

RECLAMATION

Managing Water in the West

BRANTLEY AND AVALON RESERVOIRS RESOURCE MANAGEMENT PLAN AMENDMENT FINAL ENVIRONMENTAL ASSESSMENT



**U.S. Department of the Interior
Bureau of Reclamation
Albuquerque Area Office
Albuquerque, New Mexico**

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Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

The Bureau of Land Management is responsible for stewardship of our public lands. The BLM is committed to manage, protect and improve these lands in a manner to serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife habitat, wilderness, air and scenic quality, as well as scientific and cultural values.

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Albuquerque Area Office
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FINDING OF NO SIGNIFICANT IMPACT

**Brantley and Avalon Reservoirs
Resource Management Plan Amendment
Eddy County, New Mexico**



Manager, Environment Division

3/9/11

Date



Area Manager, Albuquerque, New Mexico

3/9/11

Date

FONSI Number: AAO-10-005

INTRODUCTION

This is the Finding of No Significant Impact (FONSI) of the United States Department of the Interior (USDI), Bureau of Reclamation (Reclamation) for the Brantley and Avalon Reservoirs Resource Management Plan Amendment (RMPA) project located in Eddy County, southeastern New Mexico. The RMPA is the subject of an Environmental Assessment (EA), dated February 2011, developed in compliance with the National Environmental Policy Act (NEPA) to specifically address future Federal mineral-leasing on Carlsbad Project Area lands. The EA, however, is not the final review upon which approval of all proposed mineral-leasing actions on Reclamation lands will be based. All future, site-specific actions will receive further environmental analysis that will be tiered from the EA and RMPA documents, as appropriate.

BACKGROUND

The RMPA amends Reclamation's 2003 Resource Management Plan (RMP) for Brantley and Avalon Reservoirs (Reclamation 2003). Reclamation has prepared an EA and subsequent RMPA to address future Federal leasable (e.g., oil, gas) minerals development on approximately 49,000 acres of Reclamation-administered lands in Eddy County, New Mexico. The lands encumbered by the EA and RMPA are part of Reclamation's Carlsbad Project, which is authorized under the Reclamation Act of June 17, 1902, and the Brantley Project Acts of 1972 (P.L. 92-514) and 1980 (P.L. 96-375). The Minerals Leasing Act of 1920, as amended, provides the Secretary of the Interior with authority to issue leases on lands where the mineral rights are held by the Federal government. This authority has been delegated to the USDI, Bureau of Land Management (BLM), a Cooperating Agency for preparation of the RMPA and EA documents. In recent years the BLM has experienced a tremendous increase in interest from oil and gas development companies for new lease nominations throughout Eddy County, including the Project Area. At present the BLM is deferring new lease nominations for oil and gas development within Reclamation-administered lands until the RMPA is completed. However, site-specific applications are being considered on a case-by-case basis. Applications for oil and gas drilling activities on existing lease areas are reviewed on the ground and approved if negative effects to natural and cultural resources can be avoided or mitigated. Since Reclamation's 2003 RMP did not evaluate the cumulative impacts of reasonably foreseeable future mineral leasing and development of Project Area resources, the purpose of the RMPA is to develop appropriate guidance that will allow Reclamation and BLM to make informed decisions about oil and gas leasing and development on Reclamation-administered lands in order to comply with existing guidelines and laws.

SUMMARY OF THE PREFERRED ALTERNATIVE

Federal mineral leasing and development may occur on lands where the surface is managed by Federal, State, Native American agencies, or private individuals. For minerals development on Reclamation lands within the Project Area, management objectives are defined in terms of the availability of land for leasing (i.e., closed or open to minerals leasing) and the management of lands that are open to leasing (i.e., with standard terms and conditions or with special leasing stipulations). Federal mineral lands and lands subject to Federal mineral leasing stipulations account for 43,745 acres, or 88 percent, of the Project Area. All Federal mineral lands and lands

subject to Federal mineral leasing stipulations within the Project Area are considered open for minerals leasing.

Lands open for minerals leasing may be open with no specific development restrictions defined in the original RMP or in the RMPA. However, these areas are subject to the *Standard Lease Terms and Conditions* as defined on the lease form. Or, lands open for leasing may be managed with constraints in the form of *Special Lease Stipulations*, which are provisions that modify the standard lease rights and conditions included in a lease when environmental and planning analyses have demonstrated that additional and more stringent environmental protection is needed. The three types of special lease stipulations defined for the Project Area are (1) *no surface occupancy*, (2) *no storage facilities*, and (3) *surface occupancy on a case-by-case basis*. A stipulation of no surface occupancy does not allow the surface of a given area to be occupied by oil and gas development facilities. A stipulation of no storage facilities does not allow storage facilities within a given area. A stipulation of surface occupancy on a case-by-case basis allows for a site-specific evaluation of proposed activities to determine the appropriateness of surface occupancy and storage facilities. Under certain conditions, Reclamation may grant waivers, exceptions, or modifications to lease stipulations as defined in Appendix A of the RMPA document and according to *Reclamation Manual Directives and Standards*.

Reclamation has decided to implement Alternative C, 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation, as described in the EA. Alternative C modifies the existing management situation to respond to legislative policies, regulatory requirements, and/or *Reclamation Manual Directives and Standards* that otherwise are not currently included under the Existing (2003) Oil and Gas Leasing Stipulations (Appendix A in the EA). In addition, the maximum water surface elevation at Brantley Reservoir would be revised from 3,271 feet (997 meters) to 3,263 feet (995 meters), and a no surface occupancy special lease stipulation would be applied below that elevation.

Alternative C incorporates legislative and regulatory requirements and/or management objectives that currently are not included under existing management (i.e., Alternative A). The amount of land open to leasing with a special lease stipulation of no surface occupancy would decrease to 19,155 acres (7,752 hectares), or 39 percent of the Project Area as compared to Alternative A. The amount of land open to leasing with a special lease stipulation of no storage facilities would decrease to 6,486 acres (2,625 hectares), or 13 percent of the Project Area as compared to Alternative A. The amount of land that could be leased with standard lease terms and conditions would decrease to 10,324 acres (4,178 hectares), or 21 percent of the Project Area as compared to Alternative A. The amount of land designated for surface occupancy on a case-by-case basis, but with no wells allowed, would increase to 13,527 acres (5,474 hectares) or 27 percent of the Project Area compared to Alternatives A and B.

ENVIRONMENTAL IMPACTS

The following resources and socioeconomic factors were evaluated in detail in the EA for anticipated impacts from implementation of the RMPA: air quality, soils, cave and karst resources, water quality, vegetation, wildlife, fisheries, threatened endangered and other special status species, cultural resources, Indian trust assets, paleontological resources, social and economic values, environmental justice, recreation resources, rangeland and grazing, energy

minerals and other extractive resources, transportation and access, and visual resources. A summary of environmental impacts to these resources and factors resulting from implementation of the Preferred Alternative is provided below.

Air Quality

Direct impacts to air quality include exhaust emissions, chemical odors, and dust from motorized equipment used to construct access roads, well pads, and wells during construction and drilling phases. These direct impacts to air quality would be greatly reduced upon completion of the construction and drilling phases. Impacts to air quality would be affected indirectly by existing surface disturbances, which would create sources of fugitive dust, as well as exhaust emissions from heavy equipment and vehicles. These short-term effects would not be expected to be significantly adverse.

Soils

Direct impacts to soils resulting from oil and gas development and surface-use activities include removal of vegetation, exposure of the soil, mixing of soil horizons, soil compaction, loss of top soil productivity, and susceptibility of the soil to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust generated from vehicle traffic. These impacts could result in increased indirect impacts such as runoff, erosion, and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation of well sites, access roads, pipelines, and associated facilities. Contamination of soils from drilling and production wastes mixed into soils or spilled on the soil surfaces could cause a long-term reduction in site soil productivity. Some of these direct impacts can be reduced or avoided through proper design, construction, and maintenance, and through implementation of Best Management Practices (BMPs).

Cave and Karst Resources

The construction of roads, pipelines, well pads, and utilities can impact bedrock integrity and reroute, impede, focus, or erode natural surface drainage systems. Increased silting and sedimentation from construction can plug downstream sinkholes, caves, springs, and other components of aquifer recharge systems and result in adverse impacts to aquifer quality and cave environments. Any contaminants released into the environment during or after construction can impact aquifers and cave systems. A possibility exists for slow subsidence or sudden surface collapse during construction operations from the collapse of underlying cave passages and voids. This would cause associated safety hazards to the operator and the potential for increased environmental impact. Subsidence processes can be triggered by blasting, intense vibrations, rerouting of surface drainages, focusing of surface drainage, and general surface disturbance.

Blasting fractures in bedrock can serve as direct conduits for transfer of contaminants into cave and groundwater systems. Blasting also creates an expanded volume of rock rubble that cannot be reclaimed to natural contours, soil condition, or native vegetative condition. As such, surface and subsurface disruptions from blasting procedures can lead to permanent changes in vegetation, rainfall percolation, silting/erosion factors, aquifer recharge, and freshwater quality

and can increase the risk of contaminant migration from drilling/production facilities built atop the blast area.

During drilling, previously unknown cave and karst features could be encountered. If a void is encountered while drilling and a loss of circulation occurs, lost drilling fluids can directly contaminate groundwater recharge areas, aquifers, and groundwater quality. Drilling operations can also lead to sudden collapse of underground voids. Cementing operations may plug or alter groundwater flow, potentially reducing the water quantity at springs and water wells. Inadequate subsurface cementing, casing, and cave/aquifer protection measures can lead to the migration of oil, gas, drilling fluids, and produced saltwater into cave systems and freshwater aquifers.

Production facilities such as tank batteries, pump-jacks, compressors, transfer stations, and pipeage may fail and allow contaminants to enter caves and freshwater systems. Down hole casing and cementing failures can allow migration of fluids and/or gas between formations and aquifers. Facilities may also be subject to slow subsidence or sudden collapse of the underlying bedrock.

Water Quality

Potential direct impacts that could occur from oil and gas development and surface-use activities include increased surface water runoff and off-site sedimentation brought about by soil disturbance. These impacts include increased salt loading and water quality impairment of surface waters, channel morphology changes from road and pipeline crossings, and contamination of surface waters by produced water. The magnitude of these impacts to water quality would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, soil character, duration and time within which construction activities would occur, and the timely implementation and success or failure of mitigation measures.

Direct impacts to water quality would likely be greatest shortly after the start of construction activities and would likely decrease in time from natural stabilization and reclamation efforts. Construction activities would occur over a relatively short period; therefore, the majority of the disturbance would be intense but short lived.

Petroleum products and other chemicals that are accidentally spilled could result in surface and groundwater contamination. Similarly, possible leaks from reserve and evaporation pits could degrade surface and groundwater quality.

Vegetation

Direct negative impacts to vegetation include the loss of plant cover from energy exploration and development activities. These impacts can be minimized or negated by proper design of well pads and access roads, and implementation of appropriate reclamation techniques.

Beneficial impacts would generally be accomplished through restoration of existing disturbed areas that is designed to facilitate the growth of desired plant community populations. This would result in an improved water cycle, reduced erosion potential, and better habitat for wildlife

and livestock use. Short-term negative impacts to livestock use within the Project Area would include taking a portion of the allotment out of use while oil and gas development activities occur, and until vegetation is allowed to recover in disturbed areas.

Wildlife

Oil and gas development would initially result in the direct loss of wildlife habitat. These activities would cause direct disturbance and/or displacement of ground-dwelling animals, disturbance and loss of habitat structures such as shrubs with nests, habitat loss through erosion, and changes in food and cover relationships caused by vegetative change and increased erosion. Animal species composition and densities could change within and adjacent to any mineral development activity. Changes in the animal community and habitat structure change in plant species composition and density would persist until habitat within the development areas is restored to near pre-disturbance conditions. However, re-vegetation of disturbed sites is typically very slow in this arid part of the United States.

The indirect disturbance associated with human activities to wildlife species for non-producing wells (approximately 60 acres or 24 hectares) would be short-term, not extending beyond the 1 to 3 months required to complete the drilling pad/road and would largely disappear after abandonment and reclamation. However, if oil and gas reserves were discovered, the indirect wildlife disturbance would continue long term around the drilling pads, along the roads, and pipelines.

A further effect on wildlife populations could be increased disturbance as a result of access by industry personnel and by the public at large using oil and gas development roads. This access would increase the overall disturbance within the Project Area and potentially create additional effects including shooting, poaching, collisions with vehicles, and accidental release of pollutants. Wildlife abundance and diversity would be expected to decrease.

Impacts from typical geophysical exploration, oil and gas drilling, and fluid minerals operations would continue to displace wildlife from the area of disturbance during active operations. Mobile wildlife species would return once operations were complete and disturbed areas were reclaimed. Creation of new roads from repeated vehicular travel during oil and gas exploration and development, and possible continued use by the public for recreation purposes, may reduce the area of undisturbed wildlife habitat. Increased disturbance and human access could directly impact important habitat features such as nesting areas.

Fisheries

Potential impacts to fish habitat quality could result from contaminants (e.g., drilling fluids, engine oils, produced natural gas liquids, oil and/or oil products) entering water bodies during flood events, through groundwater, and in the event that an accidental spill is not properly contained and cleaned up. The potential contamination of water resources resulting from oil and gas exploration activities is likely to reduce the quality of fish habitat, which in turn could impact reproduction success and recruitment of fish species. Although standard oil and gas lease stipulations include implementing actions that would contain drilling fluids and waste, the potential exists for accidental spills to enter adjacent water bodies and affect fish habitat.

However, the inclusion of special lease stipulations under Alternative C that are designed to protect water quality and other resources would offer greater protection to riparian and shoreline vegetation, water resources, and ultimately fish habitat. Fish habitat in Brantley and Avalon Reservoirs and along sections of the Pecos River within the Project Area would benefit from the inclusion of a 660 horizontal feet (200 horizontal meters) buffer of surface occupancy on a case-by-case basis area from the normal high-water line of all streams, rivers, and arroyos. No wells would be allowed within this buffer and construction of access roads and pipelines will be restricted in high-value riparian and sensitive areas along streams, rivers, and arroyos. This stipulation is valuable for the prevention and/or reduction of potential contamination that could influence fish habitat quality. These buffer areas would provide extra measures of protection against high-water runoff that could inundate structures located at or below this elevation and would also provide opportunities for the lessee to recapture or contain escaped materials before they reach the water.

Threatened, Endangered, and Other Special Status Species

Any new disturbances would incrementally add to the current habitat fragmentation effect resulting from existing roads, and past oil and gas activities. Direct and indirect impacts to threatened or endangered species or their habitat would be similar to those described under the wildlife section. Special lease stipulations under Alternative C would preclude Surface Occupancy within Critical or Occupied habitat for threatened and endangered species, and would provide for seasonal restrictions in important wildlife habitat areas. This stipulation would prevent the development of oil and gas wells within habitat occupied by threatened or endangered species.

Cultural Resources

Oil and gas development, and the associated well pad construction, drilling operations, pipeline installations, and road construction, is a common cause of surface disturbance that could affect cultural resources. The more surface disturbance that occurs, the greater likelihood there is for direct negative effects to cultural resources. The movement and loss of artifacts because of soil erosion is an indirect negative impact associated with surface-disturbing activities. It is also likely that accidental damage from construction activities destroys buried cultural resources, even though nothing is visible during surface inventories.

Cultural resource inventories would continue to be required for all proposed surface-disturbing activities, including oil and gas development activities, within the Project Area. Any lands identified for development will need to follow Section 106 National Historic Preservation Act and the New Mexico State Cultural Properties Act processes before work begins. This includes all Federal mineral estates within the Project Area and future leases on lands conveyed to the Carlsbad Irrigation District in 2001. Regulations for the Protection of Historic Properties (36 CFR Part 800) defines the process for demonstrating such consideration through consultation with the State Historic Preservation Office, the Federal Advisory Council on Historic Preservation, and other interested parties.

The BLM and Reclamation will continue to work with the National Park Service in regard to any proposed mineral leasing and development within the Carlsbad Irrigation District National Historic Landmark (NHL). Reclamation, SHPO and the Archaeological Council will develop a programmatic agreement for the McMillian Dam and Reservoir area in the NHL. This area of the NHL includes approximately 1500 acres of Reclamation lands with special lease stipulations of surface occupancy on a case by case basis and no storage facilities. The Avalon Dam and Reservoir area would remain in a no surface occupancy zone. All historic properties included in the CID NHL will continue to be subject to Federal statute under the National Historic Preservation Act and the New Mexico State Cultural Properties Act, as appropriate.

Reclamation has received no indications of traditional cultural properties or sacred sites from the Native American tribes and pueblos consulted. Therefore, the assumption is the Project Area contains none of these properties. Cultural resource inventory surveys would continue to be required for surface-disturbing activities, such as oil and gas development activities. Eligible and potentially eligible sites would continue to be protected from damage or archaeologically treated to mitigate damage. Buffer areas of 100 feet (31 meters) or more would be established from the edges of sites to protect cultural resources unless Reclamation determines that circumstances justify a reduced buffer area.

Indian Trust Assets

Because there are no known ITAs within the Project Area, there would be no effects to ITAs under Alternative C.

Paleontological Resources

Land uses requiring surface disturbance can impact paleontological resources. The more disturbance that occurs, the greater the likelihood there is for negative effects. Federal law would continue to be in effect for protecting paleontological resources. No paleontological sites have been documented and no exposed, fossil-bearing geologic strata are known to occur. Therefore, Alternative C would have no impact on known paleontological sites, fossil localities, or fossil-bearing geologic strata. However, the chance of impacting unknown paleontological resources would increase as surface disturbance increases.

Social and Economic Values

Because the development of existing oil and gas leases would continue, revenues, employment, and income generated by this activity would continue at or close to current levels for the foreseeable future. Costs associated with the development requirements (e.g., plans of development, designing road networks, reclamation activities) would be borne by the lease holder under these alternatives. More intensive development planning, however, could lead to reduced development costs. Larger factors such as market prices would have more impact on the economic viability of leases and wells than the existing or proposed development stipulations.

Offering new oil and gas leases by the BLM has no direct connection to employment or income levels in the local economy because new leases do not guarantee well development. Changes in employment and personal income in the oil and gas industry is more directly connected to

market prices and not the availability of Federal minerals for lease. Increasing new oil and gas leasing by the BLM would not produce much economic benefit. Unleased tracts within the Project Area are more likely the result of a lack of interest and no evidence of payable petroleum zones. Additionally, some existing oil and gas leases remain undeveloped.

While still an important component of the local economy, employment in the petroleum industry has decreased in relation to total employment over the past 30 years, although personal income from jobs in the oil and gas industry has increased. The per capita income for all jobs in the vicinity in general trails the New Mexico average. However, the average weekly wages for those employed in the local oil and gas industry is nearly double the statewide average for all jobs.

Because the Project Area represents such a minor proportion of the overall regional oil and gas development industry in this part of New Mexico, it is not possible to accurately estimate specific economic impacts. Moreover, proposed oil and gas well developments that cannot locate within the Project Area because of the lack of area remaining for leasing and development are likely to find sufficient opportunities on surrounding Federal lands.

It is more difficult to quantitatively measure social impacts. In the social context of communities in the vicinity of the Project Area, changes would likely be minor and relatively unnoticed under Alternative C. However, individuals and families with interests in oil and gas development would be affected in particular localities. For these individuals and families, the most noticeable impact would likely be reduced personal income, reduced operations flexibility, and an increase in personal stress through increased operational restrictions.

Environmental Justice

There are no areas that meet the definitions of low-income areas or that contain minority populations. Therefore, none of the alternatives analyzed in this document would place a disproportionate share of negative environmental consequences on low-income or minority populations.

Recreation Resources

Recreation would continue within the Project Area much as it does today. Recreational users would continue to engage in wildlife viewing, boating, swimming, hunting, fishing, hiking, and camping. Oil and gas development activities would continue and are not expected to have any measurable impacts on recreational activities. However, affects such as those from noise, wildlife displacement, and visual resource impacts are likely to result in reduced satisfaction on the part of recreationists using the Project Area lands that are subject to energy development. Existing and future oil and gas development restrictions would remain in place to protect developed recreational areas and facilities.

To the extent that active oil and gas well construction requires a temporary closure in site-specific areas, some recreational users may be forced to relocate to other portions of the Project Area during these development activities. Depending upon the final location of wells and their associated infrastructure, it is possible that some recreational users would be temporarily or permanently displaced from specific undeveloped recreational areas.

Rangeland and Grazing

In general, livestock use levels within the Project Area are expected to continue into the future at current levels. There would be no change to current livestock grazing management practices. All grazing allotments are on lands that have been leased for Federal minerals exploration and development. Modifications to existing grazing permits/leases would be made based on proposed oil and gas development activities that may remove forage on specific allotments because of surface disturbance activities. If determined necessary, allotment specific AUMs would be reduced to reflect the revised forage base.

Energy, Minerals, and Other Extractive Resources

Decisions to open lands to leasing represents Reclamation's determination, based on the information available at the time, that it is appropriate to allow development consistent with the terms of the lease, laws, regulations, and orders, and subject to reasonable conditions of approval. The assumptions for surface disturbance from access roads, drill pads, pipelines, power lines, and seismic activity are detailed in Section 2.6 of the EA. Some of the estimates used reflect values for exploration and development in newly leased areas. Much of the Project Area is within or near well-developed fields. Exploration and development of resources in well-developed areas reduces the distance required for roads, pipelines, and power lines. Therefore, the actual amount of ground disturbance of the 20-year planning horizon may be less.

Reclamation and BLM have the authority to control the density and location of surface-disturbing activities affecting public land and those activities associated with Federal mineral exploration and development. Reclamation and BLM have the authority to designate areas as closed or open to oil and gas leasing, attach a NSO stipulation to leases, and attach other conditions of approval (COA) that are included in approved applications for permit to drill (APDs). Reclamation and BLM can also attach other conditions of surface use (CSU) stipulations such as requirements for wildlife surveys or plans of development (PODs). Use of these designations, stipulations, or COAs provides effective tools for development of mineral resources and management of the accompanying surface disturbance. Conditions of Approval are tools to be used in the effort to return areas that have had surface disturbance (such as drill pads and roads) to natural conditions. For a description of the COAs, see Appendix A in the RMPA document. Implementation of COAs would reduce initial surface disturbance (direct impacts) and increase opportunities for reclamation success.

Transportation and Access

Implementation would have no effect on transportation and access. Existing designated roads would continue to be managed and maintained by the appropriate responsible entity. Designated roads, as well as unmanaged and unmaintained roads, would continue to be used for oil and gas development activities, as well as other appropriate uses. Unmanaged and unmaintained roads would continue to be closed and reclaimed according to provisions described in the existing (2003) RMP. As appropriate, proposed oil and gas development activities in the vicinity of proposed road closures would include reclamation of those unmanaged and unmaintained roads identified in the existing RMP.

Visual Resources

This project will cause some short term and long term visual impacts to the natural landscape. Short term impacts occur during construction operations and prior to interim reclamation. These include the presence of construction equipment and vehicle traffic. Interim reclamation will be conducted where possible within 6 months after construction by recontouring and revegetating.

Long term impacts are visible to the casual observer through the life of the well. These include the visual evidence of storage tanks, piping, pump jacks, well pads, and roads which cause visible contrast to form, line, color, and texture within the characteristic landscape. Removal of vegetation by road and drill pad construction exposes bare soil lighter in color and smoother in texture than the surrounding vegetation. The surfacing of these areas with caliche materials causes further contrasts to the characteristic landscape. These contrasts will be visible to visitors in the vicinity of the facilities.

After final abandonment and reclamation, the pad, road, and associated infrastructure will be removed, reclaimed, recontoured, and revegetated to eliminate visual impacts. Short and long term impacts are minimized by best management practices such as color selection, reducing cut and fill, screening facilities with natural features and vegetation, interim reclamation, and contouring roads along natural changes in elevation.

CONCLUSION

Based on the analysis presented in the EA, Reclamation finds that there would be no significant impacts associated with implementation of the preferred alternative (Alternative C). Reclamation makes this Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) and the Council on Environmental Quality implementing regulations (40 CFR 1500). Reclamation has determined that the proposed action does not constitute a major Federal action that would significantly affect the human environment. Therefore, no environmental impact statement would be prepared for this proposal.

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CHAPTER 1: PURPOSE AND NEED

1.1 INTRODUCTION

The U.S. Department of the Interior (USDI), Bureau of Reclamation (Reclamation) has prepared this Environmental Assessment (EA) and subsequent Resource Management Plan Amendment (RMPA) to address future Federal leaseable (e.g., geothermal, oil, gas) minerals development on Reclamation-administered lands in Eddy County, New Mexico (Figure 1-1). The lands encumbered by the EA and RMPA are part of Reclamation’s Carlsbad Project, which is authorized under the Reclamation Act of June 17, 1902, and the Brantley Project Acts of 1972 (P.L. 92-514) and 1980 (P.L. 96-375). In 1905 the Reclamation Service was authorized to purchase an existing storage and irrigation system, together with its water rights, in the Pecos River Basin. The original system was constructed by a series of private entities; however, private operation of the project ended in 1904 when a flood on the Pecos River destroyed most of those facilities. The original Carlsbad Project was authorized by the Secretary of the Interior on November 28, 1905. Since that time, project facilities have been rehabilitated, enlarged, and improved under subsequent authorizations which provide for irrigation, flood control, river regulation, fish and wildlife, recreation, and other beneficial uses.

The Minerals Leasing Act of 1920, as amended, provides the Secretary of the Interior with authority to issue leases on lands where the mineral rights are held by the Federal government. This authority has been delegated to the USDI, Bureau of Land Management (BLM), a Cooperating Agency for preparation of this RMPA and EA. The RMPA will amend Reclamation’s 2003 Resource Management Plan for Brantley and Avalon Reservoirs (Reclamation 2003) and only affects those lands identified as containing existing *Unleased Federal Minerals*, as well as any future unleased mineral estate. This EA, however, is not the final review upon which approval of all proposed mineral-leasing actions on Reclamation lands in Eddy County will be based. All future, site-specific actions will receive further environmental assessments that will be tiered from this EA and RMPA, as appropriate.

1.1.1 Location

Brantley and Avalon Reservoirs are located on the Pecos River, approximately 15 miles and 5 miles, (24 kilometers and 8 kilometers) respectively, upstream from the City of Carlsbad, New Mexico (Project Area). The Project Area includes Brantley Dam and Reservoir, Avalon Dam and Reservoir, the historic McMillan Dam (now breached) and the McMillan Dam Tender’s Quarters, the original McMillan Reservoir area, and the section of the Pecos River between the two reservoirs, along with the lands subject to water inundation and a surrounding buffer of land at elevations higher than maximum reservoir storage (Figure 1-2). Avalon Dam and Reservoir, the historic McMillan Dam (now breached), the original McMillan Reservoir Area, and all associated buildings are listed on the National Register of Historic Places (NRHP). The Project Area is surrounded by a mosaic of mostly

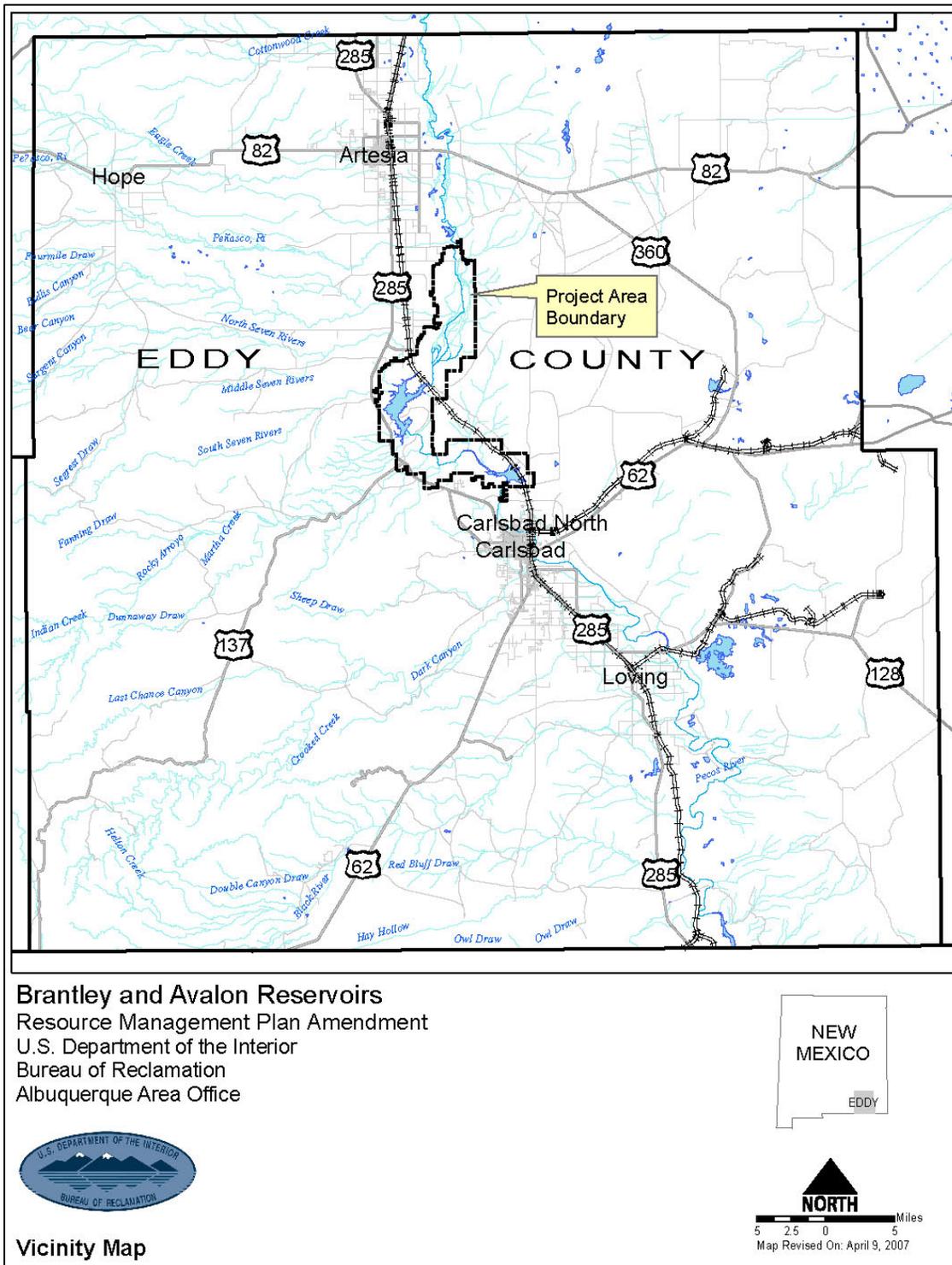


Figure 1-1. Brantley and Avalon Reservoirs Resource Management Plan Amendment (RMPA) Project Area Location Map.



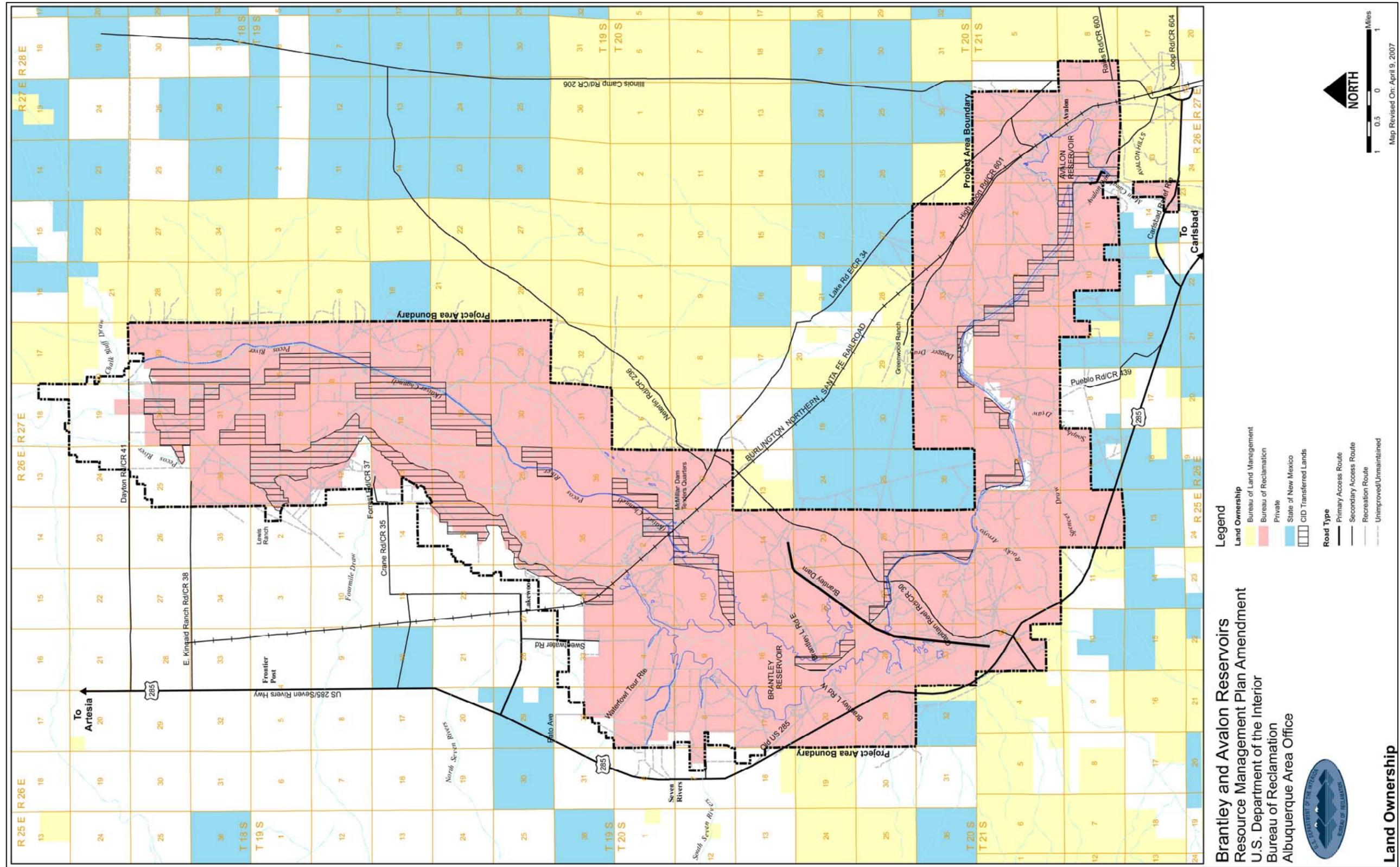


Figure 1-2. Brantley and Avalon Reservoirs Resource Management Plan Amendment (RMPA) Project Area Map.

BLM, State of New Mexico, and private lands. At Brantley Reservoir, the Project Area boundary encompasses almost 45,000 acres (18,211 hectares) of land that were acquired by Reclamation through fee purchase, condemnation, or withdrawal from public domain. At Avalon Reservoir the Project Area includes approximately 4,000 acres (1,619 hectares) of land that were acquired using similar methods. Within the Project Area boundary there are approximately 5,600 acres (2,266 hectares) of lands that were transferred to the Carlsbad Irrigation District (CID) in 2001.

1.1.2 Background

The two reservoirs are managed primarily for agricultural irrigation, but they also provide secondary flood-control, recreation, and fish and wildlife habitat benefits. Brantley Lake State Park, located on the east and west sides of Brantley Reservoir, is managed by the New Mexico State Parks Division and serves approximately 80,000 visitors annually by providing recreational activities such as camping, picnicking, boating, fishing, and swimming. Eddy County is responsible for managing lands surrounding Champion Cove at Brantley Reservoir for primitive recreational uses with no specific recreational facilities provided. The New Mexico Department of Game and Fish manages the remaining lands around Brantley Reservoir as a Wildlife Management Area, which provides hunting and fishing opportunities and improved habitat for fish and wildlife. The Seven Rivers Wildlife Management Area, located on the northwest side of Brantley Reservoir, is also managed by the New Mexico Department of Game and Fish. The lands surrounding Avalon Reservoir are managed by the CID, although there are no specific recreational facilities provided.

The oil and gas industry is a significant part of the State of New Mexico's economy, including Eddy County, and represents a major land use activity within the State. With the Project Area located above the Permian Basin, which is a rich resource for oil and gas reserves, increased interest has been expressed in exploration and production of these resources within the Project Area in recent years.

1.2 PROPOSED FEDERAL ACTION

Mineral leasing on Reclamation lands is administered by the BLM under provisions of Title 43, Subpart 3100 of the Code of Federal Regulations (CFR). Leasable minerals (e.g., oil and gas) are under discretionary authority, meaning that they are open to development through application and permitting by the BLM with concurrence by Reclamation. Except for those minerals and conditions meeting the provisions of Section 10 of the Reclamation Projects Act of 1939, leases for mineral and geothermal resources on all land acquired or withdrawn by Reclamation are issued by the BLM per an Interagency Agreement between Reclamation and BLM dated December 1982. Under this agreement the BLM will, in all issues involving mineral and geothermal leases, request that Reclamation determine whether leasing is permissible and, if so, provide any stipulations required to protect the interests of the United States. Reclamation's existing (2003) Oil and Gas Leasing Stipulations for the Project Area are presented in Appendix A.

Through the 1982 Interagency Agreement, Reclamation and the BLM agreed to coordinate on land use planning, land resource management, land conveyance and exchange, and cooperative services. The agreement brings coordinated agency efforts into compliance with existing laws and policies and provides that Reclamation will, when requested, provide expertise in the area of water resources conservation, development, and management, to be utilized by the BLM in preparing its RMPs. The agreement further provides that the BLM will, when requested, provide expertise in the areas of land, resource, forest, range, oil, gas, and mineral management, to be utilized by Reclamation when preparing its RMPs and in managing Reclamation-administered acquired or withdrawn public lands.

In further consideration of oil and gas activities on Federal lands, Section 365 of the Energy Policy Act of 2005 was signed by President George W. Bush on August 8, 2005, and a Memorandum of Understanding (MOU) executed to improve the efficiency of processing oil- and gas-use authorizations on Federal lands. The Energy Policy Act and MOU require the Secretary of the Interior and various Federal agencies to work together to further the objectives of Section 365 of the Energy Policy Act, with specific emphasis on developing measures to aid in the streamlining and coordinating of Federal permit processing for onshore oil and gas operations on Federal lands. In compliance with that requirement and to consider cumulative impacts, Reclamation is amending its existing RMP (Reclamation 2003) to appropriately evaluate future oil and gas leasing and development activities within the Project Area in order to comply with existing guidelines and laws. The proposed RMPA would affect only those lands currently identified as containing ***Unleased Federal Minerals***, or about 16 percent of the Project Area, as well as any lands within the Project Area that in the future would contain Unleased Federal Minerals (e.g., expired leases).

1.3 NEED FOR THE ACTION

Reclamation, in its 2003 RMP, evaluated the conditions for existing mineral leasing and development within the Project Area, developed additional oil and gas leasing stipulations, and recommended that such stipulations be adopted (Reclamation 2003). These recommended oil and gas leasing stipulations were consistent with the BLM's existing mineral leasing stipulations at the time. However, Reclamation did not evaluate the cumulative impacts of reasonably foreseeable future mineral leasing and development on Project Area resources in its 2003 RMP. The RMPA and the subsequent environmental review are needed to further evaluate recommended oil and gas leasing stipulations to ensure full consideration of requirements necessary to appropriately protect Project Area resources and to implement the alternatives.

1.4 PURPOSE FOR THE ACTION

In recent years the BLM has experienced a tremendous increase in interest from oil and gas development companies for new lease nominations throughout Eddy County, including the Project Area. At present the BLM is deferring new lease nominations for oil and gas development within the Project Area until the RMPA is completed. However, site-specific applications are being

considered on a case-by-case basis. Applications for oil and gas drilling activities on existing lease areas are reviewed on the ground and approved if negative effects to natural and cultural resources can be mitigated. Since Reclamation's 2003 RMP did not evaluate the cumulative impacts of reasonably foreseeable future mineral leasing and development of Project Area resources, the purpose of the RMPA is to develop appropriate guidance that will allow Reclamation and BLM to make informed decisions about oil and gas leasing and development on Reclamation-administered lands in order to comply with existing guidelines and laws.

The result of this planning process will be an RMPA that identifies the lands within the Project Area that will be subject to the proposed stipulations and made available for oil and gas development through leasing and what requirements or stipulations are needed to manage those lands and protect other resource values. Any lands identified for development will need to follow the Section 106 National Historic Preservation Act process before work begins. This includes all Federal mineral estates within the Project Area and future leases on lands conveyed to the CID in 2001. Stipulations that will be attached to future Federal mineral leases and future CID mineral leases may include, but are not limited to, controlled surface use, timing limitations, or no surface occupancy. The RMPA document also will identify the circumstances necessary for granting waivers, exceptions, or modifications to leasing stipulations.

This EA identifies the potential impacts that various alternatives for minerals leasing and subsequent development activities could have on the environment, and appropriate measures to mitigate those impacts. The primary purpose is to analyze and document the direct, indirect, and cumulative impacts of reasonably foreseeable future actions resulting from Federally authorized minerals activities. By law these impacts must be analyzed before an agency makes an irreversible commitment of resources. In the minerals program, this commitment occurs at the point of lease issuance. The purpose of preparing an EA in conjunction with the RMPA is to satisfy the requirements of the National Environmental Policy Act of 1969 (NEPA), Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1508), and other associated regulations.

This EA, which is prepared to meet current requirements of the Federal minerals program, is not the final review upon which approval of all proposed actions on Reclamation lands in Eddy County will be based. Rather, the RMPA will identify lands within Reclamation's jurisdiction that are available for leasing and how those Federal minerals might be developed and managed for oil and gas activities. Decisions on all subsequent site-specific actions will be tiered from this EA. That is, additional compliance with all applicable laws and regulations, such as NEPA, Section 106 of the National Historic Preservation Act, the Clean Water Act, and the Endangered Species Act, will occur on site-specific lease/drilling proposals. However, the scope of the site-specific approval process will be streamlined and facilitated by the planning and programmatic evaluation of impacts in the RMPA and EA documents.

1.5 RELEVANT STATUTES AND REGULATIONS

A series of legal statutes establish and define the authority of the Secretary of the Interior to make decisions regarding Federal minerals leasing and development. These may be acts of authority, mandates and guidance for planning and environmental resource management, or New Mexico state statutes. The major statutes relevant to this EA and the RMPA document are briefly described below.

1.5.1 General Mining Law of 1872

The General Mining Law of 1872 (30 USC 22-54) governs mining activity on public land. So many claims were filed under the General Mining Law that President William H. Taft issued a proclamation in 1909 withdrawing public land from such entry, pending the enactment of legislation to protect such lands. Protective legislation was not enacted until the Mineral Leasing Act of 1920, which established a leasing system for the acquisition of certain minerals (currently applies to coal, phosphate, sodium, potassium, oil, oil shale, gilsonite, and gas).

1.5.2 Mineral Leasing Act of February 25, 1920

This act is the primary authority under which the Federal government leases the majority of its onshore minerals. The BLM is currently responsible for leasing activities under the provisions of this act. Technical administration of leases and permits was originally the responsibility of the U.S. Geological Survey, as provided under this act. However, that responsibility was transferred to the BLM in 1982. Certain lands are closed to leasing in Section 43 (30 USC 226-3).

1.5.3 Mineral Leasing Act for Acquired Lands of August 7, 1947

The Mineral Leasing Act for Acquired Lands (Ch. 513, 61 Stat. 913; 30 USC 351, 352, 354, 359) provides that all deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulphur that are owned or may be acquired by the United States and that are within its acquired lands may be leased by the Secretary of the Interior under the same conditions as contained in the leasing provisions of the mineral leasing laws. No mineral deposit covered by this section shall be leased except with the consent of the head of the Executive Department, independent establishment, or instrumentality having jurisdiction over the lands containing such deposit or holding a mortgage or deed of trust secured by such lands that is unsatisfied of record. Lessees are subject to such conditions as the Secretary of the Interior may prescribe to ensure the adequate use of the lands according to the primary purposes for which they were acquired or are being administered.

1.5.4 The Federal Onshore Oil and Gas Leasing Reform Act of December 22, 1987

The 1987 Leasing Reform Act (30 USC 181, et seq.; P.L. 100-203) requires the BLM to competitively offer all public lands available for leasing prior to leasing them noncompetitively and adds environmental provisions to the leasing process. The act was a response to concerns about leasing lands at below-market rates and environmental protection. The act also provides for inspections and enforcement of regulations once operations have commenced.

1.5.5 The Migratory Bird Treaty Act of 1969

The Migratory Bird Treaty Act of 1918 (16 USC 703 et seq.) provides for the protection of migratory birds and prohibits their unlawful take or possession. In addition, Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was signed by President William J. Clinton in 2001 and directs Federal agencies to include impacts to migratory birds in their NEPA analyses.

1.5.6 National Environmental Policy Act (NEPA) of 1969

This statute (40 USC 4331 et seq.) and its implementing regulations (40 Part 1500) apply to all Federal actions including oil and gas leasing. This statute requires the Federally authorized officers in Federal agencies to perform environmental analysis and disclose the effects of their decisions on the quality of the human environment. The law further requires the Federal officers to identify and describe the significant environmental issues associated with their decisions, the proposed action and alternatives to the proposed action (including the alternative of no action), and the effects of all alternatives on the environment. Federal officers must disclose the direct, indirect, and cumulative effects of their decisions, as well as 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 ir retrievable commitments of resources made as a result of their decision. Development of Federal mineral leases is evaluated on a case-by-case basis as part of the NEPA process.

1.5.7 The Clean Air Act of 1970

The Clean Air Act (91 Stat. 685; 42 U.S.C. 7401 et seq.) provides that each state is responsible for achieving and maintaining air quality standards within its borders so long as such standards are at least as stringent as Federal standards established by the U.S. Environmental Protection Agency (EPA).

1.5.8 The Endangered Species Act of 1973

The Endangered Species Act (P.L. 93-204; 16 USC 15311, et seq.), as amended, requires special protection and management on Federal lands for threatened or endangered species. The U.S. Fish and Wildlife Service (USFWS) is responsible for administration of this act. Federal agencies proposing an action or processing an action proposed by a third party that “may affect” the existence of a species listed as threatened or endangered, or the existence of a species proposed for listing, or the existence of their habitat, must consult with the USFWS to determine if, and how, the proposed action would affect those species. Mitigation measures are developed through the consultation process and put forth as suggested conservation recommendations included in a formal USFWS Biological Opinion regarding whether the proposed action would jeopardize the continuous existence of any officially listed endangered or threatened species. Non-discretionary reasonable and prudent alternatives may be identified if the USFWS believes the proposed action has the likelihood of jeopardizing the continued existence of a listed species, or results in the destruction or adverse modification of critical habitat, or results in the incidental take of a listed species.

1.5.9 The Clean Water Act

The Federal Water Pollution Control Act Amendments (P.L. 92-500, 86 Stat. 816, as amended; 33 USC 1251, et seq.) establish national standards to restore and maintain the chemical, physical, and biological integrity of the nation’s waters. Upon passage of Environmental Quality Acts and adoption of water quality standards, State agencies are empowered to enforce water quality standards as long as those standards are at least as stringent as Federal standards established by the EPA. Also, Section 404 of the Clean Water Act, administered by the U.S. Army Corps of Engineers, requires that Waters of the United States, including intermittent streams, mud flats, and sand flats, be protected by permits prior to dredge or fill activities occurring in such areas. Wetlands that meet jurisdictional criteria of Section 404 of the Clean Water Act are partially protected by the requirement of a permit prior to any dredge or fill activity occurring in such areas.

1.5.10 National Historic Preservation Act of 1966

The National Historic Preservation Act of 1966 declares that the historic and cultural foundations of the nation should be preserved to give a sense of orientation to the people of America. The preservation of this irreplaceable heritage is in the public interest. Section 106 of the National Historic Preservation Act (P.L. 89-665, 80 Stat. 915 [16 USC 470] as amended) requires that Federal agencies undertaking or funding projects consider the effects of proposal actions on historic resources eligible for listing or listed on the NRHP regardless of land status. Regulations for *Protection of Historic Properties* (36 CFR Part 800) defines the process for demonstrating such consideration through consultation with State Historic Preservation Officers, the Federal Advisory Council on Historic Preservation, and other interested parties.

1.5.11 Reclamation Recreation Management Act of 1992

The Reclamation Recreation Management Act of 1992 (Title 28 of P.L. 102-575, 106 Stat. 4690) is an amendment to the Federal Project Recreation Act of 1965, P.L. 89-72, that provides up to 50 percent Federal cost sharing for the planning, construction, and operation and maintenance of recreation facilities with non-Federal public entities. It also provides 75 percent Federal cost sharing with non-Federal partners for fish and wildlife enhancement and up to 50 percent of the operation and maintenance of such facilities. Non-Federal public entities that have agreed to manage developed facilities and lands at Reclamation projects are to work with local Reclamation offices to identify proposed projects for funding. Congressional funds are appropriated annually and distributed for selected sites. Section 7(c) of P.L. 89-72 also gives Reclamation clear authority to contract with other Federal agencies to manage Reclamation lands. Finally, Section 2805 of P.L. 102-575 provides authority for Reclamation to develop, maintain, and revise RMPs for Reclamation lands.

1.5.12 Carlsbad Irrigation Project Acquired Land Transfer Act of 2000

On June 21, 2000, the Carlsbad Irrigation Project Acquired Land Transfer Act became Public Law 106-220. The law authorized the Secretary of the Interior to convey all rights, title, and interest of the United States in certain lands within the Carlsbad Project, the irrigation and drainage system of the Carlsbad Project, and the Pecos River Flume, to the CID. In July 2001 Reclamation issued the Final EA and Finding of No Significant Impact for this transfer of some 6,000 acres (2,428 hectares) of land within and adjacent to the Project Area. The Quitclaim Deed executing the transfer was signed by Reclamation and the CID on July 18, 2001. The conveyed lands shall continue to be managed and used by the CID according to the purposes for which the Carlsbad Project was authorized, based on historic operations and consistent with the management of other adjacent Carlsbad Project lands. Those lands within the Project Area that were transferred are further depicted in Figure 1-2.

1.5.13 Energy Policy Act of 2005

Section 365 of the Energy Policy Act of 2005 (P.L. 109-58) establishes a Federal Permit Streamlining Pilot Project with the intent to improve the efficiency of processing oil and gas use authorizations on Federal lands. Through a subsequent MOU, Reclamation assigned a staff person to support the BLM Carlsbad Field Office in New Mexico. Reclamation is to work in an integrated manner to expedite the necessary consultation and coordination, and to work closely with participating agencies to identify efficiencies in processing oil and gas authorizations.

1.5.14 Federal Cave Resources Protection Act of 1988

The Federal Cave Resources Protection Act of 1988, 16 U.S.C. 4301-4310, requires Federal agencies to secure, protect and preserve significant caves on Federal lands for the perpetual use, enjoyment and benefit of all people. Regulations 43 CFR Part 37 further addresses the management of caves on public lands in the Department of the Interior.

1.5.15 New Mexico Oil and Gas Act

The New Mexico Oil and Gas Act (Chapter 70, Article 2 NMSA 1978) establishes procedures for leasing, royalties, and operations for the oil and gas industry. The act also created the Oil Conservation Commission and provided it with jurisdiction and authority over all matters relating to the conservation of oil and gas, and the prevention of potash waste as a result of oil and gas operations in the State of New Mexico. Permitting is administered through the Oil Conservation Division of the Energy, Minerals, and Natural Resources Department.

1.5.16 New Mexico State Cultural Properties Act of 1977

The New Mexico State Cultural Properties Act requires that survey work for archaeological sites be conducted prior to any development of State or Federal lands. The act provides the authority to grant archaeological permits to the State Archaeologist.

1.5.17 New Mexico Water Quality Act

The New Mexico Water Quality Act (Chapter 74, Article 6 NMSA 1978) allows for water pollution-control programs to be established by the Water Quality Control Commission. Permitting and other regulatory authority for these programs may fall under the jurisdiction of the Environmental Improvement Division of the New Mexico Health and Environment Department, the Oil Conservation Division, or the State Engineer's Office, depending on the nature of the water used and the method of discharge.

1.5.18 Executive Orders 11988 and 11990

Executive Orders 11988 and 11990 place restrictions on government approval of construction activities in wetlands and floodplains, and require consideration of wetland and floodplain impacts in all documents prepared in compliance with NEPA.

1.6 AGENCY AND PUBLIC SCOPING ACTIVITIES AND ISSUES

Issues to be addressed in this RMPA/EA were identified through the scoping process at the beginning of this planning process. Scoping and the RMPA/EA process began with publishing a

Public Notice for the Public Scoping Meeting in the *Carlsbad Current-Argus* newspaper on July 23 and July 26, 2006. The Public Scoping Meeting was conducted by Reclamation on July 26, 2006, from 6:00 to 8:00 p.m. at the Pecos River Village Conference Facility in Carlsbad, New Mexico. A total of 11 persons attended the meeting where Reclamation representatives made a brief project presentation and provided an opportunity for attendees to ask questions. Two comment letters were submitted to Reclamation by the scoping period deadline on the August 11, 2006. The relevant comments received during the scoping period addressed private minerals ownership within the Project Area and protection of resources such as visual quality and natural habitat.

Reclamation also corresponded with numerous agencies to identify issues to be addressed during the planning process. These include the two cooperating agencies for the project, the BLM and CID, as well as the USFWS, the New Mexico State Historic Preservation Office, and 19 Native American Tribes. Relevant issues within the Project Area identified by these agencies included oil and gas development within the 100-year Federal Emergency Management Agency (FEMA) floodplain, re-evaluating the maximum water surface elevation at Brantley Reservoir, the status of threatened or endangered species, discovery of cultural resources, Traditional Cultural Properties, no surface occupancy stipulations, and the impact stipulations may have on oil and gas well development potential and feasibility.

CHAPTER 2: ALTERNATIVES

2.1 INTRODUCTION

This chapter describes continuing management directives and the alternatives examined for the Resource Management Plan Amendment (RMPA)/Environmental Assessment (EA). Continuing management directives refers to the guidance provided by legislation, the existing Brantley and Avalon Reservoirs Resource Management Plan (RMP) (Reclamation 2003), and other relevant authority on U.S. Department of the Interior, Bureau of Reclamation (Reclamation)-administered lands within the Project Area that apply to all alternatives. This chapter describes the range of alternatives developed to address resource concerns identified through scoping. The alternative selected and documented in the RMPA will update existing management directives that pertain to energy and mineral development in the previous RMP. Those Reclamation land resources and programs not addressed in this document will continue to be managed as provided under the existing RMP (Reclamation 2003), which is outlined below in the section on continuing management directives.

2.2 CONTINUING MANAGEMENT DIRECTIVES AND ACTIONS

This section describes the existing resource management directives and actions that will continue within the Project Area regardless of the alternative selected (i.e., they are common to all alternatives). It is based on the more detailed discussions provided in the RMP document (Reclamation 2003). The more detailed General Management Directives and Site-Specific Management Directives from the RMP Document are provided in Appendix B. The information that follows describes the Existing Management Strategy in the RMP and pertains only to Reclamation-administered lands within the Project Area.

2.2.1 Description of the Existing Management Strategy

The Existing Management Strategy (Figure 2-1) provides for a variety of land uses within the RMPA/EA Project Area (Project Area) including expanded developed recreation areas, improved Primitive Recreation Areas (designated sites, some limited facilities), and Wildlife Management Areas. New facilities and roads will be developed, as funding allows, including boating, camping, picnicking, hiking, and biking facilities. Facilities that improve or protect environmental quality are included, as well as regulation and information systems that inform the public. Land use cooperative agreements with jurisdictions for management of surrounding lands will be pursued. Grazing leases may be limited, reduced, increased, or maintained, based on the capability of the resources to sustain grazing, and grazing will be regulated in a more effective manner through development of an allotment-specific Grazing Management Plan by Reclamation, with assistance from the U.S. Department of the Interior, Bureau of Land Management (BLM). Under the Existing Management Strategy, some new recreational facility development will occur.

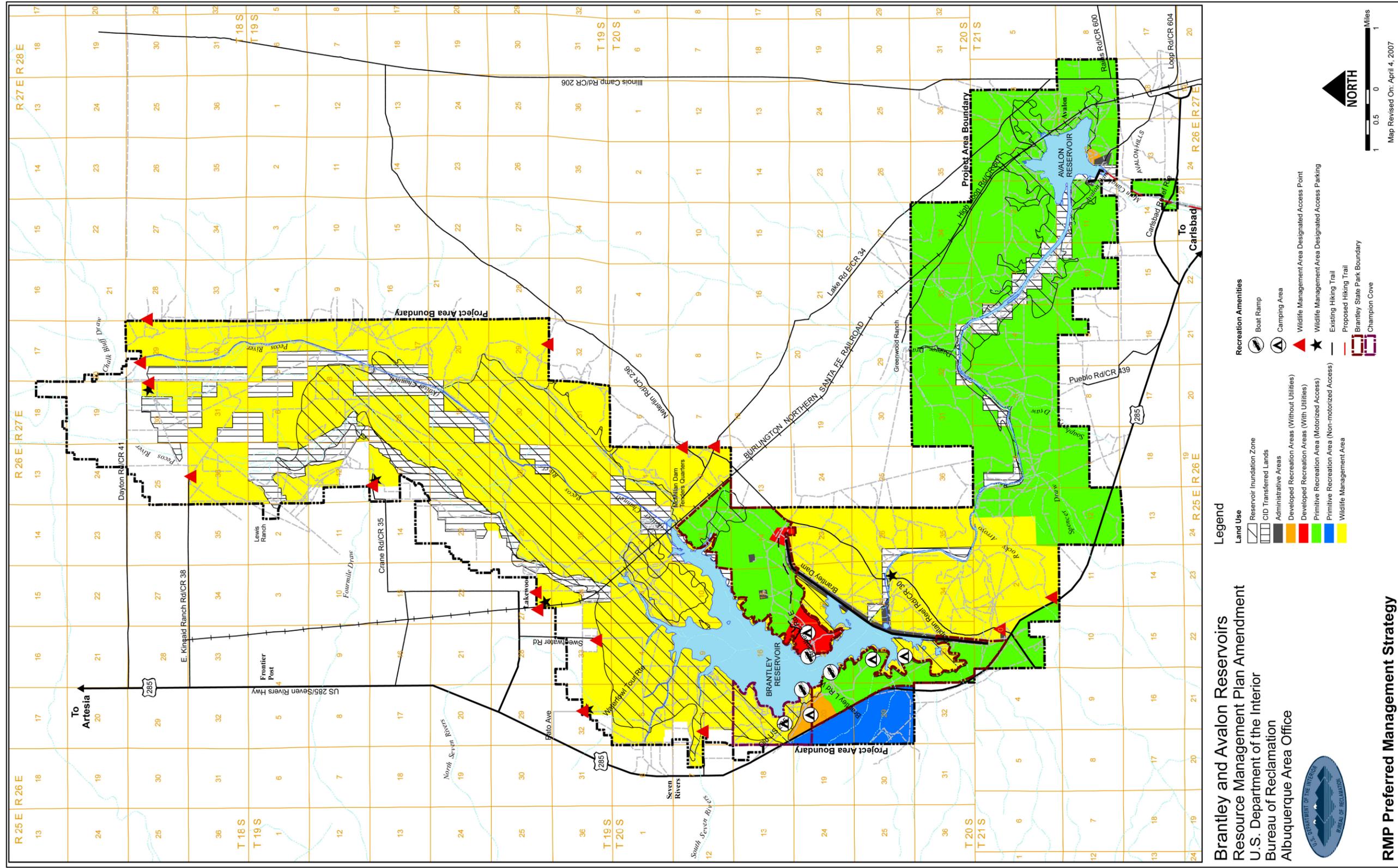


Figure 2-1. Brantley and Avalon Reservoirs Resource Management Plan (RMP) Existing Management Strategy.



Existing recreational developments will be maintained. Figure 2-1 shows the types and locations of facilities proposed under the Existing Management Strategy, and Table 2-1 provides a facility summary.

Table 2-1. Land Use Categories and Recreation Facilities Summary for the Resource Management Plan (RMP) Existing Management Strategy.

LAND USE CATEGORIES AND RECREATION FACILITIES	EXISTING MANAGEMENT STRATEGY: MULTI-USE PURPOSE EMPHASIS
Land Use Categories	
Developed Recreation Area (with utilities)	346 acres (140 hectares)
Developed Recreation Area (without utilities)	200 acres (81 hectares)
Primitive Recreation Area (motorized access)	16,354 acres (6,618 hectares)
Primitive Recreation Area (non-motorized access)	816 acres (330 hectares)
Wildlife Management Area	24,729 acres (10,007 hectares)
Administrative Area	398 acres (161 hectares)
Recreation Facilities	
Total Number of Dispersed Campsites ^a	1,717
Total Number of Developed Campsites	150
Total Number of Boat Ramps	3
Total Number of Developed Campgrounds	3
Total Number of Primitive Campgrounds	2
Approximate Facility Capacity ^b (Persons at One Time)	7,468
Approximate Boating Capacity (Boats at One Time)	Brantley = 113, Avalon = 20

^a Dispersed Campsites are calculated as 0.10 campsite per acre (0.04 campsite per hectare) in Primitive Recreation Areas (motorized access).

^b Calculated as total number of campsites multiplied by four persons; capacity will vary with water elevations.

2.2.2 Facility Management

Within existing Project Area constraints, Reclamation will explore the possible reduction of water level fluctuations and recommend beneficial water operations to enhance resources under the Existing Management Strategy. If deemed to be legal, feasible, and practical, those organizations that receive water from the Carlsbad Project will be contacted and involved in the planning process. Any changes to water operations will be consistent with the original project authorization, existing international treaties, established Federal and State laws, and Pecos River Compact regulations. In addition, Reclamation will pursue an agreement with the Carlsbad Irrigation District (CID) for maintaining and protecting historic facilities and sites within the Project Area.



Reclamation completed the Pecos River Supplemental Water Project EA in 2009 in accordance with the National Environmental Policy Act (NEPA) to evaluate the impacts from a proposal to obtain supplemental water for the Pecos River (Reclamation 2009), which may affect future water operations and facility management within the Project Area. The project is needed to comply with the 2006–2016 Biological Opinion (BO) for the Carlsbad Project Water Operations and Water Supply Conservation Environmental Impact Statement (EIS) (Reclamation 2006a). The BO and EIS commit Reclamation to operate the Carlsbad Project with a target flow of 35 cubic feet per second (cfs) at the Taiban Gage and keep the river in continuous flow in order to conserve the Federally protected Pecos bluntnose shiner (*Notropis simus pecosensis*). The purpose of the project is to provide adequate water to keep the river continuous, meet the contracted irrigation needs of the Carlsbad Project, avoid hindering New Mexico delivery requirements to Texas, and to establish partnerships in the basin. Reclamation obtained supplemental water to provide the operational ability to release approximately 2,500 acre-feet of water out of Sumner Lake per year, while also ensuring that there is enough water at Brantley Reservoir to meet the contracted irrigation needs of the Carlsbad Project.

2.2.3 Land Use

Under the Existing Management Strategy, Reclamation and New Mexico State Parks Division (State Parks) will implement a public education and information program at Brantley and Avalon Reservoirs regarding waste disposal, existing regulations, recreational opportunities, recreational use guidelines, Project Area signing, and Project Area mapping. The current “no wake” designation for shoreline areas at Brantley Reservoir will remain in force. Avalon Reservoir will be managed as a “no wake” lake under the Existing Management Strategy. Four new Developed Recreation Areas (without utilities) will be developed; one each at Avalon Reservoir, McMillan Dam Tender’s Quarters, Champion Cove, and West Side Brantley Lake State Park.

Reclamation will continue to implement oil and gas leasing stipulations under the Existing Management Strategy in an effort to prevent or reduce impacts to other Project Area resources. Oil and gas leasing stipulations include No-Surface Occupancy Zones to reduce resource conflicts within the Project Area. Reclamation will develop and implement an agreement between management agencies to notify and coordinate oil and gas activities within the Project Area. Reclamation’s oil and gas leasing stipulations from the 2003 RMP are included in Appendix A.

Under the Existing Management Strategy, Reclamation will develop and implement an access management plan to define public access sites, indicate agency jurisdiction, and prepare access regulations for the Project Area. Roads accessing existing Developed and Primitive Recreation Areas will be maintained and improved as needed. However, approximately 133 miles (214 kilometers) of currently unmanaged and unmaintained roads will be closed and revegetated.

Four new primitive access sites with small gravel parking areas will be developed in the Brantley Wildlife Management Area north of Brantley Reservoir. These include the Seven Rivers North Access Site, Lakewood Access Site, Fourmile Draw Access Site, and North Access Site. Motorized access to Wildlife Management Areas will be limited to existing travel routes, and non-motorized access could be restricted on a seasonal basis, if necessary, for the benefit of specific wildlife species.

State Parks will continue to implement access-control points within Brantley Lake State Park, and shoreline vehicular access will be prevented except at designated areas such as existing boat ramps and shoreline access points. Public and private access points to the Project Area will be clarified and restricted to designated routes. Reclamation will control access to sensitive areas (e.g., wildlife habitat, archaeological sites, Project facilities) and pursue an agreement among State Parks, New Mexico Department of Game and Fish (NMDGF), and State and local governments for management and jurisdiction of Project Area roads.

Permitted grazing will continue on approximately 12,762 acres (5,165 hectares) of Reclamation-administered lands under the Existing Management Strategy. Reclamation will pursue an agreement with the BLM for coordinated management of grazing within the Project Area. Agreements with surrounding property owners and Eddy County will be sought in order to assure that surrounding land uses are compatible with and complementary to recreation development and wildlife management within the Project Area.

2.2.4 Recreation

Under the Existing Management Strategy, the number of potential dispersed campsites found within Primitive Recreation Areas (motorized and non-motorized access) will decrease from the existing 1,737 to a total of 1,717 as a result of increased Developed Recreation Areas (both with and without utilities). The number of developed campsites will increase from 51 (existing) to 150 as a result of adding 99 potential camping units in several new campgrounds. However, the actual number of camping units developed may vary given site-specific resource considerations. Hunting and fishing will still be allowed within the Project Area as specified by the NMDGF. Recreational facilities not currently meeting Americans with Disabilities Act (ADA) standards will be improved to meet ADA requirements.

A capacity limit regarding the number of boats at one time (BAOT) on the reservoir will be established and enforced. Under the Existing Management Strategy, BAOT capacity will be established at 33 acres (13 hectares) per boat. Using this figure, approximately 113 BAOT will be allowed at Brantley Reservoir, and 20 BAOT will be allowed at Avalon Reservoir when the reservoirs are full. A new, non-motorized, multi-use trail system will be constructed under the Existing Management Strategy to connect Avalon Reservoir with the Flume in the City of Carlsbad.

Based on the number of available campsites, boat ramps, and BAOT, the Existing Management Strategy is designed to accommodate 7,468 persons at one time (PAOT) (i.e., maximum daily capacity). It is expected that yearly attendance will increase over current levels because of the increased capacity of Developed Recreation Areas (with and without utilities), the improved condition of the facilities, the broadened recreation opportunities that will be provided, and regional population growth. Primitive recreation visitation will be expected to remain about the same as under current conditions. Annual visitation to Brantley Lake State Park will be expected to grow moderately (by less than 5 percent annually) with the addition of proposed developed and primitive recreational facilities.

2.2.5 Natural and Cultural Resources

Reclamation, State Parks, the State of New Mexico Environment Department/Surface Water Quality Bureau, and other agencies (as appropriate) will protect and/or enhance the water quality of Brantley and Avalon Reservoirs. This action will include completing additional baseline quality studies and monitoring water quality.

In cooperation with State Parks and the NMDGF, Reclamation will determine the need to develop and implement an Integrated Pest Management Plan for vegetation and rodents. Control methods could include mowing, bulldozing, applying chemicals, burning, removing, pulling, and trapping. This plan would update and improve the vegetation management program currently being implemented.

The NMDGF, State Parks, and Reclamation will determine the need to develop and implement a Fishery Management Plan that would seek to enhance recreational fishing opportunities where feasible within existing operating criteria. The Fishery Management Plan would evaluate the need for catch limitations or other management modifications and implement such management actions as appropriate. In addition, fishing regulations will be established for certain bay areas to protect the fishing experience for anglers and reduce conflicts with recreational boaters. An interpretive display highlighting fish and wildlife found within the Project Area will be developed at the Visitor Center.

Reclamation currently has a wildlife management plan on the Reclamation Albuquerque Area Office website (Reclamation 2010). This plan is titled “Lower Pecos River Waterfowl and Wildlife Areas Management Plan for the Brantley Project Mitigation Lands 2005–2010.” State Parks, NMDGF, and the U.S. Fish and Wildlife Service (USFWS), and other agencies (as appropriate) will develop and implement a Wildlife Management Plan for protection and enhancement of wildlife species within Wildlife Management Areas. The Wildlife Management Plan will specify management responsibilities, designate sensitive habitats, and recommend enhancement opportunities. These same entities will develop and implement a wetlands management plan that may identify restrictions of recreational activities in wetland areas and will increase protection and enhancement opportunities within the Project Area.

Integral to the recommended mitigation measures and resource planning will be the development and use of interpretive signage. These features will promote a better public understanding of the Project Area's natural and cultural resource issues and how they relate to reservoir use. The success of a mitigation or enhancement program is often connected to the type and amount of public interpretation and communication. Reclamation and State Parks will be encouraged to develop an Interpretive Master Plan for the Project Area.

Consistent with Federal and State laws and regulations, cultural and paleontological sites will continue to be protected from the unauthorized collection and excavation of artifacts and all other ground-disturbing activities. However, protection of archaeological and paleontological resources will be emphasized, and the existing cultural resources program will be enhanced. A permit and compliance with the National Historic Preservation Act will be required for any professional excavation of archaeological or historic sites.

2.3 DESCRIPTION OF THE PROPOSED RMPA ALTERNATIVES

This section describes the three alternatives analyzed in this RMPA/EA. Alternative A is to maintain the existing (2003) oil and gas leasing stipulations, which follows the existing management strategy defined in Reclamation's 2003 RMP and maintains the existing maximum conservation pool elevation. Alternative B proposes to maintain the existing maximum conservation pool elevation with revised (2010) oil and gas leasing stipulations, while Alternative C incorporates revised maximum conservation pool elevations at Brantley Reservoir plus the new 2010 oil and gas leasing stipulations. The alternatives were developed to respond to issues identified through scoping. The projected minerals development activity and associated amount of surface disturbance predicted for the Project Area over the next 20 years varies for each alternative. It should be noted that development of existing Federal mineral leases would continue according to the terms of the lease at the time of execution, until such time as the lease expires and becomes subject to the terms in place upon expiration. As such, of the approximately 43,745 acres (17,703 hectares) of Federal (Reclamation) lands within the Project Area boundary, less than 9,361 acres (3,788 hectares), or 21 percent, are currently identified as ***Unleased Federal Minerals*** that would be immediately subject to the new oil and gas leasing stipulations under Alternatives B and C (Table 2-2). Figure 2-2 shows the location of various minerals leasing categories within the Project Area including Federal minerals.

Of the 49,493 acres (20,029 hectares) of land within the Project Area, only 43,745 acres (17,703 hectares) will be subject to the stipulations present in any of the action alternatives. These lands comprise four minerals categories identified in Table 2-2. Federal Minerals Leased Lands, which account for 25,242 acres (10,215 hectares) of the Project Area, include Federally owned minerals that are currently leased and subject to the lease stipulations in place at the time those minerals were leased. Federal Minerals Unleased Lands comprise 9,361 acres (3,788 hectares) of the Project Area, while Reclamation Minerals Subordinate Lands comprise 3,553 acres (1,438

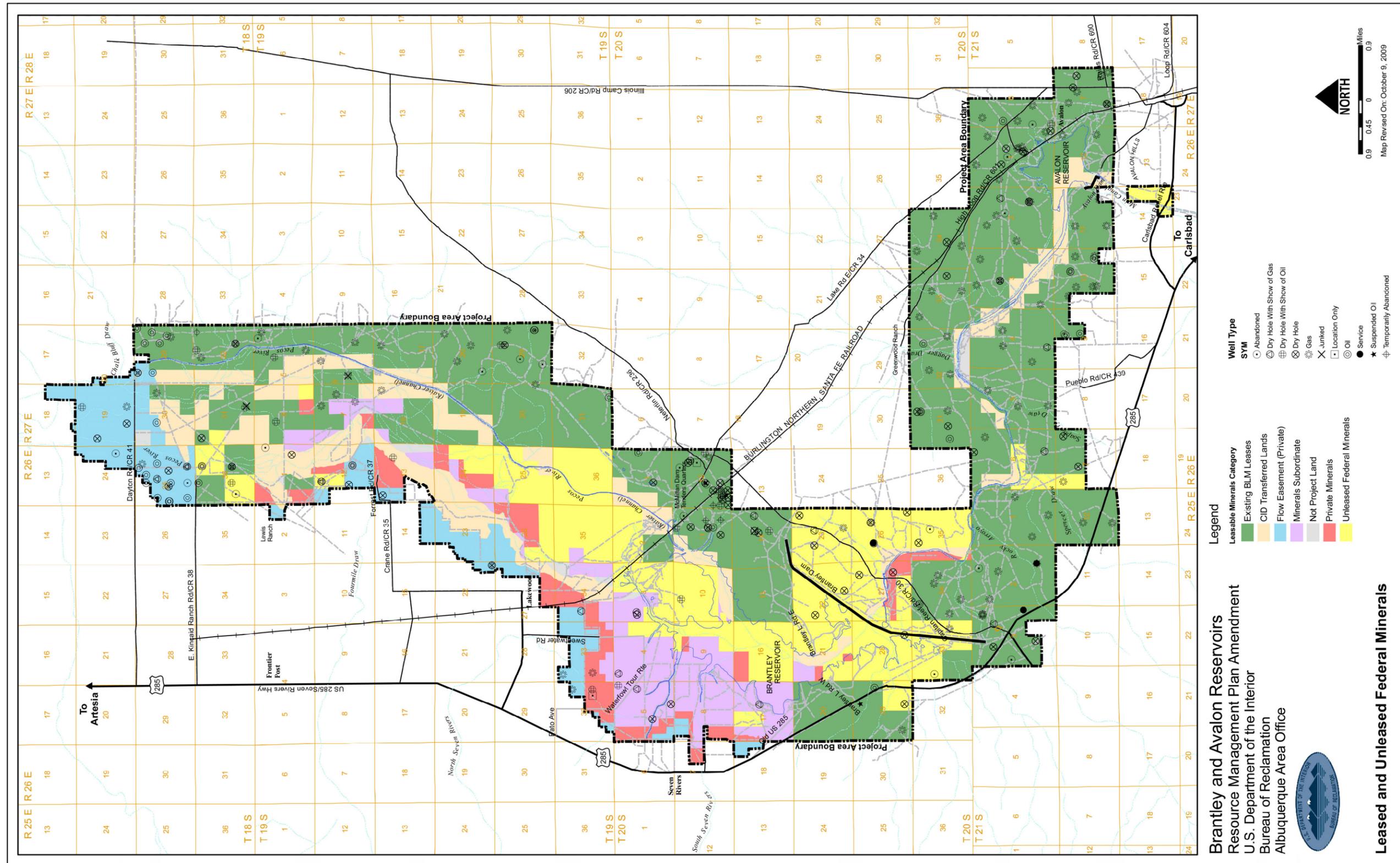


Figure 2-2. Brantley and Avalon Reservoirs Resource Management Plan Amendment (RMPA) Project Area Leased and Unleased Federal Minerals.

Brantley and Avalon Reservoirs
 Resource Management Plan Amendment
 U.S. Department of the Interior
 Bureau of Reclamation
 Albuquerque Area Office



- Legend**
- Leasable Minerals Category**
- Existing BLM Leases
 - CID Transferred Lands
 - Flow Easement (Private)
 - Minerals Subordinate
 - Not Project Land
 - Private Minerals
 - Unleased Federal Minerals
- Well Type**
- SYM**
- Abandoned
 - Dry Hole With Show of Gas
 - Dry Hole With Show of Oil
 - Dry Hole
 - Gas
 - Unlinked
 - Location Only
 - Oil
 - Service
 - Suspended Oil
 - Temporarily Abandoned



0.9 0.45 0 0.9
 Miles
 Map Revised On: October 9, 2009

Leased and Unleased Federal Minerals



Table 2-2. Leased and Unleased, Federal and Private Minerals within the Resource Management Plan Amendment (RMPA) Boundary.

MINERALS CATEGORY	AREA IN ACRES
Federal Minerals (Reclamation) Leased Lands	25,242 (10,215 hectares)
Federal Minerals (Reclamation) Unleased Lands	9,361 (3,788 hectares)
Reclamation Flowage Easement Lands (non-Federal lands)	3,349 (1,355 hectares)
Reclamation Minerals Subordinate Lands (Federal lands)	3,553 (1,438 hectares)
Carlsbad Irrigation District Lands	5,589 (2,262 hectares)
Private (non-Federal) Minerals	2,085 (844 hectares)
Non-Reclamation Lands	314 (127 hectares)
Total Area	49,493 (20,029 hectares)

hectares) of the Project Area. Although the Reclamation Minerals Subordinate Lands involve private minerals that cannot be leased by the United States, Reclamation acquired and retains the right to restrict the development of the mineral estate to conform to Reclamation stipulations.

The fourth category involves CID Lands. In 2001 the United States conveyed the surface and mineral estate of 5,589 acres (2,262 hectares) of Project Area lands to the CID. The lands conveyed to CID are subject to management consistent with the management by Reclamation on adjacent lands, including the rights and obligations related to the mineral estate. The CID mineral estate is considered private and subject to the laws and regulations of the State of New Mexico. However, the CID mineral estate can only be leased in compliance with the stipulations in place by Reclamation for the leasing of Federal minerals at the time of lease issuance. Currently, the majority of the CID mineral estate is leased and subject to the stipulations in place at the time those minerals were leased.

There are 2,085 acres (844 hectares) of Reclamation lands within the Project Area that contain Private (non-Federal) Minerals that are not subject to Federal Mineral stipulations, but are subject to the surface use stipulations as permitted by Reclamation. Reclamation also obtained flowage easements on 3,349 acres (1,355 hectares) of non-Federal land that are also not subject to Federal stipulations (Reclamation Flowage Easement Lands). And there are 314 acres (127 hectares) of private surface and private minerals lands that are not subject to the jurisdiction of the United States.

Federal mineral leasing and development may occur on lands where the surface is managed by Federal, State, Native American agencies, or private individuals. For minerals development on Federal (Reclamation) lands within the Project Area, management objectives are defined in terms of the availability of land for leasing (i.e., closed or open to minerals leasing) and the management of lands that are open to leasing (i.e., with standard terms and conditions or with special leasing stipulations). Federal mineral lands and lands subject to Federal mineral leasing stipulations account for 43,745 acres (17,703 hectares), or 88 percent, of the Project Area. All Federal mineral lands and lands subject to Federal mineral leasing stipulations within the Project Area are considered open for minerals leasing.

Lands open for minerals leasing may be open with no specific development restrictions defined in the original RMP or in the RMPA. However, these areas are subject to the ***Standard Lease Terms and Conditions*** as defined on the lease form and shown in Appendix A. Or, lands open for leasing may be managed with constraints in the form of ***Special Lease Stipulations***, which are provisions that modify the standard lease rights and conditions included in a lease when environmental and planning analyses have demonstrated that additional and more stringent environmental protection is needed. The three types of special lease stipulations defined for the Project Area are (1) ***no surface occupancy***, (2) ***no storage facilities***, and (3) ***surface occupancy on a case-by-case basis***. A stipulation of no surface occupancy does not allow the surface of a given area to be occupied by oil and gas development facilities. A stipulation of no storage facilities does not allow storage facilities within a given area. A stipulation of surface occupancy on a case-by-case basis allows for a site-specific evaluation of proposed activities to determine the appropriateness of surface occupancy and storage facilities. Under certain conditions, Reclamation may grant waivers, exceptions, or modifications to lease stipulations as defined in Appendix A and according to *Reclamation Manual Directives and Standards*.

The three alternatives analyzed in this RMPA/EA are distinguished by the type and degree of special lease stipulation constraints. Oil and gas development activities would continue to be evaluated on a case-by-case basis for all three alternatives. Alternative A represents continued implementation of existing management plans, policies, and decisions. Alternative B and Alternative C represent a change in existing management. All three alternatives address existing legislative and regulatory requirements at a programmatic level and/or places constraints if resource values are determined to be sufficiently high or protections are justified in the public interest. In addition, Alternative C incorporates a new analysis of the 100-year sedimentation estimate for Brantley Reservoir (Reclamation 2008). Reclamation has selected Alternative C as the Preferred Alternative.

Each alternative is described generally below. Table 2-3 provides a summary comparison of special lease stipulations for each of the alternatives. Tables 2-4, 2-5, and 2-6 provide a detailed summary of special lease stipulations by alternative, while Figures 2-3, 2-4, and 2-5 illustrate their geographic locations by alternative. Following this alternative descriptions section, a summary of the impacts associated with each alternative is described in Section 2.4.

2.3.1 Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

For Alternative A, existing special lease stipulations for oil and gas development within the Project Area would remain in effect (Figure 2-3). Leasing and development of Federal minerals would continue as specified in the existing RMP for the Project Area (Reclamation 2003). Reclamation, through the BLM, would continue to implement existing standard lease terms and conditions and special lease stipulations to conduct operations in a manner that would minimize adverse impacts on resources, land uses, and users.

Table 2-3. Summary Comparison of Special Lease Stipulations by Alternative.

LEASABLE MINERALS CATEGORY	NO SURFACE OCCUPANCY	NO STORAGE FACILITIES	SURFACE OCCUPANCY ON A CASE-BY-CASE BASIS	NO SPECIAL LEASE STIPULATIONS
Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation	25,808 acres (10,445 hectares)	8,352 acres (3,380 hectares)	1,629 acres (659 hectares)	13,704 acres (5,546 hectares)
Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation	40,478 acres (16,382 hectares)	0 acre (0 hectare)	957 acres (387 hectares)	8,057 acres (3,261 hectares)
Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation	19,155 acres (7,752 hectares)	6,486 acres (2,625 hectares)	13,527 acres ^a (5,474 hectares) ^a	10,324 acres (4,178 hectares)

^a No wells permitted.

Table 2-4. Detailed Area Summary of Special Lease Stipulations for Alternative A (2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation).

LEASABLE MINERALS CATEGORY	NO SURFACE OCCUPANCY	NO STORAGE FACILITIES	SURFACE OCCUPANCY ON A CASE-BY-CASE BASIS	NO SPECIAL LEASE STIPULATIONS
Federal Minerals (Reclamation) Leased Lands	9,833 acres (3,979 hectares)	3,391 acres (1,372 hectares)	875 acres (354 hectares)	11,143 acres (4,510 hectares)
Federal Minerals (Reclamation) Unleased Lands	7,040 acres (2,849 hectares)	451 acres (183 hectares)	648 acres (262 hectares)	1,222 acres (495 hectares)
Reclamation Flowage Easements (non-Federal lands)	163 acres (66 hectare)	2,292 acres (928 hectares)	0 acre (0 hectare)	894 acres (362 hectares)
Reclamation Minerals Subordinate (Federal lands)	3,548 acres (1,436 hectares)	5 acres (2 hectares)	0 acre (0 hectare)	0 acre (0 hectare)
Carlsbad Irrigation District Lands	3,824 acres (1,548 hectares)	1,533 acres (620 hectares)	39 acres (16 hectares)	193 acres (78 hectares)
Private (non-Federal) Minerals	1,133 acres (459 hectares)	633 acres (256 hectares)	67 acres (27 hectares)	252 acres (102 hectares)
Non-Reclamation Lands	267 acres (108 hectares)	47 acres (19 hectares)	0 acre (0 hectare)	0 acre (0 hectare)
Total Area	25,808 acres (10,445 hectares)	8,352 acres (3,380 hectares)	1,629 acres (659 hectares)	13,704 acres (5,546 hectares)

Table 2-5. Detailed Area Summary of Special Lease Stipulations for Alternative B (2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation).

LEASABLE MINERALS CATEGORY	NO SURFACE OCCUPANCY	NO STORAGE FACILITIES	SURFACE OCCUPANCY ON A CASE-BY-CASE BASIS	NO SPECIAL LEASE STIPULATIONS
Federal Minerals (Reclamation) Leased Lands	18,220 acres (7,374 hectares)	0 acre (0 hectare)	646 acres (261 hectares)	6,376 acres (2,580 hectares)
Federal Minerals (Reclamation) Unleased Lands	8,159 acres (3,302 hectares)	0 acre (0 hectare)	300 acre (121 hectare)	902 acres (365 hectares)
Reclamation Flowage Easements (non-Federal lands)	2,686 acres (1,087 hectares)	0 acre (0 hectare)	0 acre (0 hectare)	663 acres (268 hectares)
Reclamation Minerals Subordinate (Federal lands)	3,552 acres (1,438 hectares)	0 acre (0 hectare)	0 acre (0 hectare)	0 acre (0 hectare)
Carlsbad Irrigation District Lands	5,533 acres (2,239 hectares)	0 acre (0 hectare)	0 acre (0 hectare)	56 acres (23 hectares)
Private (non-Federal) Minerals	2,014 acres (815 hectares)	0 acre (0 hectare)	11 acres (4 hectares)	60 acres (24 hectares)
Non-Reclamation Lands	314 acres (127 hectares)	0 acre (0 hectare)	0 acre (0 hectare)	0 acre (0 hectare)
Total Area	40,478 acres (16,382 hectares)	0 acre (0 hectare)	957 acres (387 hectares)	8,057 acres (3,261 hectares)

Table 2-6. Detailed Area Summary of Special Lease Stipulations for Alternative C (2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation).

LEASABLE MINERALS CATEGORY	NO SURFACE OCCUPANCY	NO STORAGE FACILITIES	SURFACE OCCUPANCY ON A CASE-BY-CASE BASIS ^a	NO SPECIAL LEASE STIPULATIONS
Federal Minerals (Reclamation) Leased Lands	9,799 acres (3,966 hectares)	1,354 acres (548 hectares)	6,392 acres (2,587 hectares)	7,697 acres (3,115 hectares)
Federal Minerals (Reclamation) Unleased Lands	4,898 acres (1,982 hectares)	1,584 acres (641 hectares)	1,876 acres (759 hectares)	1,003 acres (406 hectares)
Reclamation Flowage Easements (non-Federal lands)	26 acres (11 hectares)	903 acres (365 hectares)	1,147 acres (464 hectares)	1,273 acres (515 hectares)
Reclamation Minerals Subordinate (Federal lands)	2,424 acres (981 hectares)	439 acres (178 hectares)	690 acres (279 hectares)	0 acre (0 hectare)
Carlsbad Irrigation District Lands	1,551 acres (628 hectares)	1,424 acres (576 hectares)	2,523 acres (1,021 hectares)	91 acres (37 hectares)
Private (non-Federal) Minerals	310 acres (125 hectares)	762 acres (308 hectares)	753 acres (305 hectares)	260 acres (105 hectares)
Non-Reclamation Lands	147 acres (59 hectares)	20 acres (8 hectares)	146 acres (59 hectares)	0 acre (0 hectare)
Total Area	19,155 acres (7,752 hectares)	6,486 acres (2,625 hectares)	13,527 acres (5,474 hectares)	10,324 acres (4,178 hectares)

^a No wells permitted.

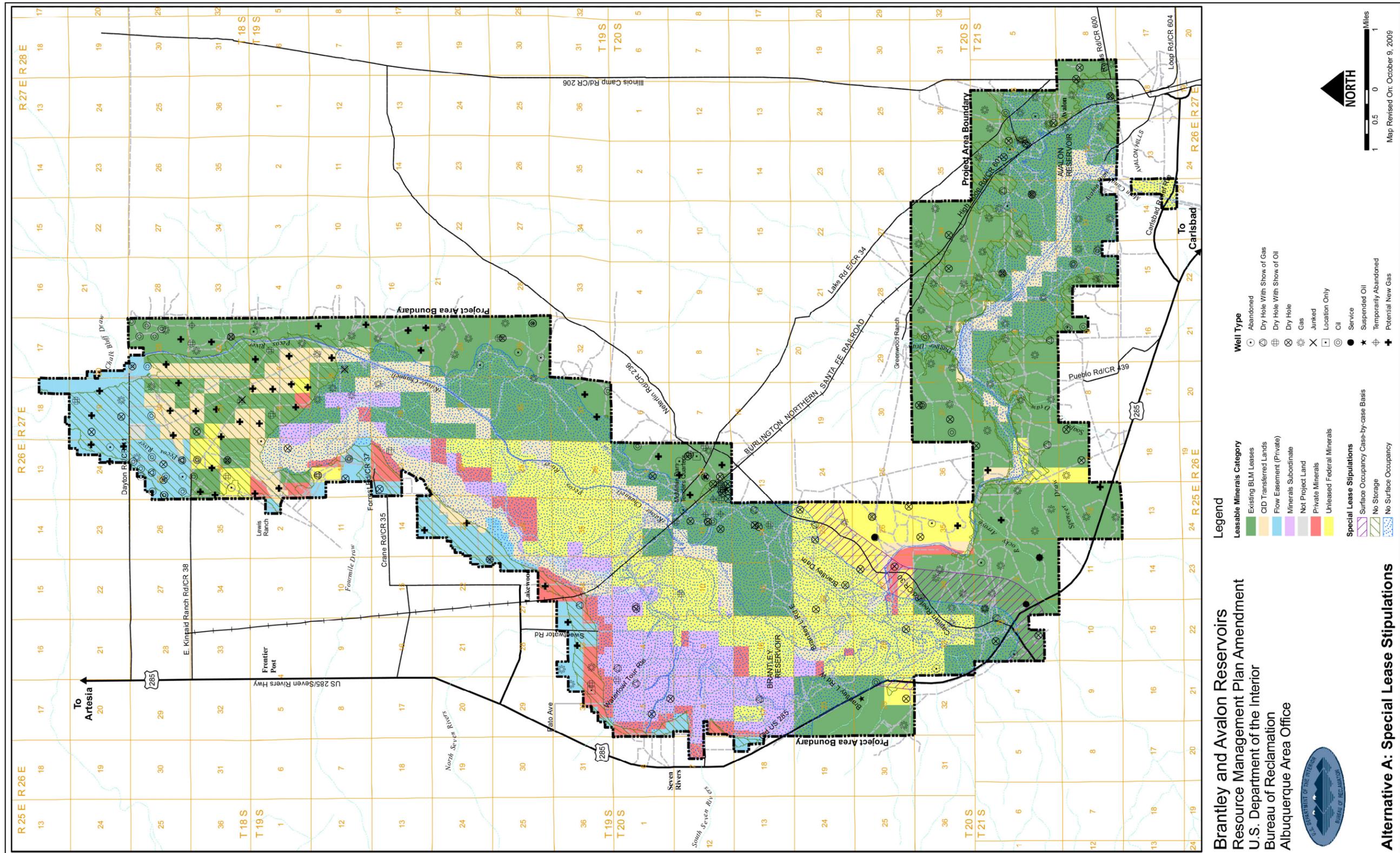


Figure 2-3. Alternative A Special Lease Stipulations.

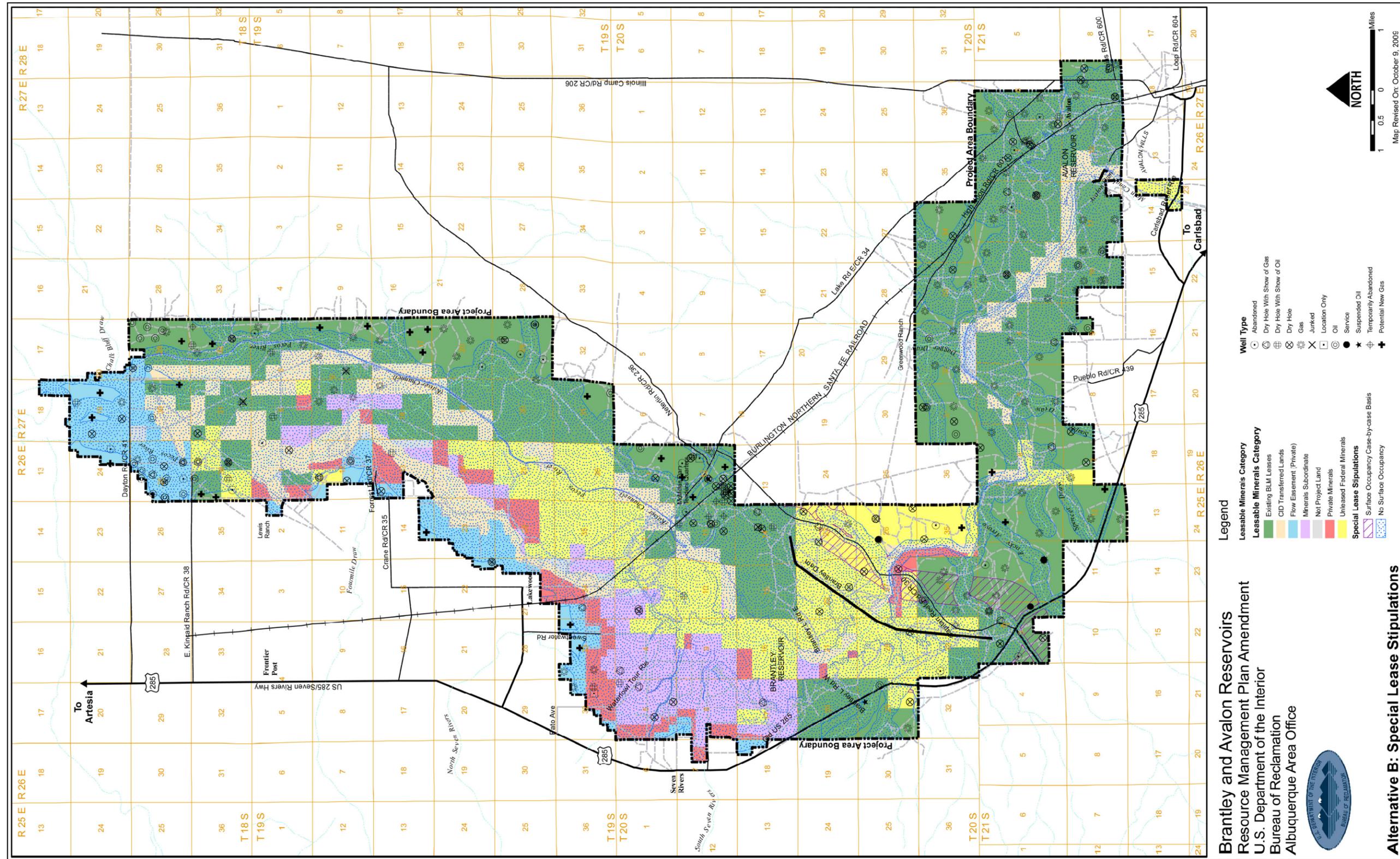


Figure 2-4. Alternative B Special Lease Stipulations.

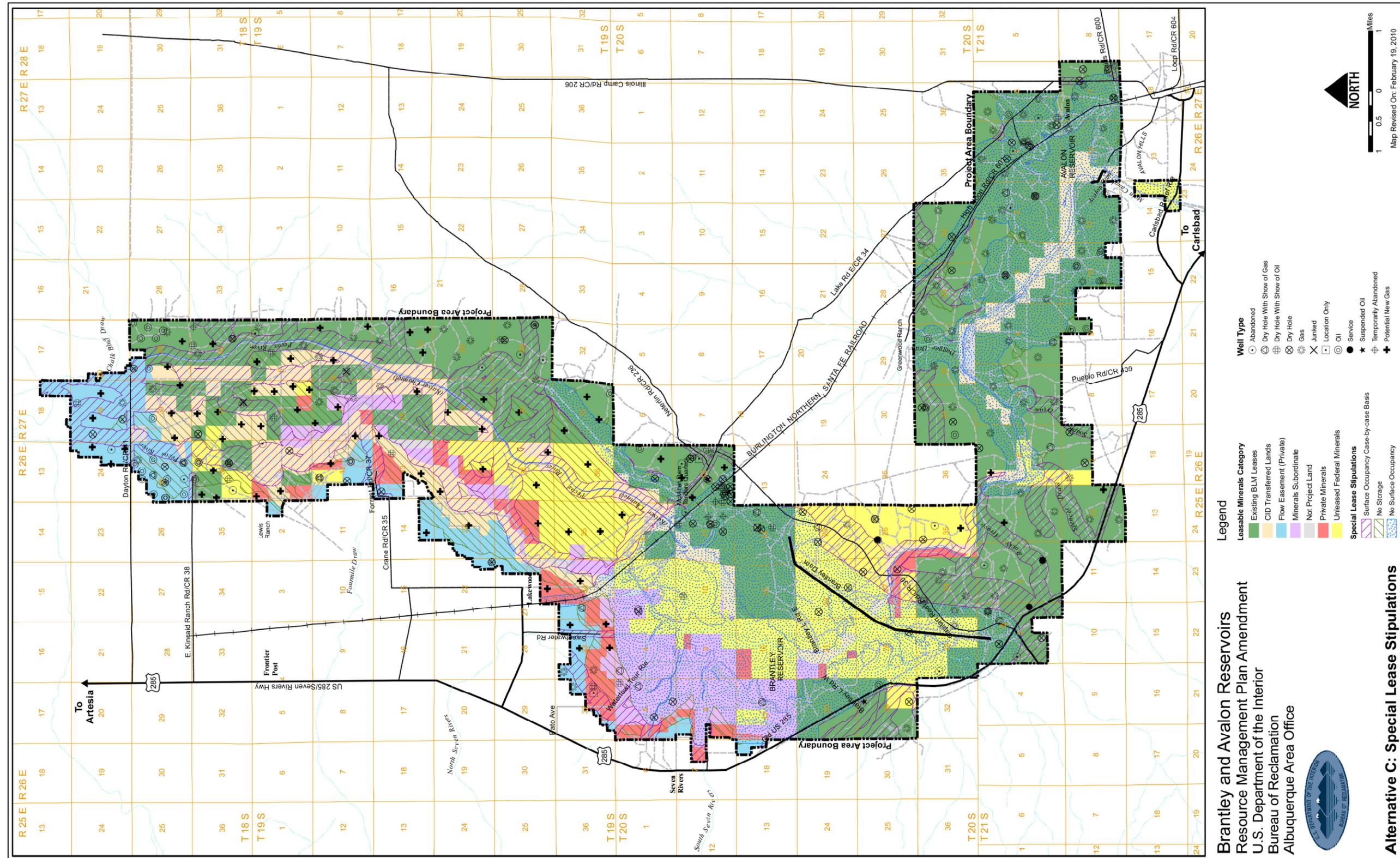


Figure 2-5. Alternative C Special Lease Stipulations.

The specific, special lease stipulations applied to meet existing management objectives of Alternative A are summarized below and shown on Figure 2-3.

- No surface occupancy within 2,640 horizontal feet (805 horizontal meters) of Brantley Dam or Avalon Dam Sites.
- Surface occupancy on a case-by-case basis for wells proposed between 2,640 horizontal feet (805 horizontal meters) and 5,280 horizontal feet (1,609 horizontal meters) of Brantley Dam Site.
- No surface occupancy within 660 horizontal feet (200 horizontal meters) of or below maximum conservation pool elevation of 3,271 feet (997 meters) at Brantley Reservoir.
- No storage facilities below an elevation of 3,286 feet (1,002 meters) at Brantley Reservoir.
- No surface occupancy within 660 horizontal feet (200 horizontal meters) of or below maximum conservation pool elevation of 3,190 feet (972 meters) at Avalon Reservoir.
- No storage facilities below an elevation of 3,200 feet (975 meters) at Avalon Reservoir.
- No surface occupancy within Brantley Lake State Park or Champion Cove recreation areas.

Under Alternative A, minerals leasing and development would continue under existing management direction. Approximately 28 percent of the Project Area would be open to minerals leasing with standard lease terms and conditions (see Appendix A). Approximately 52 percent of the Project Area could be leased with a special lease stipulation of no surface occupancy, while approximately 17 percent of the Project Area could be leased with a special lease stipulation of no storage facilities. The remainder of the Project Area (approximately 3 percent) could be leased if site-specific evaluations determined that leasing would not conflict with applicable regulations, including CID and Reclamation Project purposes, and if measures to mitigate potential impacts were applied as conditions of approval. With the conditions of approval and other requirements, impacts on resources of concern, as described in Chapter 3, are not anticipated to be significant.

2.3.2 Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Alternative B modifies the existing management situation to respond to legislative policies, regulatory requirements, and/or *Reclamation Manual* directives and standards that otherwise are not currently included under Alternative A. In doing so, the major issues addressed include minimizing soil erosion, protecting Reclamation facilities, protecting cultural resources, protecting wildlife and special status species, protecting visual resources, and protecting water quality.

The specific, special lease stipulations applied to meet the management objectives of Alternative B are summarized below and shown on Figure 2-4. These specific stipulations would replace and/or supplement the General Surface Use and Occupancy Requirements found in Appendix A, Section A-1 if this alternative is implemented.

- No surface occupancy within 2,640 horizontal feet (805 horizontal meters) of dam embankments, appurtenant structures, and tunnels at Brantley Dam or Avalon Dam Sites.
- Surface occupancy on a case-by-case basis for wells proposed between 2,640 horizontal feet (805 horizontal meters) and 5,280 horizontal feet (1,609 horizontal meters) of Brantley Dam Site.
- No surface occupancy within the 100-year floodplain at Brantley Reservoir (elevation 3,283 feet [1,001 meters]) or Avalon Reservoir (elevation 3,200 feet [975 meters]) or within a buffer 660 horizontal feet (200 horizontal meters) above these elevations.
- No surface occupancy within 300 horizontal feet (91 horizontal meters) of all publicly maintained (e.g., State of New Mexico, Eddy County) designated roads and highways.
- No surface occupancy within 660 horizontal feet (200 horizontal meters) of normal high water line of streams, rivers, and arroyos.
- No surface occupancy within 300 horizontal feet (91 meters) of all areas leased for recreational purposes (e.g., Brantley Lake State Park and Champion Cove).
- No surface occupancy within 500 horizontal feet (152 meters) of any improvements either owned, permitted, leased, or otherwise authorized by Reclamation within the leased areas.
- No surface occupancy within 200 horizontal feet (61 meters) of all designated, improved, and permitted trails.
- No surface occupancy within 200 horizontal feet (61 meters) of established crops.
- No surface occupancy within slopes steeper than 2:1 and within 200 horizontal feet (61 meters) of slopes steeper than 2:1.
- No surface occupancy within established right-of-ways of human-made canals, laterals, aqueducts, pipelines, or drainages.
- No surface occupancy within Critical or Occupied Habitat for Federally listed threatened or endangered species, and access may be restricted seasonally in other important wildlife areas.

Alternative B incorporates legislative and regulatory requirements and/or management objectives that currently are not included under existing management (i.e., Alternative A). The amount of land open to leasing with a special lease stipulation of no surface occupancy would increase substantially to 40,478 acres (16,382 hectares), or 82 percent of the Project Area, as compared to Alternative A. The amount of land that could be leased with standard lease terms and conditions would decrease to 8,057 acres (3,261 hectares), or 16 percent of the Project Area, as compared to Alternative A. About 2 percent of the Project Area could be leased if site specific evaluations determined that leasing would not conflict with applicable regulations (i.e., surface occupancy would be considered on a case-by-case basis).

While Alternative B represents an increase in constraints beyond the existing management situation (i.e., Alternative A), Alternative B provides for maximum resource protection while allowing for some mineral leasing and development to occur within the Project Area. Alternative B consolidates the requirements and objectives at the programmatic level, which would clarify the leasing process for industry, Reclamation, and BLM, and would streamline the NEPA process for site-specific actions. As with Alternative A, impacts on resources of concern, as described in Chapter 3, are not anticipated to be significant under Alternative B with implementation of the conditions of approval and other requirements.

While providing more protection for resource concerns than Alternative A, the increased amount of land closed to leasing in Alternative B would limit the spatial area in which to explore for and develop fluid minerals in certain locales. This could reduce the opportunity and/or increase the cost for oil and gas development activities in the Project Area.

2.3.3 Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Alternative C modifies Alternative B to respond to concerns expressed by CID regarding the estimated 100-year sedimentation rate for Brantley Reservoir. Similar to Alternative B, Alternative C also addresses minimizing soil erosion, protecting Reclamation facilities, protecting cultural resources, protecting wildlife and special status species, protecting visual resources, and protecting water quality. The primary difference is that the maximum water surface elevation at Brantley Reservoir would be revised from 3,271 feet (997 meters) to 3,263 feet (995 meters), and a no surface occupancy special lease stipulation would be applied below that elevation. Although Brantley Dam was first filled in 1988, the original 100-year sediment deposition estimate for Brantley Reservoir was completed in the 1950s based on limited water and suspended sediment data. New estimates were made by Reclamation using a longer-period of flow and sediment gage records, which incorporate regulation of flood peaks since the 1950s, reduction of tributary sediment sources to the Pecos River, and the amount of sediment being trapped in upstream reservoirs (Reclamation 2008). Additionally, a no storage facilities special lease stipulation would be applied to areas within 660 horizontal feet (200 horizontal meters) of the 100-year floodplain elevation and below at both Brantley and Avalon Reservoirs.

The specific, special lease stipulations applied to meet the management objectives of Alternative C are summarized below and shown on Figure 2-5. These specific stipulations would replace and/or supplement the General Surface Use and Occupancy Requirements found in Appendix A, Section A-1 if this alternative is implemented.

- No surface occupancy within 2,640 horizontal feet (805 horizontal meters) of dam embankments, appurtenant structures, and tunnels at Brantley Dam or Avalon Dam Sites.
- Surface occupancy on a case-by-case basis for wells proposed between 2,640 horizontal feet (805 horizontal meters) and 5,280 horizontal feet (1,609 horizontal meters) of Brantley Dam Site.
- No surface occupancy within 660 horizontal feet (200 horizontal meters) of maximum water surface at Brantley Reservoir (elevation 3,263 feet [995 meters]) or Avalon Reservoir (elevation 3,190 feet [972 meters]).
- No storage facilities within 660 horizontal feet (200 horizontal meters) of the 100-year floodplain at Brantley Reservoir (elevation 3,283 feet [1,001 meters]) or Avalon Reservoir (elevation 3,200 feet [975 meters]).
- Surface occupancy on a case-by-case basis within 300 horizontal feet (91 horizontal meters) of all publicly maintained (e.g., State of New Mexico, Eddy County), designated roads and highways for construction of access roads and pipelines. No wells will be permitted within these areas.
- Surface occupancy on a case-by-case basis within 660 horizontal feet (200 horizontal meters) of normal high water line of streams, rivers, and arroyos for construction of roads and pipelines. Construction of access roads and pipelines will be restricted in high-value riparian and sensitive areas along streams, rivers, and arroyos. No wells will be permitted within these areas.
- No surface occupancy within 300 horizontal feet (91 meters) of all areas leased for recreational purposes (e.g., Brantley Lake State Park and Champion Cove).
- Surface occupancy on a case-by-case basis within 500 horizontal feet (152 meters) of any improvements either owned, permitted, leased, or otherwise authorized by Reclamation within the leased areas for construction of access roads and pipelines. No wells will be permitted in these areas.
- No surface occupancy within 200 horizontal feet (61 meters) of all designated, improved, and permitted trails.

- Surface occupancy on a case-by-case basis within 200 horizontal feet (61 meters) of established crops for the construction of access roads and pipelines. No wells will be permitted within these areas.
- Surface occupancy on a case-by-case basis within slopes steeper than 2:1 and within 200 horizontal feet (61 meters) of slopes steeper than 2:1 for the construction of access roads and pipelines. No wells will be permitted within these areas.
- Surface occupancy on a case-by-case basis within established right-of-ways of human-made canals, laterals, aqueducts, pipelines, or drainages for the construction of access roads and pipelines. No wells will be permitted within these areas.
- No surface occupancy within Critical or Occupied Habitat for Federally listed threatened or endangered species, and access may be restricted seasonally in other important wildlife areas.
- Surface occupancy on a case-by-case basis for the construction of wells, pipelines, roads, overhead electric distribution lines, and any other surface disturbance within the Carlsbad Irrigation District National Historic Landmark.

Alternative C incorporates legislative and regulatory requirements and/or management objectives that currently are not included under existing management (i.e., Alternative A). The amount of land open to leasing with a special lease stipulation of no surface occupancy would decrease to 19,155 acres (7,752 hectares), or 39 percent of the Project Area as compared to Alternative A. The amount of land open to leasing with a special lease stipulation of no storage facilities would decrease to 6,486 acres (2,625 hectares), or 13 percent of the Project Area as compared to Alternative A. The amount of land that could be leased with standard lease terms and conditions would decrease to 10,324 acres (4,178 hectares), or 21 percent of the Project Area as compared to Alternative A. The amount of land designated for surface occupancy on a case-by-case basis, but with no wells allowed, would increase to 13,527 acres (5,474 hectares) or 27 percent of the Project Area compared to Alternatives A and B.

Alternative C allows for implementing the least-restrictive constraints that would provide adequate resource protection while allowing mineral leasing and development to occur. Alternative C consolidates the requirements and objectives at the programmatic level, which would clarify the leasing process for industry, Reclamation, and BLM, and would streamline the NEPA process for site-specific actions. As with Alternative A, impacts on resources of concern, as described in Chapter 3, are not anticipated to be significant under Alternative C with implementation of conditions of approval and other requirements.

The amount of land closed to well development in Alternative C would likely limit the spatial area in which to explore for and develop fluid minerals in certain locales, though not to the

extent anticipated under Alternative B. This could reduce the opportunity and/or increase the cost for oil and gas development activities in the Project Area.

2.4 SUMMARY OF IMPACTS BY ALTERNATIVE

Table 2-7 provides a summary of the Project Area resources analyzed, the anticipated resource impacts of each alternative, and the reasoning used to analyze the resources and determine consequences. For a complete description of the anticipated impacts to Project Area resources, see Chapter 4: Environmental Consequences.

Table 2-7. Summary of Impacts by Alternative.

RESOURCES ANALYZED	ALTERNATIVE A: 2003 RMP WITH OLD OIL AND GAS LEASING STIPULATIONS AND OLD MAXIMUM CONSERVATION POOL ELEVATION	ALTERNATIVE B: 2003 RMP WITH NEW OIL AND GAS LEASING STIPULATIONS AND OLD MAXIMUM CONSERVATION POOL ELEVATION	ALTERNATIVE C: 2003 RMP WITH NEW OIL AND GAS LEASING STIPULATIONS AND NEW MAXIMUM CONSERVATION POOL ELEVATION
Air Quality	200–300 acres of new surface disturbance over 20 years.	100–200 acres of new surface disturbance over 20 years; between 50% and 67% less new indirect impacts to air quality than Alternative A.	300–400 acres of new surface disturbance over 20 years; between 50% and 100% more new indirect impacts to air quality than Alternative A.
Soils	200–300 acres of new surface disturbance over 20 years.	100–200 acres of new surface disturbance over 20 years; between 50% and 67% less new direct impacts to soils than Alternative A.	300–400 acres of new surface disturbance over 20 years; between 50% and 100% more new direct impacts to soils than Alternative A.
Cave and Karst Resources	200–300 acres of new surface disturbance over 20 years; impacts unlikely due to implementation of guidelines in Appendix A-3.	100–200 acres of new surface disturbance over 20 years; impacts unlikely due to implementation of guidelines in Appendix A-3.	300–400 acres of new surface disturbance over 20 years; impacts unlikely due to implementation of guidelines in Appendix A-3.
Water Quality	200–300 acres of new surface disturbance over 20 years.	100–200 acres of new surface disturbance over 20 years; between 50% and 67% less new indirect impacts to water quality than Alternative A.	300–400 acres of new surface disturbance over 20 years; between 50% and 100% more new indirect impacts to water quality than Alternative A.
Vegetation	40–90 acres of net vegetation disturbance over 20 years.	0–40 acres of net vegetation disturbance over 20 years; between 45% and 100% less net direct impacts to vegetation than Alternative A.	90–140 acres of net vegetation disturbance over 20 years; between 125% and 250% more net direct impacts to vegetation than Alternative A.

Table 2-7. (Cont.)

RESOURCES ANALYZED	ALTERNATIVE A: 2003 RMP WITH OLD OIL AND GAS LEASING STIPULATIONS AND OLD MAXIMUM CONSERVATION POOL ELEVATION	ALTERNATIVE B: 2003 RMP WITH NEW OIL AND GAS LEASING STIPULATIONS AND OLD MAXIMUM CONSERVATION POOL ELEVATION	ALTERNATIVE C: 2003 RMP WITH NEW OIL AND GAS LEASING STIPULATIONS AND NEW MAXIMUM CONSERVATION POOL ELEVATION
Wildlife	No Surface Occupancy on 25,808 acres (52%) of Project Area land, leaving 13,704 acres open to oil and gas development subject to standard lease stipulations; 200–300 acres of new surface disturbance over 20 years.	No Surface Occupancy on 40,478 acres (82%) of Project Area land, leaving 8,057 acres open to oil and gas development subject to standard lease stipulations; 100–200 acres of new surface disturbance over 20 years.	No Surface Occupancy on 19,155 acres (39%) of Project Area land, leaving 10,324 acres open to oil and gas development subject to standard lease stipulations; 300–400 acres of new surface disturbance over 20 years.
Fisheries	No Surface Occupancy on 25,808 acres (52%) of Project Area land, leaving 13,704 acres open to oil and gas development subject to standard lease stipulations; 200–300 acres of new surface disturbance over 20 years.	No Surface Occupancy on 40,478 acres (82%) of Project Area land, leaving 8,057 acres open to oil and gas development subject to standard lease stipulations; 100–200 acres of new surface disturbance over 20 years.	No Surface Occupancy on 19,155 acres (39%) of Project Area land, leaving 10,324 acres open to oil and gas development subject to standard lease stipulations; 300–400 acres of new surface disturbance over 20 years.
Threatened, Endangered, and Other Special Status Species	No Surface Occupancy on 25,808 acres (52%) of Project Area land, leaving 13,704 acres open to oil and gas development subject to standard lease stipulations; 200–300 acres of new surface disturbance over 20 years.	No Surface Occupancy on 40,478 acres (82%) of Project Area land, leaving 8,057 acres open to oil and gas development subject to standard lease stipulations; 100–200 acres of new surface disturbance over 20 years.	No Surface Occupancy on 19,155 acres (39%) of Project Area land, leaving 10,324 acres open to oil and gas development subject to standard lease stipulations; 300–400 acres of new surface disturbance over 20 years.
Cultural Resources	200–300 acres of new surface disturbance over 20 years.	100–200 acres of new surface disturbance over 20 years; between 50% and 67% less new impacts to cultural resources than Alternative A.	300–400 acres of new surface disturbance over 20 years; between 50% and 100% more new impacts to cultural resources than Alternative A.
Indian Trusts Assets (ITAs)	No effects.	No effects.	No effects.
Paleontological Resources	200–300 acres of new surface disturbance over 20 years.	100–200 acres of new surface disturbance over 20 years; between 50% and 67% less new impacts to paleontological resources than Alternative A.	300–400 acres of new surface disturbance over 20 years; between 50% and 100% more new impacts to paleontological resources than Alternative A.
Social and Economic Values	Between 40 and 60 new wells would be drilled over 20 years.	Between 20 and 40 new wells would be drilled over 20 years; between 50% and 67% less new wells than Alternative A.	Between 60 and 80 new wells would be drilled over 20 years; between 50% and 100% more new wells than Alternative A.

Table 2-7. (Cont.)

RESOURCES ANALYZED	ALTERNATIVE A: 2003 RMP WITH OLD OIL AND GAS LEASING STIPULATIONS AND OLD MAXIMUM CONSERVATION POOL ELEVATION	ALTERNATIVE B: 2003 RMP WITH NEW OIL AND GAS LEASING STIPULATIONS AND OLD MAXIMUM CONSERVATION POOL ELEVATION	ALTERNATIVE C: 2003 RMP WITH NEW OIL AND GAS LEASING STIPULATIONS AND NEW MAXIMUM CONSERVATION POOL ELEVATION
Environmental Justice	No effects.	No effects.	No effects.
Recreation Resources	Between 40 and 60 new wells would be drilled over 20 years.	Between 20 and 40 new wells would be drilled over 20 years; between 50% and 67% less new wells than Alternative A.	Between 60 and 80 new wells would be drilled over 20 years; between 50% and 100% more new wells than Alternative A.
Rangeland and Grazing	200–300 acres of new surface disturbance over 20 years.	100–200 acres of new surface disturbance over 20 years.	300–400 acres of new surface disturbance over 20 years.
Energy, Minerals, and Other Extractive Resources	Approximately 2 to 3 wells drilled per year (40 to 60 wells over 20 years) and approximately 2 wells per year plugged and abandoned; No Surface Occupancy on 25,808 acres (52%) of Project Area land, leaving 13,704 acres open to oil and gas development subject to standard lease stipulations; estimated 200–300 acres of surface disturbance.	Approximately 1 to 2 wells drilled per year (20 to 40 wells over 20 years) and approximately 2 wells per year plugged and abandoned; No Surface Occupancy on 40,478 acres (82%) of Project Area land, leaving 8,057 acres open to oil and gas development subject to standard lease stipulations; estimated 100–200 acres of surface disturbance.	Approximately 3 to 4 wells drilled per year (60 to 80 wells over 20 years) and approximately 2 wells per year plugged and abandoned; No Surface Occupancy on 19,155 acres (39%) of Project Area land, leaving 10,324 acres open to oil and gas development subject to standard lease stipulations; estimated 300–400 acres of surface disturbance.
Transportation and Access	Approximately 2 to 3 wells drilled per year (40 to 60 wells over 20 years) and approximately 2 wells per year plugged and abandoned; estimated 200–300 acres of surface disturbance.	Approximately 1 to 2 wells drilled per year (20 to 40 wells over 20 years) and approximately 2 wells per year plugged and abandoned; estimated 100–200 acres of surface disturbance.	Approximately 3 to 4 wells drilled per year (60 to 80 wells over 20 years) and approximately 2 wells per year plugged and abandoned; estimated 300–400 acres of surface disturbance.
Visual Resources	200–300 acres of new surface disturbance over 20 years.	100–200 acres of new surface disturbance over 20 years; between 50% and 67% less new impacts to visual resources than Alternative A.	300–400 acres of new surface disturbance over 20 years; between 50% and 100% more new impacts to visual resources than Alternative A.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

Reclamation considered one alternative that was not analyzed in detail. This alternative would have reinstated oil and gas leasing stipulations that existed prior to the adoption of the 2003 RMP. Because this alternative would result in actions detrimental to a number of sensitive

resources within the Study Area, and considering that this alternative was analyzed as Alternative A in the 2003 RMP Final EA, it was dropped from further analysis.

2.6 REASONABLE FORESEEABLE MINERALS DEVELOPMENT

This section provides a summary of the exploration history, current lease status, and the 20-year projections for reasonable foreseeable development (RFD) in the Project Area. The RFD is a projection of the Federal minerals actions and activities, including development, that are likely to occur in the Project Area over the life of the RMPA (i.e., 20 years). Attention is focused on projecting Federal minerals leasing, exploration, development, production, and abandonment activities likely to occur on land managed by the Federal government within the Project Area. This projection includes the number, density, and type of wells likely to be drilled and the surface use requirements to project the amount of surface disturbance.

2.6.1 Exploration History

Well data for the Project Area, obtained from the BLM, indicates that the first well was drilled in 1926 and the oldest active well dates back to approximately 1938. To date, 330 wells have been drilled in the Project Area. A summary of current well information is provided in Table 2-8. Of the 330 wells, 188 (57 percent) are in operation, 3 (1 percent) are suspended, 10 (3 percent) are temporarily abandoned, and 25 (8 percent) are permanently abandoned. There are also approximately 104 wells (31 percent) within the Project Area that are dry, junked, service, or location only.

Table 2-8. Status of Oil and Gas Wells in the Project Area (2009).

WELL TYPE AND STATUS	NUMBER
Active Gas Well	141
Active Oil Well	47
Dry Well	61
Dry Hole with Show of Gas	16
Dry Hole with Show of Oil	19
Suspended Oil Well	3
Temporarily Abandoned Well	10
Permanently Abandoned Well	25
Junked Well	3
Service Well	3
Location Only	2
Total Wells	330

2.6.2 Development Projections

Using the past 83 years of data to determine the average rate of drilling, approximately 4.0 wells per year were drilled within the Project Area. Given a planning period of 20 years, one might project that 80 wells would be drilled within the Project Area during that time. Another scenario might be to assume that the next 20 years would be similar to the most active 10-year period for the Project Area, which was the decade from 1973 to 1982 with 77 wells drilled (or 7.7 wells per year). Conversely, another scenario might be to assume that the next 20 years would be similar to the least active 10-year period for the Project Area, which was the decade from 1987 to 1996 with 25 wells drilled (or 2.5 wells per year). Therefore, the potential RFD could range from 50 to 150 wells drilled on Reclamation lands over the 20-year planning period. The RFD does not imply any drilling restrictions or limitations; it is simply a forecast of anticipated activity based on history. The actual number of wells drilled would vary from year to year.

2.6.3 Surface Disturbance Assumptions

The assumptions for surface disturbance from access roads, drill pads, pipelines, power lines, and seismic activity were derived from Appendix 7 of the Special Status Species Proposed Resource Management Plan Amendment/Final EIS (BLM 2007).

The following surface disturbance assumptions were used to estimate impacts associated with oil and gas exploration and development drilling activities within the Project Area:

- Stabilization of surface disturbance is expected to occur within 3 years.
- Access Roads: 14-foot (4-meter)-wide travel way, 1.5 acres (0.6 hectare) of initial disturbance per access road (0.75 acre [0.03 hectare] of disturbance stabilized per access road) per well.
- Drill Pads: 1.4 acres (0.6 hectare) of disturbance per average well pad (i.e., 250 feet by 250 feet [76 meters by 76 meters]), 1.0 acre (0.4 hectare) stabilized per abandoned well.
- Pipelines: 1.6 acres (0.6 hectare) initial disturbance per producing well (i.e., 30-foot [9-meter] right-of-way width), 0.75 acre (0.03 hectare) stabilized per producing well, 0.5 acre (0.2 hectare) stabilized per abandoned producing well.
- Power Lines: 0.5 acre (0.2 hectare) initial disturbance per producing well, 0.25 acre (0.10 hectare) stabilized per well.
- Geophysical Lines: 1.0 acre (0.4 hectare) of disturbance per mile (1.6 kilometer) of geophysical line. Reclamation of disturbance is expected to occur within 3 to 5 years.

An average of 5.0 acres (2.0 hectares) per well was used to determine initial (i.e., short-term) surface disturbance in Chapter 4 discussions in this EA. This is a total acreage value and includes initial surface disturbance from roads, pipeline, power lines, and other activities associated with exploration and development of oil and gas resources. An average of 2.5 acres (1.0 hectare) per well was used to determine stabilized (i.e., long-term) surface disturbance of active wells in Chapter 4 discussions.

2.6.4 Development Estimates

The RFD history indicates that approximately two to eight wells have been drilled per year and that up to two wells per year have been plugged and abandoned, on average, in the Project Area. Direct impacts included surface disturbances of approximately 10 to 40 acres (4 to 16 hectares), of which approximately 5 to 20 acres (2 to 8 hectares) would have been reclaimed and stabilized by the end of 3 years. Successful reclamation and stabilization of the plugged and abandoned wells would have totaled approximately 3 acres (1 hectare) per year.

Over the next 20 years the RFD projects that between 40 and 150 wells would likely be drilled in the Project Area, and up to 40 wells would likely be plugged and abandoned. During that period approximately 200 to 750 acres (81 to 303 hectares) of surface area would be disturbed, while approximately 100 to 375 acres (40 to 152 hectares) would be reclaimed and stabilized within three years of the initial disturbance. Approximately 60 acres (24 hectares) would be reclaimed and stabilized from plugged and abandoned wells over the next 20-year planning period.

Table 2-9 provides a more accurate summary of the estimated number of wells drilled within the Project Area for each alternative over the next 20 years, including the amount of area disturbed by these activities. The estimated number of wells drilled per year over the next 20 years was determined by evaluating potential well locations based on proposed drilling restrictions (e.g., no surface occupancy areas, well spacing) for each of the three alternatives. Because of the relatively small geographic extent of the Project Area and over 85 years of oil and gas development history, the remaining area available for new wells will limit the number of wells that could be developed in the future compared with the past.

2.7 ALTERNATIVE ENERGY DEVELOPMENT

Neither Reclamation's 2003 RMP nor BLM's 1988 RMP address alternative (e.g., solar, wind, geothermal) energy development within the Project Area. Current agency policy regarding solar energy development is to facilitate environmentally responsible commercial development of solar energy projects. Commercial concentrated solar power or photo-voltaic generating facilities must, however, comply with Reclamation and BLM planning, environmental, and current right-of-way application requirements, as do other similar uses.

Table 2-9. Summary of Surface Disturbance from Oil and Gas Development by Alternative.

ALTERNATIVE	ESTIMATED NUMBER OF WELLS DRILLED PER YEAR	ESTIMATED NUMBER OF ACRES DIRECTLY IMPACTED PER YEAR	ESTIMATED NUMBER OF WELLS DRILLED OVER 20 YEARS	ESTIMATED NUMBER OF ACRES DIRECTLY IMPACTED OVER 20 YEARS	ESTIMATED NUMBER OF ACRES RECLAIMED AND STABILIZED OVER 20 YEARS (INCLUDES ABANDONED WELLS)
Alternative A	2 to 3	10 to 15 (4 to 6 hectares)	40 to 60	200 to 300 (81 to 121 hectares)	160 to 210 (65 to 85 hectares)
Alternative B	1 to 2	5 to 10 (2 to 4 hectares)	20 to 40	100 to 200 (41 to 81 hectares)	110 to 160 (45 to 65 hectares)
Alternative C	3 to 4	15 to 20 (6 to 8 hectares)	60 to 80	300 to 400 (121 to 162 hectares)	210 to 260 (85 to 105 hectares)

The 2005 Wind Energy Development on BLM-administered Lands in the Western United States Programmatic EIS (BLM 2005) evaluated the potential impacts associated with the proposed action to develop a Wind Energy Development Program, including the adoption of policies and BMPs. Similarly, the 2008 Geothermal Leasing in the Western United States Programmatic EIS (BLM 2008) will evaluate the potential impacts associated with the proposed action to facilitate geothermal leasing decisions on existing and future lease applications and nominations to the Federal mineral estate. These programmatic EISs amend existing BLM land use plans to address wind and geothermal energy development proposals, respectively.

As programmatic evaluations, the wind and geothermal EISs do not evaluate site-specific issues associated with individual development projects. A variety of location-specific factors and variations in project size and design would determine the magnitude of the impacts from individual projects. Therefore, based on current land use plans and policy guidance, any proposals to locate either solar, wind, or geothermal energy generating facilities within the Project Area would be evaluated on a case-by-case basis using the assessment criteria in current RMP documents for similar uses. A discussion of alternative energy potential in the Project Area can be found in Chapter 3.

CHAPTER 3: AFFECTED ENVIRONMENT

This chapter describes the existing environment that would be affected by the proposed Resource Management Plan Amendment (RMPA) alternatives. The resource information presented here is of sufficient detail to support and clarify the impact analyses provided in Chapter 4. The resources discussed in this chapter were identified by the general public and various groups and agencies with interest in the Brantley and Avalon Reservoirs RMPA Project Area (Project Area). The resource conditions have existed from 1998 to 2009; these conditions established the baseline for analysis of effects in Chapter 4: Environmental Consequences. Resource conditions were identified by on-site inspections; literature searches; contacts and coordination with local, State, and Federal agencies and personnel; and, in some cases, detailed technical reports.

3.1 REGIONAL SETTING

This section provides a baseline description of regional landscape characteristics of the Project Area. Location, climate, and geology can affect resource characteristics in the Project Area.

3.1.1 Location

The Project Area is located in the southern portion of the Pecos River Basin in southeastern New Mexico (Figure 1-1). It lies in Eddy County near the cities of Carlsbad and Artesia, New Mexico. Large, urban areas close to the Project Area include Albuquerque, New Mexico (approximately 225 miles, or 360 kilometers [km], to the northwest), Las Cruces, New Mexico (approximately 150 miles, or 240 km, to the west), and El Paso, Texas (approximately 140 miles, or 225 km, to the southwest). Other areas of regional interest include the Carlsbad Caverns and Guadalupe Mountains National Parks to the southwest. Elevations within the Project Area range from 3,260 feet (993 meters [m]) at Brantley Dam to 3,177 feet (969 m) at Avalon Dam. Principal access to the Project Area is via U.S. Highway 285 (US-285).

3.1.2 Climate

The Project Area climate is semi-arid with hot summers and mild winters. High temperatures from mid-May through mid-September usually exceed 90 degrees Fahrenheit (F) (32 degrees Celsius [C]). During this period, there is an average of 30 days when the temperature equals or exceeds 100 degrees F (38 degrees C). Winters are mild, dry, and sunny. In January, the coldest month, average daytime temperatures in the shade are near 58 degrees F (14 degrees C). Days with below-freezing temperatures (32 degrees F, 0 degrees C) are rare.

The Gulf of Mexico is the principal moisture source for this portion of New Mexico. The summer air circulation above the Gulf of Mexico brings the majority of moisture into New Mexico in the form of brief, but sometimes intense, summer thundershowers. The average annual rainfall is

approximately 12 inches (31 centimeters [cm]), the majority of which occurs May through October. During winter the average annual snowfall is 3.7 inches (9.4 cm). Because of the mild climate, snow seldom stays on the ground longer than a few hours.

Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. In New Mexico a recent study indicated that the mean annual temperatures have exceeded the global averages by nearly 50 percent since the 1970s (Enquist and Gori 2008). Similar to trends in national data, increases in mean winter temperatures in the southwest have contributed to this rise. When compared to baseline information, periods between 1991 and 2005 show temperature increases in over 95 percent of the geographical area of New Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state.

Ongoing scientific research has identified the potential impacts of anthropogenic (human-made) greenhouse gas (GHG) emissions, changes in biological carbon sequestration, and other changes from land management activities on the global climate. Through complex interactions of regional and global scale, these changes cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although natural GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused carbon dioxide equivalent (CO₂[e]) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentration” (IPCC 2007).

Global mean surface temperatures have increased nearly 1.33 degrees F from 1906 to 2005. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24 degrees north) have exhibited temperature increases of nearly 2.1 degrees F since 1900, with a nearly 1.8 degrees F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001 the IPCC indicated that by the year 2100, global average surface temperatures would increase between 2.5 and 10.4 degrees F above 1990 levels (IPCC 2001), depending on the assumptions made in the predictive model. The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may affect different regions. More recently, the computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor retention in the atmosphere, and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm

events. Although large-scale, spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict.

Several activities contribute to the phenomena of climate change, including the following: emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildland fires, activities involving combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (i.e., albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years.

3.1.3 Geology

Brantley and Avalon Reservoirs are located within the geologic region known as the Permian Basin, so titled because much of the notable geology of the region had its origins in the Permian Period (245 to 286 million years ago [mya]), and because it centers on a reef and basin that existed in a shallow sea late in that period (Chronic 1987). In late-Permian times, in what is now southeast New Mexico and northwest Texas, Capitan Reef surrounded the Delaware Basin. Capitan Reef was east of the Ouachita Mountain Range, which blocked the prevailing easterly trade winds, putting the reef, basin, and surrounding shallow seas in a “rain shadow” (Stanley 1989). A rain shadow refers to the drier side of a mountain range resulting from moisture-laden clouds precipitating before crossing over the ridgeline. Over time the Capitan Reef developed upward and somewhat inward, while the Delaware Basin deepened. By the end of the Permian Period, the Delaware Basin was cut off from regular circulation with the ocean, and evaporites precipitated within and filled the basin (Hendrickson and Jones 1952, Kelly 1971, Stanley 1989).

Most of the economically important geologic resources were also formed or originated in the Permian Period. Within the Project Area oil and gas are found predominantly to the north of the Capitan Reef area, in the shallow, water-deposited sediments that occurred on the shoreward side of the reef front. In this “northwestern shelf” area (referring to the continental shelf on the northwest of the supercontinent Pangaea), later geologic movements resulted in a complex of small faults, anticlines, and synclines that created structures trapping oil and gas between impermeable strata (Chronic 1987). Oil and gas are also found among the buried Capitan Reef sediments and within the Central Basin Plateau east of the Delaware Basin (Stipp and Haigler 1956, BLM 1986a). Gas beds occur in the Delaware Basin, but they are so deep that it is presently not economically feasible to extract them (BLM 1994). As shallow seas evaporated during the Permian Period, evaporate minerals were deposited. Many of these remaining minerals have high economic values in today’s market. These minerals include gypsum, anhydrite, salt, potash, and calcite (BLM 1994).

During the late Cenozoic Period (up to 12 mya), geologic activity in the region consisted mainly of uplift of Capitan Reef in the Guadalupe and Glass Mountains. The regional uplift and consequent dissolution of evaporites within the Pecos Valley created a complex of collapsed caverns, slumped

materials, alluvium, and river deposits (Hendrickson and Jones 1952, Kelly 1971, Reclamation 1982).

Currently, the north-south-oriented Middle Pecos Valley is bound to the west by broad, uplifted mountains and mesas, such as the Guadalupe and Sacramento Mountains. To the east of the valley is the low, gently sloping Llano Estacado Plain (Kelly 1971). The Guadalupe Ridge/Seven Rivers Hills and McMillan Escarpment cut across the valley in a northwestern direction, exposing the remnants of the ancient reef system that rimmed the Delaware Basin. The valley is mainly covered by terrace sediments and river alluvium deposited during the Quaternary Period (0 to 2 mya). The other major rock exposures in the Guadalupe Ridge/Seven Rivers Hills and McMillan Escarpment consist of the Tansill, Yates, and Seven Rivers Formations. Rocks within these formations are mainly clastic and reef-deposited sedimentary rocks and evaporites including limestone, dolomite, sandstone, mudstone, siltstone, and gypsum. Anhydrite, salt, and potash are also found within these formations, but are not often exposed as a result of weathering and dissolution patterns.

Most of the Pecos River tributaries drain the western highlands and include the Penasco, Fourmile Draw, North Seven Rivers, South Seven Rivers, and Rocky Arroyo. Very few drainages meet the Pecos River from the east, with only the Chalk Bluff Draw being notable.

3.2 RESOURCES OF CONCERN

Through the public scoping process for this Environmental Assessment (EA), the public and various interest groups and agencies identified resource concerns to be addressed in the process of implementing a RMPA for leasable minerals development at Brantley and Avalon Reservoirs. The identified resource concerns include: air quality; soils; cave and karst resources; water quality; vegetation; wildlife; fisheries; threatened, endangered, and other special status species (TES); cultural resources; Indian Trust Assets (ITAs); paleontological resources; social and economic values; Environmental Justice; recreation; rangeland and grazing; alternative energy, fluid minerals, and other extractive resources; transportation and access; and visual resources. This section describes the existing conditions of these resources of concern.

The Project Area boundary includes both Brantley and Avalon Reservoirs and an approximate 20-mile (32-km) stretch along the Pecos River above Brantley Reservoir and between the two reservoirs. Included are lands subject to inundation and a surrounding buffer above the reservoirs' maximum water storage elevations. Some of the following resource discussions include portions of the Pecos River as part of the Project Area, when relevant (e.g., fisheries, wildlife, and riparian-wetlands).

3.2.1 Air Quality

The Clean Air Act of 1970, as amended, established National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] Part 50, 2006). The New Mexico Air Quality Bureau monitors air quality for the State. Eddy County is in Air Quality Control Region (AQCR) 155, also known as the Pecos-Permian Basin AQCR. The air quality surrounding the Project Area is generally “good” according to NAAQS, and AQCR 155 has been classified as an attainment area for all air pollutants identified in the NAAQS (eCFR 2008). The closest monitoring stations to the Project Area are in Carlsbad and Artesia. The Carlsbad station monitors ozone (O₃), nitrogen dioxide (NO₂), and fine particulate matter (PM_{2.5}). The Artesia station, located approximately 15 miles (24 km) north of Brantley Reservoir, monitors sulfur dioxide (SO₂) and NO₂. Pollutants and O₃ monitored at these stations between 2006 and 2008 typically remained within acceptable criteria (NMENV 2010).

Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. The Clean Air Act, as amended (42 USC §7401), was enacted by Congress to protect the public from the adverse effects of air pollution. Subsequently, the Environmental Protection Agency (EPA) established the NAAQS for criteria pollutants including carbon monoxide, NO₂, O₃, SO₂, particulate matter less than 10 microns, and lead. The NAAQS specify maximum concentrations for these criteria pollutants. The EPA also established Prevention of Significant Deterioration (PSD) provisions for use in protecting the nation’s air quality. The PSD provisions classify air sheds into three classes, with the Project Area along the Pecos River classified as a Class II Air Quality Area. The area is in attainment status (i.e., it is below the significant thresholds for all the criteria pollutants and moderate increases in the criteria pollutants are allowed).

The primary causes of air pollution in the Project Area are from motorized equipment and dust storms caused by strong winds in spring. Particulates from nearby oil and gas production, agricultural burning, recreational and industrial vehicular traffic and ambient dust can also affect air quality. Emissions from the oil and gas industry are a concern in the Project Area because these can contribute to the formation of O₃. Air quality in the Project Area is considered generally good. The proposed action is not located in any of the areas designated by the EPA as “non-attainment areas” for any listed pollutants regulated by the Clean Air Act.

Greenhouse gasses, including carbon dioxide (CO₂), methane (CH₄), nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, O₃, and aerosols are not currently regulated by Federal law. However, the EPA has promulgated a rule requiring mandatory reporting of GHG emissions from facilities that emit 25,000 metric tons of CO₂(e) or more per year.

3.2.2 Soils

Soil Types

The soils found in the Project Area can generally be placed in two categories: (1) upland soils derived from geologic parent material through natural erosional processes, and (2) bottomland soils deposited by the Pecos River and its tributaries. The soils can be classified into types based on their composition, texture, and topographic position on the landscape. The soil types occurring in the Project Area and some of their characteristics are listed in Table 3-1. Complete descriptions and interpretations of these soil types are presented in U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) (formerly the Soil Conservation Service) Soil Surveys for Eddy County, New Mexico (USDA 1971).

Table 3-1. Soil Map Units within the Project Area.

SOIL MAP UNIT	SLOPE (PERCENT)	DEPTH TO PARENT ROCK IN INCHES (CENTIMETERS)	DEVELOPMENTAL CONSTRAINTS	
			RECREATIONAL DEVELOPMENT	BUILDING SITE DEVELOPMENT
Arno-Harkey-Anthony Association	0-1	0-87 (0-221)	Slight	Poor to Good
Limestone Rock Land-Ector Association	0-25	0-6 (0-15)	Slight	Good
Reagan-Upton Association	0-9	3-87 (7.6-221.0)	Slight	Fair to Good
Reaves Gypsum Land-Cottonwood Association	0-3	0-32 (0-81)	Slight	Poor to Fair
Simona-Pajarito Association	0-3	0-72 (0-183)	Slight	Good

Soils in the Project Area vary from flat, alluvial loams to steep, rocky outcrops, to exposed caliche surfaces. Seven soil associations are found throughout Eddy County, but five of these are found specifically within the Project Area. These include the following:

- Arno-Harkey-Anthony Association: loamy, deep soils from recently mixed alluvium.
- Limestone Rock Land-Ector Association: rockland and very shallow, stony, rocky, loamy soils over limestone; on hills and mountains.
- Reagan-Upton Association: loamy, deep soils and soils that are shallow to caliche; from old alluvium.
- Reaves Gypsum Land-Cottonwood Association: loamy soils that are very shallow to moderately deep over gypsum beds and gypsum lands.
- Simona-Pajarito Association: sandy, deep soils from wind-worked mixed sand deposits.

Soil Erosion

Soil erosion is not a major concern in the Project Area, except along certain riverine reaches of the Pecos River. Upstream of the old Lake McMillan Delta and north of the Brantley Reservoir, levees, steep banks, and channelization of the river into a straight, narrow space has increased the potential for erosion in these areas. Downstream of the delta, a pilot channel brings the Pecos River through the old Kaiser Channel (an irrigation channel originally excavated through the McMillan Delta for transporting water efficiently to McMillan Reservoir) to the breached McMillan Reservoir Levee. Banks in this section are especially prone to lateral erosion. Over time the channel will widen as sediments are removed and deposited into Brantley Reservoir. Erosion within the riverine section between Brantley and Avalon Reservoirs is relatively minor. Brantley Reservoir acts as a sediment trap and provides regulated flows to the Pecos River below the dam. This channel has more gently sloping banks covered by vegetation and is therefore not as erodible as upstream reaches.

Erosion potential in upland areas on certain soils is naturally high; however, it does not currently appear to be a major issue for water quality, rangeland resources, fisheries, or reservoir sedimentation.

Shoreline Erosion

Shoreline erosion on the margins of Brantley and Avalon Reservoirs does not presently appear to be a major concern. Much of the shoreline surrounding Avalon Reservoir has a shallow slope profile that dissipates wave action. The shoreline is further protected in some areas by dense vegetation. Brantley Reservoir has mainly shallow, sloped shorelines where unconsolidated sediments line the banks. Other portions of Brantley Reservoir's shoreline, however, consist of areas covered by coarse alluvial terrace materials and bedrock that efficiently armor the banks.

Sedimentation

Historically, the Pecos River has carried very high sediment loads, especially during high stormwater runoff periods. The river drains vast areas of arid grasslands and shrublands with highly erodible soil surfaces. The Pecos River was originally a meandering river with well-defined riparian vegetation zones and terrace-deposited sediments resulting from overbank flow occurrences (Hildebrandt and Omart 1982). With water resource development projects throughout the Pecos River watershed over the last 100 years, the system has been channelized, river terraces were modified for agriculture, rangeland was degraded, and riparian vegetation was eroded or removed. Currently, the Pecos River's high sediment load is deposited within all of the system's reservoirs. When Brantley Reservoir was built, sedimentation information was used to design a better system, one more able to accommodate such loading. As sediment fills the reservoir, the head gates of Brantley Dam can be raised to maintain a 42,000-acre-foot capacity for an estimated 100-year period, with an annual average of 7,000 acre-feet of sediment accumulation. Avalon Reservoir is not prone to high sediment loads since Brantley Reservoir currently acts as the main sediment trap. Only Rocky Arroyo enters into the Pecos River between Brantley and Avalon Reservoirs.

3.2.3 Cave and Karst Resources

The Project Area is located in gypsum karst terrain, a landform that is characterized by underground drainage through solutionally enlarged conduits. Gypsum karst terrain may contain sinkholes, sinking streams, caves, and springs. Sinkholes leading to underground drainages and voids are common. These karst features, as well as occasional fissures and discontinuities in the bedrock, provide the primary sources for rapid recharge of the groundwater aquifers of the region. The U.S. Bureau of Land Management (BLM) categorizes all areas within the Carlsbad Field Office as having either low, medium, high, or critical cave potential based on geology, occurrence of known caves, density of karst features, and potential impacts to fresh water aquifers.

The section of Project Area on the east side of the Pecos River north of Brantley Dam has a high potential for cave or karst occurrence, while the remainder of the Project Area has a medium potential (BLM 1997). A “high karst zone” is defined as an area in known soluble rock types that contain a high frequency of significant caves and karst features such as sinkholes, bedrock fractures that provide rapid recharge of karst aquifers, and springs that provide riparian habitat. A “medium karst zone” is defined as an area in known soluble rock types but may have a shallow insoluble overburden. These areas may contain isolated karst features such as caves and sinkholes. Groundwater recharge may not be wholly dependent on karst features but the karst features still provide the most rapid aquifer recharge in response to surface runoff.

Three caves with surface entries are found in the Project Area: Coffee Cave, Clark’s Caverns, and Homogenized White Cave. They are located just east of Lake McMillan in the Seven Rivers Formation. The caves are unusual because they were developed in gypsum (Breisch and Meador 1973). The caves form mazes with several levels and thousands of feet of mapped passages. No unique speleothems (i.e., cave formations) are known to occur within the caves (Reclamation 1982), but some passages in Coffee Cave are up to 60 feet in width or height (Reclamation 1972). The cliff area near the caves has numerous sinkholes and fissures that may also be connected to other caves (BLM 1977). Access to the Project Area caves is not currently managed by any agency. In the past, cave visitors left trash and debris near the cave entrances and inside the caves (BLM 1977). Unknown features may also exist within the Project Area. Because of these factors, oil and gas development activities are subject to mitigation measures designed to adequately protect known and potential cave/karst resources.

Sinkholes and cave entrances collect water and can accumulate rich organic materials and soils. This, in conjunction with the stable microclimate near cave entrances, support a greater diversity and density of plant life that provides habitat for a greater diversity and density of wildlife, such as raptors, rodents, mammals, and reptiles. In addition, the interior of the caves support a large variety of troglobitic, or cave environment-dependent species. The troglobitic species have adapted specifically to the cave environment because of the constant temperatures, constant high humidity,

and total darkness. Coffee Cave and Homogenized White Cave are known to house summer bat colonies.

3.2.4 Water Quality

Surface Water Quality

Water quality indicators are measured and compared to standards adopted by the State of New Mexico Water Quality Control Commission (NMWQCC) and set forth in the New Mexico Administrative Code (NMAC): 20.6.2: Surface and Ground Water; and 20.6.4: Interstate and Intrastate Surface Waters. The standards apply to physical, chemical, and toxic constituents affecting water quality (NMAC 2005). Water quality can be affected by changes in water operations, sedimentation rates, oil and gas development, permitted livestock grazing practices, the intensity of recreation use, and other factors.

Sections 303(d) and 305(b) of the Clean Water Act (CWA) require each state to assess and list the quality of its waters in a tri-annual report to the EPA. Reservoirs and Rivers are considered impaired if they do not support designated uses. The 2006 – 2008 report lists both Brantley Reservoir and Avalon Reservoir as Impaired because of elevated mercury concentrations. Brantley Reservoir is also listed as Impaired because of DDT concentrations in fish tissue. Within the Project Area, the Pecos River is not fully supportive of the warmwater fishery designation (NMED/SWQB 2007).

Brantley Reservoir

Designated uses for Brantley Reservoir are irrigation storage, livestock watering, wildlife habitat, primary contact recreation, and warmwater fishery (NMAC 2005). Brantley Reservoir is listed as Impaired for warmwater fisheries because of elevated levels of Mercury and DDT in fish tissue. A May 2006 Fish Consumption Advisory recommends no consumption of any fish of any species from Brantley Reservoir because of elevated concentrations of DDT found in largemouth bass (*Micropterus salmoides*) and white bass (*Morone chrysops*) (NMED 2006). As per EPA guidance, fish consumption advisories are considered existing and readily available data that indicate non-attainment with CWA goals for “fishable” waters.

The U.S. Bureau of Reclamation (Reclamation) collected water quality data weekly at three sites on or near Brantley Reservoir during calendar years 2004 and 2005: at the reservoir inlet, at the reservoir outlet along the Pecos River, and at the deepest part of the reservoir near the dam. Brantley water quality data for total dissolved solids (TDS), dissolved oxygen (DO), Salinity, Conductivity, pH, and temperature are based on the 2005 sample season.

Total Dissolved Solids (TDS)

The TDS levels in the reservoir appear to vary with seasonal water operations (Reclamation 2006b). Overall, the TDS concentration drops during periods of peak inflow and rises when outflow volume decreases. Total dissolved solids levels remain above 2 grams per liter (g/L) for most of the year. Concentration of TDS ranged from 1.98g/L to 41 g/L at the outflow during 2005, averaging 3.8 g/L.

The TDS measurements were slightly higher at the outflow compared with the inflow. As at the inflow, concentration of TDS at the inflow site decreases as inflow volume increases. The relationship between TDS and outflow volume expressed as a linear function is stronger than at the inflow. Concentration of TDS at the dam generally increases with depth of water. Concentration of TDS seemed to increase the most at about 15 feet (4.6 m) below the reservoir surface. The minimum TDS statistic, however, increases at 25 feet (7.6 m) below the reservoir surface (Reclamation 2006b).

Dissolved Gasses

Dissolved oxygen as percent saturation and concentration was variable during the 2005 sampling period. Lower DO concentration at the inflow may be a result of increased plant productivity and warmer temperatures. Dissolved oxygen increases slightly when inflow increases. The outflow has lower DO levels than the inflow and seems to be related to dam releases. Dissolved oxygen also increases during a period of increased outflow that follows a period of minimal outflow. Dissolved oxygen generally decreases with increased depth at the dam, with a large drop occurring at a depth of 20 feet (6.0 m). Data indicate possible anoxic conditions at depths greater than 20 feet (6.0 m) during parts of the year (Reclamation 2006b).

Salinity

The average salinity at the inflow during this sampling period was 2.52, measured in Practical Salinity Scale Units (PSS). Salinity at the inflow ranged from 1.28 to 4.01 PSS. Salinity increased between January and June as inflow volume decreased. Salinity decreased between June and July, during the peak inflow. Between August and December, salinity fluctuated slightly, but generally stayed above 2 PSS. Salinity generally increased with depth, particularly at the 25-foot depth (Reclamation 2006b).

Conductivity

Mean specific conductivity is measured in milli-siemens per centimeter (mS/cm). At the inflow, values ranged from 2.52 to 7.30 mS/cm. As with TDS and salinity, specific conductivity also steadily increased during the sampling period until peak inflow, then dropped with spring runoff and remained below the specific conductivity. At the outflow, the mean specific conductivity was 5.94 mS/cm. Specific conductivity at the outflow ranged from 3.09 to 8.46 mS/cm. Specific conductivity was lower during periods of high outflow. At the dam, the mean specific conductivity was 5.27 mS/cm with a range of 3.07 to 8.16 mS/cm. Specific conductivity also increased with depth at the dam at depths of 25 feet or greater (Reclamation 2006b).

pH and Water Temperature

The State guidelines specify an acceptable pH range of 6.6 – 9.0. Brantley Reservoir maintains pH values within this range. The pH measurements at the inflow and at the outflow are similar, and have no obvious relationship to flow. The average inflow pH in 2005 was 8.26, with values ranging from 7.82 to 8.56. The average reservoir pH was 8.18, with a range of 7.16 to 8.58. The pH measurements

decrease in deeper water, dropping about 0.5 pH units between depths of 15 and 20 feet. This pattern is similar to other water quality constituents within the 2005 survey (Reclamation 2006b).

The State guidelines specify acceptable water temperatures will remain below 90 degrees F. Average water temperature of the inflow was 62.75 degrees F (17.08 degrees C). Throughout the year temperatures ranged from 36.1 to 80.7 degrees F (2.27–27.0 degrees C). Reflecting seasonal air temperatures, water temperatures increased between January and June, remained consistent between June and October, and decreased from October through December. The average outflow temperature was 62.66 degrees F (17.0 degrees C), ranging from 40.8 to 78.6 degrees F (4.8–25.8 degrees C). Average water temperature at the dam was 60.86 degrees F, ranging between 40.4 and 80.9 degrees F (4.6–27.1 degrees C). In general, water temperatures decreased only slightly with increasing depth. Temperatures do, however, show an increasing trend within each 5-foot (1.53 m) depth increment (Reclamation 2006b).

Avalon Reservoir

Designated uses for Avalon Reservoir are irrigation storage, livestock and wildlife watering, secondary contact recreation, and warmwater fishery. Water quality supports all uses except warmwater fishery, which is impaired because of elevated mercury concentrations found in fish tissue. Water quality information concerning the current status of Avalon Reservoir is limited. The SWQB lists the reservoir as eutrophic based on Carlson trophic state index (Carlson 1977, NMED/SWQB 1991). Total nitrogen to phosphorus ratios indicate that phosphorus is limiting in the reservoir. The Shannon-Wiener diversity indices indicate that phytoplankton and diatom diversity is good as well. Fish consumption guidelines for mercury were issued for Avalon Reservoir in 1993 and remain in place for channel catfish (*Ictalurus punctatus*). Atmospheric deposition is listed as the probable source of the mercury contamination (NMED/SWQB 1998).

The Pecos River

The Project Area includes the main stem of the Pecos River, from the headwaters of Brantley Reservoir upstream to Acme, New Mexico. Designated uses for this section of the Pecos River above Brantley Reservoir include: irrigation, livestock watering, wildlife habitat, secondary contact recreation (e.g., swimming, water skiing), and warmwater fishery (SWQCC 1995). The segment of the Pecos River from the headwaters of Brantley Reservoir upstream to Acme was listed on the 1996 303(d) list for total ammonia and mercury. A 1997 water quality survey (NMED/SWQB 1999) on this segment of the river documented as exceeding the chronic numeric standard for total ammonia on three occasions, but did not exceed the standard for mercury. The ammonia incidents were isolated and did not constitute violations of water quality standards. The 2008–2010 303(d) and 305(b) report does not list as Impaired any Project Area section of the Pecos River outside of the reservoirs (NMED/SWQB 2008).

Water quality in the Pecos River historically has been poor because of natural soluble minerals from surface waters, irrigation returns, and groundwater discharges containing high salinity levels (COE

1995, Reclamation 1982, Roberston 1997). Bank erosion is high during storm events, resulting in large quantities of sediment in the Pecos River.

A 1997 report attributes the most serious water quality degradation in the Pecos River to high TDS, sulfate, and chloride concentrations. According to this report, TDS values peaked upstream of Brantley Reservoir near Artesia and the Lakewood U.S. Geological Survey gages (Robertson 1997). The New Mexico Environment Department, Surface Water Quality Bureau (NMED/SWQB) (1999) conducted a three-season water quality survey on the lower Pecos River in 1997. Chemical, biological, and physical parameters were collected from below Sumner Reservoir to above Brantley Reservoir. This study found no values exceeding standards for sulfate or chloride concentrations.

Groundwater Quality

In the general vicinity of the Project Area, groundwater is often found near the Earth's surface. In the Pecos River alluvium water is found at depths of 20 to 50 feet (6 to 15 m). However, this water is not available to users because it too easily drains the Pecos River. Furthermore, groundwater quality is relatively good in the southern portion of the Project Area but water north of Brantley Reservoir has high salinity levels because of the alluvium's salinity. Near Brantley Reservoir, groundwater depths are between 100 and 200 feet (30 and 61 m) on both sides of the Reservoir. Near Avalon Reservoir, groundwater can generally be found between 50 to 100 feet (15 to 30 m) (Hendrickson and Jones 1952).

Within the Project Area two wells currently are being used for irrigation on the Seven Rivers Farm operated by the State of New Mexico Department of Game and Fish (NMDGF). These wells are classified as high or very high salinity wells. Both wells, however, are reported to be low in sodium levels. Calcium and sulfate ions are the most common ions and are likely derived from dissolution of gypsum or anhydrite. High salinity does not preclude use of these waters for irrigation because of the favorable ratio of ions present. Calcium sulfate (gypsum) is not harmful to crops and is often added to ameliorate high sodium and alkalinity problems. These waters, however, are only recommended for use in soils with moderate to rapid permeability, a condition found on most of the farm's soils (LSS 1992).

Project Area oil and gas wells pose a concern for groundwater resources. Oil and gas wells produce a few byproducts, namely waste oil and brine that have the potential to affect groundwater resources. However, numerous safe handling and removal rules exist to prevent groundwater, surface water, and soil contamination (BLM 1986b). There is no evidence that these requirements are not being met on either the active or closed wells in the Project Area.

3.2.5 Vegetation

The Project Area is near the boundary of two vegetative provinces: the Great Plains Grassland and the Chihuahuan Desert. The difference between these two vegetation types is apparent; Great Plains

Grassland areas are dominated by grasses and Chihuahuan Desert areas are dominated by shrubs. At the boundary, however, the distinction between these types is unclear. Although the actual mapping boundaries differ, both Dick-Peddie et al. (1993) and Brown and Lowe (1982) map the Project Area as Chihuahuan Desert Scrub and Desert Grassland.

Upland Plant Communities

Nine upland plant communities were identified and mapped in the Project Area using aerial photography and field surveys from 1998. Classification of the plant communities in the Project Area were made on an ecological framework, modified by the functional needs of resource analyses. Plant communities were identified based on areas with similar plant species, structure, and composition in a similar environment. Upland plant communities comprise approximately 77 percent of the Project Area and are described in greater detail in the Brantley and Avalon Reservoirs Resource Management Plan (Reclamation 2003). Table 3-2 lists each upland plant community, its area of coverage, and its percent of total Project Area.

Table 3-2. Upland Plant Communities in the Project Area.

PLANT COMMUNITY	ACRES (HECTARES)	PERCENTAGE
Arroyo Shrubland	1,439 (582)	3.36
Desert Plains Grassland	702 (284)	1.64
Disturbed Ground	1,785 (722)	4.17
Juniper Shrubland	11 (4)	0.02
Kochia-Dominated Area	2,943 (1,191)	6.87
Limestone/Gypsum Hills Shrubland	1,982 (802)	4.63
Mesquite Shrubland	4,474 (1,811)	10.44
Mixed Desert Shrubland	18,752 (7,589)	43.77
Saltbush Shrubland	773 (313)	1.80
Total Upland Vegetation	32,861 (13,298)	76.70

Riparian-Wetland Plant Communities

In this EA riparian-wetlands are defined as plant communities in the transition zone between aquatic (water) and terrestrial (land) habitats. Project Area riparian-wetlands occur in two general locations: along the shorelines and littoral zones of the Brantley and Avalon Reservoirs, and along reaches of the Pecos River in the Project Area. The mapping and analysis of riparian-wetland plant communities were concurrent with the mapping and analysis of upland vegetation. A total of 8,656 acres (3,503 hectares) of riparian-wetlands were identified in the Project Area.

At Brantley Reservoir, riparian-wetland habitat occurs along the shoreline in narrow bands, particularly in protected areas such as bays and coves. Because the bays and coves are somewhat protected from wind and wave erosion, the substrate is available for the establishment of riparian-wetland vegetation. Exposed shoreline supports little or no riparian-wetland vegetation because of shoreline erosion and/or unsuitable substrates to support vegetation establishment. Riparian-wetland



vegetation observed along the shoreline includes saltcedar (*Tamarix* spp.), rush (*Juncus* spp.), sedge (*Carex* spp.), bulrush (*Scirpus* spp.), Bermuda grass (*Cynodon dactylon*), and summer cypress (*Kochia scoparia*), saltcedar being the species most commonly observed. The primary influences on the condition of riparian-wetlands at Brantley Reservoir appear to be water level fluctuations and recreational use.

Saltcedar dominates the riparian-wetland plant communities bordering the Pecos River in the portion of the Project Area upstream of Brantley Reservoir. The river was straightened and channelized; subsequently it became greatly incised within its historic floodplain. Decadent stands of saltcedar with little or no understory vegetation border the river banks. Remaining understory vegetation includes Bermuda grass, rushes, and cattail (*Typha latifolia*). Although saltcedar stands are present on the historic floodplain, they are not considered riparian-wetland plant communities because riparian-wetland plant species are absent in their understories. The primary influence on the condition of riparian-wetlands along the Pecos River above Brantley Reservoir appears to be the lowering of water levels resulting from river incisement.

Saltcedar also dominates the riparian-wetland plant communities observed along the Pecos River between Brantley and Avalon Reservoirs. In general, the Pecos River is channelized with steep banks. This precludes the establishment of most riparian-wetland vegetation; however, saltcedar occurs in dense stands above the river. In a few isolated locations along the Pecos River between Brantley and Avalon Reservoirs where the river is not confined, small patches of cattail and narrow bands of rushes occur along the banks. The primary influence on the condition of riparian-wetlands along the Pecos River between the reservoirs appears to be fluctuations in river flows associated with the operation of Brantley Reservoir and grazing.

Avalon Reservoir is much older than Brantley Reservoir. Like Brantley Reservoir, the riparian-wetland vegetation occurs primarily in those areas protected from wind and wave erosion, as well as in the reservoir's inflow area. The most common riparian-wetland species observed at Avalon Reservoir was saltcedar; other species include rushes, bulrushes, Bermuda grass, plantain (*Plantago* spp.), cocklebur (*Xanthium* spp.), alkali sacaton (*Sporobolus airoides*), and giant sacaton (*Sporobolus wrightii*). The primary influences on the condition of riparian-wetlands at Avalon Reservoir appear to be water level fluctuations and grazing.

Riparian-wetlands serve many important ecological functions. Based on preliminary observation, it appears that the riparian-wetlands in the Project Area provide habitat for fish and wildlife, help stabilize the shorelines and riverbanks, improve water quality by filtering sediment, and provide recreational opportunities such as wildlife viewing and (in the case of saltcedar communities) providing shade and screening for campers in Primitive Recreation Areas. The functional value of a riparian-wetland is dependent on species composition, size, location, soils, and other factors.

Within the Project Area, all of the riparian-wetland plant communities are very similar in species composition and are dominated by the presence of saltcedar. Therefore, for the purposes of this

resource analysis, all of the riparian-wetland plant communities within the Project Area were considered a single habitat type even though there may be slight differences in plant species composition. Riparian-wetland plant communities in the Project Area include Marsh, Riparian Grassland, Tamarisk Shrubland, Unconsolidated Shoreline, and Open Water areas. These plant communities are described in greater detail in the Brantley and Avalon Reservoirs Resource Management Plan (Reclamation 2003). Table 3-3 lists each riparian-wetland plant community, its area of coverage, and its percent of total Project Area.

Table 3-3. Riparian-wetland Plant Communities in the Project Area.

PLANT COMMUNITY	ACRES (HECTARES)	PERCENTAGE
Marsh	5 (2)	0.01
Riparian Grassland	144 (58)	0.34
Open Water ^a	2,320 (939)	5.42
Tamarisk Shrubland	6,172 (2,498)	14.41
Unconsolidated Shoreline	15 (6)	0.03
Total Riparian-Wetland Vegetation	8,656 (3,503)	20.21

^a Area of open water based on conditions present in May 1998.

Noxious Weed Species

Under the Federal Noxious Weed Act of 1974, noxious weeds are defined as plants that are “of foreign origin, are new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation, or the fish or wildlife resources of the United States or the public health.” Noxious weeds typically have characteristics that enhance their capability to successfully reproduce and spread over long distances. For example, these species often have prolific seed production, the ability to reproduce vegetatively, and highly effective means of seed dispersal (e.g., the presence of hooks or barbs on the seeds enabling them to attach to animal fur, clothing, vehicles, and equipment). These characteristics promote rapid natural spread into pristine or semi-pristine environments, thus interfering with composition, structure, and ecosystem processes of the native plant communities’ species.

The Federal government maintains a noxious weed list including plants that are noxious mainly on lands not under state jurisdiction (i.e., U.S. territories and other possessions). Federal agencies have policies designating noxious weeds and managerial control measures, but these agencies often defer to county or state regulations concerning noxious weeds. State and local jurisdictions have authority to regulate noxious weeds over the rest of the country. New Mexico noxious weeds legislation includes the following: Harmful Plant Act (1976), Noxious Weed Act (1978), Harmful Weed Act 76-7-23 through 30, and the Noxious Weed Management Act of 1998. These noxious weed species are non-native and are presented in Table 3-4.



Table 3-4. Noxious Weeds in the State of New Mexico.

COMMON NAME	BOTANICAL NAME	ORIGIN ^a	GROWTH FORM ^b
African rue	<i>Peganum harmala</i>	E	F
Alfombrilla	<i>Drymaria arenarioides</i>	E	F
Arabiangrass	<i>Schizmus arabicus</i>	E	G
bindweed	<i>Convolvillus arvense</i>	E	F
Black Henbane	<i>Hyoscyamus niger</i>	E	F
bull thistle	<i>Cirsium vulgare</i>	E	F
camelthorn	<i>Alhagi maurorum</i>	E	S
Canada thistle	<i>Cirsium arvense</i>	E	F
common toadflax	<i>Linaria vulgaris</i>	E	F
Dalmation toadflax	<i>Linaria dalmatica</i>	E	F
diffuse knapweed	<i>Centaurea diffusa</i>	E	F
Dyer's Woad	<i>Isatis tinctoria</i>	E	F
Eurasian Watermilfoil	<i>Myriophyllum spicatum</i>	E	F
halogeton	<i>Halogeton glomeratus</i>	E	F
hoary cress	<i>Cardaria draba</i>	E	F
Hydrilla	<i>hydrilla verricillata</i>	E	F
jointed goat grass	<i>Aegilops cylindria</i>	E	F
leafy spurge	<i>Euphorbia esula</i>	E	F
Malta starthistle	<i>Centaurea melitensis</i>	E	F
Mediterranean grass	<i>Schizmus barbatus</i>	E	G
musk thistle	<i>Carduus Nutans</i>	E	F
onionweed	<i>Asphodelus fistulosus</i>	E	F
peppergrass	<i>Lepidium latifolium</i>	E	F
poison hemlock	<i>Conium maculatum</i>	E	F
puncturevine	<i>Tribulus terrestris</i>	E	F
purple loostrife	<i>Lythrum salicaria</i>	E	F
purple starthistle	<i>Centaurea calcitrapa</i>	E	F
Russian knapweed	<i>Acroptilon repens</i>	E	F
Russian thistle	<i>Salsola kalic</i>	E	F
Russian olive	<i>Elaeagnus augustofolia</i>	E	T
Scotch thistle	<i>Onopordum acanthium</i>	E	F
spotted knapweed	<i>Centaurea micranthos</i>	E	F
tamarisk (saltcedar)	<i>Tamarix chinensisc</i>	E	S
teasel	<i>Dipsacus fullonum</i>	E	F
Ulmus pulmila	<i>Siberian Elm</i>	E	T
whitetop	<i>Cardaria draba</i>	E	F
yellow starthistle	<i>Centaurea solstitialis</i>	E	F

Source: NRCS (2007)

^a E = Exotic (non-native), N = Native.^b F = forb, G = grass or grasslike plant, S = shrub, T = tree shrub.

The BLM, along with other agencies, has completed a map of noxious weed occurrences for Eddy County. Their mapping identifies the noxious weeds of Malta starthistle (*Centaurea mlitensis*) and African rue (*Peganum harmala*) as occurring within the Project Area. Through surveying the Project Area, no other occurrences of noxious weeds were located, nor were a majority of the BLM's weed infestation populations located. This is likely the result of weed eradication efforts and the lack of suitable precipitation during the survey year.

Undesirable Species

In addition to noxious weeds, many other plant species are considered undesirable. The National Undesirable Plant Management Act of 1990 defines these plants as “undesirable, noxious, exotic, injurious, or poisonous, pursuant to State or Federal law.” Several plant species that may occur in the Project Area are included in this category. Some of the undesirable plants are exotic but not designated as noxious because they are not invasive, are now considered naturalized, or are only pests under certain conditions (e.g., on crop lands). Native species, under Federal law, are not considered noxious, but several native species are considered undesirable. These particular species are agricultural pests either indicative of overgrazed rangeland or prevalent in other areas where extensive ecosystem disturbance has occurred. They are native plants that are not problematic in healthy ecosystems because their populations are low. In disturbed habitats, however, these undesirable plants occur in much higher numbers. Some of these plants are poisonous to livestock and wildlife, while others are simply unpalatable. In high numbers, these species indicate poor range conditions. Table 3-5 lists those species considered potential problems or disturbance indicators.

In the Project Area saltcedar and Russian olive are the most serious vegetation problems. The two species dominate vast portions of the northern half of the Project Area. In 1968 Reclamation began a Salt Cedar Clearing Program in the Brantley Reservoir area to clear the undesirable shrubs for recreational and land management purposes (W. Able 2000, pers. comm.). The work is performed under the jurisdiction of the Pecos River Basin Water Salvage Project (see Chapter 1).

3.2.6 Wildlife

Wildlife of interest to State and Federal agencies and the general public in the Brantley and Avalon Reservoir RMPA Project Area include special status species (Federal and State TES), big game, waterfowl, and general wildlife populations. Also of concern in the Project Area are wildlife use patterns in Tamarisk Shrublands before and after control practices are implemented. Wildlife habitat in the area supports populations of ungulates, carnivores, water birds, shore birds, upland birds, rodents, amphibians, reptiles, and raptors. Population numbers and composition vary with habitat suitability.

Table 3-5. Undesirable Plant Species that May Occur in the Project Area.

COMMON NAME	BOTANICAL NAME	ORIGIN
annual bursage	<i>Ambrosia acanthicarpa</i>	Native
Bermuda grass	<i>Cynodon dactylon</i>	Exotic
bitterweed	<i>Hymenoxys odorata</i>	Native
Black nightshade	<i>Solanum nigrum</i>	Exotic
Broom snakeweed	<i>Gutierrezia sarothrae</i>	Native
buffalobur	<i>Solanum rostratum</i>	Native
curly dock	<i>Rumex crispus</i>	Exotic
erect knotweed	<i>Polygonum aviculare</i>	Exotic
flixweed	<i>Descurainia sophia</i>	Exotic
Green foxtail	<i>Setaria viridis</i>	Exotic
horseweed	<i>Conyza canadensis</i>	Exotic
lamb's quarters	<i>Chenopodium album</i>	Exotic
large crabgrass	<i>Digitaria sanguinalis</i>	Exotic
London rocket	<i>Sisymbrium irio</i>	Exotic
Mexican devilweed	<i>Chloracantha spinosa</i>	Native
netseed lamb's quarters	<i>Chenopodium berlandieri</i>	Exotic
nettleleaf goosefoot	<i>Chenopodium murale</i>	Exotic
perennial sowthistle	<i>Sonchus asper</i>	Exotic
pinnate mustard	<i>Descurainia pinnata</i>	Native
prostrate spurge	<i>Euphorbia prostrata</i>	Exotic
prostrate vervain	<i>Verbena bracteata</i>	Native
rabbitfoot grass	<i>Polypogon monspeliensis</i>	Exotic
Ridell's groundsel	<i>Senecio riddellii</i>	Native
rough cocklebur	<i>Xanthium strumarium</i>	Exotic
salsify	<i>Tragopogon dubius</i>	Exotic
sheep sorrel	<i>Rumex acetosella</i>	Exotic
silverleaf nightshade	<i>Solanum elaeagnifolium</i>	Native
spiny cocklebur	<i>Xanthium spinosum</i>	Exotic
stinkgrass	<i>Eragrostis cilianensis</i>	Exotic
storksbill	<i>Erodium cicutarium</i>	Exotic
summer-cypress	<i>Kochia scoparia</i>	Exotic
sweetclover	<i>Melilotus sp.</i>	Exotic
wild buckwheat	<i>Polygonum convolvulus</i>	Exotic

General Habitat

Approximately 80 percent of the wildlife habitat in the Project Area is composed of upland vegetation types (i.e., Mixed Desert Shrubland Arroyo Shrubland, Desert Plains Grassland, Juniper Shrubland, Kochia-Dominated Area, Limestone/Gypsum Hills Shrubland, Mesquite Shrubland, and Saltbush Shrubland). The majority of the upland vegetation types are located away from the waterways and contain relatively little understory because of natural conditions and grazing. Nevertheless, upland vegetation is important to a wide range of wildlife including rodents, big game, reptiles, non-game species, upland game birds, raptors, and songbirds.

Riparian-wetland vegetation types (i.e., Marsh, Tamarisk Shrubland, and Riparian Grassland) comprise about 20 percent of the wildlife habitat in the Project Area. Of this 20 percent, 98 percent

of the habitat is Tamarisk Shrubland. Riparian-wetland vegetation types are primarily located along the Pecos River and shorelines of Brantley and Avalon Reservoirs. Despite the limited riparian-wetland vegetation types, these habitats substantially add to the biological diversity of the Project Area by attracting diverse wildlife species that otherwise would not occur in the area. Riparian-wetland habitats are considered a limited resource in the surrounding arid environment, yet are used by a number of waterfowl, shorebirds, passerines, and amphibians.

The Brantley Wildlife Management Area, designated as part of the mitigation for the development of Brantley Dam and Reservoir, lies within the Project Area boundary. It is managed by the NMDGF and consists primarily of Tamarisk Shrublands of varying densities and open field areas. The NMDGF manages this area for upland species with techniques such as mowing strips, planting small grains, and controlled burning. Within the Brantley Wildlife Management Area, the Seven Rivers Waterfowl Management Area is used to grow corn and alfalfa primarily for waterfowl. Milo, wheat, and millet are also grown to a lesser extent.

Hunting waterfowl, upland game birds, big game, and furbearers is not allowed at Brantley Lake State Park. However, regulated hunting of these groups of wildlife is allowed on other Project Area lands that are administered by NMDGF and Reclamation. During the open season, waterfowl and upland game bird hunting is restricted to certain hours and days of the week on the Seven Rivers Waterfowl Management Area. Wildlife species that were documented within the Project Area during a multi-day site visit in 1998 are shown in Table 3-6.

Birds

A total of 179 bird species were documented in the general area during past studies, including 32 known and 25 suspected breeding species (Reclamation 1972). The Pecos River Valley is noted for its migratory waterfowl and shorebirds and, to a lesser extent, nesting and wintering species. The Project Area attracts a large number of waterfowl and shorebirds because of its complex of open water, riparian-wetland, and upland habitats. This complex provides resources required by water-dependent birds such as food items (e.g., fish, macroinvertebrates, emergent vegetation), sites to loaf and rest, protective cover, nest material, and secluded nesting areas. Such resources are directly associated with riparian-wetland vegetation types (Marsh, Riparian Grassland, and Tamarisk Shrubland) that are larger than 1.0 acre (0.4 hectare) in size and are within 100 feet (30 m) of the Pecos River and reservoir shores. Habitat quality for waterfowl and shorebirds is limited in some parts of the Project Area by the high degree of disturbance resulting from recreational use, cattle grazing, fluctuating water levels, and the invasion of large, mono-typic stands of Tamarisk Shrublands. Regardless, the Project Area contains areas that are particularly suitable for waterfowl and shorebirds. Common waterfowl and shorebird species include mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), northern pintail (*Anas acuta*), teal, (*Anas* spp.), redhead (*Aythya americana*), lesser scaup (*Aythya affinis*), Canada goose (*Branta canadensis*), sandhill crane (*Grus canadensis*), killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), and black-necked stilt (*Himantopus mexicanus*) (Reclamation 1972).

Table 3-6. Wildlife Species Known to Occur within the Project Area.^a

COMMON NAME	SCIENTIFIC NAME
BIRDS	
American coot	<i>Fulica americana</i>
American avocet	<i>Recurvirostra americana</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
bank swallow	<i>Riparia riparia</i>
barn swallow	<i>Hirundo rustica</i>
belted kingfisher	<i>Ceryle alcyon</i>
black-necked stilt	<i>Himantopus mexicanus</i>
brown pelican	<i>Pelecanus occidentalis carolinensus</i> ^b
burrowing owl	<i>Athene cunicularia</i>
canyon wren	<i>Catherpes mexicanus</i>
cliff swallow	<i>Hirundo pyrrhonota</i>
common loon	<i>Gavia immer</i>
common nighthawk	<i>Chordeiles minor</i>
double-crested cormorant	<i>Phalacrocorax auritus</i>
eared grebe	<i>Podiceps nigricollis</i>
greater roadrunner	<i>Geococcyx californianus</i>
great blue heron	<i>Ardea herodias</i>
great-horned owl	<i>Bubo virginianus</i>
green heron	<i>Butorides virescens</i>
herring gull	<i>Larus argentatus</i>
house sparrow	<i>Passer domesticus</i>
interior least tern	<i>Sterna antillarum</i> ^b
killdeer	<i>Charadrius vociferus</i>
mallard	<i>Anas platyrhynchos</i>
mourning dove	<i>Zenaida macroura</i>
northern harrier	<i>Circus cyaneus</i>
northern shoveler	<i>Anas clypeata</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>
ring-necked pheasant	<i>Phasianus colchicus</i>
scaled quail	<i>Callipepla squamata</i>
snowy egret	<i>Egretta thula</i>
turkey vulture	<i>Cathartes aura</i>
western kingbird	<i>Tyrannus verticalis</i>
western meadowlark	<i>Sturnella neglecta</i>
white-winged dove	<i>Zenaida asiatica</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>
MAMMALS	
blacktail jackrabbit	<i>Lepus californicus</i>
coyote	<i>Canis latrans</i>
raccoon	<i>Procyon lotor</i> (sign observed)
mule deer	<i>Odocoileus hemionus</i>
HERPETOFAUNA	
little striped whiptail	<i>Cnemidophorus inornatus</i>
turtle	unidentified
western whiptail	<i>Cnemidophorus tigris</i>

^a Species observed by the RMP/EA Project Team during a multi-day site visit in May 1998.

^b Species of special concern to the Federal Government or State of New Mexico.

Mudflats along the shores of the reservoirs and the Pecos River provide loafing and foraging areas for many species of waterfowl and shorebirds such as American avocets, black-necked stilts, killdeers, sandpipers, terns, and numerous duck species. Project Area mudflats are typically inundated during periods of high water and occur primarily within the footprint of Avalon Reservoir and immediately downstream along the Pecos River in areas where topographic relief is minor. Riparian Grasslands often border the mudflats.

One notable habitat area, a small Marsh below the Avalon Reservoir dam, supports high densities of waterfowl and shorebirds. This area is comprised of open water with emergent vegetation, several scattered cottonwoods, and stands of seepwillow (*Baccharis* sp.). The Marsh is bordered by Riparian Grassland and Tamarisk Shrubland communities and is likely used by breeding birds (e.g., teals, northern shovelers, and grebes) for nesting, foraging, and brood-rearing. Also, migrating and wintering birds likely use this area because of its abundance of food items and isolation. Arroyo outflow areas in the Project Area may also provide secluded sites for nesting and brood-rearing.

Other areas important to feeding waterfowl and shorebirds are near fish spawning areas, such as the shallow littoral zones containing inundated vegetation and shorelines of gravel and rock. Some waterfowl, including American coot (*Fulica americana*), common merganser (*Mergus merganser*), and herring gull (*Larus argentatus*), forage in deeper portions of Avalon Reservoir.

Raptors, such as red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), American kestrel (*Falco sparverius*), and golden eagle (*Aquila chrysaetos*) are known to occur throughout the Project Area. The upland areas provide an abundance of small mammal prey including kangaroo rat (*Dipodomys* spp.), house mouse (*Mus musculus*), deer mouse (*Peromyscus maniculatus*), and gopher (*Thomomys* spp.). Few roosting and nesting sites are available for raptors with the exception of 10.7 acres (4.3 hectares) of Juniper Woodland located in the upper draws of the Project Area. Raptors may also use mature stands of Tamarisk Shrubland for roosting and nesting.

Habitat for most songbirds is associated with the riparian-wetland areas. In particular, Marsh and Tamarisk Shrublands with dense growth and complex vertical structure support nesting, migrating, and wintering populations of songbirds. These habitats provide nesting sites, protective cover from weather and predators, and prey (e.g., seed, plant material, insects). The Project Area contains 4.7 acres (1.9 hectares) of Marsh and 6,171.7 acres (2,497.6 hectares) of Tamarisk Shrubland. Songbirds frequently use Arroyo Shrublands. The 1,439.2 acres (582.4 hectares) of Arroyo Shrubland in the Project Area are structurally diverse, making them attractive to a wide range of species. Songbirds inhabit other habitats in the Project Area but in reduced numbers and diversity.

Executive Order 13186, titled "Responsibilities of Federal Agencies to Protect Migratory Birds," signed on January 10, 2001, requires that Federal agencies evaluate the effects of Federal actions on migratory birds. A migratory bird inventory has not been completed for the Project Area. Common migratory birds that were documented in the Project Area in 1998 are listed in Table 3-6.

Mammals

Twenty-six mammal species were documented in the general Project Area (Reclamation 1972). An additional 40 species occur in the Pecos River Valley and may be present within the Project Area. Common mammals include deer mouse, blacktail jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), white-footed mouse (*Peromyscus leucopus*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*). Mammals inhabit all vegetation types in the Project Area.

Furbearers known to occur in the Project Area include striped skunk, raccoon, coyote, ringtail (*Bassariscus astutus*), fox (*Vulpes*), muskrat (*Ondatra zibethica*), badger (*Taxidea taxus*), and bobcat (*Lynx rufus*). Most furbearers, except muskrats and ringtails, occur in upland and riparian-wetland habitats. Muskrats are more commonly associated with wet areas, such as the reservoirs, the Pecos River, canals, small ponds, and adjacent vegetation. Ringtails inhabit the rockier sites, such as those along Brantley Dam.

Big game species in the Project Area include mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antilocapra americana*). The Project Area is on the eastern edge of the mule deer range in New Mexico (Reclamation 1972). These species use all upland habitats and Riparian Grasslands for foraging. Areas of particular importance include 702.1 acres (284.1 hectares) of desert plains grasslands and 1,439.2 acres (582.4 hectares) of Arroyo Shrublands that provide cover and forage. The arroyos leading to the reservoirs are also used as movement corridors. However, species movement may be limited by five-strand barbed wire fencing in the Project Area. The reservoirs, the Pecos River, canals, and ponds provide important water sources.

The Project Area likely supports a high number of bat species because of the availability of roosting and nursery sites associated with several caves (e.g., Coffee Cave, Clark's Caverns, and Homogenized White Cave) and abandoned buildings at the McMillan Dam site in the Project Area. Aquatic resources (e.g., reservoirs, Pecos River, canals, and small ponds) and Marsh and Riparian Grassland habitats within the Project Area provide a source of insect prey for bats.

Herpetofauna

Fourteen species of amphibians and 57 species of reptiles are known to exist in the Pecos River Valley (Reclamation 1972). The little striped whiptail (*Cnemidophorus inornatus*) is the most common reptile. Other common herpetofauna include ornate box turtle (*Terrapene ornata*), Texas horned lizard (*Phrynosoma cornutum*), western hognose snake (*Heterodon nasicus*), gopher snake (*Pituophis melanoleucus*), prairie rattlesnake (*Crotalus viridis*), checkered whiptail (*Cnemidophorus tesselatus*), Woodhouse toad (*Bufo woodhousei*), and cricket frog (*Acris crepitans*). Reptiles can be found throughout the Project Area in all upland habitats. Garter snake (*Thamnophis* spp.), several turtle species (e.g., yellow mud turtle [*Kinosternon flavescens*] and Texas spiny softshell turtle [*Trionyx spiniferus*]) and amphibians are more typically associated with aquatic sites, such as the Marsh and Riparian Grassland habitats, the Pecos River, canals, and scattered ponds. Toads may also occur in the sandy areas of upland habitats.

3.2.7 Fisheries

Since Brantley and Avalon Reservoirs, as well as parts of the Pecos River, support essentially the same fish species, this discussion combines all three water resources. Conditions unique to a particular water body are noted where they occur.

Fish Species

A total of 26 species of fish representing 11 families are known to occur in the reservoirs and river within the Project Area (Table 3-7). All of the species listed have been documented in both reservoirs and the river within the Project Area (M. McInnis 1998, pers. comm.) with a few exceptions. The gray redbhorse (*Moxostoma congestum*) and the blue sucker (*Cycleptus elongatus*) were extirpated above Brantley Reservoir during the 1900s and from the river section between Brantley and Bataan Dams as recent as 2004 (Zymonas and Propst 2007). The Mexican Tetra (*Astyanax mexicanus*) has been documented in low numbers in the Pecos River and Brantley Reservoir (S. Denny 2008, pers. comm.); only one fish was captured during recent surveys upstream of the Project Area in Chaves County (Davenport 2008). Smallmouth buffalo, black crappie, and threadfin shad have not been observed for several years but could still occur in Project Area reservoirs (S. Denny 2008, pers. comm.).

Fisheries Management

The primary sport fishes in Brantley and Avalon reservoirs are largemouth bass and walleye (*Sander vitreus vitreus*) (M. McInnis 1998, pers. comm.). Other important game species include channel catfish, white bass, spotted bass (*Micropterus punctulatus*), and white crappie (*Pomoxis annularis*). The primary forage fish in the reservoirs are gizzard shad (*Dorosoma cepedianum*), with other fishes from “bait-bucket” introductions making up a small part of the forage base.

Brantley and Avalon Reservoirs are open year round and provide limited angling opportunities for a variety of sport fishes. There are very few fish in Brantley Reservoir because of almost-yearly fish kills from golden algae (*Prymnesium parvum*). After the first algae kills, NMDGF stocked largemouth bass (northern and Florida strains), but stocking was suspended because of continued kills. No stocking has occurred in Avalon Reservoir for at least 10 years and fish occur in low abundance in this reservoir (S. Denny 2008, pers. comm.).

Daily bag and possession limits for Avalon Reservoir are shown in Table 3-8. Brantley Reservoir is catch-and-release only because of DDT contamination in fish. According to preliminary testing above and below the reservoir this contamination seems limited to Brantley Reservoir (S. Denny 2008, pers. comm.).

Table 3-7. Fish Species^a Reported from Brantley Reservoir (BR), Avalon Reservoir (AR), and the Pecos River (PR) within the Project Area.

COMMON NAME (SCIENTIFIC NAME)	BR	AR	PR
Family Atherinidae - silverside			
inland silverside (<i>Menidia beryllina</i>)	X	X	X
Family Catostomidae - sucker			
gray redbreast (<i>Moxostoma congestum</i>) ^b		X	
river carpsucker (<i>Carpionodes carpio</i>)	X	X	X
smallmouth buffalo (<i>Ictiobus bubalus</i>)	X	X	X
Family Centrarchidae - sunfish			
black crappie (<i>Pomoxis nigromaculatus</i>)	X	X	X
bluegill (<i>Lepomis macrochirus</i>)	X	X	X
green sunfish (<i>Lepomis cyanellus</i>)	X	X	X
largemouth bass (<i>Micropterus salmoides</i>)	X	X	X
longear sunfish (<i>Lepomis megalotis</i>)	X	X	X
spotted bass (<i>Micropterus punctulatus</i>)	X	X	X
warmouth (<i>Lepomis gulosus</i>)	X	X	X
white crappie (<i>Pomoxis annularis</i>)	X	X	X
Family Characidae - tetras			
Mexican tetra (<i>Astyanax mexicanus</i>)			X
Family Clupeidae - herring			
gizzard shad (<i>Dorosoma cepedianum</i>)	X	X	X
threadfin shad (<i>Dorosoma petenense</i>)	X	X	
Family Cyprinidae - carp and minnow			
common carp (<i>Cyprinus carpio</i>)	X	X	X
fathead minnow (<i>Pimephales promelas</i>)	X	X	X
Pecos bluntnose shiner (<i>Notropis simus pecosensis</i>)	X		X
red shiner (<i>Cyprinella lutrensis</i>)	X	X	X
Family Fundulidae - killifish			
plains killifish (<i>Fundulus zebrinus</i>)	X	X	X
Family Ictaluridae - catfish			
black bullhead (<i>Ameiurus melas</i>)	X	X	X
channel catfish (<i>Ictalurus punctatus</i>)	X	X	X
flathead catfish (<i>Pylodictis olivaris</i>)	X	X	X
Family Lepisosteidae - gars			
longnose gar (<i>Lepisosteus osseus</i>)	X	X	X
Family Percichthyidae - temperate bass			
white bass (<i>Morone chrysops</i>)	X	X	
Family Percidae - perch			
bigscale logperch (<i>Percina macrolepida</i>) ^b	X	X	X
walleye (<i>Stizostedion vitreum</i>)	X	X	
Family Poeciliidae - livebearers			
western mosquitofish (<i>Gambusia affinis</i>)	X	X	X

^a List of fishes from McInnis (1998).

^b Listed as threatened by the State of New Mexico (NMDGF 1996).

Table 3-8. Daily Bag, Possession, and Size Limits for Fishes in Avalon Reservoirs.^a

SPECIES	LIMITS		
	DAILY BAG	POSSESSION	SIZE
black bass (largemouth and spotted)	5	10	14 inches (35.5 centimeter) minimum size
black, white crappie	20	40	none
catfish (except bullheads)	15	30	none
walleye	5	10	none
white bass	25	50	none
all other warmwater game fishes	20	40	none

^a These regulations apply Statewide except for the special size limit on largemouth bass (NMDGF 2008).

McInnis (1998, pers. comm.) indicated that habitat for primary sport fishes appears to be good, at least for adult fishes. Shallow littoral areas with inundated vegetation are seasonally available, as are gravel, rip-rap, and rocky shorelines. Gravel and rocky areas are preferred by littoral species, such as sunfish (*Centrarchid* spp.) and black bass (*Micropterus salmoides floridanus*), for spawning and nursery areas. Walleye are believed to spawn over the rip-rap along the dam, but reproduction and recruitment has not been successful because of water level fluctuations during the period of spawning and egg incubation. Fish numbers in both reservoirs are very low because of annual golden algae fish kills and discontinued stocking.

Water Quality

Nutrient levels in Brantley and Avalon Reservoirs are fairly high, in part because of stormwater runoff and irrigation water returns. Plankton and benthos densities are good, including *Daphnia* spp. The NMED/SWQB classified Avalon Reservoir as eutrophic, with good phytoplankton diversity. Brantley Reservoir was classified as meso-eutrophic, also with good phytoplankton diversity (NMED/SWQB 2003).

Negative impacts to the fishery are primarily associated with water level fluctuations that can negatively affect reproduction and recruitment of species (principally sunfishes and walleye) using littoral zones for spawning and nursery areas. Reductions in water level elevations in early spring during the spawning period can desiccate eggs, prematurely end spawning, and eliminate shallow water cover used by young fishes. Fish kills caused by golden algae blooms occur almost-yearly in Brantley Reservoir.

Warmwater fisheries in both Brantley and Avalon Reservoirs are listed as Impaired because of chronic levels of mercury concentration. Additionally, the State of New Mexico has determined eating fish from Brantley Reservoir is a serious health risk because of elevated concentrations of DDT in fish tissue. In a joint advisory, the NMDGF, NMED, New Mexico State Police (NMSP), and New Mexico Department of Health (NMDH) recommend no fish of any species be eaten from Brantley Reservoir (NMED 2006).

Recent studies of Project Area water quality indicate that chronic levels of mercury concentrations in surface waters of the Pecos Basin exceed the New Mexico Chronic Standards for warmwater fisheries. Fish species most likely to be affected by high mercury concentrations are piscivorous species. Piscivorous fish families reported in Brantley and Avalon Reservoirs and the Pecos River include walleye, catfish (*Ictaluridae* spp.), gar (*Lepisosteidae* spp.), white bass (*Percichthyidae* spp.), sunfish (*Centrarchidae* spp.), bass (*Centrarchidae* spp.), crappie (*Centrarchidae* spp.), perch and bigscale logperch (*Percidae* spp.) (Eddy and Underhill 1978). The smaller omnivorous fish species, including killfish (*Fundulidae* spp.), sucker (*Catostomidae* spp.), gizzard and threadfin shad (*Clupeidae* spp.), and carp and minnow (*Cyprinidae* spp.) provide a food source for various birds. Mercury contamination effects on fishes are demonstrated loss of vision, loss of equilibrium, rolling or side-to-side swimming, and reproductive and developmental problems (Sorenson 1991).

Because of the high mercury concentrations found in fish muscle tissue, fish consumption guidelines for Brantley and Avalon Reservoirs were issued by the NMED, the NMDH, and NMDGF. Fish consumption advisories for Brantley Reservoir recommend against eating any fish caught in this reservoir (NMED 2006). It is also recommended that women who are pregnant, breastfeeding, or planning to be pregnant, and children under 18 years of age should not eat channel catfish (19 inches [48 cm] or longer) from Avalon Reservoir and no more than one meal a month of channel catfish (up to 19 inches [48 cm]). For the general public it is recommended the consumption of no more than two meals a month of channel catfish (19 inches [48 cm] or longer) captured in Avalon Reservoir (NMDE et al. 2001).

3.2.8 Threatened, Endangered, and Other Special Status Species

A list of State and Federally protected species for Eddy County was reviewed (BISON-M 2008, NMHP 2008). Of the listed protected species, 11 are identified as either threatened or endangered at the Federal level, and 32 are protected at the State level. The blue sucker (*Cycleptus elongatus*) and grey redhorse (*Maxostoma congestum*) are listed as endangered and threatened by the State of New Mexico, respectively, and were historically found within the Project Area. The Federally protected species include: gypsum wild buckwheat (*Eriogonum gypsophyllum*), least tern (*Sterna antillarum athalassos*), Mexican spotted owl (*Strix occidentalis lucida*), Pecos bluntnose shiner (*Notropis simus pecosensis*), piping plover (*Charadrius melodus circumcinctus*), and southwestern willow flycatcher (*Empidonax traillii extimus*) (Table 3-9). Of these, least tern, southwestern willow flycatcher, Pecos bluntnose shiner, and gypsum wild-buckwheat are the only species for which there is suitable habitat in the Project Area.

Wildlife

Two bird species of concern potentially occur in the Project Area (Table 3-9). The potential for species to occur in the Project Area was based on a site visit, habitat assessment, and detailed literature review. Surveys for wildlife TES were not conducted.

Table 3-9. Federal and State Listed Threatened, Endangered, and other Special-status Species that Potentially Occur at Brantley and Avalon Reservoirs.

COMMON NAME (SCIENTIFIC NAME)	USFWS STATUS ^a	NMDGF STATUS ^b
Wildlife		
interior least tern (<i>Sterna antillarum athalassos</i>)	E ^c	E
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T ^d	-- ^e
northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	E
Pecos bluntnose shiner (<i>Notropis simus pecosensis</i>)	T w/ CH ^f	E
Pecos gambusia (<i>Gambusia nobilis</i>)	E	E
piping plover (<i>Charadrius melodus circumcinctus</i>)	T	T
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	E	E
Plants		
gypsum wild buckwheat (<i>Eriogonum gypsophyllum</i>)	T w/ CH	E
Kuenzler hedgehog cactus (<i>Echinocereus fendleri</i> var. <i>Kuenzleri</i>)	E	E
Lee pincushion cactus (<i>Coryphantha sneedii</i> var. <i>leei</i>)	T	E
Sneed pincushion cactus (<i>Escobaria sneedii</i> var. <i>sneedii</i>)	E	E

^a USFWS = Listed by U.S. Fish and Wildlife Service.

^b NMDGF = Listed by New Mexico Department of Game and Fish.

^c E = Endangered.

^d T = Threatened.

^e -- = No Agency Classification.

^f T w/ CH = Threatened with Critical Habitat.

Least Tern

Least terns measure 8.3–9.4 inches (21–24 cm) long with a 20-inch (51-cm) wingspread. Sexes are alike, characterized by a black-capped crown, white forehead, grayish back and dorsal wing surfaces, snowy white undersurfaces, legs of various orange and yellow colors depending on sex, and a black-tipped bill whose color varies depending on sex. Immature birds have darker plumage than adults, a dark bill, and dark eye stripe on their white foreheads.

During the breeding season, the least tern's range is usually restricted to a reach of river near sandbars where nests are located. Ranges can vary considerably in size, especially for re-nesting birds who usually find sites away from the original nesting site. Terns are considered piscivorous and usually feed in shallow waters of rivers, streams, and lakes.

Nesting areas usually consist of sparsely vegetated sand and gravel bars in wide unobstructed river channels, or salt flats along lake shorelines. Nesting sites are usually located at higher elevations away from the water's edge because nesting starts when river flows are high and small amounts of sand are exposed (USFWS 1990).

The breeding population of interior least terns (*Sterna antillarum*) in New Mexico declined from about 60 birds in the early 1960s to three poorly producing nesting pairs annually from 1987 to 1990. Least terns were first recorded in New Mexico nesting at Bitter Lake National Wildlife Refuge in 1949 (USFWS 1990, 2006), and least terns have continuously nested on or adjacent to refuge

lands annually since then. Population counts over the period have been variable, ranging as high as 60 birds in 1961, but typically number 20 to 30 individuals during a breeding season.

For several years during the 1980s, the breeding colony was on a vegetation free area of the Roswell Test Facility adjacent to the refuge. The colony then shifted back to barren alkali flats on the refuge following the growth of vegetation at the off-refuge site. A 1997 survey of potential nesting habitat on BLM lands by the New Mexico Natural Heritage Program located two nests at the Grace Well flats just north of the refuge.

On June 9, 2004, five pairs of interior least terns were first observed in a backwater area of Brantley Reservoir on the Pecos River in Eddy County. It is unknown whether interior least terns had used areas around Brantley Reservoir for nesting in years prior to 2004. In 2004 a total of at least 14 adults were observed, with an estimated seven nests on the lakeshore. Six juvenile least terns were observed near the nesting area in late August. The nesting area used by least terns in 2004 spanned approximately 28 acres (USFWS 2006).

In 2006 least terns were first detected within the Project Area when a single adult was detected in mid-May. The number of least terns observed within the Project Area increased to 20 adults by late May. During summer 2006, two least tern nests were found on the west shore of Brantley Reservoir with three eggs in each nest. The nests found in 2006 were thought to have failed because of rapidly fluctuating lake levels (Doster 2006).

During 2007 the least tern population seemed to peak at five adults in late May and courtship behavior was observed. No nests were found during 2007 Project Area surveys (Doster 2007).

During the 2008 breeding season, a total of six least tern eggs were found in five nests along the western shoreline of Brantley Reservoir, northeast of Champion Cove. All nests were located well within the reservoir pool at an approximate elevation of 3,241 feet (988 meters). All eggs and nests were inundated once irrigation releases from upstream sources were initiated. In total, 30 adult least terns were documented within the Project Area during the 2008 breeding season (Doster 2009).

In 2006 approximately 84 acres (34 hectares) of least tern nesting and brood-rearing habitat was created along the western shoreline of Brantley Reservoir. These created habitat areas were not used by least terns during the 2008 breeding season. At the time when most least terns arrive at the Project Area, water levels in Brantley Reservoir were very low, leaving the created habitat sites more than 0.25 mile (0.40 kilometer) from the water's edge. As a result, the created habitat areas were much less attractive to terns that prefer to nest close to the water's edge (Doster 2009).

Southwestern Willow Flycatcher

The willow flycatcher is a widely distributed summer resident of much of the United States and southern Canada (Brown 1988). Currently, four subspecies of willow flycatcher are recognized in North America and distinguished by subtle differences in color, morphology, and breeding range

(Phillips 1948, Aldrich 1953, Unitt 1987, Browning 1993). One subspecies breeds east of the Rocky Mountains, *E. t. traillii*. Three breed west of the Rocky Mountains, *E. t. brewateri*, *E. t. adastus*, and *E. t. extimus* (Unitt 1987). Browning (1993) recognizes a fifth subspecies (*E. t. campestris*) that is said to occur in the central portion of the United States.

Historically, the southwestern willow flycatcher was widespread across the southwestern United States, breeding in riparian habitats ranging from sea level to approximately 7,000 feet in Arizona, southern California, New Mexico, southern Nevada, southern Utah, southwestern Colorado, west Texas, and extreme northwest Mexico (Phillips 1948, USFWS 1995, McKernan and Braden 2001). This species has been documented at a total of 109 sites on 43 drainages throughout the southwestern United States. The majority of the population occurs in Arizona, California, and New Mexico, accounting for 92 percent of all breeding territories (Marshall 2000).

In New Mexico southwestern willow flycatcher breeding territories have been documented on the upper, middle, and lower Rio Grande; the Rio Chama; the Zuni River; and the middle and lower Gila River (Marshall 2000). Although no southwestern willow flycatchers have been documented within the Project Area, suitable habitat is present along the Pecos River between Brantley and Avalon Reservoirs (R.H. Doster 2008, pers. comm.).

Plants

A list of State and Federally protected vegetation species for Eddy County was obtained from Natural Heritage New Mexico (NMNHP 2008). Of the seven species listed for Eddy County, four are Federally protected and another three are State protected. Of the species presented in Table 3-9, only the gypsum wild-buckwheat is known to occur within the Project Area (Reclamation 2003).

Gypsum Wild-buckwheat

Only three populations of the gypsum wild-buckwheat are known to exist in the world, all in Eddy County, New Mexico. One of these populations is found on both Reclamation and BLM lands in the lower Seven Rivers Hills area, immediately west of US-285 on the west side of the Project Area. On Reclamation lands the species occurs within the Mixed Desert Scrub habitat on the Seven Rivers Hills escarpment where approximately 50 individuals have been observed. An adjacent 540-acre (219-hectare) parcel of BLM land is designated as a Special Management Area (SMA) to protect the species and its habitat (Reclamation 2003). Critical habitat was designated for the species on the adjacent SMA lands in 1981. Typically, the plant is found on gypsum soils, most frequently on materials that have eroded from nearby gypsum outcrops. On the Seven Rivers Hills SMA, the terrain is mostly a complex of bare, steep slopes and deep, eroded arroyos (BLM 1986).

Fishes

The Pecos bluntnose shiner is the only Federally listed fish species that potentially occurs within the Project Area. Its distribution, abundance, and life history are provided below.

Pecos Bluntnose Shiner

Distribution and Abundance

The Pecos bluntnose shiner (*Notropis simus pecosensis*) is a cyprinid species endemic to the Pecos River in New Mexico and Texas. The abundance and distribution of the bluntnose shiner has declined since the mid 1900s largely because of habitat alterations to the Rio Grande and Pecos Rivers resulting from water diversions and the construction of impoundments (Hatch et al. 1985; USFWS 1987). Although there was some confusion regarding taxonomic status of the species, Chernoff et al. (1982) determined that two subspecies existed. The Rio Grande subspecies, now considered extinct, occurred from El Paso, Texas, north to the Chama River in New Mexico. The Pecos form historically occurred from the town of Santa Rosa to an area north of Carlsbad (USFWS 1987, Bestgen and Platania 1990).

Declines in the abundance of the Pecos bluntnose shiner were reported by Brooks et al. (1991). Their review of historic collections and comparisons with fish surveys conducted in the Pecos River from 1986 to 1990 also provided evidence of the reduction in the range of this species. Pecos bluntnose were captured sporadically from Sumner Dam downstream to the Brantley Reservoir inflow. As noted, the species historically occurred throughout the Pecos River in both New Mexico and Texas, but their range is now restricted to a 225-mile (362-km) section of the river between these two reservoirs (Hatch et al. 1985, Brooks et al. 1991). Hatch et al. (1985) warn that their distribution in this river section is tenuous because of periodic dewatering of many habitats for irrigation demands. A narrower range was reported by Brooks et al. 1995, indicating that collections during 1990 occurred only from approximately 4.8 miles (8 km) south of Fort Sumner downstream to an area near the Rio Felix confluence. There is also evidence that adult or breeding Pecos bluntnose shiner tend to be more common upstream of the Highway 70 bridge near Roswell. Downstream of the Rio Hondo confluence near Roswell, samples have included mostly eggs, larvae, and young bluntnose shiner (Brooks et al. 1991). Recent fish community monitoring surveys between the confluence of Willow Creek and the Bitter Lake National Wildlife Refuge indicate that Pecos bluntnose shiner catch rates have increased since 2005 because of more favorable hydrologic conditions. Results of these surveys indicate higher catch rates of Pecos Bluntnose shiner in the upper reaches of the section sampled than at lower reaches. Catch rates in lower reaches, including the Brantley Reservoir inflow, increased seasonally because of upstream reproduction (Davenport 2008).

Several factors have contributed to the imperiled status of the Pecos bluntnose shiner, but the most significant appears to be seasonal dewatering of substantial reaches of its historic habitat (Propst 1999, Davenport 2008). Other factors that have contributed to the decline of the Pecos bluntnose shiner locally include contaminants, non-native predators, and channel modification (NMDGF 2006). Non-native fish species include the plains minnow (*Hybognathus placitus*) and the Arkansas River shiner (*Notropis girardi*) (Sublette et al. 1990), which now comprise a large portion of the shiner guild and may result in increased inter-specific competition with Pecos bluntnose shiner.

The Pecos bluntnose shiner was listed by the NMDGF as a State threatened species in 1976. In 1987 the USFWS listed this species as Federally threatened and designated critical habitat (USFWS 1987). Critical habitat for the species was designated in two sections of the Pecos River. The first section extends from approximately 10 miles (16 km) downstream of Ft. Sumner and approximately 64 miles (103 km) further downstream. The second section starts near Hagerman and extends 37 miles (60 km) to the Highway 82 bridge, near Artesia. The designated critical area for this species does not extend into the Project Area. Brantley Dam is located approximately 15 miles (24 km) below the critical area boundary and does not affect the designated critical habitat (USFWS 1987). However, this species reportedly occurs seasonally in the headwaters of Brantley Reservoir because of the displacement of young fish from upstream habitats during flood events (USFWS 1992).

Within the designated critical habitat sections of the Pecos River, the channel is typically wide, sandy, and unstable. The shifting bed structure is a common attribute of suitable habitat for the Pecos bluntnose shiner, where the channel spreads out and becomes braided. This stretch of river is hydrologically characterized as a losing reach, where surface water is lost to seepage and evaporation. Under some conditions water losses in this portion of the river can be as high as 50 percent before the water reaches Acme. Downstream from Acme, the river is a gaining reach and is characterized by a narrowing and deepening channel, which decreases its value as shiner habitat.

Life History and Ecology

The Pecos bluntnose shiner is a relatively large shiner. Adults reach up to 3.5 inches (9 cm) (USFWS 1987). Hatch et al. (1985) reported sizes of three age classes with the age-2 fish ranging from 2.3 to 2.8 inches (59–72 millimeters [mm]) in total length. In the wild, bluntnose shiners may survive 3 years, but most in a population are age-1 or less (USFWS 1992).

The Pecos bluntnose shiner is a pelagic broadcast spawner. Spawning begins in early summer and ends in October (Sublette et al. 1990). Elevated flow (e.g., from spring runoff, storm events) is an environmental cue to initiate spawning (Platania 1995). Females release their nonadhesive, semi-buoyant eggs in the water column and males immediately fertilize them (Platania 1998). Life-history studies of this species have suggested that fertilized eggs hatch relatively quickly, within 24 to 48 hours, and their dispersal is more closely related to increased flow than to absolute water volume (Platania 1995). In the protolarvae stage, bluntnose shiners drift with the current and in 4 to 8 days move into protected, low-velocity habitats. Larvae and juveniles tend to be most common in slow-velocity shoreline habitats and small embayments and backwaters (Propst 1999). Platania (1995) suggested that this life-history strategy allows larvae to gain refuge from high flows at a very early stage. Backwaters, characterized by warm and relatively nutrient-rich waters, allow larvae to reach their maximum growth rate.

The Pecos bluntnose shiner is a drift feeder (Hoagstrom 2002), positioning itself in relatively calm water next to currents within the water column. Adult bluntnose shiners are mainly insectivorous, while young likely feed on zooplankton and small aquatic insects (Propst 1999). Hatch et al. (1985) found that the species occupies most major habitats within the river, but is most common in the main

channel, in low-velocity water, 6.5–16.1 inches (17–41 cm) deep, over a sandy substrate. More specifically, habitat use and availability studies conducted by Kehmeier et al. (2004) have indicated that Pecos bluntnose shiners commonly select low to moderate velocity plunge habitats and avoid higher-velocity runs and flats. Their study also indicated that plunge habitats selected by this species did not change significantly as a result of variations in discharge, while runs and flats increased significantly with discharge.

Permanent river flows are considered critical for the conservation of the Pecos bluntnose shiner (USFWS 1992). Valdez et al. (2003) and Kehmeier et al. (2004) reported that habitats more often used by Pecos bluntnose shiners were available in similar quantities despite substantial variations in discharge (i.e., 3–80 cfs) during their studies. These authors suggested that flexible management of the Pecos River based on water availability may be more appropriate than managing to provide minimum flows for the conservation of the Pecos bluntnose shiner. It has been hypothesized that predation pressure on Pecos bluntnose shiner and other prey species would increase in isolated pools during extended zero-flow periods (Larson and Propst 2000). Further, Hatch et al. (1985) have suggested that stream desiccation could be considered the main reason for the decline of the species in the Pecos River.

3.2.9 Cultural Resources

The Project Area and its area of impact include a variety of cultural resources. Cultural resources are those that tie the regional land use heritage to a concept of “time depth.” Known Project Area cultural resources include archaeological sites (prehistoric and historic) and the Carlsbad Irrigation District (CID) National Historic Landmark. Reclamation will continue to conduct Section 106 review and compliance on oil and gas projects pursuant to a Programmatic Agreement with the BLM. The BLM is the lead agency for cultural resources compliance on projects that (1) involve permission to drill on BLM or Reclamation lands, including access roads and pipelines submitted as a package with a well; and (2) involve multiple surface land status, in which BLM is one of the parties (Reclamation 2002). Reclamation will periodically undertake archaeological field projects on its historic properties as part of its Section 110 stewardship responsibility. Reclamation will also continue to monitor the condition of its historic properties and fulfill its obligations under the Archaeological Resources Protection Act of 1979 (J. Hanson 2007, pers. comm.).

Archaeological Sites

An archaeological site is a location with physical evidence of past human use, occupation and/or activity. Features, structures, and accumulated artifacts left after the use of a site comprise this physical evidence. Patterns in the evidence are interpreted to provide an understanding of a site’s use. Most of the Project Area archaeological sites can be tied to Native American groups and reflect prehistoric use. Some, however, contain elements illustrating the transition to historic lifeways. Fewer can be associated strictly with European American occupation of the region. This regional history progression provides a model dividing archaeological sites into distinct sets.

A total of 252 archaeological sites have been documented within the Project Area. This total combines the 202 sites documented during previous projects with those identified as a result of a 1999 inventory of a 1,500-acre (607-hectare) parcel of the current Project Area (Weymouth et al. 2000). Of all of the known sites within the Project Area, 80 percent are prehistoric, 12 percent are historic, and 8 percent possess both historic and prehistoric components. Reclamation is in the process of nominating to the National Register Historic Places (NRHP) 23 archaeological sites in the McMillan-Avalon segment of the Pecos River (J. Hanson 2007, pers. comm.).

The Carlsbad Irrigation District (CID)

In 1882 retired Lincoln County Sheriff Pat Garret returned to his ranch in Roswell, New Mexico. He devised a plan to dam the Pecos River and sell water to the farmers who would be attracted by the reclaimed lands. He gained financial backing from partnerships with prominent cattleman Charles B. Eddy, cigar manufacturer Robert Weems Tansill, and railman James J. Hagerman. This group founded the Pecos Irrigation and Investment Company. In the late 1800s, Avalon Dam was constructed. By 1890 it held back the Pecos River, and the first portion of an irrigation network was installed. By 1893 the Pecos Irrigation Company added McMillan Dam, located upstream, to its system. Problems with the dams and canals proved costly. Although the founders of the small irrigation company spent \$2,000,000 on upkeep of the system, it was never made efficient (Hufstetler and Johnson 1993).

Violent floods swept the Pecos River in October 1904. Among the hardest hit was the Pecos Irrigation Company. The Carlsbad Reclamation Project, as it had come to be known, was so terribly underfunded that repairs to the damaged canals and waterworks proved impossible. The company went bankrupt and local farms went without water (Hufstetler and Johnson 1993).

On November 28, 1905, the Secretary of the Interior acquired, through the U.S. Reclamation Service (Reclamation Service), the Carlsbad Reclamation Project for \$150,000. The Reclamation Service started reassembling the entire Carlsbad irrigation network. By 1907 most of the damaged irrigation system was repaired. The agency then implemented new technological advances in dam and gate design. By the next decade the Reclamation Service had built an impressive irrigation network. With better funding than their predecessors, the Reclamation Service was able to promote the irrigation district. This attracted many farmers seeking affordable land and Federally subsidized irrigation service (Hufstetler and Johnson 1993).

In 1964 CID facilities constructed between 1888 and 1949 as part of the Carlsbad Irrigation project or Improvement Company were listed as a National Historic Landmark (NHL). The CID was designated a NHL for its significance to “the historic evolution of western American reclamation activity and policy” (Hufstetler and Johnson 1991). The CID’s resources are representative of technological experimentation and evolution in irrigation structures during the late 19th and early 20th centuries (Hufstetler and Johnson 1991).

The NHL boundaries were defined in a revision to the NRHP in 1991. This district encompasses 5,464 acres (2,211 hectares) and at the time of the nomination revision, the area included McMillan Dam and Reservoir, Avalon Dam and Reservoir, and 28 canals, structures, and support buildings (Hufstetler and Johnson 1991).

In 1993 the National Park Service (NPS) incorporated the CID's NRHP nomination and numerous Historic American Building Survey/Historic American Engineering Record studies into a published history of the district (Hufstetler and Johnson 1993). Later that year the NPS assessed the McMillan gatekeeper's house, garage/boathouse, and gatehouse, and the outlet works for stabilization and potential restoration (Kline n.d.).

In 2000 ownership of the distribution system and other elements of the NHL were transferred to CID from Reclamation under terms outlined in a MOU, which ensures continued cultural resource protection. All historic properties included in the CID NHL will continue to be subject to Federal statute under the National Historic Preservation Act and the New Mexico State Cultural Properties Act, as appropriate (J. Hanson 2007, pers. comm.). All historic properties within the Brantley-Avalon area that are eligible for the NRHP but not part of the NHL also may require Section 106 review and compliance to determine the effects of any undertaking on the properties. State law also may apply (J. Hanson 2007, pers. comm.).

Traditional Cultural Properties (TCPs)

A traditional cultural property (TCP) is "one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of that community" (Parker and King 1992). An initial TCP study for the Project Area was initiated in 1998, and correspondence with concerned Native American groups continued through 1999. Consultation was conducted with the Mescalero Apache, the Comanche, and the Kiowa because they are the most prominent in the Project Area's ethnographic history. Active correspondence with these groups was maintained throughout the initial TCP study. Each group recognizes the Project Area as having been occupied and utilized by their people. Ongoing correspondence allowed sufficient opportunity for the members of these groups to discuss their concerns about the RMP.

The initial TCP study summarized the ethnographic histories of each of the selected groups (Polk and Wenzel 2000). Each group's history, language, cultural practices, social organization, and subsistence strategies were taken into account. The Project Area's role in these aspects of culture was then analyzed. No TCPs have been identified, to date, within the Project Area by any of the tribes consulted.

Indian Sacred Sites

In 1996 President William J. Clinton signed Executive Order 13007: Indian Sacred Sites. Section 1 of the executive order requires that all executive agencies manage the lands under their jurisdiction in a manner that facilitates access and ceremonial use of Indian Sacred Sites by Indian religious

practitioners. This facilitation includes the avoidance of such sites in order to protect their physical integrity, feeling, and association.

To date, Reclamation has received no tribal claims regarding the sacred nature of any location within the Project Area. Correspondence with the Mescalero Apache, Comanche, and Kiowa was conducted in conjunction with the initial TCP study. Although all of the groups contacted made statements to the effect that they recognize the importance of the Pecos River to their general cultural heritage, no concern was voiced about the sanctity of any particular property at that time.

3.2.10 Indian Trust Assets (ITAs)

Indian Trust Assets are “legal interests” in assets held in trust by the U.S. Government for individual Indians or tribes. Lands, minerals, water rights, hunting and fishing rights, claims, titles or money are some of the assets held in ITAs. As assets held in trust, ITAs cannot be sold, leased, or alienated without the express approval of the U.S. Government. Secretarial Order 3175 and Reclamation policy require that Reclamation evaluate and assess impacts of a proposed project on ITAs. This requires inventorying all ITAs within the Project Area. Should any ITA be impacted, mitigation of impact must be undertaken.

The Comanche, Kiowa, Mescalero Apache, and the Bureau of Indian Affairs were contacted concerning possible ITAs in the Project Area. To date, none have been identified.

3.2.11 Paleontological Resources

Paleontology is the study of plant and animal fossil remains. It takes into account the stratigraphic orientation and geologic contexts of fossiliferous rocks in order to provide some understanding of paleoenvironments. The purpose of this section is to identify paleontological localities and fossil-bearing geologic strata and to provide an understanding of the potential impacts upon the Project Area’s paleontological resources. Permian sedimentary rock formations mantled by Quaternary deposits comprise the bedrock geology of the Project Area. Most of the Permian deposits are remnants of the Permian Basin, which formed during the late Paleozoic (230 to 280 mya). Climatic changes caused the sea levels to fluctuate. Some portions evaporated completely, leaving large deposits of dolomite, potash, and gypsum.

Brantley and Avalon Reservoirs lie on top of the Artesia Group, between the San Andreas Formation (west) and Triassic Formation (east). The Artesia Group consists of five formations. These five are, in ascending order, Graysburg, Queen, Yates, Seven Rivers, and Tansill. The Graysburg and Queen Formations consist of sandstone, dolomite, and gypsum. Limestone, gypsum, and dolomite predominate the Seven Rivers Formation. The Yates Formation includes both sandstone and limestone with deposits of dolomite and gypsum. Dolomite and gypsum dominate the Tansill

Formation. This geology, based on information found in Kelley (1971), Lucas and Anderson (1994), and Hill (1996) is summarized below.

No fossil localities are known to exist within a 3-mile (5-km) radius of the Project Area (Lucas 1999). However, Project Area's geology is conducive to the preservation of fossil remains. Permian formations would most likely represent primitive marine life. Gastropods and pelecypods may also be represented. Echinoderms, corals, and trilobites may occur with diminished frequency. The paleontology of the Project Area is based largely on Donegan and DeFord (1950), Walter (1953), Hayes (1964), Croft (1978), Miller (1982), Wardlaw and Grant (1992), Harris (1993), Noe and Mazullo (1994) and Lucas and Morgan (1996).

Although no sensitive paleontological localities have been documented in the Project Area vicinity, some exposures of specific geologic strata may contain sensitive fossil elements. There is a high potential for paleontological resources to be in the Project Area. This potential is greatest wherever stable and well-stratified rock outcrops are exposed within the Project Area.

3.2.12 Social and Economic Values

This section describes the social and economic conditions in the RMPA area of influence. Information on the local economy, such as tourism, oil, gas, and grazing is included. The most recent demographic information on Eddy and Chaves Counties, and the communities affected by management of resources within the Project Area are described.

The area of influence, for social and economic analysis purposes, is described as Chaves and Eddy Counties, New Mexico. The principal communities under consideration are the Cities of Carlsbad (including North Carlsbad, a census designation given to the developed area just north of the incorporated city), Artesia, and Roswell.

Demographics

Population

Table 3-10 summarizes population characteristics comparing Chaves and Eddy Counties to the state as a whole. Table 3-11 summarizes demographic characteristics for communities in the Project Area that are potentially affected by resource management: Artesia, Carlsbad, North Carlsbad, and Roswell.

Eddy County

The U.S. Census 2000 population of Eddy County was 51,658 and there were 14,060 families or an average family size of 3.12 persons. Approximately 39 percent of the population was Hispanic and 70 percent lived in an urban setting. The largest urban area is the county seat, Carlsbad; 49.6 percent of the county population resided in Carlsbad in 2000.

Table 3-10. The 2000 Population Characteristics for Counties Influenced by Resource Management within the Project Area.

CATEGORY	NEW MEXICO		EDDY COUNTY			CHAVES COUNTY		
	Total	Percent of Total	Total	Percent of Total	Percent of State	Total	Percent of Total	Percent of State
U.S. Census 2000^a								
Persons	1,819,046	100.0	51,658	100.0	2.8	61,382	100.0	3.4
Families	466,515	100.0	14,060	100.0	3.0	16,077	100.0	3.4
Average family size	3.18	– ^b	3.12	–	–	3.17	–	–
Hispanic or Latino Ethnicity, Persons	765,386	42.1	20,023	38.8		26,904	43.8	
Urban:	1,238,037	68.0	36,211	70.1	2.9	45,194	73.6	3.7
Inside Urbanized Area	674,017	54.4	–	0.0	0.0	–	0.0	0.0
Outside Urbanized Area	564,020	45.6	36,211	100.0	6.4	45,194	100.0	8.0
Rural:	581,009	32.0	15,447	29.9	2.6	16,188	26.4	2.8
Farm	14,102	2.4	714	4.6	5.1	681	4.2	4.8
Nonfarm	566,907	97.6	14,733	95.4	2.6	15,507	95.8	2.7
2006–2008 3-Year Estimates^c								
Persons	1,962,226	100.0	50,986	100.0	2.6	62,339	100.0	3.2
Families	482,189	100.0	13,518	100.0	2.8	16,341	100.0	3.4
Hispanic or Latino Ethnicity, Persons	873,171	44.5	21,443	42.1	2.5	30,298	48.6	3.5
Population Growth Projections^d								
Persons, 2015	2,357,234	100.0	56,331	100.0	2.4	65,025	100.0	2.8
Persons, 2025	2,707,757	100.0	59,731	100.0	2.1	68,720	100.0	2.5

^a Source: USCB 2010.^b No data available.^c 2006–2008 American Community Survey 3-Year Estimates (USCB 2010).^d New Mexico State Data Center (NMEDD 2010).

Based on the 2006–2008 American Community Survey, Eddy County had an estimated population of 50,986, approximately 2.6 percent of New Mexico's estimated total population of 1.96 million over the same period. This estimate represented a small decline in the county population from the Census 2000 population of 51,658. Population growth estimates by the State of New Mexico show that Eddy County is projected to grow at a slower rate than the state as a whole, but is expected to exceed 59,700 by 2025. The county Hispanic population proportion estimate for 2006–2008, 42.1 percent, was slightly higher than the 2000 county estimate (39 percent) and was slightly lower than the statewide estimate, 44.5 percent, in 2006–2008.

Table 3-11. The 2000 Population Demographics for Communities Influenced by Resource Management within the Project Area.

PERSONS	ARTESIA CITY Eddy County			CARLSBAD CITY Eddy County			CARLSBAD NORTH Eddy County			ROSWELL CITY Chaves County		
	Total	Percent of Total	Percent of County	Total	Percent of Total	Percent of County	Total	Percent of Total	Percent of County	Total	Percent of Total	Percent of County
Persons, 2000 ^a	10,692	100.0	20.7	25,025	100.0	49.6	1,245	100.0	2.4	45,293	100.0	73.8
Persons, 2007 ^b	10,485	100.0	20.6	25,033	100.0	49.0	– ^d	–	–	45,569	100.0	72.8
Total Families, 2000 ^a	2,895	100.0	20.6	6,951	100.0	49.4	377	100.0	2.7	11,747	100.0	73.1
Persons of Hispanic Origin, 2000 ^a	4,809	45.0	9.3	9,417	36.7	18.2	181	14.5	0.4	20,084	44.3	32.7
Persons of Hispanic Origin, 2006–2008 ^c	–	–	–	10,296	40.7	20.2	–	–	–	23,223	50.1	37.3

^a 2000 U.S. Census (Source: USCB 2010).

^b 2008 New Mexico Statistical Abstract & Resources (NMEDD 2010).

^c 2006-2008 American Community Survey 3-Year Estimates (USCB 2010).

^d No data available.

Chaves County

Chaves County is slightly more populous than Eddy County, with a Census 2000 population of 61,382 and a 2006-2008 estimated population of 62,339. The average family size in 2000 (3.17) was similar to that of Eddy County (3.12) and the state as a whole (3.18). Chaves County is expected to grow to 68,720 persons by 2025. As with Eddy County, most of Chaves County’s population was urban or urbanized (73.6 percent in the 2000 Census), residing primarily in the county seat of Roswell with 45,293 persons in 2000 and 45,569 in 2007. Nearly half (48.6 percent) of the County Population 2006–2008 was Hispanic.

Communities

Carlsbad and Roswell are the respective county seats of Eddy County and Chaves County. Each is a medium-sized city; the 2007 estimated population of Carlsbad was 25,033 persons and Roswell’s estimate was 45,569 persons. The Hispanic populations of Carlsbad and Roswell were similar in proportion to their respective counties. Artesia and Carlsbad North are smaller towns located in Eddy County. Artesia’s 2007 estimated population was 10,485. Carlsbad North’s population was 1,245 in the 2000 Census. A more recent estimate for Carlsbad North was not available.



Income

Household and personal income characteristics are summarized in Tables 3-12 and 3-13. Median household income and per capita income in Chaves County is lower than statewide figures, both in the Census 2000 and 2006–2008 American Community Survey estimates. Eddy County also had values below the statewide figures in Census 2000, but was higher than the state estimates in 2006–2008. Consistent with these trends, the proportion of persons with income below the poverty level is higher in Chaves County (21 percent in 2000 and 20 percent in 2006–2008), compared to the state (about 18 percent in both census estimates). The Eddy County proportion was slightly lower in 2000 (17.2 percent), and even lower in 2006–2008 (14.4 percent).

Table 3-12. The 2000–2004 Income Characteristics for Counties Influenced by Resource Management within the Project Area.

CATEGORY	NEW MEXICO		EDDY COUNTY		CHAVES COUNTY	
	Number	Percent	Number	Percent	Number	Percent
Census 2000^a						
Median Household Income	\$34,133	– ^b	\$31,998	–	\$28,513	–
Per Capita Income	\$17,261	–	\$15,823	–	\$14,990	–
Income below Poverty Level, Persons	328,933	18.1	8,885	17.2	12,936	21.1
Income below Poverty Level within Race/Ethnic Group^c						
White alone	167,002	14.0	5,675	14.6	7,463	17.3
Black or African American alone	7,204	23.0	280	29.9	410	35.6
American Indian and Alaska Native alone	61,092	36.2	112	28.3	268	46.0
Asian alone	2,421	13.5	20	9.2	23	6.3
Native Hawaiian and Other Pacific Islander alone	144	11.9	–	–	3	6.0
Some other race alone	77,047	25.2	2,433	26.6	4,013	31.5
Two or more races	14,023	20.3	249	17.7	598	29.2
Hispanic or Latino Ethnicity, any Race	178,288	23.7	5,188	26.1	8,550	32.3
2006–2008 3-Year Estimates^d						
Median Household Income	\$43,202	–	\$45,858	–	\$37,536	–
Per Capita Income	\$22,781	–	\$25,151	–	\$19,021	–
Income below Poverty Level, Persons	–	17.9	–	14.4	–	20.0

^a 2000 U.S. Census (USCB 2010).

^b Not applicable or no data.

^c Percentages within race/ethnic group, persons for whom poverty status is known.

^d 2006-2008 American Community Survey 3-Year Estimates (USCB 2010).



Table 3-13. The 2000 Poverty Characteristics for Communities Influenced by Resource Management within the Project Area.

CATEGORY	ARTESIA CITY Eddy County		CARLSBAD CITY Eddy County		CARLSBAD NORTH Eddy County		ROSWELL CITY Eddy County	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Census 2000^a								
Median household income	\$29,529	– ^b	\$30,658	–	\$52,361	–	\$27,252	–
Per Capita Income	\$13,085	–	\$16,496	–	\$27,192	–	\$14,589	–
Income below Poverty Level, Persons	2,177	20.4	4,175	16.7	44	3.5	10,003	22.1
Income below Poverty Level within Race/Ethnic Group^c								
White alone	1,259	16.4	2,925	15.0	44	4.0	5,757	18.6
Black or African American alone	48	25.4	173	26.4	–	–	388	35.2
American Indian and Alaska Native alone	36	28.1	53	31.7	–	–	252	48.6
Asian alone	13	32.5	7	4.5	–	–	19	5.6
Native Hawaiian and Other Pacific Islander alone	–	–	–	–	–	–	–	–
Some other race alone	667	28.0	966	23.4	–	–	3,100	32.1
Two or more races	154	42.3	51	7.4	–	–	487	28.6
Hispanic or Latino Ethnicity	1,521	29.9	2,051	22.1	12	6.0	6,650	33.1
2006–2008 3-Year Estimates^d								
Median household income	–	–	\$43,138	–	–	–	\$35,869	–
Per Capita Income	–	–	\$22,963	–	–	–	\$19,065	–
Income below Poverty Level, Persons	–	–	–	11.2	–	–	–	21.0

^a 2000 U.S. Census (USCB 2010).

^b Not applicable or no data.

^c Percentages within race/ethnic group, among persons for whom poverty status was known.

^d 2006-2008 American Community Survey 3-Year Estimates (USCB 2010).

The communities differed quite a bit in household and personal income characteristics. Carlsbad North had the highest estimates for median household income and per capita income in the Census 2000 figures. The other three communities had estimates slightly below the statewide figures. Similarly the proportion of persons with income below the poverty level was much lower in Carlsbad North (3.5 percent) than the other communities or the statewide figure (18 percent). In the



2006–2008 American Community Survey, estimates are only available for the county seats, Carlsbad and Roswell. Income characteristics for Carlsbad were similar to the statewide figures for that period, while estimates for Roswell were somewhat lower.

Employment

The civilian labor force in Eddy County in August 2010 was 29,041 individuals, of which 1,730 were unemployed (6 percent). The labor force in Chaves County was 28,511, of which 2,326 were unemployed (8.2 percent). Statewide, the unemployment rate was 8.4 percent (NMDOL 2010). Employment characteristics by sector from the U.S. Census are summarized in Tables 3-14 and 3-15. The general patterns for the Project Area counties and communities are similar to the state as a whole except that there are proportionately more individuals employed in the private, for-profit sector and slightly fewer in the government sector proportionately. Carlsbad North was the exception, where proportionately there were more government workers (32.7 percent of the local civilian employed population); however, this figure is from the 2000 Census. A more recent estimate for Carlsbad North was not available.

In terms of employment by industry (Table 3-16), Eddy County is different from Chaves County and the state as a whole in having a larger proportion of the labor force in mining. Health Care and Social Assistance are the largest employment sectors in Chaves County and in the State as a whole. Average weekly wages (Table 3-17) are relatively higher in Eddy County as well. Eddy County ranked second to Los Alamos County out of 33 New Mexico Counties for average weekly wage in the first quarter of 2010. Chaves County was ranked 15th.

Housing

The Project Area counties appear to provide affordable living. In the 2006–2008 American Community Survey (USCB 2010), the median home prices in Eddy County (\$85,600) and Chaves County (\$81,400) were equal to 55 percent and 52 percent of the Statewide median of \$154,900, respectively. Rent in the Project Area is also somewhat lower, from 11 percent to 16 percent lower than the State median of \$661.

Local Economy

The local economy is historically linked to the extraction of mineral resources, principally potash and petroleum. Tourism also plays a role in the local economy. Over the years, ranching and agriculture, long important industries, have also generated much of the local economic activity. However, it is important to note that only about 5 percent of the total local population resides in rural areas.

Table 3-14. The 2000 Employment Characteristics for Counties Influenced by Resource Management within the Project Area.

WORKERS	NEW MEXICO		EDDY COUNTY			CHAVES COUNTY		
	Persons	Percent of Total	Persons	Percent of Total	Percent of State	Persons	Percent of Total	Percent of State
Census 2000^a								
Employed Persons 16 Years and Over	763,116	42.0	20,591	39.9	2.7	23,028	37.5	3.0
Private for Profit Wage and Salary Workers	518,466	67.9	15,310	74.4	3.0	16,713	72.6	3.2
Local Government Workers	84,120	11.2	2,028	9.8	2.4	1,788	7.8	2.1
State Government Workers	59,040	7.7	778	3.8	1.3	813	3.5	1.4
Federal Government Workers	30,029	3.9	667	3.2	2.2	1,546	6.7	5.1
Self-employed Workers	68,108	8.9	1,702	8.3	2.5	2,010	8.7	3.0
Unpaid Family Workers	3,353	0.4	106	0.5	3.2	158	0.7	4.7
2006–2008 3-Year Estimates^b								
Civilian Employed Population 16 Years and Over	763,116	–	23,265	–	3.0	26,756	–	3.5
Private for Profit Wage and Salary Workers	522,466	68.5	17,168	73.8	3.3	19,875	74.3	3.8
Government Workers	173,189	22.7	4,236	18.2	2.4	4,142	15.5	2.4
Self-employed Workers	64,108	8.4	1,813	7.8	2.8	2,655	9.9	4.1
Unpaid Family Workers	3,353	0.4	48	0.2	1.4	84	0.3	2.5

^a 2000 U.S. Census (USCB 2010).

^b 2006–2008 American Community Survey 3-Year Estimates (USCB 2010).



Table 3-15. The 2000 Employment Characteristic for Communities Influenced by Resource Management within the Project Area.

WORKERS	ARTESIA CITY (EDDY COUNTY)			CARLSBAD CITY (EDDY COUNTY)			CARLSBAD NORTH (EDDY COUNTY)			ROSWELL CITY (CHAVES COUNTY)		
	Persons	Percent of Total	Percent of County	Persons	Percent of Total	Percent of County	Persons	Percent of Total	Percent of County	Persons	Percent of Total	Percent of County
Census 2000^a												
Civilian Employed Population 16 Years and Over	4,411	53.9	21.4	10,065	40.9	51.2	569	57.5	2.8	16,582	48.6	72.0
Private for Profit Wage and Salary Workers	3,285	74.5	15.6	7,688	76.4	37.3	341	59.9	1.7	12,107	73.0	52.6
Government Workers	732	16.6	3.6	1,674	16.6	8.1	186	32.7	0.9	3,079	18.8	13.4
Self-employed Workers	354	8.0	1.7	675	6.7	3.3	42	7.4	0.2	1,316	7.9	5.7
Unpaid Family Workers	40	0.9	0.2	28	0.3	0.1	0	0	0	80	0.3	0.3
2006–2008 3-Year Estimates^b												
Civilian Employed Population 16 Years and Over	— ^c	—	—	11,446	45.3	—	—	—	—	20,277	43.8	—
Private for Profit Wage and Salary Workers	—	—	—	8,460	73.9	—	—	—	—	15,263	75.3	—
Government Workers	—	—	—	2,245	19.6	—	—	—	—	3,079	15.2	—
Self-employed Workers	—	—	—	693	6.1	—	—	—	—	1,869	9.2	—
Unpaid Family Workers	—	—	—	48	0.4	—	—	—	—	66	0.3	—

^a 2000 U.S. Census (USCB 2010).

^b 2006–2008 American Community Survey 3-Year Estimates (USCB 2010).

^c No data available.

Table 3-16. Employment by Industry for First Quarter 2010 in the State of New Mexico and in Eddy and Chaves Counties.

INDUSTRY	NEW MEXICO			EDDY COUNTY			CHAVES COUNTY		
	Employers	Employees	Percent Employees	Employers	Employees	Percent Employees	Employers	Employees	Percent Employees
Agriculture, Forestry, Fishing and Hunting	747	9,331	1.2	40	362	1.6	79	1,223	5.7
Mining	913	17,390	2.2	114	3,815	16.4	53	389	1.8
Utilities	402	6,186	0.8	24	281	1.2	11	141	0.7
Construction	6,071	46,062	6.0	157	1,691	7.3	162	1,149	5.4
Manufacturing (31–33)	1,616	28,456	3.7	33	834	3.6	48	944	4.4
Transportation and Warehousing (48 and 49)	1,733	20,968	2.7	63	792	3.4	74	907	4.2
Wholesale Trade	3,004	21,526	2.8	70	527	2.3	67	688	3.2
Retail Trade (44 and 45)	6,452	89,718	11.6	164	2,218	9.5	213	2,801	13.1
Information	1,004	15,655	2.0	24	278	1.2	21	251	1.2
Finance and Insurance	2,746	21,754	2.8	73	653	2.8	96	595	2.8
Real Estate and Rental and Leasing	2,382	10,002	1.3	50	424	1.8	77	180	0.8
Professional, Scientific and Technical Service	6,387	54,856	7.1	90	979	4.2	126	580	2.7
Management of Companies and Enterprises	274	4,937	0.6	– ^c	–	–	11	49	0.2
Admin., Support, Waste Mgmt, Remediation	2,913	42,317	5.5	66	1,481	6.4	59	451	2.1
Education Services	1,111	84,113	10.9	39	2,018	8.7	40	2,412	11.2
Health Care and Social Assistance	5,893	121,494	15.7	134	2,744	11.8	247	4,048	18.9
Arts, Entertainment, and Recreation	879	16,200	2.1	–	–	–	20	267	1.2
Accommodation and Food Services	3,854	78,314	10.1	110	1,830	7.9	115	2,807	13.1
Other Services (except Public Admin.)	4,050	20,922	2.7	117	723	3.1	136	544	2.5
Public Administration	1,720	63,079	8.2	67	1,298	5.6	66	1,027	4.8
Unclassified establishments	22	13	0.0	0	0	0.0	1		0.0
All Industries	54,173	773,293	100.0	1,455	23,257	100.0	1,722	21,454	100.0

Source: New Mexico Department of Labor (NMDL 2010)

^a Data not available.

Table 3-17. Comparison of State Employment and Wage Levels to Eddy and Chaves Counties, First Quarter 2010.

EMPLOYMENT AND WAGES	NEW MEXICO	EDDY COUNTY	CHAVES COUNTY
Total Average Employment	773,293	23,257	21,454
Average Hourly Wage ^a	\$17.90	\$22.03	\$14.25
Average Weekly Wage	\$716	\$881	\$570
Average Annual Wage ^a	\$37,232	\$45,812	\$29,640

^a Assumes a 40-hour week worked the year round.

Tourism

The Carlsbad Caverns and Guadalupe Mountains National Parks are major tourist attractions for the area. The Carlsbad Caverns were named a World Heritage Site in 1995, one of only 21 in the United States. Other tourism draws are Brantley and Avalon Reservoirs (specifically Brantley Lake State Park) and the Living Desert State Park. Cavern City Air Terminal is operated by the City of Carlsbad. One commercial airline offers daily service to Albuquerque. The El Paso International Airport is located approximately 140 miles (225 km) from Carlsbad by motor vehicle.

Oil and Gas Industry

The petroleum industry in New Mexico directly provided 13,000 jobs in 2003 (BMMR 2003, IPPA 2005). This amounted to 1.4 percent of the total non-agricultural jobs in the State (730,100) (BBER 2003). While the percentage is low for the state overall, gas industry jobs are geographically significant to the economies in the northwestern and southeastern portions of the state, where they are located. The San Juan Basin in northern New Mexico has 85 percent of the conventional natural gas in the state; the Permian Basin in southeastern New Mexico has 90 percent of the oil-linked natural gas.

Four in-state refineries, three located in the northwestern portion of the state and one in the southeast, refine about 40 percent of the state’s crude oil production; the rest is transported to out-of-state refineries (NM 2003).

Oil and natural gas production contributes \$1.3 billion annually through taxes and royalties on oil, natural gas, and carbon dioxide production (NMOGA 2007). The structure of the State General Fund is oriented toward oil and gas revenue, making up between 12 and 20 percent of the General Fund’s revenues. In 2008 oil and gas revenues generated 20.39 percent of the General Fund at a total of \$1.236 billion (Starbuck 2009). These monies finance New Mexico’s schools, roads, and other public projects and services. In addition to these direct benefits, there are royalties that are deposited into the State’s Land Grant Permanent Fund (LGPF) and the Severance Tax Bond Fund (STBF). Interest earnings from these funds are distributed to fund schools and hospitals, and to retire government debt (NMLFC 2008). In 2008 distribution from the LGPF totaled \$390.5 million; distributions from the STBF totaled \$177.2 million (Starbuck 2009).



Much of the state’s oil and gas production comes from small producers (NM 2003). In general, the independent producers are those most severely harmed by oil industry difficulties. Independent petroleum producers range from “mom-and-pop” companies to large independents like Yates Petroleum Corporation, which employs 375 persons in Artesia and is the largest New Mexico-based oil and gas corporation (Artesia Chamber 2007). Most fields in New Mexico have a combination of oil and gas, which allows small producers to diversify. As one Farmington, New Mexico, oil producer noted in 1998, despite the fact that his income had been cut in half within 6 or 7 months, the company was able to stay economically viable because of natural gas production (AP 1998).

The oil and gas industry is an important part of Eddy County’s economy and plays a smaller, but still substantial, role for Chaves County. In 2006 Eddy County had 10,880 wells, producing 230,231,429 cubic feet (Mcf) of gas, and 17,619,424 barrels (bbl) of oil. Chaves County had 2,287 wells, producing 22,545,597 Mcf of gas, and 467,507 bbl of oil. Eddy County ranks third in oil and gas production in the State; Chaves County ranks fifth in gas production, and sixth in oil production (EMNRD 2007). An oil refinery is located in Artesia, north of the Project Area.

The oil and gas industry contributes substantial numbers of jobs to the economy of both counties (Table 3-18). In Eddy County oil and gas extraction alone provided 1,046 jobs during 2005, up from 1,032 jobs during 2004. Data indicate an additional 59 jobs in 2006, for a total of 1,105 jobs. In Chaves County oil and gas extraction provided 273 jobs in 2005, up from 247 jobs during in 2004 (USBLS 2007). These jobs are significantly higher paying than many other jobs in the area. Employee earnings from oil and gas extraction in 2005 were more than \$86 million, up from \$75 million during 2004.

Table 3-18. Jobs and Wages from Oil and Gas Extraction, Eddy and Chaves Counties.

COUNTY	OIL AND GAS EXTRACTION JOBS	PERCENT OF ALL JOBS	OIL AND GAS EXTRACTION TOTAL WAGES	PERCENT OF TOTAL WAGES FOR ALL JOBS	OIL AND GAS EXTRACTION AVERAGE WEEKLY WAGES	OIL AND GAS EXTRACTION PERCENT OF AVERAGE WEEKLY WAGES FOR ALL JOBS
Eddy	1,046	6.2	\$76,586,000	13.4	\$1,409	215
Chaves	273	1.6	\$10,261,000	6.6	\$722	152

Source: USBLS (2007).

Most of the industry jobs in the area are oil and gas extraction jobs, but refining also provides jobs. The Navajo Refining Company in Artesia is the largest refinery in the State of New Mexico, with 470 employees (Artesia Chamber 2007). The refinery has a crude oil capacity of 83,000 bbl, and it distributes refined products in the southwestern United States including: El Paso, Texas; Albuquerque, New Mexico; Phoenix and Tucson, Arizona; and northern New Mexico (Holly Corporation 2007). The refinery does not rely solely on New Mexico producers; it purchases its



crude oil from producers both in southeastern New Mexico and in west Texas, and it recently purchased a crude oil gathering system in west Texas that will allow it to purchase crude oil in new areas of west Texas (Holly Corporation 2007).

The Project Area contains less than 2 percent of the more than 21,000 oil and gas wells in Eddy County. About half of those are in operation. In 2009 the Project Area contained a total of 330 wells permitted to more than 50 companies. Of these wells 32 percent (107) are dry, junked, suspended, service, or location only. About 8 percent (25) are permanently abandoned and an additional 3 percent (10) are temporarily abandoned. About 57 percent of the wells (188) are currently in operation: 141 of these wells are gas wells and 47 are oil wells.

Grazing Industry

General Economic Impact of Grazing in New Mexico

As of 1991 there were roughly 3,529 ranching operations on Federal lands in New Mexico, with a total of 2.1 million authorized animal unit months (AUMs) (Fowler et al. 1997). The Project Area represents 896 permitted AUMs, or less than 0.1 percent of the total AUMs authorized Statewide. According to an analysis of western states grazing prepared by the Range Improvement Task Force at New Mexico State University (NMSU), Statewide operations resulted in \$99.4 million in direct expenditures within the state, or roughly \$46.85 per AUM (Fowler et al. 1997). Expenditures include medical, dental, restaurant, movie, video, vehicle repair, gas, food, veterinary, and clothing expenses. It is reasonable to argue that a large percentage of these expenditures would result in direct economic impacts to the state (as opposed to a redistribution of existing economic activity) because much of the livestock production (65 percent) is for export from the state. Using the simple approach of applying the estimated proportion of export activity to total direct expenditures would result in a direct economic impact to the state of roughly \$30.45 per AUM.

An economic impacts analysis prepared by the NMSU Range Improvement Task Force (NMSU 1999) indicates that the total livestock industry in New Mexico produces direct, indirect, and induced economic activity equal to more than \$620 million. The amount attributable to a single AUM is \$81.74 (NMSU 1999). Note that this figure has not been adjusted to reflect the amount of the industry involved in export activity—a common measure for isolating the economic impact of funds flowing into the regional economy versus a redistribution of local economic activity. According to a recent study, roughly 65 percent of livestock production is sold out of state, or “exported” from New Mexico. Applying this ratio to the overall estimated economic activity suggests that the State impact is in the range of \$53 per AUM (NMSU 1999). Economic impacts in the Project Area, assuming \$53 per AUM, should approximate \$47,488 annually.

Other measures of economic contribution and productivity include a review of net and gross receipts. In 1991, a strong year for the western livestock industry, the average New Mexico operator generated \$167 in net receipts per animal unit (AU). One AU is roughly equal to 11 AUMs in southern New Mexico where grazing occurs nearly year round. The total value of production per

AUM, which is essentially gross sales per AUM, was equal to \$44.57 in 1991 and \$31.33 in 1996 (NMSU 1995).

Overview of Grazing Fees

Grazing fees are charged using a formula established in the Public Rangelands Improvement Act of 1978 (PRIA) extended by Executive Order #12548 (enacted by President Ronald Reagan on February 14, 1986). The PRIA provides a base value of \$1.23 per AUM “adjusted by indices of livestock market price and rancher operating cost” (Cody 1996). The 1986 Executive order created a minimum fee of \$1.35 per AUM. Grazing fees established under PRIA for the years 1986 through 2009 are shown in Table 3-19. Reclamation charges \$3.34 per AUM as its grazing fee in the Project Area.

Table 3-19. Grazing Fees from 1986 to 2009 under the Public Rangelands Improvement Act of 1978 (PRIA) Formula.

YEAR	AMOUNT PER ANIMAL UNIT MONTH	YEAR	AMOUNT PER ANIMAL UNIT MONTH
1986	\$1.35	1998	\$1.35
1987	\$1.35	1999	\$1.35
1988	\$1.54	2000	\$1.35
1989	\$1.86	2001	\$1.35
1990	\$1.81	2002	\$1.35
1991	\$1.97	2003	\$1.35
1992	\$1.92	2004	\$1.43
1993	\$1.86	2005	\$1.79
1994	\$1.98	2006	\$1.56
1995	\$1.61	2007	\$1.35
1996	\$1.35	2008	\$1.35
1997	\$1.35	2009	\$1.35

Sources: BLM (2009), Vincent (2007).

Role of Project Area Lands in Grazing Allotment Operations

The estimated percentage of each grazing allotment within the Project Area boundaries can provide an indication of the total land area being grazed—on both Project Area and adjacent BLM lands—within the six allotments. Of the estimated 26,445 acres (10,702 hectares) grazed on allotments containing both BLM and Project Area lands, the Project Area lands 11,523 acres (5,528 hectares) represent about 44 percent of the total. The Project Area lands represent an estimated 36 percent of the total AUMs permitted with the allotments.

Four of the six Project Area grazing allotments include portions of BLM, State, or private lands, along with the Project Area lands. The AUMs are also allocated among the various jurisdictions. Both AUM and acreage figures are provided in Table 3-20 to evaluate the reliance of specific grazing permit holders on the Project Area lands for their ranching operations.



Table 3-20. Grazing Permittee Reliance on Project Area Lands.

ALLOTMENT AND TRACT CONDITION	PERMITTED GRAZING AREA ON PROJECT AREA LAND (ACRES)	AUMS ^a ALLOWED BY EXISTING RECLAMATION PERMITS	TOTAL ACRES IN ALLOTMENT	TOTAL AUMS IN ALLOTMENT	PERCENT OF TOTAL AUMS IN ALLOTMENT ON PROJECT AREA LANDS	LEVEL OF RELIANCE ON PROJECT AREA LANDS
Ballard (Tract 16) (fair)	1,180	90	5,380	522	17	Low
Hyden (Tract 19) (fair)	1,368	120	1,600	120	100	High
Carter (Tract 17) (low-fair)	912	68	2,090	156	44	Moderate
Greenwood (Tract 15) (fair)	3,960	305	4,738	401	76	High
McNew (Tract 18) (fair)	1,508	120	1,678	132	91	High
Evans (Tract 14) (fair)	2,595	193	10,359	1,106	17	Low
TOTALS	11,523	896	26,445	2,485	N/A^b	N/A

^a AUM = animal unit month.

^b N/A = Not applicable.

The six permittees have different levels of reliance on Project Area land for grazing. Four have a high level of reliance (more than 50 percent of their allotments are on Project Area land). Two have a low level of reliance (less than 20 percent of their allotments are on Project Area land) and one has a moderate level of reliance (between 20 percent and 50 percent of their allotment are on Project Area land). Note that the reliance on Project Area lands discussed in this section only relates to the proportion of land area or the permitted AUMs falling within the Project Area boundaries; it is not a reflection of the forage value of the Project Area versus other lands or any other factor.

3.2.13 Environmental Justice

Environmental Justice refers to the protection of human rights, particularly those of minority and lower-income populations. It further means that, to the greatest extent practicable and permitted by law, minority and low-income groups have the opportunity to participate prior to and during decision-making processes regarding government programs and activities affecting human health and the environment. It means that these groups are not to be affected in a disproportionately high and adverse manner by such programs. Environmental Justice means that such populations are allowed to share in the benefits of and are not excluded from the due processes associated with government activities involving human health and the environment. Environmental Justice is included in this document in compliance with Executive Order 12898, signed in 1994.

The 2006–2008 American Community Survey provides the most recent race characteristics for Eddy and Chaves Counties (Table 3-21). Approximately 42 percent of the Eddy County population and nearly 49 percent of the Chaves County population is of Hispanic or Latino origin. This percentage is consistent with the state as a whole, of which 44.5 percent of the population is Hispanic or Latino. New Mexico has the highest proportion of Hispanic population for any state in the United States.

Table 3-21. Population Composition by Race for New Mexico, Eddy County, and Chaves County.

HISPANIC OR LATINO AND RACE	NEW MEXICO		EDDY COUNTY		CHAVES COUNTY	
	Number	Percent	Number	Percent	Number	Percent
Hispanic or Latino (of any race)	873,171	44.5	21,443	42.1	30,298	48.6
Mexican	483,759	24.7	– ^a	–	23,880	38.3
Puerto Rican	7,595	0.4	–	–	179	0.3
Cuban	3,582	0.2	–	–	85	0.1
Other Hispanic or Latino	378,235	19.3	–	–	6,154	9.9
Not Hispanic or Latino	1,089,055	55.5	29,543	57.9	32,041	51.4
White	822,308	41.9	27,367	53.7	29,231	46.9
Black or African American	39,541	2.0	822	1.6	430	0.7
American Indian and Alaska Native	171,340	8.7	164	0.3	175	0.3
Asian	25,124	1.3	204	0.4	415	0.7
Native Hawaiian or Pacific Islander	625	0.0	0	0.0	0	0.0
Some other race	5,284	0.3	111	0.2	32	0.1
Two or more races	24,833	1.3	875	1.7	1,758	2.8
Total population	1,962,226	100.0	50,986	100.0	62,339	100.0

Source: 2006-2008 American Community Survey 3-Year Estimates (USCB 2010)

^a Data not available.

Also from the 2006–2008 American Community Survey (and summarized in Table 3-12), about 14 percent of Eddy County’s residents were living in poverty; Chaves County was noticeably higher at 20 percent. Statewide, about 18 percent of New Mexicans lived in poverty. The Statewide estimate remained consistent from the 2000 Census, as did the estimate for Chaves County. However, the 2006–2008 estimate for Eddy County (14.4 percent) was somewhat lower than the 2000 Census figure (17.2 percent), but close to the error margin of the American Community Survey estimate (+/- 2.5 percent).



3.2.14 Recreation Resources

When Brantley Reservoir was constructed it was identified as a much-needed, water-based recreation resource in a part of New Mexico where such recreation opportunities were lacking (State Parks 1981). Since completion of the dam in 1988 and the opening of Brantley Lake State Park in 1989, it has become a popular recreation area for residents of southwestern New Mexico and western Texas. In addition to Brantley Reservoir, other recreation resources in the area provide a variety of opportunities, including Carlsbad Caverns National Park and World Heritage Site, Living Desert State Park, Sitting Bull Falls, the unidentified flying object attractions in and around Roswell, and public lands under BLM jurisdiction. Lake Carlsbad, located within the City of Carlsbad, is a popular swimming and boating area that is readily accessed by local residents. The combination of these many attractions makes the area appealing to locals and visitors from other states and foreign countries seeking recreational activities.

Brantley Reservoir Recreation Opportunities and Facilities

The Brantley Lake State Park Management and Development Plan provides direction for the enhancement of recreational opportunities, the protection of park resources and the natural environment, and the facilitation of public input (State Parks 2003). This document set forth objectives, policies, improvements and changes proposed for implementation between 2002 and 2007. The park provides year-round recreation opportunities, including fishing, boating, and swimming. Camping, picnicking, and hiking are also enjoyed in conjunction with water-based activities. Fees are collected for use at all facilities.

Developed Recreation Opportunities

New Mexico State Parks (State Parks) manages the developed recreation areas, including the Visitor Center, Administration Area, Limestone Campground, East Side Day Use Area, and the Seven Rivers Day Use Area.

Visitor Center/Administration Area

The Visitor Center is located at the main entrance to the State Park. It is attractively landscaped with native materials and provides ample parking for short-term visits. Its facilities are accessible and offer opportunities for orientation, disseminating visitor and area information, and collecting user fees. Phones, restrooms, and a dump station are provided. This area includes a maintenance shop, boathouse, and three double-wide mobile homes for park staff. A 2.2-mile (2.5-km), interpretive loop trail connects the Visitor Center to the day use area, through Limestone Campground. Another 0.24-mile (0.38-km) loop trail connects the campground to the lake.

Limestone Campground

Located approximately 0.25 mile (0.40 km) from Brantley Reservoir, Limestone Campground is the park's only developed campground. It includes 52 overnight sites with defined parking areas, tables, grills, water, and electricity. Three sites have sewer hook-ups. Some of the sites (37) have shade structures with wind breaks, and 20 sites have tent pads. Two sites are being upgraded to meet

current requirements for Americans with Disabilities Act. The campground includes a group shelter area with picnic tables and barbeque grills, a bath house/comfort station (showers), a playground, and a trailhead for three nature/interpretive trails. Facilities are modern and attractive.

East Side Day Use Area

This area includes parking for picnicking and boat launching. Parking lot capacity is about 50 stalls for vehicles and vehicle/trailer combinations, and an additional 15 stalls for the picnic area (A. Fiala 1998, pers. comm.). There are 12 picnic sites with tables, grills, and shade/wind shelters, and a group shelter (State Parks 2003; S. Phipps 2007, pers. comm.). A parking lot, playground with shade structure, and volleyball court are located near the group shelter. Restroom facilities and accessible picnic facilities are provided. An interpretive nature trail connects the East Side Day Use Area with Limestone Campground and the Visitor Center. The boat ramp is concrete and accommodates launching two rigs simultaneously. A courtesy dock is adjacent to the ramp.

Seven Rivers Day Use Area

Located off US-285, this area provides boating and fishing access to the lake. It includes two vault toilets, four picnic shelters, a concrete boat ramp, a courtesy dock, and a fishing dock. The parking lot accommodates approximately 50 vehicles and vehicle/trailer combinations. A primitive road provides access to a primitive area for fishing and camping. No water or electricity is available on this side of the park (S. Phipps 2007, pers. comm.).

Primitive Recreation Opportunities (Managed)

Rocky Bay and South Bay Primitive Areas

Rocky Bay and South Bay primitive camping areas are managed by State Parks. Rocky Bay Primitive Area is on the east side, and South Bay Primitive Area is on the west. At capacity, State Park personnel estimate that there are approximately 100 campsites between these two areas (60 percent at South Bay and 40 percent at Rocky Bay). Fees are collected at the entrance for either day use (\$5.00) or overnight camping (\$8.00) (S. Phipps 2007, pers. comm.). Facilities are limited to a comfort station in the Day Use area for Rocky Bay and a vault toilet at South Bay. Both areas have been cleared of vegetation (usually saltcedar) to provide places for pitching tents or pulling recreational vehicles (RVs) near the shoreline.

Champion Cove Primitive Area

Champion Cove is an undeveloped recreation site located between the Brantley Wildlife Management Area and Brantley Lake State Park on the west side of the reservoir. It is a popular area that has been used heavily for more than 15 years. Through a 2003 Memorandum of Agreement (MOA) between the United States and Eddy County, the County leases the land from the United States and is responsible for recreation development and maintenance. The County provides sanitary services including vault toilets and dumpsters. The New Mexico State Police provide supplemental law enforcement in Champion Cove under a contract with the County.

Boating Activity

There have been no accurate boat counts for Brantley Reservoir. Based on available parking spaces and camping sites, State Parks personnel estimate that the reservoir can accommodate approximately 250 to 300 boats. Brantley Reservoir currently has a surface of 3,775 acres (1,528 hectares) at conservation pool (42,000 acre-feet), and approximately 260 surface acres (105 surface hectares) at minimum pool (2,000 acre-feet). As siltation occurs, it is anticipated that surface acres will increase in order to accommodate the required conservation pool. According to State Parks personnel, this fluctuation, as much as 1.0 foot (0.3 m) overnight, dramatically affects visitation and requires the relocation of facilities (docks) to accommodate water level changes.

Fishing Activity

Brantley and Avalon Reservoirs are open year round and provide limited angling opportunities for a variety of sport fishes. Brantley is a catch-and-release fishery because of fish contamination issues. As noted previously, NMDGF stocking in Brantley Reservoir was suspended because of continued golden-algae kills and no stocking has occurred in Avalon Reservoir for at least 10 years (S. Denny 2008, pers. comm.). Fishing for channel catfish in the Pecos River below the dam is a popular activity for recreational anglers.

Trails

In addition to three nature/interpretive trails that connect facilities at the State Park and provide recreation opportunities, there has been interest in developing a mountain bike trail at the State Park. Mountain bike groups have contacted the State Park and expressed interest in the trail; however, a trail location or design has not been finalized to date.

Caving Activity

An estimated 300–500 cave visitors explore or conduct research in Coffee Cave, Homogenized White Cave, and Clarks Caverns each year.

Recreational Vehicle (RV) Usage

Recreational vehicle usage is increasing at Brantley Lake State Park, resulting in an increased demand for more RV-developed sites. Approximately 50 percent of RV visitors are day users and the other 50 percent are overnight campers (A. Fiala 1998, pers. comm.).

Visitation and Visitor Characteristics

State Parks personnel report that most park visitation occurs between mid-March and Labor Day, with a major influx of visits from west Texas college students during Spring Break. Easter weekend is the busiest, and there is heavy visitation during Memorial Day and Labor Day weekends. On peak days, facilities are used at maximum capacity.

Table 3-22 shows visitation numbers based on vehicle counts, adjusted by a factor that equates to the number of persons per vehicle (approximately 2.2 in winter, 2.6 in spring and fall, and 2.9 in summer). Visitation numbers were provided by Brantley Lake State Park (A. Fiala 1998, pers.

Table 3-22. Changes in Visitation at Brantley Lake State Park, 1993 to 2009.

YEAR	NUMBER OF VISITORS	CHANGE IN VISITORS	CHANGE PER YEAR (APPROXIMATE)
1993	101,482	N/A ^a	N/A
1994	99,688	-1,794	-2%
1995	99,797	+109	+01%
1996	118,127	+19,330	+19%
1997	136,527	+18,400	+16%
1998	119,293	-17,234	-13%
1999	151,187	+31,894	+27%
2000	131,448	-19,739	-13%
2001	123,298	-8,150	-6%
2002	97,028	-26,270	-21%
2003	69,459	-27,569	-28%
2004	74,468	-5,009	-7%
2005	73,738	-730	-1%
2006	69,083	-4,655	-6%
2007	87,308	18,225	+26%
2008	73,248	-14,060	-16%
2009	79,800	6,552	+9%

Source: A. Stiteler, pers. comm. (2003, 2007, 2010)

^a N/A = Not applicable.

comm.; A. Stiteler 2010, pers. comm.). The highest annual visitation between the 17-year period 1993 to 2009 occurred in 1999, with just over 151 thousand visitors. Visitation has dropped off since 2001, varying between a high of 97 thousand in 2002 to about 69 thousand in 2006. Visitation in 2009 was just under 80 thousand.

During spring and summer months, most of the visitors are local or from west Texas. During winter months, visitors come from northern states to enjoy the warm winter climate and visit other nearby attractions. During the spring and summer months, visitors are primarily families; in winter there are more couples and senior citizens.

Recreation Conflicts and Concerns

State Parks personnel said that most of the water skiing occurs in the open areas of Brantley Reservoir and fishing takes place in the inlets. Still, there are conflicts between anglers and boaters. Personnel also mention conflicts occurring more frequently because of increased personal watercraft use. Fluctuations in water level elevations are a frustration to park managers and appear to have an effect on visitation. According to State Parks personnel, when water levels are up (thus fewer areas suitable for access), visitation is down.

Avalon Reservoir Recreation Opportunities and Facilities

Avalon Reservoir is between Brantley Reservoir to the north and the City of Carlsbad to the south. Managed by the CID, its primary function is to divert water for irrigation into a canal system. Aside from a very primitive unpaved parking area and boat launch area, there are no developed recreation facilities at Avalon Reservoir.

According to Brantley Lake State Parks personnel, water-based recreation activity at Avalon Reservoir is minimal, presumably because the reservoir water level fluctuates so much and so frequently, and because the water is shallow. This is confirmed by the Avalon dam tender who observed some personal watercraft, canoes, and flat-bottomed fishing boats. No ski boats or swimmers were observed. The dam tender indicates that in past years, Avalon Reservoir was a popular windsurfing area; however, in recent years, these recreation users have gone elsewhere.

The primary recreation activity on land surrounding the lake is hunting (e.g. deer, duck, quail, and dove) (A. Fiala 1998, pers. comm.). Informal dispersed camping is occasionally observed near the Number 3 Spillway across the dam from the Dam Tenders Quarters. It is described as an open, shallow area that is ideal for families with children (P. Adkins 1998, pers. comm.). According to the Avalon Reservoir dam tender, the reservoir is primarily used by “old timers” who fish at Avalon Reservoir because the boat ramps are more accessible than those at Brantley Reservoir.

Brantley Wildlife Management Area Recreation Opportunities

The Brantley Wildlife Management Area is managed by the NMDGF, which allows day use only. The majority of the uses are fishing, hunting, hiking, photography, and wildlife viewing.

Pecos River Recreation Opportunities and Facilities

The stretch of the river between Brantley and Avalon Reservoirs is reportedly heavily used by anglers. However, there does not appear to be any specific information regarding recreation/angler use in the area.

3.2.15 Rangeland and Grazing

Project Area grazing is limited primarily to lands surrounding the Pecos River downstream of Brantley Reservoir. Reclamation currently manages Project Area grazing permits and allotments in this area. Some of these allotments are grazed in conjunction with BLM allotments on adjacent BLM and State-owned lands. Permittees are billed for the number of AUMs the Federal land can support. On lands adjacent to the Project Area, the BLM established studies monitoring range trend and providing valuable information for assessing proper stocking rates.

Reclamation land is only a portion of the total allotment area for most Project Area permit holders. Reclamation land in the Project Area consists primarily of upland range sites, with small draws occurring occasionally. The only true riparian areas in the grazed portion of the Project Area are on

lands surrounding Avalon Reservoir. Riparian areas around Avalon Reservoir have been invaded by saltcedar, which provides some shade for livestock but has no grazing value.

Project Area grazing management consists primarily of continuous, year-round stocking of cows and calves. Along stream channels and other water bodies within the Project Area, no physical separations (e.g., fences) exist, and if alternative livestock water sources are not readily available, cattle will congregate on the banks of Avalon Reservoir, in draws, or along the Pecos River. The Pecos River dissects the Project Area and is the primary source of water in most allotments.

Project Area floodplain lands are subjected to continuous, moderate-to-heavy grazing, as well as disturbance from recreational users. Excessive recreational use makes grazing these areas difficult, if not impossible, and increases the rate of succession of undesirable plants. These impacts concern Reclamation because many of these areas provide important habitat for other resources (e.g., fish and wildlife). The Main Canal, which diverts water from Avalon Dam, has a fence along its border, which keeps livestock from disturbing the canal.

Available soil moisture is the single most limiting factor for plant growth in southern New Mexico (Holechek et al. 1989, Herbel and Gibbens 1996). Plant production can be directly correlated to precipitation levels. The Project Area has the potential to support abundant amounts of forage at current grazing levels, even in years of less-than-average precipitation. However, increasing recreational use and increasing oil and gas site development have placed pressure on many of the Project Area grazing allotments. Portions of Project Area allotments display evidence of overgrazing and degradation from recreation users. Of all the grazing area in the BLM Carlsbad Field Office area, approximately 5 percent is in excellent condition, 50 percent is in good condition, 44 percent is in fair condition, and 1 percent is in poor condition (BLM 2007).

Project Area Grazing Allotments

Six grazing allotments within the Project Area, primarily surrounding Avalon Reservoir and the Pecos River below Brantley Dam, are leased to grazing associations or to individuals. These allotments total approximately 12,762 acres (5,165 hectares) of Reclamation lands within the Project Area. Of that total, 90 percent, or 11,523 acres (4,663 hectares), is permitted for grazing and 10 percent, or 1,239 acres (501 hectares), is not currently permitted. These allotments are summarized in Table 3-23 and are further described below.

Lonnie Evans Allotment (Tract Number 14)

The Lonnie Evans Allotment encompasses 2,595 acres (1,051 hectares) of permitted Reclamation land and 355 acres (144 hectares) that are not currently permitted for grazing. The permit for this allotment allows year-round use of 193 AUMs, for a stocking rate of 0.074 AUMs per acre per year for the Reclamation portion of this allotment. The overall condition of this allotment is good.

Table 3-23. Allotment Size and Animal Unit Month (AUM) Values.

AREA	ALLOTMENT					
	14	15	16	17	18	19
Total Area	2,950 acres (1,194 hectares)	4,078 acres (1,650 hectares)	1,614 acres (653 hectares)	2,090 acres (846 hectares)	1,741 acres (705 hectares)	1,600 acres (648 hectares)
Area Permitted for Grazing	2,595 acres (1,051 hectares)	3,960 acres (1,602 hectares)	1,180 acres (477 hectares)	912 acres (369 hectares)	1,508 acres (610 hectares)	1,368 acres (553 hectares)
Area Not Permitted For Grazing	355 acres (144 hectares)	0 acres (0 hectares)	434 acres (176 hectares)	227 acres (92 hectares)	223 acres (90 hectares)	0 acres (0 hectares)
Permitted Animal Unit Months	193	305	90	68	120	120
Permitted Animal Unit Months/Acre	0.074	0.075	0.076	0.075	0.079	0.075

Greenwood Allotment (Tract Number 15)

The Greenwood Allotment encompasses 4,078 acres (1,651 hectares) of permitted land, though only 3,960 acres (1,603 hectares) involve Reclamation lands. The remainder is now on CID lands. Recreational use of the Reclamation portion of this allotment is high. The permit for this allotment allows the annual removal of 305 AUMs, giving a stocking rate of 0.075 AUMs per acre per year for the Reclamation portion of this allotment. Overall condition of this allotment is fair.

Ballard Allotment (Tract Number 16)

The Ballard Allotment encompasses 1,180 acres (477 hectares) of permitted Reclamation land and 434 acres (176 hectares) of land that are not currently permitted for grazing. Recreational use of the Reclamation portion of this allotment is high. The permit for this allotment allows year-round use of 90 AUMs, giving a permitted stocking rate of 0.076 AUMs per acre per year for the Reclamation portion of this allotment. The overall condition of this allotment is fair.

Carter Allotment (Tract Number 17)

The Carter Allotment encompasses 912 acres (369 hectares) of permitted Reclamation land and 227 acres (92 hectares) of land that are not permitted for grazing. Recreational use of the Reclamation portion of this allotment is high. The permit for this allotment allows year-round use of 68 AUMs, giving a stocking rate of 0.075 AUMs per acre per year for the Reclamation portion of this allotment. Overall condition of this allotment is low to fair.

McNew Allotment (Tract Number 18)

The McNew Allotment encompasses 1,508 acres (610 hectares) of permitted Reclamation land and an additional 223 acres (90 hectares) of land that are not currently permitted for grazing. Reclamation land consists of 64 percent of the allotment holdings. The permittee currently grazes 14 cow/calf pairs on this allotment. The remainder is contiguous to the Reclamation portion and is not fenced between deeded and State-owned lands. The permit for this allotment allows year-round use

of 120 AUMs, giving a stocking rate of 0.079 AUMs per acre per year for the Reclamation portion of this allotment. The overall condition of this allotment is fair.

Ron Hyden Trust Allotment (Tract Number 19)

The Ron Hyden Allotment encompasses 1,600 acres (648 hectares) of permitted land, though only 1,368 acres (553 hectares) involve Reclamation lands. The remainder is now on CID lands. The Reclamation portion of this allotment comprises 24 percent of grazing lands within this operation. The permit for this allotment allows year-round use of 120 AUMs, giving a stocking rate of 0.075 AUMs per acre per year for the Reclamation portion of this allotment. Overall condition of this allotment is fair.

3.2.16 Alternative Energy, Fluid Minerals, and Other Extractive Resources

Mineral resources are divided into three categories: locatable, leasable, and saleable. Locatable minerals include gold, silver, lead, zinc, and other “high value” metallic ores subject to the Mining Law of 1872, as amended by 30 U.S.C. Ch. 2. Leasable minerals are oil and gas, oil shale, coal, potash, phosphate, sodium, gilsonite, and geothermal resources. These are subject to lease under: the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181, et seq.); the Mineral Leasing Act for Acquired Lands as amended (30 U.S.C. 351-359); the Federal Coal Leasing Amendments Act, 1997 (30 U.S.C. 184, et seq.); and the Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025).

Saleable minerals are of the common variety and include sand, stone, gravel, pumice, cinders, clay, and other minerals extracted in bulk. These minerals are subject to sale and disposal at the discretion of Reclamation under: the Act of July 31, 1947, as amended (30 U.S.C. 601 et seq.); the Act of July 23, 1955 (30 U.S.C. 601); the Act of September 28, 1962 (30 U.S.C. 611); and Section 10 of the Reclamation Projects Act of 1939 (43 U.S.C. 387). Mineral leasing on Reclamation lands is administered by the BLM under provisions of Title 43, Subpart 3100 of the CFR. Leasable minerals (i.e., oil and gas) are under discretionary authority, meaning they are open to development through application and permitting by the BLM with concurrence by Reclamation. Except for those minerals and conditions meeting the provisions of Section 10 of the Reclamation Projects Act of 1939, leases for mineral and geothermal resources on all land acquired or withdrawn by Reclamation are issued by the BLM per an interagency agreement between Reclamation and BLM dated December 1982.

Under this agreement the BLM will, in all issues involving fluid mineral and geothermal leases, request that Reclamation determine if leasing is permissible and if so, provide any stipulations required to protect the interests of the United States. Current Reclamation stipulations and conditions of approval for oil and gas leasing within the Project Area are provided in Appendix A. Additional Reclamation stipulations are developed and included as part of any permit to use Reclamation-withdrawn lands. The current stipulations primarily address oil and gas leasing and do not address other Project Area mineral resource developments.

Alternative Energy

In February 2003, the Department of Energy and the Department of Interior released the report “*Assessing the Potential for Renewable Energy on Public Lands*” (BLM 2003). The report weighed factors for producing energy from concentrated solar power (CSP), photo-voltaic (PV), wind, biomass, and geothermal facilities. The report indicates the potential for producing energy from biomass and geothermal resources is low in southeast New Mexico, although a portion of the Project Area north of Brantley Dam is within a region of known or potential geothermal resources.

The report indicates the potential for producing wind energy in the Project Area is poor to fair. Poor is defined as Class 2 with wind speeds of 12.5 to 14.3 miles per hour measured at an altitude of 50 meters. Fair is defined as Class 3 with wind speeds of 14.3 to 15.7 miles per hour measured at an altitude of 50 meters. Most of the Project Area falls within the Class 2 category. The report indicates the potential for CSP and PV in the Project Area are good, with an average of 5.5 to 6.5 kilowatt hour per square meter per day (kWh/m²/day).

Oil and Gas

Since 1926, 330 wells have been drilled within the Project Area. Of the total known wells, 188 wells (57 percent) are in operation, 3 wells (1 percent) are suspended, 10 wells (3 percent) are temporarily abandoned, and 25 wells (8 percent) are permanently abandoned. In addition, 104 wells (31 percent) are dry, junked, service, or location only (Table 2-5).

In 2009 nine wells were in production within Brantley Reservoir’s inundation zone, but they were above the maximum conservation pool (current reservoir level). If any wells are operational when the Brantley Reservoir floodgates are raised to the point that they are within the actual flood pool, adequate berming will be required to prevent inundation and potential water contamination (Reclamation 1982). Non-operational wells are closed according to the Carlsbad Resource Area RMP (BLM 1994).

Exact information about the production of Project Area wells is not available. Of the more than 21,000 wells estimated in Eddy County, less than 2 percent are located within the Project Area (GO-TECH 2009). Thus, it is not possible to determine what amount of oil and gas production comes directly from the Project Area. Because production numbers are not available on specific wells, it is not possible to evaluate the effect of increasing or decreasing the number of wells. Similarly, it is difficult to evaluate the impact on specific operators.

Oil and gas exploration and production operations typically produce some hazardous materials. These materials include drilling fluids, drilling muds, water, and crude oil. Additional hazardous materials typically associated with drilling and production operations include new and used motor oil, gasoline, diesel fuel, and other materials related to motor and machinery maintenance.

Exploration and production wastes are regulated by Code 43 of the Federal Regulations Part 3160 and are not considered hazardous waste materials. A number of management practices for oil and

gas exploration and production operations were specified in the Brantley Reservoir Project National Environmental Policy Act (NEPA) documents (Reclamation 1971, 1972, 1981, 1982) and the Carlsbad and Roswell District BLM NEPA documents (BLM 1986b, 1994). These practices should be sufficient to prevent adverse impacts from oil operations. The BLM is responsible for monitoring compliance with the specified practices.

Minerals

New Mexico leads the nation in potash production by providing more than 70 percent of total sales in the United States. The Carlsbad District in Southeast New Mexico is the largest potash producing area in the nation with Mosaic Potash, Inc., and Intrepid Potash, Inc., operating mines in the district. While potash mining and processing was once the number one regional industry, oil and gas have surpassed it. Competition with foreign sources and a lower demand for the region's potash have resulted in an uncertain future for this industry. It is, therefore, unlikely that potash exploration would occur within or near the Project Area in the near future. However, if market conditions change, this relatively rare resource may spur an exploration boom for potash minerals within the Project Area (BLM 1994). Reclamation's current stipulations do not address potash mining.

Aggregate Resources

A variety of aggregate resources are found within the Project Area, including gravel, sand, and caliche. Currently, neither sand nor gravel resources are used within the Project Area. These resources exist, however, and greater demands for them may occur in the future. Caliche, a calcareously cemented layer common near the surface of Project Area soils, is used as well pad and road base. This resource currently is not being extracted. Reclamation's current stipulations do not address removal of aggregate resources. No other extractable or saleable geologic resources are known to occur within the Project Area.

3.2.17 Transportation and Access

Project Area Access

U.S. Highway 285 provides the primary access from outlying populated areas to the Brantley and Avalon Reservoirs' vicinity, where available public activities include hunting, fishing, boating, camping, picnicking, wildlife observation, and other recreation-related opportunities. Direct access to Brantley Lake State Park is provided along Eddy County Road 30 (Capitan Reef Road) to East Brantley Road and along West Brantley Lake Road from US-285. Other roads in the vicinity provide access to points along the reservoir's shores, the Pecos River channel, and to general recreation areas in the Project Area. Table 3-24 lists the principal roads providing access to the Project Area, while Table 3-25 lists the primary and secondary roads providing access within the Project Area.

Table 3-24. Summary of Maintained Principal Access Roads to the Project Area.

ROAD NUMBER/ NAME	ADMINISTRATIVE JURISDICTION AND MAINTENANCE RESPONSIBILITY	TYPICAL ROAD WIDTH IN FEET (METERS)	SURFACE TYPE	CURRENT SURFACE CONDITION	ACCESS PROVIDED
U.S. Highway 285 (US-285)/ Seven Rivers Highway	NMSHTD ^a	48.0 feet (14.6 meters) divided with 16.0-foot (5.5- meter) shoulders	Asphalt Pavement	Good	From points north, west, and south to Project Area vicinity.
County Road 41/ Dayton Road	Eddy County	22.0 feet (6.7 meters)	Asphalt Pavement	Good	From US-285 to north boundary of Project Area.
County Road 38/ East Kincaid Ranch Road	Eddy County	22.0 feet (6.7 meters)	Asphalt Pavement	Good	From US-285 to northwest portion of Project Area.
County Road 35/Crane Road to County Road 34/Lake Road to County Road 37/ Forrest Lee Road	Eddy County	22.0 to 24.0 feet (6.7 to 7.3 meters)	Asphalt Pavement	Good	From US-285 to northwest portion of Project Area.
NM Highway 381/Lakewood Road	Eddy County	22.0 feet (6.7 meters)	Asphalt Pavement	Good	From US-285 to west portion of Project Area.
Pato Avenue	NMDGF ^b	22.0 feet (6.7 meters)	Graded Gravel	Good	From US-285 to Seven River Sanctuary Road.
County Road 33/ Sweetwater Road to Water	Eddy County	12.0 feet (3.7 meters)	Asphalt Pavement	Good	From Lakewood Road to Seven River Sanctuary Road.
County Road 34/ Lake Road (west)	Eddy County	24.0 feet (7.3 meters)	Asphalt Pavement	Good	General access to northwest and west portions of Project Area.
County Road 32/ Skyward Road	Eddy County	22.0 feet (6.7 meters)	Graded	Good	From US-285 to west portion of Project Area.
Carlsbad Relief Route	NMSHTD	48.0 feet (14.6 meters) divided with 16.0-foot (5.5- meter) shoulders	Asphalt Pavement	Good	Access across south portion of Project Area between US-285 Illinois Camp Road and US 62/180 (Hobbs Highway).
County Road 206/ Illinois Camp Road	Eddy County	24.0 feet (7.3 meters)	Asphalt Pavement	Good	General access along east portion of Project Area.
County Road 34/ Lake Road (east)	Eddy County	24.0 feet (7.3 meters)	Asphalt Pavement	Good	From Illinois Camp Road to east and southeast portion of Project Area.
County Road 236/Netherlin Road	Eddy County	24.0 feet (7.3 meters)	Graded	Good	From Illinois Camp Road to east portion of Project Area.

^a NMSHTD = New Mexico State Highway and Transportation Department.

^b NMDGF = New Mexico Department of Game and Fish.

Table 3-25. Summary of Maintained Primary and Secondary Access Roads in the Project Area.

CURRENT ROAD NUMBER/NAME	ADMINISTRATIVE JURISDICTION AND MAINTENANCE RESPONSIBILITY	ROAD LENGTH IN MILES (KILOMETERS)	TYPICAL ROAD WIDTH IN FEET (MEETERS)	SURFACE TYPE	CURRENT SURFACE CONDITION
Primary Access					
U.S. Highway 285 (US-285)/Seven Rivers Highway	NMSHTD ^a	5.0 miles (8.0 kilometers)	48.0 feet (14.6 meters) divided with 16.0-foot (5.5-meter) shoulders	Asphalt Pavement	Good
Carlsbad Relief Route	NMSHTD	1.0 mile (1.6 kilometers)	48.0 feet (14.6 meters) divided with 16.0-foot (5.5-meter) shoulders	Asphalt Pavement	Good
Carlsbad Relief Route Access Roads	NMSHTD	0.2 mile (0.3 kilometer)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
Highway 137 (Queen Road)	NMSHTD	0.7 mile (1.1 kilometers)	24.0 feet (7.3 meters)	Asphalt Pavement	Good-Rough
Water Fowl Tour Route	NMDGF ^b	2.7 miles (4.3 kilometers)	12.0 to 22 feet (3.7 to 6.7 meters)	Graded	Good
Brantley Lake Road East	State Parks ^c	4.3 kilometers (2.7 miles)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
Rocky Bay Primitive Area Road	State Parks ^c	1.0 mile (1.6 kilometers)	18 feet (5.5 meters)	Graded	Good-Rough
Brantley Lake Road West	State Parks ^c	0.8 mile (1.3 kilometers)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
Seven Rivers Primitive Area Road	State Parks ^c	1.8 miles (2.9 kilometers)	18 feet (5.5 meters)	Graded	Good-Rough
County Road 206 (Illinois Camp Road)	Eddy County	3.4 kilometers (2.1 miles)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
County Road 34 (Lake Road East)	Eddy County	2.8 miles (4.5 kilometers)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
County Road 236 (Netherlin Road)	Eddy County	0.6 mile (1.0 kilometer)	24.0 feet (7.3 meters)	Graded	Good
County Road 604 (Loop Road ^d)	Eddy County	0.8 mile (1.3 kilometers)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
County Road 601 (High Noon Road)	Eddy County	4.1 miles (6.6 kilometers)	24.0 feet (7.3 meters)	Graded	Good
County Road 602 (Avalon Road)	Eddy County	1.4 miles (2.3 kilometers)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
County Road 600 (Rains Road)	Eddy County	0.4 mile (0.6 kilometer)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
County Road 30 (Capitan Reef Road)	Eddy County	6.2 miles (9.9 kilometers)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
County Road 7 (Forrest Lee Road)	Eddy County	0.2 mile (0.3 kilometer)	24.0 feet (7.3 meters)	Asphalt Pavement	Good
Town of Carlsbad Roads	Town of Carlsbad	0.4 mile (0.6 kilometer)	-	-	-

Table 3-25. (Cont.)

CURRENT ROAD NUMBER/NAME	ADMINISTRATIVE JURISDICTION AND MAINTENANCE RESPONSIBILITY	ROAD LENGTH IN MILES (KILOMETERS)	TYPICAL ROAD WIDTH IN FEET (METERS)	SURFACE TYPE	CURRENT SURFACE CONDITION
Secondary Access					
Old Aggregate Haul Road	CID	2.1 miles (3.4 kilometers)	30 feet (9.1 meters)	Graded	Good-Rough
Brantley Dam Service Roads	CID	8.6 miles (13.8 kilometers)	12.0 to 15.0 feet (3.7 to 4.6 meters)	Graded	Good
Main Canal Roads	CID	3.2 miles (5.1 kilometers)	12.0 to 22 feet (3.7 to 6.7 meters)	Graded	Good-Rough
B.N.& S.F. Railroad Service Roads	BNSF Railroad	1.8 miles (2.9 kilometers)	18 feet (5.5 meters)	Graded	Good-Rough
Oil and Gas Roads	BLM/Oil and Gas Cos. ^e	30.0 miles (48.3 kilometers)	12.0 feet (3.7 meters)	Graded	Rough
Old U.S. Highway 285 ^f	BOR ^g	0.8 mile (1.3 kilometers)	22.0 feet (6.7 meters)	Graded	Good
Champion Cove Road (South)	BOR ^g	0.4 mile (0.6 kilometer)	24.0 feet (7.3 meters)	Graded	Good
Champion Cove Road (North)	BOR ^g	0.7 mile (1.1 kilometers)	22.0 feet (6.7 meters)	Graded	Good
Unimproved and Unmaintained Roads	-	287.3 miles (462.4 kilometers)	Various	Unimproved	Rough

^a NMSHTD = New Mexico State Highway and Transportation Department.

^b NMDGF = New Mexico Department of Game and Fish.

^c Maintenance assistance in the past has been provided by Eddy County, the CID, and the NMSHTD.

^d County Road 604 is planned to be replaced by the proposed east leg of the Carlsbad Relief Route.

^e Maintenance responsibility is specified in oil and gas lease and right-of-way agreements between the BLM and individual oil and gas companies.

^f This portion of old U.S. Highway 285 provides access to the Champion Cove vicinity.

^g Most recent road maintenance has been provided by the Eddy County Road Department in response to a petition to the County Commission by local residents.

Designated Roads

Maintained roads serving the Project Area vicinity are components of the New Mexico State Highway and Transportation Department (NMSHTD) system, the State Parks system, the Eddy County road system, Reclamation roads, BLM roads, CID roads, and oil and gas roads. State highway system roads that provide Project Area access are US-285 and the Carlsbad Relief Route. Current and forecasted traffic for US-285 is outlined in Table 3-26.

A railroad line located in the central portion of the Project Area was realigned when Brantley Dam was built in approximately 1985. The railroad is operated by the Burlington Northern Santa Fe Railway. The line runs from Texas to Clovis, New Mexico, and hauls principally sulfur, potash, and salt through the area. There are neither passenger services nor load-out sites near the Project Area. Sidings are provided for rail car storage near Avalon Reservoir and at Lakewood, New Mexico.



Table 3-26. Past and Projected Annual Average Daily Traffic (AADT) along U.S. Highway 285 (US-285) in the Vicinity of Brantley and Avalon Reservoirs.

TRAVEL COUNT STATION (PROJECT)	ANNUAL AVERAGE DAILY TRAFFIC (AADT)		
	Year		
	1989	1997	2017
US-285, Junction NM 137 (Queen's Highway)	2,889	3,446 (+19%) ^a	4,596
US-285, Junction NM 381 (Lakewood Road)	3,909	3,996 (+2%)	5,330

Source: NMSHTD computerized highway database.

^a Percent change in AADT between 1989 and 1997.

Unmanaged or Unmaintained Roads

Access throughout the Project Area is also provided by approximately 287 miles (462 km) of unimproved roads or two-track routes. None of these roads are managed or maintained by any of the entities listed above. Most of these roads or routes evolved indiscriminately through recreational use.

3.2.18 Visual Resources Management

The BLM uses a Visual Resource Management (VRM) system to inventory and manage visual resources on public lands. Although Reclamation does not utilize a VRM system, BLM’s Carlsbad Field Office mapping of VRM classifications does include the Project Area. The primary objective of VRM is to maintain the existing visual quality of public lands and to protect unique and fragile visual resources. The VRM system uses four classes to describe the different degrees of visual modification allowed in the landscape. The VRM classes are visual ratings that describe an area in terms of visual quality, viewer sensitivity to the landscape, and the distance in which a viewer would observe an area. Once an area has been assigned a VRM class, that class can be used to analyze and to determine the visual impacts of proposed activities on the land, and to gauge the amount of disturbance an area can tolerate before it exceeds the visual objectives of the established VRM class (BLM 1980).

Existing VRM classes were assigned to areas within the Carlsbad Field Office through the BLM RMP planning process and were ultimately based on the management decisions made in the RMP document (BLM 1988). These VRM classes conform to the land-use allocations set forth in the RMP that covers the Project Area and are assigned using the guidelines and management objectives for VRM Classes I through IV. The VRM classes established for the Project Area as mapped by the BLM include Class III and Class IV areas.

The objective of the VRM Class III is to partially retain the existing character of the landscape. 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. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The objective of the VRM Class IV is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements of color, form, line, and texture.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This chapter describes the predicted consequences, or potential effects, on the environment by implementing the proposed Resource Management Plan Amendment (RMPA) alternatives described in Chapter 2. The current conditions of the potentially affected environmental resources at the proposed RMPA Project Area (Project Area), described in Chapter 3, establish the baseline for impact analyses. Using the information in Chapter 3 and a description of the activities that may occur in the reasonably foreseeable future within the Project Area (see Chapter 2), the types of impacts that could result from implementing the alternatives were identified. To the extent possible, the impact analyses provide quantitative impact estimates from the various alternatives, in order to facilitate comparisons among alternatives during the decision-making process.

Impacts are defined as modifications to the environment, as it presently exists, that are brought about by an outside action. Impacts can be beneficial (positive) or adverse (negative), and result from the action directly or indirectly. Impacts can be permanent, long-lasting (long-term), or temporary (short-term). In the case of this analysis, long-term impacts are defined as those that would extend beyond 10 years. Short-term impacts are defined as those changes to the environment during or within a few years of ground-disturbing activities that last 10 years or less. Impacts can vary in significance from no change, or only discernible change, to a full modification or elimination of the environmental condition.

Climate change analyses are comprised of several factors, including greenhouse gasses (GHGs), land use management practices, and the albedo effect. The models necessary to relate climate to specific activities associated with those factors are presently unavailable. As a consequence, impact assessment of effects of specific anthropogenic activities cannot be performed. Additionally, specific levels of significance have not yet been established. When further information on the impacts to climate change in southeastern New Mexico is acquired, such information will be incorporated into the U.S. Bureau of Reclamation's (Reclamation's) National Environmental Policy Act (NEPA) documents as appropriate.

4.1 RESOURCES OF CONCERN

The Project Area resources that could be impacted by implementation of the RMPA include: air quality; soils; cave and karst resources; water quality; vegetation; wildlife; fisheries; threatened, endangered, and other special status species (TES); cultural resources; Indian Trust Assets (ITAs); paleontological resources; social and economic values; Environmental Justice; recreation; rangeland and grazing; energy, minerals, and other extractive resources; transportation and access; and visual resources. This section describes the potential impacts to these resources by alternative.

4.1.1 Air Quality

Surface-disturbing activities and exhaust emissions, chemical odors, and dust from motorized equipment can affect air quality. Current air resource management strategies would continue unchanged in the Project Area. Air quality would be temporarily impacted from exhaust emissions, chemical odors, and fugitive dust from motorized equipment used to construct the access roads and well pads, and by the drilling equipment used to drill the wells. Emissions from machinery and leaks or releases from wells or pipelines could result in localized airshed degradation. Blowouts and accidents during drilling and production could result in well fires and release of gases. The winds that frequent the Project Area generally disperse odors and emissions. The generation of dust and the pollution from motorized equipment would greatly decrease upon completion of the construction and drilling phase for each individual project.

The winds that frequent the southeastern part of New Mexico generally disperse odors but they may increase the particulate matter, especially fine particles. When compared to the baseline of criteria pollutants in the area, there could be temporary increases in chemical odors, dust caused by vehicles traveling to and from the Project Area and from motorized equipment used during construction, drilling, and production of the wells. Potential impacts of development could include increased emissions of volatile organic compounds, which could lead to ground-level ozone increases during drilling, testing, and production activities. However, these increases would be considered de minimis levels under 40 CFR 51.165(f) or under the New Mexico State Plan. Because this is a Class II airshed, the predicted increases in criteria pollutants are allowable, would not require a permit, and would not affect human health or the environment. Impacts to air quality will diminish upon completion of the construction and drilling phases of each well project.

Consumption of oil and gas developed from the proposed wells is expected to produce GHGs. Consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demography, and weather or climate. Environmental and economic climate change impacts from commodity consumption are not effects of the proposed planning decisions and thus are not required to be analyzed under NEPA. They are not direct effects, as defined by the Council on Environmental Quality (CEQ), because they do not occur at the same time and place as the proposed action. Neither are they indirect effects because the proposed action and resulting greenhouse gas emissions production are not a proximate cause of the emissions or other factors resulting from consumption. The best scientific data available to the agencies today do not provide the degree of precision needed to draw a causal connection between the oil produced at a particular drilling site, the GHG emissions that may eventually result from the consumption of the refined petroleum product, and a particular impact or effect. Effects from consumption are not only speculative, but beyond the scope of agency authority or control. Therefore, this document does not include analysis of the consumption of resources produced as a result of planning decisions.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Direct impacts to air quality include exhaust emissions, chemical odors, and dust from motorized equipment used to construct access roads, well pads, and wells during construction and drilling phases. These direct impacts to air quality would be greatly reduced upon completion of the construction and drilling phases. Impacts to air quality would be affected indirectly by existing surface disturbances, which would create sources of fugitive dust, as well as exhaust emissions from heavy equipment and vehicles working in the Project Area. These short-term effects would not be expected to be significantly adverse. The extent of anticipated new surface disturbances, as well as existing surface disturbances that will be reclaimed, under Alternative A are shown in Table 2-8. From 200 to 300 acres (81 to 121 hectares) of disturbance, and from 160 to 210 acres (65 to 85 hectares) of reclamation, are estimated over the 20-year planning period under Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of direct and indirect impacts to air quality resulting from implementation of Alternative B would be the same as those described for Alternative A. Impacts to air quality are directly and indirectly related to surface disturbance and construction equipment emissions. From 100 to 200 acres (41 to 81 hectares) of disturbance, and from 110 to 160 acres (45 to 65 hectares) of reclamation, are estimated over the 20-year planning period under Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of direct and indirect impacts to air quality resulting from implementation of Alternative C would be the same as those described for Alternative A. Impacts to air quality are directly and indirectly related to surface disturbance and construction equipment emissions. From 300 to 400 acres (121 to 162 hectares) of disturbance, and from 210 to 260 acres (85 to 105 hectares) of reclamation, are estimated over the 20-year planning period under Alternative C.

4.1.2 Soils

Actions that make soils more susceptible to erosion, or that impair soil productivity include, but are not limited to: soil disturbing activities that result in soil loss from accelerated wind or water erosion; activities that reduce vegetative cover, thus exposing the soil to erosion processes and reducing the amount of soil organic matter and soil productivity; activities that tend to concentrate surface runoff or steepened hydraulic gradients, thus increasing soil erosion by flowing water; activities that result in sediment loading directly to streams; activities that damage soil structure by compaction or other means; and activities that degrade the physical, chemical, or biological properties of the soil, such as high-intensity burns, contamination by toxic substances, or other means.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Direct impacts to soils resulting from oil and gas development and surface-use activities in the Project Area include removal of vegetation, exposure of the soil, mixing of soil horizons, soil compaction, loss of top soil productivity, and susceptibility of the soil to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust generated from vehicle traffic. These impacts could result in increased indirect impacts such as runoff, erosion, and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation of well sites, access roads, pipelines, and associated facilities.

Contamination of soils from drilling and production wastes mixed into soils or spilled on the soil surfaces could cause a long-term reduction in site soil productivity. Some of these direct impacts can be reduced or avoided through proper design, construction, and maintenance, and through implementation of Best Management Practices (BMPs). Direct impacts to soil resources from new surface disturbances are shown in Table 2-8. From 200 to 300 acres (81 to 121 hectares) of soil disturbance, and from 160 to 210 acres (65 to 85 hectares) of soil reclamation, are estimated over the 20-year planning period under Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of direct and indirect impacts to soils resulting from implementation of Alternative B would be the same as those described for Alternative A. Impacts to soil resources are directly and indirectly related to surface disturbance. From 100 to 200 acres (41 to 81 hectares) of soil disturbance, and from 110 to 160 acres (45 to 65 hectares) of soil reclamation, are estimated over the 20-year planning period under Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of direct and indirect impacts to soils resulting from implementation of Alternative C would be the same as those described for Alternative A. Impacts to soil resources are directly and indirectly related to surface disturbance. From 300 to 400 acres (121 to 162 hectares) of soil disturbance, and from 210 to 260 acres (85 to 105 hectares) of soil reclamation, are estimated over the 20-year planning period under Alternative C.

4.1.3 Cave and Karst Resources

Actions that could affect cave and karst resources include surface disturbance and drilling activities that intercept and/or contaminate these subsurface systems. Spills or leaks from pipelines, tank batteries, reserve pits, and/or down-hole casing can introduce contaminants into the groundwater systems through sinkholes and underground conduits that resurge in the springs that feed the Pecos River, causing contamination of the river environment. Cave and karst

features provide direct conduits leading to groundwater. These conduits can quickly transport surface and subsurface contaminants directly into underground water systems and freshwater aquifers without filtration or biodegradation. In addition, contaminants spilled or leaked into or onto cave and karst zone surfaces and subsurfaces may lead directly to the disruption, displacement, or extermination of cave species and critical biological processes. In extreme or rare cases, a buildup of hydrocarbons in cave systems from surface leaks or spills could potentially cause underground ignitions or asphyxiation of wildlife or humans within the cave.

In cave and karst terrains, rainfall and surface runoff is directly channeled into natural underground water systems and aquifers. Changes in geologic formation integrity, runoff quantity and quality, drainage course, rainfall percolation factors, vegetation, surface contour, and other surface factors can negatively impact cave ecosystems and aquifer recharge processes. Blasting, heavy vibrations, and focusing of surface drainages can lead to slow subsidence, sudden collapse of subsurface voids, and/or cave ecosystem damage.

To mitigate or lessen the probability of impacts associated with the drilling and production of oil and gas wells in karst areas, the guidelines listed in Appendix A-3, *Practices for Oil and Gas Drilling and Production in Cave and Karst Areas*, will be followed. The U.S. Bureau of Land Management (BLM) maintains up to date locations and surveys of known cave and karst features. Projects will be located away from these features whenever possible. Drilling pads, roads, utilities, pipelines, and flowlines will be routed around cave and karst features at an adequate distance to mitigate adverse impacts. Wellbore engineering plans will incorporate required cave and aquifer protection protocols. Highly sensitive cave and karst areas with critical freshwater aquifer recharge concerns may have a number of special surface and subsurface planning and construction requirements based upon the risk of adverse impacts created by a specific location or process.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The construction of roads, pipelines, well pads, and utilities can impact bedrock integrity and reroute, impede, focus, or erode natural surface drainage systems. Increased silting and sedimentation from construction can plug downstream sinkholes, caves, springs, and other components of aquifer recharge systems and result in adverse impacts to aquifer quality and cave environments. Any contaminants released into the environment during or after construction can impact aquifers and cave systems. A possibility exists for slow subsidence or sudden surface collapse during construction operations from the collapse of underlying cave passages and voids. This would cause associated safety hazards to the operator and the potential for increased environmental impact. Subsidence processes can be triggered by blasting, intense vibrations, rerouting of surface drainages, focusing of surface drainage, and general surface disturbance.

Blasting fractures in bedrock can serve as direct conduits for transfer of contaminants into cave and groundwater systems. Blasting also creates an expanded volume of rock rubble that cannot

be reclaimed to natural contours, soil condition, or native vegetative condition. As such, surface and subsurface disruptions from blasting procedures can lead to permanent changes in vegetation, rainfall percolation, silting/erosion factors, aquifer recharge, and freshwater quality and can increase the risk of contaminant migration from drilling/production facilities built atop the blast area.

During drilling, previously unknown cave and karst features could be encountered. If a void is encountered while drilling and a loss of circulation occurs, lost drilling fluids can directly contaminate groundwater recharge areas, aquifers, and groundwater quality. Drilling operations can also lead to sudden collapse of underground voids. Cementing operations may plug or alter groundwater flow, potentially reducing the water quantity at springs and water wells. Inadequate subsurface cementing, casing, and cave/aquifer protection measures can lead to the migration of oil, gas, drilling fluids, and produced saltwater into cave systems and freshwater aquifers.

Production facilities such as tank batteries, pump-jacks, compressors, transfer stations, and pipage may fail and allow contaminants to enter caves and freshwater systems. Downhole casing and cementing failures can allow migration of fluids and/or gas between formations and aquifers. Facilities may also be subject to slow subsidence or sudden collapse of the underlying bedrock.

Under Alternative A, Reclamation's general stipulations for constructing roads and regulating drilling operations in cave and karst areas would continue to be used (see Appendix A). Specific stipulations for mineral exploration and production operations would be adopted to protect cave and karst resources, including a 660-foot (200-meter) No-Surface Occupancy Zone buffer around identified cave entrances. These measures would help protect cave and karst resources, such as groundwater quality, troglobitic species, and wildlife habitat, from adverse impacts related to mineral development activities. Direct impacts from new surface disturbances are shown in Table 2-8. From 200 to 300 acres (81 to 121 hectares) of surface disturbance, and from 160 to 210 acres (65 to 85 hectares) of surface reclamation, are estimated over the 20-year planning period under Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of direct and indirect impacts to cave and karst resources resulting from implementation of Alternative B would be the same as those described for Alternative A. From 100 to 200 acres (41 to 81 hectares) of surface disturbance, and from 110 to 160 acres (45 to 65 hectares) of surface reclamation, are estimated over the 20-year planning period under Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of direct and indirect impacts to cave and karst resources resulting from implementation of Alternative C would be the same as those described for Alternative A. From 300 to 400 acres (121 to 162 hectares) of surface disturbance, and from 210 to 260 acres (85 to 105 hectares) of surface reclamation, are estimated over the 20-year planning period under Alternative C.

4.1.4 Water Quality

Surface disturbance in the Project Area may result in degradation of surface water and groundwater quality resulting from non-point source pollution, increased soil losses, increased erosion, and reduced percolation of water into the ground. Development of oil and gas leases in these areas could lead to increased sedimentation and discharge of pollutants into the reservoirs or river.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Potential direct impacts that could occur from oil and gas development and surface-use activities include increased surface water runoff and off-site sedimentation brought about by soil disturbance. These impacts include increased salt loading and water quality impairment of surface waters, channel morphology changes from road and pipeline crossings, and contamination of surface waters by produced water. The magnitude of these impacts to water quality would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, soil character, duration and time within which construction activities would occur, and the timely implementation and success or failure of mitigation measures.

Direct impacts to water quality would likely be greatest shortly after the start of construction activities and would likely decrease in time from natural stabilization and reclamation efforts. Construction activities would occur over a relatively short period; therefore, the majority of the disturbance would be intense but short lived.

Petroleum products and other chemicals that are accidentally spilled could result in surface and groundwater contamination. Similarly, possible leaks from reserve and evaporation pits could degrade surface and groundwater quality. Authorization of individually proposed projects would require full compliance with Reclamation directives and stipulations that relate to surface and groundwater protection.

Specific impacts to water quality are indirectly related to surface disturbances resulting from oil and gas development activities. New surface disturbances anticipated from implementation of Alternative A are shown in Table 2-8. From 200 to 300 acres (81 to 121 hectares) of surface

disturbance, and from 160 to 210 acres (65 to 85 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of impacts to water quality resulting from implementation of Alternative B would be the same as those described for Alternative A. From 100 to 200 acres (41 to 81 hectares) of surface disturbance, and from 110 to 160 acres (45 to 65 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under the Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of impacts to water quality resulting from implementation of Alternative C would be the same as those described for Alternative A. From 300 to 400 acres (121 to 162 hectares) of surface disturbance, and from 210 to 260 acres (85 to 105 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative C.

4.1.5 Vegetation

Natural forces or land uses that cause surface disturbance can reduce the cover or change the composition of the vegetative resource. As more cover is lost and/or less desirable species increase in composition, the likelihood of negative effects is increased.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Direct negative impacts to vegetation include the loss of plant cover from energy exploration and development activities. These impacts can be minimized or negated by proper design of well pads and access roads, and implementation of appropriate reclamation techniques.

Beneficial impacts would generally be accomplished through restoration of existing disturbed areas that is designed to facilitate the growth of desired plant community populations. This would result in an improved water cycle, reduced erosion potential, and better habitat for wildlife and livestock use. Short-term negative impacts to livestock use within the Project Area would include taking a portion of the allotment out of use while oil and gas development activities occur, and until vegetation is allowed to recover in disturbed areas.

As shown in Table 2-8, over the 20-year life of the RMPA, approximately 200 to 300 acres (81 to 121 hectares) of vegetation could be disturbed by oil and gas development construction activities within the Project Area under Alternative A. Of that amount, approximately 160 to 210 acres (65 to 85 hectares) could be reclaimed and stabilized during initial rehabilitation and as plugged and abandoned wells are reclaimed. This leaves a possible 40 to 90 acres (16 to 36 hectares) of net vegetative disturbance with implementation of Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of impacts to vegetation resulting from implementation of Alternative B would be the same as those described for Alternative A. As shown in Table 2-8, over the 20-year life of the RMPA, approximately 100 to 200 acres (41 to 81 hectares) of vegetation could be disturbed by oil and gas development construction activities within the Project Area under Alternative B. Of that amount, approximately 110 to 160 acres (45 to 65 hectares) could be reclaimed and stabilized during initial rehabilitation and as plugged and abandoned wells are reclaimed. This leaves a possible 0 to 40 acres (0 to 16 hectares) of net vegetative disturbance with implementation of Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of impacts to vegetation resulting from implementation of Alternative C would be the same as those described for Alternative A. As shown in Table 2-8, over the 20-year life of the RMPA, approximately 300 to 400 acres (121 to 162 hectares) of vegetation could be disturbed by oil and gas development construction activities within the Project Area under Alternative C. Of that amount, approximately 210 to 260 acres (85 to 105 hectares) could be reclaimed and stabilized during initial rehabilitation and as plugged and abandoned wells are reclaimed. This leaves a possible 90 to 140 acres (36 to 57 hectares) of net vegetative disturbance with implementation of Alternative C.

4.1.6 Wildlife

Generally, the quality and condition of wildlife habitat will largely dictate the abundance and distribution of wildlife within the Project Area. It is anticipated that the majority of impacts to wildlife resulting from implementation of each of the alternatives would result from displacement of wildlife through temporary disturbances or permanent destruction of habitat. Other impacts resulting from oil and gas development and operations could lead to reduced reproductive success and increased stress on specific species.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Oil and gas development would initially result in the direct loss of wildlife habitat. Based on the 20-year projection, construction of well pads, roads, and pipeline operations could have direct effects on 200 to 300 acres (81 to 121 hectares) within the Project Area. Any new disturbances could incrementally increase the current habitat fragmentation effect within the Project Area resulting from existing roads, livestock management, and past oil and gas development activities.

These activities would cause direct disturbance and/or displacement of ground-dwelling animals, disturbance, and loss of habitat structures such as shrubs with nests, habitat loss through erosion, and changes in food and cover relationships caused by vegetative change and increased erosion.

Animal species composition and densities could change within and adjacent to any mineral development activity. Changes in the animal community and habitat structure change in plant species composition and density would persist until habitat within the development areas is restored to near pre-disturbance conditions. However, re-vegetation of disturbed sites is typically very slow in this arid part of the United States.

The indirect disturbance associated with human activities to wildlife species for non-producing wells (approximately 60 acres or 24 hectares) would be short-term, not extending beyond the 1 to 3 months required to complete the drilling pad/road and would largely disappear after abandonment and reclamation. However, if oil and gas reserves were discovered, the indirect wildlife disturbance would continue long term around the drilling pads, along the roads, and pipelines.

A further effect on wildlife populations could be increased disturbance as a result of access by industry personnel and by the public at large using oil and gas development roads. This access would increase the overall disturbance within the Project Area and potentially create additional effects including shooting, poaching, collisions with vehicles, and accidental release of pollutants. Wildlife abundance and diversity would be expected to decrease.

Impacts from typical geophysical exploration, oil and gas drilling, and fluid minerals operations would continue to displace wildlife from the area of disturbance during active operations. Mobile wildlife species would return once operations were complete and disturbed areas were reclaimed. Creation of new roads from repeated vehicular travel during oil and gas exploration and development, and possible continued use by the public for recreation purposes, may reduce the area of undisturbed wildlife habitat. Increased disturbance and human access could directly impact important habitat features such as nesting areas.

Under Alternative A, existing special lease stipulations would remain in effect and oil and gas leases could continue with the No Surface Occupancy (NSO) stipulation applied to 25,808 acres (10,445 hectares), leaving 13,704 acres (5,546 hectares) of land subject to standard lease stipulations. The abundance and diversity of wildlife known to occur within the Project Area would likely be impacted as additional habitat is developed and reproductive success could decrease as exposure to disturbances including noise and human activity continue.

Birds

Under Alternative A, current stipulations would prohibit surface occupancy within 660 horizontal feet (200 horizontal meters) of or below the maximum conservation pool elevation of 3,271 feet (997 meters) and storage facilities would not be permitted below an elevation of 3,286 feet (1,002 meters) at Brantley Reservoir. At Avalon Reservoir surface occupancy would be prohibited within 660 horizontal feet (200 horizontal meters) of or below maximum conservation pool elevation of 3,190 feet (972 meters) and storage facilities would be prohibited below an

elevation of 3,200 feet (975 meters). Alternative A does allow for surface occupancy within the 100 year floodplain above the maximum conservation pool elevation of 3,271 feet (997 meters).

Although current stipulations prohibit surface occupancy below the maximum conservation pool elevation, oil and gas development activities within the 100 year floodplain would further restrict the amount of available riparian-wetland vegetation communities in these areas that currently provide resources such as forage (e.g., fish, macroinvertebrates, emergent vegetation) for large numbers of waterfowl and shorebirds. In addition to forage, these areas also provide loafing sites, cover, nesting material, and secluded nest sites for many of the species known to occur within the Project Area. To avoid direct impact to migratory birds protected by the Migratory Bird Treaty Act (16 USC 703, et seq.), clearing and grubbing of woody vegetation would be scheduled between August 15 and April 15, outside of the normal breeding season for many birds. Should vegetation removal and construction take place between April 15 and August 15, preconstruction nesting bird surveys would be conducted to identify any breeding activity that could be disturbed. This type of precaution would help to minimize nest abandonment or nest predation, which can frequently be attributed to human disturbance.

Although riparian-wetland vegetation communities found along the Pecos River, Brantley and Avalon Reservoirs represent only 20 percent of the total available wildlife habitat, they are responsible for much of the avian diversity found within the Project Area. Additionally, riparian-wetland communities serve to stabilize banks while preventing erosion and excessive sedimentation, and intercept pollutants that may have originated from the watershed (Cooperrider et al. 1986). Development of oil and gas leases in these areas could lead to increased sedimentation and discharge of pollutants into the reservoir, which would result in a decline of available food resources such as aquatic insects and fish.

Herpetofauna

Under Alternative A, reptiles and amphibians would likely be directly impacted because existing stipulations allow for surface occupancy within the 100-year floodplain (between elevations 3,271 feet [997 meters] and 3,286 feet [1,002 meters]). Impacts would likely result from a direct loss of available habitat and mortality resulting from vehicular traffic and accidental discharge of contaminants. Loss of habitat could also result in the depletion of available food resources. Because amphibians respire through their skin, they are extremely susceptible to the effects of poor air and water quality. In upland communities, reptiles would likely be impacted similarly by this alternative through loss of habitat resulting in displacement and/or direct mortality resulting from vehicular activity during periods when reptiles are most active (e.g., at night, after rain events).

Mammals

Bats and other small mammals would likely be directly impacted because existing stipulations allow for surface occupancy between the elevations of 3,271 feet (997 meters) and 3,286 feet (1,002 meters), which represents the 100-year floodplain at Brantley Reservoir. As such, many

aquatic, riparian, and wetland communities that provide cover, foraging areas, etc., for small mammals could be lost or severely degraded. The potential release of pollutants and increases in sedimentation would likely decrease the abundance and diversity of aquatic insects, which serve as the primary food for bats of the area.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The amount and severity of direct and indirect impacts to wildlife habitat as a result of oil and gas development activities under Alternative B would be considerably less than those described for Alternative A because Alternative B prohibits surface occupancy below the 100-year floodplain elevations at Brantley Reservoir (i.e., elevation 3,283 feet [1,001 meters]) and Avalon Reservoir (i.e., elevation 3,200 feet [975 meters]), or within a buffer of 660 horizontal feet (200 horizontal meters) above these elevations. Under Alternative B, a total of 40,478 acres (16,382 hectares) would be classified as NSO and 8,057 acres (3,261 hectares) would be classified as open to oil and gas development using standard leasing stipulations.

Implementation of the proposed special lease stipulations found in Section 2.3.2 would provide a flexible platform to minimize direct habitat loss and fragmentation. These stipulations would minimize habitat fragmentation, limit surface disturbance, and expedite habitat restoration. However, these stipulations do not restrict or otherwise regulate other forms of human disturbance within the Project Area. As such, disturbances resulting from such things as recreational activities and agricultural practices would likely continue to limit or further degrade the overall quality of available wildlife habitat within the Project Area.

Birds

Avian communities within the Project Area would experience fewer impacts under Alternative B. Total acreage classified as NSO would increase to 40,478 acres (16,382 hectares) and only 8,057 acres (3,261 hectares) would be subject to standard lease stipulations. Under Alternative B, fewer total acres of avian habitat would be lost than would be lost under Alternative A.

Under Alternative B, there would be a NSO designation within 660 horizontal feet (200 horizontal meters) of the 100-year floodplain at Brantley and Avalon Reservoirs. Other stipulations include NSO within 660 horizontal feet (200 horizontal meters) of the normal high-water line of streams, rivers, and arroyos. This would protect existing riparian-wetland communities, which serve to help reduce sedimentation and pollutant discharges into both reservoirs. Additionally, the protection of these communities would help to promote an abundance and diversity of avian species, while providing food resource, nesting areas, etc. This alternative would also protect sand bars and unvegetated shorelines, which are used by the least tern during the breeding season. However, nesting shorebirds would still be subjected to rapid changes in water elevation, which would contribute to the overall lack of nest success.

Although no Critical habitat has been designated for threatened or endangered species within the Project Area, Alternative B does stipulate that there will be NSO in areas designated as Critical or Occupied habitat for threatened or endangered species, which further protects sensitive avian species (e.g., southwestern willow flycatcher [*Empidonax traillii extimus*]) that may eventually be found within the Project Area.

Herpetofauna

Alternative B would have fewer impacts to amphibians than Alternatives A and C because of the special lease stipulations defined under Alternative B. Proposed NSO areas would be designated within the 100-year floodplain or within 660 horizontal feet (200 meters) of this elevation and the normal high-water line of streams, rivers, and arroyos at Brantley and Avalon Reservoirs. Under Alternative B, riparian-wetland communities would be protected and would continue to provide the necessary habitat and resources for amphibians to persist within the Project Area. Additionally, riparian-wetland communities would serve as buffers against sedimentation and pollutant discharges into the reservoirs and the Pecos River, which would also serve to benefit the amphibian populations within the Project Area. Despite these stipulations, reptiles and amphibians would likely still be impacted by such things as recreational activities and agricultural practices. Up-gradient oil and gas developments could result in accidental release of contaminants that could result in the direct mortality of amphibians in particular because they respire through their skin and are extremely sensitive to changes in air and water quality.

Mammals

All mammal species would benefit from implementation of Alternative B, compared to implementation of Alternative A, because Alternative B greatly reduces the amount of surface area that could be disturbed by oil and gas development activities within the Project Area.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Although Alternative C strives to minimize soil erosion, protect wildlife, special status species, and water quality in a manner similar to Alternative B, the maximum conservation pool elevation of Brantley Reservoir would be revised from 3,271 feet (997 meters) to 3,263 feet (995 meters) and the NSO stipulation would be applied below that elevation. As a result, only 19,155 acres (7,752 hectares) would be designated as NSO and 10,324 acres (4,178 hectares) would be designated as open to oil and gas development using standard leasing stipulations. Based on total acres of land available for oil and gas development (see Table 2-3), Alternative C allows for the greatest potential amount of wildlife habitat degradation.

Birds

Avian communities within the Project Area would benefit to a lesser extent under Alternative C because more total acres of avian habitat would potentially be lost than under Alternatives A or B. Much of the available nesting and brood rearing habitat for shorebirds would be open to oil and gas development if Alternative C were implemented.

Herpetofauna

Of the herpetofauna found within the Project Area, amphibians and reptiles would likely be impacted to a greater extent from implementation of Alternative C as compared to Alternatives A or B. Both reptiles and amphibians alike would be impacted by a direct loss of habitat and direct mortality resulting from vehicular traffic. In addition, amphibians would likely suffer direct mortality from decreases in air or water quality because they respire through their skin and are extremely sensitive to environmental changes.

Mammals

Bats and other small mammals would likely be directly impacted to a greater extent under Alternative C because it allows for the most acreage of available habitat to be disturbed by oil and gas development activities. As such, many aquatic, riparian, and wetland communities that provide cover, foraging areas, etc. for small mammals could be lost or severely degraded.

4.1.7 Fisheries

Actions that have the potential to impact the Project Area fisheries include ground disturbances from oil and gas site development and the associated infrastructure. In general, pollution of freshwaters by oil and gas products in localized areas is known to be harmful and can cause mortality to aquatic organisms including invertebrates and fish. Direct effects of oil and gas development and surface-use activities include the removal of vegetation, soil exposure, and increased soil susceptibility to erosion. In turn, these effects can lead to increased stormwater runoff, soil erosion, off-site sedimentation, increased salt loading, water-quality impairments to surface waters, and ultimately, to the decline in fish habitat quality. In addition, soil disturbances can also lead to changes in stream channel morphology from road and pipeline crossings, as well as to the contamination of surface waters by produced water. Activities that could cause direct or indirect impacts include the use of existing drill pads and access roads, and the construction and operation of new well sites, access roads, gas pipelines, and facilities.

For all alternatives, the extent of potential impacts to water resources, and thus to fish habitat would depend on the proximity of the disturbance to the drainage channel, the slope of the disturbed areas, the size of the disturbed area, the duration and timing of construction activities, and the implementation of lease stipulations and mitigation measures. In addition, oil, oil products, or other chemicals that are accidentally spilled could also contaminate ground and surface waters, and thus impact fish habitat.

One of the greatest concerns of present and future oil and gas exploration activities within the Project Area is the potential for introduction of hazardous materials into adjacent waters and the impact of pollution to aquatic species and their habitat. As noted in Section 2.6, the reasonable foreseeable development (RFD) and associated amount of surface disturbance anticipated for the Project Area for the next 20 years varies by alternative, and the differences among them are based on modifications to existing management prescriptions. The standard lease terms and

conditions include many stipulations designed to contain all drilling fluids and waste byproducts produced in the drilling process on site and to prevent escape of any fluids from the site. However, accidental spills that may enter an adjacent waterway have the potential to affect water quality, fish habitat, and Project Area fisheries. Contaminants associated with oil and gas well drilling and production could potentially lead to reductions in habitat quality, increase the bioaccumulation of heavy metals in fish species, and the direct loss of fish.

In general, while the nature and types of impact to water resources, fish, and fish habitat would be consistent across project alternatives, the extent of such impacts would vary depending on the special lease stipulations associated with each alternative. The potential for detrimental effects on fish habitat is likely to be greater under Alternative A and Alternative C than under Alternative B because of differences in the degree of protection to aquatic resources provided by standard and special lease stipulations. Under Alternative B, beneficial impacts on Project Area fisheries and fish habitat could result from further restrictions on Surface Occupancy along areas adjacent to Brantley and Avalon Reservoirs and along sections of the Pecos River, as well as from other special lease stipulations. The total areas of NSO under Alternative A, Alternative B, and Alternative C, are 25,808 acres (10,445 hectares), 40,478 acres (16,382 hectares), and 19,155 acres (7,752 hectares), respectively. Consequently, the potential for detrimental impacts to water resources and fish habitat is reduced under Alternative B, when compared to Alternative A and Alternative C. Under all alternatives, actual positive effects on fisheries at Brantley and Avalon Reservoirs are not anticipated because of the poor condition of the fishery in both reservoirs.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

It is anticipated that the extent of potential impacts of oil and gas exploration and development on the quality of fish habitat would be greater under Alternative A than under Alternative B. Potential impacts to fish habitat quality could result from contaminants (e.g., drilling fluids, engine oils, produced natural gas liquids, oil and/or oil products) entering water bodies within the Project Area during flood events, through groundwater, and in the event that an accidental spill is not properly contained and cleaned up. The potential contamination of water resources resulting from oil and gas exploration activities is likely to reduce the quality of fish habitat, which in turn could impact reproduction success and recruitment of fish species. Although standard oil and gas lease stipulations include implementing actions that would contain drilling fluids and waste, the potential exists for accidental spills to enter adjacent water bodies and affect fish habitat.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Potential impacts on Project Area fisheries under the Alternative B are similar to those described above under Alternative A. However, the inclusion of special lease stipulations under Alternative B that are designed to protect water quality and other resources would offer greater

protection to riparian and shoreline vegetation, water resources, and ultimately fish habitat. Fish habitat in Brantley and Avalon Reservoirs and along sections of the Pecos River within the Project Area would benefit from the inclusion of a 660 horizontal feet (200 horizontal meters) buffer of NSO area from the normal high-water line of all streams, rivers, and arroyos. This stipulation is valuable for the prevention and/or reduction of potential contamination that could influence fish habitat quality. These buffer areas would provide extra measures of protection against high-water runoff that could inundate structures located at or below this elevation and would also provide opportunities for the lessee to recapture or contain escaped materials before they reach the water.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

General impacts to fisheries resulting from implementation of Alternative C would be similar to those described for Alternative A and Alternative B. However, this alternative is the least restrictive in terms of surface occupancy area and would allow for the development of a substantially larger surface area (13,527 acres [5,474 hectares]) under surface occupancy on a case-by-case basis stipulation. The NSO special lease stipulation under this alternative would be applied at water surface elevations below 3,263 feet (995 meters) and 3,190 feet (972 meters) at Brantley and Avalon Reservoirs, respectively. Overall, the potential for detrimental effects on fish habitat is likely to be greater under Alternative C given the reduced degree of protection to aquatic resources provided by its special lease stipulations.

4.1.8 Threatened, Endangered, and Other Special Status Species

A Biological Assessment (BA) was prepared and submitted to the United States Fish and Wildlife Service (USFWS) as required to provide detailed analyses of all Federally listed (threatened or endangered) species that may be affected. All anticipated environmental effects to threatened or endangered species have been included in the Final BA (Reclamation 2011).

The 20-year projection for RFD includes the drilling of 20 to 80 wells on Reclamation lands within the Project Area, depending upon the alternative that is implemented. Activities associated with oil and gas well exploration and production that may affect these four species include the development and use of access roads, well pads, and pipelines. Under the various alternatives being considered, it is anticipated that between 100 and 400 acres (41 to 162 hectares) of surface area would be directly impacted over a 20-year period (see Table 2-8).

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Impacts on threatened or endangered species habitat, both existing and future, would continue under Alternative A. Based on the surface use and occupancy requirements currently in place on Reclamation lands, there are no specific requirements for oil and gas development to avoid occupied habitat for these species. Oil and gas development would initially result in the direct

loss of wildlife habitat, including threatened or endangered species habitat. Based on the 20-year projection, construction of well pads, roads, and pipeline operations would have direct effects on 200 to 300 acres (81 to 121 hectares) within the Project Area. Any new disturbances would incrementally add to the current habitat fragmentation effect within the Project Area resulting from existing roads, livestock management, water operations, recreational activities, and past oil and gas development activities. Direct and indirect impacts to threatened or endangered species habitat would be similar to those described in the wildlife section.

Under Alternative A, existing special lease stipulations would remain in effect and oil and gas leases could continue with the NSO stipulation applied to 25,808 acres (10,445 hectares), leaving 13,704 acres (5,546 hectares) of land subject to standard lease stipulations.

Least Tern

Direct effects of oil and gas development and surface-use activities including the removal of vegetation, soil exposure, and increased soil susceptibility to erosion all have the potential of having detrimental effects on the least tern's prey base and can potentially lead to indirect impacts that include increased runoff, erosion, off-site sedimentation, increased salt loading and water-quality impairments to surface waters. Actions that have the potential of negatively impacting the least tern include any action that would reduce the abundance of fish in the reservoir because least terns are known as a piscivorous species. In addition, soil disturbances can potentially lead to changes in channel morphology from road and pipeline crossings, as well as to the contamination of surface waters by produced water. Activities that could cause these direct or indirect impacts include the use of existing trails and roads, and the construction and operation of well sites, access roads, gas pipelines, and associated facilities. The extent of these potential impacts to water resources, and thus to habitat used by the least tern's prey base, would depend on the proximity of the disturbance to the drainage channel, the slope of the disturbed areas, the size of the disturbed area, the duration and timing of construction activities, and the implementation of mitigation measures.

One of the greatest concerns of oil and gas exploration activities within the Project Area is the potential for introduction of contaminants into aquatic systems, which would impact aquatic species that serve as the least tern's prey base. Leaks and breaks on lines that cross ravines and the Pecos River would likely have the greatest impacts to aquatic species. The standard lease agreement has many stipulations designed to contain all drilling fluids and waste byproducts produced in the drilling process on site and to prevent escape of any fluids from the site. However, accidental spills that may enter an adjacent waterway have the potential to affect aquatic resources.

Contaminants associated with the oil and gas well drilling and production process have the potential to enter the Pecos River. Drilling fluids, engine oils, produced natural gas liquids, oil and/or oil products could be potentially transported into the Pecos River during a flood event or through the groundwater if any spill events are not properly cleaned up. This type of

contamination could potentially result in a direct loss of fish and increase the chronic bioaccumulation of heavy metals in fish species, which are eaten by piscivorous avian species including the least tern. The accumulation of contaminants including heavy metals and pesticides, etc. is known to have a negative effect on the reproductive success of many avian species (Thompson et al. 1997). However, in addition to stipulations that reduce potential impacts to water resources and aquatic biota, oil and gas wells and storage facilities would include safety measures to ensure operations that minimize the potential for habitat pollution in the form of oil leaks or spills. Such measures would include the replacement of worn or out-of-date materials and equipment, construction of spill-containment structures, removal of contaminated materials, and protection of well sites (see Appendix A).

Existing special lease stipulations would preclude Surface Occupancy within the maximum conservation pool elevation of both reservoirs. These stipulations would prevent the development of oil and gas wells within Project Area least tern habitat. Limits on the spatial area and locales where oil and gas exploration and development can occur, coupled the other constraints placed by special lease stipulations and conditions of approval, would provide adequate protection for the least tern and its habitat.

Southwestern Willow Flycatcher

Given the limited amount of suitable flycatcher habitat within the Project Area, negative impacts to flycatchers are not anticipated. However, removal of woody riparian vegetation, including salt cedar, for development of oil and gas leases, recreational access, etc. would further restrict the distribution of the species should they be found within the Project Area. Although one of the greatest concerns of oil and gas exploration within the Project Area is the potential for introduction of contaminants into aquatic systems, such problems are not likely to have a negative impact upon the southwestern willow flycatcher because the amount of potentially suitable habitat within the Project Area is very limited and no flycatchers have been found to date (R. Doster 2008, pers. comm.).

Leaks and breaks on the lines that cross ravines and the Pecos River would have the greatest impacts to aquatic species. The standard lease agreement (see Appendix A) has many stipulations designed to contain all drilling fluids and waste byproducts produced in the drilling process on site and to prevent escape of any fluids from the site. However, accidental spills that may enter an adjacent waterway have the potential to affect riparian and aquatic resources. Potential impacts from oil and gas exploration and development on the flycatcher or its potentially suitable habitat could occur. However, limits on the spatial area and locales where oil and gas exploration and development can occur, coupled with other constraints placed by special lease stipulations, would provide adequate protection for the flycatcher and its habitat.

Gypsum Wild-Buckwheat

Direct negative impacts to the gypsum wild-buckwheat would include development of mineral, oil, and gas leases in areas where the species is either known to exist or could potentially be

found. These areas include habitat where the soils consist primarily of gypsum that eroded from nearby outcroppings. Other activities including recreation would also have negative effects on the species by compacting the soils, destroying live plants, etc.

Because gypsum wild-buckwheat can be found only in steep upland areas away from waterways that could be contaminated by discharge from oil and gas exploration, it is unlikely that the species would be negatively impacted by such discharges. Critical habitat for this species was designated on BLM lands adjacent to the Project Area in 1981. However, without a stipulation for NSO within occupied habitat, there is the potential for oil and gas development activities to directly impact existing populations of gypsum wild-buckwheat within the Project Area under Alternative A.

Pecos Bluntnose Shiner

Direct effects of oil and gas development and surface-use activities include the removal of vegetation, soil exposure, and increased soil susceptibility to erosion. In turn, these effects can lead to indirect impacts that include increased runoff, erosion, off-site sedimentation, increased salt loading and water-quality impairments to surface waters. Soil disturbances can also lead to changes in channel morphology caused by road and pipeline crossings, as well as to the contamination of surface waters by produced water. Activities that could cause these direct or indirect impacts include the use of existing trails and roads, and the construction and operation of well sites, access roads, gas pipelines, and facilities (BLM 2007). As noted in BLM (2007), the extent of potential impacts to water resources, and consequently to habitat potentially used by displaced bluntnose shiner, would depend on the proximity of the disturbance to the drainage channel, the slope of the disturbed areas, the size of the disturbed area, the duration and timing of construction activities, and the implementation of mitigation measures.

One of the greatest concerns of oil and gas exploration activities within the Project Area is the potential for introduction of contaminants into adjacent waters and the subsequent impact of pollution to aquatic species. Leaks and breaks on lines that cross ravines and the Pecos River would likely have the greatest impacts to aquatic species. The standard lease agreement (see Appendix A) has many stipulations designed to contain all drilling fluids and waste byproducts produced in the drilling process on site and to prevent escape of any fluids from the site. However, accidental spills that may enter an adjacent waterway have the potential to affect aquatic resources.

Oil, oil products, or other chemicals accidentally spilled could contaminate ground and surface waters and could impact habitats where early life stages of bluntnose shiner occur. Road construction can be deleterious to fish and other aquatic life forms as it can potentially alter the hydrology of watersheds. Roads increase surface runoff, sedimentation and debris avalanches, destroy riparian vegetation and often require in-stream structures, such as culverts and bridges, which remove aquatic habitat and/or function as barriers to fish movement (Furniss et al. 1991).

A feature of the landscape capable of buffering and enhancing the protection of water quality and aquatic life is dense vegetation in the riparian zone. Riparian areas act as filters that reduce the concentration of contaminants that enter the watershed and move toward the waterway. However, streambanks along the Pecos River have been highly modified and native riparian vegetation is virtually non-existent. Much of the landscape along the Pecos River and its tributaries is composed of sparse vegetation and groundcover that may slow down the movement of contaminants toward the water is very limited. While riparian vegetation has not been recognized to be critical for the survival of the bluntnose shiner (USFWS 1987), the scarcity or lack of a functional riparian buffer would allow accidental spills to enter waterways and affect the aquatic life in adjacent areas.

Under Alternative A, the area designated as NSO amounts to 25,808 acres (10,445 hectares). Well data provided by the BLM indicated that a total of 330 wells have been drilled within the Project Area. In relation to the area of NSO, 91 wells (of which 30 are active) are located at or below the current maximum conservation pool elevation at Brantley Reservoir (elevation 3,271 feet or 997 meters), and another 21 wells (of which 8 are active) are located within the 100-year floodplain. Only one active well is located in the vicinity of the northern portion of the reservoir near the inflow of the Pecos River. Currently, no active wells occur within 1 mile (1.6 kilometers) of the Pecos River channel 5 miles (8 kilometers) upstream of its inflow into Brantley Reservoir. Further, none of the 48 potential new gas well locations would occur in this area.

Contaminants associated with the oil and gas well drilling and production process have the potential to enter the Pecos River. Drilling fluids, engine oils, produced natural gas liquids, oil and/or oil products could be potentially transported into the Pecos River during a flood event or through the groundwater if any spill events are not properly cleaned up. This type of contamination could result in a direct loss of fish, reduced habitat quality, and/or increased chronic bioaccumulation of heavy metals in fish species. However, in addition to stipulations that reduce potential impacts to water resources and aquatic biota, oil and gas wells and storage facilities would include safety measures to ensure operations that minimize the potential for habitat pollution in the form of oil leaks or spills. Such measures would include the replacement of worn or out-of-date materials and equipment, construction of spill containment structures, removal of contaminated materials, and protection of well sites (see Section 4.1.16). These are standard operation procedures and have no additional impact.

The Project Area is located below the lower Critical habitat boundary for the bluntnose shiner. The limited number of active wells in the vicinity of the northern portion of the reservoir or near its headwaters, coupled with the existing special lease stipulations, would reduce the possibility of contamination of the reservoir and potential negative effects on displaced young bluntnose shiner that may occur seasonally in the headwaters of Brantley Reservoir. Overall, while Alternative A would allow for minerals leasing and development, limits on the spatial area and locales where oil and gas exploration and development can occur would provide adequate

protection for bluntnose shiner that may occur seasonally in the inflow area of Brantley Reservoir.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Potential impacts to threatened or endangered species under Alternative B would be similar to those described under Alternative A. However, threatened or endangered species within the Project Area would be least affected under Alternative B. Total acreage classified as NSO would increase to 40,478 acres (16,382 hectares) and only 8,057 acres (3,261 hectares) would be subject to standard lease stipulations. Based on the 20-year projection, construction of well pads, roads, and pipeline operations would have direct effects between 100 to 200 acres (41 to 81 hectares) within the Project Area. Any new disturbances would incrementally increase the current habitat fragmentation effect within the Project Area resulting from existing roads, livestock management, and past oil and gas activities. The types of direct and indirect impacts to threatened or endangered species habitat would be similar to those described under Alternative A.

Least Tern

The inclusion of a 660 horizontal feet (200 meter) buffer of NSO from the 100-year floodplain of Brantley and Avalon Reservoirs and the normal high-water line of all streams, rivers, and arroyos, is a valuable step in preventing and/or minimizing the potential of contamination of these waterways and any subsequent impacts on aquatic species. These buffer areas provide an extra measure of protection against extremely high-water runoff that could inundate structures that are located at or below this elevation level and also provide an opportunity for the lessee to recapture or contain escaped materials before they reach the water. Consequently, the potential pollution of waterways and impacts to aquatic species that serve as the least tern's prey base are unlikely.

Under Alternative B, efforts to prevent or minimize impacts to resources (e.g., soil erosion, water quality, and special status species) within the Project Area include oil and gas special lease stipulations that restrict Surface Occupancy. The total area of NSO under Alternative B amounts to 40,478 acres (16,382 hectares). Well data provided by the BLM indicated that a total of 330 wells have been drilled within the Project Area. In relation to the area of NSO, 112 wells (of which 38 are active) are located within the current maximum conservation pool elevation at Brantley Reservoir (elevation 3,271 feet or 997 meters) and the 100-year floodplain (elevation 3,283 feet or 1,001 meters).

Special lease stipulations under Alternative B would preclude Surface Occupancy within both the maximum conservation pool elevation and the 100-year flood plain of the reservoir. These stipulations would prevent the development of oil and gas wells within Project Area least tern habitat, and would greatly reduce human disturbance during the least tern breeding season, which is thought to greatly reduce reproductive success (Mayer and Dryer 1988, Smith and

Renken 1990). Other special lease stipulations that would minimize potential negative effects of well drilling and production on the least tern include NSO within 660 horizontal feet (200 meters) of the normal high-water line of streams, rivers, and arroyos, and NSO within Critical or Occupied habitat for threatened and endangered species. Further, access may be restricted seasonally in other important wildlife areas as needed.

Overall, while Alternative B would allow for minerals leasing and development, limits on the spatial area and locales where oil and gas exploration and development can occur under this alternative coupled with other constraints placed by special lease stipulations, would provide adequate protection for least terns that may occur seasonally in the Project Area. The NSO stipulations set under Alternative B would minimize future potential impacts of oil and gas exploration and development on the least tern and its occupied habitat.

Southwestern Willow Flycatcher

Under Alternative B, efforts to prevent or minimize impacts to resources (e.g., soil erosion, water quality, and special status species) within the Project Area include oil and gas special lease stipulations that restrict Surface Occupancy. The total area of NSO under Alternative B amounts to 40,478 acres (16,382 hectares). Well data provided by the BLM indicated that a total of 330 wells have been drilled within the Project Area. In relation to the area of NSO, 112 wells (of which 38 are active) are located within the maximum conservation pool elevation at Brantley Reservoir (elevation 3,271 feet or 997 meters) and the 100-year floodplain (elevation 3,283 feet or 1,001 meters).

Special lease stipulations under Alternative B would preclude Surface Occupancy within both the maximum conservation pool elevation and the 100-year flood plain of the reservoir. These stipulations would prevent the development of oil and gas wells within potential Project Area southwestern willow flycatcher habitat. Other special lease stipulations that would minimize potential negative effects of well drilling and production on the southwestern willow flycatcher include NSO within 660 horizontal feet (200 meters) of the normal high-water line of streams, rivers, and arroyos, and NSO within Critical or Occupied habitat for threatened and endangered species. Further, access may be restricted seasonally in other important wildlife areas as needed.

Overall, while Alternative B would allow for minerals leasing and development, limits on the spatial area and locales where oil and gas exploration and development can occur under this alternative, coupled with other constraints placed by special lease stipulations, would provide adequate protection for southwestern willow flycatchers that may eventually occur within the Project Area. The NSO stipulations set under Alternative B would minimize future potential impacts of oil and gas exploration and development on the southwestern willow flycatcher and its potentially suitable habitat.

Gypsum Wild-Buckwheat

Under Alternative B, efforts to prevent or minimize impacts to resources (e.g., soil erosion, water quality, and special status species) within the Project Area include oil and gas special lease stipulations that restrict Surface Occupancy. The total area of NSO under Alternative B amounts to 40,478 acres (16,382 hectares). Special lease stipulations under Alternative B would preclude Surface Occupancy within Critical or Occupied habitat for threatened and endangered species. This stipulation would prevent the development of oil and gas wells within Project Area gypsum wild-buckwheat habitat. Additionally, known buckwheat populations occur within a BLM designated Special Management Area adjacent to the Project Area, which provides the species additional protection.

Overall, while Alternative B would allow for minerals leasing and development, limits on the spatial area and locales where oil and gas exploration and development can occur under this alternative coupled with other constraints placed by special lease stipulations, would provide adequate protection for gypsum wild-buckwheat populations known to occur within the Project Area.

Pecos Bluntnose Shiner

As previously noted, one of the greatest potential concerns of oil and gas exploration activities within the Project Area is the potential for introduction of materials into the adjacent waters and the subsequent impact of pollution to aquatic species. Leaks and breaks on lines that cross ravines and the Pecos River would likely have the greatest potential for impacts to aquatic species. The standard lease agreement has many stipulations designed to contain all drilling fluids and waste byproducts produced in the drilling process on site and to prevent escape of any fluids from the site. However, as noted above, accidental spills that may enter an adjacent waterway have the potential to affect aquatic resources. To minimize the potential for habitat pollution from leaks and spills, wells and storage facilities would include safety measures to ensure operations that minimize the potential for habitat pollution in the form of oil leaks or spills.

Under Alternative B, efforts to prevent or minimize impacts to resources (e.g., soil erosion, water quality, and special status species) within the Project Area include oil and gas special lease stipulations that increase restrictions on surface occupancy. The total area of NSO under the Alternative B amounts to 40,478 acres (16,382 hectares), the largest NSO among all alternatives. In addition, the inclusion of a 660 horizontal feet (200 meter) buffer of NSO from the 100-year floodplain of Brantley and Avalon Reservoirs and the normal high-water line of all streams, rivers, and arroyos, is a valuable step in preventing or minimizing the potential of contamination of these waterways and any subsequent impacts on bluntnose shiner or habitats where they may occur. These buffer areas provide an extra measure of protection against extremely high-water runoff that could inundate structures that are located at or below this elevation level and also provide an opportunity for the lessee to recapture or contain escaped materials before they reach the water.

Although the Project Area is located below the lower critical habitat boundary for the bluntnose shiner, the limited number of active wells in the vicinity of the northern portion of the reservoir or near its headwaters coupled with the proposed special lease stipulations would reduce the possibility of contamination of the reservoir and potential negative effects on displaced young bluntnose shiner that may occur seasonally in the inflow area of Brantley Reservoir. Other special lease stipulations that would minimize potential negative effects of well drilling and production on the bluntnose shiner include NSO within Critical or Occupied habitat for Federally listed threatened or endangered species and seasonal access restrictions in other important wildlife areas as needed. Further, among all alternatives, Alternative B accounts for the lowest number of potential new gas well developments (i.e., 20 to 40 potential wells total) within the Project Area.

Overall, while Alternative B would allow for minerals leasing and development, limits on the spatial area and locales where oil and gas exploration and development can occur under this alternative coupled with other constraints placed by special lease stipulations, would provide adequate protection for bluntnose shiner that may occur seasonally in the Project Area.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Under Alternative C, the total acreage classified as NSO would decrease to 19,155 acres (7,752 hectares) compared to Alternative A, and only 10,324 acres (4,178 hectares) would be subject to standard lease stipulations. Up to 60 to 80 potential new gas wells could be developed in the Project Area under this alternative and based on the 20-year RFD projection, construction of well pads, roads, and pipeline operations would have direct effects between 300 to 400 acres (121 to 162 hectares) within the Project Area. Any new disturbances would incrementally add to the current habitat fragmentation effect within the Project Area resulting from existing roads, livestock management, and past oil and gas activities. Direct and indirect impacts to threatened or endangered species or their habitat under Alternative C would be similar to those described for Alternative B. However, the total amount of area available for oil and gas development activities is much greater under Alternative C than under Alternative B. Therefore, the likelihood of either disturbing or eliminating habitat for protected species is greatest under Alternative C.

Least Tern

Although Alternative C is similar to Alternative B because both address concerns regarding the minimization of soil erosion, protection of wildlife and special status species, and protection of water quality, Alternative C allows for a revision to the maximum conservation pool elevation at Brantley Reservoir from 3,271 feet (997 meters) to 3,263 feet (995 meters) and a NSO stipulation would be applied below that elevation. The total area of NSO under Alternative C amounts to 19,155 acres (7,752 hectares). Well data provided by the BLM indicated that a total of 330 wells have been drilled within the Project Area. In relation to the area of NSO, 112 wells (of which 38 are active) are located within the current maximum conservation pool elevation at

Brantley Reservoir (elevation 3,271 feet or 997 meters) and the 100-year floodplain (elevation 3,283 feet or 1,001 meters). Any additional well development below the existing maximum conservation pool elevation would further reduce the amount of breeding habitat for least terns.

Overall, while Alternative C would allow for minerals leasing and development, limits on the spatial area and locales where oil and gas exploration and development can occur under this alternative coupled with other constraints placed by special lease stipulations, would provide adequate protection for least terns that may occur seasonally in the Project Area. The NSO stipulations set under Alternative C would minimize future potential impacts of oil and gas exploration and development on the least tern and its occupied habitat.

Southwestern Willow Flycatcher

Under Alternative C, efforts to prevent or minimize impacts to resources within the Project Area are similar to those identified in Alternative B. However, Alternative C would allow for a revision to the maximum conservation pool elevation at Brantley Reservoir from 3,271 feet (997 meters) to 3,263 feet (995 meters) and a NSO stipulation would be applied below that elevation. The total area of NSO under Alternative C amounts to 19,155 acres (7,752 hectares). Well data provided by the BLM indicated that a total of 330 wells have been drilled within the Project Area. In relation to the area of NSO, 112 wells (of which 38 are active) are located within the current maximum conservation pool elevation at Brantley Reservoir (elevation 3,271 feet or 997 meters) and the 100-year floodplain (elevation 3,283 feet or 1,001 meters).

Although special lease stipulations under Alternative C would be applied at elevations below the revised maximum conservation pool elevation, oil and gas development would be permitted in portions of the Project Area that may serve as potential flycatcher habitat. Other special lease stipulations that would minimize potential negative effects of well drilling and production on the flycatcher include NSO within Critical or Occupied habitat for threatened and endangered species. Further, access would be restricted seasonally in other important wildlife areas as needed.

Overall, while Alternative C would allow for minerals leasing and development, limits on the spatial area and locales where oil and gas exploration and development can occur, coupled with other constraints placed by special lease stipulations, would provide adequate protection for southwestern willow flycatchers that may eventually occur within the Project Area. Other special lease stipulations that would minimize potential negative effects of well drilling and production on the southwestern willow flycatcher include NSO within 660 horizontal feet (200 meters) of the normal high-water line of streams, rivers, and arroyos, and NSO within Critical or Occupied habitat for threatened and endangered species. The NSO stipulations set under Alternative C would minimize future potential impacts of oil and gas exploration and development on the southwestern willow flycatcher and its potentially suitable habitat.

Gypsum Wild-Buckwheat

Under Alternative C, efforts to prevent or minimize impacts to resources within the Project Area are similar to those identified in Alternative B. However, Alternative C would allow for a revision to the maximum conservation pool elevation at Brantley Reservoir from 3,271 feet (997 meters) to 3,263 feet (995 meters) and a NSO stipulation would be applied below that elevation. The total area of NSO under Alternative C amounts to 19,155 acres (7,752 hectares). Well data provided by the BLM indicated that a total of 330 wells have been drilled within the Project Area. In relation to the area of NSO, 112 wells (of which 38 are active) are located within the current maximum conservation pool elevation at Brantley Reservoir (elevation 3,271 feet or 997 meters) and the 100-year floodplain (elevation 3,283 feet or 1,001 meters). Special lease stipulations under Alternative C would preclude Surface Occupancy within Critical or Occupied habitat for threatened and endangered species. This stipulation would prevent the development of oil and gas wells within the Project Area gypsum wild-buckwheat habitat. Additionally, known buckwheat populations occur within a BLM designated Special Management Area adjacent to the Project Area, which provides the species additional protection.

Overall, while Alternative C would allow for additional minerals leasing and development when compared to Alternatives A and B, limits on the spatial area and locales where oil and gas exploration and development can occur under this alternative, coupled with other constraints placed by special lease stipulations, would provide adequate protection for gypsum wild-buckwheat populations known to occur within the Project Area.

Pecos Bluntnose Shiner

Under Alternative C, it is anticipated that general impacts on aquatic resources and bluntnose shiner that may occur seasonally in the Project Area, specifically in the inflow area of Brantley Reservoir, would be similar to those described for Alternative A and Alternative B. However, this alternative is the least restrictive in terms of surface occupancy area and would allow for the development of a substantially larger surface area (13,527 acres [5,474 hectares]) under surface occupancy on a case-by-case basis stipulation. The NSO special lease stipulation under this alternative would be applied at water surface elevations below 3,263 feet (995 meters) and 3,190 feet (972 meters) at Brantley and Avalon Reservoirs, respectively. Further, this alternative would allow for the surface occupancy on a case-by-case basis within 660 feet (200 horizontal meters) of the normal high-water of water bodies in the Project Area for construction of roads and pipelines.

While there is a limited number of active wells in the vicinity of the northern portion of the reservoir or near its inflow area, Alternative C could allow for the development of a larger area in the vicinity of water bodies in the Project Area, thus increasing the potential of contamination of aquatic resources and impact bluntnose shiner that may occur seasonally in the inflow area of Brantley Reservoir. In general, given the differences in restrictions and the overall reduced degree of protection to aquatic resources provided by special lease stipulations, the potential for

detrimental effects on bluntnose shiner that may occur seasonally in the Project Area would be greater under this alternative.

4.1.9 Cultural Resources

Land uses requiring surface disturbance can impact cultural resources. Oil and gas development, and the associated well pad construction, drilling operations, pipeline installations, and road construction, is a common cause of surface disturbance within the Project Area that could affect cultural resources. The more surface disturbance that occurs, the greater likelihood there is for direct negative effects to cultural resources. The movement and loss of artifacts because of soil erosion is an indirect negative impact associated with surface-disturbing activities. It is also likely that accidental damage from construction activities destroys buried cultural resources, even though nothing is visible during surface inventories.

Cultural resource inventories would continue to be required for all proposed surface-disturbing activities, including oil and gas development activities, within the Project Area. Any lands identified for development will need to follow Section 106 National Historic Preservation Act and the New Mexico State Cultural Properties Act processes before work begins. This includes all Federal mineral estates within the Project Area and future leases on lands conveyed to the Carlsbad Irrigation District in 2001. Regulations for the Protection of Historic Properties (36 CFR Part 800) defines the process for demonstrating such consideration through consultation with the State Historic Preservation Office, the Federal Advisory Council on Historic Preservation, and other interested parties.

The BLM and Reclamation will continue to work with the National Park Service in regard to any proposed mineral leasing and development within the Carlsbad Irrigation District National Historic Landmark (NHL). Reclamation, SHPO and the Archaeological Council will develop a programmatic agreement for the McMillian Dam and Reservoir area in the NHL. This area of the NHL includes approximately 1500 acres of Reclamation lands with special lease stipulations of surface occupancy on a case by case basis and no storage facilities. The Avalon Dam and Reservoir area would remain in a no surface occupancy zone. All historic properties included in the CID NHL will continue to be subject to Federal statute under the National Historic Preservation Act and the New Mexico State Cultural Properties Act, as appropriate.

Reclamation has received no indications of traditional cultural properties or sacred sites from the Native American tribes and pueblos consulted. Therefore, the assumption is the Project Area contains none of these properties. Cultural resource inventory surveys would continue to be required for Federal actions involving surface-disturbing activities, such as oil and gas development activities, within the Project Area. Eligible and potentially eligible sites would continue to be protected from damage or archaeologically treated to mitigate damage. Buffer areas of 100 feet (31 meters) or more would be established from the edges of sites to protect

cultural resources unless Reclamation determines that circumstances justify a reduced buffer area.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Federal laws, statutes, regulations, and policies would remain in effect for identifying and protecting cultural resources. The amount of potential impacts to cultural resources would be determined by the actual amount of oil and gas development activities and associated surface disturbance. The chance of impacting cultural resources would increase as surface disturbance increases. The amount of surface disturbance anticipated during the 20-year planning horizon is shown in Table 2-8. From 200 to 300 acres (81 to 121 hectares) of surface disturbance, and from 160 to 210 acres (65 to 85 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of direct and indirect impacts to cultural resources resulting from implementation of Alternative B would be the same as those described for Alternative A. From 100 to 200 acres (41 to 81 hectares) of surface disturbance, and from 110 to 160 acres (45 to 65 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of direct and indirect impacts to cultural resources resulting from implementation of Alternative C would be the same as those described for Alternative A. From 300 to 400 acres (121 to 162 hectares) of surface disturbance, and from 210 to 260 acres (85 to 105 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative C.

4.1.10 Indian Trust Assets (ITAs)

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Because there are no known ITAs within the Project Area, there would be no effects to ITAs under Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Because there are no known ITAs within the Project Area, there would be no effects to ITAs under Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Because there are no known ITAs within the Project Area, there would be no effects to ITAs under Alternative C.

4.1.11 Paleontological Resources

Land uses requiring surface disturbance can impact paleontological resources. The more disturbance that occurs, the greater the likelihood there is for negative effects.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Federal law would continue to be in effect for protecting paleontological resources within the Project Area. No paleontological sites have been documented in the Project Area and no exposed, fossil-bearing geologic strata are known to occur in the Project Area. Therefore, Alternative A would have no impact on known paleontological sites, fossil localities, or fossil-bearing geologic strata. However, the chance of impacting unknown paleontological resources would increase as surface disturbance increases. The amount of surface disturbance anticipated during the 20-year planning horizon is shown in Table 2-8. From 200 to 300 acres (81 to 121 hectares) of surface disturbance, and from 160 to 210 acres (65 to 85 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative A.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The potential for impacts to unknown paleontological resources resulting from implementation of Alternative B would be the same as those described for Alternative A. From 100 to 200 acres (41 to 81 hectares) of surface disturbance, and from 110 to 160 acres (45 to 65 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative B.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The potential for impacts to unknown paleontological resources resulting from implementation of Alternative C would be the same as those described for Alternative A. From 300 to 400 acres (121 to 162 hectares) of surface disturbance, and from 210 to 260 acres (85 to 105 hectares) of surface reclamation, are anticipated to occur over the 20-year planning period under Alternative C.

4.1.12 Social and Economic Values

For the analysis of impacts to social and economic values, it is assumed that development of existing oil and gas leases would continue in the Project Area.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Social and economic trends identified in Chapter 3 would continue for the foreseeable future. Because the development of existing oil and gas leases would continue, revenues, employment, and income generated by this activity would continue at or close to current levels for the foreseeable future. Costs associated with the development requirements (e.g., plans of development, designing road networks, reclamation activities) would be borne by the lease holder under these alternatives. More intensive development planning, however, could lead to reduced development costs. Larger factors such as market prices would have more impact on the economic viability of leases and wells than the existing or proposed development stipulations.

Offering new oil and gas leases by the BLM within the Project Area has no direct connection to employment or income levels in the local economy because new leases do not guarantee well development. Changes in employment and personal income in the oil and gas industry is more directly connected to market prices and not the availability of Federal minerals for lease. Increasing new oil and gas leasing by the BLM in the Project Area would not produce much economic benefit. Unleased tracts within the Project Area are more likely the result of a lack of interest and no evidence of payable petroleum zones. Additionally, some existing oil and gas leases within the Project Area remain undeveloped.

While still an important component of the local economy, employment in the petroleum industry has decreased in relation to total employment over the past 30 years, although personal income from jobs in the oil and gas industry has increased. The per capita income for all jobs in the vicinity of the Project Area in general trails the New Mexico average. However, the average weekly wages for those employed in the local oil and gas industry is nearly double the statewide average for all jobs (see Chapter 3).

It is estimated that between 40 and 60 wells would be drilled on Project Area lands during the next 20-year planning period under Alternative A. This is somewhat less than the average of 80 wells over a 20 year period estimated in the RFD section of Chapter 2. The difference, however, is likely more reflective of the long history of oil and gas development in the Project Area, and the lack of area remaining to develop because of well-spacing requirements, than existing or proposed stipulations.

Changes in local economic conditions such as employment and personal income tend to be reflected in society as a whole. Large-scale changes in these conditions would be more easily documented in an economic impact analysis than the small-scale changes analyzed in this alternative. Because the Project Area represents such a minor proportion of the overall regional oil and gas development industry in this part of New Mexico, it is not possible to accurately estimate specific economic impacts. Moreover, proposed oil and gas well developments that cannot locate within the Project Area because of the lack of area remaining for leasing and development are likely to find sufficient opportunities on surrounding Federal lands.

It is more difficult to quantitatively measure social impacts. In the social context of communities in the vicinity of the Project Area, changes would likely be minor and relatively unnoticed under Alternative A. However, individuals and families with interests in oil and gas development would be affected in particular localities. For these individuals and families, the most noticeable impact would likely be reduced personal income, reduced operations flexibility, and an increase in personal stress through increased operational restrictions.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of impacts to social and economic values resulting from implementation of Alternative B would be the same as those described for Alternative A. It is estimated that between 20 and 40 wells would be drilled on Project Area lands during the next 20-year planning period under Alternative B. This is less than half of the average of 80 wells over a 20-year period estimated in the RFD section of Chapter 2. Although the number of potential wells would be substantially less with implementation of Alternative B compared with Alternative A, changes in the local social and economic values are not likely to be noticed because operators would relocate to nearby Federal lands.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of impacts to social and economic values resulting from implementation of Alternative C would be the same as those described for Alternative A. It is estimated that between 60 and 80 wells would be drilled on Project Area lands during the next 20-year planning period under Alternative C. This level of development is similar to the average of 80 wells over a 20 year period estimated in the RFD section of Chapter 2.

4.1.13 Environmental Justice

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

There are no areas within the Project Area that meet the definitions of low-income areas or that contain minority populations. Therefore, none of the alternatives analyzed in this document would place a disproportionate share of negative environmental consequences on low-income or minority populations in or around the Project Area.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Impacts to minority and low-income populations resulting from implementation of Alternative B would be similar to those described for Alternative A.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Impacts to minority and low-income populations resulting from implementation of Alternative C would be similar to those described for Alternative A.

4.1.14 Recreation Resources

The demand for recreation opportunities on Project Area lands is expected to continue.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Recreation would continue within the Project Area much as it does today. Recreational users would continue to engage in wildlife viewing, boating, swimming, hunting, fishing, hiking, and camping. Oil and gas development activities would continue throughout the Project Area and are not expected to have any measurable impacts on recreational activities. However, affects such as those from noise, wildlife displacement, and visual resource impacts are likely to result in reduced satisfaction on the part of recreationists using the Project Area lands that are subject to energy development. Existing and future oil and gas development restrictions would remain in place to protect developed recreational areas and facilities.

To the extent that active oil and gas well construction requires a temporary closure in site-specific areas, some dispersed recreational users may be forced to relocate to other portions of the Project Area during these development activities. It is estimated that between 40 and 60 wells would be drilled on Project Area lands during the next 20-year planning period under Alternative A. Depending upon the final location of these wells and their associated infrastructure, it is possible that some dispersed recreational users would be temporarily or permanently displaced from specific undeveloped recreational areas within the Project Area.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Impacts to recreation resources resulting from implementation of Alternative B would be similar to those described for Alternative A. To the extent that active oil and gas well construction requires a temporary closure in site-specific areas, some recreational users may be forced to relocate to other portions of the Project Area during these development activities. It is estimated that between 20 and 40 wells would be drilled on Project Area lands during the next 20-year planning period under Alternative B. Depending upon the final location of these wells and their associated infrastructure, it is possible that some recreational users would be temporarily or permanently displaced from specific undeveloped recreational areas within the Project Area.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Impacts to recreation resources resulting from implementation of Alternative C would be similar to those described for Alternative A. To the extent that active oil and gas well construction

requires a temporary closure in site-specific areas, some recreational users may be forced to relocate to other portions of the Project Area during these development activities. It is estimated that between 60 and 80 wells would be drilled on Project Area lands during the next 20-year planning period under Alternative C. Depending upon the final location of these wells and their associated infrastructure, it is possible that some recreational users would be temporarily or permanently displaced from specific undeveloped recreational areas within the Project Area.

4.1.15 Rangeland and Grazing

Under current conditions, Reclamation has the authority to make the necessary adjustments in grazing management to allow for oil and gas development on Project Area allotments. Oil and gas development may have an impact on animal unit months (AUMs), depending on the amount of area disturbed. Fluctuations in annual livestock use are also expected because of unrelated factors such as weather conditions and the price of livestock.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

In general, livestock use levels within the Project Area are expected to continue into the future at current levels under Alternative A. Under Alternative A, there would be no change to current livestock grazing management practices. All Project Area grazing allotments are on lands that have been leased for Federal minerals exploration and development. Modifications to existing grazing permits/leases would be made based on proposed oil and gas development activities that may remove forage on specific allotments because of surface disturbance activities. If determined necessary, allotment specific AUMs would be reduced to reflect the revised forage base.

As shown in Table 2-8, over the 20-year life of the RMPA, approximately 200 to 300 acres (81 to 121 hectares) of vegetation could be disturbed by oil and gas development construction activities within the Project Area under Alternative A. Of that amount, approximately 160 to 210 acres (65 to 85 hectares) could be reclaimed and stabilized during initial rehabilitation and as plugged and abandoned wells are reclaimed. This leaves a possible 40 to 90 acres (16 to 36 hectares) of net vegetative disturbance with implementation of Alternative A. To the extent that these disturbances may occur on existing grazing allotments within the Project Area, existing grazing operations would be negatively affected by implementation of Alternative A accordingly. Short-term negative economic impacts to individual grazing operations would include fewer livestock being grazed, increased costs associated with moving cattle to other pastures, and/or finding additional pastures. Smaller ranch operations would be affected more than larger operations because they generally have fewer resources and less flexibility. Long-term negative impacts to grazing operations are not anticipated.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The types of impacts to rangeland and grazing resources resulting from implementation of Alternative B would be the same as those described for Alternative A. As shown in Table 2-8, over the 20-year life of the RMPA, approximately 100 to 200 acres (41 to 81 hectares) of vegetation could be disturbed by oil and gas development construction activities within the Project Area under Alternative B. Of that amount, approximately 110 to 160 acres (45 to 65 hectares) could be reclaimed and stabilized during initial rehabilitation and as plugged and abandoned wells are reclaimed. This leaves a possible 0 to 40 acres (0 to 16 hectares) of net vegetative disturbance with implementation of Alternative B. To the extent that these disturbances may occur on existing grazing allotments within the Project Area, existing grazing operations would be negatively affected by implementation of Alternative B, though to a lesser extent than under Alternatives A or C.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of impacts to rangeland and grazing resources resulting from implementation of Alternative C would be the same as those described for Alternative A. As shown in Table 2-8, over the 20-year life of the RMPA, approximately 300 to 400 acres (121 to 162 hectares) of vegetation could be disturbed by oil and gas development construction activities within the Project Area under Alternative C. Of that amount, approximately 210 to 260 acres (85 to 105 hectares) could be reclaimed and stabilized during initial rehabilitation and as plugged and abandoned wells are reclaimed. This leaves a possible 90 to 140 acres (36 to 57 hectares) of net vegetative disturbance with implementation of Alternative C. To the extent that these disturbances may occur on existing grazing allotments within the Project Area, existing grazing operations would be negatively affected by implementation of Alternative C to a greater extent than under Alternatives A or B.

4.1.16 Energy, Minerals, and Other Extractive Resources

The basic assumption for mineral resources development within the Project Area is that there would be demand for the resource regardless of the action taken and that some level of exploration and development of resources would be allowed. Reclamation and BLM planning guidance for oil and gas leasing directs these agencies to make land use plan decisions (such as this RMPA) at the following four levels:

- Lands open for leasing subject to existing laws, regulations, formal orders, and the conditions of the standard lease form;
- Lands open to leasing subject to moderate constraints such as seasonal and controlled surface use restrictions;

- Lands open to leasing subject to major constraints such as NSO stipulations; and
- Lands closed to leasing.

Decisions to open lands to leasing represents Reclamation's determination, based on the information available at the time, that it is appropriate to allow development consistent with the terms of the lease, laws, regulations, and orders, and subject to reasonable conditions of approval. The assumptions for surface disturbance from access roads, drill pads, pipelines, power lines, and seismic activity are detailed in Section 2.6 of this RMPA. Some of the estimates used reflect values for exploration and development in newly leased areas. Much of the Project Area is within or near well-developed fields. Exploration and development of resources in well-developed areas reduces the distance required for roads, pipelines, and power lines. Therefore, the actual amount of ground disturbance within the Project Area of the 20-year planning horizon may be less.

Reclamation and BLM have the authority to control the density and location of surface-disturbing activities affecting public land and those activities associated with Federal mineral exploration and development. Reclamation and BLM have the authority to designate areas as closed or open to oil and gas leasing, attach a NSO stipulation to leases, and attach other conditions of approval (COA) that are included in approved applications for permit to drill (APDs). Reclamation and BLM can also attach other conditions of surface use (CSU) stipulations such as requirements for wildlife surveys or plans of development (PODs). Use of these designations, stipulations, or COAs provides effective tools for development of mineral resources and management of the accompanying surface disturbance.

Restrictions to leasing of Federal minerals and Surface Occupancy may result in an increase in development of private and State minerals adjacent to leased and unleased Federal lands. Reclamation COAs are common to all alternatives. Conditions of Approval are tools to be used in the effort to return areas that have had surface disturbance (such as drill pads and roads) to natural conditions. For a description of the COAs, see Appendix A. Implementation of COAs would reduce initial surface disturbance (direct impacts) and increase opportunities for reclamation success.

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

The RFD projections for oil and gas activities developed for this EA are based on drilling statistics for the Project Area during the past 83 years from 1926 to 2009 (see Section 2.6). The RFD does not imply any drilling restrictions or limitations but is simply a forecast of anticipated activity. The actual number of wells drilled per year varies from year to year.

The RFD indicates that approximately 2 to 3 wells per year would be drilled and up to two wells per year would be plugged and abandoned in the Project Area under Alternative A. Direct

impacts include surface disturbances of approximately 10 to 15 acres (4 to 6 hectares), of which approximately 5 to 8 acres (2 to 3 hectares) would be reclaimed and stabilized by the end of 3 years. Successful reclamation of the plugged and abandoned wells would total approximately 3 acres (1 hectare) per year.

Over the next 20 years, a total of 40 to 60 wells would be drilled in the Project Area and approximately 40 wells would be plugged and abandoned under Alternative A. During that period, approximately 200 to 300 acres (81 to 121 hectares) of surface would be disturbed and approximately 160 to 210 acres (65 to 85 hectares) would be reclaimed and stabilized within 3 years of initial disturbance. Approximately 60 acres (24 hectares) would be reclaimed and stabilized from plugged and abandoned wells over the 20-year planning period.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Under Alternative B, no areas would be closed to new oil and gas leasing. However, areas available for leasing with a NSO stipulation would increase from 25,808 acres (10,445 hectares) under Alternative A to 40,478 acres (16,382 hectares) under Alternative B. Leasing with a NSO stipulation could dissuade bidders from purchasing lease parcels. When applied to permits for drilling, proponents may have to relocate drilling projects, thereby increasing construction costs on the project. Some lands may have to be developed through directional well drilling. Of the proposed lands open to oil and gas leasing with the NSO stipulation, all are in areas of high or moderate hydrocarbon potential. Some lease on these lands with the NSO stipulation could also be subject to drainage of hydrocarbons by non-Federal wells. In this situation, the lessee would not be responsible for payment of lost royalties unless an economic directional well can be drilled.

When the notice of a competitive sale of oil and gas leases clearly provides that a lease would be subject to a NSO stipulation, by making a bid for the indicated parcel the bidder is bound to accept the stipulation. Lessees would be advised that issuance of a lease in the Project Area with the NSO stipulation does not guarantee that a suitable surface location would be available for drilling or that the lease would be developed. Prospective lessees should take this into consideration prior to obtaining a lease with the NSO stipulation. If a lessee acquires a lease with an NSO stipulation attached, then it would be the responsibility of the lessee to locate a suitable surface location that meets existing requirements. The immediate and long-term effects of NSO restrictions could include lost production opportunities, increased drilling and production costs, and loss of royalties.

There are existing oil and gas leases in areas where NSO stipulations would be applied to newly issued leases. Development of resources covered by these leases would continue under the terms of the lease and appropriate conditions of approval in these areas. Plans of Development (PODs) and COAs would be used to guide orderly development on existing Federal leases in the Project

Area. Abandoned well pads and the caliche roads that serve them would be cleaned of caliche, raked, contoured, and reclaimed.

Oil and gas wells and storage facilities would include safety measures to ensure operations that minimize the potential for habitat pollution in the form of oil leaks or spills. Such measures would include, but not be limited to, replacement of worn or out-of-date materials and equipment, construction of spill-containment structures, removal of contaminated materials, and protection of well sites. These are standard operating procedures and have no additional impact. The RFD indicates that approximately 1 to 2 wells per year would be drilled and up to two wells per year would be plugged and abandoned in the Project Area under Alternative B. Direct impacts include surface disturbances of approximately 5 to 10 acres (2 to 4 hectares), of which approximately 2 to 5 acres (1 to 2 hectares) would be reclaimed and stabilized by the end of 3 years. Successful reclamation of the plugged and abandoned wells would total approximately 3 acres (1 hectare) per year.

Over the next 20 years, a total of 20 to 40 wells would be drilled in the Project Area and approximately 40 wells would be plugged and abandoned under Alternative B. During that period, approximately 100 to 200 acres (41 to 81 hectares) of surface would be disturbed and approximately 110 to 160 acres (45 to 65 hectares) would be reclaimed and stabilized within three years of initial disturbance. Approximately 60 acres (24 hectares) would be reclaimed and stabilized from plugged and abandoned wells over the 20-year planning period.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

The types of direct and indirect impacts to energy, minerals, and other extractive resources resulting from implementation of Alternative C would be the same as those described in the introduction of this section (Section 4.1.16) and Alternative B. The areas available for leasing with a NSO stipulation would decrease from 25,808 acres (10,445 hectares) under Alternative A to 19,155 acres (7,752 hectares) under Alternative C. The RFD indicates that approximately 3 to 4 wells per year would be drilled and up to two wells per year would be plugged and abandoned in the Project Area under Alternative C. Direct impacts include surface disturbances of approximately 15 to 20 acres (6 to 8 hectares), of which approximately 8 to 10 acres (3 to 4 hectares) would be reclaimed and stabilized by the end of 3 years. Successful reclamation of the plugged and abandoned wells would total approximately 3 acres (1 hectare) per year.

Over the next 20 years, a total of 60 to 80 wells would be drilled in the Project Area and approximately 40 wells would be plugged and abandoned under Alternative C. During that period, approximately 300 to 400 acres (121 to 162 hectares) of surface would be disturbed and approximately 210 to 260 acres (85 to 105 hectares) would be reclaimed and stabilized within three years of initial disturbance. Approximately 60 acres (24 hectares) would be reclaimed and stabilized from plugged and abandoned wells over the 20-year planning period.

4.1.17 Transportation and Access

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Implementation of Alternative A would have no affect on transportation and access within the Project Area. Existing designated roads would continue to be managed and maintained by the appropriate responsible entity (see Chapter 3). Designated roads, as well as unmanaged and unmaintained roads, would continue to be used for oil and gas development activities, as well as other appropriate uses allowed within the Project Area. Unmanaged and unmaintained roads would continue to be closed and reclaimed according to provisions described in the existing RMP (Reclamation 2003). As appropriate, proposed oil and gas development activities in the vicinity of proposed road closures would include reclamation of those unmanaged and unmaintained roads identified in the existing RMP.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Affects to transportation and access resulting from implementation of Alternative B would be similar to those described for Alternative A.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Affects to transportation and access resulting from implementation of Alternative C would be similar to those described for Alternative A.

4.1.18 Visual Resources

Alternative A: 2003 RMP with Old Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

This project will cause some short term and long term visual impacts to the natural landscape. Short term impacts occur during construction operations and prior to interim reclamation. These include the presence of construction equipment and vehicle traffic. Interim reclamation will be conducted where possible within 6 months after construction by recontouring and revegetating.

Long term impacts are visible to the casual observer through the life of the well. These include the visual evidence of storage tanks, piping, pump jacks, well pads, and roads which cause visible contrast to form, line, color, and texture within the characteristic landscape. Removal of vegetation by road and drill pad construction exposes bare soil lighter in color and smoother in texture than the surrounding vegetation. The surfacing of these areas with caliche materials causes further contrasts to the characteristic landscape. These contrasts will be visible to visitors in the vicinity of the facilities.

After final abandonment and reclamation, the pad, road, and associated infrastructure will be removed, reclaimed, recontoured, and revegetated to eliminate visual impacts. Short and long term impacts are minimized by best management practices such as color selection, reducing cut and fill, screening facilities with natural features and vegetation, interim reclamation, and contouring roads along natural changes in elevation. Implementation of the General Conditions of Approval (Appendix A, Section A-2) will further minimize impacts to visual resources.

Alternative B: 2003 RMP with New Oil and Gas Leasing Stipulations and Old Maximum Conservation Pool Elevation

Affects to visual resources resulting from implementation of Alternative B would be similar to those described for Alternative A, though to a lesser extent because of fewer wells being constructed.

Alternative C: 2003 RMP with New Oil and Gas Leasing Stipulations and New Maximum Conservation Pool Elevation

Affects to visual resources resulting from implementation of Alternative C would be similar to those described for Alternative A, though to a greater extent because of more wells being constructed.

4.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

A commitment of resources is irreversible when its primary or secondary impacts limit the future option for a resource. An irretrievable commitment refers to the use or consumption of resources neither renewable nor recoverable for later use by future generations. Implementation of any of the alternatives would require a commitment of natural, physical, human, and fiscal resources to construct and operate wells, well pads, access roads, pipelines, and associated utilities. Any construction would require the use of fossil fuels for construction vehicles, equipment, and construction-worker vehicles. Electricity would also be used at construction sites.

Construction and operation of oil and gas facilities within the Project Area would require the use of various types of raw materials, including soil, aggregate, steel, electrical supplies, piping, and other building materials such as metal, stone, sand, and fill material. Additionally, the fabrication and preparation of these construction materials would require labor and natural resources. Utilization of these resources would be irretrievable. However, these resources are readily available at this time and adverse effects on their continued availability are not expected.

Construction and operation of oil and gas facilities would require labor, which would otherwise be unavailable for other projects. The commitment of labor is considered irretrievable. Furthermore, fiscal resources would be irretrievably committed to construction and operation of these facilities. These funds would then not be available for other projects and activities.

In addition to the resources utilized in construction and operation of proposed oil and gas facilities, there would be irreversible and irretrievable loss of existing resources in the areas of impact. These resources would include the loss of biological habitat as discussed throughout Section 4.1. Most negative long-term effects have been minimized to the extent possible, but some effects remain.

4.3 CUMULATIVE IMPACTS

The Project Area is part of the Permian Basin which overlaps western Texas and eastern New Mexico. The first oil well drilled in the New Mexico portion of the Permian Basin dates from the 1920s and the area continues to produce oil and natural gas. That production includes lands within the Project Area where the first well was drilled in 1926. The boundary of the Carlsbad Field Office of the BLM encompasses both Lea and Eddy Counties, as well as the southern portion of Chaves County, an area consisting of approximately 6,381,000 acres (2,582,391 hectares). Within this boundary are approximately 2,197,000 acres (889,126 hectares) of BLM land where the Federal government owns both the surface and subsurface mineral estate, as well as an additional 1,898,000 acres (768,121 hectares) of Federal mineral estate where the surface is not administered by the BLM (e.g., lands administered by Reclamation, National Park Service, Forest Service, Department of Energy). The 43,745 acres (17,703 hectares) of Federal mineral lands and lands subject to Federal mineral leasing stipulations within the Project Area fall within this latter category and represent approximately 1 percent of the Federal mineral estate within the Carlsbad Field Office area.

In the Carlsbad Field Office, some 15,400 wells were drilled as new well completions during the 30-year period between 1975 and 2004 (BLM 2007). This represents an average of 513 well completions per year. The 1997 Carlsbad RMPA (BLM 1997) analyzed surface disturbance as nine acres (4 hectares) of initial surface disturbance for each well, which included well pads, access roads, and pipeline right-of-ways. The analysis also included reclamation in the amount of 5 acres (2 hectares) per well within two years. Using this analysis, the amount of surface disturbance from existing Federal wells within the Carlsbad Field Office ranges from 61,600 to 138,600 acres (24,930 to 56,091 hectares). There are also active wells on State and private lands adjacent to the Project Area and throughout the Carlsbad Field Office area.

During the same 30-year period between 1975 and 2004, there were 154 well completions within the Project Area. This represents an average of 5 well completions per year. Using the BLM analysis above, the amount of surface disturbance from existing wells within the Project Area ranges from 770 to 1,386 acres (312 to 561 hectares). Over the next 20 years, between 20 and 80 wells could be drilled within the Project Area depending upon which alternative is implemented. During this period, approximately 100 to 400 acres (41 to 162 hectares) of surface could be disturbed and approximately 50 to 200 acres (20 to 81 hectares) of surface could be reclaimed and stabilized within three years of initial disturbance. Approximately 60 acres (24 hectares) of

surface could be reclaimed and stabilized from plugged and abandoned wells over the next 20 years.

Alternative B is more restrictive than Alternatives A or C for oil and gas development within the Project Area. Because of the revised conservation pool elevation at Brantley Reservoir under Alternative C, it is less restrictive than Alternative A or Alternative B for oil and gas development within the Project Area. Approximately 20 to 40 more wells could be drilled under Alternative C than under Alternatives A or B over the 20-year planning period. Complying with existing or proposed mineral leasing stipulations may in effect mean that some areas previously open to exploration and development with limited restrictions would be closed to protect sensitive resources. Over time this may result in increased costs associated with exploration and development, a decrease in oil and gas production, and reduced profits and associated economic benefits for entities extracting such Project Area resources. To the degree that NSO restrictions remove property from future oil and gas drilling, or make drilling significantly more difficult, some mineral resources may be unavailable for future extraction.

The New Mexico Greenhouse Gas Inventory and Reference Case Projection 1990–2020 estimates that approximately 17.3 million metric tons of natural gas and 2.3 million metric tons of natural gas emissions are projected by 2010 as a result of oil and natural gas production, processing, transmission, and distribution. The lack of scientific tools designed to predict climate change on local scales limits the ability to quantify or even identify potential future impacts. However, potential impacts to natural resources and plant and animal species from climate change are likely to be varied, including those in the southwestern United States. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur because of increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations and extinction of endemic threatened or endangered plants may be accelerated. Due to loss of habitat or competition from other species whose ranges may shift northward or to higher altitudes, the population of some animal species may also be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in turn, could impact water resources and species dependant on historic water conditions. Forests at higher elevations in New Mexico, for example, have been exposed to warmer and drier conditions.

Soils and vegetation are directly impacted by these past and future surface disturbances. As a result of oil and gas development activities under any of the alternatives, soils would be removed from vegetation production. These anticipated direct impacts are listed earlier in this chapter under their respective sections. Cumulative impacts would include this loss of productive soil to support vegetation, combined with the loss of soils and vegetation from surface-disturbing activities in the past. Cumulative impacts to soils and vegetation would be greater under Alternative C than under Alternatives A or B.

Any industrial activities that take place upon or within karst terrains or freshwater aquifer recharge zones have the potential to create both short-term and long-term negative impacts to freshwater aquifers and cave systems. While a number of mitigation measure can be implemented to mitigate many impacts (see Appendix A-3), it is still possible for impacts to occur from containment failures, well blowouts, accidents, spills, and structural collapses. To the extent that increased oil and gas development activities increases this potential, Alternative C has the greatest potential to negatively affect cave and karst resources when compared to Alternatives A or B.

Water quality and air quality are indirectly impacted by past and future surface disturbances. These anticipated indirect impacts are listed earlier in this chapter under their respective sections. Additional surface disturbance as a result of oil and gas development activities has the potential to further degrade overall water quality within the Project Area. Cumulative impacts to water and air quality would be greater under Alternative C than under Alternatives A or B.

Changes in vegetation and wildlife habitat, not directly caused by construction activities, would be most prone to the amount and timing of precipitation. A prolonged drought could lead to a decrease in desirable grasses, shrubs, and forbs and an increase in less desirable “invasive” type species. Conversely, several years of above normal precipitation could result in an increase in desirable grasses, shrubs, and forbs and a decrease in less desirable invasive type species. Localized areas could see improvement in cover/composition because of livestock management prescriptions, closure of unmanaged/unmaintained roads, and vegetation treatment (e.g., invasive species control) type projects. Additional vegetative cover would improve watershed function, increase infiltration, reduce runoff, and allow more precipitation to be available for vegetative growth.

Under any of the alternatives, surface disturbance and habitat fragmentation would continue as would other activities on Project Area lands authorized by Reclamation. Fragmentation is one of the affects that create habitat connectivity issues. Roads, powerlines, and infrastructure associated with oil and gas field development are all fragmentary in nature. With the reclamation of plugged and abandoned wells and associated infrastructure, connectivity of habitat can occur between habitat patches, thus expanding the available habitat for wildlife and sensitive species. By removing roads, powerlines, well pads, and any other infrastructure down to native soils, coupled with proper seeding of native species, available habitat could be increased over time. Impacts to wildlife resources and sensitive species would be considered greater under Alternative C than under Alternatives A or B.

Cumulative impacts to Project Area fisheries may result from continued reservoir water level fluctuations, occasional reduced Pecos River flows, increased oil and gas development activities, and increased recreational activities. Spring irrigation draw downs have historically occurred during the spawning period for littoral fish species in Brantley Reservoir. Such dewatering can have a significant negative impact on reproductive success of littoral spawning fishes and reduce

the aquatic invertebrate food base available to young-of-year and juvenile fishes. Channelization, surface erosion, and damage to riparian areas along the Pecos River would continue to degrade habitat for native fish species in the Project Area.

Reductions in livestock numbers or changes in season of use as a result of oil and gas development activities would negatively impact grazing operators within the Project Area. This would impact local businesses as grazing operators would have less disposable income to spend at businesses in and around the Project Area. This is not expected to be significant because the amount of rangeland being grazed within the Project Area is minimal. This cumulative impact is expected to be localized to certain allotments or pastures, not the entire Project Area. The potential for impacts to grazing operators would be considered greater under Alternative C than under Alternatives A or B.

Implementation of any of the alternatives would affect some portion of employment and personal income derived from oil and gas development within the Project Area. Because the amount of oil and gas development varies between alternatives, the resulting affects to social and economic conditions, positive or negative, would also vary. However, because the Project Area represents less than 1 percent of all oil and gas development activity within the Carlsbad Field Office area, the affects are expected to be localized and minimal. Given the relative economic diversity of the counties surrounding the Project Area, economic affects would be readily absorbed by the local economy and would not be noticeable to the general population. However, some individuals and companies would be directly affected.

Numerous past and present activities have resulted in adverse impacts on cultural resources within the Project Area. These activities include: the development of the Pecos River with its associated dams, canals, and ditches; increasing oil and gas development activities; grazing; and recreational use of the Project Area. It is anticipated that future impacts on cultural resources would occur because: the population of the Carlsbad, New Mexico, area would continue to increase; demand for additional recreational opportunities would increase; oil and gas exploration would continue, at least at present levels; vandalism in the Project Area would continue to degrade and destroy known and currently unknown historical and archaeological sites; continuing erosion along the Pecos River channel and reservoir beaches would adversely impact archaeological sites located within the inundation zone; and the impacts associated with unregulated camping, vehicle use, and recreation would continue. Such impacts, because they are cumulative in nature, result in the bit-by-bit destruction of the total archaeological and record. In addition, natural erosional processes, vandalism, recreational activities, and unauthorized land uses would continue to negatively affect the condition of cultural and archaeological resources no matter which alternative is implemented. The potential for impacts to cultural resources would be considered greatest under Alternative C compared to Alternatives A or B.

Opportunities for uncontrolled access and use of public lands are expected to decrease over time. This appears to be a regional and national trend, resulting from protecting resources from

damage and from protecting recreational experiences from overcrowding and conflicts. Additionally, oil and gas development activities within the Project Area can result in the permanent displacement of dispersed recreational activities in those areas. From a recreational opportunity perspective, the long-term cumulative effects are a net loss.

Currently, there are no alternative energy generating sites, ITAs, paleontological resources, waste water, solid waste, or hazardous waste resources that would be affected by implementation of any of the alternatives. Similarly, low income or minority populations, water rights, water operations, and fire management would not be affected by any of the alternatives.

CHAPTER 5: CONSULTATION AND COORDINATION

The preparation of the Brantley and Avalon Reservoirs Resource Management Plan Amendment (RMPA) Environmental Assessment (EA) required a comprehensive consultation and coordination effort throughout the RMPA planning process. The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) initiated the RMPA planning process in July 2006 by requesting comments to determine the scope of issues and concerns that needed to be addressed in this Final EA document. As part of the resource inventory phase of the planning process, members of the interdisciplinary team formally and informally contacted various relevant agencies to request data to supplement Reclamation's existing resource database. This chapter describes the coordination with agencies that either have jurisdiction by law or interest in the development of the RMPA for the Project Area. In addition, this chapter describes the public involvement process that was undertaken for the Brantley and Avalon Reservoirs RMPA project and provides a distribution list of agencies and organizations receiving a copy of this Final EA. Written comments received on the Draft EA document, along with Reclamation responses, are provided in Appendix D.

5.1 CONSULTATION

A number of Federal and State government agencies, as well as local governments, were consulted during the RMPA planning process through communications, meetings, and other cooperative efforts. Cooperating agencies for this EA are the U.S. Department of Interior, Bureau of Land Management (BLM) and the Carlsbad Irrigation District (CID). Additional government agencies consulted included the U.S. Fish and Wildlife Service (USFWS), the New Mexico State Historic Preservation Office (NMSHPO), the New Mexico Department of Game and Fish (NMDGF), and 19 Native American Tribes. Consultation with the USFWS is required by the Fish and Wildlife Coordination Act (16 USC Sec.661 et seq.) and Endangered Species Act of 1973 (16 USC Sect 1531 et seq.). As part of data collection, Reclamation requested and the USFWS provided a list of Federally listed species that may occur in Eddy County. A subsequent Biological Assessment (BA) was completed and is retained on file at the Reclamation Albuquerque Area Office.

The NMSHPO was informed about the RMPA planning process in compliance with Section 106 of the National Historic Preservation Act (Appendix C). The NMDGF and the New Mexico Natural Resources Department were also contacted in regard to State-listed threatened and endangered plant and animal species, consistent with legislation protecting State-listed species. Coordination and consultation with these State agencies continued throughout the planning process and will continue during implementation of the RMPA.

Reclamation contacted 19 Tribes to invite their involvement in the RMPA planning process and to identify any concerns they may have regarding the potential effects on trust assets, cultural

and biological resources, or tribal health and safety. Those Tribes that were contacted are listed in the distribution list (Section 5.3 below) for the RMPA Final EA document. Correspondence received from the Tribes is provided in Appendix C.

5.2 PUBLIC INVOLVEMENT

The public participation process for the RMPA/EA has been ongoing throughout the development of this Final EA. The RMPA/EA scoping process began with publishing of a Public Notice for the Public Scoping Meeting on July 23, 2006. The Public Scoping Meeting was conducted by Reclamation on July 26, 2006 from 6:00 to 8:00 p.m. at the Pecos River Village Conference Facility in Carlsbad, New Mexico. A total of 11 persons attended the meeting where Reclamation representatives made a brief project presentation and provided an opportunity for attendees to ask questions. Two comment letters were submitted to Reclamation by the end of the August 11, 2006, scoping period. The relevant comments received during the scoping period addressed private minerals ownership within the Project Area and protection of resources such as visual quality and natural habitat.

5.3 DISTRIBUTION LIST

Reclamation has distributed information on how to obtain or view a copy of the Final EA document to the following government agencies, Indian Tribes, organizations, and individuals:

5.3.1 Government Agencies

City of Albuquerque
Environmental Department
P.O. Box 1293
Albuquerque New Mexico 87103

Carlsbad Soil and Water
Conservation District
3219 S. Canal St.
Carlsbad, New Mexico 88220

City of Artesia
P.O. Box 1310
Artesia, New Mexico 88211

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Conservation District
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Brantley Lake State Park
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Drinking Water Bureau
New Mexico Environmental Department
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Administrative Offices
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Eddy County
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New Mexico Department of Game and Fish
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Energy Minerals Natural
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New Mexico Riparian Council
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Ground Water Quality Bureau
New Mexico Environment Department
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New Mexico State Parks
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Reeves Co. Water Improvement District 2
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Interstate Stream Commission
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Santa Fe, New Mexico 87504
Southwest Region Bureau of Indian Affairs
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New Mexico Historic Preservation Division
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New Mexico Department of Game and Fish
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U.S. Army Corps of Engineers
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Albuquerque, New Mexico 87109

U.S. Fish and Wildlife Service
3800 Commons NE
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USDA Natural Resources
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U.S. Geological Survey
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5.3.2 Indian Tribes

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Dulce, New Mexico 87528

Apache Tribes of Oklahoma
P.O. Box 1220
Anadarko, Oklahoma 73005

Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, Oklahoma 73015

Cochiti Pueblo
Environmental Affairs Office
P.O. Box 70
Cochiti, New Mexico 87072

Mescalero Apache Tribe
P.O. Box 227
Mescalero, New Mexico 88340

Comanche Indian Tribe
P.O. Box 908
Lawton, Oklahoma 73502

Navajo Nation
P.O. Box 9000
Window Rock, Arizona 86515

Fort Sill Apache Tribe of Oklahoma
Rout 2, Box 121
Apache, Oklahoma 73006

Pueblo of Jemez
P.O. Box 100
Jemez Pueblo, New Mexico 87024

Hopi Tribe
P.O. Box 123
Kykotsmovi, Arizona 86039

Pueblo of Isleta
Environmental Affairs Office
P.O. Box 1270
Isleta, New Mexico 87022

Pueblo of Sandia
Environmental Affairs Office
Box 6008
Bernalillo, New Mexico 87004

Six Middle Grande Pueblos Coalition
2016 Gabaldon Dr. NW
Albuquerque, New Mexico 87104

Pueblo of Santa Ana
Department of Natural Resources
2 Dove Rd.
Bernalillo, New Mexico 87004

Ysleta Del Sur Pueblo
P.O. Box 17579 Ysleta Station
El Paso, Texas 79917

Pueblo of Santa Clara
P.O. Box 580
Española, New Mexico 87532

5.3.3 Congressional Delegation and New Mexico State Legislators

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Senator
200 E. Fourth St. Ste. 300
Roswell, New Mexico 88201

Honorable Bill Richardson
Governor State of New Mexico
Office of the Governor
Santa Fe, New Mexico 87501

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P.O. Box 1415
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New Mexico Association
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163 Trail Canyon Rd.
Carlsbad, New Mexico 88220

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207 Willow Ln.
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5.3.5 Libraries

Artesia Public Library
306 W. Richardson Ave.
Artesia, New Mexico 88210

Eddie County Law Library
County Courthouse
102 N. Canal St.
Carlsbad, New Mexico 88220

Carlsbad Public Library
101 S. Halagueno St.
Carlsbad, New Mexico 88220

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**APPENDIX A: EXISTING (2003) OIL AND GAS LEASING
STIPULATIONS**

**A-1: GENERAL SURFACE USE
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APPENDIX A: EXISTING (2003) OIL AND GAS LEASING STIPULATIONS

APPENDIX A-1: GENERAL SURFACE USE AND OCCUPANCY REQUIREMENTS

This appendix describes practices intended to be applied, when needed, to minimize surface disturbance.

The intent of the Surface Use and Occupancy Requirements is to best manage mechanical surface disturbance and other effects on specified natural resources. Mechanical surface disturbance is created by the use of such things as tools and machinery. Circumstances for waivers of the requirements have been included so that they will not be applied needlessly. Exceptions to the requirements will be considered in emergency situations involving human health and safety and the protection of the environment.

The basis for the “200 meter rule” used in the Surface Use and Occupancy Requirements is 43 CFR 3101.1-2, which states that, at a minimum, mitigation measures are deemed consistent with oil and gas lease rights if they do not require “...relocation of proposed operations by more than 200 meters...” The intent of the actions described in this Appendix is to comply with the regulations and allow the relocation of proposed activities to mitigate impacts, but by no more than 200 meters, without undertaking additional NEPA analysis. The opportunity exists through the NEPA process to design mitigation of impacts that would require relocation greater than 200 meters. The “200 meter rule” simply allows relocation of an activity, such as during on-site meetings prior to APD approval, without the need for detailed NEPA analysis.

The Surface Use and Occupancy Requirements identify minimum use standards for activities around certain natural and man-made features to ensure protection of those features.

- **Wildlife Habitat Projects:** Surface disturbance will not be allowed within 200 meters of existing or planned wildlife habitat improvement projects. Large-scale vegetation manipulation projects such as prescribed burns will be excepted. This requirement will be considered for waiver with appropriate off-site mitigation, as determined by the Authorized Officer.
- **Endangered Species:** Surface disturbance will not be allowed within 200 meters of critical endangered species habitat.
- **Raptor Nests and Heronries:** Surface disturbance will not be allowed within 200 meters of active heronries or by delaying activity for up to 120 days, or a combination of both. Raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and

escarpments, will be protected by not allowing surface disturbance within 200 meters of nests or by delaying activity for up to 90 days, or a combination of both. Exceptions to this requirement for raptor nests will be considered if the nests expected to be disturbed are inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and will not result in continuing activity in proximity to the nest.

- **Slopes or Fragile Soils:** Surface disturbance will not be allowed on slopes over 30 percent. Exceptions will be considered for projects designed to enhance or protect renewable natural resources, or if a plan of operations and development which provides for adequate mitigation of impacts was approved by the Authorized Officer. Occupancy or use of fragile soils will be considered on a case-by-case basis.
- **Streams, Rivers, and Floodplains:** Surface disturbance will not be allowed within 200 meters of the outer edge of the 100-year floodplain (As Defined by the Federal Emergency Management Agency FEMA), to protect the integrity of the floodplain. On a case-by-case basis, an exception to this requirement may be considered based on one or more of the criteria listed below. The first three criteria would not be applied in areas of identified critical or occupied habitat for federally listed threatened or endangered species.
 - Additional development in areas with existing developments that have shown no adverse impacts to the riparian areas as determined by the Authorized Officer, following a case-by-case review at the time of permitting.
 - Suitable off-site mitigation if habitat loss has been identified.
 - An approved plan of operations ensures the protection of water or soil resources, or both.
 - Installation of habitat, rangeland or recreation projects designed to enhance or protect renewable natural resources.
- **Playas and Alkali Lakes:** Surface disturbance will not be allowed within 200 meters of playas or alkali lakes. Waiver of this requirement will be considered on a case-by-case basis for projects designed to enhance or protect renewable natural resources. An exception for oil and gas development will be considered if playa lake loss was mitigated by the protection and development of another playa exhibiting the potential for improvement. Mitigation could include: installing fencing; developing a supplemental water supply; planting trees and shrubs for shelter belts; conducting playa basin excavation; constructing erosion control structures or cross dikes; or by improving the habitat in another area.

- **Springs, Seeps, and Tanks:** Surface disturbance will not be allowed within 200 meters of the source of a spring or seep, or within downstream riparian areas created by flows from the source or resulting from riparian area management. Surface disturbance will not be allowed within 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of tanks. Exceptions to this requirement will be considered for the installation of habitat or rangeland projects designed to enhance the spring or seep, or downstream flows.
- **Caves and Karst:** Surface disturbance will not be allowed within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. Waiver of this requirement will be considered for projects that enhance or protect renewable natural resource values, when the proposed activity is of a short duration, or when an approved plan of operations ensures the protection of the cave and karst resources. Also see Appendix A-3 for cave and karst drilling practices.
- **Visual Resource Management:** Painting of oil field equipment and structures to minimize visual impacts will be conducted according to the requirements of Notice to Lessees (NTL) 87-1, New Mexico. Low profile facilities also may be required, when needed, to reduce the contrast of a project with the dominant color, line, texture, and form of the surrounding landscape. Other surface facilities or equipment approved by the BOR, such as large-scale range improvements or pipelines, will be painted, when needed, to conform with the requirements of visual resource management to minimize visual impacts. Paint colors will be selected from the ten standard environmental colors approved by the Rocky Mountain Coordinating Committee. The selected paint color will match as closely as possible the predominant soil or vegetation color of the area.
- **Recreation Areas:** Facilities must be located so that they are not visible from designated recreation areas such as campgrounds, picnic areas, boat launch ramps, etc.
- **Spacing Requirements:** The lease or portion of a lease for an area within and below the full conservation pool elevation may be issued for the sole purpose of assisting the orderly development of the Federal mineral estate. This lease will only be used to maintain state well-spacing requirements on the lands noted above. With the exception of providing access, determined on a case-by-case basis, this lease does not grant surface occupancy.

The specific stipulations listed below are designed to protect the dams, water conveyance facilities, and the water quality in the Project Area.

1. Permittee agrees to provide written notice to the Bureau of Reclamation (BOR) 15 days prior to any and all intended surface activities in connection with exploration, drilling, or any other activity associated with, or leading to, oil and gas, geothermal or other leasable mineral

- production including seismic activity on any lands which the BOR has jurisdiction as the surface agency.
2. Permittee agrees to no surface occupancy within 800 horizontal meters (~1/2 mile) from the Brantley or Avalon Dam sites. Drilling proposed within 800 to 1600 meters (~ 1/2 to ~ 1 mile) of either dam will be considered on a case-by-case basis after review of the geology of the proposed site. This stipulation is to ensure the integrity of the structures.
 - 3a. Permittee agrees to no surface occupancy within 200 horizontal meters (~ 1/8 mile) or below the full conservation pool elevation (Brantley full pool elevation is 3,271 feet AMS) and no storage facilities below the maximum flood zone elevation at Brantley Reservoir (Brantley maximum flood surface elevation is 3286 feet above sea level). This stipulation is to reduce the possibility of contamination (pollution) affecting the reservoir waters.
 - 3b. Permittee agrees to no surface occupancy within 200 horizontal meters (~ 1/8 mile) of the maximum conservation pool elevation (Avalon maximum conservation pool surface elevation is 3190 feet) and no storage facilities below 3,200 feet at Avalon Reservoir.
 4. Permittee agrees to no surface occupancy within 200 horizontal meters (~ 1/8 mile) of the centerline of any constructed or proposed BOR tunnel, canal, aqueduct, pipeline, lateral, drain, transmission line, telephone line, roadway, building, or other permanent structures or facilities under the administration, jurisdiction, or ownership of the BOR. BOR operation and maintenance roads will not be used for access without prior approval of the BOR.
 5. Permittee agrees to no surface occupancy within 200 horizontal meters (approximately 1/8 mile) of any improved campground, boat ramp, or other permanent recreation facility.
 6. Permittee agrees to locate production facilities so they are not visible from the reservoir or public recreation facilities (campgrounds, etc.).
 7. Permittee agrees to no surface occupancy within the boundaries of Brantley Lake State Park or other designated public recreation areas.

APPENDIX A-2: GENERAL CONDITIONS OF APPROVAL

This appendix describes standard conditions of approval. When appropriate, conditions of approval may be selected from this list and attached to use authorizations. A check-list or other suitable means may be used to identify applicable conditions of approval. The emphasis is primarily on oil and gas operations and rights-of-way, but these conditions may be applied to other activities, as well.

General Conditions

1. Reclamation does, through the duly authorized officer executing this Permit, hereby consent to Permittee’s request to enter onto lands of the United States for the purpose of; establishing, constructing, placing, operating and maintaining an oil and gas well head and appurtenant facilities approved _____ by the State of New Mexico’s Energy, Minerals and Natural Resources Department (_____) and constructing, improving and maintaining an access road to that site, subject to the terms and conditions herein written:

said lands located in the XX (XX) of Section XX and the XX of the XX (XX) of Section XX of Township XX South, Range XX East, New Mexico Principal Meridian in Eddy County, New Mexico. The area is shown in the attached “Exhibit A,” and made a part hereof.

2. This permission given herein will neither constitute nor be construed as any surrender of the jurisdiction and supervision of the United States over the lands described herein.
3. The Permittee hereby agrees to indemnify and hold harmless the United States, their employees, agents, and assigns from any loss or damage and from any liability on account of personal injury, property damage, or claims for personal injury or death arising out the Permittee’s activities under this Permit.
4. The Permittee will comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the Permittee will comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et. seq.) with regard to any toxic substances that are used, generated by or stored on United States lands or on facilities authorized by this permit. (Re: 40 CFR, Part 702-799 and particularly provisions on polychlorinated biphenyls, 40 CFR, Part 761.1 - 761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 will be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of the reportable release or spill of toxic substances will be furnished to Reclamation concurrent with the filing of the reports to the involved Federal agency or State government.
5. The Permittee agrees to indemnify and hold harmless the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601 et. seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et. seq.) on United States lands unless the release is wholly unrelated to the



Permittee's activities on United States lands. This agreement applies without regard to whether a release is caused by the Permittee, its agent or unrelated third parties.

6. If, during any phase of the construction, operation, maintenance, or termination of the facilities authorized by this permit, any oil or other pollutant should be discharged, impacting United States lands, the control and removal, disposal, and cleaning up of such oil or other pollutant, wherever found will be the responsibility of the Permittee, regardless of fault. Upon failure of the Permittee to control, repair all damages to United States lands resulting therefrom, Reclamation may take such measures as deemed necessary to control and clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the Permittee. Such action by Reclamation will not relieve the Permittee of any liability or responsibility.
7. The Permittee will comply with all applicable water, ground, and air pollution laws and regulations of the United States, the State of New Mexico and local authorities. In addition the Permittee will comply with the following hazardous materials restrictions:
 - A. The Permittee will comply with all applicable Federal, State, and local laws and regulations, and Reclamation policies and instructions, existing or hereafter enacted or promulgated, concerning any hazardous material that will be used, produced, transported, stored or disposed of on or in lands, waters or facilities owned by the United States or administered by Reclamation.
 - B. "Hazardous material" means any substance, pollutant or contaminant listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. 9601, et seq., and the regulations promulgated pursuant to that Act.
 - C. The Permittee may not allow contamination of lands, waters or facilities owned by the United States or administered by Reclamation by hazardous materials, thermal pollution, refuse, garbage, sewage effluent, industrial waste, petroleum products, mine tailings, mineral salts, pesticides (including, but not limited to, the misuse of pesticides), pesticide containers or any other pollutants.
 - D. The Permittee will report to Reclamation, within 24 hours of its occurrence, any events which may or does result in pollution or contamination adversely affecting lands, water or facilities owned by the United States or administered by Reclamation.
 - E. Violation of any of the provisions of this Article will constitute grounds for immediate termination of this Permit and will make the Permittee liable for the cost of full and complete remediation and/or restoration of any Federal resources or facilities that are adversely affected as a result of violation.

- F. The Permittee agrees to include the provision contained in paragraphs (a) through (e) of this Article in any subcontract or third party contract it may enter into pursuant to this Permit.
 - G. Reclamation agrees to provide information necessary for the Permittee, using reasonable diligence, to comply with the provision of this Article.
8. The holder shall be responsible for maintaining the site in a sanitary condition at all times; waste materials shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.
 9. The Permittee will minimize disturbance to existing fences and other improvements on United States lands. The Permittee is required to promptly repair improvements to at least their former condition. Functional use of these improvements will be maintained at all times. The Permittee will make a documented good-faith effort to contact the owner of any improvements prior to disturbing those facilities. When necessary to pass through a fence line, the fence will be braced on both sides of the passageway prior to cutting the fence.
 10. This Permit is granted subject to the existing rights in favor of the public or third parties for highways, roads, railroads, telegraph, telephone and electrical transmission lines, canals, laterals, ditches, flumes, siphons, and pipelines on, over, and across said land.
 11. This Permit is personal, revocable, and nontransferable and will become effective on the date hereinabove written and unless otherwise sooner terminated, will continue for ten (10) years so long as in the opinion of Reclamation it is considered expedient and not detrimental to the public interest, and will be revocable upon sixty (60) days written notice to the Permittee in accordance with Article 11. Upon such revocation or termination, the aforesaid structure or structures and all accessories will be removed without delay at the expense of the Permittee. The Permittee will leave the site(s) in a condition satisfactory to Reclamation and the Bureau of Land Management.
 12. This Permit may be revoked by Reclamation upon sixty (60) days written notice to the Permittee if:
 - A. The Permittee's use of the land interferes with existing or proposed facilities; or
 - B. The land contained in the Permit is needed for any United States purpose; or
 - C. The United States disposes of its interest in the land contained in this Permit; or

- D. The Permittee fails to comply with any other terms or conditions of this Permit and upon notification of the violation, Permittee fails to adequately cure the violation in a timely manner. Reclamation will have the final determination regarding the adequacy of the cure.
13. Reclamation has appraised the fair market value of the right-of-use fee in accordance with 43 CFR, Part 429.3. Said appraisal has established the fee for the right-of-use as \$ _____, and is due prior to the United States executing this Permit.
14. The Permittee will comply with Section 106 of the National Historic Preservation Act (P.L. 89-665, 80 Stat.915 [16 USC 470] as amended, the New Mexico Cultural Properties Act (NMSA 1978, 18-6-1 through 18-6-23), and the Prehistoric and Historic Sites Preservation Act (NMSA 18-8-1 through 18-8-8) and their implementing regulations for all registered cultural properties on Reclamation lands, specifically including all properties and lands within the Carlsbad Irrigation District National Historic Landmark. The New Mexico State Cultural Properties Act requires that survey work for archaeological sites be conducted prior to any development on State or Federal lands. The Permittee will get written authorization before any work is started within the Carlsbad Irrigation District National Historic Landmark. Any cultural resources discovered shall be immediately reported to the authorizing officer.

Pursuant to the Memorandum of Agreement with the Bureau of Reclamation, the Advisory Council on Historic Preservation and the New Mexico State Historic Preservation Officer, the Carlsbad Irrigation District will ensure compliance with the New Mexico Cultural Properties Act (NMSA 1978, 18-6-1 through 18-6-23), and the Prehistoric and Historic Sites Preservation Act (NMSA 18-8-1 through 18-8-8) and their implementing regulations for all registered cultural properties conveyed to the CID by the Bureau of Reclamation.

In the event cultural resources (including architecture, artifacts, and/or cultural debris of bone, shell, charcoal, or wood) are discovered during activities authorized herein, Permittee will immediately cease work in proximity of the discovery location and contact the Reclamation archaeologist immediately at (505) 462-3644, giving location and nature of the findings. The Permittee will exercise care so as not to disturb or damage the cultural materials discovered, and will provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the Government.

Discovery of Human Remains: Any person who knows or has reason to know that he or she has inadvertently discovered possible human remains on Federal lands, must provide immediate telephone notification of the inadvertent discovery to the Reclamation archaeologist at (505) 462-3644.

If the discovery occurred in connection with an activity, including (but not limited to) construction, mining, logging, and agriculture, the person will cease the activity in the area of the discovery, make a reasonable effort to protect the items discovered, and wait for approval from the Reclamation archaeologist before resuming such activity. The requirement is prescribed under the Native American Graves Protection and Repatriation Act (Public Law 101-601; 104 Stat. 3042) of November 1990 and National Historic Preservation Act, Section 110(a)(2)(E)(iii) (Public Law 102-575, 106 Stat. 4753) of October 1992.

Destruction of Archaeological Resources: Any person who excavates, removes, damages, alters or defaces or attempts to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands or Indian land is subject to a maximum of five years in prison and \$250,000 fine, as prescribed under Sections 6 and 7 of the Archaeological Resources Protection Act of 1979 (Public Law 96-95, 93 Stat. 721), as amended.

15. No member of or delegate to Congress or the Resident Commissioner will be admitted to any share or part of this Permit or to any benefit to arise therefrom, but this restriction will not be construed to extend to this Permit if made with a corporation or company for its general benefit.
16. The Permittee warrants that no person or agency has been employed or retained to solicit or secure this Permit upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee except bona fide employees and bona fide commercial agencies maintained by the Permittee for the purpose of securing business. For breach or violation of this warranty, Reclamation will have the right to revoke this Permit without liability or in its discretion to require the Permittee to pay the full amount of such commission, percentage, brokerage, or contingency fee to the United States.

Road Construction, Improvement, and Maintenance

17. The road will have a driving surface of 14 feet. The maximum grade is 10 percent unless agreed to by Reclamation in writing. If Reclamation does permit grades in excess of 10 percent for a distance of more than 300 feet, that segment will be designed by a professional engineer. Maximum width of surface disturbance from construction, improvement and maintenance activities will be 30 feet.
18. Crowning with materials on site and ditching on one side of the road of the uphill side will be required. The crown will have a grade of approximately 2 percent, i.e. 1 inch crown per 12 feet of width. If conditions dictate, ditching may be required for both sides of the road; if conditions permit, flat-bladed road may be considered.

19. Drainage control will be ensured over the entire road through the use of borrow ditches, outsloping, insloping, natural rolling topography, lead-off (turnout) ditches, culverts, and/or drainage dips. All lead-off ditches will be graded to a 3 percent maximum ditch slope. The spacing interval for lead-off ditches will be determined according to the following table, but may be amended depending upon existing soil types and centerline road slope in percentage.

SPACING INTERVAL FOR TURNOUT DITCHES

<u>Percent Slope</u>	<u>Spacing Interval</u>
0 – 4	400 feet – 150 feet
4 – 6	250 feet – 125 feet
6 – 8	200 feet – 100 feet
8 – 10	150 feet – 75 feet

A typical lead-off ditch has a minimum depth of one foot below and a berm 6 inches above the natural surface elevation. The berm will be on the downslope side of the lead-off ditch. The ditch will tie into vegetation wherever possible.

Culvert pipes will be used for cross drainage dips where low water crossings are not feasible. The minimum culvert diameter must be 18 inches. Any culvert pipe installed will be of a sufficient diameter to pass the anticipated flow of water. Culvert location and diameters will be submitted to Reclamation by Permittee for Reclamation approval.

On road slopes exceeding 2 percent, drainage dips will drain water into an adjacent lead-off ditch. Drainage dip location and spacing will be determined by the following formula:

$$\text{spacing interval} = 400 \text{ ft} / \text{road slope percent} + 100 \text{ ft.}$$

$$\text{example 2\% slope: } 400/2 + 100 = 300 \text{ feet}$$

20. The road or those portion identified by Reclamation may, as determined by Reclamation, be required to be surfaced with caliche, gravel, or other surfacing material which will be approved by Reclamation. When surfacing is required, surfacing material will be compacted to a minimum thickness of six inches with caliche material. The width of surfacing will be no less than the driving surface. Prior to using any mineral materials from any existing or proposed source, authorization must be obtained from Reclamation.
21. Where used, all Cattleguard grids and foundation design and construction will meet the American Association of State Highway and Transportation Officials (AASHTO) Load Rating H-20, although AASHTO U-80 rated grids will be required where heavy loads (Exceeding H-20 loading), are anticipated. Cattleguard grids will not be less than 8 feet in length nor less than 14 feet in width. A wire gate, 16 foot minimum width will be provided on one side unless otherwise requested by the surface user.



- 22. Permittee will maintain the road in a safe, usable condition. A maintenance program will include, but not limited to blading, ditching, culvert cleaning, drainage installation, cattle guard maintenance and surfacing.
- 23. Unless otherwise approved by the Authorized Officer, vehicle turnouts will be required. Turnouts will be located at 2000-foot intervals, or the turnouts will be intervisible, whichever is less.
- 24. Unless otherwise determined by Reclamation, the road will not be used as an access for the public. Reclamation withdrawn lands are established for project purposes and are not subject to the use by the general public. Permittee will be responsible to ensure that the public use is restricted from the withdrawn lands under management by Reclamation.
- 25. The area will be kept free of the following plant species: Malta starthistle, African rue, Scotch thistle, and Saltcedar.
- 26. Reclamation will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be done at that point until clearance has been issued by Reclamation. Special restoration stipulations or a realignment may be required at such intersections, if any. Roads and pipelines will be routed around sinkholes and other karst features when practical. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out of cave or karst features.

Road Rehabilitation

- 27. When the road is abandoned, it will be ripped at least sixteen inches deep, including all turnouts. The caliche may be reclaimed for re-use before ripping. The caliche will be removed and topsoil placed over the impacted area, and the surface disced before seeding. All culverts or other structures will be removed. All fill material will be replaced into the cut areas; borrow and lead-off ditches, drainage dips, or other erosion control earthwork will be filled or smoothed, and the abandoned road returned to the natural contours, as closely as possible. Traffic barriers will be installed at all vehicular access points to prevent further use of the road. Water breaks at least 8-inches high will be constructed as directed by Reclamation.
- 28. Permittee will reseed the entire area with the following mixture:

<u>Seed</u>	<u>Rate (lbs. per acre PLS)</u>
Alkali sacaton (<i>Sporobolus airoides</i>)	3 lbs. per acre
Sideoats grama (<i>Bouteloua curtipendula</i>)	5 lbs. per acre



Pounds of pure live seed (PLS): (Pounds of seed) * (percent of purity) * (percent of germination).

All disturbed areas are to be seeded with the seed mixture listed above. The seed and fertilizer are to be applied together by broadcasting with a seed spreader, than harrowed for seed coverage. Use of a seed drill is acceptable. Appropriate measures will be taken to insure that the seed/fertilizer mixture is evenly and uniformly planted. There will be no primary or secondary noxious weeds in the seed mixture. Seeds will be tested for viability and purity in accordance with State law(s) within nine months prior to purchase. Commercial seed will be either certified or registered and the seed mixture container will be tagged in accordance with State law(s). The seed will be available for inspection by Reclamation. The seeding will be repeated until a satisfactory stand is established as determined by Reclamation. Evaluation of growth will not be made before completion of the growing season after seeding.

29. Normally the best time for seeding is between June 15 and September 15. However, the Permittee may reseed immediately after completing surface abandonment procedures. In any event, Reclamation reserves the right to require reseeding at a specified time if the seed does not germinate after one complete growing season.
30. Permittee will contact Reclamation at 505.462.3599 at least three working days prior to the start of reseeding activities.

Drilling Surface Requirements: Standards

31. The approval of this action does not in any way grant or imply approval of any off-lease or off-unit action. It is the responsibility of the applicant to obtain any such approvals from the appropriate surface managing agency, including the Reclamation, and/or any private landowners.
32. Prior to commencing construction of the road, pad, or other associated developments, the operator shall provide the dirt contractor with a copy of the approved Surface Use Plan and the attached Conditions of Approval.
33. All topsoil and vegetation encountered during the construction of the drill site areas shall be stockpiled and made available for resurfacing of the disturbed areas after completion of the drilling operations. Topsoil on the (well name and number) is approximately (specify) inches in depth. A minimum of approximately (specify) Cubic yards of topsoil material shall be stockpiled on the (specify) edge / at the (specify) corner of the location for reclamation of the pad and pit area.

34. The Permittee shall post signs identifying the location permitted herein in accordance with the requirements contained in 43 CFR 3162.6. The following data is required on the well sign:

Operator's Name: _____

Well Name and No.: _____

Lease No.: _____

Location: xx' fxl & xx' fxl - Sec. nn T nn S, R nn E NMPM

35. All vehicles and equipment associated with the drilling, completion, or production phases of this well shall be confined to the approved road, pad and other areas approved herein.
36. The drill pad and access road for this well must be surfaced with 6 inches on compacted caliche, gravel or other approved surfacing material. Caliche, gravel or other related materials from new or existing pits on Federal mineral estate shall not be taken without the approval of Reclamation and the Bureau of Land Management. Payment for Federal mineral materials to be used for construction is required prior to construction of the pad and road.
37. Reserve or mud pits shall not be constructed within the Project Area. The Permittee will use the Closed Loop System with no reserve pits. The entire well pad will be bermed to prevent oil, salt, and other contaminants from leaving the well pad. Topsoil shall not be used to construct any of the berms. The berms shall be maintained throughout the life of the well.
38. Stockpiling of topsoil is required. The topsoil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. Any water erosion that may occur during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. The surface material for the road and well pad shall be removed before reclamation can begin.
39. Firewalls/Containment Dikes are to be constructed and maintained around all storage facilities/batteries. A 20-millimeter, permanent liner will be installed with a 4-ounce felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1.5 times the capacity of the largest tank. Automatic shut-off check valves, or similar systems, will be installed to minimize the effects of catastrophic line failures used in production or drilling. Exhaust noise from pump jack engines must be muffled or otherwise controlled.
40. If during any drilling or construction activities any sinkholes or cave openings are discovered, all drilling or construction activities shall cease immediately and Reclamation

will be notified. Within one working day, Reclamation will evaluate the situation and determine if construction can continue or provide mitigation measures to lessen damage to the karst environment. Reclamation will coordinate this activity with the Bureau of Land Management and a verbal recommendation to proceed or stop the operation will be issued.

41. All trash, junk and other waste material will be contained in trash cages or bins to prevent scattering and will be removed and deposited in an approved sanitary landfill. Waste burial on site is not permitted.
42. All above ground structures not subject to safety requirements shall be painted by the Permittee to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project will be provided within thirty days following the execution of this permit.
43. All open-vent exhaust stacks associated with heater-treater, separator and dehydrator units shall be modified to prevent birds and bats from entering them and to the extent practical to discourage perching and nesting.

New production equipment installed on federal leases after November 1, 1993, will have the open-vent exhaust stacks constructed to prevent the entry of birds and bats and, to the extent practical, to discourage perching and nesting.

Buried Pipelines

44. The holder shall conduct all activities associated with the construction, operation, and termination of the pipeline within the authorized limits.
45. The pipeline shall be buried with a minimum cover of _____ inches between the top of the pipe and ground level.
46. Blading of all vegetation shall/shall not be allowed. Blading is defined as the complete removal of brush and ground vegetation. Clearing of brush species shall be allowed. Clearing is defined as the removal of brush while leaving ground vegetation (grasses, weeds, etc.) intact. Clearing is best accomplished by holding the blade 4 to 6 inches above the ground surface. In areas where blading and/or clearing is allowed, the maximum width of these operations shall not exceed _____ feet.
47. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing

- them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.
48. Vegetation, soil, and rocks left as a result of construction or maintenance activity shall be randomly scattered over the project area and shall not be left in rows, piles, or berms, unless otherwise approved by the Authorized Officer, except that an earthen berm shall be left over the ditch line to allow for settling back to grade.
 49. The holder shall seed all surface disturbed by construction activities. Seeding shall be done according to the attached seeding requirements (Exhibit _____), using the attached seed mixture (as determined to meet Desired Plant Community objectives).
 50. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates “Standard Environmental Colors” designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is _____, Munsell Soil Color Chart Number _____.
 51. The holder shall post signs designating the Reclamation serial number assigned to this authorization at the following locations: the points of origin and completion, or entry to and exit from public lands, of the pipeline and at all major road crossings. These signs shall be posted in a permanent, conspicuous manner, and shall be maintained in a legible condition for the term of the authorization.
 52. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder shall take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

Surface Installed Pipeline

53. No surface pipeline will be placed within/below the 100-year floodplain at Brantley Reservoir (elevation 3,283 feet [1,000 meters]) or Avalon Reservoir (elevation 3,200 feet [975 meters]).
54. The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2803/2883. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from fire or soil movement (including landslides and slumps as well as wind and water caused movement of particles) caused or substantially aggravated by any of the following within the permit area:

- A. Activities of the holder, including but not limited to, construction, operation, maintenance, and termination of the facility.
- B. Activities of other parties including but not limited to:
 - 1. Land clearing.
 - 2. Earth-disturbing and earth-moving work.
 - 3. Blasting.
 - 4. Vandalism and sabotage.
- C. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars (\$1,000,000) for any one event and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction of in which the damage or injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from the negligent acts of the United States.

- 55. The holder shall conduct all activities associated with the construction, operation, and termination of the pipeline within the authorized width of _____ feet.
- 56. No blading or clearing of any vegetation shall be allowed unless approved in writing by the Authorized Officer.
- 57. The holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky or dune areas, the pipeline will be “snaked” around hummocks and dunes rather than suspended across these features.
- 58. The pipeline shall be buried a minimum of _____ inches under all roads, including “two-tracks” and trails. Burial shall continue for 20 feet on each side of each crossing. The condition of the road, upon completion of the construction, shall be returned to at least its former state, with no bumps, dips, or soft spots remaining in the road surface.
- 59. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.

60. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates “Standard Environmental Colors” designated by the Rocky Mountain five-State Interagency Committee. The color selected for this project is _____, Munsell Soil Color Chart Number _____.
61. The holder shall post signs designating the Reclamation serial number assigned to this pipeline at the following locations: the points of origin and completion, or entry to and exit from public lands, of the pipeline and at all major road crossings. These signs shall be posted in a permanent, conspicuous manner, and shall be maintained in a legible condition for the term of the authorization.
62. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder shall take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

Overhead Electric Distribution Lines

63. The holder shall conduct all activities associated with the construction, operation, and termination of the power line within the authorized limits.
64. No blading or clearing of any vegetation will be allowed unless approved in writing by the Authorized Officer.
65. Power lines shall be constructed to standards outlined in “Suggested Practices for Raptor Protection on Power lines,” Raptor Research Foundation, Inc., 1981, unless otherwise agreed to by the Authorized Officer in writing. The holder is responsible for demonstrating that power pole designs not meeting these standards are “raptor safe”. Such proof shall be provided by a raptor expert approved by the Authorized Officer. The Reclamation reserves the right to require modifications or additions to power line structures constructed under this authorization, should they be necessary to ensure the safety of large perching birds. These modifications and/or additions shall be made by the holder without liability or expense to the United States.
66. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence will be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

67. Construction holes left open overnight shall be covered. Covers shall be secured in place and shall be strong enough to prevent livestock or wildlife from falling through and into a hole.
68. The holder shall evenly spread the excess soil excavated from pole holes in the immediate vicinity of the pole structure.
69. The Reclamation serial number assigned to this authorization grant shall be posted in a permanent, conspicuous manner, and be maintained in a legible condition for the term of the authorization at all major road crossings and at all serviced facilities. Numbers will be at least two inches high and will be affixed to the pole nearest the road crossing and at the facilities served.
70. Upon cancellation, relinquishment, or expiration of this grant, the holder shall comply with those abandonment procedures prescribed in the grant or determined at the time of abandonment.
71. All surface structures (poles, lines, transformers, etc.) Shall be removed within _____ days of abandonment, relinquishment, or termination of use of the serviced facilities or within _____ days of abandonment, relinquishment, or termination of this authorization, whichever comes first. This will not apply where the power line extends to serve an active, adjoining facility or facilities.

Communication Sites

72. The authorization is conditioned upon the submission of a copy of an approved license and/or renewal license granted by the Federal Communication Commission (FCC) or the Interdepartmental Radio Advisory Committee (IRAC) for each electronic station installation authorized or future amendments of this authorization. A copy of the FCC or IRAC authorization shall be submitted with 90 days of issuance of this authorization or within 90 days following approval of an amendment to this authorization. Failure to submit the FCC or IRAC authorization copy within the time specified shall be grounds for termination of this authorization or cancellation of an amendment to this authorization. The Authorized Officer may grant an extension of up to 90 days, if requested in writing by the holder.
73. The holder and its sublessees shall at all times operate their radio-electronic equipment in such a manner as not to cause interference with radio-electronic operations of existing users in the vicinity. If such interference results from holder's or sublessee's operations, holder shall promptly, at its own expense, modify the equipment and operations, or shut down if necessary to eliminate or reduce the interference to the satisfaction of the FCC, IRAC, and/or the Authorized Officer.

74. The holder shall notify the Authorized Officer of any intent to locate additional users within or upon their existing facilities, not less than 45 days prior to occupancy of holder's facilities. Information that must included is:
 - A. Name, current address, and phone number of the third party user(s).
 - B. Expected date of occupancy.
 - C. A photo or sketch of the type of antennas to be installed, as well as any other planned physical changes to the exterior facilities operated by the holder. If the proposed use is not specified in the original authorization shall be required.
75. No less than 45 days prior to occupancy of the holder's facility, the holder shall notify existing users within a 1-mile radius that the holder intends to accommodate a new communication user in its facility. Existing users can then file any comments pertaining to potential frequency or electromagnetic problems with the Federal Communications Commission, 1919 M Street NW, Washington, DC 20554, with a copy to the Authorized Officer.
76. The holder shall be responsible for the actions and operations of any third party users associated with this facility. All such use shall be subject to the applicable terms, conditions, and stipulations of this authorization.
77. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is _____, Munsell Soil Color Chart Number _____.
78. The holder shall post signs designating the Reclamation serial number assigned to this facility at the points of entry to and exit from the site. These signs shall be posted in a permanent, conspicuous manner, and shall be maintained in a legible condition for the term of the authorization.
79. The holder agrees to share road maintenance costs with all present and future users of the access road. At such future time as a Users Association for this communication site is formed, the holder shall join the Users Association and remain a member in good standing. Within 30 days of the creation of such Users Association the holder shall provide the authorized officer with evidence of membership. Failure of the holder to join the Users Association and remain a member in good standing shall constitute sufficient grounds for termination of this authorization.

Mineral Material Sites (Gravel, Sand, Saleable Type Minerals)

80. All design, material, and construction, operation, maintenance, and termination practices shall be in accordance with safe and proven engineering practices, and include Storm Water Pollution Prevention Plans that address erosion and sediment control as well as other potential pollutants.
81. The holder shall conduct all activities associated with the construction, operation, and termination of the material pit within the authorized limits.
82. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.
83. The holder shall be responsible for the actions and operations of any third party users associated with this authorization. All such use shall be subject to the applicable terms, conditions, and stipulations of this authorization.
84. The road proposed as part of this authorization shall be constructed and maintained in accordance with Reclamation road standards, including the New Mexico Roads Policy.
85. The holder shall seed all surface disturbed by construction activities. Seeding shall be done according to the attached seeding requirements (Exhibit _____), using the attached seed mixture (as determined by DPC).
86. Suitable topsoil material removed in conjunction with clearing and stripping shall be conserved in stockpiles (within the material site) (at the following staked locations: specify location). Topsoil shall be stripped to an average depth of (specify) inches. A total of (specify) cubic yards of topsoil shall be stockpiled.
87. Excess excavated, unsuitable, or slide material shall be disposed of as directed by the Authorized Officer.
88. No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of (designate) inches deep, the soil shall be deemed too wet to adequately support construction equipment.

89. Existing roads and trails on public lands that are blocked as the result of the material pit activities shall be rerouted or rebuilt as directed by the authorized officer.
90. The holder shall recontour the disturbed area and obliterate all earthwork by removing embankments, backfilling excavations, and grading to reestablish the approximate original contour of the land as determined by the Authorized Officer.
91. The holder shall uniformly spread topsoil over all unoccupied disturbed areas. Spreading shall not be done when the ground or topsoil is frozen or wet.
92. Reclamation will monitor construction on this material pit site. Notify the appropriate Reclamation Resource Area Office at least _____ working days prior to commencing excavation at _____.

Floodplain Development

93. If a threat of flooding by the Pecos River occurs during drilling operations, the _____ Resource Area Manager will issue a shut-in order. Toxic substances and, possibly, drilling equipment will be removed from the floodplain.
94. A drilling pad will be elevated at least _____ (inches, feet) and surfaced according to Condition of Approval 36.
95. All riparian habitat will be protected according to instructions provided by the Authorized Officer. Trees will not be cut down unless authorized.
96. No storage facilities will be allowed within 660 horizontal feet (200 horizontal meters) of the 100-year floodplain at Brantley or Avalon Reservoirs.
97. Pits containing oil, tank bottoms or other hydrocarbons, salt water, or any toxic substances will not be allowed in the floodplain.
98. Provision for containing salt water flow must be made prior to beginning drilling, without resorting to reserve pits constructed in the ground. Metal tanks or tank trucks must be in place to collect salt water. Salt water storage will not be allowed in the floodplain.
99. Production facilities will be located outside the floodplain.
100. Flow lines from the wellhead to production facilities will be buried, if soil conditions permit burial.

101. Special precautions will be taken to reduce damage from flooding:
- A. The well will be equipped with a down-hole shut-in device, rated at working pressure of 1,500 psi; or
 - B. The wellhead will be buried below ground in a concrete cellar with a grate over it; or
 - C. Three steel posts will be set in concrete. Horizontal steel cross bars will connect the posts. Heavy gauge chain link fencing will be welded or bolted to the post and cross bars. The V must point upstream or in the direction specified.
102. Chemical toilets will be used instead of latrines.

Drilling Rig Storage

103. The holder shall conduct all activities associated with the operation, and termination of the rig storage within the authorized limits. All activity will be limited to _____ (describe authorized area of activity) and the immediate perimeter _____ (describe distance; maximum of 20 feet).
104. If the storage of this rig should interfere with the producer's operations, the holder shall be required to remove it immediately.
105. Should the well be plugged and abandoned during the term of this permit, the permittee will be required either to remove the drilling rig within 30 days or assume all responsibility for restoration of the well pad and access road.
106. The Reclamation will be notified in writing within 30 days after removal of the drilling rig. Address correspondence to:

Bureau of Reclamation
Carlsbad Project Office
620 East Greene
Carlsbad, NM 88221-1356

Geophysical Exploration

107. All large, hummocky sand dunes encountered during geophysical operations shall be avoided by driving around the sand dunes.



108. Any large trees (e.g., soapberry, elm or large mesquite) encountered in the area of operations shall be avoided and shall not be disturbed.
109. Playas shall be avoided by using re-routes or skips.
110. Wildlife watering facilities shall be avoided by using re-routes or skips.
111. Archaeological sites shall be avoided by adhering to the re-routes flagged in the field, which are listed in the attachment to the NOI. Additional cultural resources protections provided in cultural report _____, which are listed in the attachment, shall be followed.
112. Any fence needing to be cut during operations to allow access shall be immediately repaired to a condition as good as or better than the condition in which the fence was found. No fence shall be removed.
113. Where appropriate, disturbed areas shall be rehabilitated as directed by the Authorized Officer. Rehabilitation techniques may include, but are not limited to: ripping, discing, or other seed bed preparation; reseeding; placement of erosion control devices; and berming, barricading, and/or signing geophysical routes where they cross roads.
114. Operations shall be suspended when, in the judgment of the Authorized Officer, they have the possibility of unduly harming the surface during periods of wet weather or drought.

APPENDIX A-3: PRACTICES FOR OIL AND GAS DRILLING AND OPERATIONS IN CAVE AND KARST AREAS

This appendix describes practices for detecting and avoiding significant caves and significant karst features with respect to oil and gas drilling, and for mitigating impacts to significant caves and karst when they cannot be avoided. These mitigations are predicated on the Reclamation’s responsibilities for resource management and protection derived from the Federal Land Policy and Management Act, the Federal Cave Resources Protection Act, and the National Environmental Policy Act. The practices described here supersede those of the Draft “Interim Guide for Oil and Gas Drilling and Operations in Cave and Karst Areas” (February 1993).

Potential for Caves or Karst

A map of cave or karst potential will be maintained to provide the public with current information about the likelihood of the presence of cave or karst resources. The map will serve as an indicator of the potential for encountering caves or karst for which special practices could be required, following

NEPA analysis, to mitigate drilling impacts. The primary use of the map is as a source of information for individuals or companies contemplating the leasing of federal minerals.

Three zones of cave or karst occurrence have been identified and categorized: high potential; medium potential; and low potential. Areas that contain known cave or karst features are in the high potential zone. Areas containing known soluble rock formations with the potential for cave or karst development are in the medium potential zone. These zones were identified using geological maps and existing information on caves and karst. All other lands fall into the low potential zone. These zones were identified using geologic maps and existing information on caves and karst. All other lands fall into the low potential zone. These zones may be increased or decreased in size as new information from drilling, cave exploration or other sources becomes available.

The cave or karst occurrence zones have been further divided into smaller geographic areas to provide an additional means of identification of a specific area. An estimate has been made for each of these areas as to the lowest likely depth at which caves might be expected. Again, this is simply a source of information for individuals or companies contemplating the leasing of Federal minerals. The lease notice “Potential Cave or Karst Occurrence Area” (Roswell 46), will be applied to leases when all or part of the lease is located in a high or medium potential cave or karst occurrence area. An example of the least notice is included below. The purpose of the lease notice, as with maps of cave or karst potential, is to provide information to the purchasers of federal oil and gas leases.

Table C3-1. Cave or Karst Occurrence Areas, Brantley and Avalon Project Area.

AREA NAME	DEPTH ^b	POTENTIAL ^b
Burton Flats	350	High

Because the identification of cave or karst potential zones is only informational, the mitigations described below will be applied, when and where appropriate, irrespective of any identified zone of cave or karst potential. However, the emphasis of management will be on caves presently designated significant or on those designated in the future as significant, and on significant karst features.

Lease Notice

Potential Cave or Karst Occurrence Area

All or portions of the lease are located in a potential cave or karst occurrence area. Within this area, caves or karst features such as sinkholes, passages, and large rooms may be encountered from the surface to a depth of as much as 2,500 feet, within surface areas ranging from a few acres to hundreds of acres. Due to the sensitive nature of the cave or karst systems of this area, special



protective measures may be developed during environmental analyses and be required as part of approvals for drilling or other operations on this lease. These measures could include relocation of the proposed well; changes in drilling operations; special casing and cementing programs; modifications to surface facilities; or other reasonable measures to mitigate impacts to cave or karst values. These measures may be imposed in accordance with 43 CFR 3101.1-2; 43 CFR 3162.5-1; Onshore Oil and Gas Order No. 1; and Section 6 of the lease terms (Roswell 46 February 1991).

Mitigation of Drilling Impacts

The need to relocate drilling locations to avoid caves or karst, and any special drilling or production practices employed to mitigate impacts to caves or karst, will be determined during the NEPA analysis of APDs or other applications.

The practices described below will be applied where needed, and to the extent necessary, to ensure that the potential impacts of drilling oil or gas wells, or of constructing other facilities, in cave or karst areas would be minimized according to the following process:

1. Detect potential cave or karst resources and determine their significance.
2. Avoid cave or karst resources where possible.
3. Mitigate impacts to caves or karst that cannot be avoided.

The result of any detection efforts will be addressed in the NEPA analysis and appropriate mitigations will be developed, if needed as part of the analysis.

Depending on the results of detection, avoidance will be considered as a means of mitigating potential impacts. In most cases, avoidance will be accomplished by relocation of the proposed well location, which is often done in consultation with the operator at the time of a field examination. Moving a proposed location up to 200 meters is a commonly employed avoidance measure. The need to move a location more than 200 meters will be addressed in the NEPA analysis of an APD. If the construction of a pipeline, road, power line or other facility is proposed, rerouting or relocation will be required to accomplish avoidance.

The management of oil and gas operations in cave or karst areas, including approvals for drilling oil or gas wells, will be guided by procedures described below, Surface Use and Occupancy Requirements (Appendix A-1), and Conditions of Approval (Appendix A-2). These practices will be modified as new and cost effective technologies for cave and karst protection become available.

Detection Methods

The primary detection method will be the review of Reclamation or other records on the presence of caves or karst features in the area of interest, in conjunction with a field exam by a Reclamation

employee or cave inventory contractor to determine the presence of unrecorded cave or karst features. Depending on the results of initial detection efforts and a determination of potential significance by the Reclamation, cave exploration could be employed to gain additional information. As various geophysical techniques are proven useful for cave detection and become generally available for use, they may be considered on a case-by-case basis as a means of locating unrecorded cave or karst features.

Surface Mitigation

Whether or not a proposed activity has been relocated to reduce potential impacts on caves or karst, surface mitigations will be applied, when needed to minimize the risk of impacts during construction, drilling or production. Appropriate surface mitigations will be developed during the NEPA analysis of a proposal and could include one or more of the following practices, most of which have long been employed to mitigate impacts.

Practices to minimize potential impacts from reserve pit spill or leakage:

- The use of a Closed Loop System or steel tanks.

Practices to minimize potential impacts from leaking tanks or pipelines:

- The construction of berms around storage tanks sufficient to contain spills, in accordance with Conditions of Approval (Appendix A-2);
- The installation of leak detection systems for pipelines or tanks;
- The use of permanent liners in storage tank areas;
- The use of differential pressure shut-off valves;
- The use of corrosion-inhibiting coatings and cathodic protection.

Practices to minimize the potential impacts of vented or escaping gases settling in caves:

- The flaring or venting of gas to protect human safety and to better disperse the gases and eliminate possible gas ignitions;
- The use of stock tank vapor recovery systems.

Subsurface Mitigation

Applicable and reasonable subsurface mitigations will be applied where the presence of caves or karst is obvious or expected, based on the results of detection efforts, and in lost circulation zones. The options could include, but are not limited to, the following practices:

Drilling

- Cable tool drilling techniques will be used when possible in areas where encounters of caves or karst are expected at depths not greater than 350 feet.
- Rotary drilling techniques in cave or karst areas will include the use of either fresh water mud, foam, or compressed air as a circulating medium in zones where caves or karst are expected. Below those zones, the operator may use whatever drilling fluid is appropriate.

Casing and Cementing

- All casing will meet or exceed National Association of Corrosion Engineers specifications pertaining to the geology of the location and be run according to American Petroleum Institute and Reclamation standards.
- A “cave protection” casing could be required in instances when a designated significant cave would be jeopardized. The cave-protection casing string would be set at least 100 feet below the deepest known cave-bearing zone as determined by drilling or other pertinent methods.
- Regardless of the type of drilling machinery used, if bit drops of four feet or more and circulation losses greater than 75 percent occur simultaneously while drilling in any cave-bearing zone, drilling operations will immediately stop and the Reclamation will be notified by the Operator. The Reclamation will assess the consequences of the situation and work with the Operator on corrective actions to resolve the problem. If corrective actions fail, the well will be plugged.
- The casing will be cemented in place using one or a combination of any of the following methods that are environmentally sound, as determined by the Reclamation and the Operator:
 1. If a large void or severe lost circulation zone is encountered, isolation from above and below rather than complete cement coverage of these zones could be employed. This would be accomplished by using stage cementing equipment, external casing packers, cement baskets, and one-inch remedial cementing techniques.

2. For a less severe lost circulation zone encountered while drilling, the operator would attempt to circulate cement to the surface using a single or multistage cementing job composed of a “lead” and “tail” slurry for each stage.
3. Foam cementing techniques may be used.

Any corrective actions proposed to resolve problems related to bit drops or lost circulation will require Reclamation concurrence before implementation. A decision on how to proceed will be reached within 24 hours of notification.

Monitoring Drilling Operations

Where the presence of significant caves or significant karst features are obvious or expected based on the results of detection efforts, and in lost circulation zones, constant monitoring of drilling operations by the Reclamation could be required.

Monitoring Production Operations

On wells within one-half mile of significant caves, annual pressure tests will be performed by the Operator on all casing annuli. If the test results indicated a casing failure, remedial actions approved by the Reclamation will be undertaken to correct the problem.

Plugging and Abandonment

The BLM standards for plugging and abandonment in Onshore Oil and Gas Order No. 2 will be applied to protect or isolate all useable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, caves, and any prospectively valuable deposits of minerals. This includes any zones encountered during drilling that contain fluids with a potential to migrate.

Record Keeping

The Operator will track the customary drilling activities, including the rate of penetration, pump pressure, weight on bit, bit drops, percent of mud returns, and presence or absence of cuttings returning to the surface. As part of customary record keeping, each detectable void or sudden increase in the rate of penetration not attributable to a change in the formation type should be documented and evaluated as it is encountered.

The Reclamation may review data held by companies on wells drilled in cave or karst areas, to gain information about impacts to caves and karst. This information will be used to categorize lost-circulation zones on the basis of depth, relative volume, and severity, and to evaluate and compare the relative success or failure of different remedies attempted to combat lost-circulation problems

while drilling and cementing casing in these zones. This information also will be used to update information about the occurrence of cave and karst features. Information concerning cave resources gathered during drilling will be submitted, as well, to be retained by Reclamation in accordance with the regulations implementing the Federal Cave Resources Protection Act.

**APPENDIX B: BUREAU OF RECLAMATION'S 2003
RESOURCE MANAGEMENT PLAN
DETAILED MANAGEMENT DIRECTIVES**

APPENDIX B: BUREAU OF RECLAMATION'S 2003 RESOURCE MANAGEMENT PLAN DETAILED MANAGEMENT DIRECTIVES

GENERAL MANAGEMENT DIRECTIVES

General management directives for the Resource Management Plan were developed in response to the findings from the resource inventory, public involvement program, and issue identification as outlined in Table 4-3 of the RMP. Management directives provide a statement of the Management Direction (goal), Management Objective, Management Action, and Lead Agency/Partnerships for each of the four issue categories identified in Chapter 4 of the RMP. The goals and objectives serve as a primary foundation on which the proposed management directive was developed. Each goal reflects the desired management direction (goal) for the Project Area. Along with each management direction is a set of management objectives and management actions that describe a series of activities that must be accomplished in order to achieve the management direction (goal). Recommendations for partnerships or management responsibilities are included to aid in implementation of management directives.

Table B-1 provides a detailed summary of preferred management strategy specifics along with management objectives, management actions, and anticipated partnerships and responsibilities. The four issue categories identified in Chapter 4 of the RMP were used for the management direction as a means of organizing management strategies, indicating areas of emphasis, and aiding in the understanding of the scope of management. The four categories include Facility Management, Land Use, Recreation, and Natural and Cultural Resources.

SITE-SPECIFIC AND ACTIVITY AREA MANAGEMENT DIRECTIVES

Thirty-six site-specific areas and facilities have been identified for detailed management directives. Each site is identified, its function (land use) indicated, and its management action outlined. Table B-2 provides the detailed information for each specific area.

Table B-1. General Management Directives.

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
CATEGORY A: FACILITY MANAGEMENT			
A1: Encourage and Support Balanced Water Use and Management within the Constraints of Existing New Mexico Water Law, Compacts, Treaties, and Contracts with Water Users	Explore the reduction of reservoir water level fluctuations at Brantley and Avalon Reservoirs through timing of water releases to meet other resource needs.	Investigate reservoir fluctuations and establish a minimum pool recommendation. Investigate water release timing and the effect on other resource needs and establish an appropriate water release schedule.	Reclamation ^a , State Parks ^b , and CID ^c .
	Investigate the acquisition of water rights to increase the minimum pool at Brantley Reservoir and to enhance natural resources and recreational uses.	Participate in water operations planning process for the Pecos River.	Reclamation, CID, NMDGF ^d , and other agencies as appropriate.
	Recommend the development of a Drought Contingency Plan.	Support the development of a Drought Contingency Plan.	Reclamation, State Parks, CID, and other agencies as appropriate.
	Clarify water rights as set forth in the Pecos River Compact.	Make available to the public all information regarding the Pecos River compact and on-going water operations plan.	Reclamation, State Parks, and CID.
	Recommend beneficial water operations that enhance recreation, fish, wildlife, and scenic values while meeting project purposes.	Develop guidelines for enhancing water-related resource values where opportunities exist within existing operating criteria. These guidelines will be developed to maximize both ecological and recreational benefits through improved management of available resources.	Reclamation, CID, NMDGF, State Parks, and other agencies as appropriate.
A2: Protect and Manage Historic Facilities	Pursue the development of an agreement with the CID for establishing guidelines to maintain and protect historic facilities and sites within the Project Area. These would include the McMillan facilities, the Avalon facilities, and the Flume.	Develop guidelines for protecting historic facilities and sites. Pursue an agreement with the CID for maintaining historic facilities and sites.	Reclamation, CID, and State Parks.
	Recommend mechanisms to protect, restore, and recognize historic, pre-historic, and paleontological resource sites.	Develop and implement an integrated Cultural Resources Management Plan (see also Goal D4).	Reclamation, CID, State Parks, and other agencies as appropriate.



Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
CATEGORY B: LAND USE			
B1: Coordinate Oil and Gas Leases to be Compatible with other Resource Needs	Consider and identify appropriate changes to Reclamation's Oil and Gas Leasing Stipulations.	Adopt Mineral Lease Stipulations as identified in Appendix C of the RMP.	Reclamation.
	Identify and establish additional "no surface occupancy" areas where development activities may conflict with other resource needs.	Adopt Mineral Lease Stipulations as identified in Appendix C of the RMP.	Reclamation.
	Develop an agreement between managing agencies for notification and coordination of oil and gas activities.	Pursue an agreement between managing agencies for notification and coordination of oil and gas activities.	Reclamation, BLM ^e , CID, State Parks, and other agencies as appropriate.
B2: Manage Grazing Leases to be Compatible with other Resource Needs	Review current grazing leases and determine their compatibility with other resource needs.	Revise current grazing leases to align practice with natural and cultural resources as appropriate.	Reclamation, BLM, CID, and other agencies as appropriate.
	Determine appropriate grazing scenarios within the Project Area through the development and implementation of a Grazing Management Plan (GMP).	Develop an allotment-specific livestock GMP.	Reclamation, BLM, CID, and other agencies as appropriate.
	Establish and implement a range condition monitoring process.	Incorporate range condition monitoring process into the livestock GMP.	Reclamation, BLM, and CID.
	Explore a cooperative agreement with the BLM for management of grazing leases within the Project Area.	Implement cooperative agreement with the BLM for management of grazing leases.	Reclamation, BLM, and CID.
B3: Minimize Conflicts and Incompatibilities among Land Uses	Provide adequate space between sensitive areas (e.g., important wildlife habitat, historic structures, project facilities, etc.) and identified public-use areas.	Install adequate signage and/or fencing as appropriate.	Reclamation and State Parks.
	As much as possible, within the constraints of the land base, plan for compatible areas to accommodate recreational, natural resource, and other future uses.	Follow guidelines established in the Site Specific Management Directives (see Table B-3, below).	Reclamation and State Parks.



Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS	
		Establish recommendations to prevent or minimize damage to Project Area resources caused by inappropriate livestock grazing, oil and gas development, or recreational activities.	Develop and implement an allotment-specific livestock GMP for the Project Area.	Reclamation, State Parks, and BLM.
		Coordinate with the CID to suggest management of resources on transferred lands that is compatible with resource management within the Project Area.	Work with the CID cooperatively on management of resources on transferred lands as appropriate.	Reclamation and CID.
		Establish continued coordination with local communities, Eddy County, BLM, State Parks, NMDGF, and other resource management agencies to maintain the rural character of the Project Area while providing for economic opportunities.	Participate with local agencies as appropriate to monitor development and plan for appropriate growth surround Project Area lands.	Reclamation, CID, Eddy County, BLM, State Parks, NMDGF, and other agencies as appropriate.
B4:	Improve Law Enforcement and Promote Public Health, Safety, and Welfare	In coordination with other agencies, pursue an agreement with local law enforcement agencies to provide additional law enforcement on Project Area lands not presently being patrolled and to supplement law enforcement provided by other agencies such as State Parks and NMDGF.	Develop an agreement between managing agencies as appropriate to provide law enforcement.	Reclamation, NMDGF, State Parks, and other agencies as appropriate.

Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS	
		Develop, clarify, formalize, and/or enforce appropriate regulations and guidelines to educate the public about management of Reclamation land and waters within the Project Area on the following topics: <ul style="list-style-type: none"> ▸ Vandalism/Crime ▸ Management of waste ▸ Trespass ▸ Boating regulations ▸ Recreational use of wildlife management areas ▸ Access ▸ Camping ▸ Hunting/Fishing 	Develop and implement a public education and information program. Create and make available maps for the Project Area showing access points, land uses, points of interest, and recreation sites. Describe current rules and regulations including waste disposal, boating regulations, camping regulations, and hunting/fishing regulations.	Reclamation, CID, State Parks, NMDGF, and other agencies as appropriate.
B5:	Provide Adequate and Safe Access to All Designated Project Public Use Areas	Cooperate with the State, county, and local governments, and others, in their efforts to achieve needed improvements and/or maintenance of regional and local access roads.	Investigate the feasibility of entering into cooperative agreements with local and state entities to formulate a regional travel management plan.	Reclamation, State Parks, and NMSHTD ^f .
		Provide adequate vehicular access and parking at all designated use areas on Reclamation lands.	Monitor public use and determine access and parking needs where access will not interfere with other resource plans.	Reclamation and State Parks.
		Control access to sensitive areas (e.g., wildlife habitat, archaeological sites, project facilities, etc.).	Support State Parks in their efforts to implement access control points within existing Developed Recreation Areas (motorized and non-motorized) and to prevent shoreline vehicular access except at designated areas such as existing boat ramps.	Reclamation and State Parks.

Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
	<p>Clarify and define the use of existing access points through a clear, formal Memorandum of Understanding (MOU) among Reclamation, State Parks, NMDGF, and State and local governments.</p>	<p>Review and revise the license agreement and/or the MOU between Reclamation, State Parks, and local governments as necessary. Establish a process and criteria for reviewing requests for future access points.</p>	<p>Reclamation and State Parks.</p>
	<p>Develop and provide an access plan to Project Area users indicating:</p> <ul style="list-style-type: none"> ▶ Public access to and through the Project Area ▶ Various uses of land within the Project Area ▶ Agency management responsibilities within the Project Area ▶ Access regulations within the Project Area 	<p>Develop and implement an access management plan. Close and revegetate approximately 214 kilometers (133 miles) of unmanaged and unmaintained roads. Develop four new primitive access sites with small gravel parking areas.</p>	<p>Reclamation, State Parks, and other agencies as appropriate.</p>
CATEGORY C: RECREATION			
C1:	Investigate and Develop Appropriate Uses of the Champion Cove Area	Identify and evaluate appropriate uses of the Champion Cove area that will be compatible with existing resource needs.	Work with Eddy County, State Parks, and NMDGF on Champion Cove issues.
		Pursue an agreement for management of the area.	Establish management responsibility for the Champion Cove area.
		Identify needed facilities to provide security, access control, refuse disposal, and waste management should public use be continued. Consider "movable" facilities to accommodate changing reservoir water levels and consider limiting public access to better manage resources.	Work with Eddy County, State Parks, and NMDGF on Champion Cove issues.
		Ensure safe access to and from Highway 285 into Champion Cove.	Work with Eddy County, State Parks, and NMDGF on Champion Cove issues.
			Reclamation, Eddy County, State Parks, and NMDGF.



Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
C2: Provide Accessible Recreational Facilities	Provide appropriate access for the elderly and disabled at all Reclamation and State facilities that is consistent with current Federal regulations and guidelines.	Meet Americans with Disabilities Act and Rehabilitation Act requirements.		Reclamation and State Parks.
	Survey and evaluate existing facilities within the Project Area for access requirements.	Meet Americans with Disabilities Act and Rehabilitation Act requirements.		Reclamation and State Parks.
	Recommend improvements to existing facilities to bring them into compliance.	Meet Americans with Disabilities Act and Rehabilitation Act requirements.		Reclamation and State Parks.
C3: Provide Adequate Recreational Support Facilities, Both Land-Based and Water-Based, to Meet Demand within the Limits of the Project Area's Carrying Capacity	Determine the Project Area's carrying capacity for water-based and land-based recreational activities. Designate areas suitable for future facilities development.	Accommodate needed changes of future developed water-based and land-based oriented recreation uses such as: <ul style="list-style-type: none"> ▶ Number of developed campsites, ▶ Number of dispersed campsites, ▶ Capacity limits for BAOT, ▶ Multi-use trail systems, and ▶ Other shoreline support facilities. See Site-Specific Management Directives in Table B-3 for further information.		Reclamation, NMDGF, and State Parks.
	Investigate, plan for, and locate additional recreational support facilities at key locations within the Project Area as demand warrants.	See Site-Specific Management Directives in Table B-3 for further information.		Reclamation, NMDGF, and State Parks.

Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
	<p>Explore the possibility of developing trail systems throughout the Project Area that will accommodate hiking, equestrian, and bicycle uses. In any trail system, achieve linkages among the various recreation sites.</p>	<p>Identify the needs for a non-motorized multi-use trail system. Prepare a trails master plan for the Project Area. The master plan should include:</p> <ul style="list-style-type: none"> ▶ Location of trail route; ▶ Trailhead locations; ▶ Linkages to existing trails or recreational facilities; ▶ Trail interpretation and signage; and ▶ Trail support facilities such as restrooms, bicycle stands, horse rails, etc. ▶ Connection between Avalon Reservoir and the Flume by extending the existing canal trail. 	<p>Reclamation, CID, and State Parks.</p>
	<p>Provide opportunities for nature interpretation and wildlife observation wherever consistent with natural resource conservation and management Goals and Objectives. Recommend informational lectures/programs at the Visitor Center/ campgrounds to inform and educate visitors.</p>	<p>Develop and implement an Interpretive Master Plan that highlights education opportunities for visitors to the Project Area. Identify areas for nature interpretation and wildlife observation. Create programs to develop information and instruction of:</p> <ul style="list-style-type: none"> ▶ Wildlife within the Project Area, ▶ Nature interpretation, and ▶ Lecture series on specific wildlife or nature subjects. <p>Provide information on interpretive programs at visitors centers and campground kiosks.</p>	<p>Reclamation and State Parks.</p>

Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS	
CATEGORY D: NATURAL AND CULTURAL RESOURCES				
D1:	Protect Water Quality in the Reservoirs and the Pecos River	Provide sanitation and waste management facilities at developed recreation sites (e.g., restrooms, trash containers, Recreational Vehicle [RV] and boat dump stations, etc.).	Ensure the appropriate sanitation/waste management facilities are provided at all recreation areas. Inventory current facilities and address current and future needs. Develop and implement a contingency and containment plan for stored petroleum products as necessary.	Reclamation and State Parks.
		Encourage and support the State of New Mexico Environment Department, Field Operations Division, in achieving and enforcing proper installation, operation, and maintenance standards for sewer systems and private septic systems on properties surrounding the Project Area.	Regulate the construction and use of septic systems to ensure compliance with State regulations. Investigate alternative waste water disposal systems (e.g. sanitary sewer system).	Reclamation, NMED/SWQB ⁹ , and State Parks.
		Develop and implement an ongoing water quality monitoring program.	Continue the on-going water quality monitoring program for both reservoirs. Ensure the water quality monitoring program is being followed. Complete additional baseline studies and monitor water quality as needed.	Reclamation, State Parks, CID, NMED/SWQB, and other agencies as appropriate.
		Investigate and determine the source of illegal waste disposal in order to protect water quality.	Work with appropriate agencies to control illegal dumping.	Reclamation, NMDGF, State Parks, and other agencies as appropriate.



Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
D2: Control/Manage Noxious Weeds and Other Vegetation	Prepare and administer an Integrated Vegetation Management Plan for the Project Area, in compliance with the Noxious Plant Management MOU, to control and manage salt cedar, noxious weeds, or other vegetation and to re-establish native vegetation within the Project Area.	Develop and implement an Integrated Pest Management Plan for vegetation and rodents that would include: <ul style="list-style-type: none"> ▶ Describe the methods used (e.g. mechanical, chemical, thermal) to control various pests (e.g. weeds, shrubs, vertebrates, and invertebrates). ▶ Monitor the effects of vegetation management on wildlife habitats and populations. ▶ Update and improve the pest management program currently being implemented. 	Reclamation, CID, State Parks, NMDGF, and other agencies as appropriate.
	Monitor the effects of vegetation management on wildlife habitats and populations.	Incorporate findings into the Integrated Pest Management Plan.	Reclamation, CID, State Parks, NMDGF, and other agencies as appropriate.
D3: Manage Wildfires	Pursue a formal agreement with the appropriate agency(ies) for wildfire management.	Work with the appropriate agencies to provide wildfire management of Project Area lands.	Reclamation, BLM, NMDGF, State Parks, and other agencies as appropriate.
	Reduce fire hazards through appropriate grazing, mechanical, and/or prescribed burning methods.	Incorporate findings into the Fire Management Plan (FMP).	Reclamation, BLM, NMDGF, State Parks, and other agencies as appropriate.
	Develop and implement a FMP.	Work with appropriate agencies to develop and implement a FMP.	Reclamation, BLM, NMDGF, State Parks, and other agencies as appropriate.

Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)		MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
D4:	Protect Cultural Resources	Identify the location, integrity, and eligibility of cultural resource sites within the Project Area including historic, pre-historic, and paleontological resource artifacts.	Document (e.g. mapping, photography, excavation, or collection) locations and integrity of cultural resources within the Project Area (e.g. historic, prehistoric, and paleontological resource artifacts).	Reclamation, CID, State Parks, NMSHPO ^h and other agencies as appropriate.
		Establish a proactive program to protect, preserve, and interpret historic, pre-historic, and paleontological resource sites where appropriate.	Develop an Integrated Cultural Resources Management Plan. This plan would: <ul style="list-style-type: none"> ▶ Protect unauthorized collection and excavation of artifacts and all other ground-disturbing activities. ▶ Require permitting and compliance with the National Historic Preservation Act for any professional excavation of archaeological or historic sites. ▶ Develop a public education program about these cultural resources. ▶ Document eligible sites with the National Register of Historic Places. ▶ Assess all cultural resources within the area for potential effect before any ground-disturbing activities. ▶ Include a 'stop work' order on all construction activities if cultural resources are found during construction. ▶ Pursue and agreement with the CID for establishing guidelines to maintain and protect historic facilities and sites within the Project Area. 	Reclamation, CID, State Parks, NMSHPO, and other agencies as appropriate.

Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
D5:	Protect and Enhance Suitable Vegetation and Wildlife Habitat Values	<p>Identify and designate Wildlife Management Areas at suitable locations within the Project Area to preserve long-term, viable habitat for avian species, big game, and other mammals.</p>	<p>Develop a Wildlife Management Plan for protection and enhancement of wildlife species within designated Wildlife Management Areas. Specify management responsibilities, designate sensitive habitats, and recommend enhancement opportunities. The Wildlife Management Plan would:</p> <ul style="list-style-type: none"> ▶ Specify suitable recreation within Wildlife management Areas. ▶ Identify measures to enforce restrictions on recreational use. ▶ Identify areas in need of restoration. ▶ Describe desired vegetation conditions and measures to expand natural habitat for endangered species. ▶ Protect and enhance areas designated as occupied territories of threatened or endangered species.

Table B-1. General Management Directives (cont.).

	Clarify and/or establish management agreements, where appropriate, with the USFWS, NMDGF, State Parks, other agencies with appropriate management responsibilities, and/or adjacent land owners for the management of designated Wildlife Management Areas and for threatened and endangered species (TES) habitat protection and enhancement.	Develop and implement management agreements with appropriate agencies for management of Wildlife Management Areas.	Reclamation, State Parks, NMDGF, USFWS, other agencies (as appropriate), and land owners.
	Investigate buffer zones or other measures to avoid conflict with or damage to Wildlife Management Areas arising from human uses on land or water as needed.	Develop a Wildlife Management Plan indicating buffer zones on a land use map. Include a set of prohibited and recommended uses within each buffer zone.	Reclamation, State Parks, NMDGF, USFWS, and other agencies as appropriate.
	Identify wetlands and riparian vegetation and provide recommendations for the protection of such areas in accordance with existing Federal and State regulations.	Develop and implement a Wetlands Management Plan that would: <ul style="list-style-type: none"> ▶ Identify restrictions of recreational activities in wetland areas. ▶ Specify the appropriate setback for development of recreational facilities. ▶ Apply best management practices to control erosion and limit impacts to any nearby wetlands. ▶ Increase protection and enhancement opportunities within the wetland areas. ▶ Inventory wetland and riparian vegetation. ▶ Protect jurisdictional wetlands in accordance with existing Federal regulations. 	Reclamation, State Parks, NMDGF, USFWS, and other agencies as appropriate.
	Clarify designated locations available for public hunting and fishing.	Provide current hunting regulations information at public information sites.	Reclamation, State Parks, and NMDGF.

Table B-1. General Management Directives (cont.).

MANAGEMENT DIRECTION (GOAL)	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION	LEAD AGENCY/ PARTNERSHIPS
D6: Protect and Enhance the Quality of the Fishery	Identify beneficial water level management for fish spawning periods at Brantley and Avalon Reservoirs within current legal constraints.	Identify beneficial pool levels for each reservoir. Incorporate findings into the Fisheries Management Plan.	Reclamation, CID, NMDGF, and State Parks.
	Recommend and support beneficial flows for the Pecos River between Brantley and Avalon Reservoirs within current legal constraints.	Identify beneficial river flows for the Pecos River. Incorporate findings into the Fisheries Management Plan.	Reclamation, CID, NMDGF, and State Parks.
	Cooperate with NMDGF and other appropriate agencies in developing fishery management and stocking programs consistent with public demand.	Develop and implement a Fisheries Management Plan that would: <ul style="list-style-type: none"> ▶ Identify a fishery management and stocking program. ▶ Identify the public fishery demand. ▶ Monitor the reservoirs and river to evaluate the need for catch limitations. ▶ Consider establishing fishing regulations for certain shoreline areas to protect the shoreline fishing experience. 	Reclamation, State Parks, NMDGF, and other appropriate agencies.
	Plan for and implement new studies of the fishery habitat and species composition. Fine-tune fishery management programs based on these studies and fishing demand.	Study fish habitat and species composition and include findings in the fishery management plan.	Reclamation, State Parks, NMDGF, and USFWS.

^a U.S. Department of the Interior, Bureau of Reclamation.
^b New Mexico State Park and Recreation Division.
^c Carlsbad Irrigation District.
^d New Mexico Department of Game and Fish.
^e U.S. Department of the Interior, Bureau of Land Management.
^f New Mexico State Highway Transportation Department.
^g State of New Mexico Environment Department - Surface Water Quality Bureau.
^h New Mexico State Historic Preservation Office.
ⁱ U.S. Fish and Wildlife Service.



Table B-2. Site-Specific Management Directives.

Avalon Day Use Area	<p>Developed Recreation Area (without utilities)</p> <ul style="list-style-type: none"> ▶ 10 hectares (24 acres) <p>Administrative Area</p> <ul style="list-style-type: none"> ▶ 24 hectares (59 acres) 	<p>Maintain existing facilities.</p> <p>Develop new Developed Recreation Area (without utilities) day use area.</p> <p>Provide adequate sanitation/waste management facilities.</p> <p>Develop a new non-motorized multi-use trail along the existing canal to connect Avalon Dam with the Flume.</p> <p>Protect historic resources.</p>
Pecos River Primitive Area	<p>Primitive Recreation Area (motorized access)</p> <ul style="list-style-type: none"> ▶ 5,461 hectares (13,495 acres) ▶ 1,350 Potential Dispersed Camping Units (maximum) 	<p>Maintain existing facilities.</p> <p>Provide adequate sanitation/waste management facilities.</p> <p>Protect historic resources.</p>
Brantley Lake State Park Visitor Center	<p>Developed Recreation Area (with utilities)</p> <ul style="list-style-type: none"> ▶ 19 hectares (47 acres) 	<p>Maintain existing facilities.</p> <p>Develop a public education and information program.</p> <p>Provide an interpretive fish and wildlife display.</p> <p>Provide adequate sanitation/waste management facilities.</p>
East Side Brantley Lake State Park and Rocky Bay Primitive Area	<p>Primitive Recreation Area (motorized access)</p> <ul style="list-style-type: none"> ▶ 623 hectares (1,539 acres) ▶ 154 Potential Dispersed Camping Units (maximum) <p>Administrative Area</p> <ul style="list-style-type: none"> ▶ 9 hectares (21 acres) 	<p>Maintain existing facilities.</p> <p>Provide adequate sanitation/waste management facilities.</p> <p>Improve check station.</p>
Limestone Campground and East Side Day Use Area	<p>Developed Recreation Area (with utilities)</p> <ul style="list-style-type: none"> ▶ 104 hectares (256 acres) ▶ 100 Potential Developed Camping Units (maximum) 	<p>Maintain existing facilities.</p> <p>Expand existing campground as necessary.</p> <p>Provide adequate sanitation/waste management facilities.</p>
Seven Rivers Day Use Area	<p>Developed Recreation Area (without utilities)</p> <ul style="list-style-type: none"> ▶ 4 hectares (10 acres) 	<p>Maintain existing facilities.</p> <p>Provide adequate sanitation/waste management facilities.</p> <p>Develop a new non-motorized multi-use trail system.</p>

Table B-2. Site-Specific Management Directives (cont.).

AREAS AND FACILITIES	FUNCTION (LAND USE CATEGORY)	MANAGEMENT ACTION
Seven Rivers Primitive Area	Primitive Recreation Area (motorized access) <ul style="list-style-type: none"> ▸ 265 hectares (655 acres) ▸ 66 Potential Dispersed Camping Units (maximum) 	Maintain existing facilities. Provide adequate sanitation/waste management facilities. Develop a new non-motorized multi-use trail system.
South Bay Primitive Area	Primitive Recreation Area (motorized access) <ul style="list-style-type: none"> ▸ 265 hectares (655 acres) ▸ 66 Potential Dispersed Camping Units (maximum) 	Maintain existing facilities. Provide adequate sanitation/waste management facilities. Develop a new non-motorized multi-use trail system.
Champion Cove	Developed Recreation Area (without utilities) <ul style="list-style-type: none"> ▸ 72 hectares (177 acres) ▸ 50 Potential Developed Camping Units (maximum) 	Develop new Developed Recreation Area (without utilities) campground. Improve access road. Develop a new non-motorized, multi-use trail system. Provide adequate sanitation/waste management facilities. Construct boat ramp. Establish management responsibility for the area through cooperative agreement.
The Flume Day Use Area	Developed Recreation Area (with utilities) <ul style="list-style-type: none"> ▸ 17 hectares (43 acres) 	Maintain existing facilities. Provide adequate sanitation/waste management facilities. Develop a new non-motorized multi-use trail along the existing canal to connect Avalon Dam with the Flume (i.e., extend existing trail to Avalon Dam).
Brantley Wildlife Management Area	Wildlife Management Area <ul style="list-style-type: none"> ▸ 10,008 hectares (24,729 acres) Administrative Area <ul style="list-style-type: none"> ▸ 128 hectares (317 acres) 	Maintain existing facilities. Develop new Primitive access sites with small gravel parking areas at four locations. Provide adequate sanitation/waste management facilities.

APPENDIX C: AGENCY CORRESPONDENCE



IN REPLY REFER TO:

United States Department of the Interior

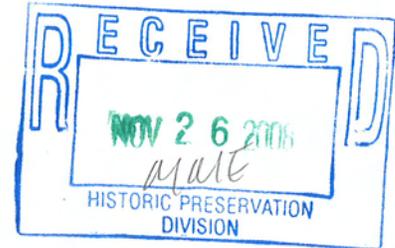
BUREAU OF RECLAMATION

Albuquerque Area Office
555 Broadway Blvd. NE, Suite 100
Albuquerque, NM 87102-2352



NOV 26 2008

ALB-186
ENV-1.10



085867

Ms. Katherine A. Slick
Director, New Mexico State Historic Preservation Office
Department of Cultural Affairs
Bataan Memorial Building, 407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Subject: Preliminary Section 106 Consultation for the Environmental Assessment (EA) for the Brantley and Avalon Reservoirs 2008 Resource Management Plan Amendment, Carlsbad Project, New Mexico

Dear Ms. Slick:

The U.S. Department of the Interior, Bureau of Reclamation is preparing an EA and subsequent Resource Management Plan Amendment (RMPA) to address future Federal leasable (e.g., geothermal, oil, gas) minerals development on Reclamation-administered lands in Eddy County, New Mexico (Figure 1-1). The lands encumbered by the EA and RMPA are part of Reclamation's Carlsbad Project, which is authorized under the Reclamation Act of June 17, 1902, and the Brantley Project Acts of 1972 (P. L. 92-514) and 1980 (P. L. 96-375).

The original Carlsbad Project was authorized by the Secretary of the Interior on November 28, 1905, from which time project facilities have been rehabilitated, enlarged, and improved under subsequent authorizations to provide for irrigation, flood control, river regulation, fish and wildlife, recreation, and other beneficial uses.

The Minerals Leasing Act of 1920, as amended, provides the Department with authority to issue leases on lands where the mineral rights are held by the Federal government. This authority has been delegated to the Department, Bureau of Land Management, a Cooperating Agency for the RMPA and EA. The RMPA will amend Reclamation's 2003 Resource Management Plan for Brantley and Avalon Reservoirs by modifying the existing oil and gas development stipulations of Federal minerals, and only affects those lands identified as containing existing *Unleased Federal Minerals*, as well as any future unleased Federal mineral estate.

The result of this planning process will be an RMPA that identifies approximately 40,000 acres at the Reservoirs that will be subject to the proposed stipulations, made available for oil and gas development through Federal leasing, and what requirements or stipulations are needed to manage those lands to protect other resource values. This includes all Federal mineral lands, and future leases on lands conveyed by Reclamation to the Carlsbad Irrigation District (CID) in 2001. Stipulations that will be attached to future Federal mineral leases and future CID mineral leases may

include, but are not limited to, controlled surface use, timing limitations, or no surface occupancy. The RMPA document also will identify the circumstances necessary for granting waivers, exceptions, or modifications to leasing stipulations.

The area of impact includes a variety of cultural resources, such as archaeological sites (prehistoric and historic), the historic CID, and through consultation with the appropriate Native American groups may also include Traditional Cultural Properties (TCPs), Sacred Sites (to date after previous and ongoing consultations no TCPs or sacred sites have been determined). Reclamation will continue to conduct Section 106 review and compliance on oil and gas projects pursuant to a Programmatic Agreement with the BLM, and other agreements between BLM and your office. The BLM is the lead agency for cultural resources compliance on projects that (1) involve permission to drill on BLM or Reclamation lands, including access roads and pipelines submitted as a package with a well; and (2) involve multiple surface land status, in which BLM is one of the parties.

Reclamation will periodically undertake archaeological field projects on its historic properties as part of its Section 110 stewardship responsibility. Reclamation also will continue to monitor the condition of its historic properties and fulfill its obligations under the Archaeological Resources Protection Act of 1979.

This EA, which is prepared to meet current requirements of the Federal minerals program, is not the final review upon which approval of all proposed actions on Reclamation lands in Eddy County will be based. Rather, the RMPA will identify lands within Reclamation's jurisdiction that are available for leasing and how those Federal minerals might be developed and managed for oil and gas activities. Decisions on all subsequent site-specific actions will be tiered from this EA. That is, additional compliance with all applicable laws and regulations, such as the National Environmental Policy Act, National Historic Preservation Act (NHPA), the Clean Water Act, and the Endangered Species Act, will occur on site specific lease/drilling proposals. However, the scope of the site-specific approval process will be streamlined and facilitated by the planning and programmatic evaluation of impacts in the RMPA and EA documents.

Under Section 106 of the NHPA, as amended, Reclamation is informing your office of our EA and RMPA planning process. The EA and RMPA will be provided to your office for review and comments. Existing environmental compliance procedures by BLM and Reclamation will continue to be utilized to provide environmental compliance for oil and gas development.

If you have any questions or concerns about the project, please contact Mr. Mark Hungerford at 505-462-3664.

Sincerely,

COMMENTS

Norman Ash
for NM State Historic Preservation Officer

12/03/08

John R. Poland

John R. Poland
Area Manager

We look forward to reviewing the documents!

Enclosure

NOV 17 2008

ALB-186
ENV-1.10

Mr. Bobby Jay
Tribal Administrator, Apache Tribe of Oklahoma
P.O. Box 1220
Anadarko, OK 73005

Subject: Consultation Invitation Regarding the Brantley and Avalon Reservoirs Resource Management
Plan Amendment Environmental Assessment

Dear Mr. Jay:

In accordance with the National Environmental Policy Act of 1969, the Bureau of Reclamation is preparing an Environmental Assessment (EA) and an amendment to the original Reclamation 2003 Resource Management Plan to evaluate the conditions for existing mineral leasing and development within the Project Area, develop additional oil and gas leasing stipulations and to develop appropriate guidance that will allow Reclamation and Bureau of Land Management to make informed decisions about oil and gas leasing and development on Reclamation-administered lands in order to comply with existing guidelines and laws.

Reclamation is preparing this EA and subsequent Resource Management Plan Amendment to address future Federal leasable (e.g., oil, gas) minerals development on Reclamation-administered lands in Eddy County, New Mexico.

The purpose of this letter is to invite your Tribe's involvement on a government-to-government basis to identify any concerns your tribe may have regarding the potential effects of our future activities on trust assets, cultural and biological resources, or tribal health and safety. Reclamation wants to ensure that you have an opportunity to help us identify and address any issues important to your tribe.

Reclamation will gladly provide any additional information needed by you or your staff to describe the proposal in further detail. To discuss the EA or arrange a meeting, please contact Ms. Marsha Carra at 505-462-3602.

Sincerely,



John R. Poland
Area Manager

Identical Letter Sent to Persons on Next Page.

Identical Letter Sent To:

Honorable Wallace Coffey
Chairman, Comanche Indian Tribe
P.O. Box 908
Lawton, OK 73502

Mr. Johnny Wauqua
Chairman, Comanche Tribal Business
Committee
P.O. Box 908
Lawton, OK 73502

Honorable Jeff Houser
Chairman, Fort Sill Apache Tribe of Oklahoma
Route 2, Box 121
Apache, OK 73006

Honorable Benjamin H. Nuvamsa
Chairman, Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

Mr. Leigh Kuwanwisiwma
Director, Hopi Tribe Cultural Preservation
Office
P.O. Box 123
Kykotsmovi, AZ 86039

Honorable Levi Pesata
President, Jicarilla Apache Nation
P.O. Box 507
Dulce, NM 87528

Honorable Don Tofpi
Chairman, Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015-0369

Mr. Dewey Tsonetokoy, Sr.
Kiowa NAGPRA Coordinator
Route 2, Box 74
Ft Cobb, OK 73038

Mr. Don Tofpi
Chairman, Kiowa Business Committee
P.O. Box 369
Carnegie, OK 73015-0369

Honorable Carlton Palmer
President, Mescalero Apache Tribe
P.O. Box 227
Mescalero, NM 88340

Ms. Donna Stern-McFadden
Tribal Historic Preservation Office
P.O. Box 227
Mescalero, NM 88340

Honorable Joe Shirley
President, Navajo Nation
P.O. Box 9000
Window Rock, AZ 86515

Mr. Lawrence Morgan
Speaker, Navajo Nation Council
P.O. Box 3390
Window Rock, AZ 86515

Honorable Robert Benavides
Governor, Pueblo of Isleta
P.O. Box 1270
Isleta, NM 87022

Mr. John Sorrell
Hydrology, Pueblo of Isleta
P.O. Box 1270
Isleta, NM 87022

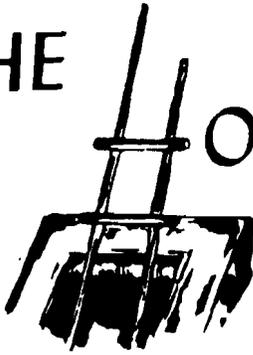
Honorable Paul Chinana
Governor, Pueblo of Jemez
P.O. Box 100
Jemez Pueblo, NM 87024

Honorable Frank Paiz
Governor, Ysleta del Sur Pueblo
P.O. Box 17579
El Paso, TX 79917

Mr. Rick Casada
Cultural Resources Coordinator
Ysleta del Sur Pueblo
P.O. Box 17579
El Paso, TX 79917

WBR:MCarra:DKinsey:11/07/08:505-462-3602
G:\SecFiles\Envi\Carra, Marsha\Draft_SHPO Letter-110708.doc

THE



HOP I TRIBE

CHAIRMAN

VICE-CHAIRMAN

January 12, 2009

John R. Poland, Area Manager
Attention: Marsha Carra
Bureau of Reclamation, Albuquerque Area Office
555 Broadway Blvd., NE, Suite 100
Albuqérque, New Mexico 87102-2352

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Fldr #		
Date	Initial	To
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1/23	WR	102
1/26	WL	150
1/26	MC	186
192		

Dear Mr. Poland,

This letter is in response to your correspondence dated November 17, 2008, regarding the Bureau of Reclamation preparing an Environmental Assessment and an amendment to the 2003 Resource Management Plan to address oil and gas leasing and development on Reclamation administered lands in Eddy County.

The Hopi Tribe claims cultural affiliation to prehistoric cultural groups in New Mexico, and the Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites and Traditional Cultural Properties. The Hopi Cultural Preservation Office considers the archaeological sites of our ancestors to be Traditional Cultural Properties. Therefore, we appreciate Reclamation's solicitation of our input and efforts to address our concerns.

And therefore, please provide us with a copy of the draft Brantley and Avalon Reservoirs Resource Management Plan Amendment Environmental Assessment for review and comment. Should you have any questions or need additional information, please contact Terry Morgart at 928-734-3619 the Hopi Cultural Preservation Office. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

xc: New Mexico State Historic Preservation Office



THE NAVAJO NATION

JOE SHRILEY, JR.
PRESIDENT

RECEIVED BOR
ALBUQUERQUE AREA OFFICE
OFFICIAL FILE COPY
FEB 09 2009

BEN SHELLY
VICE PRESIDENT

February 04, 2009

Class <i>LND-6-00</i>		
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<i>2/10</i>	<i>RP</i>	<i>100</i>
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<i>2/13</i>	<i>MC</i>	<i>186</i>

Action

192

Mr. John R. Poland, Area Manager
Bureau of Reclamation
555 Broadway NE, Suite 100
Albuquerque, New Mexico 87102-2352

Subject: Tribal Consultation Request. Proposing an Amendment of the Resources Management Plan to include evaluation of the existing mineral leasing and development of additional oil and gas leasing strategies at the Brantley and Avalon Reservoirs, New Mexico.

Dear Mr. Poland:

Our apology for an oversight and missing the deadline date of our response to your request, please note that in reference to your letter of November 17, 2008, the Historic Preservation Department – Traditional Culture Program (HPD-TCP) received a request for consultation regarding the above undertaking and/or project. After reviewing your consultation documents, HPD-TCP has concluded the proposed undertaking/project area **will not impact** any Navajo traditional cultural properties or historical properties.

However, if there are any inadvertent discoveries made during the course of the undertaking, your agency shall cease all operations within the project area. HPD-TCP shall be notified by telephone within 24 hours and a formal letter be sent within 72 hours. All work shall be suspended until mitigation measures/procedures have been developed in consultation with the Navajo Nation.

The HPD-TCP appreciates your agency's consultation efforts, pursuant to 36 CFR Pt. 800.1 (c)(2)(iii). Should you have additional concerns and/or questions, do not hesitate to contact me. My contact information is listed below.

Sincerely,

Tony Joe, Program Manager
Historic Preservation Department – Traditional Culture Program

Tel: 928.871.7688 Fax: 928.871.7886 E-mail: tonyjoe@navajo.org

TCP 09-193
File: Office file/chrono



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

March 4, 2011

Cons. #22420-2011-I-0033

Memorandum

To: Area Manager, Bureau of Reclamation, Upper Colorado Region Albuquerque Area Office, Albuquerque, New Mexico

From: Field Supervisor, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico

Subject: Concurrence with the Revised Biological Assessment for the Brantley and Avalon Reservoirs Resource Management Plan Amendment

Thank you for your request for concurrence under section 7 of the Endangered Species Act, as amended, on the revised Biological Assessment of the Brantley and Avalon Reservoirs Resource Management Plan Amendment. The Bureau of Reclamation's (Reclamation) proposed action addresses future Federal leasable oil, gas, and mineral development on approximately 49,000 acres in Eddy County, New Mexico. The revised January 28, 2011, biological assessment and Reclamation's February 25, 2011, electronic mail correspondence to the New Mexico Ecological Services Field Office (NMESFO) determined that the proposed action "may affect, is not likely to adversely affect" the Pecos bluntnose shiner (*Notropis simus pecosensis*), interior least tern (*Sterna antillarum athalassos*), and gypsum wild-buckwheat (*Eriogonum gypsophilum*) and its critical habitat.

The NMESFO concurs with your determinations that the Brantley and Avalon Reservoirs Resource Management Plan Amendment "may affect, is not likely to adversely affect" these species and critical habitat with implementation of your proposed special lease stipulations. These stipulations include the following, among others:

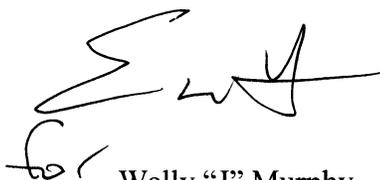
- No surface occupancy within 2,640 horizontal feet of dam embankments, appurtenant structures, and tunnels at Brantley Dam or Avalon Dam sites.
- No surface occupancy within 660 horizontal feet of maximum water surface at Brantley Reservoir (elevation 3,263 feet) or Avalon Reservoir (elevation 3,190 feet).

- No storage facilities within 660 horizontal feet of the 100-year floodplain at Brantley Reservoir (elevation 3,283 feet) or Avalon Reservoir (elevation 3,200 feet).
- Surface occupancy on a case-by-case basis within 660 horizontal feet of normal high water line of streams, rivers, and arroyos for construction of roads and pipelines. Construction of access roads and pipelines will be restricted in high-value riparian and sensitive areas along streams, rivers, and arroyos. No wells permitted within these areas.
- Wildlife Habitat Projects: Surface disturbance will not be allowed within 200 meters of existing or planned wildlife habitat improvement projects. Large-scale vegetation manipulation projects such as prescribed burns will be excepted. This requirement will be considered for waiver with appropriate off-site mitigation, as determined by the Authorized Officer.
- Endangered Species: Surface disturbance will not be allowed within 200 meters of critical endangered species habitat.

This concludes section 7 consultation on the proposed Brantley and Avalon Reservoirs Resource Management Plan Amendment. Please contact the NMESFO to verify that the above determinations and concurrence are still valid if: 1) Future surveys detect listed or proposed species in habitats where they have not been previously observed; 2) the project is changed or new information reveals effects of the action to the listed species or critical habitat that have not been considered in this analysis; or 3) a new species is listed or critical habitat designated that may be affected by the action.

The NMESFO appreciates the information and analysis conducted by the Albuquerque Area Office in this biological assessment. We also commend Reclamation for avoiding adverse effects to listed species and critical habitat in this project. In future communications regarding this memorandum or the proposed project, please refer to Consultation #22420-2011-I-0033. If you have any questions concerning this memorandum, please contact Dr. Patricia Zenone of my staff at (505) 761-4718.

Sincerely,



Wally "J" Murphy
Field Supervisor

cc:

Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico

Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division,
Santa Fe, New Mexico

District Manager, Bureau of Land Management, Carlsbad District Office, Carlsbad, New Mexico

**APPENDIX D: COMMENT LETTERS AND COMMENT
RESPONSES**

APPENDIX D: COMMENT LETTERS AND COMMENT RESPONSES

This appendix contains the unabridged comment letters received from agencies, organizations, and the general public on the Brantley and Avalon Reservoirs Resource Management Plan Amendment (RMPA) Draft Environmental Assessment (DEA). In most cases, comments were directed at specific topics of concern, while others requested clarification or correction of content in the DEA. All comment letters received are included in their entirety below, along with Reclamation responses to substantive comments. Where appropriate, the Final Environmental Assessment (FEA) has been revised in response to these comments where noted.

Each comment letter is numbered and presented with sequential numbers for each comment on the right margin of the letter. The vertical bars above the numbering indicate the position and length of each particular comment. The first number corresponds to the sequential number of the letter while the second number corresponds to the sequential number of the comment(s) in each letter. Responses to comments within each letter are presented following the letter itself.

Comment Letter 1

From: mburrows@valornet.com [<mailto:mburrows@valornet.com>]
Sent: Thursday, August 05, 2010 1:22 PM
To: Carra, Marsha F
Subject: Suggestion

Dear Ms. Carra :

This is Marvin Burrows down in Hobbs, NM. I've worked in the oil and gas industry in New Mexico for 43 years. I've worked as production supervisor for various companies, and as manager for oil and gas producers and pipeline companies. My current title is Engineering Manager for Rice Operating Company.

I've been following the progression of the issue concerning whether or not there should be oil and gas development of the Brantley / Avalon Project Areas. Has it been considered that the companies wanting to develop that area might be willing to contribute a percentage of oil and gas production toward the betterment of the project area? If, for example, \$.05 for each MCF of gas produced, and \$.50 for each barrel of oil produced, could go into a fund used for the betterment of the Project Area, I feel certain the developers would do it. It would even be a great tax deduction.

If such contributions went to the bottomless pit / black hole in Washington DC, I don't think the idea would ever fly. But if the money so contributed was in fact used for the betterment of the area, I don't think it would be a hard sell at all.

In all of my years of making things work, I've learned (the hard way) that there is always a compromise that is win/win. We just have to look for it.

Thanks

Marvin L. Burrows
Hobbs, NM

Comment 1-1

Response to Comment Letter 1

Thank you for your comments. Your comments are addressed below.

Response to Comment 1-1: Reclamation appreciates your suggestion for contributing a percentage of oil and gas production revenues generated within the Project Area toward improvements within the Project Area. Revenues from oil and gas production on Federal leases within the Project Area are collected and distributed by the Bureau of Land Management (BLM). Reclamation has no authority to impose any additional fees on lessees beyond the fees charged for administrative costs and right-of-use rental for surface facilities.

Comment Letter 2



New Mexico Oil & Gas Association

2009-2010 Executive Committee

Chairman
Leland Gould
Western Refining, Inc.

Vice Chairman
Ray Payne
Devon Energy Corp.

Treasurer
Mike Hanagan
Manzano, LLC

Chairman-Elect
Kelly Hart
BP America

Kent Adams
BOPCO, LP

Daryn Forrest
Hobbs Rental Corp.

Ken Huseman
Basic Energy Services

Matthew Hyde
Concho Resources, Inc.

Thomas Janiszewski
Oxy Permian

A. Roy Lyons
ConocoPhillips

Mitch Mamoulides
Chevron USA, Inc.

Pinson McWhorter
Yates Petroleum

Raye Miller
Marbob Energy Corp.

Gary Pitts
EOG Resources, Inc.

Tom Price, Jr.
Chesapeake Energy Corp.

Robert Revella
Williams

Jason Sandel
Aztec Well Servicing Co.

Michael Smith
EPCO, Inc.

Jim Townsend
Holly Corp.

Ronnie Trammell
DCP Midstream

Jennifer Webster
El Paso Corp.

Past Chairman
Cliff Brunson
BBC International

President
Steve Henke

P.O. Box 1864
Santa Fe, NM 87504-1864

Ph: 505-982-2568
Fax: 505-986-1094

www.nmoga.org

August 27, 2010

VIA E-MAIL
Ms. Marsha Carra
Bureau of Reclamation
555 Broadway Blvd, NE
Suite 100
Albuquerque, NM 87102

Re: Brantley and Avalon Reservoir RMPA/DEA Carlsbad Project

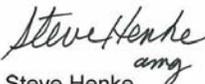
Dear Ms. Carra:

The New Mexico Oil and Gas Association (NMOGA) is a nonprofit trade association that represents all aspects of New Mexico's oil and natural gas industry. NMOGA represents over 300 member companies, from the largest major oil company to the smallest of independents, and all segments of the industry, including crude oil refiners, natural gas processors, pipeline operators as well as service and supply companies that support all segments of the oil and gas industry.

With the delay of the documents appearing on your web site, we lost the time needed to circulate to our members to coordinate comments. Therefore, we are requesting an extension of the comment period for the Brantley and Avalon Reservoir RMPA/DEA until Thursday, September 30, 2010.

I appreciate your consideration. If you have any questions, please feel free to contact me at 505.982.2568.

Sincerely,



Steve Henke
President

xc: Linda Rundell
Doug Burger
Jim Stovall

"Ensuring tomorrow's future today."
Serving our members since 1929

Comment 2-1

Response to Comment Letter 2

Thank you for your comments. Your comments are addressed below.

Response to Comment 2-1: Reclamation approved the request to extend the public comment period from 30 days to 60 days, ending on September 30, 2010.

Comment Letter 3



Devon Energy Corporation
20 North Broadway
Oklahoma City, OK 73102-8260

405 235 3611
www.devonenergy.com

September 26, 2010

Via Electronic Mail and Certified Mail

Marsha Carra
U.S. Department of the Interior
Bureau of Reclamation
Albuquerque Area Office
555 Broadway NE, Suite 100
Albuquerque, NM 87102-2352
Email: mcarra@usbr.gov

Re: Brantley and Avalon Reservoirs Resource Management Plan Amendment Draft
Environmental Assessment

Dear Ms. Carra:

Devon Energy Corporation (Devon) files these comments on the Bureau of Reclamation's (Reclamation) Brantley and Avalon Reservoirs Resource Management Plan (RMP) Amendment, Draft Environmental Assessment (EA) and Proposed Finding of No Significant Impact (FONSI). On August 30, Reclamation agreed to extend the comment period until September 30, 2010 and Devon timely submits these comments.

Devon appreciates the opportunity to comment on this RMP Amendment and the accompanying Draft EA and FONSI to Reclamation's 2003 RMP for the Brantley and Avalon Reservoirs. Devon currently has approximately 6,000 gross acres of oil and gas leases and approximately 50 wells within this planning area. Devon also has a significant lease position adjacent to the planning area and stands to be dramatically affected by the decisions made by this process. In addition to these comments, Devon also adopts and incorporates by reference the comments filed by the New Mexico Oil and Gas Association. Devon supports Reclamation's efforts to balance multiple and often competing interests in the planning area but believes several provisions and restrictions should be modified to accommodate multiple uses on the lands in the planning area, including oil and gas development.

GENERAL COMMENTS

Devon supports Reclamation's preferred alternative (Alternative C) with the modifications and revisions discussed below. These edits and modifications will protect the federal mineral estate while at the same time providing environmental protection measures that ensure protection of water resources, threatened and endangered species, cultural resources, wildlife and air quality. Reclamation should increase the amount of acreage that potential lessees could occupy, or lands that could later be occupied as determined on a case-by-case basis, based

Comment 3-1



Comment Letter 3 (cont.)

Ms. Marsha Carra
 Page 2
 September 20, 2010

on the site-specific parameters of each well or group of wells. Reclamation and the Bureau of Land Management (BLM) should preserve as much regulatory flexibility as possible for future oil and gas development in the project area.

Reclamation is conducting the RMP Amendment in cooperation and coordination with BLM, which has been delegated the authority to issue and manage oil and gas leases for lands controlled by Reclamation. Draft EA at 2. Given this dynamic, it is imperative that the rights and obligations of federal mineral lessees be protected by provisions related to BLM’s management of the federal mineral estate pursuant to the Mineral Leasing Act (MLA) and the Federal Land Policy Management Act (FLPMA). As a result, Reclamation must also follow the requirements for oil and gas leasing and management of the federal mineral estate found in the statutes, regulations, manuals, handbooks and policy of BLM and the Department of the Interior. Accordingly, in the specific comments below, Devon references and includes comments on Reclamation’s duty to comply with BLM’s management guidelines and parameters in overseeing the federal oil and gas program. Thus, the Draft EA should include a description and statement regarding FLPMA and Reclamation’s obligation to BLM and the Department of Interior in protecting the federal mineral estate in accordance with FLMPA. These statements should be included in Section 1.5 – Relevant Statutes and Regulations.

Devon provides the following background on the National Environmental Policy Act (NEPA) to provide context for its comments on the Draft EA. NEPA is a procedural statute that “prescribes the necessary process [and] does not mandate particular results.” *Wyo. Farm Bureau Fed’n v. Babbitt*, 199 F.3d 1224, 1240 (10th Cir. 2000). As explained by the U.S. Supreme Court in *Robertson v. Methow Valley Citizens Council*, “[i]t is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process.” 490 U.S. 332, 350 (1989). It is also well settled legal precedent that NEPA “does not require agencies to elevate environmental concerns over other appropriate considerations.” *Citizens’ Comm. to Save Our Canyons v. United States Forest Serv.*, 297 F.3d 1012, 1022 (10th Cir. 2002); *Utah Shared Access Alliance v. U.S. Forest Serv.*, 288 F.3d 1205, 1207 (10th Cir. 2002). NEPA does not require Reclamation to promote environmental concerns over other resources, including environmentally responsible oil and gas development.

NEPA does require Reclamation to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. § 4332(2)(E). As stated in 40 C.F.R. § 1508.9(b), this statutory provision is independent of the environmental impact statement (EIS) requirement and mandates that agencies seek alternatives for all proposals, including those for which the agency prepares only an environmental assessment. See *Davis v. Mineta*, 302 F.3d 1104, 1120 (10th Cir. 2002). Reclamation’s Draft EA for the Brantley and Avalon RMP Amendment, therefore, must consider a reasonable range of alternatives for oil and gas leasing.

Comment 3-1 (cont.)

Comment 3-2

Comment 3-3



Comment Letter 3 (cont.)

Ms. Marsha Carra
 Page 3
 September 20, 2010

SPECIFIC COMMENTS

Devon provides the following specific comments on the Draft EA.

1. Valid Existing Rights

Much of the planning area overlaps valid existing federal, state and private oil and gas leases. FLPMA states that “[a]ll actions by the Secretary concerned under this Act shall be subject to valid existing rights.” 43 U.S.C. § 1701 note (h). 43 C.F.R. § 1610.5-3(b); *see also Colorado Enviro. Coal.*, 165 IBLA at 227 (explaining that “FLPMA expressly provides that “[a]ll actions by the Secretary concerned under this Act shall be subject to valid existing rights.”) (citing 43 U.S.C. § 1701 note (h) (2000)). Thus, existing oil and gas lessees have valid existing rights to develop these leases regardless of the current or future land use designations that may be imposed upon this area.

Devon urges Reclamation and BLM to continue to recognize valid existing lease rights within the planning area. The valid existing rights and obligations conferred to operators from the Department of the Interior under these federal leases are not pre-empted or otherwise excused by Reclamation’s designation of new recreational and other types of management areas. In addition, Reclamation cannot deny operators access to their leases (i.e. roads, pipelines) when such access necessarily must traverse across unleased areas. The Draft EA should specify that valid existing rights will be protected regardless of the management decisions made as part of the RMP Amendment. Reclamation should include the following text in the RMP Amendment and Final EA:

Valid existing rights are legal rights to use the land that were in existence prior to implementation of the decisions in the RMP and/or RMP Amendment. The most significant types of valid existing rights are oil and gas leases, mining claims, and right-of-way authorizations. The oil and gas leasing stipulations specified for particular areas in the RMP Amendment will not apply to existing leases. These existing leases will be subject to the specific lease stipulations that were applied under the previous land use plan or that are attached to the actual lease. An existing right-of-way will only be subject to the specific terms and conditions that were applied when it was authorized.

2. Lease Stipulations

Reclamation has applied three types of special lease stipulations for the Project Area: (1) no surface occupancy; (2) no storage facilities; and (3) surface occupancy on a case-by-case basis. Draft FONSI at 3. These stipulations are subject to exception, modification and waiver at the discretion of the authorized officer. *Id.* The Draft EA does not contain an adequate analysis of why Reclamation determined to limit the special lease stipulations to these three. To completely comply with NEPA’s mandate to fully examine a reasonable range of alternatives, Reclamation must analyze other less restrictive alternatives that will not so heavily limit oil and gas development in the Planning Area. There are other reasonable and feasible alternative lease stipulations that Reclamation could apply that would allow the development of the oil and gas leases while protecting other important resources. For example, Reclamation should consider

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Comment 3-6



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lease stipulations that allow for waiver of NSO if the authorized officer determines there is no potential to impact the waters in each reservoir based on yearly water levels. The Draft EA must explain why other alternatives were not considered in full and were subsequently dismissed.

Reclamation must also fully discuss and disclose to the public the specifics regarding the granting the exceptions, modifications and waivers of each of these lease stipulations. As written, the Draft EA fails to include any discussion regarding Reclamation’s use of these waivers.

3. Adequate Socio-Economic Analysis

Under NEPA, Reclamation must integrate social science and economic information in the preparation of informed, sustainable land use planning decisions, including amendments to land use planning decisions. In addition, BLM’s regulations implementing FLPMA for land use planning for mineral resources require that RMP decisions “estimate and display the physical, biological, economic, and social effects of implementing each alternative considered in detail.” 43 C.F.R. § 1610.4-6.

Similarly, NEPA requires federal agencies to “insure the integrated use of the natural and social sciences . . . in planning and decision making.” 42 U.S.C. § 4332. Under NEPA’s implementing regulations, the “human environment” includes economic and social effects. Specifically, this regulation provides that the human environment includes “the natural and physical environment and the relationship of people with that environment. . . . [and] the economic or social and natural or physical environmental” must discuss these effects on the human environment. 40 C.F.R. § 1508.14.

A proper socio-economic impact analysis must be used to assess the social and economic consequences of implementing the various alternatives identified through the planning process. The impact analysis must also include recent and verifiable income and employment for various economic sectors, community infrastructure, state and local revenues and expenditures, and land use patterns.

There is no support for Reclamation’s statement that there is a lack of interest by the oil and gas industry in this area. Draft EA at 4-29. This statement specifically contradicts the Draft EA’s purpose and need for developing the RMP Amendment that “[i]n the recent years the BLM has experienced a tremendous increase in interest from oil and gas development companies for new lease nominations throughout Eddy County, including the Project Area.” Draft EA at 1-5. Reclamation must correct these statements.

Mineral development is critical to the local economies of Eddy and other surrounding New Mexico counties. The Draft EA fails to fully account for the adverse economic impacts that would result from the restrictions placed on mineral development in the agency-preferred alternative (Alternative C). These restrictions would adversely impact tax revenues, employment, energy prices and royalty payments. Reclamation must fully consider how restricting oil and gas development on lands in the Planning Area would adversely affect local, state, and federal economies before making its final decision on this RMP Amendment.

Comment 3-6 (cont.)

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The 2009 Economic Impact Report of New Mexico’s Oil and Gas Industry prepared by C. Megan Starbuck, Ph.D., available at the Energy Advances New Mexico website, concluded that over \$3.53 billion was generated by the extraction of oil and natural gas in New Mexico. This translates to over 15,650 jobs associated with the oil and gas industry. Further, revenue from taxes (\$983 million) accounted for over 18% of the state’s total tax revenue. These figures underscore the important and positive beneficial role that oil and natural gas development plays. Production taxes, royalties and leasing bonus and rentals are also realized at the federal, state and county level. In the Draft EA, Reclamation should account for these benefits by including a more thorough discussion of the positive economics of the oil and gas industry.

The data provided by Reclamation in the Draft EA does not support its conclusions in Section 4.1.12 that increasing oil and gas development would not produce much economic benefit. Draft EA at Section 3.2.12; Draft EA at 4-29. The Draft EA acknowledges that oil and gas revenues for the State of New Mexico for 2008 exceed \$1.3 billion (one fifth of the total General Fund revenue for the state). Draft EA at 3-45. Eddy County ranks third, and Chavez County ranks fifth in the state for oil and gas production and each “contributes substantial numbers of jobs to the economy of both counties.” Draft EA at 3-45. The oil and gas industry also provide “significantly higher paying that many other jobs area” for these two counties.

Census and other data from 2003 do not support the conclusions reached in the Draft EA. Reclamation admits that the oil and gas industry has a lower unemployment rate and produces higher paying jobs, but concludes that restrictions on the oil and gas development will have little economic impact. Reclamation must correct these statements. Reclamation should use more current and accurate data provided from sources similar to The 2009 Economic Impact Report of New Mexico’s Oil and Gas Industry in its socio-economic analysis. Review of economic data from the State of New Mexico actually demonstrates that increased oil and gas development and fewer restrictions on development will increase the positive impacts on the state and local economies. Reclamation must also provide a supportable rationale, with relevant data, for its conclusions.

In the event Reclamation adopts Alternative C, or components of Alternative C in the RMP Amendment, Reclamation must quantify the reduction in economic gain and other impacts that are associated with restrictions imposed on oil and gas development by the NSO stipulations and the “no well” restrictions. Reclamation must also consider the impact that planning decisions have on the commodity price at a national level.

The Draft EA excludes and provides insufficient data and information on the highly significant state and local revenue generated due to a variety of taxes paid to the state and local governments. Another major contribution to the economy made by the oil and gas industry is payments to the federal government, 50 percent of which is returned to the state which apportions appropriate revenue to counties, in the form of federal lease rentals, lease bonus payments, and royalties generated from federal activities on public lands. Section 4.1.12 of the Draft EA does not contain a full and comprehensive analysis of the positive impacts of oil and gas development on the stated and local economies. Nor does the Draft EA fully disclose the negative impacts that restricting development will have on these economies. To fully comply with NEPA, the RMP

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Amendment and EA must provide a rational basis for its conclusions regarding the economic impact of restrictions on oil and gas leasing and development. Accordingly, Reclamation must revise and update Sections 3.2.12 and 4.1.12.

4. Reasonably Foreseeable Development

It is well established that Reasonably Foreseeable Development (RFD) projections do not limit the number of wells that BLM may authorize. *Theodore Roosevelt Conservation Partnership v. Salazar*, --- F.3d ---, 2010 WL 2869778, *7 (D.C. Cir. 2010) (the RFD “estimate would not impose a hard cap on the actual number of wells that can be drilled in the [resource area.]” The RFD “serves as an analytical baseline for evaluating environmental impacts, not ‘a point past which further exploration and development is prohibited.’” *Id.* (quoting *Wyoming Outdoor Council*, 164 IBLA 84, 99 (2004)).¹ The RFD is an analysis of the impacts from a number of wells, but ultimately is an analysis of the environmental impacts from the surface disturbance and other impacts from a selected level of development. *See id.* at *8.

It should also be noted that once a well is plugged and the well pad reclaimed and abandoned, it no longer has an adverse effect on the environment. The key element that must be considered in determining what level of oil and gas activity will be allowed over the life of the plan is not the number of wells that could be drilled, but rather the net effect of surface disturbance and activities. It is imperative that Reclamation clearly state that the 60-80 wells projected over the next 20 years (or life of the RMP Amendment) is an analytical tool the agency uses to assess potential environmental impacts. Under the governing RFD case law and policy, and to preclude future permitting delays, Reclamation should include the following language in Section 2.6, or where appropriate, of the EA.

The well projection numbers in the RFD do not limit the number of wells which Reclamation and BLM may ultimately authorize in the Planning Area. Total well counts or surface disturbances exceeding these projected levels of oil and gas development do not automatically prompt a need for a supplemental NEPA analysis prior to additional leasing or development. Mitigation of environmental effects, for example, through successful reclamation, utilization of directional drilling from shared well locations, and minimizing pad and road construction can prevent the level of impacts from substantially exceeding those originally analyzed in the EA and RMP Amendment.

Reclamation should also provide an expanded discussion of the RFD and its interplay with future oil and gas leasing and development. Reclamation should also include the language above to strengthen the RMP Amendment and EA.

5. Green House Gases and Climate Change

¹ See also BLM Instruction Memorandum No. 2004-089, *Policy for Reasonably Foreseeable Development (RFD) Scenario for Oil and Gas* (Jan. 23, 2004).

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Devon supports Reclamation's analysis regarding the highly speculative impacts from green house gases (GHG) and climate change. Draft EA at 4-2. Reclamation, BLM and the Environmental Protection Agency (EPA) do not possess a quantitative model or analytical tool of any kind to evaluate the impacts of oil and gas leasing, which represents the potential development, not actual development, on global climate change from emissions of GHGs. The impacts related to air quality are better assessed when specific projects have actually been proposed, and Reclamation and BLM assess those impacts on a project-level basis. So long as the Draft EA adequately discloses the potential effects of the leasing on air quality to inform Reclamation and BLM during the decision-making process and involve the public, NEPA's purpose and goals are satisfied.

Certain groups opposed to oil and gas development likely will request that Reclamation complete a comprehensive air quality, ozone and climate change analysis as part of this RMP Amendment and EA. It is important, however, to place the context and scope of Reclamations and BLM's jurisdiction over air quality issues into perspective. Air quality analysis is a matter of special expertise where reviewing tribunals show the most deference to agencies conducting the analysis. *See, e.g., Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 377 (1989). Moreover, unlike many other resources over which Reclamation and BLM have special jurisdiction, Reclamation's and BLM's role over air quality regulation is extremely limited. Under the Clean Air Act, each state has the primary responsibility for assuring air quality within the state. 42 U.S.C. § 7407. EPA has primary responsibility for areas within Indian airsheds, although EPA has not yet developed a minor source permit program for regulated activities within Indian airshed.

In addition, a decision to approve revisions to a RMP without a quantified ozone analysis in the NEPA document has been affirmed as reasonable. In *San Juan Citizens Alliance v. Norton*, 586 F. Supp. 2d 1270 (D.N.M. 2008), BLM learned during the comment period on the draft EIS that ozone formation was becoming a concern in northern New Mexico's San Juan Basin. Rather than halting its decision process on the RMP, however, BLM worked with EPA on a modeling and regulatory project to provide information needed to assess control measures to be applied when new sources sought permits. *Id.* at 1289-90. The court affirmed BLM's approach and upheld the RMP.

The RMP Amendment here will not specifically authorize any activity capable of emitting air pollutants. Potential lessees will be required to obtain a permit and authorization from the appropriate state agency or EPA before constructing any regulated emission source that is analyzed in the NEPA document. Applications for Permits to Drill (APDs) will be issued with conditions of approval that require operators to comply with all applicable laws, but the Reclamation nor BLM is legally authorized to regulate air quality standards. It is the responsibility of EPA or the State of New Mexico to issue air permits for oil and gas operations and to ensure that operators comply with those permits and the CAA. Here, Reclamation must merely analyze and disclose impacts to air and other resources in NEPA documents, but it is not the regulating agency that ensures that oil and gas operations comply with the CAA.

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The level of analysis described in the Draft EA is sufficient for the limited purpose of this document. Reclamation need not conduct a detailed ozone or GHG analysis prior to issuing a FONSI.

6. Least Restrictive Lease Stipulations

The Draft EA does not contain an adequate analysis of Reclamation’s justification for application of the overly restrictive lease stipulations. Reclamation must include a discussion and analysis of each lease stipulation with an explanation on why less restrictive alternatives are not viable. As currently written, the Draft EA does not conform to BLM’s Manual on Land Use Planning and Manual 1624 for Fluid Minerals, which specifically directs BLM not only to identify which areas would be subject to different categories of restrictions as included in the Draft EA, but also to show that the least restrictive lease stipulation that would offer adequate protection of a resource has been selected. See BLM Handbook H-1601-1, App. C. II. F. at 16. Below are specific comments related to specific lease stipulations or restrictions on development:

a. The Draft EA proposes limits on surface occupancy on a case-by-case basis for wells proposed within 2,640 horizontal feet (805 horizontal meters) and 5,280 horizontal feet (1,609 horizontal meters) of Brantley Dam Site. Draft EA at 2-19.

Devon believes that this restriction may be a mistake. This restriction should state that surface occupancy will be authorized on a case-by-case basis for wells proposed within 2,640 horizontal feet (805 horizontal meters) of Avalon Dam Site and 5,280 horizontal feet (1,609 horizontal meters) of Brantley Dam Site. Reclamation should correct or clarify this stipulation.

b. The Draft EA proposes limits on surface occupancy within 660 horizontal feet (200 horizontal meters) of maximum water surface at Brantley Reservoir (elevation 3,263 feet [995 meters]) or Avalon Reservoir, (elevation 3,190 feet [972 meters]). Draft EA at 2-19.

Reclamation changed the elevation restrictions for the Brantley Reservoir, but not the Avalon Reservoir without a reasonable explanation. The Avalon Reservoir elevation restriction should also be revised because the elevation of the spillway gates is only 3177 feet. There is no for the current elevation limitations if the water cannot reach those elevations. Reclamation’s imposition of this restriction is not supported by the Draft EA, and it should be consistent with the spillway gates and the elevation restriction justification for the Brantley Reservoir.

c. The Draft EA proposes no storage facilities within 660 horizontal feet (200 horizontal meters) of the 100-year floodplain at Brantley Reservoir (elevation 3,283 feet [1,001 meters]) or Avalon Reservoir (elevation 3,200 feet [975 meters]). Draft EA at 2-19.

Reclamation claims this restriction addresses speculative, potential impacts to fisheries from spills and releases of toxic chemicals into the adjacent waters. Reclamation’s rationale does not support the 200 meter horizontal setback. BLM has provided no supporting data or information to support its finding that a 200 meter setback would provide any further protection,

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especially considering that Reclamation admits that the fisheries are in “poor condition.” The EA should remove this setback because the standard oil and gas lease stipulations provide “implementing actions that would contain drilling fluid and wastes.” Draft EA at 4-15—4-16 (BLM admits that these are merely “extra measures”). The current stipulation provides adequate protection and is the least restrictive measure needed to protect this resource.

There is consensus that the Pecos River floodplain is a gradually sloping, broad area that will never be flooded again because of the existence of upstream dams, flood control structures and diversions. Most of this area should not be considered a riparian area that is properly functioning, in particular, because of the effects of the Old McMillan lake bed and other uses that have persisted for years in the area. Therefore, Reclamation should modify this overly restrictive floodplain stipulation for this area, and the stipulation should be modified to only cover the lands to the river’s edge.

d. The Draft EA proposes limits on surface occupancy on a case-by-case basis within 300 horizontal feet (91 horizontal meters) of all publicly maintained (e.g., State of New Mexico, Eddy County), designated roads and highways for construction of access roads and pipelines. No wells will be permitted within these areas. Draft EA at 2-19.

The Draft EA does not provide an adequate analysis or justification for this restriction. The mere presence of a road should not provide a definitive restriction on the surface occupancy and oil and gas development. The RMP Amendment should consider not only whether to allow surface disturbance in these areas, but also whether or not to also allow wells in these areas on a case by case basis.

e. The Draft EA proposes limits on surface occupancy on a case-by-case basis within 660 horizontal feet (200 horizontal meters) of normal high water line of streams, rivers, and arroyos for construction of roads and pipelines. Construction of access roads and pipelines will be restricted in high-value riparian and sensitive areas along streams, rivers, and arroyos. No wells will be permitted within these areas. Draft EA at 2-19.

The Draft EA does not provide an adequate analysis or justification for this restriction. The Draft EA does not contain a definition of arroyos so it is difficult to provide substantive comments on this section. This restriction on arroyos should be removed because it unnecessary and not the least restrictive measure needed to protect these resources.

f. The Draft EA proposes limits on surface occupancy on a case-by-case basis within 500 horizontal feet (152 meters) of any improvements either owned, permitted, leased, or otherwise authorized by Reclamation within the leased areas for construction of access roads and pipelines. No wells will be permitted in these areas. Draft EA at 2-19.

The EA does not provide an adequate analysis or justification for this restriction. The RMP Amendment should consider whether or not to allow wells in these areas on a case-by-case basis.

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 Comment 3-25



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g. The Draft EA proposes limits of no surface occupancy within 200 horizontal feet (61 meters) of all designated, improved, and permitted trails. Draft EA at 2-19.

The EA does not define what types of trails Reclamation intends to protect with this restriction. It should also be noted in the EA that existing and future leases will not be constrained in the event that Reclamation or others designate new trails.

The Draft EA also includes a discussion of “three nature/interpretive” trails within the Planning Area. Draft EA at 3-52. The Draft EA does not contain the authority under which Reclamation would impose such a restriction or why a less restrictive stipulation could not protect these trails.

The Draft EA does not include any description, analysis or explanation for the NSO stipulation within 200 feet of “all designated, improved, and permitted trails.” Draft EA at 2-19. The Draft EA should include a discussion that existing oil and gas leases will not be restricted by future trails or a proposed mountain biking trail. These new trails would be subject to the valid existing rights of the oil and gas lessees. The Draft EA contains no analysis or explanation on why this setback is appropriate. To fully comply with NEPA, Reclamation must provide a complete analysis of its imposition of these overly restrictive (and currently unsupported) lease stipulations, explain why these restrictions are essential, and explain why they are the least restrictive means necessary to protect the resources.

The Draft EA should further explain the application of this stipulation and whether or not the trail would be protected if it qualified for inclusion on the National Register of Historic Places (NRHP). If the trail does not qualify for inclusion on the NRHP, Reclamation should discuss and analyze why the ¼ mile stipulation is appropriate. Reclamation should also consider less restrictive stipulations and conditions of approval to protect the trail, including reasonable crossings along the trail, fencing, interpretive signs, or barriers to protect important areas. All trails do not deserve the heightened protections as congressionally designated, historic trails or those that qualify for inclusion on the NRHP.

h. The Draft EA proposes limits on surface occupancy on a case-by-case basis within 200 horizontal feet (61 meters) of established crops for the construction of access roads and pipelines. No wells will be permitted within these areas. Draft EA at 2-20.

The EA does not provide an adequate analysis or justification for this restriction. The RMP Amendment should consider whether or not to allow wells in these areas on a case-by-case basis.

i. The Draft EA proposes limits on surface occupancy on a case-by-case basis within slopes steeper than 2:1 and within 200 horizontal feet (61 meters) of slopes steeper than 2:1 for the construction of access roads and pipelines. No wells will be permitted within these areas. Draft EA at 2-20.

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Comment 3-29

Comment 3-30



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The EA does not provide an adequate analysis or justification for this restriction. The RMP Amendment should consider whether or not to allow wells in these areas on a case-by-case basis.

j. The Draft EA proposes limits on surface occupancy on a case-by-case basis within established right-of-ways of human-made canals, laterals, aqueducts, pipelines, or drainages for the construction of access roads and pipelines. No wells will be permitted within these areas. Draft EA at 2-20.

The EA does not provide an adequate analysis or justification for this restriction. The RMP Amendment should consider whether or not to allow wells in these areas on a case by case basis.

7. Directional Drilling

Reclamation cannot simply presume that directional drilling will allow development in the regulatory environment offered by the Draft EA and RMP Amendment. By applying NSO and “no well” restrictions, Reclamation apparently assumes that these areas could be developed through directional drilling. These determinations, however, must be made on a site specific basis. The RMP Amendment must be flexible enough to allow and to promote adoption of new technologies as they evolve. Reclamation should state objectives and manage them rather than simply prescribe restrictions that may not be necessary in the future with the advent of new technology.

8. Development and Production (Brantley)

The current development constraints within the Brantley area include NSO below 3271 feet (except on case-by-case), and no storage facilities below 3286 feet. Devon supports Reclamation’s change that will restrict surface occupancy for wells to 3261 feet. The elevation of the spillway gates is 3261 feet, and thus there is no need to have elevation limitations if the water can not reach those elevations. The conservation storage elevation is 3256 feet, at which time water is released downstream. If a “major” flooding event exceeded this capacity, by the time flood water went through the gates and over the spillway, there would be very little water backed up to negatively effect oil and gas production facilities at the proposed elevations.

9. Development and Production (Avalon)

Unlike the limit on the Brantley area, Reclamation increased the NSO and other restrictions for the Avalon area based on the maximum water surface for each reservoir. The current development constraints within the Avalon area include NSO below 3190 feet (except on case-by-case), and no storage facilities will be allowed below 3200 feet. Devon proposes that the managing elevation for both an NSO and storage facilities should be changed to 3178 feet -- the elevation of the spillway gates is 3177 feet. There is no need for the current elevation limitations beyond the spillway gate level if the water cannot reach those elevations. The basis for the restriction limits for the Brantley and Avalon should be consistent.

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The Draft EA contains no analysis or explanation of why a setback is appropriate for the Brantley Reservoir but not the Avalon Reservoir. To fully comply with NEPA, Reclamation must provide a complete analysis of its imposition of these overly restrictive (and currently unsupported) lease stipulations, explain why these restrictions are essential, and why they are the least restrictive means necessary to protect these resources.

10. Floodplain Stipulations for the Entire Planning Area

Current Management requires locations and facilities to be 200 meters away from the outer edge of the floodplain. The Draft EA does not contain an adequate analysis to support this restriction. As explained above, Reclamation is required to apply the least restrictive mitigation measure to protect the resource at issue. The 200 meter restriction from the edge of the floodplain is not the least restrictive measure. Instead, Reclamation should require that new locations and production facilities not be allowed within 200 meters of the edge of the river – not the floodplain. The Pecos River floodplain is a gradually sloping, broad area, and with the existence of upstream dams, flood control structures and diversions, it is unlikely to ever be flooded again. The floodplain stipulation for this area should be limited to the river's edge.

Devon appreciates the opportunity to provide these comments on the Proposed RMP Amendment and Draft EA. Devon looks forward to Reclamation's responses to these comments and changes to the Draft EA prior to the approval of the RMP Amendment. Please include Victoria Sánchez, Devon Regulatory Advisor, at (405) 228-8379 on all future notifications concerning the Proposed RMP Amendment and Draft EA. Devon would appreciate the opportunity to discuss the RMP Amendment and the proposed restrictions on oil and gas development with Reclamation and BLM.

Sincerely,



Randy Bolles
Manager, Regulatory Affairs
Western Division
Devon Energy Corporation

cc: Doug Burger, District Manager for Pecos District, Bureau of Land Management
Jim Stovall, Field Manager Carlsbad Field Office, Bureau of Land Management

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Comment 3-36

Responses to Comment Letter 3

Thank you for your comments. Your comments are addressed below.

Response to Comment 3-1: The amount of land available for surface occupancy within the Project Area is determined substantially by existing legislative policies, regulatory requirements, and/or *Reclamation Manual Directives and Standards* (<http://www.usbr.gov/recman/Ind/Ind06-01.pdf>). The Department of the Interior requires each of its bureaus to establish a directives system setting forth its bureau-wide requirements. Reclamation's directives system is the *Reclamation Manual Directives and Standards*. Adherence to all requirements in the *Reclamation Manual Directives and Standards* is mandatory. However, a request for waiver from a *Reclamation Manual Directives and Standards* requirement can be made in accordance with a waiver request. A request will be reviewed and resolved with an approval or disapproval from the responsible official. Waivers will not be granted for statutory, regulatory, Executive Order, Departmental or Office of Management and Budget requirements that are applicable to Reclamation.

Response to Comment 3-2: While the Federal Land Policy Management Act (FLPMA) is BLM's Organic Act for public lands, Reclamation's land management authority for its withdrawn and acquired lands derives from the Reclamation Act of 1902, Reclamation Projects Act of 1939, Reclamation Recreation Management Act of 1992, Resource Management Plans (RMPs), as well as *Reclamation Manual Directives and Standards*. Reclamation actively seeks input and recommendations from BLM on issues such as mineral development, but is not obligated to follow BLM's management guidelines and parameters in overseeing development of the Federal mineral estate. Section 2805 of the Reclamation Recreation Management Act provides authority for Reclamation to develop, maintain, and revise RMPs for Reclamation lands.

Mineral leasing on Reclamation lands is administered by the BLM under provisions of Title 43, Subpart 3100 of the Code of Federal Regulations (CFR). Leasable minerals (e.g., oil, gas, and geothermal) are under discretionary authority, meaning that they are open to development through application and permitting by the BLM with concurrence by Reclamation. Except for those minerals and conditions meeting the provisions of Section 10 of the Reclamation Projects Act of 1939, leases for mineral and geothermal resources on all land acquired or withdrawn by Reclamation are issued by the BLM per an Interagency Agreement between Reclamation and BLM dated December 1982. Under this agreement the BLM will, in all issues involving mineral and geothermal leases, request that Reclamation determine whether leasing is permissible and, if so, provide any stipulations required to protect the interests of the United States. In addition, lands that were conveyed to the Carlsbad Irrigation District in 2001 are also required to be managed and used according to the purposes for which the Carlsbad Project was authorized,

Responses to Comment Letter 3 (cont.)

based on historic operations and consistent with the management of other adjacent Carlsbad Project lands.

Response to Comment 3-3: The range of alternatives that Reclamation presented in the DEA responds directly to the issues and concerns that were raised during the public scoping process. As such, there are no known unresolved conflicts concerning alternative uses of available resources within the Project Area. All three alternatives presented in the DEA address existing legislative and regulatory requirements at a programmatic level and/or place constraints if resource values are determined to be sufficiently high or protections are justified in the public interest.

Response to Comments 3-4 and 3-5: The DEA clearly states that activities allowed under existing Federal mineral leases would continue according to the terms of the lease as presently in effect, until such time as the lease expires. However, any lease activity after the expiration date would be subject to the new special lease stipulations. As such, less than 9,361 acres (3,788 hectares), or 21 percent of the Project Area, are currently identified as Unleased Federal Minerals that would be immediately subject to any of the proposed alternatives presented in the DEA.

Response to Comment 3-6: No public or agency comments have been received to specifically suggest other special lease stipulations for the Project Area than those proposed in the DEA. Reclamation is not aware of additional special lease stipulations that would be appropriate for use within the Project Area. The alternatives were developed to respond to issues identified through scoping as described in Section 1.6 of the DEA. The three alternatives analyzed in the DEA are distinguished by the type and degree of special lease stipulation constraints. No other alternatives or special lease stipulations meet the purpose and need criteria for the EA. Site specific oil and gas development activities proposed within the Project Area would continue to be evaluated on a case-by-case basis for all three alternatives. The purpose of the Surface Use and Occupancy Requirements found in Appendix A is to best manage surface disturbances and other effects on project facilities and natural or cultural resources within the Project Area. Circumstances for waivers of the requirements are included in Appendix A so that they will not be applied needlessly.

Response to Comment 3-7: Circumstances for granting exceptions, modifications, or waivers of surface use and occupancy requirements are included in Appendix A and in the *Reclamation Manual Directives and Standards* (<http://www.usbr.gov/recman/lnd/lnd06-01.pdf>). See also Response to Comment 3-1.

Responses to Comment Letter 3 (cont.)

Response to Comment 3-8: Recent and verifiable data on income and employment for various economic sectors, population, housing, and revenue affected by oil and gas development within the Project Area were presented in Chapter 3 of the DEA. Where appropriate, this information has been updated in the FEA.

Response to Comment 3-9: The reference pertains only to existing unleased tracts of land within the Project Area. The fact that these areas remain unleased is likely due to lack of interest and no evidence of payable oil and gas zones. It is not intended to infer that there is a lack of interest in oil and gas development activities within the Project Area, but rather to speculate on why certain tracts remain unleased.

Response to Comment 3-10: Reclamation believes that the agency-preferred alternative (Alternative C) is less restrictive on mineral leasing and development within the Project Area than occurs under existing conditions (Alternative A). Chapter 3 of the DEA clearly describes the economic importance of mineral development to Eddy County and New Mexico in general. However, with the Project Area representing less than 2 percent of the operating wells in Eddy County and less than 1 percent of the mineral estate within BLM's Carlsbad Field Office (CFO), its significance to the local economy is likewise minimal within this context. Because the Project Area represents such a minor portion of the overall regional oil and gas development industry in this part of New Mexico, it is not possible to accurately estimate specific economic impacts.

Response to Comment 3-11: The economic benefits derived from the oil and gas industry locally and at the state level were clearly detailed in Chapter 3 of the DEA. More current data has also been included in Chapter 3 of the FEA.

Response to Comment 3-12: Because the Project Area contains less than 2 percent of the operating wells in Eddy County and less than 1 percent of the mineral estate in the CFO, Reclamation contends that oil and gas development within the Project Area does not contribute significantly to the local economy when considered within the regional context of this part of New Mexico.

Response to Comment 3-13: Reclamation's conclusions are based on the minor portion of the oil and gas industry affected by mineral development within the Project Area compared to the regional context and economy.

Response to Comment 3-14: Because Alternative C provides for more potential well locations than found under existing conditions (Alternative A), the agency-preferred alternative will likely result in additional economic benefits, not reductions, due to less restrictions on

Responses to Comment Letter 3 (cont.)

mineral development within the Project Area. Reclamation has clearly demonstrated that there will be more oil and gas wells under Alternative C (60 to 80 wells) than under Alternative A (40 to 60 wells) over the life of the RMPA. This level of development is similar to the average of 80 wells over a 20-year period as estimated in Section 2.6 of the DEA.

Response to Comment 3-15: See Responses to Comments 3-8 through 3-14.

Response to Comment 3-16: Reclamation agrees that the number of wells projected are just estimates, and that this number will not be used as a limit for well development. Under BLM and Reclamation environmental policies, every proposed well is covered by site specific, case by case environmental compliance documents. See also Response to Comment 3-14.

Response to Comment 3-17: Reclamation agrees with the comment.

Response to Comment 3-18: Reclamation is not bound by BLM Manuals or Handbooks. Rather, many of the proposed special lease stipulations are derived from the Reclamation Act of 1902, Reclamation Projects Act of 1939, Reclamation Recreation Management Act of 1992, Resource Management Plans (RMPs), as well as *Reclamation Manual Directives and Standards*.

Response to Comment 3-19: There is no mistake. The no surface occupancy within 2,640 horizontal feet (805 horizontal meters) of Brantley and Avalon Dam Sites and the surface occupancy on a case-by-case basis within 2,640 horizontal feet (805 horizontal meters) and 5,280 horizontal feet (1,609 horizontal meters) of Brantley Dam Site have been Reclamation special lease stipulations at the Project Area for many years. These special lease stipulations were also incorporated into BLM's 1988 Carlsbad Resource Management Plan and its 1997 RMPA.

Response to Comment 3-20: The maximum water surface elevation at Brantley Reservoir is affected by Pecos River sediment transport and deposition rates. Brantley Dam and Reservoir were designed to accommodate sedimentation over a 100-year period. The reason Reclamation modified the maximum water surface elevation at Brantley Reservoir is because of new information on sedimentation rates which have dropped significantly over the years due to construction of upstream reservoirs. Avalon Reservoir's maximum water surface elevation is not subject to the same effects from Pecos River sediment transport because Brantley Dam is located immediately upstream, thus trapping most of the river's sediment. The maximum known water surface elevation at Avalon Dam to date was 3,184 feet. Reclamation does not intend to amend these long-standing special lease stipulations.

Responses to Comment Letter 3 (cont.)

Response to Comment 3-21: The special lease stipulation that requires no storage facilities be located within 660 horizontal feet (200 horizontal meters) of the 100-year floodplain elevation at each reservoir has been in place since Brantley Dam was constructed. This current stipulation has been implemented to protect the integrity of the dam structures and to reduce the possibility of contamination (pollution) affecting the reservoir waters. Case-by-case exceptions to this requirement that may be considered are described in Appendix A.

Response to Comment 3-22: Reclamation is not aware of any scientific consensus that the Pecos River floodplain will never be flooded again.

Response to Comment 3-23: Publicly maintained roads within the Project Area are heavily used by recreationists throughout the year. The limits on surface occupancy proposed along publicly maintained roads are intended to provide compliance with the conditions outlined in the *Reclamation Manual Directives and Standards* for areas receiving concentrated public use. With the Project Area serving as a recreational destination for the region, Reclamation is protecting the safety of recreationists and the visual quality found along publicly maintained roads with this special lease stipulation.

Response to Comment 3-24: This special lease stipulation is a requirement of the *Reclamation Manual Directives and Standards* for all Reclamation lands where minerals are owned by the United States or are subordinated to the rights of the United States. As it pertains to surface occupancy for mineral operations, the specific condition in LND 06-01 states that there "...will be no well drilled within 660 feet of a river, channel, permanent stream, tributary, or marsh site." Adherence to all requirements in the *Reclamation Manual Directives and Standards* is mandatory.

Response to Comment 3-25: This special lease stipulation exists to protect the interests of Reclamation, as well as the interests of those who have executed an easement, lease, license, or permit for use of Reclamation lands, facilities, and water surfaces. Reclamation has a responsibility to protect the interests of those who have an agreement to use Reclamation lands, facilities, and water surfaces. If surface occupancy can be shown to not interfere with Reclamation project purposes and any relevant land use authorizations, a waiver from this condition may be granted according to the procedures outlined in Appendix A and in the *Reclamation Manual Directives and Standards*.

Response to Comment 3-26: This special lease stipulation is a requirement of the *Reclamation Manual Directives and Standards* for all Reclamation lands where minerals are owned by the United States or are subordinated to the rights of the United States. As it pertains to surface occupancy for mineral operations, the specific condition in LND 06-01 states that

Responses to Comment Letter 3 (cont.)

there "...will be no surface occupancy within 300 horizontal feet of any developed recreational areas or undeveloped recreational areas receiving concentrated public use." Reclamation considers designated, improved, and permitted trails to meet the definition of a developed recreational facility. Currently, all designated trails within the Project Area are located within Brantley Lake State Park. Adherence to all requirements in the *Reclamation Manual Directives and Standards* is mandatory.

Response to Comment 3-27: Public safety is the primary reason to implement the NSO stipulation within 200 feet of all designated, improved, and permitted trails. Well sites are inherently dangerous and should not be accessible by the general public. Chapter 1, page 1-1, of the DEA clearly explains that proposed special lease stipulations only affect those lands identified as containing existing unleased federal minerals, as well as any future unleased mineral estate (e.g., expired leases). Further, Chapter 2, page 2-7, states that the development of existing Federal mineral leases would continue according to the terms of the lease at the time of execution, until such time as the lease expires and becomes subject to the terms in place upon expiration.

Response to Comment 3-28: Reclamation has not proposed any trail within the Project Area for inclusion on the National Register of Historic Places and has not proposed a ¼ mile stipulation. This comment does not apply to this RMPA.

Response to Comment 3-29: All areas surrounding Brantley Reservoir that are not part of Brantley Lake State Park are part of the Brantley Wildlife Management Area (WMA). The WMA was established as mitigation for the construction and operation of Brantley Dam and Reservoir, and is managed by the New Mexico Department of Game and Fish (NMDGF) through agreement with Reclamation. These mitigation lands are to be managed to fully compensate for the wetland and other types of habitats lost as described within the project's Fish and Wildlife Coordination Act Report. Part of the required mitigation involves NMDGF managing this area for upland species and waterfowl. The NMDGF implements mowing strips, planting of small grains, and controlled burning in these upland areas. Within the WMA is the Seven Rivers Waterfowl Management Area which is used to grow corn, alfalfa, milo, wheat, and millet primarily for waterfowl use. Reclamation has determined that oil and gas development is not compatible in areas where crops have been established for wildlife mitigation purposes (Brantley Mitigation). For these reasons, the limits on surface occupancy in these areas were established.

Response to Comment 3-30: Avoiding steep slopes is a standard best management practice (BMP) for oil and gas development on Federal lands. The purpose is to minimize long-term disruption of the surface resources and existing uses, and to promote successful reclamation.

Responses to Comment Letter 3 (cont.)

According to BLM's *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book* (2006), well locations constructed on steep slopes cost more to construct, maintain, and reclaim and result in greater resource impacts. In addition, this stipulation has been in place on Project Area lands for many years.

Response to Comment 3-31: This special lease stipulation is a requirement of the *Reclamation Manual Directives and Standards* for all Reclamation lands where minerals are owned by the United States or are subordinated to the rights of the United States. As it pertains to surface occupancy for mineral operations, the specific condition in LND 06-01 states that there "...will be no surface occupancy or other use within the right-of-way of any canal, tunnel, aqueduct, pipeline, lateral, or drain." Adherence to all requirements in the *Reclamation Manual Directives and Standards* is mandatory.

Response to Comment 3-32: Reclamation and BLM have determined the potential number of new wells that could be drilled within the Project Area based on the proposed special lease stipulations for each alternative. The Proposed Action will likely provide between 60 and 80 new wells over the next 20 years. This represents a typical number of wells for the 20-year time period based on the reasonable foreseeable minerals development analysis of over 85 years of oil and gas development within the Project Area. This analysis was not based on directional drilling practices.

Response to Comment 3-33: The maximum water surface at Brantley Reservoir under the Proposed Action is 3,263 feet elevation. Surface occupancy is restricted below this elevation according to *Reclamation Manual Directives and Standards*. Brantley Dam provides for flood control to protect downstream communities and facilities. The top of flood control elevation is 3,283 feet. A major flood event could result in water levels reaching the flood control elevation, especially as the reservoir fills with sediment over time as designed.

Response to Comments 3-34 and 3-35: The current no surface occupancy stipulations for Avalon Dam and Reservoir have been in place to protect Project facilities and water quality, as well as to ensure the safety of downstream communities. The maximum known water surface elevation at Avalon Dam to date was 3,184 feet. Reclamation does not intend to amend these long-standing special lease stipulations.

The special lease stipulation that requires no storage facilities be located within 660 horizontal feet (200 horizontal meters) of the 100-year floodplain elevation at each reservoir has been in place since Brantley Dam was constructed. This current stipulation has been implemented to protect the integrity of the dam structures and to reduce the possibility of contamination

Responses to Comment Letter 3 (cont.)

(pollution) affecting the reservoir waters. Case-by-case exceptions to this requirement that may be considered are described in Appendix A.

Response to Comment 3-36: The current and proposed floodplain special lease stipulations for both reservoirs exist to protect Project facilities and downstream life and property. It is essential that Reclamation adequately protect the operation, maintenance, and structural safety of its facilities. Reclamation must also protect its ability to perform emergency actions when necessary.

Comment Letter 4



BILL RICHARDSON
Governor

STATE OF NEW MEXICO
DEPARTMENT OF CULTURAL AFFAIRS
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Bureau of Reclamation
555 Broadway NE, Suite 100
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October 4, 2010

Subject Brantley-Avalon Draft EA and Section 106 Compliance

Dear Mr. Hamman,

The New Mexico State Historic Preservation Office (SHPO) has completed a review of the Draft Environmental Assessment (EA) for the Brantley-Avalon Reservoirs Resource Management Plan (B-ARMP), which we received on September 15, 2010 (HPD log 090368).

It is important to note that National Historic Landmarks (NHL) have special requirements for protection, pursuant to Section 110(f) of the National Historic Preservation Act, and 36 CFR 800.10(c). Therefore, the SHPO recommends that the Bureau of Reclamation notify the Secretary of Interior, represented by the National Park Service, of the proposed management plan as soon as possible to obtain additional guidance on the matter.

After reviewing the B-ARMP, the SHPO feels that the EA does not give adequate consideration to the cultural properties listed on the State Register of Cultural Properties (SR) and the National Register of Historic Properties (NRHP), which are located within the Area of Potential Effect of the proposed mineral leases. These properties include the Carlsbad Reclamation Project (CIP) NHL (SR7), Avalon Dam (SR 557), Lake McMillan Dam (SR 558), and Seven Rivers (SR 77). Of these, Avalon and McMillan Dams are contributing elements to the CIP NHL. The SHPO's concern is that the cumulative effects of long-term energy development will result in adverse effects to these registered properties.

If you have any further questions feel free to call or e-mail me. I can be reached at (505)827-4225 or Bob.Estes@state.nm.us.

Sincerely,

Bob Estes
Archaeologist

Michelle Ensey
Archaeologist

Comment 4-1
Comment 4-2



Responses to Comment Letter 4

Thank you for your comments. Your comments are addressed below.

Response to Comment 4-1: The BLM and Reclamation will continue to work with the Section 106 and 110 Regulations, as well as coordinate with the National Park Service in regards to any proposed mineral leasing and development within the Carlsbad Irrigation District National Historic Landmark (NHL). Reclamation, SHPO and the Archaeological Council will develop a programmatic agreement for the McMillian Dam and Reservoir area in the NHL. This area of the NHL includes approximately 1500 acres of Reclamation lands with special lease stipulations of surface occupancy on a case by case basis and no storage facilities. The Avalon Dam and Reservoir area would remain in a no surface occupancy zone. As stated in the EA (p.3-34) all historic properties included in the CID NHL will continue to be subject to Federal statute under the National Historic Preservation Act and the New Mexico State Cultural Properties Act, as appropriate.

Response to Comment 4-2: As stated in the DEA, cultural resource inventories would continue to be required for all proposed surface-disturbing activities, including oil and gas development activities, within the Project Area. Any lands identified for development will need to follow Section 106 National Historic Preservation Act and the New Mexico State Cultural Properties Act processes before work begins. This includes all Federal mineral estates within the Project Area and future leases on lands conveyed to the Carlsbad Irrigation District in 2001. Regulations for the *Protection of Historic Properties* (36 CFR Part 800) defines the process for demonstrating such consideration through consultation with the State Historic Preservation Office, the Federal Advisory Council on Historic Preservation, and other interested parties (see Appendix A-2, General Conditions of Approval # 14).

