are used in the combination best meeting the present and future needs of the American people. Such a concept allows for the most judicious use of some or all of the resources over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions. Relative resource values are considered, not necessarily the combination of uses that would give the greatest potential economic return or the greatest unit output.

NATIONAL REGISTER OF HISTORIC PLACES. A list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture.

NATIONAL TRAILS SYSTEM. The National Trails System is composed of four types of trails: (1) national recreation trails; (2) national scenic trails; (3) national historic trails; and (4) connecting or side trails. National recreation trails provide for numerous outdoor recreation activities in a variety of urban, rural, and remote areas. They may be designated by the Secretary of the Interior or by the Secretary of Agriculture where lands administered by that agency are involved.

NONCOMMERCIAL USE. A recreational activity on public land or related waters where actual expenses are shared equally among all members or participants. Any person, group, or organization seeking to qualify as noncommercial must establish to the satisfaction of BLM that no financial or business gain will be derived from the proposed use. Fund raising, for any purpose, renders an activity a commercial use.

NONPOINT SOURCE POLLUTION (NPS). The alteration of waters by activities not regulated as point sources, which degrade the quality or adversely affect the biological community inhabiting the waters.

NO SURFACE OCCUPANCY (NSO). A condition of surface use attached to a lease or other authorization applied to minerals exploration and development which prohibits occupancy of only the land surface or to protect other identified resource values.

NOXIOUS WEED. A plant that causes disease or has other adverse effects on the human environment and is, therefore, detrimental to the agriculture and commerce of the United States and public health. Generally, noxious weeds possess one or more of the characteristics of being aggressive and difficult to manage, parasitic, a carrier or host of harmful insects or disease, and being either native, new to, or not common in, the United States. In most cases, however noxious weeds are normative species. Noxious weeds are designated and regulated by various state and Federal laws.

OCCUPIED LESSER PRAIRIE-CHICKEN HABITAT. All areas within 1.5 miles of an active lesser prairie chicken site, regardless of vegetation that has been active for one out of the last 5 years. Upon discovery of a previously unknown active sites, the surrounding 1.5-mile radius circle is considered occupied habitat.

OCCUPIED RAPTOR NEST. An occupied raptor nest is defined as a large stick nest with the observation of one or more raptors within the nest or within the immediate vicinity of the nest and/or evidence of raptor occupation (e.g. recent nest material, prey remains) during the breeding season (March – June).

OFF-HIGHWAY VEHICLE (OHV). Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) any nonamphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency

purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used for national defense.

Open: Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner not causing, or unlikely to cause significant, undue damage to or disturbance of the soil, wildlife, wildlife habitat, improvements, cultural, or vegetative resources of other authorized uses of the public land.

Limited: Designated areas and trails where the use of an OHV is subject to restrictions, such as limiting the number on types of vehicles allowed, or dates and times of use (seasonal restrictions); limiting use to designated roads and trails. Combinations of restrictions are possible, such as limiting use to certain types of vehicles during certain times of the year.

Closed: Designated areas, roads, and trails where the use of an OHV is permanently or temporarily prohibited. Emergency use of vehicles allowed.

ONE HUNDRED-YEAR FLOOD. The flood that will be equaled or exceeded an average of once every 100 years; i.e. the flood that has a one percent chance of being equaled or exceeded in any given year.

ONE HUNDRED-YEAR FLOODPLAIN. The area adjacent to a stream or body of water that would be inundated at the peak of the one hundred-year flood. The floodplain delineated on Flood Insurance Rate Maps (FIRMS) or Flood Hazard Boundary Maps (FHBMS) published by the Federal Emergency Management Agency will be used for management purposes. When a FIRM or FHBM map is not available for the area of interest, the best available information will be used.

OPERATING PLAN. An applicant's/permittee's plan to conduct their activity or event on public lands or related waters in conjunction with a Special Recreation Permit. An operating plan will describe at a minimum how services will be delivered, how an event will be conducted, and describes measures that will be implemented to protect resources and provide for public health and safety.

ORGANIZED GROUP ACTIVITY OR EVENT. A structured, ordered, consolidated, or scheduled event or occupation of public lands for the purpose of recreational use that is not commercial or competitive, and which BLM has determined needs a special recreation permit based on planning decisions, resource concerns, potential user conflicts, or public health and safety.

PAYMENT IN LIEU OF TAXES (PILT). Payments to local or state governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing.

PERENNIAL STREAM. Surface water normally flows throughout the year except during infrequent years of drought.

PERMIT (GRAZING). A document authorizing use of the public land within grazing districts under Section 3 of the Taylor Grazing Act for the purpose of grazing livestock.

PERMIT. An authorization, revocable by or at the discretion of BLM, to utilize public lands for a fixed period of time. A permit conveys no possessory interest in the land.

PERMITTEE. An individual, group or organization who has fulfilled all the requirements for and has been awarded a permit.

PETROGLYPH. A form of rock art manufactured by incising, scratching, or pecking designs into rock surfaces.

PHREATOPHYTE. A type of plant common to add regions which has an extensive root system to draw water directly from the water table.

PHYSICAL ACCESS. In the context of access to public land, especially public land tracts that may be adjacent to or surrounded by land of other ownerships, physical access exists when a person can physically reach a given public land tract. The existence of physical access does not always mean that legal access exists. In some cases, taking advantage of physical access may involve trespass. (See "Legal Access.")

PIPELINE. A system of connected lengths of steel or plastic pipe, laid either in the earth or on the surface that is used for transporting petroleum, petroleum products, chemicals, natural gas, or other fluids.

PLAYA. A shallow, nearly level, often saline, dry lake bed. Playas vary considerably in materials, salinity, and hydrologic regime. In general, playas: (1) collect surface runoff in closed basins; (2) are poorly vegetated; (3) are ephemerally flooded; and (4) have a thin surface of non-gravelly, fine-textured sediment.

POINT SOURCE POLLUTION. Pollution discharged from any discernible, confined, and discrete conveyance into a water body; e.g., effluent from a pipe. Point source pollution does not include return flow from irrigated agricultural land.

POTENTIALLY SUITABLE LESSER PRAIRIE-CHICKEN HABITAT. Unoccupied areas of appropriate vegetation type, but in patches of less than 320 acres and/or falling within Robel impact/avoidance distances around infrastructure.

PRECIPITATION. Any or all forms of water particles, liquid or solid, which fall from the atmosphere and reach the ground.

PRESCRIBED FIRE. Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements (where applicable) must be met, prior to ignition.

PRESCRIPTION. A written statement defining objectives to be attained as well as temperature, humidity, wind direction and wind speed, fuel moisture content, and soil moisture under which a fire will be allowed to burn, generally expressed as acceptable ranges of the various indices, and the limit of the geographic area to be covered.

PRIMITIVE (P). Areas with recreation opportunities for isolation from the sights and sounds of man, to feel a part of the natural environmental, to have a high degree of challenge and risk, and to use outdoor skills. One of the six classes of the Recreation Opportunity Spectrum (ROS).

PUBLIC LAND. Any land and interest in land owned by the United States within the several states and administered by the Secretary of the Interior through the Bureau of the Land Management, without regard to how the United States acquired ownership, except (1) land located on the Outer Continental Shelf; and (2) land held for the benefit of Indians, Aleuts, and Eskimos.

PUBLIC VALUES AND INTERPRETATION (ARCHAEOLOGY). A level of management of cultural sites which contribute to the belief systems and folkways of a cultural group such as locations having religious significance. Public interpretive sites would have qualities that would lend themselves to being utilized as recreation, education, and interpretive areas.

QUARRYING (MINING). The extraction of building stone or other valuable nonmetallic constituent from a surface mine, or quarry.

RANGE IMPROVEMENT. An authorized activity or program on or relating to rangelands which is designed to improve production of forage; range vegetative composition; control patterns of use; provide water; stabilize soil and water conditions; and provide habitat for livestock, wild horses or burros, and wildlife. The term includes, but is not limited to structures, treatment projects, and use of mechanical means to accomplish the desired results.

RANGELAND. Land used for grazing by livestock and big game animals on which the vegetation is dominated by grasses, grass-like plants, forbs, or shrubs.

RAPTOR. A bird of prey, such as an eagle, hawk, or owl.

RECLAMATION. The reconstruction of disturbance by returning the land to a condition approximate or equal to that which existed prior to disturbance, or to a stable and productive condition compatible with the land use plan. The immediate goal of reclamation is to stabilize disturbed areas and protect both disturbed and adjacent undisturbed areas from unnecessary degradation.

RECREATION AND PUBLIC PURPOSES ACT (R&PP). The Act of June 14, 1926, as amended (43 U.S.C. 869, 869-4). Allows the disposal of public land to any state, local, Federal, or political instrumentality or nonprofit organization or any recreational or public purpose, at the discretion of the uthorized officer.

RECREATION AREA/SITE. An area of recreation may be a site, complex of sites, or a high impact recreation area that, at a minimum, meets all of the conditions in REA Chapter 3(f)(4)(A-D). Further Definition: High-Impact Recreation Area, Geographic area, or Waterway Corridor: A high impact recreation area or geographic area or waterway corridor of concentrated recreation use which includes a variety of developed sites providing a similar recreation opportunity. High-impact recreation areas incur significant expenditures for restoration, public safety, sanitation facilities, education, maintenance, and other activities necessary to protect the health and safety of visitors, cultural resources and the natural environment. They may contain

sub-areas of little development and use which results in environmental impacts such as noticeable litter, vandalism, soil compaction, or erosion. These areas require intensive management to enhance visitor experiences, address environmental impacts, and manage conflicting uses. An area of high recreation impact is not an administrative unit such as a National Forest, BLM Field Office, or Reclamation Project. In addition, it is contiguous areas directly associated with a clearly identified special, natural, or cultural features, place or activity that is the focal point of recreation use and have clearly defined access points and clearly described area boundaries.

Typically, a high impact recreation area is comprised of a complex of individual sites and displays one or more of the following characteristics:

(1) Has a population of one million or more within two hours of driving time;
(2) Contains rivers, streams, lakes or interpreted scenic byways corridors;
(3) Designed and conducted to maintain or enhance the recreational opportunities through Natural Resource Management Activities;
(4) Has regionally or nationally recognized recreation resources; and
(5) Is regionally or locally marketed for its tourism value.

RECREATION EXPERIENCES. Psychological outcomes realized either by recreation-tourism participants as a direct result of their onsite leisure engagements and recreation-tourism activity participation or by non-participating community residents as a result of their interaction with visitors and guests within their community and/or interaction with the BLM and other public and private recreation-tourism providers and their actions.

RECREATION OPPORTUNITIES. Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.

RECREATION-TOURISM MARKET. Recreation-tourism visitors, affected community residents, affecting local governments and private sector businesses, or other constituents and the communities or other places where these customers originate (local, regional, national, or international). Based on analysis of supply and demand, land use plans strategically identify primary recreation-tourism markets for each SRMA—destination, community, or undeveloped.

RECREATION OPPORTUNITY SPECTRUM (ROS). A continuum used to characterize recreation opportunities in terms of setting, activity, and experience opportunities. Six classes are included: primitive (P), semiprimitive nonmotorized (SPNM), semi-primitive motorized (SPM), roaded natural (RN), rural (R), and modern urban (U). Refer to the individual definitions in this glossary.

RELATED WATERS. Waters which lie directly over or adjacent to public lands and require some management control to protect federally administered resources or to provide for enhanced visitor safety.

RESERVATION. A withdrawal of a permanent nature, dedicated to a specific public purpose.

RESOURCE MANAGEMENT PLAN (RMP). A written land use plan that outlines BLM's decisions and strategies for management of the resources in a particular area. The RMP has been used by the BLM since 1980.

RESTRICTED AREAS. Areas where mitigation such as seasonal restrictions isrequired to protect resource values.

ROADED NATURAL (RN). Areas with about equal recreation opportunities for affiliation with other user groups and for isolation from sights and sounds of humans. Involves the opportunity to have a high degree of interaction with the natural environmental. Challenge and risk opportunities are not very important except in specific challenging activities. The practice of outdoor skills may be important. Opportunities for both motorized and nonmotorized recreation are present. One of the six classes of the Recreation Opportunity Spectrum (ROS).

RURAL (R). Areas with recreation opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. These factors are generally more important than the natural setting. Opportunities for wild land challenges, risk taking, and testing of outdoor skills are unimportant, except in activities involving challenge and risk. One of the six classes of the Recreation Opportunity Spectrum (ROS).

SCOPING PROCESS. An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. Scoping may involve public meetings, field interviews with representatives of agencies and interest groups, discussions with resource specialists and managers, written comments in response to news release, direct mailings and articles about the proposed action, and scoping meetings.

RIGHT-OF-WAY (ROW). The legal right for use, occupancy, or access across land or water areas for a specified purpose or purposes. Also, the lands covered by such a right. Examples are roads, power lines, pipelines, water wells, and communication sites. It does not grant an estate of any kind.

RIPARIAN AREAS. Riparian areas are a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers, and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil.

RIPARIAN AREA. A riparian area is an area of land occurring adjacent to streams, rivers, and other water bodies that is directly influenced by water. A riparian community is characterized by certain types of vegetation, soils, hydrology, and fauna and requires free or unbound water or conditions more moist than normally found in the area. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent on free water in the soil.

SEDIMENT YIELD. A quantitative measureof the total sediment outflow from a watershed over a given period of time at a specified point in the channel. Sediment yield is the difference between the total erosion from slopes, channels, and mass wasting, and the amount of sediment deposited before reaching the specified point in the channel.

SEEPS. Is where ground water percolates to the surface and forms a saturated area.

SEMI-PRIMITIVE MOTORIZED (SPM). Areas with some recreation opportunity for isolation from the sights and sounds of humans, but not as important as for primitive opportunities. Involves the opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills. Provides an explicit opportunity to use motorized equipment while in the area. One of the six classes of the Recreation Opportunity Spectrum (ROS).

SEMI-PRIMITIVE NON-MOTORIZED (SPNM). Areas with some recreation opportunity for isolation from the sights and sounds of humans, but not as important as for primitive opportunities. Involves the opportunity to have a high degree of interaction with the natural environmental, to have moderate challenge and risk, and to use outdoor skills. One of the six classes of the Recreation Opportunity Spectrum (ROS).

SIGNIFICANT CAVE. A cave located on federal lands that possesses one or more of the following features, characteristics, or values (1) Biota; (2) Cultural; (3) Geologic/Mineralogic/Paleontologic; (4) Hydrologic; (5) Recreational; (6) Educational or Scientific.

SIGNIFICANT KARST. An area in which sinkholes or other features, such as lineaments, provide points of recharge to an aquifer that is the source of water for human, livestock, or wildlife use, or which provides a primary recharge zone for cave-related hydrologic systems.

SINKHOLE. A closed depression formed when the ground surface collapses above voids created by the solution of carbonate or evaporate rocks. Water levels typically fluctuate rapidly in sinkholes because of their close connection to groundwater.

SLOPE. The inclination of the land surface to the horizontal. When expressed as a percent, slope equals the change in elevation divided by the horizontal distance, with the result multiplied by 100 percent. Thus, a slope of 20 percent is a change in elevation of 20 feet for every 100 feet horizontally.

SPECIAL AREAS. Designated by statute, Executive, or Secretarial order, State Director special rule making authority, or an area covered by joint agreement between BLM and a State under Title II of the Sikes Act (16 U.S.C. 670a et seq.).

SPECIAL HABITAT FEATURE. A specific component of a habitat site requiring individual consideration, including geological anomalies (cliffs), aquatic situations (seeps), or manmade structures (windmill). A feature may be present in the habitat site because of animal use (booming grounds). Special habitat features may affect wildlife positively or negatively.

SPECIAL MANAGEMENT AREAS. An area containing one or a combination of unique resources or values that receive more intensive management (e.g., ACECS, WSAS, and SRMAS.)

SPECIAL RECREATION MANAGEMENT AREA (SRMA). Areas requiring explicit recreation management to achieve BLM's recreation objectives and to provide specific recreation opportunities. SRMAs are listed in this plan, which also define SRMA management objectives. BLM's recreation investments are concentrated in these areas.

SPECIAL RECREATION PERMIT. An authorization that allows specified recreational uses of the public lands and related waters. Special Recreation Permits are issued as a means to manage visitor use, protect natural and cultural resources, and as a mechanism to authorize commercial, competitive, and vending use; organized group activities and events; and individual or group use of special areas.

SPECIAL STATUS SPECIES. Wildlife and plant species either Federally-listed or proposed for listing (candidates) as endangered or threatened, State-listed species, or BLM determined priority species (sensitive species).

SPRING. Where water is discharged from a fixed point and the flow usually forms a small channel.

SOLID LEASABLE MINERALS. The chlorides, sulfates, carbonates, borates, silicates or nitrates of potassium or sodium and related products; sulphur in the States of Louisiana and New Mexico and on all acquired lands; phosphate, including associated and related minerals; asphalt in certain lands in Oklahoma; and gilsonite (including all vein-type solid hydrocarbons).

STATE APPROPRIATIVE WATER RIGHT. A water right licensed by the New Mexico State Engineer once proof of beneficial use is established.

STATE HISTORIC PRESERVATION OFFICER (SHPO). A position within State governments responsible for coordinating State participation in the implementation of the National Historic Preservation Act. This officer serves as an assistant and consultant when identifying cultural properties, assessing effects to them, and considering alternatives to avoid or reduce those effects.

STIPULATION. A requirement, usually dealing with protection of the environment that is made a part of a lease, grant, or other authorizing document. In the case of oil and gas leases, a provision that modifies standard lease rights and is attached to and made a part of the lease. Also, refer to "CONDITION OF APPROVAL" in the Glossary. The following represent the major stipulations on BLM land:

No Surface Occupancy Stipulation (NSO): A stipulation in which use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values.

Timing Limitation Stipulation: A stipulation which prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project specific mitigation measures would be insufficient.

Controlled Surface Use Stipulation (CSU): A stipulation in which use and occupancy is allowed (unless restricted by another stipulation), but identified resources values require special operational constraints that may modify the lease rights.

STRUTTING GROUND. Synonymous with Lek.

SUITABILITY. The adaptability of an area to grazing by livestock or wildlife.

SUITABLE LESSER PRAIRIE-CHICKEN HABITAT. Unoccupied areas of appropriate vegetation type, in patches of 320 acres or more falling entirely outside of Robel impact/avoidance distances around infrastructure.

SUITABLE RANGE. Rangeland that is accessible to livestock, which can be grazed on a sustained yield basis without damaging the resource.

SURFACE DISTURBANCE. Any action that removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation.

SURFACE USE PLAN OF OPERATIONS (SUPO). The purpose of a Surface Use Plan of Operations (SUPO) is to manage development so that impacts to special status species habitat are minimized or eliminated. A SUPO would incorporate applicable best management practices and disclose all future well locations; the location and arrangement of well infrastructure (e. g., tank batteries, compressors, power lines and poles); road locations; and rights-of-way. Surface Use Plan of Operations (SUPO) contain proprietary information and therefore are not subject to disclosure under the Freedom of Information Act.

SURFACE WATER. All water located at the surface of the land, such as streams, rivers, and lakes.

THREATENED SPECIES (Federal). Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Whether a species is threatened or endangered is determined by the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) over utilization for commercial, sporting, scientific, or educational

purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors. Also, see "Endangered Species (Federal)" in the Glossary.

THREATENED SPECIES (State). Any species or subspecies that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range in New Mexico. Also, see "Endangered Species (State)" in the Glossary.

TRAVEL MANAGEMENT AREAS. Polygons or delineated areas where a rational approach has been taken to classify areas open, closed, or limited, and have identified and/or designated network of roads, trails, ways, and other routes that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose as well as clearly defined activity types, modes of travel, and seasons or timeframes for allowable access or other limitations.

TURBIDITY. A condition in water caused by the presence of suspended matter which results in the scattering and absorption of light. Generally, a measure of fine suspended matter in water.

UNDEVELOPED RECREATION-TOURISM MARKET. National, regional, and/or local recreation-tourism visitors, communities, or other constituents who value public lands for the distinctive kinds of dispersed recreation produced by the vast size and largely open, undeveloped character of their recreation settings. Major investments in facilities are excluded within SRMAs where BLM's strategy is to target demonstrated undeveloped recreation-tourism market demand. Here, recreation management actions are geared toward meeting primary recreation-tourism market demand to sustain distinctive recreation setting characteristics; however, major investments in visitor services are authorized both to sustain those distinctive setting characteristics and to maintain visitor freedom to choose where to go and what to do—all in response to demonstrated demand for undeveloped recreation.

UNITIZATION. The joint development of an oil field that includes territory controlled by different owners. A unitized field allows participants to share both royalties and risks in the development of the field and to utilize the field's natural features without damaging the field through excessive competition.

UNSUITABLE LESSER PRAIRIE-CHICKEN HABITAT. Areas outside appropriate vegetation. This may include urban and agricultural areas, areas where shinnery oak is naturally not present or has been eliminated by chemical treatment, and other areas where natural vegetation has been greatly altered or degraded.

USE OF WILDLAND FIRE. Either wildland fire use or prescribed fire applications to meet resource objectives.

VALUE. As used in the RMP/EIS, a value refers to a natural resource or characteristic of a natural resource that is not usually a commodity or is difficult to quantify in terms of a unit of measurement. Examples of values in this context are listed in FLPMA and include scientific, scenic, air and atmospheric, historical, archeological and ecological resources.

VEGETATION TREATMENTS. Methods used to manage the growth and spread of vegetation. A vegetative management practice can either be a direct management of the vegetation itself, for example prescribed fire or indirect management like a change in the number of livestock utilizing the vegetation, or a change in the time frames when livestock are utilizing the vegetation.

VISUAL RESOURCES MANAGEMENT (VRM). The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES. VRM classes are based on relative visual ratings of inventoried lands. Each class describes the different degree of modification allowed to the basic elements of the landscape. The following are the minimum management objective for each class.

Class 1: Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to Visual Areas of Critical Environmental Concern, wilderness areas, wild and scenic rivers, and other similar situations.

Class II: Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen but should not attract attention.

Class III: Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape.

Class IV: Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the changes should repeat the basic elements of the landscape.

Rehabilitation Area: Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement; i.e., add acceptable visual variety to an area or site. It should be considered an interim or short term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired visual resource management class should be identified.

WAIVER. Permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold.

WATER QUALITY STANDARD. Regulations which specify designated uses for surface waters of the state, and water quality criteria to protect those uses. Standards are specified by the Water Quality Control Commission, in accordance with Section 303 of the Clean Water Act.

WETLANDS. Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and which, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, shallows, swamps, lake shores, bogs, muskegs, wet meadows, estuaries, and riparian areas.

WILDERNESS. The definition contained in Section 2(c) of the Wilderness Act of 1964 is as follows: “A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized 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.” Wilderness is an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features or scientific, educational, scenic, or historical value.

WILDERNESS AREA (WA). An area formally designated by Congress as part of the National Wilderness Preservation System.

WILDERNESS STUDY AREA (WSA). A roadless area which has been found to have wilderness characteristics.

WILDERNESS CHARACTERISTICS. Those characteristics of wilderness as described in Section 2(c) of the Wilderness Act. These include size, naturalness, solitude, primitive and unconfined type of recreation, and supplemental values.

WILDFIRE. An unplanned, unwanted wildland fire including unauthorized humancaused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

WILDFIRE SUPPRESSION. An appropriate management response to wildfire, escaped wildland fire use or prescribed fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire.

WILDLAND FIRE. Any non-structure fire that occurs in the wildland. Three distinct types of wildland fire have been defined and include wildfire, wildland fire use, and prescribed fire.

WILDLAND FIRE USE. The application of the appropriate management response to naturally-ignited wildland fires to accomplish specific resource management objectives in predefined designated areas outlined in Fire Management Plans.

WILDLIFE. Includes all species of animals, birds, mammals, mollusks, crustaceans, amphibians, fish, insects, reptiles, or their progeny or eggs which, whether raised in captivity or not, are normally found in a wild state. Feral horses and burrows are excluded.

WITHDRAWAL. Removal or withholding of public land, by statute or secretarial order, from operation of some or all of the public land laws. A mineral withdrawal is the closing of an area to mineral location and development activities. A mineral withdrawal includes public lands potentially valuable for solid leasable minerals, precluding the disposal of the lands except with a mineral reservation clause unless the lands are found not to contain a valuable deposit of minerals.

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APPENDIX A

Maps

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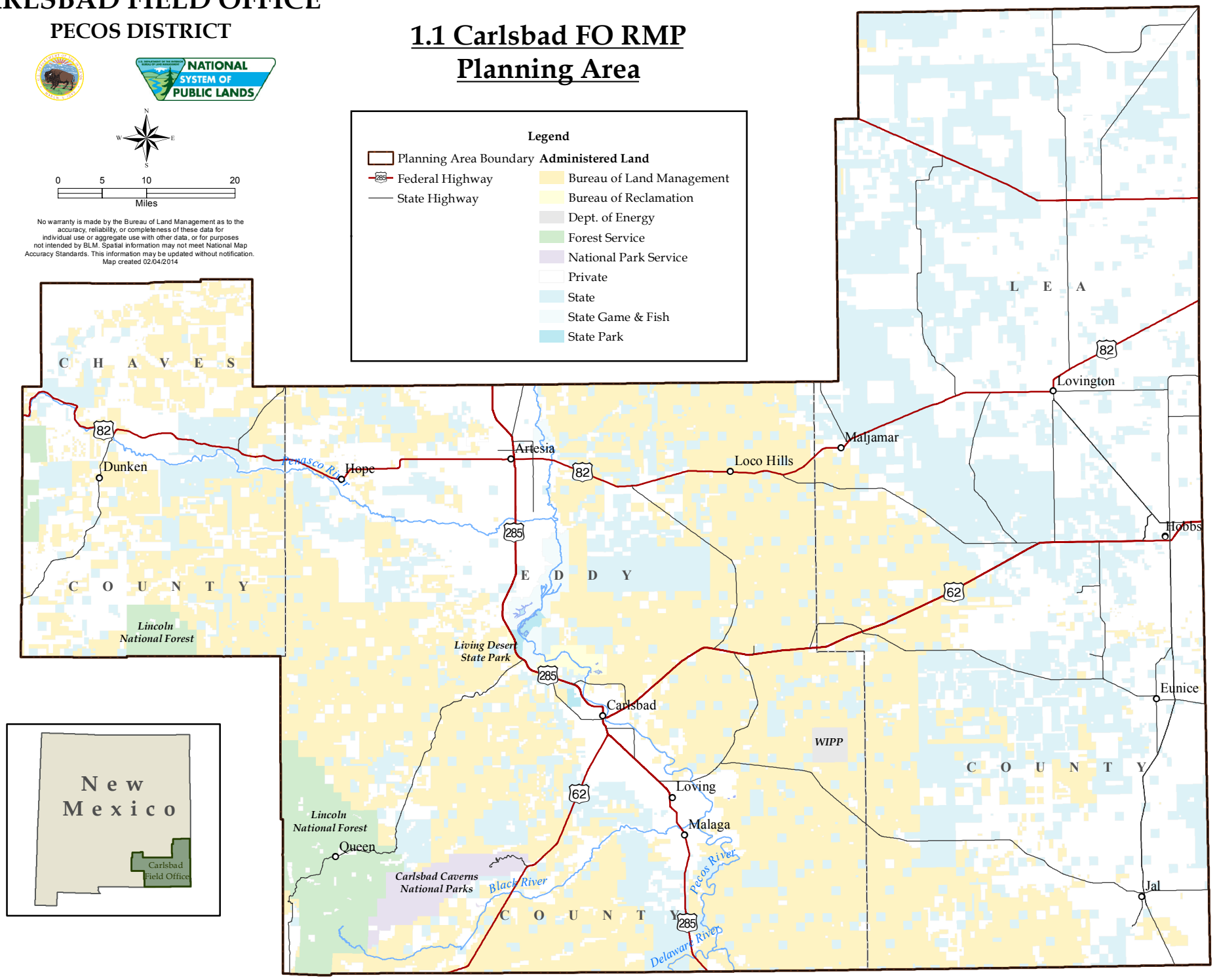
CARLSBAD FIELD OFFICE

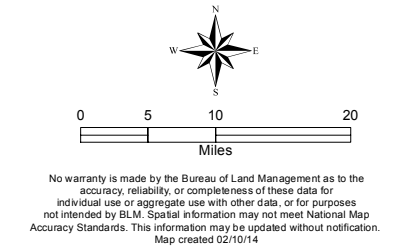
PECOS DISTRICT

1.1 Carlsbad FO RMP Planning Area



CARLSBAD FIELD OFFICE
PECOS DISTRICT

2.1 General Soils



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Map created 02/10/14

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

Soils

- Gypsum
- Loamy
- Sandy
- Shallow

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park



C H A V E S C O U N T Y

E D D Y C O U N T Y

L E A C O U N T Y

Dunken
Hope
Artesia
Loco Hills
Maljamar
Lovington
Hobbs
Carlsbad
Loving
Malaga
Queen
Eunice
Jal

Pecos River
Black River
Delaware River

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285
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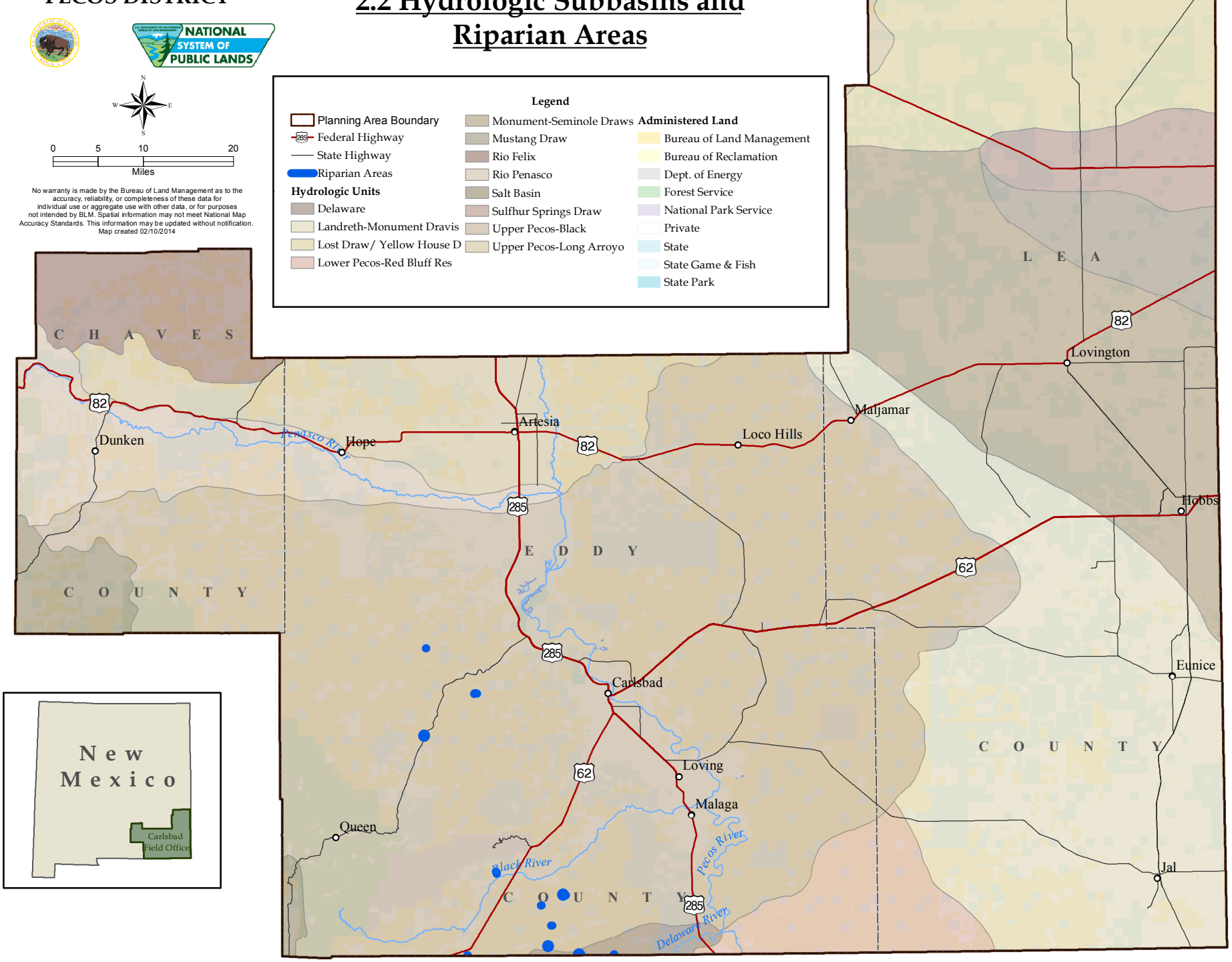
CARLSBAD FIELD OFFICE

PECOS DISTRICT

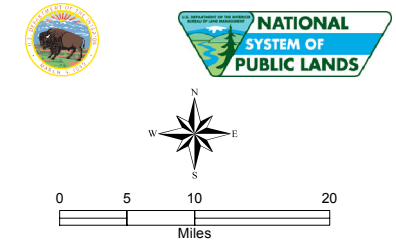
2.2 Hydrologic Subbasins and Riparian Areas



CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.3 Regional Aquifers



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

Regional Aquifer

- Ogallala Aquifer
- Pecos River Basin Alluvial
- Roswell Basin System
- Capitan

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

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Malaga

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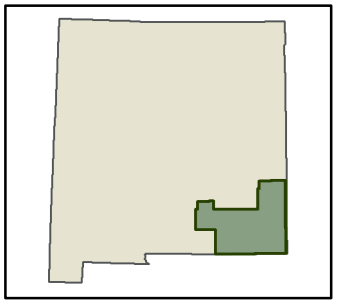
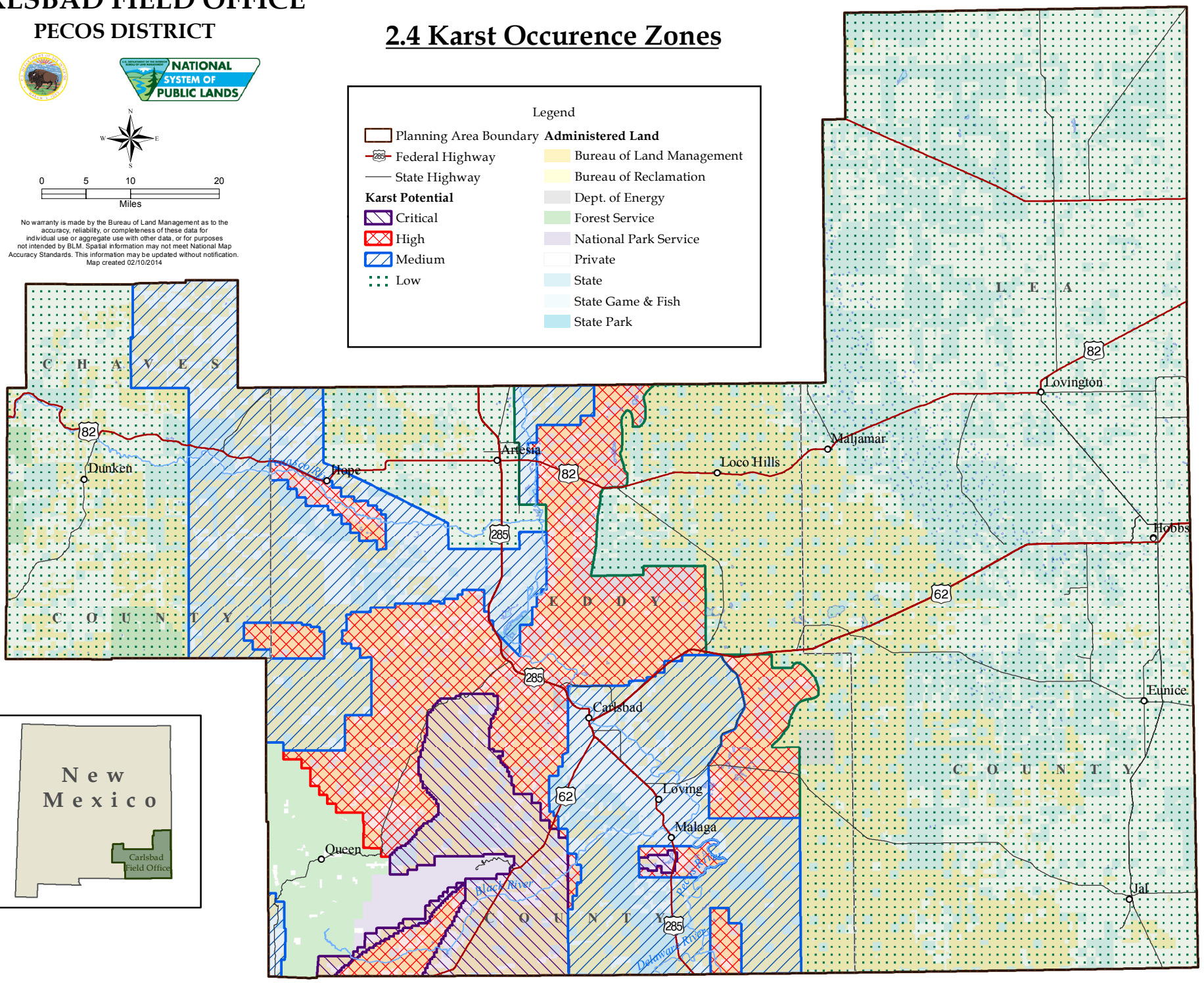


CARLSBAD FIELD OFFICE

PECOS DISTRICT

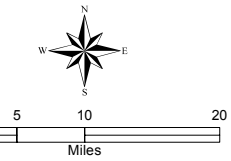
2.4 Karst Occurence Zones



CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.5 Major Land Resource Areas



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

Major Land Resource Areas

- Arizona and New Mexico Mountains
- Central New Mexico Highlands
- Southern Desert Foothills
- Southern Desertic Basins, Plains, and Mountains
- Southern High Plains, Southern Part
- Southern High Plains, Southwestern Part

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

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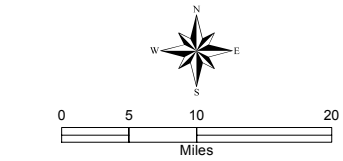
CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.6 Special Status Species Aquatic & Plants



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Tharpe's Blue-Star
- Lee's Pincushion Cactus
- Sheer's Pincushion Cactus
- Federal Highway
- State Highway
- TX Hornshell Re-Introduction Areas
- TX Hornshell Study Area
- Tharpe's Blue-Star
- Gypsum Wild-Buckwheat
- Pecos Bluntnose Shiner Critical Habitat
- Kuenzler Hedgehog Cactus Potential Habitat

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park



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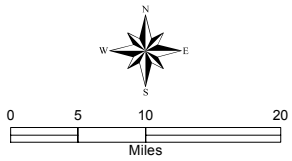
CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.7 Lesser Prairie Chicken (LPC) and Aplomado Falcon Habitat



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- LPC Timing Restriction
- Aplomado Falcon Grasslands
- Hope Study Area

LPC Habitat Areas

- Habitat Areas
- Primary Population Area
- Isolated Population Area

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

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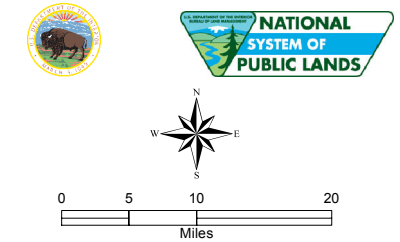
CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.8 Dunes Sagebrush Lizard (DSL) Habitat Areas



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- DSL TAMU Poly
- DSL Habitat Model

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

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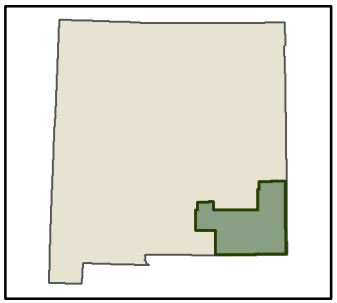
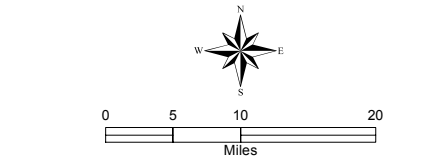


CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.9 Noxious Weeds Treatment Areas



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- Noxious Weeds Treatment Areas

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

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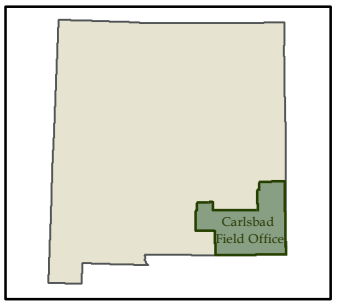
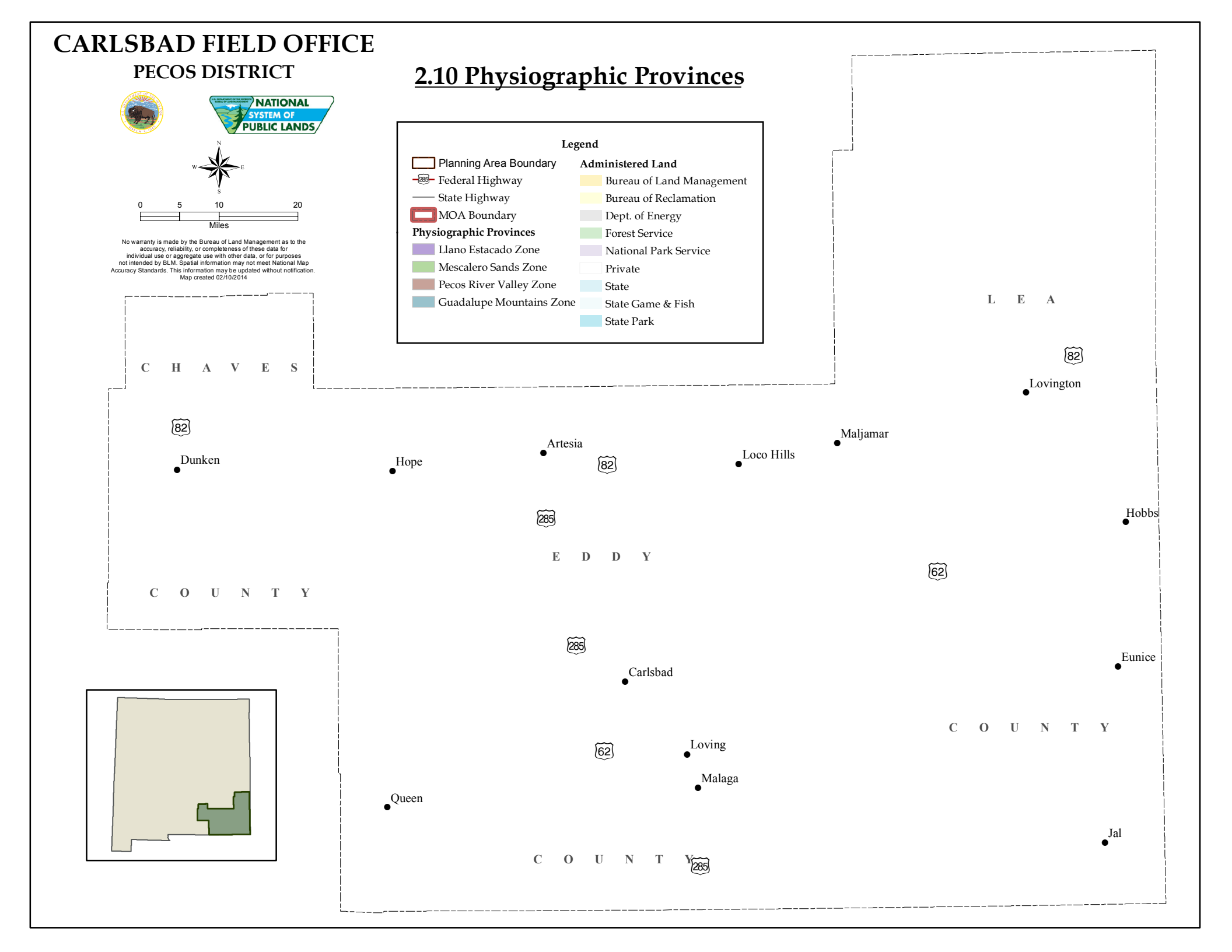


CARLSBAD FIELD OFFICE

PECOS DISTRICT

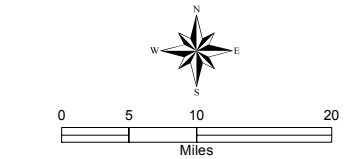
2.10 Physiographic Provinces



CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.11 Paleontological Potential Fossil Yield Classifications



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

Paleontological Potential Fossil Yield

- 2
- 3
- 4

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

C H A V E S

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Maljamar

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Loco Hills

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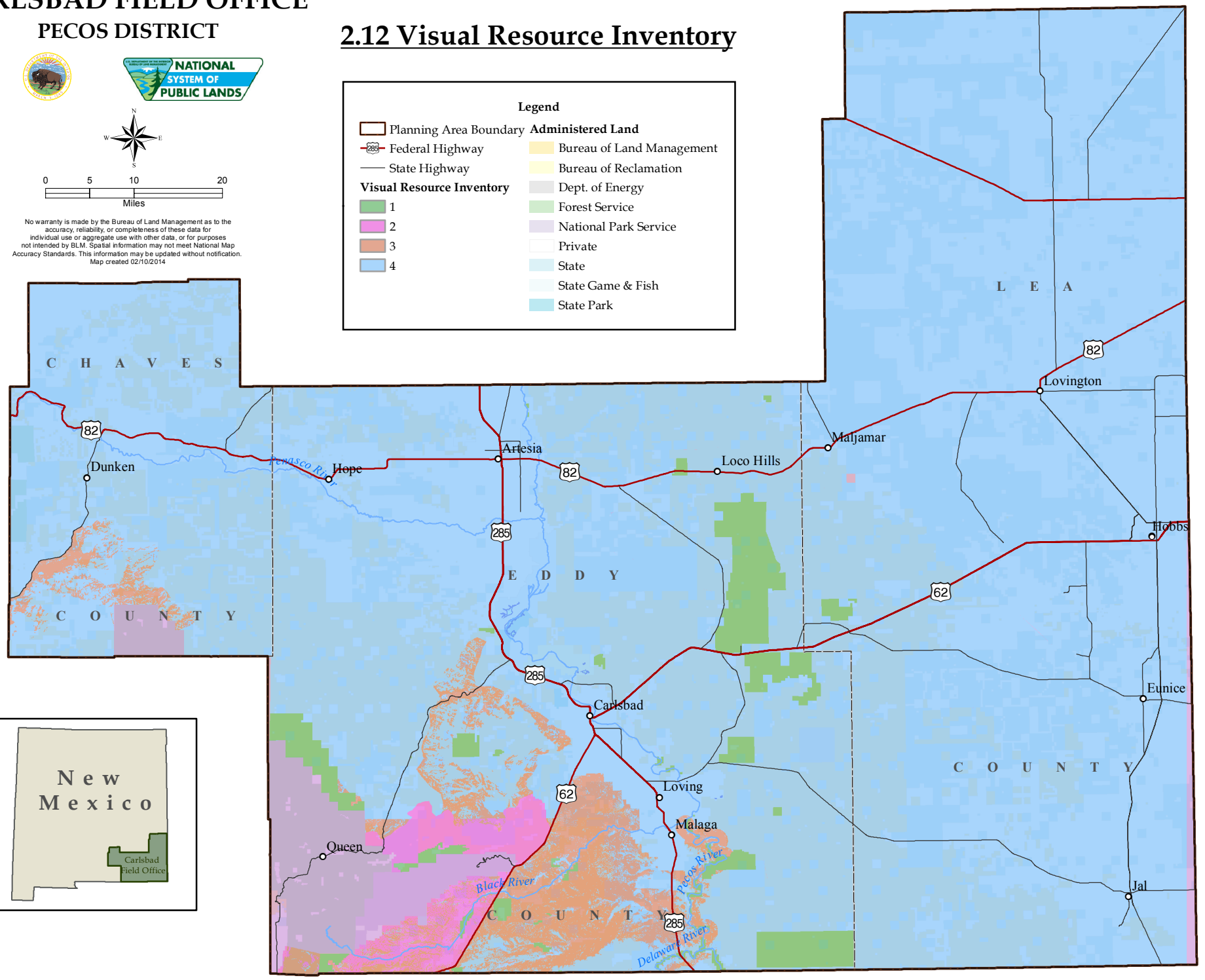
Note: There are no PFYC 1 or 5 areas located in the CFO Planning Area

CARLSBAD FIELD OFFICE

PECOS DISTRICT

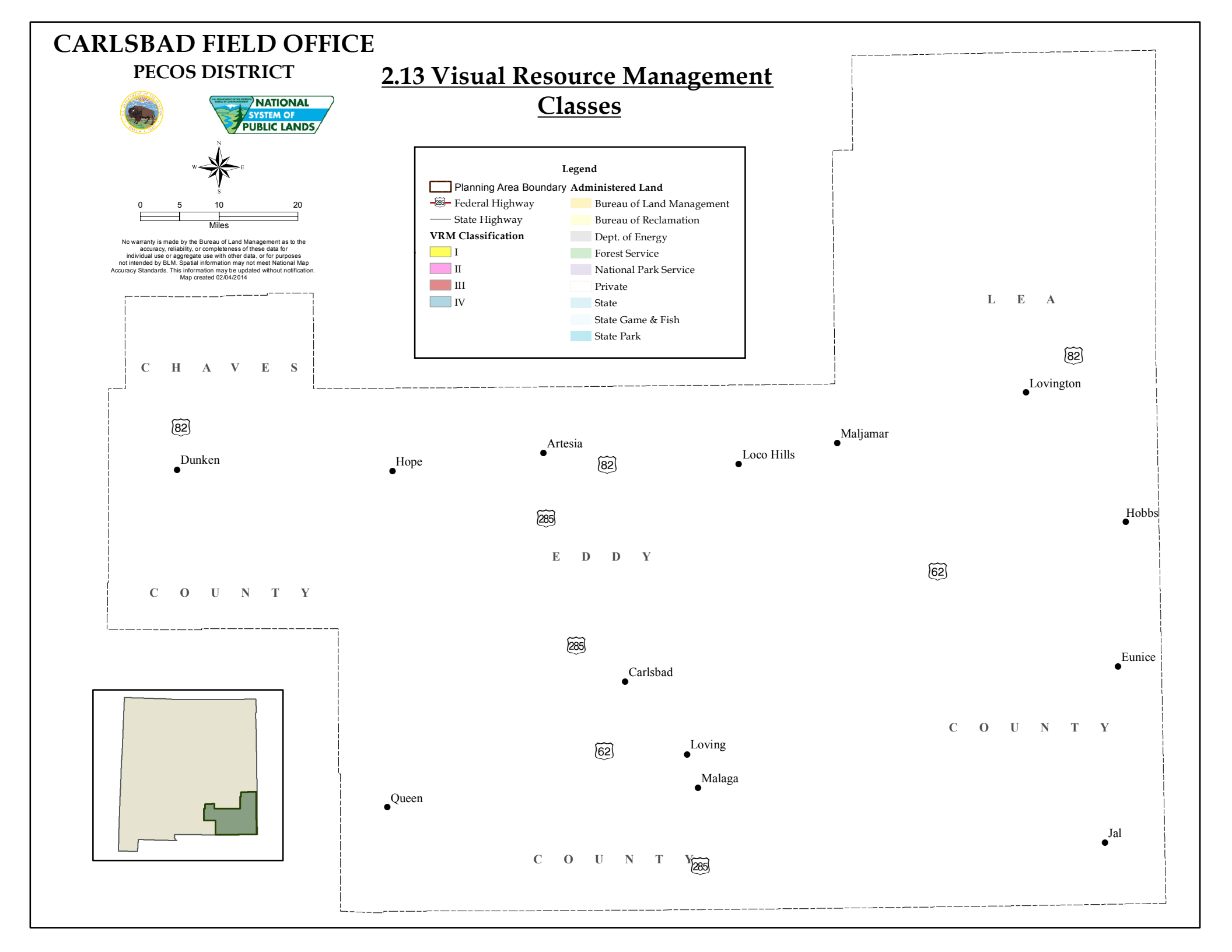
2.12 Visual Resource Inventory



CARLSBAD FIELD OFFICE

PECOS DISTRICT

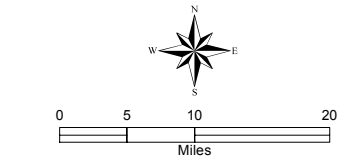
2.13 Visual Resource Management Classes



CARLSBAD FIELD OFFICE

PECOS DISTRICT

2.14 Special Recreation Management Areas and Off Road Vehicle Recreational Areas



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Map created 02/04/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

SRMAs

- Pecos River Corridor
- Cave Resources

ORV Areas

- Alkali Lake
- Hackberry Lake

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

C H A V E S

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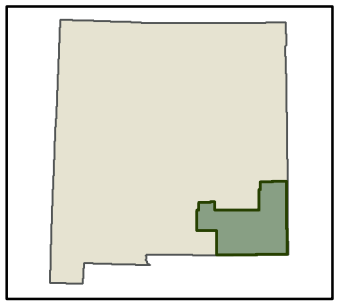
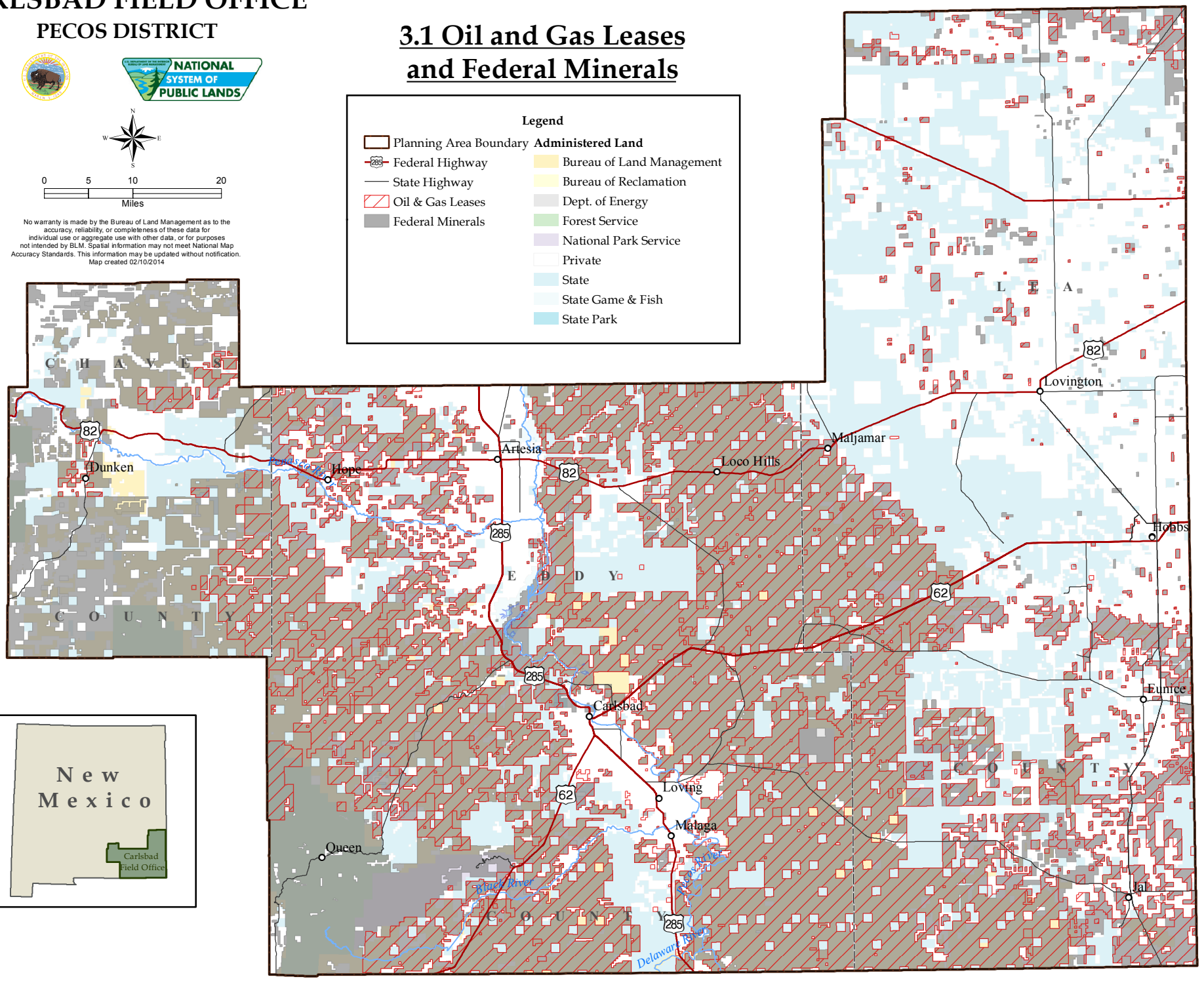


CARLSBAD FIELD OFFICE

PECOS DISTRICT

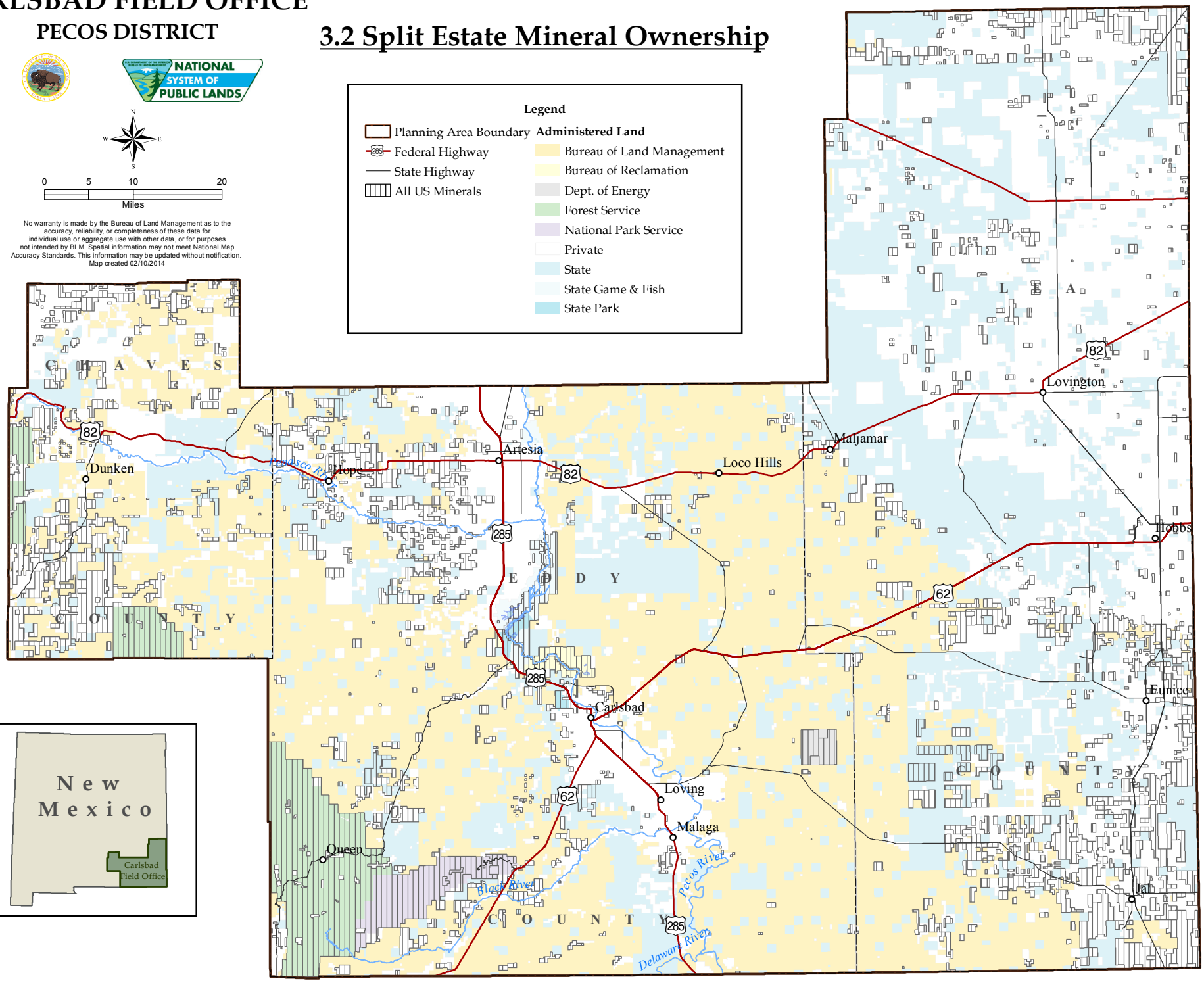
3.1 Oil and Gas Leases and Federal Minerals



CARLSBAD FIELD OFFICE

PECOS DISTRICT

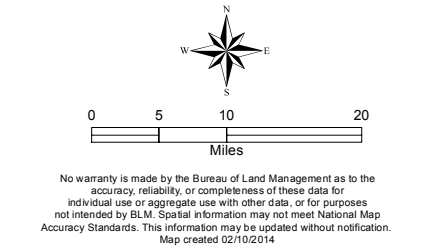
3.2 Split Estate Mineral Ownership



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.3 Subsurface Salt



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- Subsurface Salt

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

C H A V E S

C O U N T Y

L E A

C O U N T Y

E D D Y

C O U N T Y

C O U N T Y

Lovington

Maljamar

Loco Hills

Artesia

Hope

Dunken

Hobbs

Eunice

Carlsbad

Loving

Malaga

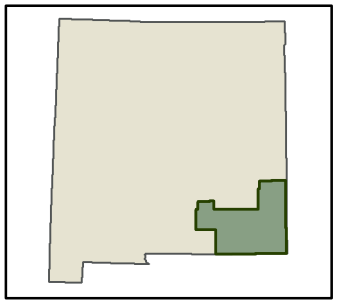
Queen

Jal

82

285

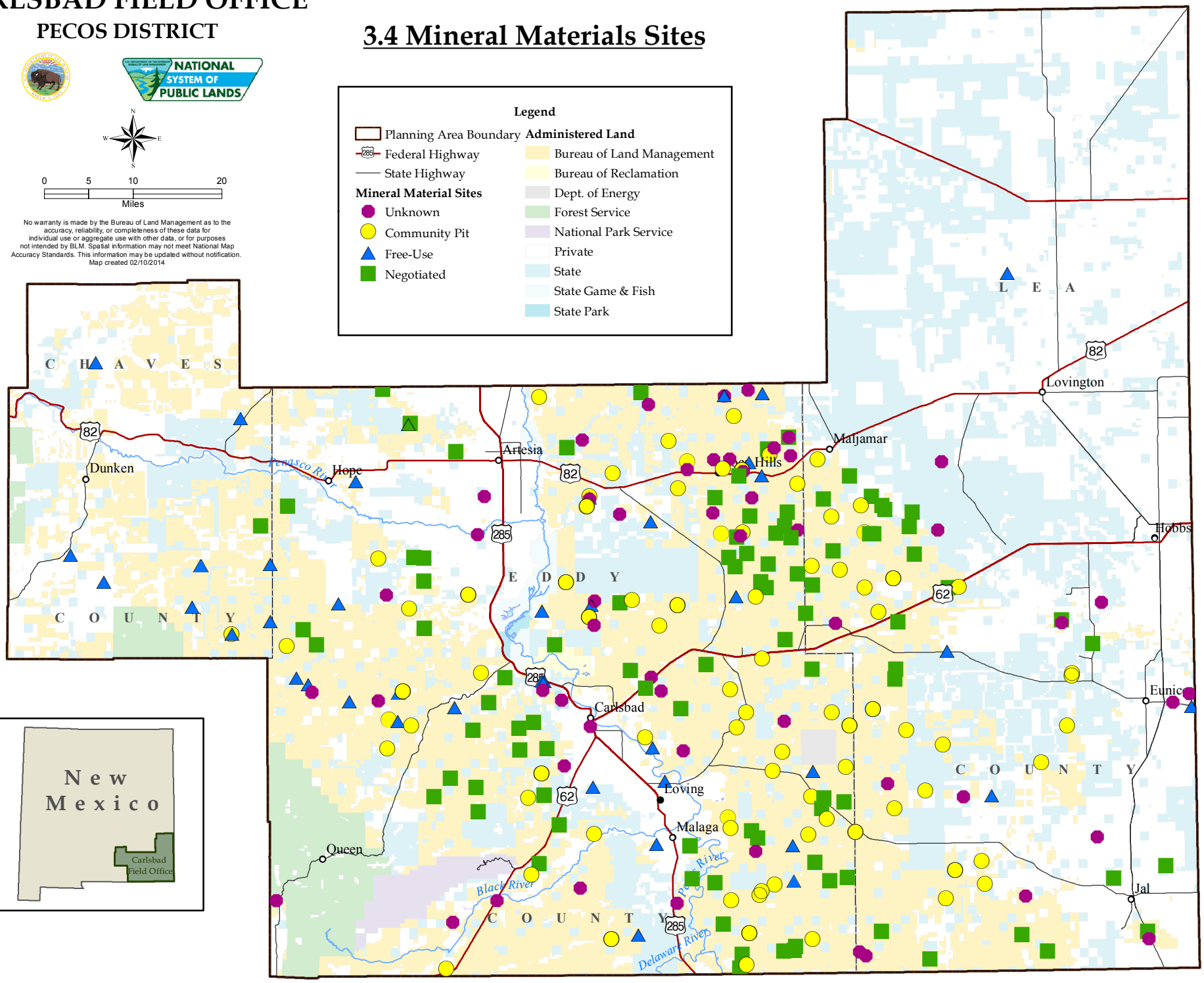
62



CARLSBAD FIELD OFFICE

PECOS DISTRICT

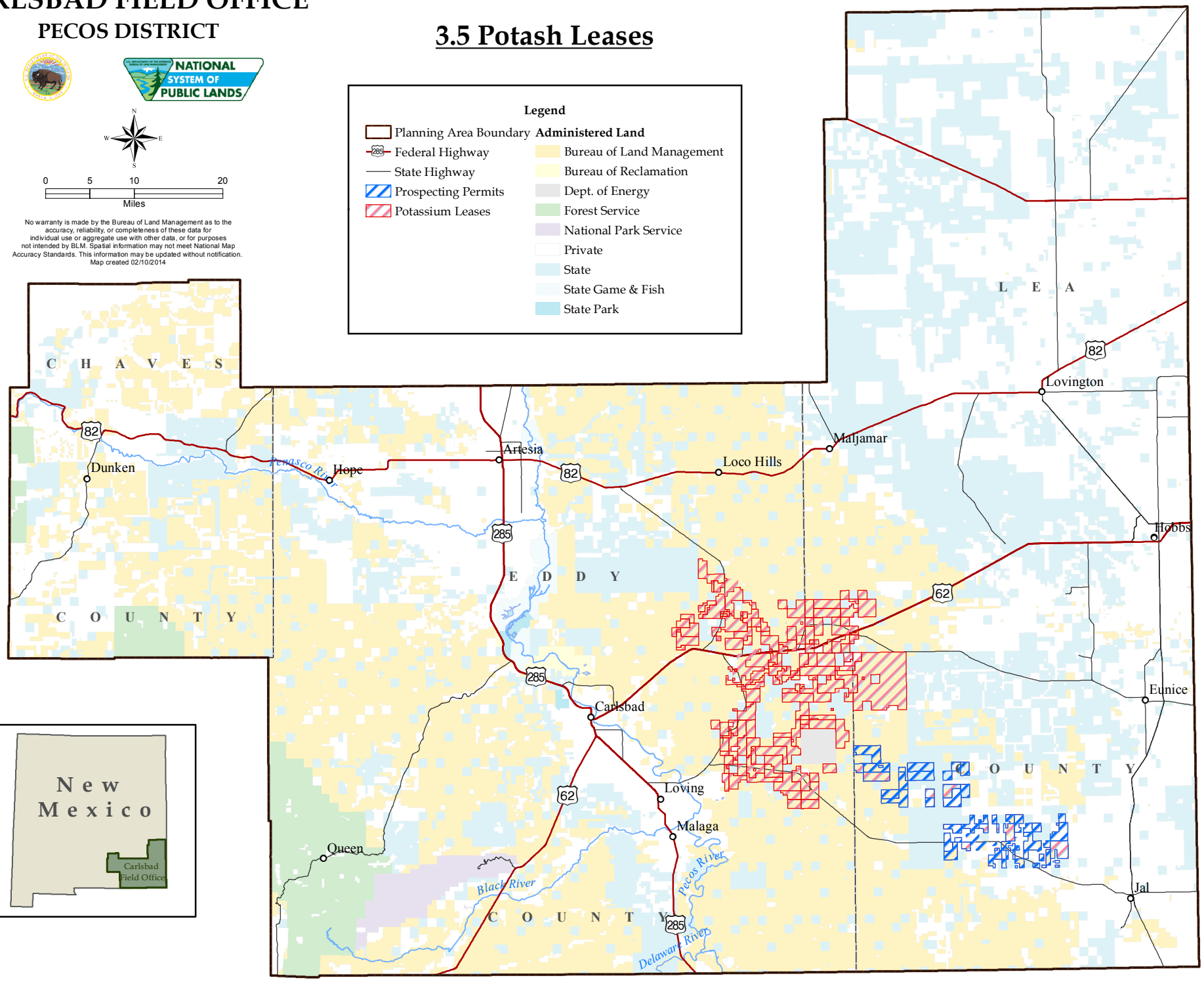
3.4 Mineral Materials Sites



CARLSBAD FIELD OFFICE

PECOS DISTRICT

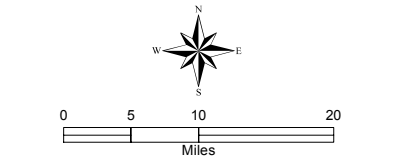
3.5 Potash Leases



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.6 Secretary's Order for Potash Area 2012



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- 2012 Secretary's Potash Area

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park



C H A V E S C O U N T Y

E D D Y C O U N T Y

L E A C O U N T Y

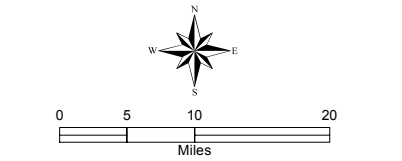
Dunken
Hope
Pecos River
Artesia
Loco Hills
Maljamar
Lovington
Hobbs
Carlsbad
Eunice
Loving
Malaga
Queen
Black River
Pecos River
Jal
Delaware River

82
285
62

CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.7 Wind Resource Potential



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

Wind Resource at 50 m

- Poor
- Marginal
- Fair
- Good
- Excellent
- Outstanding
- Superb

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

L E A

C H A V E S

C O U N T Y

E D D Y

C O U N T Y

C O U N T Y

C O U N T Y

82

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Lovington

Maljamar

Artesia

Loco Hills

Hope

Dunken

Hobbs

Eunice

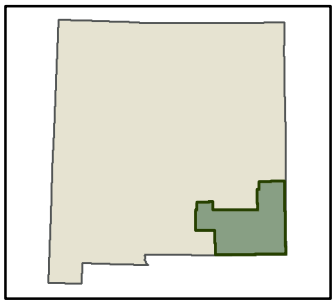
Carlsbad

Loving

Malaga

Queen

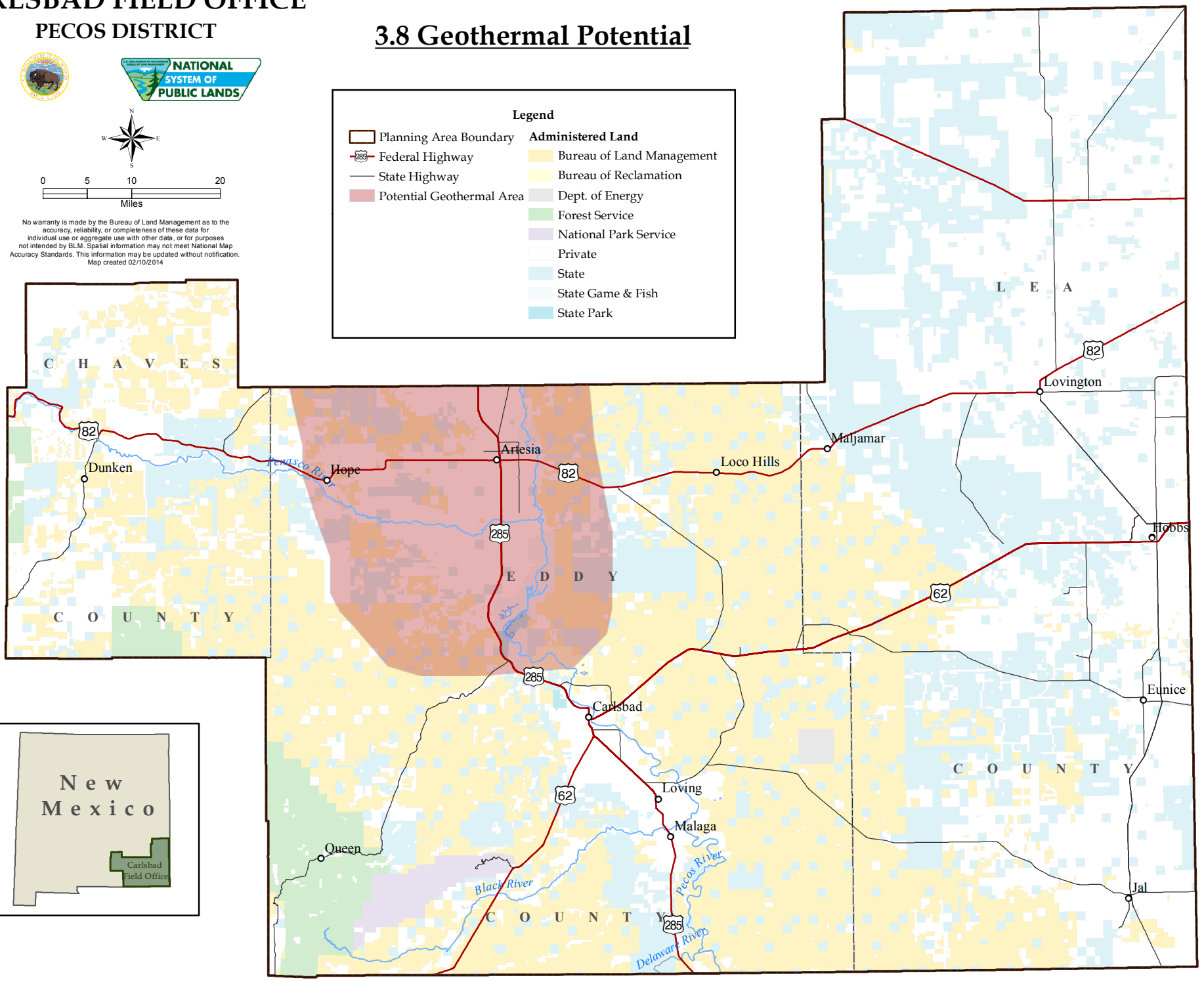
Jal



CARLSBAD FIELD OFFICE

PECOS DISTRICT

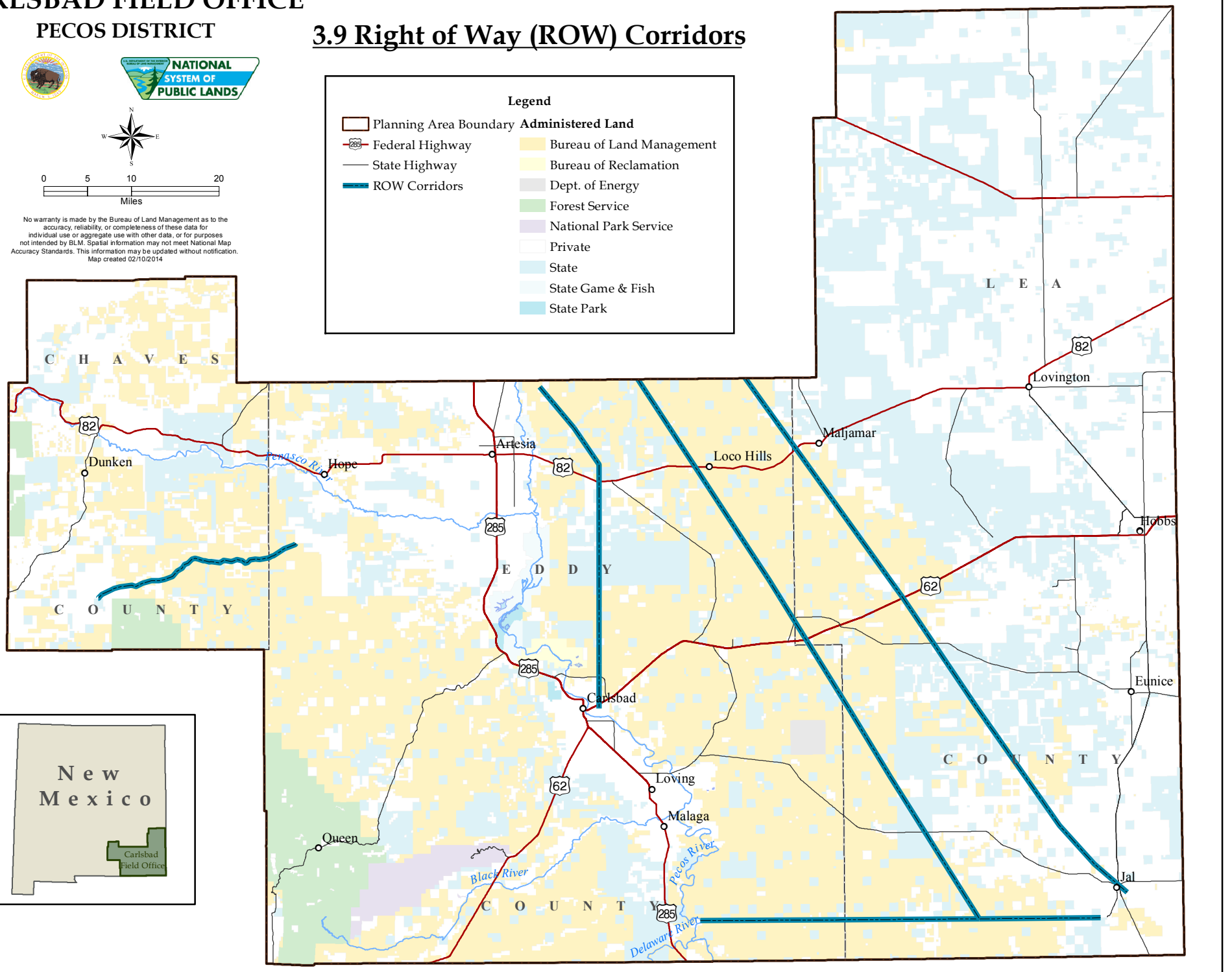
3.8 Geothermal Potential



CARLSBAD FIELD OFFICE

PECOS DISTRICT

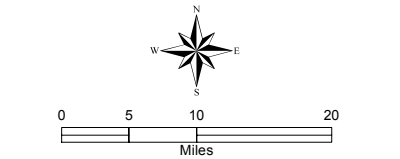
3.9 Right of Way (ROW) Corridors



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.10 Leased Grazing Areas



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Map created 02/10/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- Allotments Leased by Others
- Leased Grazing Area

Administered Land

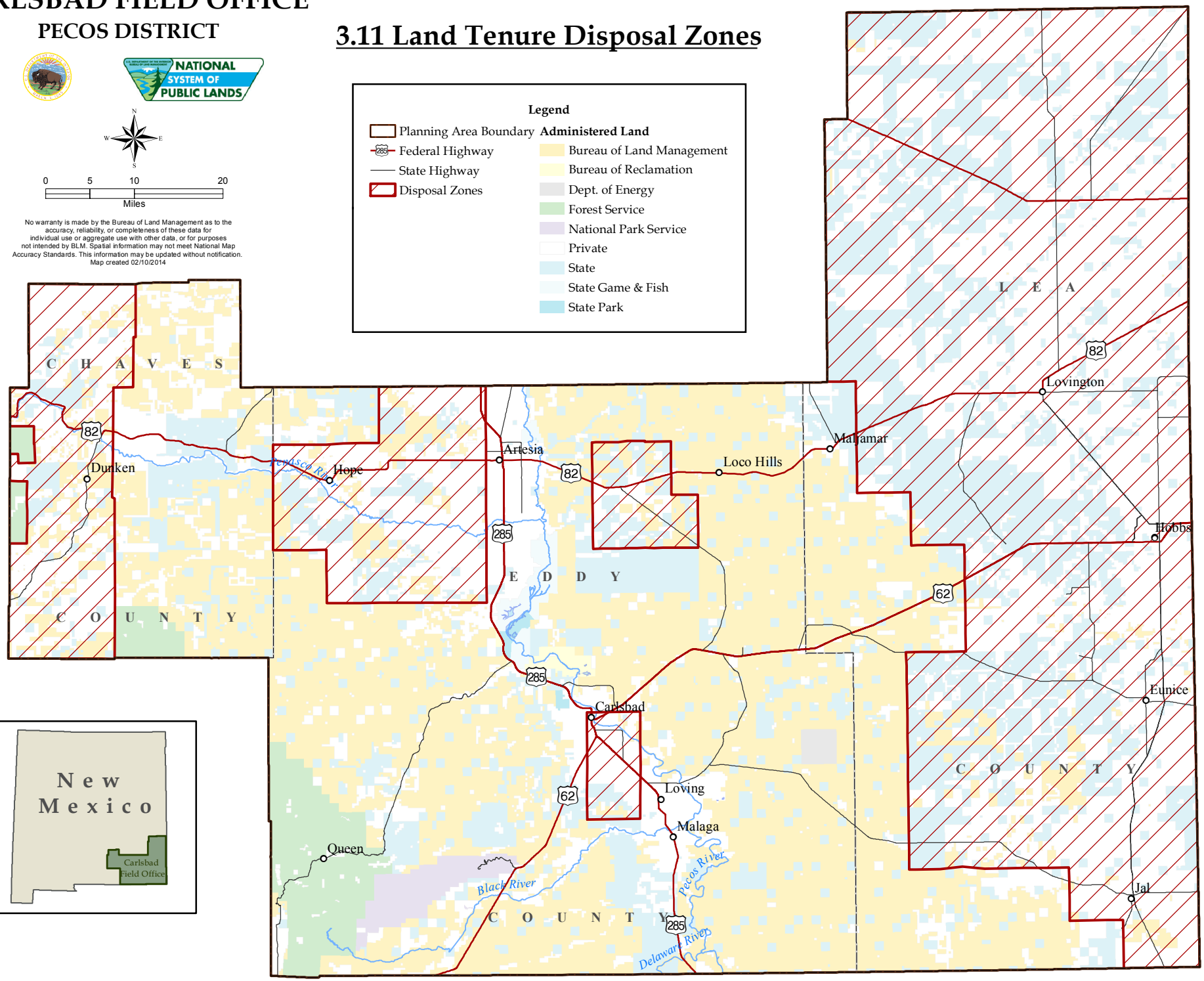
- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park



CARLSBAD FIELD OFFICE

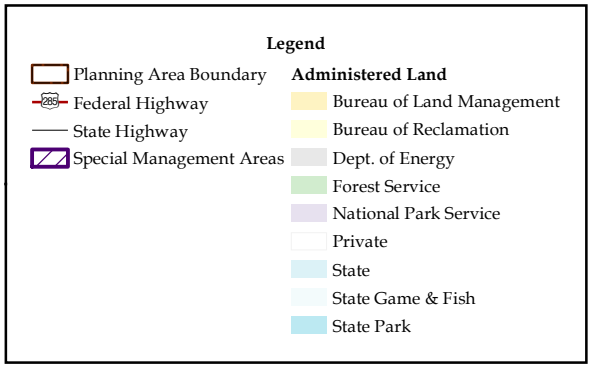
PECOS DISTRICT

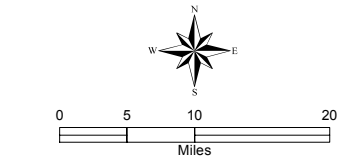
3.11 Land Tenure Disposal Zones



CARLSBAD FIELD OFFICE
PECOS DISTRICT

3.12 Special Management Areas





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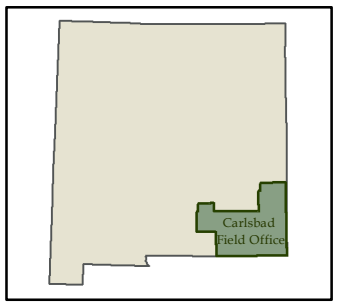
Map created 9/13/2013

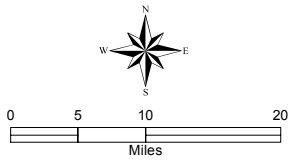
1. Bluntnose Shiner Habitat
2. Poco Site
3. Bear Grass Draw
4. Hackberry Lake OHV Use Area
5. Laguna Plata
6. Potash Bull Wheel
7. Maroon Cliffs
8. Seven Rivers Hills
9. Alkali Lake OHV Area
10. Pecos River Corridor
11. Phantom Banks Heronries
11. Pope's Well
12. Cave Resources
13. Dark Canyon
14. Springs Riparian Habitat
15. Guadalupe Escarpment Scenic Area Zone 1
16. Guadalupe Escarpment Scenic Area Zone 2



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.13 Designated Wilderness Study Areas



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Map created 02/04/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- Wilderness Study Areas

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

C H A V E S

C O U N T Y

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C O U N T Y

E D D Y

C O U N T Y

C O U N T Y

82
285
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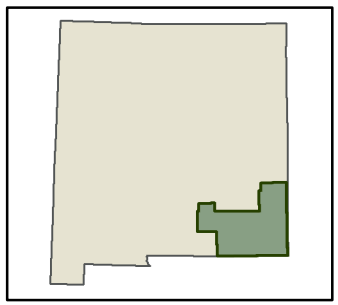
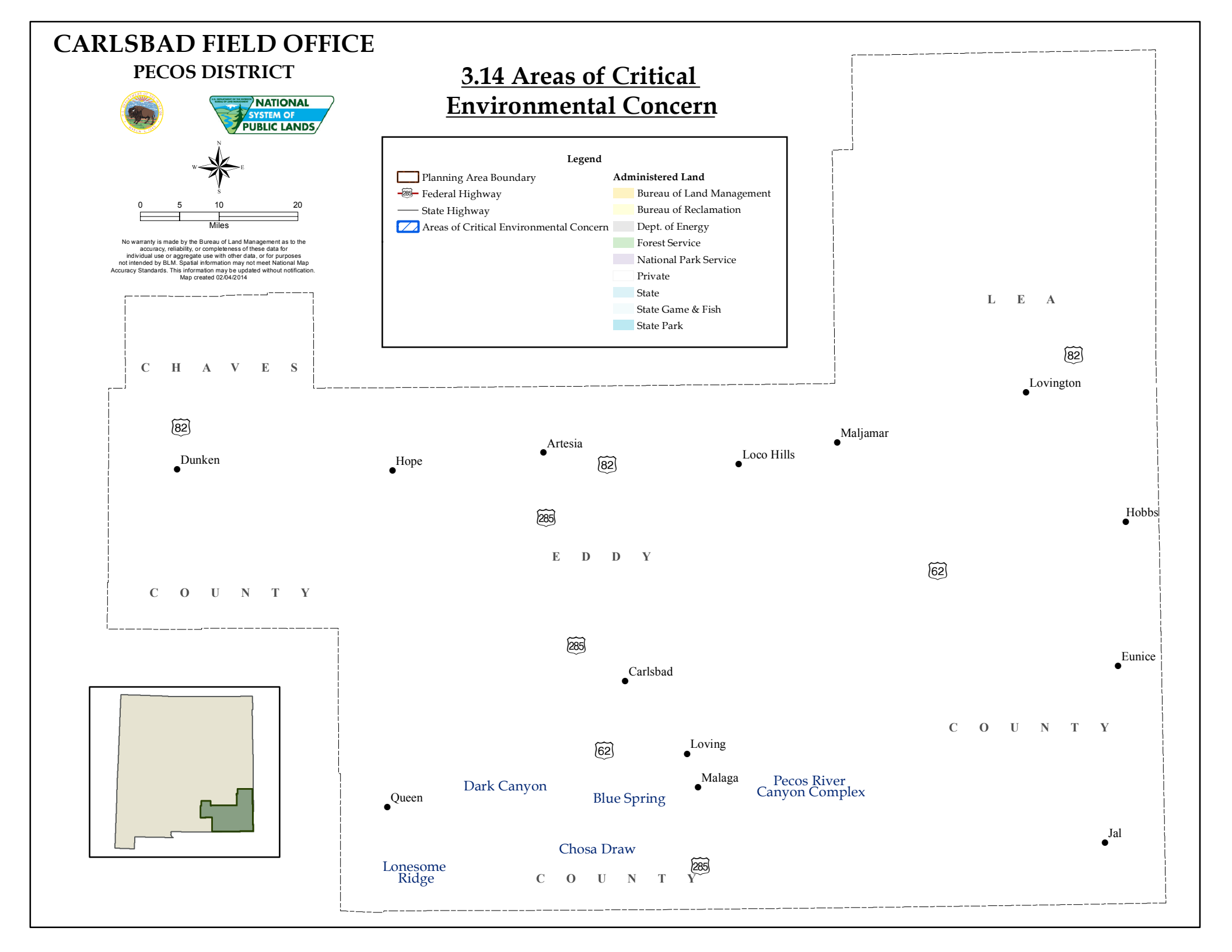
Lovington
Maljamar
Artesia
Loco Hills
Dunken
Hope
Hobbs
Eunice
Carlsbad
Loving
Malaga
Mudgetts
Queen
Jal
Devil's Den
Lonesome Ridge
McKittrick Canyon



CARLSBAD FIELD OFFICE

PECOS DISTRICT

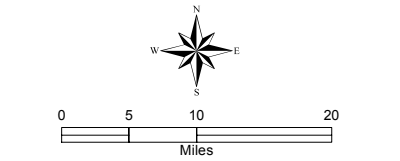
3.14 Areas of Critical Environmental Concern



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.15 Research Natural Areas



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Map created 02/04/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway
- Research Natural Areas

Administered Land

- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park

C H A V E S

C O U N T Y

L E A

E D D Y

C O U N T Y

C O U N T Y

C O U N T Y

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285

62

Lovington

Maljamar

Artesia

Loco Hills

Hope

Dunken

Hobbs

Eunice

Carlsbad

Loving

Malaga

Queen

Jal

S. Texas Hill Canyon

Dry Cave

Little Mckittrick Draw

Pecos River Canyon Complex

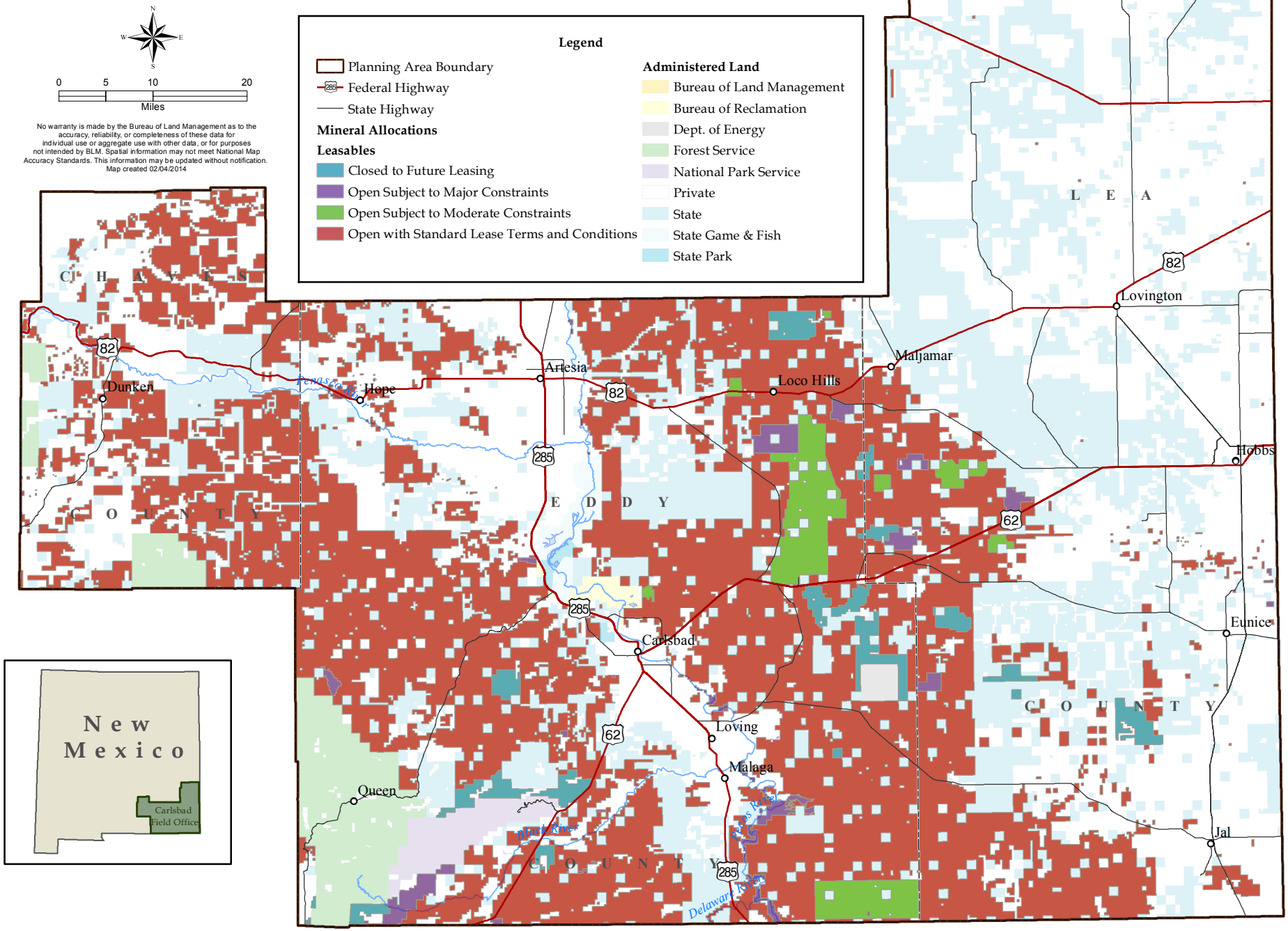
Yeso Hills



CARLSBAD FIELD OFFICE

PECOS DISTRICT

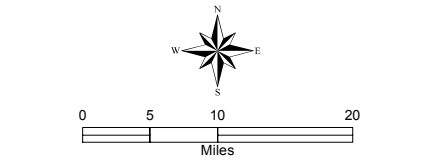
3.16 Minerals - Leasable Allocations Surface Ownership



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.17 Minerals - Leasable Allocations
Subsurface Ownership



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Map created 02/04/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

Mineral Allocations

Leasables

- Closed to Future Leasing
- Open Subject to Major Constraints
- Open Subject to Moderate Constraints
- Open with Standard Lease Terms and Conditions

Administered Land

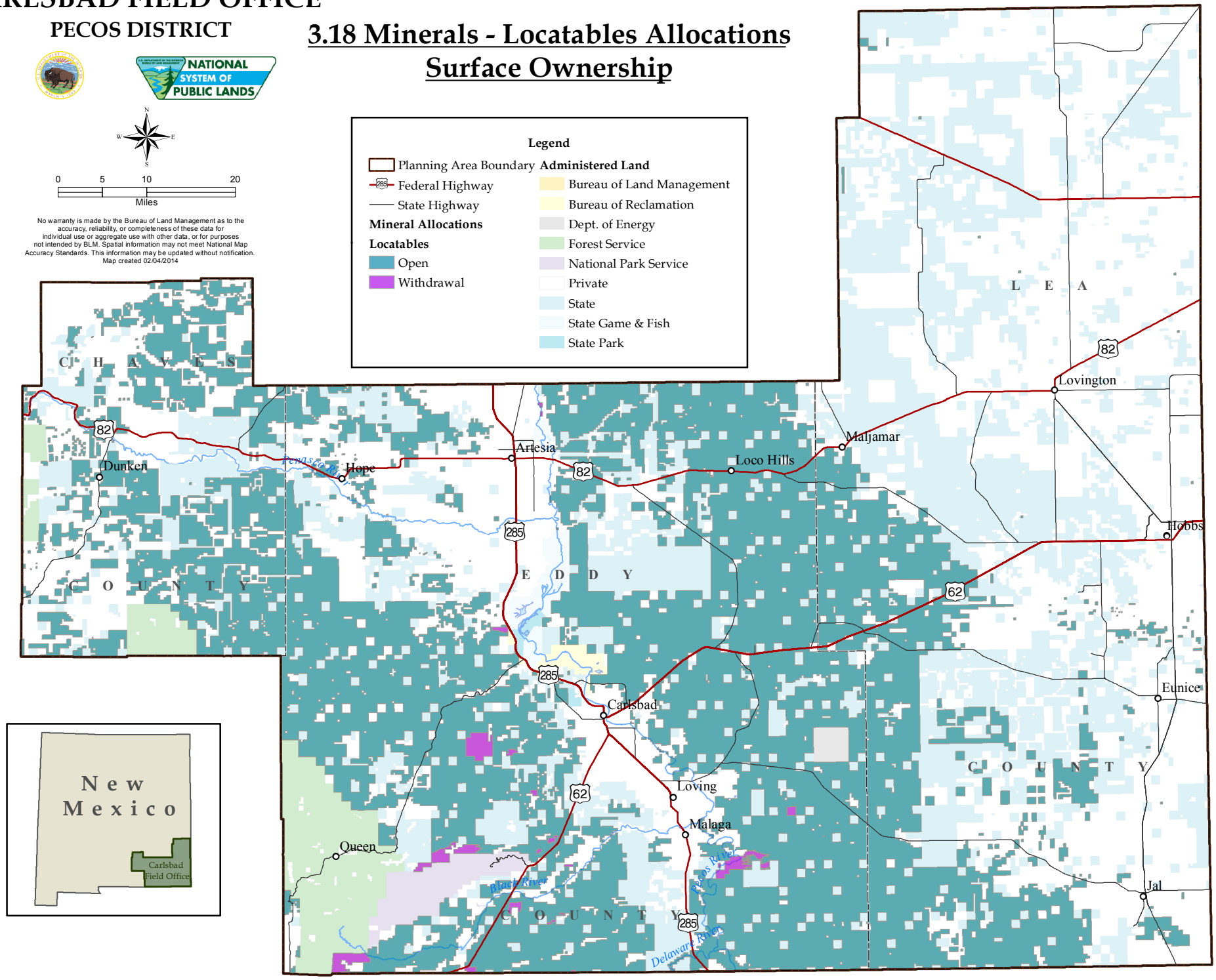
- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park



CARLSBAD FIELD OFFICE

PECOS DISTRICT

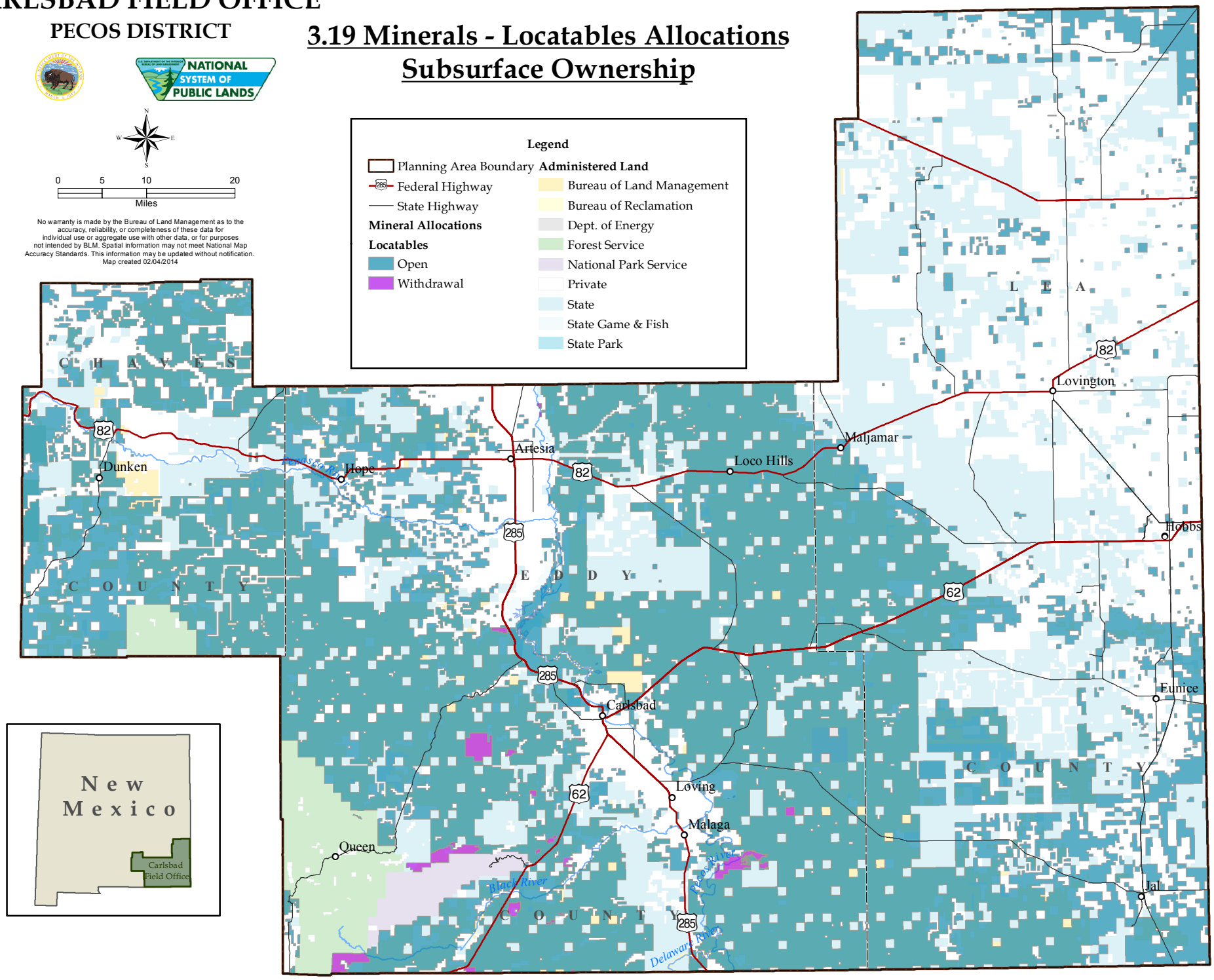
3.18 Minerals - Locatables Allocations
Surface Ownership



CARLSBAD FIELD OFFICE

PECOS DISTRICT

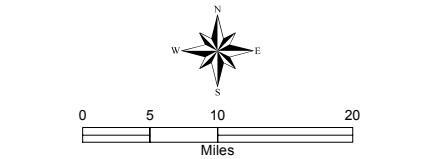
3.19 Minerals - Locatables Allocations
Subsurface Ownership



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.20 Minerals - Salables Allocations
Surface Ownership



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Map created 02/04/2014

Legend

- Planning Area Boundary
- Federal Highway
- State Highway

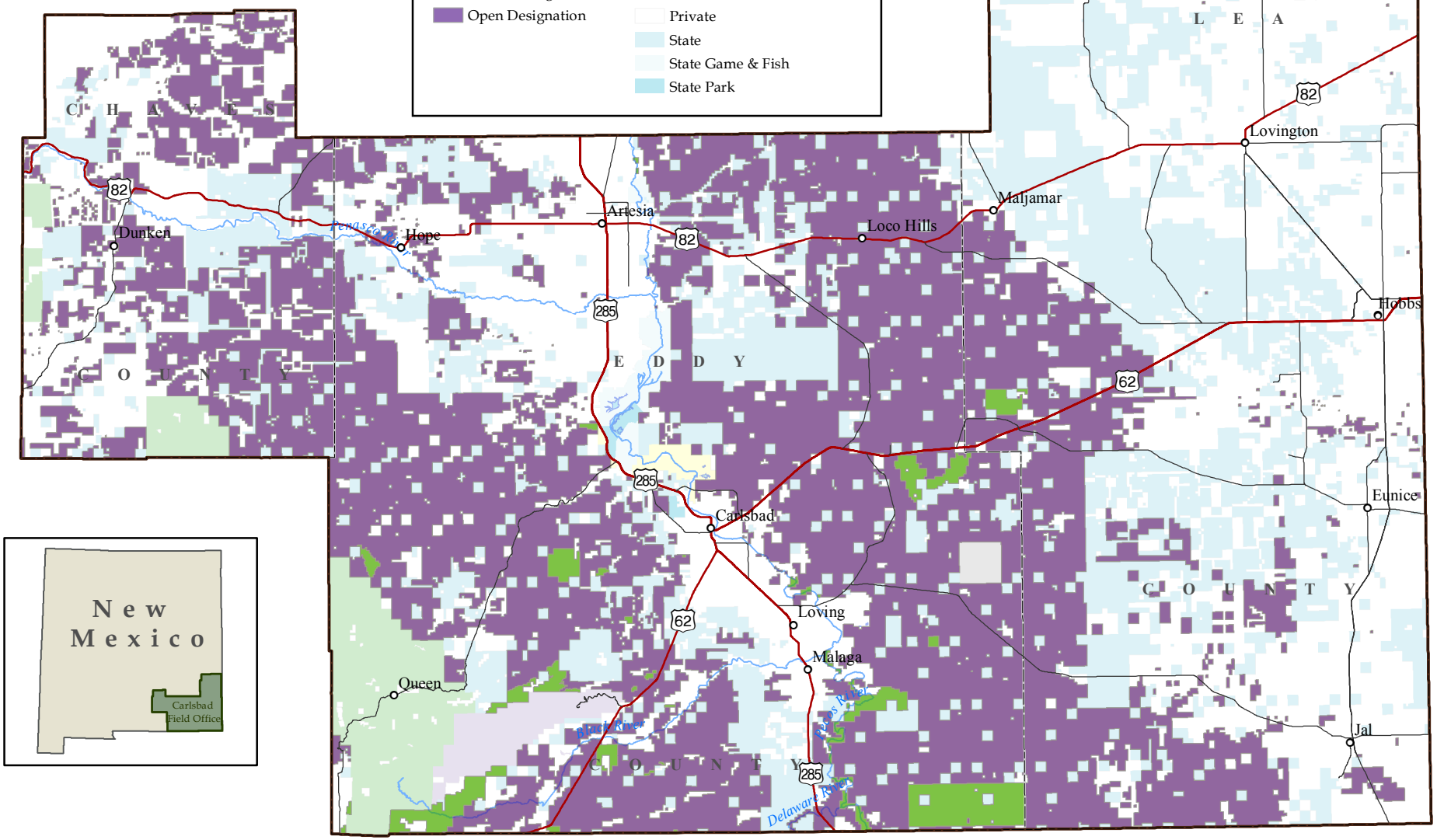
Mineral Allocations

Salables

- Closed Designation
- Open Designation

Administered Land

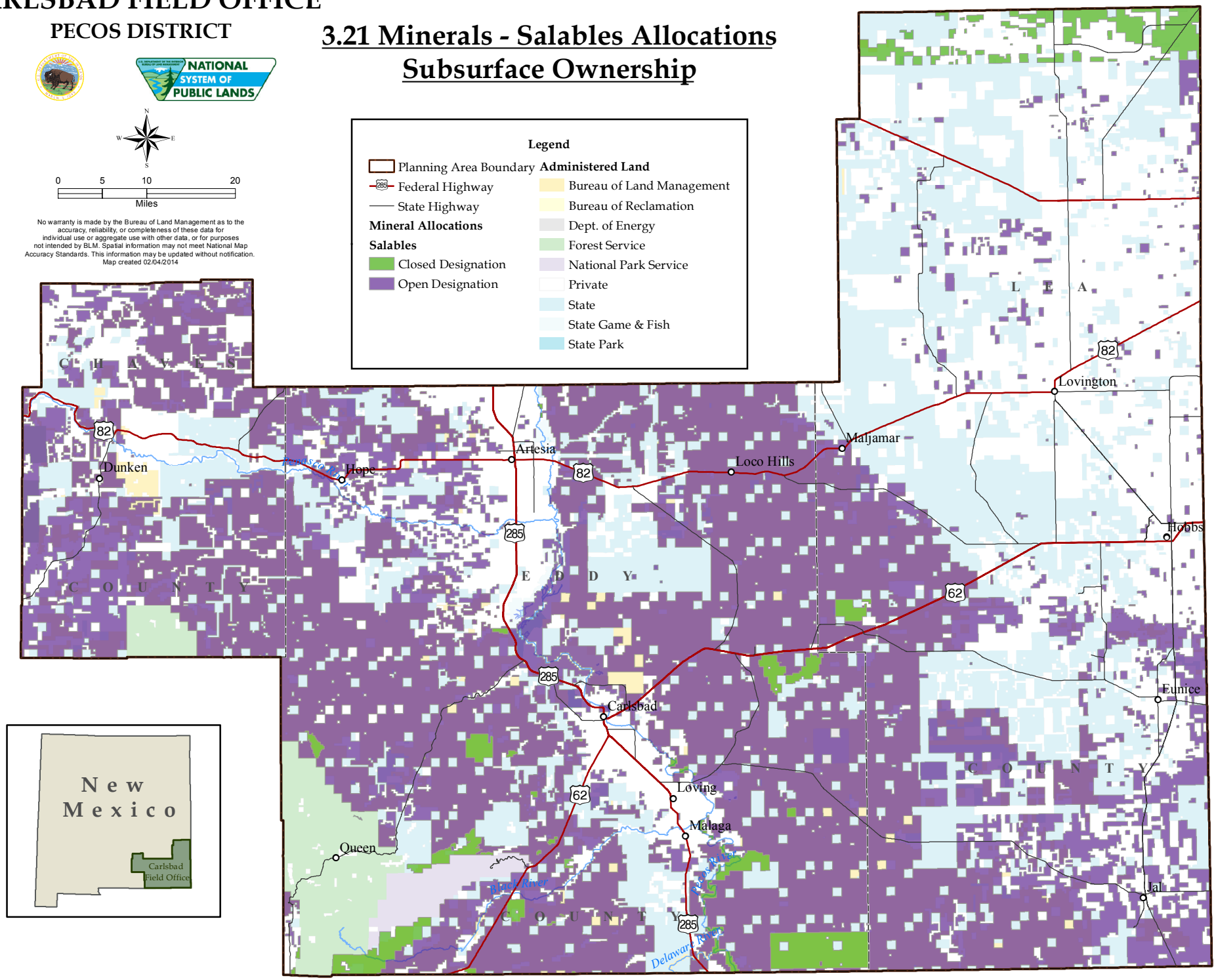
- Bureau of Land Management
- Bureau of Reclamation
- Dept. of Energy
- Forest Service
- National Park Service
- Private
- State
- State Game & Fish
- State Park



CARLSBAD FIELD OFFICE

PECOS DISTRICT

3.21 Minerals - Salables Allocations Subsurface Ownership



APPENDIX B

Grazing Permits and Suspended Aums

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Allotment Number	Allotment Name	Livestock Kind Text	Livestock Number	Period Begin Date	Period End Date	Aums	Public Lnd Pct
76001	COLLUM	CATTLE	1	3/1	2/28	12	100
76002	GLADIOLA	CATTLE	1	3/1	6/30	4	100
76004	SAND TRAP	CATTLE	28	3/1	2/28	336	100
76006	PUMPJACK SOUTH	CATTLE	248	6/1	2/28	1758	79
76007	MALJAMAR SOUTH	CATTLE	178	3/1	2/28	1452	68
76008	QUERECHO PLAINS	CATTLE	115	3/1	2/28	1339	97
76009	BUCKEYE NORTH	CATTLE	4	3/1	2/28	48	100
76010	GOLF COURSE	CATTLE	4	3/1	2/28	48	100
76011	LAGUNA TONTO	HORSE	12	3/1	2/28	85	59
76011	LAGUNA TONTO	CATTLE	288	3/1	2/28	2039	59
76011	BUCKEYE SOUTH	HORSE	4	3/1	2/28	34	70
76011	BUCKEYE SOUTH	CATTLE	408	3/1	2/28	3427	70
76011	SALT LAKE	HORSE	10	3/1	2/28	100	83
76011	SALT LAKE	CATTLE	620	3/1	2/28	6175	83
76012	MONUMENT DRAW	CATTLE	1	3/1	4/30	2	100
76013	RECORD	CATTLE	3	3/1	2/28	36	100
76014	WHITE BREAKS	CATTLE	3	3/1	2/28	36	100
76015	NADINE	CATTLE	25	3/1	2/28	300	100
76016	JONES CITY - NORTH	CATTLE	6	3/1	2/28	72	100
76017	EUNICE	CATTLE	20	3/1	2/28	240	100
76018	SOUTH MONUMENT DRAW	CATTLE	5	3/1	2/28	60	100
76019	MONUMENT - SOUTHWEST	CATTLE	10	5/1	2/28	100	100
76020	LEA TOWNSITE	CATTLE	466	3/1	3/15	172	75
76020	LEA TOWNSITE	CATTLE	466	5/15	2/28	3332	75
76021	HALFWAY	HORSE	4	3/1	2/28	40	83
76021	HALFWAY	CATTLE	359	3/1	2/28	3576	83
76022	LAGUNA TOSTON	CATTLE	67	3/1	2/28	804	100
76022	LAGUNA TOSTON	HORSE	3	3/1	2/28	36	100
76023	BILBRY BASIN	CATTLE	75	3/1	2/28	792	88
76024	JONES CITY	CATTLE	1	3/1	2/28	12	100
76025	OIL CENTER NORTH	CATTLE	25	3/1	2/28	300	100
76026	OIL CENTER SOUTH	CATTLE	11	3/1	2/28	132	100
76027	SAN SIMON	CATTLE	158	3/1	2/28	1896	100
76028	SWAG	CATTLE	160	3/1	2/28	1805	94
76029	PLAYA DUNES	CATTLE	131	3/1	2/28	1163	74
76030	DEEP WELLS	CATTLE	70	3/1	2/28	647	77
76031	EAST RATTLESNAKE CAN	CATTLE	1	3/1	8/31	6	100
76032	JAL - NORTHWEST	CATTLE	4	3/1	2/28	48	100
76033	E. RATTLESNAKE FLAT	HORSE	4	3/1	2/28	36	75
76033	E. RATTLESNAKE FLAT	CATTLE	296	3/1	2/28	2664	75
76035	MEDLIN-WELLS	CATTLE	180	3/1	2/28	1771	82
76036	OCHOA - NORTHWEST	CATTLE	1	3/1	6/30	4	100
76037	RED TANK	CATTLE	830	3/1	2/28	3685	37
76038	FAIRVIEW	CATTLE	363	3/1	2/28	3703	85
76038	FAIRVIEW	HORSE	7	3/1	2/28	71	85
76039	BOBCAT DRAW	CATTLE	113	3/1	2/28	1112	82
76039	BOBCAT DRAW	HORSE	7	3/1	2/28	69	82

Allotment Number	Allotment Name	Livestock Kind Text	Livestock Number	Period Begin Date	Period End Date	Aums	Public Lnd Pct
76040	PENN TANK	CATTLE	80	3/1	2/28	883	92
76041	OLD BALDY	CATTLE	7	3/1	2/28	84	100
76042	TOBOSA FLATS	CATTLE	92	3/1	2/28	927	84
76043	JAVELINA BASIN	CATTLE	310	3/1	2/28	2269	61
76043	JAVELINA BASIN	HORSE	10	3/1	2/28	73	61
76045	COTTON PLACE	HORSE	1	3/1	2/28	8	67
76045	COTTON PLACE	CATTLE	53	3/1	2/28	426	67
76046	GOEDEKE GRAZING CELL	CATTLE	92	3/1	2/28	894	81
76047	MONUMENT-JAL OILFIEL	CATTLE	32	3/1	2/28	384	100
76048	SAN SIMON SWALE	CATTLE	66	3/1	2/28	792	100
76049	HART RANCH	CATTLE	117	3/1	2/28	379	27
76050	CERCA	CATTLE	1	3/1	2/28	12	100
76051	ANDREWS FLAT	CATTLE	200	3/1	2/28	2040	85
76052	MEXICO WELLS	HORSE	10	3/1	2/28	110	92
76052	MEXICO WELLS	CATTLE	160	3/1	2/28	1766	92
76053	RUTH ROSS PLACE	HORSE	1	3/1	2/28	9	78
76053	RUTH ROSS PLACE	CATTLE	184	3/1	2/28	1722	78
76054	SOUTHEAST JAL	GOAT	5	3/1	2/28	12	100
76055	WEST JACKSON	CATTLE	3	3/1	2/28	36	100
76056	BROOKIN WEST	CATTLE	10	3/1	2/28	120	100
76056	BROOKIN WEST	CATTLE	2	3/1	2/28	24	100
76057	JACKSON EAST	CATTLE	10	3/1	2/28	120	100
76057	JACKSON EAST	CATTLE	2	3/1	2/28	24	100
76058	EDDY 13	CATTLE	58	3/1	2/28	633	91
76060	IRONHOUSE DRAW	CATTLE	1	3/1	6/30	4	100
76061	SAND DUNE	CATTLE	50	3/1	2/28	600	100
76063	MAIN CANAL	CATTLE	10	3/1	2/28	66	55
76064	AVALON HILLS	CATTLE	22	3/1	2/28	150	57
76104	SAND TRAP II	CATTLE	7	3/1	2/28	84	100
76106	PUMPJACK SOUTH II	CATTLE	4	3/1	2/28	48	100
76107	MALJAMAR SOUTH II	CATTLE	2	3/1	2/28	24	100
76120	LEA TOWNSITE II	CATTLE	5	3/1	2/28	60	100
76128	SWAG II	CATTLE	7	3/1	2/28	84	100
76137	RED TANK II	CATTLE	29	3/1	2/28	348	100
77001	SECO SNAKE	CATTLE	45	3/1	11/30	252	62
77002	LAKE ARTHUR EAST	CATTLE	4	3/1	2/28	48	100
77003	TAYLOR PEAK	CATTLE	75	3/1	2/28	567	63
77004	LOCO HILLS	CATTLE	175	3/1	2/28	1806	86
77005	JOHNSON DRAW	CATTLE	33	3/1	2/28	277	70
77006	CHALK BLUFF	CATTLE	65	3/1	2/28	655	84
77007	SAND HILL	CATTLE	85	3/1	2/28	714	70
77008	CEDAR LAKE	CATTLE	225	10/1	2/28	871	78
77008	CEDAR LAKE	CATTLE	225	3/1	3/31	179	78
77008	CEDAR LAKE	CATTLE	80	4/1	9/30	375	78
77009	BURTON NORTH	CATTLE	8	3/1	2/28	96	100
77010	HILINE	CATTLE	20	3/1	2/28	204	85
77011	DIPPER ALLOTMENT	CATTLE	160	3/1	2/28	922	48

Allotment Number	Allotment Name	Livestock Kind Text	Livestock Number	Period Begin Date	Period End Date	Aums	Public Lnd Pct
77012	TWIN WELLS NORTH	CATTLE	1195	3/1	2/28	11615	81
77012	TWIN WELLS NORTH	HORSE	5	3/1	2/28	49	81
77013	CLAYTON BASIN	CATTLE	985	3/1	2/28	10047	85
77013	CLAYTON BASIN	HORSE	15	3/1	2/28	153	85
77014	BURTON SOUTH	CATTLE	105	3/1	2/28	970	77
77015	ANGELL DRAW	CATTLE	151	3/1	2/28	1595	88
77015	ANGELL DRAW	HORSE	4	3/1	2/28	42	88
77016	DAGGER DRAW	CATTLE	106	3/1	2/28	1272	100
77016	DAGGER DRAW	HORSE	4	3/1	2/28	48	100
77017	AVALON	CATTLE	8	3/1	2/28	96	100
77018	RAILROAD	CATTLE	36	3/1	2/28	432	100
77019	KEYSTONE	HORSE	1	3/1	2/28	7	55
77019	KEYSTONE	CATTLE	19	3/1	2/28	125	55
77020	ALKALI LAKE	CATTLE	236	3/1	2/28	2634	93
77020	ALKALI LAKE	HORSE	4	3/1	2/28	45	93
77021	WEST BILBRY	CATTLE	121	3/1	2/28	1176	81
77022	MAROON CLIFFS	CATTLE	208	3/1	2/28	1972	79
77024	ALACRAN HILLS	CATTLE	14	3/1	2/28	69	41
77025	INDIAN FLATS	CATTLE	78	3/1	2/28	636	68
77025	INDIAN FLATS	HORSE	3	3/1	2/28	24	68
77026	QUAHADA RIDGE	CATTLE	50	3/1	2/28	564	94
77027	LIVINGSTON RIDGE	HORSE	20	3/1	2/28	178	74
77027	LIVINGSTON RIDGE	CATTLE	710	3/1	2/28	6305	74
77028	OLD INDIAN DRAW	HORSE	2	3/1	2/28	20	85
77028	OLD INDIAN DRAW	CATTLE	128	3/1	2/28	1306	85
77031	BRUSHY KNOB	CATTLE	280	3/1	2/28	2890	86
77032	ANTELOPE RIDGE	CATTLE	950	3/1	2/28	9576	84
77033	NASH DRAW	CATTLE	150	3/1	2/28	1422	79
77034	REMUDA BASIN	CATTLE	110	3/1	2/28	752	57
77036	PIERCE CANYON	CATTLE	177	3/1	2/28	1997	94
77037	RUSTLER BREAKS	CATTLE	281	3/1	2/28	3102	92
77038	LA HUERTA	CATTLE	2	3/1	2/28	12	50
77039	SUN WELLS	CATTLE	230	3/1	2/28	2429	88
77040	PHANTOM BANKS	CATTLE	670	3/1	2/28	7477	93
77041	LOWER TUCKER DRAW	CATTLE	150	3/1	2/28	756	42
77042	TWIN WELLS	CATTLE	710	3/1	2/28	6646	78
77043	LITTLE LAKE	CATTLE	80	3/1	2/28	691	72
77044	BURTON FLATS	CATTLE	60	3/1	2/28	698	97
77045	LINDSEY LAKE	CATTLE	100	3/1	2/28	924	77
77046	EAST TELLTALE BLUFF	CATTLE	30	3/1	2/28	68	19
77047	HARROUN CROSSING	CATTLE	31	3/1	10/31	60	24
77048	FENTON DRAW	CATTLE	69	3/1	2/28	811	98
77049	MIMOSA	HORSE	1	3/1	2/28	11	90
77049	MIMOSA	CATTLE	255	3/1	2/28	2754	90
78001	CROOKED CANYON	CATTLE	32	3/1	2/28	261	68
78001	CROOKED CANYON	SHEEP	1135	3/1	2/28	1852	68
78001	CROOKED CANYON	HORSE	5	3/1	2/28	41	68

Allotment Number	Allotment Name	Livestock Kind Text	Livestock Number	Period Begin Date	Period End Date	Aums	Public Lnd Pct
78001	FELIZ RIVER	CATTLE	292	3/1	2/28	1717	49
78001	COTTONWOOD	CATTLE	678	3/1	2/28	2604	32
78001	SQUAW CANYON	SHEEP	2400	3/1	2/28	2362	41
78001	SQUAW CANYON	HORSE	14	3/1	2/28	69	41
78001	SQUAW CANYON	CATTLE	361	3/1	2/28	1776	41
78001	OX YOKE	CATTLE	160	3/1	2/28	1171	61
78001	OX YOKE	SHEEP	4800	3/1	2/28	7027	61
78001	FELIZ RIVER NORTH	CATTLE	523	3/1	2/28	4205	67
78003	EL RANCHO GRANDE	CATTLE	59	3/1	2/28	326	46
78004	COTTONWOOD ACRES	CATTLE	22	3/1	2/28	214	81
78006	COTTONWOOD CREEK	CATTLE	260	3/1	2/28	1373	44
78007	BRANGUS RANCH	CATTLE	118	3/1	2/28	623	44
78009	CROW	CATTLE	38	3/1	2/28	287	63
78011	TUMBLEWEED DRAW	CATTLE	12	3/1	2/28	144	100
78011	TUMBLEWEED DRAW	CATTLE	105	3/1	2/28	416	33
78012	DRY CHAPARRAL	CATTLE	65	3/1	2/28	538	69
78013	ROAD BEND	CATTLE	80	3/1	2/28	797	83
78014	WEST CATCLAW	CATTLE	133	3/1	2/28	1277	80
78016	WEST JOHNSON DRAW	CATTLE	154	3/1	2/28	665	36
78017	HOPE CANAL ALLOTMENT	CATTLE	45	3/1	2/28	459	85
78020	COTTONTAIL	CATTLE	50	3/1	2/28	540	90
78020	COTTONTAIL	HORSE	5	3/1	2/28	54	90
78020	COTTONTAIL	SHEEP	400	3/1	2/28	864	90
78024	ATOKA	CATTLE	3	3/1	2/28	36	100
78025	DAYTON	CATTLE	6	3/1	2/28	72	100
78026	ANTELOPE SINK	HORSE	2	3/1	2/28	18	76
78026	ANTELOPE SINK	CATTLE	234	3/1	2/28	2134	76
78027	ROCK TANK	CATTLE	4	3/1	2/28	48	100
78028	HOPE HILL	CATTLE	21	3/1	2/28	252	100
78031	NORTH HOPE	CATTLE	1	3/1	10/31	8	100
78036	PENASCO RIVER FARM	CATTLE	3	3/1	2/28	36	100
78038	EAST HOPE	CATTLE	15	3/1	2/28	135	75
78040	SINKHOLE FLAT	HORSE	2	3/1	2/28	19	78
78040	SINKHOLE FLAT	CATTLE	134	3/1	2/28	1254	78
78041	SIEGREST DRAW	HORSE	5	3/1	2/28	29	49
78041	SIEGREST DRAW	CATTLE	950	3/1	2/28	5586	49
78042	GARDENER DRAW	CATTLE	17	3/1	2/28	204	100
78043	MCKITTRICK DRAW	CATTLE	49	3/1	2/28	465	79
78043	MCKITTRICK DRAW	HORSE	4	3/1	2/28	38	79
78046	SEVEN RIVERS NORTH	HORSE	2	3/1	2/28	17	69
78046	SEVEN RIVERS NORTH	CATTLE	93	3/1	2/28	770	69
78048	DEER CANYON	CATTLE	438	3/1	2/28	4573	87
78048	DEER CANYON	HORSE	6	3/1	2/28	63	87
78048	DEER CANYON	GOAT	150	3/1	2/28	313	87
78048	DEER CANYON	SHEEP	5	3/1	2/28	10	87
78049	COLLIER TANK	CATTLE	297	3/1	2/28	3208	90
78050	TEXAS HILL	HORSE	10	3/1	2/28	101	84

Allotment Number	Allotment Name	Livestock Kind Text	Livestock Number	Period Begin Date	Period End Date	Aums	Public Lnd Pct
78050	TEXAS HILL	CATTLE	715	3/1	2/28	7207	84
78050	TEXAS HILL	SHEEP	1950	3/1	2/28	3931	84
78051	BOX CANYON	HORSE	1	3/1	2/28	9	77
78051	BOX CANYON	SHEEP	5	3/1	2/28	9	77
78051	BOX CANYON	GOAT	10	3/1	2/28	19	77
78051	BOX CANYON	CATTLE	231	3/1	2/28	2134	77
78052	BLACK MUHLEY	CATTLE	275	3/1	2/28	1518	46
78053	SEVEN RIVERS SOUTH	CATTLE	52	3/1	2/28	393	63
78054	GYP WATERHOLE	CATTLE	65	3/1	2/28	390	50
78055	SEVEN RIVERS HILL	HORSE	4	3/1	2/28	28	59
78055	SEVEN RIVERS HILL	CATTLE	184	3/1	2/28	1303	59
78056	BRANTLEY DAM	CATTLE	8	3/1	2/28	96	100
78057	THREE TWINS NORTH	CATTLE	55	3/1	2/28	541	82
78058	ROCK HOUSE	CATTLE	105	3/1	2/28	1159	92
78060	WADCUTTER DRAW	HORSE	2	3/1	2/28	18	77
78060	WADCUTTER DRAW	CATTLE	153	3/1	2/28	1414	77
78061	INDIAN BASIN	CATTLE	223	3/1	2/28	2382	89
78061	INDIAN BASIN	HORSE	2	3/1	2/28	21	89
78062	LITTLE BOX CANYON	CATTLE	180	3/1	2/28	1858	86
78062	LITTLE BOX CANYON	HORSE	8	3/1	2/28	83	86
78062	LITTLE BOX CANYON	GOAT	10	3/1	2/28	21	86
78063	BURRO HILL	CATTLE	370	3/1	2/28	3996	90
78064	CAWLEY DRAW	CATTLE	460	3/1	2/28	4858	88
78065	INDIAN HILLS	HORSE	1	3/1	2/28	10	81
78065	INDIAN HILLS	CATTLE	369	3/1	2/28	3587	81
78066	ROCKY ARROYO	CATTLE	15	3/1	2/28	131	73
78068	THREE TWINS	CATTLE	150	3/1	2/28	1152	64
78069	GOLDEN EAGLE	HORSE	4	3/1	2/28	7	15
78069	GOLDEN EAGLE	CATTLE	71	3/1	2/28	128	15
78070	SOAPBERRY DRAW	CATTLE	1	3/1	2/28	12	100
78071	DOLOMITE	HORSE	1	3/1	2/28	3	25
78071	DOLOMITE	CATTLE	55	3/1	2/28	165	25
78073	HACKBERRY HILLS	CATTLE	55	3/1	2/28	310	47
78075	AIRPORT	CATTLE	95	3/1	2/28	559	49
78075	AIRPORT	HORSE	5	3/1	2/28	29	49
78076	GOPHER HILLS	HORSE	6	3/1	2/28	50	69
78076	GOPHER HILLS	CATTLE	56	3/1	2/28	464	69
78077	MCGRUDER HILL	CATTLE	120	3/1	2/28	1310	91
78077	MCGRUDER HILL	SHEEP	25	3/1	2/28	55	91
78077	MCGRUDER HILL	HORSE	8	3/1	2/28	87	91
78079	BEARDON CANYON	CATTLE	150	3/1	2/28	1476	82
78079	BEARDON CANYON	HORSE	4	3/1	2/28	39	82
78079	BEARDON CANYON	SHEEP	130	3/1	2/28	256	82
78080	AZOTEA MESA	SHEEP	845	3/1	2/28	1541	76
78080	AZOTEA MESA	CATTLE	120	3/1	2/28	1094	76
78080	AZOTEA MESA	HORSE	10	3/1	2/28	91	76
78081	THREE FORKS CANYON	CATTLE	1140	3/1	2/28	8071	59

Allotment Number	Allotment Name	Livestock Kind Text	Livestock Number	Period Begin Date	Period End Date	Aums	Public Lnd Pct
78081	THREE FORKS CANYON	HORSE	10	3/1	2/28	71	59
78082	BANDANNA POINT	CATTLE	156	3/1	2/28	1498	80
78082	BANDANNA POINT	HORSE	2	3/1	2/28	19	80
78083	KUYKENDALL DRAW	CATTLE	285	3/1	2/28	2770	81
78084	DARK CANYON	HORSE	10	3/1	2/28	70	58
78084	DARK CANYON	SHEEP	25	3/1	2/28	35	58
78084	DARK CANYON	CATTLE	422	3/1	2/28	2937	58
78084	LOWER GUADALUPE RIDGE	CATTLE	167	3/1	2/28	1623	81
78086	CASS DRAW	CATTLE	5	3/1	2/28	60	100
78087	BIG HACKBERRY DRAW	CATTLE	285	3/1	2/28	1676	49
78088	HARKEY CROSSING	CATTLE	120	3/1	2/28	317	22
78089	THREEMILE DRAW	CATTLE	60	3/1	2/28	475	66
78090	BLUE SPRING	CATTLE	6	3/1	2/28	72	100
78091	FOREHAND CROSSING	HORSE	2	3/1	2/28	24	100
78091	FOREHAND CROSSING	CATTLE	28	3/1	2/28	336	100
78092	FLUME DRAW HILLS	CATTLE	20	3/1	2/28	194	81
78094	CHINA DRAW	CATTLE	47	3/1	2/28	564	100
78095	KELLY WELL	CATTLE	39	3/1	2/28	215	46
78096	SALT DRAW	HORSE	5	3/1	2/28	10	16
78096	SALT DRAW	CATTLE	170	3/1	2/28	326	16
78097	WILLOW LAKE	CATTLE	44	3/1	2/28	290	55
78098	OTIS	CATTLE	7	3/1	2/28	84	100
78099	HERRADURA BEND	CATTLE	19	3/1	2/28	228	100
78100	MOSLEY CANYON	CATTLE	119	3/1	2/28	643	45
78100	MOSLEY CANYON	CATTLE	2	3/1	2/28	24	100
78101	RED BLUFF DRAW	CATTLE	6	3/1	2/28	72	100
78102	LOWER REED WELL	HORSE	2	3/1	2/28	21	89
78102	LOWER REED WELL	CATTLE	63	3/1	2/28	673	89
78103	TECOLOTE PEAK	CATTLE	110	3/1	2/28	1056	80
78103	TECOLOTE PEAK	HORSE	5	3/1	2/28	48	80
78104	COTTONWOOD HILLS	CATTLE	145	3/1	2/28	1549	89
78106	COTTONWOOD SPRINGS	CATTLE	163	3/1	2/28	1584	81
78106	COTTONWOOD SPRINGS	HORSE	1	3/1	2/28	10	81
78107	HAY HOLLOW	CATTLE	125	3/1	2/28	1200	80
78108	JUMPING SPRINGS	CATTLE	190	3/1	2/28	1801	79
78109	LOBO	CATTLE	196	3/1	2/28	1576	67
78110	NUEVO CANYON	HORSE	2	3/1	11/30	15	85
78110	NUEVO CANYON	CATTLE	44	3/1	11/30	338	85
78111	WHITE CITY	CATTLE	40	3/1	2/28	202	42
78112	EWING PLACE	CATTLE	17	3/1	2/28	192	94
78113	UPPER JURNIGAN DRAW	BURRO	5	3/1	2/28	36	60
78113	UPPER JURNIGAN DRAW	CATTLE	10	3/1	2/28	72	60
78115	SERPENTINE BENDS	CATTLE	68	3/1	2/28	571	70
78115	SERPENTINE BENDS	HORSE	2	3/1	2/28	17	70
78116	LAST CHANCE CANYON	HORSE	1	3/1	2/28	11	90
78116	LAST CHANCE CANYON	CATTLE	279	3/1	2/28	3013	90
78117	WEST HESS HILLS	CATTLE	23	3/1	2/28	276	100

Allotment Number	Allotment Name	Livestock Kind Text	Livestock Number	Period Begin Date	Period End Date	Aums	Public Lnd Pct
78118	HACKBERRY CANYON	CATTLE	26	3/1	2/28	312	100
78119	RATTLESNAKE CANYON	CATTLE	45	3/1	2/28	373	69
78120	BLACK RIVER	CATTLE	25	3/1	2/28	174	58
78121	DOUBLE CANYON	CATTLE	75	3/1	2/28	513	57
78121	DOUBLE CANYON	HORSE	1	3/1	2/28	7	57
78122	GRAPEVINE DRAW	CATTLE	95	3/1	2/28	650	57
78124	STETSON SEEP	CATTLE	198	3/1	2/28	1188	50
78126	LOWER DOUBLE CANYON	CATTLE	4	3/1	7/31	20	100
78126	LOWER DOUBLE CANYON	CATTLE	21	3/1	2/28	239	95
78130	GRAPEVINE SPRING	CATTLE	6	3/1	2/28	72	100
78130	GRAPEVINE SPRING	HORSE	7	3/1	2/28	84	100
78131	THURMAN DRAW	CATTLE	110	3/1	2/28	792	60
78136	LAZY U T SPRINGS	CATTLE	235	3/1	2/28	2312	82
78138	SLAUGHTER CANYON	CATTLE	66	3/1	2/28	404	51
78138	SLAUGHTER CANYON	HORSE	4	3/1	2/28	24	51
78141	LOWER DELAWARE RIVER	CATTLE	70	3/1	2/28	538	64
78142	DELAWARE RIVER-WEST	CATTLE	42	3/1	2/28	504	100
78144	C P HILL	CATTLE	290	3/1	2/28	2993	86
78145	PECOS RIVER	HORSE	5	4/1	10/31	14	40
78146	RAIN SPRINGS	CATTLE	135	3/1	2/28	1150	71
79001	EAGLE CREEK	CATTLE	543	3/1	2/28	3258	50
79001	EAGLE CREEK	HORSE	7	3/1	2/28	42	50
79001	EAGLE CREEK	SHEEP	5	3/1	2/28	6	50
79002	FELIZ	SHEEP	1910	3/1	2/28	2613	57
79002	FELIZ	HORSE	5	3/1	2/28	34	57
79002	FELIZ	CATTLE	100	3/1	2/28	684	57
79005	SALT HOUSE DRAW	CATTLE	350	3/1	2/28	2520	60
79005	SALT HOUSE DRAW	CATTLE	3	3/1	2/28	36	100
79005	SALT HOUSE DRAW	SHEEP	1650	3/1	2/28	2376	60
79007	MANNING DOME	CATTLE	32	3/1	2/28	384	100
79008	BROWNING CANYON	CATTLE	20	3/1	2/28	240	100
79010	TELEPHONE CANYON	CATTLE	7	3/1	2/28	84	100
79011	BURNT CANYON	CATTLE	16	5/1	11/30	113	100
79012	SIXTEEN SPRINGS	CATTLE	6	3/1	2/28	72	100
79013	MCDONALD FLATS	CATTLE	52	3/1	2/28	624	100
79016	PENASCO CANYON	SHEEP	100	3/1	2/28	240	100
79016	PENASCO CANYON	CATTLE	26	3/1	2/28	312	100
79017	FLYING H	CATTLE	262	3/1	2/28	503	16
79018	CHERRY FLAT	SHEEP	100	3/1	2/28	240	100
79018	CHERRY FLAT	CATTLE	10	3/1	2/28	120	100
79019	PENASCO RIVER	SHEEP	3065	3/1	2/28	3237	44
79019	PENASCO RIVER	HORSE	12	3/1	2/28	63	44
79019	PENASCO RIVER	CATTLE	210	3/1	2/28	1109	44
79020	BIG CHERRY CANYON	CATTLE	42	3/1	2/24	498	100
79021	PENASCO SCHOOL	CATTLE	202	3/1	2/28	1091	45
79022	PENASCO	CATTLE	55	3/1	2/28	660	100
79023	CHERRY ALLOTMENT	CATTLE	5	3/1	2/28	60	100

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79024	CUEVO EAST	CATTLE	275	3/1	2/28	1980	60
79025	CUEVO WEST	CATTLE	35	3/1	2/28	420	100
79026	ELKINS, SAM	CATTLE	340	3/1	2/28	2407	59
79027	PENASCO EAST	CATTLE	100	3/1	2/28	1200	100
79028	PRETTY BIRD HILLS	CATTLE	1334	3/1	2/28	9125	57
79028	PRETTY BIRD HILLS	HORSE	1	3/1	2/28	7	57
79028	PRETTY BIRD HILLS	SHEEP	100	3/1	2/28	137	57
79029	SIXTEEN TANK	CATTLE	267	3/1	2/28	2179	68
79030	ENCINO DRAW	SHEEP	2160	3/1	2/28	3629	70
79030	ENCINO DRAW	CATTLE	103	3/1	2/28	865	70
79030	ENCINO DRAW	HORSE	5	3/1	2/28	42	70
79031	ACRES LAKE	CATTLE	423	3/1	2/28	4061	80
79032	LONG CANYON	CATTLE	550	3/1	2/28	5214	79
79032	LONG CANYON	SHEEP	200	3/1	2/28	379	79
79032	LONG CANYON	HORSE	10	3/1	2/28	95	79
79033	BUCKHORN	CATTLE	127	3/1	2/28	991	65
79033	BUCKHORN	HORSE	4	3/1	2/28	31	65
79034	SOUTH LONG CANYON	CATTLE	17	3/1	2/28	204	100
79036	WOODLAND	CATTLE	80	3/1	2/28	470	49
79037	4 MILE CANYON	CATTLE	9	3/1	2/28	108	100
79038	NORTH LONG CANYON	CATTLE	12	3/1	2/28	144	100
79039	CHAMPION CANYON	CATTLE	115	3/1	2/28	635	46
79040	SIXTEEN MILE DRAW	CATTLE	493	3/1	2/28	2189	37
79041	PINON	CATTLE	11	3/1	2/28	132	100
79042	BARCLAY DRAW	CATTLE	35	3/1	2/28	420	100
79043	JUNIPER	CATTLE	21	3/1	2/28	252	100
79044	WRIGHT WELL DRAW	CATTLE	74	3/1	2/28	506	57
79045	BEAR CANYON	CATTLE	165	3/1	2/28	1386	70
79046	CROOKED CREEK	CATTLE	485	3/1	2/28	4190	72
79046	CROOKED CREEK	HORSE	10	3/1	2/28	86	72
79048	UPPER SEGREST DRAW	CATTLE	159	3/1	2/28	1584	83
79049	UPPER PACKSADDLE CAN	CATTLE	24	3/1	2/28	288	100
79050	CHERRY CANYON	CATTLE	26	3/1	2/28	312	100
79051	THIMBLE CANYON	CATTLE	32	3/1	2/28	384	100
79054	STEVENS DRAW	CATTLE	1	3/1	2/28	12	100
79054	STEVENS DRAW	SHEEP	12	3/1	2/28	29	100
79054	STEVENS DRAW	HORSE	1	3/1	2/28	12	100
79056	RIM	SHEEP	85	3/1	2/28	204	100
79109	CROOKED CANYON - II	CATTLE	10	3/1	2/28	120	100
79127	COX CANYON - II	CATTLE	4	3/1	2/28	48	100
79129	4 MILE CANYON - II	CATTLE	2	3/1	2/28	24	100
79225	COX CANYON	CATTLE	37	3/1	2/28	444	100
79226	COX CANYON - E	CATTLE	27	3/1	2/28	324	100
79228	4 MILE CANYON - E	CATTLE	25	3/1	2/28	300	100

Allotment Number	Allotment Name	Suspended Aums
76001	COLLUM	0
76002	GLADIOLA	1
76004	SAND TRAP	22
76006	PUMPJACK SOUTH	593
76007	MALJAMAR SOUTH	0
76008	QUERECHO PLAINS	116
76009	BUCKEYE NORTH	0
76010	GOLF COURSE	42
76011	LAGUNA TONTO	78
76012	MONUMENT DRAW	1
76013	RECORD	38
76014	WHITE BREAKS	17
76015	NADINE	0
76016	JONES CITY - NORTH	122
76017	EUNICE	0
76018	SOUTH MONUMENT DRAW	59
76019	MONUMENT - SOUTHWEST	17
76020	LEA TOWNSITE	0
76021	HALFWAY	0
76022	LAGUNA TOSTON	96
76023	BILBRY BASIN	16
76024	JONES CITY	11
76025	OIL CENTER NORTH	217
76026	OIL CENTER SOUTH	53
76027	SAN SIMON	788
76028	SWAG	456
76029	PLAYA DUNES	0
76030	DEEP WELLS	0
76031	EAST RATTLESNAKE CAN	85
76032	JAL - NORTHWEST	166
76033	E. RATTLESNAKE FLAT	72
76035	MEDLIN-WELLS	2
76036	OCHOA - NORTHWEST	2
76037	RED TANK	31
76038	FAIRVIEW	0
76039	BOBCAT DRAW	1399
76040	PENN TANK	648
76041	OLD BALDY	0
76042	TOBOSA FLATS	0
76043	JAVELINA BASIN	0
76045	COTTON PLACE	0
76046	GOEDEKE GRAZING CELL	0
76047	MONUMENT-JAL OILFIEL	16
76048	SAN SIMON SWALE	0
76049	HART RANCH	34
76050	CERCA	0
76051	ANDREWS FLAT	264

Allotment Number	Allotment Name	Suspended Aums
76052	MEXICO WELLS	1152
76053	RUTH ROSS PLACE	917
76054	SOUTHEAST JAL	0
76055	WEST JACKSON	24
76056	BROOKIN WEST	6
76057	JACKSON EAST	12
76058	EDDY 13	0
76060	IRONHOUSE DRAW	4
76061	SAND DUNE	0
76063	MAIN CANAL	0
76064	AVALON HILLS	0
76104	SAND TRAP II	0
76106	PUMPJACK SOUTH II	0
76107	MALJAMAR SOUTH II	24
76120	LEA TOWNSITE II	0
76128	SWAG II	0
76137	RED TANK II	0
77001	SECO SNAKE	118
77002	LAKE ARTHUR EAST	0
77003	TAYLOR PEAK	0
77004	LOCO HILLS	0
77005	JOHNSON DRAW	0
77006	CHALK BLUFF	0
77007	SAND HILL	0
77008	CEDAR LAKE	458
77009	BURTON NORTH	0
77010	HILINE	143
77011	DIPPER ALLOTMENT	0
77012	TWIN WELLS NORTH	1963
77013	CLAYTON BASIN	0
77014	BURTON SOUTH	0
77015	ANGELL DRAW	0
77016	DAGGER DRAW	0
77017	AVALON	0
77018	RAILROAD	0
77019	KEYSTONE	0
77020	ALKALI LAKE	19
77021	WEST BILBRY	145
77022	MAROON CLIFFS	31
77024	ALACRAN HILLS	2
77025	INDIAN FLATS	0
77026	QUAHADA RIDGE	0
77027	LIVINGSTON RIDGE	0
77028	OLD INDIAN DRAW	0
77031	BRUSHY KNOB	0
77032	ANTELOPE RIDGE	366
77033	NASH DRAW	531

Allotment Number	Allotment Name	Suspended Aums
77034	REMUDA BASIN	5
77036	PIERCE CANYON	1562
77037	RUSTLER BREAKS	0
77038	LA HUERTA	0
77039	SUN WELLS	528
77040	PHANTOM BANKS	145
77041	LOWER TUCKER DRAW	63
77042	TWIN WELLS	165
77043	LITTLE LAKE	242
77044	BURTON FLATS	14
77045	LINDSEY LAKE	0
77046	EAST TELLTALE BLUFF	0
77047	HARROUN CROSSING	0
77048	FENTON DRAW	0
77049	MIMOSA	0
78001	FELIZ RIVER	0
78003	EL RANCHO GRANDE	0
78004	COTTONWOOD ACRES	0
78006	COTTONWOOD CREEK	0
78007	BRANGUS RANCH	0
78009	CROW	0
78011	TUMBLEWEED DRAW	0
78012	DRY CHAPARRAL	0
78013	ROAD BEND	0
78014	WEST CATCLAW	0
78016	WEST JOHNSON DRAW	0
78017	HOPE CANAL ALLOTMENT	0
78020	COTTONTAIL	0
78024	ATOKA	0
78025	DAYTON	0
78026	ANTELOPE SINK	0
78027	ROCK TANK	0
78028	HOPE HILL	0
78031	NORTH HOPE	0
78036	PENASCO RIVER FARM	0
78038	EAST HOPE	0
78040	SINKHOLE FLAT	0
78041	SIEGREST DRAW	0
78042	GARDENER DRAW	0
78043	MCKITTRICK DRAW	0
78046	SEVEN RIVERS NORTH	0
78048	DEER CANYON	0
78049	COLLIER TANK	0
78050	TEXAS HILL	0
78051	BOX CANYON	0
78052	BLACK MUHLEY	0
78053	SEVEN RIVERS SOUTH	0

Allotment Number	Allotment Name	Suspended Aums
78054	GYP WATERHOLE	0
78055	SEVEN RIVERS HILL	0
78056	BRANTLEY DAM	0
78057	THREE TWINS NORTH	0
78058	ROCK HOUSE	0
78060	WADCUTTER DRAW	0
78061	INDIAN BASIN	0
78062	LITTLE BOX CANYON	0
78063	BURRO HILL	0
78064	CAWLEY DRAW	0
78065	INDIAN HILLS	0
78066	ROCKY ARROYO	0
78068	THREE TWINS	0
78069	GOLDEN EAGLE	0
78070	SOAPBERRY DRAW	0
78071	DOLOMITE	0
78073	HACKBERRY HILLS	0
78075	AIRPORT	0
78076	GOPHER HILLS	0
78077	MCGRUDER HILL	0
78079	BEARDON CANYON	0
78080	AZOTEA MESA	0
78081	THREE FORKS CANYON	0
78082	BANDANNA POINT	0
78083	KUYKENDALL DRAW	0
78084	DARK CANYON	0
78086	CASS DRAW	0
78087	BIG HACKBERRY DRAW	0
78088	HARKEY CROSSING	0
78089	THREEMILE DRAW	0
78090	BLUE SPRING	0
78091	FOREHAND CROSSING	0
78092	FLUME DRAW HILLS	0
78094	CHINA DRAW	0
78095	KELLY WELL	0
78096	SALT DRAW	0
78097	WILLOW LAKE	0
78098	OTIS	0
78099	HERRADURA BEND	0
78100	MOSLEY CANYON	0
78101	RED BLUFF DRAW	0
78102	LOWER REED WELL	0
78103	TECOLOTE PEAK	0
78104	COTTONWOOD HILLS	0
78106	COTTONWOOD SPRINGS	0
78107	HAY HOLLOW	0
78108	JUMPING SPRINGS	0

Allotment Number	Allotment Name	Suspended Aums
78109	LOBO	0
78110	NUEVO CANYON	0
78111	WHITE CITY	0
78112	EWING PLACE	0
78113	UPPER JURNIGAN DRAW	0
78115	SERPENTINE BENDS	0
78116	LAST CHANCE CANYON	0
78117	WEST HESS HILLS	0
78118	HACKBERRY CANYON	0
78119	RATTLESNAKE CANYON	0
78120	BLACK RIVER	0
78121	DOUBLE CANYON	0
78122	GRAPEVINE DRAW	0
78124	STETSON SEEP	0
78126	LOWER DOUBLE CANYON	0
78130	GRAPEVINE SPRING	0
78131	THURMAN DRAW	0
78136	LAZY U T SPRINGS	0
78138	SLAUGHTER CANYON	0
78141	LOWER DELAWARE RIVER	0
78142	DELAWARE RIVER-WEST	0
78144	C P HILL	0
78145	PECOS RIVER	0
78146	RAIN SPRINGS	0
79001	EAGLE CREEK	0
79002	FELIZ	766
79005	SALT HOUSE DRAW	0
79007	MANNING DOME	0
79008	BROWNING CANYON	0
79010	TELEPHONE CANYON	0
79011	BURNT CANYON	0
79012	SIXTEEN SPRINGS	0
79013	MCDONALD FLATS	0
79016	PENASCO CANYON	0
79017	FLYING H	0
79018	CHERRY FLAT	0
79019	PENASCO RIVER	0
79020	BIG CHERRY CANYON	0
79021	PENASCO SCHOOL	0
79022	PENASCO	0
79023	CHERRY ALLOTMENT	0
79024	CUEVO EAST	0
79025	CUEVO WEST	0
79026	ELKINS, SAM	0
79027	PENASCO EAST	0
79028	PRETTY BIRD HILLS	356
79029	SIXTEEN TANK	0

Allotment Number	Allotment Name	Suspended Aums
79030	ENCINO DRAW	1269
79031	ACRES LAKE	0
79032	LONG CANYON	0
79033	BUCKHORN	0
79034	SOUTH LONG CANYON	0
79036	WOODLAND	0
79037	4 MILE CANYON	0
79038	NORTH LONG CANYON	0
79039	CHAMPION CANYON	0
79040	SIXTEEN MILE DRAW	0
79041	PINON	0
79042	BARCLAY DRAW	0
79043	JUNIPER	0
79044	WRIGHT WELL DRAW	0
79045	BEAR CANYON	0
79046	CROOKED CREEK	0
79048	UPPER SEGREST DRAW	0
79049	UPPER PACKSADDLE CAN	168
79050	CHERRY CANYON	0
79051	THIMBLE CANYON	0
79054	STEVENS DRAW	0
79056	RIM	0
79109	CROOKED CANYON - II	0
79127	COX CANYON - II	0
79129	4 MILE CANYON - II	0
79225	COX CANYON	0
79226	COX CANYON - E	0
79228	4 MILE CANYON - E	0