

**Final Biological Evaluation of Proposed Long-Term
Miscellaneous Purposes Contract
Eddy County, NM**

**US Department of the Interior, Bureau of Reclamation
and New Mexico Interstate Stream Commission**



NOVEMBER 14, 2005



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1.0 INTRODUCTION

The Bureau of Reclamation proposes to enter into a long-term miscellaneous purposes contract with the Carlsbad Irrigation District to allow for the use of Carlsbad Project water for purposes other than irrigation, specifically the use of Carlsbad Project water for state line delivery to Texas. The water would be used to maintain long-term compliance with the Pecos River Compact and the United States Supreme Court Amended Decree in Texas vs. New Mexico.

1.1 Purpose of the Biological Evaluation

This document was prepared to make an effects determination of the Proposed Action on species listed under the Endangered Species Act of 1973 (ESA). Should a “may affect” determination be made for any federally listed species, then a biological assessment (BA) will be prepared to determine if the Proposed Action would adversely affect listed species. Any subsequent BA would document a finding of “is not likely to adversely affect” or “is likely to adversely affect” listed species or designated critical habitat. Depending on the findings of the BA, the document would be classified as informal or formal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act of 1973 (ESA). This biological evaluation tiers to the evaluation of impacts to the environment disclosed in the long-term Miscellaneous Purposes Contract Environmental Impact Statement (MPEIS) prepared pursuant to the National Environmental Policy Act of 1969 (NEPA). The Bureau of Reclamation (Reclamation) and the New Mexico Interstate Stream Commission (NMISC) are joint lead agencies for the MPEIS. Reclamation and NMISC met with the USFWS on August 27, 2004, to notify USFWS that the team would prepare a Biological Evaluation to determine whether a “may affect” would occur, and whether informal consultation with the USFWS was necessary.

2.0 DESCRIPTION, PURPOSE AND NEED FOR ACTION

Under the Proposed Action, Reclamation would enter into a long-term miscellaneous purposes contract with the Carlsbad Irrigation District (CID) for a term of 40 years. This long-term conversion and delivery includes but is not limited to: 1920 Sale of Water for Miscellaneous Purposes Act Contract, subsequent third-party contracts, CID membership agreements, and any tool or agreement for the conversion and delivery of project irrigation water for NMISC purposes. Reclamation would also review any third party contracts between CID and the NMISC.

The purpose of the Proposed Action is to allow for the use of Carlsbad Project water for purposes other than irrigation. The need for the action is three-fold: 1) to maintain long-

term compliance with the Pecos River Compact and the United States Supreme Court Amended Decree in Texas vs. New Mexico, 2) to use up to 50,000 acre-feet per year of Project water for purposes other than irrigation, specifically for state line delivery to maintain compliance with the Pecos River Compact, and 3) to partially fulfill requirements of the Settlement Agreement which the NMISC, CID and Reclamation, and other parties executed in 2003.

Two alternatives were analyzed in the MPEIS: 1) the No Action Alternative and 2) the Proposed Action alternative. Unlike many other NEPA evaluations, the No Action Alternative is not the same as the continuation of the environmental baseline. Reclamation is currently allowing for the use of Carlsbad Project water for miscellaneous purposes under a short-term miscellaneous purposes contract until 2009. Under the No Action Alternative, it is assumed that the existing short-term contract would expire in 2009 and not be renewed. Conversely, the Proposed Action — a long-term contract — would continue the recent historical baseline under the short-term contract into the long-term future. Actual leases and water releases would continue to vary from year to year. For example, total Carlsbad Project water leased has varied since the leasing program began from 5,600 acre-feet in 2003 to 44,800 acre-feet in 1997. Similarly, the amount of land fallowed due to leasing has varied from 0 acres in 2004 to 5,133 acres in 1993. Such variation would continue with the Proposed Action. The likelihood of a priority call for water by the New Mexico Office of the State Engineer would be considerably less with the Proposed Action than the No Action Alternative.

2.1 Analysis Area

The Proposed Action is the execution of a long-term miscellaneous purposes contract, which would allow for the release of Carlsbad Project water from Avalon Dam, the last dam on the Pecos River in New Mexico, to the river for state line delivery. Avalon Dam is located just north of Carlsbad in Eddy County, New Mexico (Figure 1). The term “analysis area” refers to the area of potential direct and indirect effect of the Proposed Action. The analysis area for the Proposed Action is downstream of Avalon Dam, the Pecos River floodplain from Avalon Dam to the state line, and the irrigated lands within the CID. The long-term miscellaneous purposes contract would not change water timing or distribution upstream of Avalon Dam.

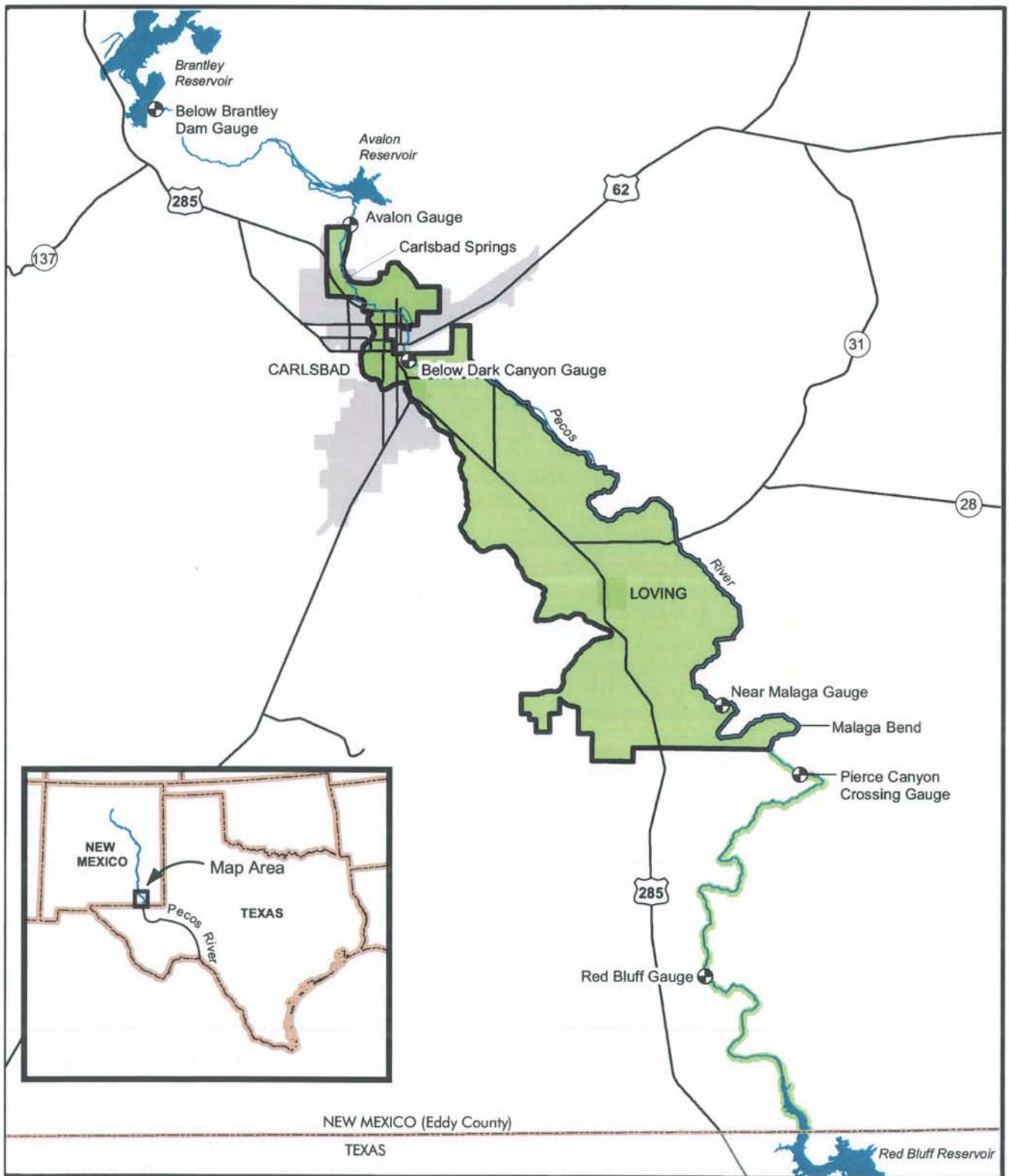
3.0 FEDERALLY LISTED SPECIES

3.1 Species List

Section 4 of the ESA requires the Secretary of the Interior to consider for listing any species that suffers from the present or threatened destruction, modification, or



curtailment of its habitat or range; that is over utilized for commercial, recreational, scientific, or educational purposes; that is affected overall by disease or predation; that have an inadequacy of existing regulatory mechanisms; and/or that are affected by other natural or manmade factors. The USFWS provided a list of federally listed threatened and endangered species occurring in Eddy County, New Mexico as of October 4, 2004 (USFWS 2004) (Table 1).



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- Analysis Area
- Selected USGS Gauge Sites on Pecos River
- Carlsbad Irrigation District

Figure 1
Analysis Area

1 Inch = 5 Miles



File: 2300-BE_Project_Location.mxd (IP)
 Date: September 13, 2005

Table 1: Federally-Listed Endangered and Threatened Species to be Evaluated in Eddy County, New Mexico.

Common Name	Scientific Name	Federal Status
Fish		
Pecos bluntnose shiner	<i>Notropis simus pecosensis</i>	T
Pecos gambusia	<i>Gambusia nobilis</i>	E
Birds		
Bald eagle	<i>Haliaeetus leucocephalus</i>	AD, T
Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>	E
Interior least tern	<i>Sterna antillarum</i>	E
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Mammals		
Black-footed Ferret	<i>Mustela nigripes</i>	E, EXPN
Plants		
Gypsum wild-buckwheat	<i>Eriogonum gypsophilum</i>	T with CH
Kuenzler hedgehog cactus	<i>Echinocereus fendleri</i> var. <i>kuenzleri</i>	E
Lee pincushion cactus	<i>Coryphantha sneedii</i> var. <i>leei</i>	T
Sneed pincushion cactus	<i>Coryphantha sneedii</i> var. <i>sneedii</i>	E

E=Endangered; T=Threatened; AD=Proposed Delisting; EXPN=Experimental population; CH=Critical Habitat.

Some of the species listed in Table 1 are not known to occur within the analysis area. Species distribution is discussed in the *Threatened and Endangered Species* section of the document.

4.0 ENVIRONMENTAL BASELINE

4.1 Geology

According to the Geologic Map of New Mexico (Green and Jones 1997), the direct impacts analysis area is primarily underlain by alluvium (Qa), age Holocene to Pleistocene. Other geologic units that may underlie the analysis area include:

- *Qoa*—Older alluvial deposits of upland plains and piedmont areas, and calcic soils and eolian cover sediments of High Plains region (middle to lower Pleistocene). This unit includes scattered lacustrine, playa, and alluvial deposits of the Tahoka, Double Tanks, Tule, Blackwater Draw, and Gatuña Formations, the latter of which may be Pliocene-age at its base; outcrops, however, are basically of Quaternary deposits.
- *Pat*—Artesia Group (Guadalupean). Shelf facies forming broad south-southeast trending outcrop from Glorieta to Artesia area; includes Tansill, Yates, Seven

Rivers, Queen, and Grayburg Formations (Guadalupian). This unit may locally include the Triassic Moenkopi Formation at its top.

- *Pr*—Rustler Formation (Upper Permian). This unit consists of siltstone, gypsum, sandstone, and dolomite.
- *Psr*—Seven Rivers Formation (Guadalupian). This unit consists of gypsum, anhydrite, salt, dolomite, and siltstone.
- *Pty*—Tansill and Yates Formations (Guadalupian). This unit consists of sandstone, siltstone, limestone, dolomite, and anhydrite.

4.2 Soils

Soils within the Pecos River floodplain are formed by alluvial deposition, and soils in adjacent upland areas are formed from parent material. These soils are used for agriculture, ranching and wildlife habitat. The major soil series within the Pecos River floodplain include Pajarito, Armo, Anthony, Harkley, Dev, and Pima, while the major series within CID's irrigated lands include Reagan, Harkley, Karro, and Anthony (USDA 1971). The USDA classifies select soil map units within the Reagan, Harkey and Pima series as prime farmland when irrigated. The general soil series within the analysis area are briefly described below:

- Pajarito—very deep, well drained soils that formed in sandy sediments from mixed sources;
- Armo—very deep, moderately well drained soils with very low permeability formed in clayey alluvium;
- Anthony—very deep, well drained formed in stratified alluvium;
- Harkley—very deep, well drained soils that formed in calcareous mixed alluvial sediments;
- Dev—very deep, well drained, moderately permeable soils that formed in gravelly alluvium;
- Pima—deep, well drained soils formed in stream alluvium on alluvial fans and flood plains;
- Reagan—very deep, well drained soils that formed from calcareous loamy materials; and
- Karro—very deep, well drained soils that formed in mixed alluvium.

4.3 Hydrology

Surface Water

The analysis area includes the Pecos River floodplain and select tributaries leading to the river from CID irrigated lands. Two primary sources of inflow to the Pecos River within the analysis area are: 1) snowfall in the northern headwaters and 2) rainfall

associated with summer storms across the Pecos River Basin. Alluvial and deep aquifer discharge and irrigation return flows also contribute to the Pecos River flow within the analysis area.

Brantley and Avalon Reservoirs in Eddy County store Project water for irrigation. CID releases water from Avalon Dam into the CID main canal for use by CID irrigators. There are no other major surface water users south of CID along the Pecos River in New Mexico. The major sources of surface flow within the Pecos River south of Avalon Dam are releases from the dam (for flood control, conservation spills, and NMISC lease/purchase of Project water), flood inflows from the immediate watershed, base inflows, and irrigation return flows from the CID and surrounding area.

Ground Water

The analysis area lies primarily within the Carlsbad Basin and may be influenced by the Roswell Artesian Basin to the north. Both basins contain two aquifers: 1) a shallow alluvial aquifer along the Pecos River and 2) a deep carbonate aquifer. In both basins, the shallow and deep aquifers are connected and in general more so in the Carlsbad Basin than in the Roswell Artesian Basin. Water levels in the alluvial aquifer vary substantially over time, depending on irrigation practices and precipitation patterns. Lower ground water levels correlate with droughts or extended periods of relatively low surface water supply (e.g. the early 1960s and mid-to-late 1970s), times during which irrigation pumping typically increased. During periods of high rainfall (e.g. the mid-1960s, the 1980s, and early 1990s) and abundant surface water availability, irrigation pumping was relatively low and aquifer water levels stabilized or recovered (Barroll et al. 2002).

NMISC Lease Program

Since 1992, NMISC has leased water from CID for state line delivery. CID releases this water from Avalon Dam to the Pecos River historically in October or November, after the irrigation season has finished and state line delivery obligations are more definitive. These releases are currently constrained to about 600 cubic feet per second due to a low flow culvert near the flume over the Pecos River north of Carlsbad. Additional releases during July or December are less common but have occurred. Under the Proposed Action, releases would continue into the long-term future in a similar manner as under the existing short-term contract.

4.4 Geomorphology

As described in Section 3.4 of the MPEIS and Geomorphology Technical Report (Hydrosphere 2005), the geomorphology of the Pecos River within the analysis area is relatively stable without any obvious areas of instability, down cutting, or sediment deposition.

4.5 Wetlands

The USFWS developed a national classification system for wetlands so that the extent and status of wetland types can be addressed on a national level (Cowardin et al. 1979). The Cowardin classification system describes a hierarchy of wetland systems and classes of wetlands and other waters. The USFWS's National Wetland Inventory (NWI) was used as the primary resource to determine the extent of wetlands in the analysis area. A field reconnaissance of the analysis area took place in August 2004 (aci consulting 2004). Along with the NWI maps, U.S. Geologic Survey topographic maps, floodplain maps, vegetation, and soils maps were used to aid in wetland identification. Aerial photography was also used to identify potential wetlands in the analysis area.

Wetlands are distributed throughout the analysis area with a concentration along the Pecos River corridor. Riverine, palustrine, and lacustrine wetlands are found in the analysis area and are defined by Cowardin et al. (1979) as:

- Riverine – all freshwater habitats contained within a channel, including springs, streams, and /or rivers, except those dominated by trees, shrubs, or persistent emergent vegetation;
- Palustrine – a water system dominated by emergent vegetation, or small (less than 20 acres), shallow (<less than 6.6 feet in depth) bodies of water without shoreline features dominated by bedrock or wave action; and
- Lacustrine – habitats situated within a topographic depression or dammed river channel that contain less than 30 percent aerial coverage of trees, shrubs, and emergent vegetation.

Riverine Wetlands

Approximately 80.5 linear miles of riverine wetlands lie within the analysis area. According to USFWS National Wetland Inventory maps (USFWS 1990a), these wetlands include the Pecos River and its natural and man-made tributaries, including: Delaware River, Bluff Draw, Salt Draw, Pickett Draw, Wood Draw, Livingston Canal, Harroun Canal, Black River, Brushy Draw, Cass Draw, Esperanza Draw, Dark Canyon Draw, Southern Canal, and East Canal. These riverine systems are primarily of the lower perennial subsystem, in which the gradient is low and water velocity is slow, and of the unconsolidated bottom or unconsolidated shore classes. Less commonly found in the analysis area are riverine systems of the intermittent subsystem and streambed class. Riverine wetlands within the analysis area are classified within the permanently, temporarily, seasonally, and intermittently flooded regimes (USFWS 1990a).

Palustrine Wetlands

Approximately 23.6 linear miles of palustrine wetlands occur within the analysis area. These areas are predominantly located along the Pecos River, its tributaries, and within the floodplain adjacent to riverine wetlands. Palustrine systems include vegetated wetlands such as marshes, swamps, bogs, fens, and wet meadows. While these wetlands are not assigned to a subsystem, they may be characterized by the emergent class, with erect, rooted, herbaceous hydrophytes (excluding moss and lichens); the scrub-shrub class, with woody vegetation less than 20 feet in height; and the unconsolidated shore class, with unconsolidated substrates, vegetative cover of less than 30 percent, and temporary, seasonal, or intermittent flooding.

Lacustrine Wetlands

Approximately 7.5 linear miles of linear lacustrine wetlands occur within the analysis area. These wetland areas are typically along the perimeter and within lake and impoundment systems within the analysis area. These include: Lake Carlsbad, areas south of Telltale Bluff, along Culebra Bluff northeast of Loving, and the upper extent of Red Bluff Reservoir. Lacustrine wetlands in the analysis area are either littoral subsystems (wetland habitats extending from shoreline to a water depth of about 6.6 feet) and limnetic subsystems (deepwater habitats).

4.6 Vegetation

The analysis area lies on the northern edge of the Chihuahuan Desert Ecological Region (ecoregion) (USEPA 2004). The Chihuahuan Desert ecoregion extends from southeastern Arizona to the Edwards Plateau region in central Texas. The topography of this ecoregion is defined by broad basins and valleys surrounded by alluvial fans and terraces. Isolated mesas and mountains are interspersed throughout the central and western portions of the ecoregion. Vegetation within the Chihuahuan Desert ecoregion consists primarily of arid grasslands and shrublands. Specifically, three vegetation communities are found within the analysis area: semidesert grassland, Chihuahuan desertscrub, and riparian scrublands.

Semidesert Grassland

Semidesert grassland characterizes the analysis area between Avalon Dam and just southeast of Carlsbad, New Mexico (Brown and Lowe 1980). Grasses in semidesert grassland regions include: black grama (*Bouteloua eriopoda*), slender grama (*Bouteloua filiformis*), chino grama (*Bouteloua breviseta*), spruce top grama (*Bouteloua chondrosioides*), bushy muhly (*Muhlenbergia porteri*), three-awns (*Aristida* spp.), Arizona cottontop (*Trichachne californica*), slim tridens (*Tridens muticus*), pappusgrass (*Pappophorum vaginatum*), tanglehead grass (*Heteropogon contortus*), and vine

mesquite grass (*Panicum obtusum*) (Brown 1994). Sotols (*Dasyilirion* spp.), beargrasses (*Nolina* spp.), agaves (*Agave* spp.), and yuccas (*Yucca* spp.) are also common in this region. Other scrub-shrub species that may dominate the semidesert grassland region include mesquite (*Prosopis glandulosa*, *Prosopis juliflora*), one-seed juniper (*Juniperus monosperma*), lote bush (*Ziziphus obtusifolia*), crucillo (*Condalia spathulata*), allthorn (*Koeberlinia spinosa*), mimosa (*Mimosa* spp.), Wright's lippia (*Aloysia wrightii*), catclaw acacia (*Acacia greggii*), littleleaf sumac (*Rhus microphylla*), desert hackberry (*Celtis pallida*), and ocotillo (*Fouquieria splendens*).

Cactus species, which are well represented in semidesert grassland communities, may include barrel cactus (*Ferocactus wislizenii*), Turk's head (*Echinocactus horzonthalonius*), cane cholla (*Opuntia imbricata*, *Opuntia spinosior*), prickly pears (*Opuntia* spp.), hedgehogs (*Echinocereus* spp.), and pincushions (*Mammillaria* spp.). Additional semidesert grassland species include false broomweed (*Haploesthes greggii*), viscid acacia (*Acacia neovernicosa*), cowpen daisy (*Verbesina enceliodes*), wild zinnia (*Zinnia grandiflora*), plains bristle grass (*Setaria leucopila*), purple nightshade (*Solanum elaeagnifolium*), leatherweed (*Croton pottsii*), desert seepweed (*Suaeda suffrutescens*), and dove weed (*Croton texensis*) (Brown 1994).

Hildebrandt and Ohmart (1982) conducted a biological resource inventory of the Pecos River Basin in New Mexico and Texas. Transect LV-02, which was located in the vicinity of Loving, New Mexico, was a salt cedar-dominated community, and contained vegetation typical of semidesert grassland within the analysis area. The vegetation inventoried in that transect included: iodine bush (*Allenrolfea occidentalis*), baccharis (*Baccharis salicina*), salt cedar (*Tamarix chinensis*), inland salt grass (*Distichlis spicata* and *Distichlis stricta*), alkali sacaton (*Sporobolus airoides*), tansy mustard (*Descurainia pinnata*), snakeweed (*Grindelia* spp.), rayless goldenrod (*Haplopappus heterophyllus*), mountain pepperweed (*Lepidium montanum* and *Lepidium oblongum*), and threeseed phlox (*Phacelia* spp.) (Hildebrandt and Ohmart 1982).

Chihuahuan Desertscrub

The southern section of the analysis area, from just southeast of Carlsbad to the Red Bluff gauging station, has vegetation characteristic of the Chihuahuan desertscrub biotic community (Brown and Lowe 1980). This region contains fairly homogeneous vegetation types throughout its expanse and is dominated primarily by creosotebush (*Larrea tridentata*).

Two species, tarbush (*Flourensia cernua*) and whitethorn acacia (*Acacia neovernicosa*), occasionally share dominance with creosotebush in the Chihuahuan desertscrub community. Ocotillos, allthorn, mesquite, agaves (especially *Agave lechuguilla*), yuccas, sotols, and beargrasses are also well represented in vegetative communities in the Chihuahuan desertscrub. Understory species may include mariola (*Parthenium incanum*), guayule (*Parthenium argentatum*), goldeneye (*Viguiera stenoloba*), desert

zinnia (*Zinnia acerosa*, *Zinnia grandiflora*), dogweeds (*Dyssoida* spp.), and cacti (Brown 1994).

A transect by Hildebrandt and Ohmart (1982) in the vicinity of Pecos, Texas had vegetation that may be typical of Chihuahuan desertscrub within the analysis area. The vegetation inventoried in that transect included: whitethorn acacia (*Acacia constricta*), catclaw acacia, iodine bush (*Atriplex canescens*), creosotebush (*Larrea divaricata* and *Larrea tridentate*), buckhorn cholla (*Opuntia acanthocarpa*), Engelmann prickly pear (*Opuntia engelmannii*), honey mesquite (*Prosopis glandulosa*), lote bush (*Ziziphus obtusifolia*), and snakeweed (*Xanthocephalum sarothrae*) (Hildebrandt and Ohmart 1982).

Riparian Scrublands

Floodplains and stream channels throughout the analysis area has vegetation characteristic of the riparian scrublands community (Brown 1994). This community typically has salt cedar along with a diverse range of species. Two structural types described by Hildebrandt and Ohmart (1982) within the analysis area contain: (1) little foliage volume above 15 feet above ground, dense between 4.9 and 15 feet above ground, and (2) little foliage volume above 9.8 feet above ground, generally sparse, with open areas between trees or groups of trees.

According to Brown (1994) and field observations, species that may occur in riparian scrublands include aster (*Aster spinosus*), desert broom (*Baccharis sarthroides*), horsetails (*Equisetum* spp.), heliotrope (*Heliotropium curassavicum*), burrobrushes (*Hymenoclea* spp.), camphor-weed (*Pluchea camphorata*), cowpen daisy, honey mesquite, screwbean mesquite (*Prosopis pubescens*), catclaw, black-brush (*Acacia rigidula*), viscid acacia, huisache (*Acacia farnesiana*), desert-willow (*Chilopsis linearis*), tree tobacco (*Nicotiana glauca*), common buttonbush (*Cephalanthus occidentalis*), Texas paloverde (*Cercidium texanum*), Bermuda grass (*Cynodon dactylon*), cocklebur (*Xanthium spinosum*), Canadian wildrye (*Elymus canadensis*), Johnson grass (*Sorghum halepense*), western goldenrod (*Solidago occidentalis*), Quinine bush (*Allenrolfea occidentalis*), curlycup gumweed (*Grindelia squarrosa*), prostrate pigweed (*Amaranthus blitoides*), marsh fleabane (*Pluchea purpurascens*), buffalo gourd (*Cucurbita foetidissima*), and green bristle grass (*Setaria viridis*). Aquatic habitats that are more protected from the main stream channel, such as cut-off ponds, may contain cattail (*Typha* spp.), American three-square sedge (*Schoenoplectus americanus*), sandmat (*Chamaesyce prostrate*), other sedges, common reed (*Phragmites australis*), curly dock (*Rumex crispus*), and other emergent marshland species.

4.7 Wildlife

Each vegetation community supports different types, diversities, and densities of wildlife within the analysis area. The wildlife species typically found in each community are discussed in the following sections. General threats to wildlife include displacement, habitat modification and loss, prey base decline, and competition.

Semidesert Grassland Habitat

This section summarizes the common wildlife resources within the semidesert grassland region of the analysis area, between Avalon Reservoir and just southeast of Carlsbad, New Mexico.

Mammals that are commonly found in the semidesert grassland community include the black-tailed jackrabbit (*Lepus californicus*), spotted ground squirrel (*Spermophilus pilosoma*), hispid pocket mouse (*Perognathus hispidus*), kangaroo rats (*Dipodomys* spp.), white-footed mouse (*Peromyscus leucopus*), cotton rats (*Sigmodon* spp.), southern grasshopper mouse (*Onychomys torridus*), southern plains wood rat (*Neotoma micropus*), white-throated wood rat (*Neotoma albigula*), badger (*Taxidea taxus*), and coyote (*Canis latrans*) (Brown 1994).

Bird species that are well represented in this region include Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), mourning dove (*Zenaidura macroura*), scaled quail (*Callipepla squamata*), greater roadrunner (*Geococcyx californianus*), burrowing owl (*Athene cunicularia*), common poorwill (*Phalaenoptilus nuttallii*), ladder-backed woodpecker (*Picoides scalaris*), western kingbird (*Tyrannus verticalis*), ash-throated flycatcher (*Myiarchus cinerascens*), Say's phoebe (*Sayornis saya*), barn swallow (*Hirundo rustica*), verdin (*Auriparus flaviceps*), cactus wren (*Campylorhynchus brunneicapillus*), northern mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), Scott's oriole (*Icterus parisorum*), and Cassin's sparrow (*Aimophila assini*) (Brown 1994).

Amphibians and reptiles common in this region include western green toad (*Bufo debilis insidiosus*), desert grassland whiptail (*Cnemidophorus uniparens*), western hooknose snake (*Ficimia cana*), Mexican hognose snake (*Heterodon nasicus kennerlyi*), southwestern earless lizard (*Holbrookia texana scitula*), and desert box turtle (*Terrapene ornata luteola*) (Brown 1994).

Chihuahuan Desertscrub Habitat

The Chihuahuan desertscrub community is found in the southern section of the analysis area, from just southeast of Carlsbad to the Red Bluff gauge.

Mammals commonly found in the Chihuahuan desertscrub community include the Texas antelope ground squirrel (*Ammospermophilus interpres*), kangaroo rat, desert pocket gopher (*Geomys arenarius*), Goldman's woodrat (*Neotoma goldmani*), desert

shrew (*Notiosorex crawfordi*), desert mule deer (*Odocoileus hemionus crooki*), southern grasshopper mouse, desert bighorn sheep (*Ovis canadensis mexicana*), yellow-faced pocket gopher (*Pappogeomys castanops*), desert pocket mouse (*Perognathus pencillatus*), Nelson's pocket mouse (*Perognathus nelsoni*), and desert cottontail (*Sylvilagus auduboni*) (Brown 1994).

Bird species characteristic of this region include the scaled quail and Chihuahuan raven (*Corvus cryptoleucus*). Other birds that are less abundant, but still represented in the region, include mourning dove, greater roadrunner, lesser nighthawk (*Chordeiles actutipennis*), Scott's oriole, cactus wren, curve-billed thrasher (*Toxostoma curvirostre*), and black-throated sparrow (*Amphispiza bilineata*) (Brown 1994).

Amphibians and reptiles common in this region include the whiptails (*Cnemidophorus* spp.), western diamondback rattlesnake (*Crotalus atrox*), Mohave rattlesnake (*Crotalus scutulatus*), Texas banded gecko (*Coleonyx brevis*), greater earless lizard (*Cophosaurus texanus*), bolson tortoise (*Gopherus flavomarginatus*), striped whipsnake (*Masticophis taeniatus*), roundtail horned lizard (*Phrynosoma modestum*), Mexican blackhead snake (*Tantilla antriceps*), Trans-Pecos ratsnake (*Elaphe subocularis*), Merriam's canyon lizard (*Sceloporus merriami*), and other *Sceloporus* spp. (Brown 1994).

Riparian Scrublands Habitat

Riparian scrublands traverse the analysis area along the floodplain of the Pecos River and some of its tributaries. Since riparian areas commonly contain greater available surface and ground water than adjacent upland areas, greater densities and diversity of vegetation are frequently found.

Mammals commonly found in the riparian shrublands include cotton rat (*Sigmodon hispidis*), white-footed mouse (*Peromyscus leucopus*), desert pocket mouse, beaver (*Castor canadensis*), raccoon (*Procyon lotor*), and bats (Brown 1994).

Birds commonly associated with this community include crissal thrasher (*Toxostoma dorsale*), verdin (*Auriparus flaviceps*), black-tailed gnatcatcher (*Polioptila melanura*), phainopepla (*Phainopepla nitens*), black phoebe (*Sayornis nigricans*), and Lucy's warbler (*Vermivora luciae*) (Brown 1994).

Amphibians and reptiles common in riparian scrublands include western spadefoot (*Scaphiopus hammondi*), red-spotted toad (*Bufo punctatus*), side-blotched lizard (*Uta stansburiana*), spiny softshelled turtle (*Trionyx spiniferus emoryi*), and pond slider (*Chrysemys scripta*).

Fishes that may occur adjacent to this community include speckled chub (*Hybopsis aestivalis*), blue sucker (*Cycleptus elongatus*), river carpsucker (*Carpionodes carpio*), buffalofishes (*Ictiobus* spp.), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), red shiner (*Notropis lutrensis*), Conchos pupfish (*Cyprinodon eximius*),

Mexican tetra (*Astyanax mexicanus*), mosquitofish (*Gambusia affinis*), roundnose minnow (*Dionda episcopa*), Tamaulipas shiner (*Notropis braytoni*), fathead minnow (*Pimephales promelas*), longnose gar (*Lepisosteus osseus*), gizzard shad (*Dorosoma cepedianum*), gray redhorse (*Scartomyzon congestus*), flathead catfish (*Pyiodictis olivaris*), Pecos gambusia (*Gambusia nobilis*), warmouth (*Lepomis gulosus*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), longear sunfish (*Lepomis megalotis*), and largemouth bass (*Micropterus salmoides*) (Brown 1994, Hoagstrom 2000).

4.8 THREATENED AND ENDANGERED SPECIES

4.8.1 Fish

Pecos Bluntnose Shiner

The Pecos bluntnose shiner (*Notropis simus pecosensis*) was listed by USFWS as threatened in 1987 and by the New Mexico Department of Game and Fish (NMDGF) in 1976. The shiner's range was limited to the Pecos River from Fort Sumner south to the inflow areas of Brantley Reservoir (Brooks et al. 1991, Plantania 1995, Propst 1999 Hoagstrom 2003, NMDGF 2004). The Pecos bluntnose shiner is not found below Avalon Dam, the analysis area for the Proposed Action.

The Pecos River subspecies is closely related to the Rio Grande form (*Notropis simus simus*). Natural springs serve as habitat for the shiner and, after two years, individuals have an affinity for main channel habitats (Sublette et al. 1990). Recent studies indicate that the Pecos bluntnose shiner prefers low to moderate velocity plunge habitats as opposed to the higher velocity runs and flats (Kehmeier et al. 2004).

The main conservation effort underway is the maintenance of semi-natural flow within the Pecos River and the avoidance of large block releases during the summer (Propst 1999). Primary threats to this species include restricted flow, water diversions, and pollution of the Pecos River (USFWS 1987). However, a recent study by Kehmeier et al. (2004) indicate that availability of the plunge habitats commonly utilized by the Pecos bluntnose shiner is not significantly affected by changes in river discharge; that is, even at very low flows, the volumetric availability of preferred habitats remained consistent. As such, maintaining a continuous flow throughout the river should be adequate to conserve habitat commonly utilized by the Pecos bluntnose shiner and aid in the recovery of this species.

Pecos Gambusia

The Pecos gambusia (*Gambusia nobilis*) was federally listed as endangered in 1970 and was listed as endangered by NMDGF in 1975. The Pecos gambusia is known to occur in the spring systems of the Pecos River valley in southeast New Mexico and Texas (Lawrence and Burr 1991). The species typically occurs in New Mexico only at springs and gypsum sinkholes in Bitter Lake National Wildlife Refuge and Blue Spring (Bednarz 1979; Echelle and Echelle 1980). The species has successfully been introduced to unoccupied sinkholes at Bitter Lake Wildlife Refuge (USFWS 1983). The species has also been introduced to a series of artificial pools at Living Desert State Park, located just west of Carlsbad (USFWS 1983), and within the Salt Creek Wilderness Area (Bednarz 1979), which is located in the northern section of the Bitter Lake National Wildlife Refuge. This species typically prefers springs and spring runs with either lithic or vegetative cover (Echelle et. al 1989 in NMDGF 2000). The species is not known within the analysis area.

Conservation efforts have concentrated on the maintenance of existing populations and limited introduction to new locations; the security of those populations has increased over time (Propst 1999). The primary threats to the species are loss of habitat and inability to interact successfully with nonnative fish species (USFWS 1983). Other threats include groundwater depletion, spring run dredging, and habitat modification by livestock (NMDGF 2000).

4.8.2 Birds

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was federally listed as endangered in 1967 and was reclassified as threatened in 1995; in 1999 this species was proposed for federal delisting. The bald eagle was state-listed as threatened in 1975. The range of the bald eagle extends from Canada through the United States to northern Mexico. In New Mexico, wintering bald eagles are known to occur in Colfax and Sierra Counties (NMDGF 2000). The Biota Information System of New Mexico (BISON-M) lists the species as rare in Eddy County (NMDGF 1988). New Mexico falls within the southwest recovery unit for the species.

The bald eagle hunts for fish and also eats carrion or injured waterfowl or rodents. The bald eagle typically lives a long life; the oldest bald eagle known in the wild was reported to be 28 years of age. This species typically prefers habitat near water sources where food is readily available, including estuaries, large lakes, reservoirs, major rivers, and coastal areas.

Annual surveys reveal that the wintering bald eagle population in New Mexico has steadily increased, rising from 220 birds in the late 1970s to 450 birds by the mid-1990s.

Few nesting pairs of bald eagles have been documented within New Mexico, none of which are in the vicinity of the Pecos River below Avalon Reservoir (Reclamation 2003). Primary threats to this species include wintering habitat degradation, disturbance, environmental contamination, and illegal take (NMDGF 2000).

Aplomado Falcon

The aplomado falcon (*Falco femoralis septentrionalis*) was federally listed as endangered in 1986 and was state-listed as endangered in 1990. The range of this species includes the southwestern U.S., much of Mexico, and the western coast of Guatemala [51 FR 6686]. In New Mexico, the aplomado falcon is known to occur in the desert grasslands of the southern third of the state (NMDGF 2000).

This species eats birds, insects, rodents, small snakes, and lizards and often catches its prey while in flight. Typical habitat for this species includes open grasslands, savanna, and marshy habitats.

Reports of aplomado falcon presence in southwest New Mexico have increased since the late 1980s. In 1999, a total of six sightings were reported in Grant, Doña Ana, and Otero Counties (NMDGF 2004). The primary threats to this species include alteration or degradation of grassland habitat due to excessive grazing and agricultural development, and pesticide contamination. The recovery plan for the aplomado falcon outlines the need to maintain patches of coastal prairies and desert grassland, and eliminate pesticide use within inhabited areas in order to establish self-sustaining populations in the southwestern U.S. (USFWS 1990b).

Interior Least Tern

The interior least tern (*Sterna antillarum*) was federally listed as endangered in 1985 and state-listed as endangered in 1976. The breeding range for this species extends from California, the Dakotas, and Maine southward to Latin America. Interior populations breed primarily in the Mississippi River Basin. In New Mexico, the interior least tern nests historically only at or near Bitter Lake National Wildlife Refuge and is known to be a regular migrant through Eddy County (NMDGF 2000).

The interior least tern feeds on small fish, crustaceans, and sand eels; it catches its prey by hovering and plunge diving to the surface. Typical nesting habitat for this species includes rivers or the barren flats of saline lakes and ponds. The interior least tern is known to occasionally occur in wetland areas throughout New Mexico in at least 15 counties, including Eddy County (NMDGF 2000).

Over the past 50 years, the breeding population of interior least terns in New Mexico has rarely exceeded 16 breeding adults. Between 1990 and 1999, five or six breeding pairs were present within New Mexico annually (NMDGF 2000). In late spring 2004, Reclamation documented a nesting and breeding colony of interior least terns at Brantley Reservoir (Reclamation 2004). Reclamation biologists documented 14 adult

terns and estimated seven nests (Reclamation 2005). Brantley Reservoir is about 10 miles upstream along the Pecos River outside of the analysis area. The Brantley Reservoir observation was the latest in Eddy County although outside of the analysis area. Primary threats to this species include loss of river habitats due to inundation, channelization, and altered flow regimes in river systems; human disturbance of flats and beaches; and pesticide and chemical contamination of environment and food sources (NMDGF 2000).

Mexican Spotted Owl

The Mexican spotted owl (*Strix occidentalis lucida*) was federally listed as endangered in 1993. This species is found from parts of central Colorado and Utah south through Arizona, New Mexico, and western Texas (USFWS 1993).

In New Mexico, the Mexican spotted owl historically occurs in most of the major mountain ranges of the state including the Sangre de Cristo, Jemez, Manzano, Sacramento, San Mateo, and Black Range. This species typically prefers mountain and canyon habitat containing forests with dense, closed canopies. Critical habitat units are designated in New Mexico in portions of McKinley, Rio Arriba, Sandoval, Socorro, and Taos Counties. Primary threats to this species include habitat loss due to timber harvest and fires and increased predation associated with habitat fragmentation.

4.8.3 Mammals

Black-footed Ferret

The black-footed ferret (*Mustela nigripes*) was federally listed as endangered in 1967. Historically, the range for this species included the Great Plains, extending from the Rocky Mountains east and south through the Dakotas, Nebraska, Kansas, Oklahoma, Texas, New Mexico, and Arizona (USFWS 1998). Currently, this species is known to occur in Arizona, Colorado, Montana, South Dakota, Utah, Wyoming, and parts of Mexico, due to the establishment of non-essential experimental populations in these states.

This species typically occurs in mixed shrub habitats where prairie dogs are also present; prairie dogs are the primary food source of the black-footed ferret. The decline of prairie dog populations has contributed significantly to the decline of ferret populations (Burt and Grossenheider 1952).

The primary contributors to the population decline of this species include habitat loss due to conversion to agricultural land and elimination of prairie dog populations due in part to sylvatic plague (USFWS 1998).

4.8.4 Plants

Gypsum Wild-Buckwheat

The gypsum wild-buckwheat (*Eriogonum gypsophilum*) was federally listed as threatened in 1981 and is state listed as endangered. Its known range includes three locations within Eddy County, New Mexico: Seven River Hills north of Carlsbad, south of Black River Village, and in the drainages of Ben Slaughter Draw and Hay Hollow (NMRPTC 1999). This species occurs in semi-arid areas with gypsum soils. The species is not known within the analysis area.

Critical habitat was designated at the time of listing for gypsum wild-buckwheat; 130 acres of public land in Eddy County administered by the Bureau of Land Management was originally designated as critical habitat for this species. Primary threats to this species include habitat loss and degradation, trampling by grazing livestock, and mortality due to off-road vehicles.

Kuenzler Hedgehog Cactus

Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*) was federally listed as endangered in 1979 (USFWS 1979). The species is listed as endangered in New Mexico. The species ranges through the southern side of the Capitan Mountains, eastern and northwestern lower sides of the Sacramento Mountains and northern end of the Guadalupe Mountains. This range includes portions of Chaves, Eddy, Lincoln, and Otero Counties within the range of 5,200-6,600 feet elevation (NMRPTC 1999). Within Eddy County the species is limited to the Guadalupe Mountains along the western perimeter. The recovery plan for the species identifies two populations in Lincoln County, New Mexico (USFWS 1985). The species is not known within the analysis area.

Lee Pincushion Cactus

Lee pincushion cactus (*Coryphantha sneedii* var. *leei*) was federally listed as threatened in 1979 [44 FR 61558]. The species is listed as threatened in New Mexico. Its only known range is the eastern Guadalupe Mountains in Eddy County, New Mexico within Carlsbad Caverns National Park restricted to north facing ledges within the Tansil Limestone Formation. It is common in its very restricted area of distribution. It primarily inhabits cracks in limestone in areas of broken terrain and steep slopes of Chihuahuan desert scrub at 4,000-5,000 feet elevation (USFWS 1986). The species is not known within the analysis area.

Collection by commercial or private collectors is the primary threat to the species. Other threats include destruction or modification of habitat and natural threats (Heil and Brack 1985).

Sneed Pincushion Cactus

Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*) was federally listed as endangered under the Endangered Species Act in 1979. The species is distributed across less than 100 miles in the Guadalupe and Franklin Mountains in southern New Mexico and west Texas, respectively. It is located in the Carlsbad Caverns National Park in southwest Eddy County, New Mexico. It primarily inhabits cracks in limestone in areas of broken terrain and steep slopes usually in Chihuahuan desert scrub at 4,000-7,700 feet elevation (USFWS 1986). The species is not known within the analysis area.

Primary threats to this species include habitat destruction and private or commercial collection. Habitat destruction and modification in the Franklin Mountains has increased due to urban development of El Paso (USFWS 1986).

5.0 EFFECTS OF THE ACTION ON EACH SPECIES

This section evaluates what effects the Proposed Action may have on federally listed species. Should the Proposed Action “may affect” any federally listed species, then a BA will be prepared to determine if the Proposed Action would adversely affect listed species.

Under the Proposed Action, state line deliveries by the NMISC would continue in essentially the same manner as current deliveries into the long-term future. The Proposed Action would not affect any threatened or endangered species. Current trends related to endangered and threatened species within the analysis area would likely continue into the long-term future. Accordingly, any development or recession of vegetation communities along the Pecos River and upland areas would follow current patterns.

5.1 Fish

Pecos Bluntnose Shiner

The Pecos bluntnose shiner’s range in the Pecos River extends from Fort Sumner south to Brantley Reservoir (Hoagstrom 2003, NMDGF 2004). The species is not known to occur within the analysis area, nor does critical habitat exist in the analysis area. The Proposed Action would not affect the Pecos bluntnose shiner.

Pecos Gambusia

Both known locations within Eddy County are not within the analysis area or hydrologically connected to the analysis area. The Proposed Action would not affect the Pecos gambusia.

5.2 Birds

Bald Eagle

Both wintering and breeding populations of bald eagles inhabit New Mexico. The species typically prefers habitat near water sources where food is readily available, including estuaries, large lakes, reservoirs, major rivers, and coastal areas. Since 1992, Project water has been delivered to the state line by CID for the NMISC under an existing short-term contract. Under the Proposed Action (a long-term contract), Project water would be delivered in essentially the same manner as it has been delivered under the existing short-term contract. In New Mexico, wintering bald eagles are known in only Colfax and Sierra Counties (NMDGF 2000). Any bald eagles in the analysis area would likely be transient and unaffected by the Proposed Action. The Proposed Action would not affect the bald eagle.

Aplomado Falcon

The aplomado falcon is known to occur in desert grasslands of the southern third of New Mexico. Recent documented observations of the species have been in southwest New Mexico in Grant, Doña Ana, and Otero Counties (NMDGF 2004). The analysis area of the Proposed Action is associated with the Pecos River riparian corridor and the adjacent CID, not desert grassland, and is located in southeast New Mexico. The Proposed Action would not affect the aplomado falcon.

Interior Least Tern

The interior least tern is known to occasionally occur in wetland areas throughout New Mexico, including Eddy County (NMDGF 2000). In the spring of 2004, a colony of interior least terns nested at Brantley Reservoir about 10 miles north of the analysis area. This is the closest known occurrence of the species to the analysis area. The Proposed Action would continue the existing releases from Avalon Dam into the Pecos River into the long-term future and would not directly alter any habitat upstream of Avalon Dam. The Proposed Action would not affect the interior least tern.

Mexican Spotted Owl

This species typically prefers mountain and canyon habitat outside the analysis area along the Pecos River valley. Any occurrence in Eddy County will likely be west of the analysis area. The Proposed Action would not affect the Mexican spotted owl.

5.3 Mammals

Black-footed Ferret

The endangered black-footed ferret is reported to have an experimental population within Eddy County in upland area not associated with the analysis area and is commonly associated with upland prairie dog colonies. The Proposed Action would not affect any possible experimental populations within the Eddy County. The Proposed Action would not affect the black-footed ferret.

5.4 Plants

Gypsum Wild-Buckwheat

The threatened gypsum wild-buckwheat is known to occur in three areas within Eddy County (NMRPTC 1999). However, these areas are located more than 8 miles west of the analysis area and are hydrologically upgradient from the Pecos River. The Proposed Action would not affect the gypsum wild-buckwheat.

Kuenzler Hedgehog Cactus, Lee Pincushion Cactus, and Sneed Pincushion Cactus

These cacti are endemic to the foothill mountain areas west of the analysis area in Eddy County. These areas are hydrologically upgradient of the Pecos River and not within the analysis area along the Pecos River valley or in the CID. Therefore, the Proposed Action would have no effect to the Kuenzler hedgehog cactus and Lee and Sneed pincushion cacti.

6.0 CUMULATIVE EFFECTS

Under Section 7 of the ESA, cumulative effects are defined as those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation [50 CFR §402.02]. In addition, to be considered for cumulative effects, resources must first be potentially impacted by the Proposed Action.

Several State or private activities are reasonably certain to occur within the analysis area of the long-term miscellaneous purposes contract. These include: 1) execution of the terms of the Settlement Agreement, 2) the New Mexico Salt Cedar Control Project, 3) NMISC water conservation project, and 4) the Calloway culvert reconstruction.

6.1 Settlement Agreement

The Settlement Agreement describes actions to be taken by the NMISC and others that will resolve litigation, implement a plan to ensure delivery of water to the CID and New Mexico-Texas state line, and settle many water management issues on the Pecos River. The Settlement Agreement also mentions three certain conditions that must be met, postponed or waived by the parties before the Settlement Agreement is effective. These three conditions precedent are: 1) entry of a partial final decree, 2) implementation of a consensus plan, and 3) completion of federal contracts and environmental compliance. The third condition is to be met by two independent environmental processes. One process reviews the long-term miscellaneous purposes contract in the form of the MPEIS and this biological evaluation. The other, concurrent process reviews the Carlsbad project water operations and water supply conservation in the form of an Environmental Impact Statement and a biological assessment.

The non-federal components of the Settlement Agreement include physical and operation components listed in Table 2.

Table 2: Summary of Settlement Agreement Physical and Operational Components.

Component	Action
Physical Components	
NMISC land and water right acquisition in CID	Up to 6,000 acres
NMISC land acquisition and water right in Roswell Artesian Basin (RAB)	Up to 11,000 acres
NMISC land acquisition and water right above Pecos River near Acme gauge	Up to 1,000 acres
Development of augmentation well field	Yes
Operational Components	
Supplemental pumping within CID	Up to 3.697 acre-feet/acre
Reallocation of NMISC allotment	Yes
Target volumes supplied to CID	Yes
Augmentation well field pumping	Up to 100,000 acre-feet in a 5-year period, or 35,000 acre-feet in any given year
Sell/Lease back	May occur following accumulation of 115,000 acre-feet state line credit
Pecos River Compact Shortfall Condition	Voluntary measures to increase flow

6.2 New Mexico Salt Cedar Control Project

The only non-federal major vegetation management/research project ongoing in the analysis area is the New Mexico salt cedar control project. The project began in 2004 and is supervised by New Mexico State University in coordination with state agencies.

The project is currently developing priority areas and associated budgets for land clearing and channel maintenance.

6.3 NMISC Water Conservation Project

In 1991, New Mexico Legislature authorized NMISC to purchase and retire Carlsbad Project water as well as other water in the lower Pecos River basin. In 2003, an agreement was developed between CID and NMISC to bypass RAB-leased water through Carlsbad Project water facilities for delivery to the state line. NMISC has purchased and retired water rights in the Lower Pecos River basin under this program.

6.4 Calloway Culvert Reconstruction

The Calloway Culvert is in the City of Carlsbad and proposed for reconstruction. Releases from Avalon Dam into the Pecos River are restricted by the capacity of this culvert, which currently can accommodate a maximum discharge of 600 cfs. The Calloway Culvert is being redesigned with a capacity of 1,200 cfs and reconstruction is expected to be complete in 2007 (Tully 2005).

6.5 Cumulative Effects

When the Proposed Action is analyzed in conjunction with the actions listed above in sections 6.1-6.4, it is foreseeable that a larger volume of water may be released by NMISC at a more efficient, higher rate of flow. Efficient releases could also provide a greater bank inundation along the Pecos River downstream from Avalon Dam, the release point. Increased volumes could provide more water for listed species and their habitat within the Pecos River floodplain than under the current conditions. The Proposed Action would not cumulatively affect federally listed threatened or endangered species.

7.0 CONCLUSIONS AND EFFECT DETERMINATION

As detailed in Sections 5.1-5.4 and 6.5, the Proposed Action would not affect federally listed threatened and endangered species. This biological evaluation documents that no formal or informal consultation under Section 7 of the Endangered Species Act is needed for the Proposed Action.

Table 3: Species Effects Determination

Species, Status	Determination	Rationale
Pecos bluntnose Shiner, T	No Effect	Not present in analysis area
Pecos gambusia, E	No Effect	Not present in analysis area
Bald eagle, T	No Effect	Not present in analysis area
Aplomado falcon, E	No Effect	Not present in analysis area
Interior least tern, E	No Effect	Not present in analysis area
Mexican spotted owl, T	No Effect	Not present in analysis area
Black-footed ferret, E	No Effect	Extirpated from the area
Gypsum wild-buckwheat, T/CT	No Effect	Not present in analysis area
Kuenzler hedgehog cactus, E	No Effect	Not present in analysis area
Sneed pincushion cactus, E	No Effect	Not present in analysis area
Lee's pincushion cactus, T	No Effect	Not present in analysis area

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