

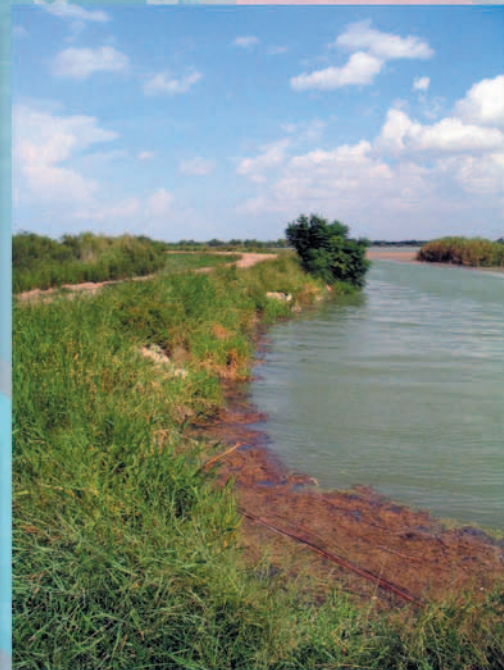


United States Section
International Boundary and Water Commission

Biological Resources Survey

**Rio Grande and Tijuana River Flood Control Projects
New Mexico, Texas and California**

August 2005



Final Report

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Section 1

Introduction

The United States Section of the International Boundary and Water Commission (USIBWC) maintains four flood control projects along the Rio Grande and one along the Tijuana River. The four Rio Grande flood control projects are located between Percha Dam in Sierra County, New Mexico, and the Gulf of Mexico. The Tijuana River flood control project is in the United States portion of the Tijuana River in San Diego County, California.

This biological resources survey is a literature review of biological resources such as habitats, communities, and species in the Rio Grande and Tijuana River watersheds, focusing on those resources within the five flood control project areas. A field biological survey of the Presidio-Ojinaga flood control project was conducted in June of 2005 to supplement and verify the information obtained through the literature review. The results of the literature review and field survey are documented in this report.

1.1 Background

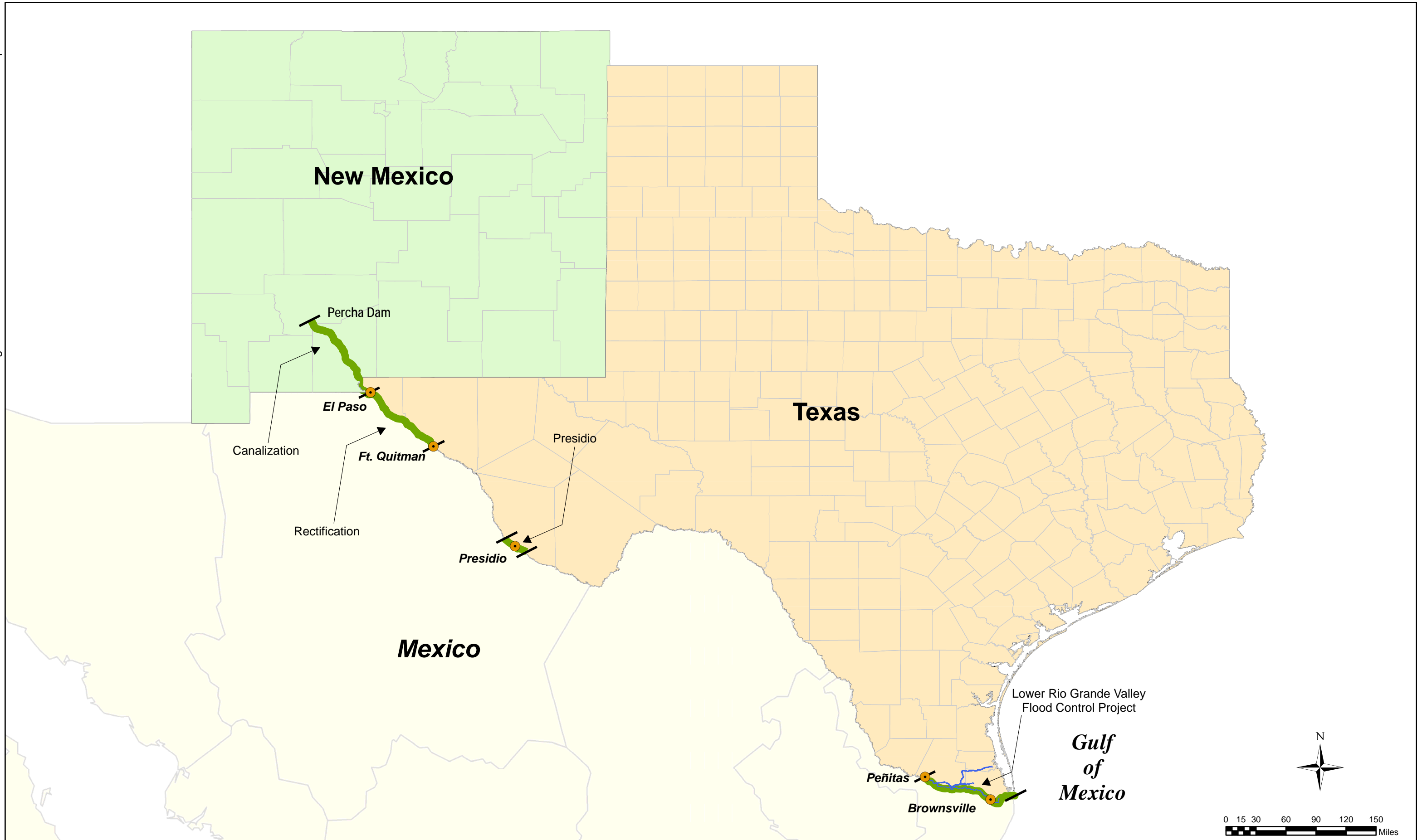
The USIBWC maintains four flood control projects along the Rio Grande:

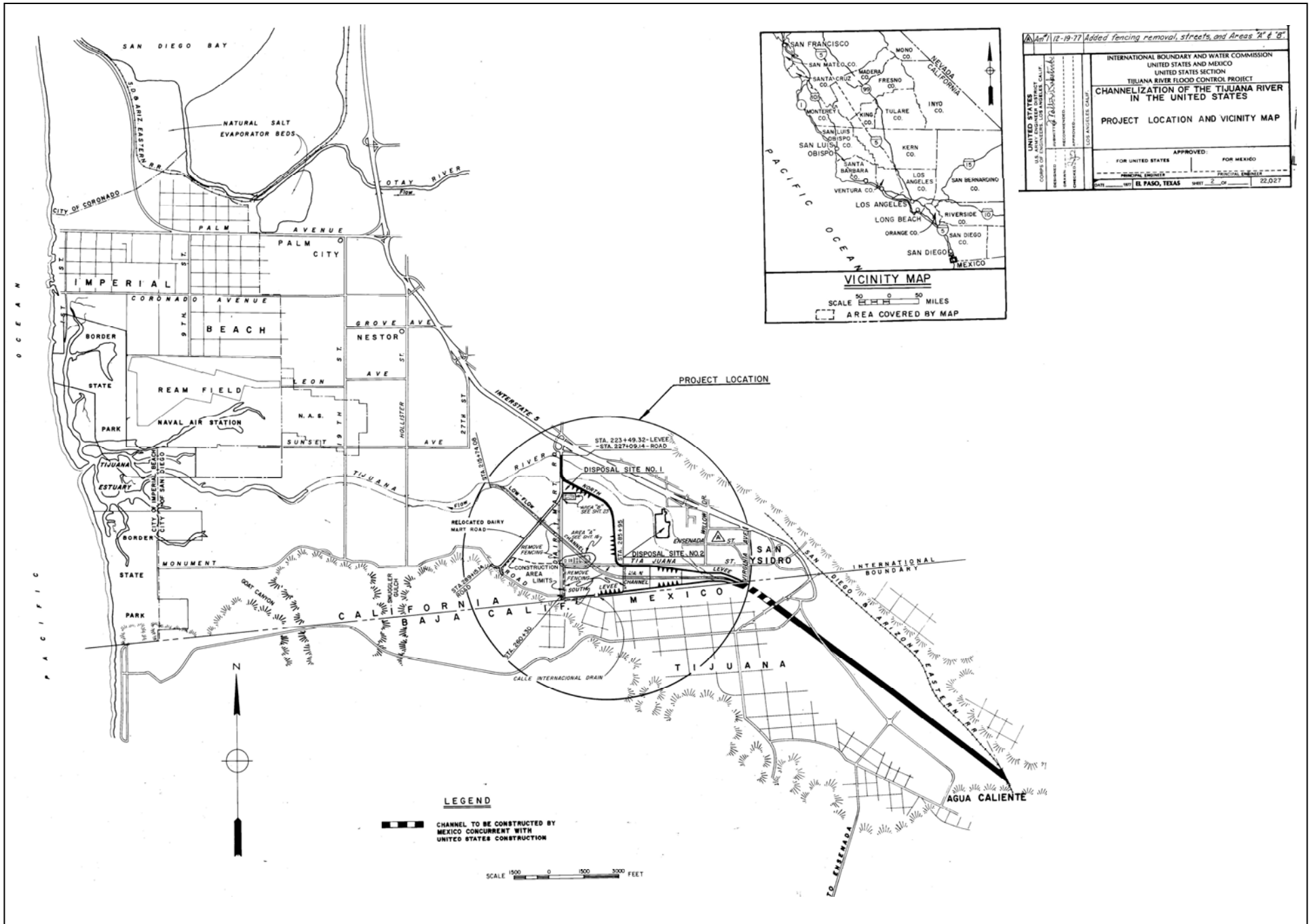
- 1) Canalization Project, extending 105.4 miles from Percha Diversion Dam in New Mexico to American Diversion Dam in El Paso County, Texas;
- 2) Rectification Project, extending 86 miles from American Diversion Dam to Fort Quitman, Texas;
- 3) Presidio-Ojinaga Flood Control Project, extending 15.2 miles along the Rio Grande and including spur levees between the sister cities of Presidio, Texas and Ojinaga, Chihuahua, Mexico; and
- 4) Lower Rio Grande Flood Control Project (LRGFCP), extending 180 miles between the town of Peñitas, Texas, to the Gulf of Mexico.

The major diversions within the lower region of the Rio Grande include the Percha Leasburg, Mesilla, American, International, and Riverside dams.

In addition, the USIBWC maintains the Tijuana River Flood Control Project, located in the United States portion of the Tijuana River, extending 2.3 miles from the international boundary. This project represents a continuation of the flood control project located in Mexico, and provides flood protection to areas of San Diego, California, in the United States.

Figure 1-1 shows the locations of the four Rio Grande flood control projects. Figure 1-2 shows the location of the Tijuana River Flood Control Project.





12-19-77 Added fencing removal, streets, and Areas "A" & "B"	
INTERNATIONAL BOUNDARY AND WATER COMMISSION UNITED STATES SECTION TIJUANA RIVER FLOOD CONTROL PROJECT CHANNELIZATION OF THE TIJUANA RIVER IN THE UNITED STATES	
PROJECT LOCATION AND VICINITY MAP	
APPROVED:	
FOR UNITED STATES	FOR MEXICO
DATE: 12-19-77	SHEET 2 OF 22.027

LEGEND

CHANNEL TO BE CONSTRUCTED BY MEXICO CONCURRENT WITH UNITED STATES CONSTRUCTION

SCALE 1:50,000 (1 inch = 5 miles)
 0 1000 2000 FEET

1.2 Purpose and Objective

This document does not include any new field work in the Canalization, Rectification, Lower Rio Grande Valley, or Tijuana River project areas. It does include the results of a new field survey in the Presidio project area. Current lists of endangered, threatened, candidate, rare and special species according to the United States Fish and Wildlife Service and the New Mexico, Texas and California state agencies are also included in this document. General descriptions of vegetation and wildlife in the Rio Grande and Tijuana River watersheds are provided, including common plants and animals in the five flood control project areas. Sensitive plants and animals known or suspected to be in the study area according to previous reports are discussed.

1.3 Agency Coordination

Comments were sought for inclusion in this report from four United States Fish and Wildlife Service offices, as well as three state-level wildlife offices. The comments were used to add field-specific present knowledge of biological conditions in each of the project areas to this report. The letter soliciting comments, the list of agencies contacted, and the responses received from the agencies are included in Appendix A. Responses were received from the Carlsbad and Albuquerque offices of the United States Fish and Wildlife Service and the State of New Mexico Department of Game and Fish.

Section 2

Descriptions of Project Areas

The major biological resources (i.e., habitats, communities, and species) associated with the five project areas are described in this section.

2.1 Rio Grande Watershed

The Rio Grande, at 1,896 miles in length, is the nation's fifth longest river, originating in south central Colorado and flowing to the Gulf of Mexico. The Texas portion of the Rio Grande was designated as an American Heritage River in July of 1998. A segment of the river, about 1,250 miles in length, forms the boundary between the United States and Mexico. The Rio Grande and its tributaries, all of which are ephemeral, are drainages for the plateau shrub lands of New Mexico, the Chihuahuan Desert of New Mexico and Texas, and the Tamaulipan Mezquital of south Texas and adjacent Mexico. The USIBWC flood control projects in New Mexico and Texas are within the Chihuahuan Desert and Tamaulipan Mezquital regions.

The Chihuahuan Desert is considered the most biologically diverse desert in the world (Ricketts et al. 1999 in Gil and Wilkins 2004). Most of the Rio Grande watershed lies within the Chihuahuan Desert, as defined by Schmidt (1979) in Brown (1994). The Chihuahuan Desert can be generally characterized by dominant vegetative communities, including creosote bush (*Larrea divaricata*), tarbush (*Flourensia cernua*), whitethorn acacia (*Acacia constricta*), sandpaperbush (*Mortonia scabrella*), mesquite (*Prosopis juliflora glandulosa*), succulents (*Agave*, *Yucca*, *Dasyllirion*, *Opuntia*), mixed shrubs, and saltbush (*Suaeda torreyana*), with ocotillo (*Fouquieria splendens*) also commonly present (Brown 1994).

The riparian habitat consists mainly of tall dense vegetation such as the cottonwood-willow and saltcedar (*Tamarix L*), and short sparse vegetation such as thorny shrub communities and screwbean mesquite-wolfberry. The salt cedar tends to have an advantage over other species because of its adaptation to the saline soils. Screwbean mesquite-wolfberry occurs mainly in the flood plain, beyond the cottonwood/willow or saltcedar. Honey mesquite may also be present in this habitat along with quailbush (*Atriplex lentiformis*). Openings between shrubs may allow for the growth of forbs and grasses such as alkali sacaton (*Sporobolus airoides*) and saltgrass (*Distichlis spicata*). The thorny shrub community is composed of mesophytic plants such as honey mesquite and buckthorn (*Rhamnus californica*), and xerophytic species such as creosote bush and lechuguilla (*Agave lechuguilla*). Wet meadows, palustrine marshes, spring seeps, perched wetlands, salt marshes, and sand bars also occur throughout the river (Fullerton and Batts 2003).

Animals common to or characteristic of the Chihuahuan desert include a large variety of invertebrates and vertebrates. Mammals commonly associated with the Chihuahuan desert include several types of rodents and other small mammals, such as desert pocket gopher (*Geomys atenarius*), Nelson's kangaroo rat (*Dipodomys nelsoni*), Nelson's pocket mouse (*Chaetodipus nelsoni*), and desert-adapted forms of ground squirrels (*Spermophilus sp.*), woodrats (*Neotoma sp*) cottontail (*Sylvilagus sp.*), and

larger mammals such as mule deer (*Odocoileus hemionus*) and bighorn sheep (*Ovis Canadensis*) (Brown 1994).

Bird communities are comprised of predominantly wide-ranging desert-adapted species, with only the scaled quail (*Callipepla squamata*) and white-necked raven (*Corvus albicollis*) considered characteristic of the Chihuahuan desert (Brown 1994). Other common bird species found within the Chihuahuan desert (as well as within other arid ecosystems in the Southwest) include mourning dove (*Zenaida macroura*), roadrunner (*Geococcyx californicus*), lesser nighthawk (*Chordeiles acutipennis*), Scott's oriole (*Icterus parisorum*), cactus wren (*Campylorhynchus brunneicapillus*), curve-billed thrasher (*Toxostoma curvirostre*), and black-throated sparrow (*Amphispiza bilineata*) (Brown 1994).

Reptiles are well-represented in the Chihuahuan desert, and commonly observed taxa include a wide variety of lizards, such as Texas banded gecko (*Coleonyx brevis*), horned lizards (*Phrynosoma sp.*), several species of spiny lizards (*Sceloporus sp.*), and whiptail lizards (*Cnemidophorus sp.*). The latter genus includes interesting parthenogenic taxa whose populations consist of all female clones; however, these are not restricted to the Chihuahuan desert. Snakes characteristic of (but not necessarily limited to) the Chihuahuan desert include trans-Pecos ratsnake (*Bogertophis subocularis*), western hooknose snake (*Gyalopion canum*), Texas black-headed snake (*Tantilla atriceps*), and several species of whipsnake (*Masticophis sp.*) and rattlesnake (*Crotalus sp.*). The commonly encountered rattlesnakes include wide-ranging species that are found beyond the Chihuahuan desert, such as the Mojave rattlesnake (*C. scutulatus*) and western diamondback rattlesnake (*C. atrox*). Most of the other reptile species identified above are characteristic of the Chihuahuan desert, but even some of these are relict grassland species. Most of the lizards identified above are diurnal and commonly seen, but geckos and several of the snake species identified are nocturnal, especially during the hottest months.

In general, desert environments do not support abundant or diverse amphibian communities compared to wetter environments. However, several arid-adapted amphibians can be found in the Chihuahuan desert, and some of these can be abundant where habitats are suitable. Desert-adapted species that may be found within the Chihuahuan desert include tiger salamander (*Ambystoma tigrinum*), spadefoots (*Scaphiopus sp.* and *Spea sp.*), Great Plains narrowmouth toad (*Gastrophryne olivacea*), and several species of true toads (*Bufo sp.*). These are not necessarily commonly observed animals because they are often nocturnal and in some cases come to the surface only briefly during short breeding periods.

The Tamaulipan Mezquital of south Texas and adjacent Mexico is considered one of the "last great habitats" in North America due to its unique biological resources (Fulbright and Bryant 2002 in Gil and Wilkins 2004). This habitat is rapidly being lost in the United States due to urbanization and agricultural development along the Rio Grande in south Texas. Many of the vertebrates identified above for the Chihuahuan desert, or closely related taxa, may also occur in far south Texas where suitable habitats still exist. Also, a few species of vertebrates unique to this environment, such as Texas indigo snake (*Drymarchon corais erebennus*), can still be found in appropriate habitats but are becoming increasingly scarce.

The United States Forest Service (USFS) takes a somewhat different approach to describing habitats of the United States by identifying ecoregions, the boundaries of which are slightly different than the boundaries of the Chihuahuan desert and Tamaulipan Mezquital described above. Each ecoregion represents a unique combination of vegetative communities and climatic conditions. Ecoregions consist of several divisions, including Domains, Divisions, Provinces, and in some cases Regimes. The entire 335,000 square mile Rio Grande watershed falls within the Dry Domain. Several Divisions, Provinces, and Regimes within this Domain have been identified by the USFS. These are described below.

- Tropical/Subtropical Steppe Division
- Colorado Plateau Semi-Desert Province in southern New Mexico
- Southwest Plateau and Plains Dry Steppe and Shrub Province in central and southern Texas
- Tropical/Subtropical Steppe Regime Mountains
- Arizona-New Mexico Mountains Semi-Desert – Open Woodland – Coniferous Forest – Alpine Meadow Province (in much of New Mexico)
- Tropical/Subtropical Desert Division
- Chihuahuan Semi-Desert Province (in southwest Texas)

Many of the plant and animal taxa considered characteristic of the Chihuahuan desert and adjacent environments can be found in multiple ecoregions. For the most part, the specific plant communities, microhabitats, and quality of habitats determine the types of animals likely to occur in or use the area. The specific areas of concern for this project provide varying degrees of habitat suitability, and many taxa listed above may not occur within the project area due to limited habitat availability. Habitat quality is an important parameter to consider with regard to identifying species that may be impacted by project actions because much of the Rio Grande watershed is degraded compared to past conditions, before urbanization and water diversion/controls. Even though the habitats within the Rio Grande watershed (including in some cases those within or near project areas) have been and continue to be subject to varying degrees of degradation from a variety of sources (dams and other flood control measures, water diversion, urbanization, development, contaminants, water use, introduction of exotic species, etc.), the watershed maintains a significant biological value, especially where unique habitats remain.

Each of the unique habitats found within the Rio Grande watershed supports a wide variety of plant and animal species, including several that have been identified as State Species of Concern, rare, threatened, or endangered. Gil and Wilkins (2004) list 181 species within the Rio Grande watershed as threatened, endangered, or species of concern. These species are identified below for relevant portions of the Rio Grande watershed, from Percha Dam in New Mexico to the Gulf of Mexico.

2.2 Rio Grande Canalization Project

The Rio Grande Canalization Project extends 105.4 miles from Percha Diversion Dam in New Mexico to the American Diversion Dam in El Paso, Texas. From Percha Dam to the Mesilla Diversion, channel width averages between 200 and 300 ft. The levees confine the floodplain to widths ranging from 600 to 1200 ft. Near the Selden Canyon, no levees have been constructed and the floodplain is naturally limited to 600 to 1200 ft. In the canyon the channel is slightly sinuous, at a value of 1.1, and has a sand bed. The gradient in this stretch of the river is roughly 4 ft/mi. From the Mesilla Diversion Dam to the American Dam, the floodplain is confined to an average width of 600 ft and the channel width is confined to an average of 220 ft. The channel here has a sand bed, a sinuosity of 1.05, and a channel slope of approximately 4 ft/mi (Fullerton and Batts 2003). The Canalization Project was constructed between 1938 and 1943 to provide flood control and facilitate water deliveries to the Rincon and Mesilla Valleys in New Mexico, El Paso Valley in Texas, and the Juarez Valley in Mexico, in accordance with the 1906 Convention Between the United States and Mexico for the Equitable Distribution of the Waters of the Rio Grande.

2.2.1 Vegetation Communities

The Rio Grande Canalization Project is located in the Trans-Pecos region of the Chihuahuan Desert. The natural vegetation in the Trans-Pecos region consists of grassland and desert shrub land. Of the grass types, tobosa (*Hilaria mutica*) and black grama (*Bouteloua eriopoda*) are among the most common. The desert shrub areas consist of creosote bush and tarbush. The riparian areas are dominated by invasive (non-native) salt cedar or tamarisk (*Tamarix ramosissima*), although native vegetation such as willow (*Salicaceae*), cottonwood (*Populus deltoids*) and screwbean mesquite-wolfberry are dominant in some communities, with ash (*Fraxinus sp.*) and desert willow (*Chilopsis linearis*) also present (USIBWC 2004). In particular, cottonwood-willow communities tend to occur upstream of Selden Canyon, particularly in the 1.2 miles downstream of Percha Dam, and screwbean mesquite-wolfberry and cottonwood-willow communities are dominant in Selden Canyon (WWF et al. 2001).

The cottonwood-willow communities in the Canalization Project consist of mainly gooding willow (*Salix goodingii*), cottonwoods and sometimes a dense understory of seepwillow (*Baccharis salicifolia*), plus a blend of grasses and forbs. Indicator species are the beaver and Southwestern willow flycatcher. The screwbean mesquite-wolfberry communities contain screwbean mesquite (*Prosopis pubescens*), wolfberry (*Lycium torregii*) and scattered honey mesquites. Forbs and grasses include alkali sacaton and saltgrass. Indicator species are mockingbirds (*Mimus polyglottos*), prrhuloxias (*Cardinalis sinuatus*), and verdin (*Auriparus flaviceps*).

Invasive species in addition to salt cedar that can be found in riparian zones of the Canalization Project include Russian olive (*Elaeagnus angustifolia*), especially in the northern reaches of the Project, and Russian thistle, or tumbleweed (*Salsola iberica*). Salt cedar tends to spread rapidly in riparian areas of the Canalization project when they are not regularly mowed. Native cottonwood communities appear to be shrinking, with very little successful seed germination taking place (USIBWC 2004).

Riparian vegetation communities in the watershed are mainly herbaceous with less than 20 percent cover of trees and shrubs, containing grasses, sedges, and forbs. Non-native species such as Russian thistle, red bladderpod (*Sphaerophysa salsola*), and jimson-weed (*Datura stramonium*) are common. Without mowing, these herbaceous areas would likely convert quickly to woody salt cedar communities. Other riparian vegetation communities that can be found in the project floodplains are woodlands, shrublands, exposed ground, cropland and wetland. Bare exposed ground is a very common land cover type in the floodplains (USIBWC 2004). Within the levees between Las Cruces and El Paso, the riparian habitat is extremely fragmented and low quality. There is little to no regeneration due to lack of flooding and frequent mowing (Fullerton and Batts 2003).

In the upland areas, common plants are snakeweed (*Stachytarpheta* spp), saltbush (*Suaeda torreyana*), and salt cedar. Land cover in upland areas can be classified into exposed ground, herbaceous, or woodland/shrubland, with exposed ground being abundant (USIBWC 2004).

An extensive list of plants in the Canalization project according to the 2004 USIBWC Biological Assessment is included in Appendix B, Item 1.

2.2.2 Wildlife Communities

The Rio Grande waters in the Canalization Project can be considered a lotic (flowing) habitat of low diversity. The river largely lacks certain characteristics of optimal aquatic habitat such as riffles, instream cover, and pooling. The river channel is mostly straight with very little variation in velocity. The bottom is sand and silt, and is not considered favorable to supporting a diverse aquatic life community. At least 22 species of fish live in the Rio Grande in the Canalization Project. These include channel catfish (*Ictalurus punctatus*), white crappie (*Pomoxis annularis*), bluegill (*Lepomis macrochirus*), common carp (*Cyprinus carpio*), river carpsucker (*Carpionodes carpio*), smallmouth buffalo (*Ictiobus bubalus*), gizzard shad (*Dorosoma cepedianum*), black bullhead (*Ameiurus melas*), flathead catfish (*Pylodictis olivaris*), largemouth bass (*Micropterus salmoides*), warmouth (*Chaenobryttus gulosus*), green sunfish (*Lepomis cyanellus*), longear sunfish (*Lepomis megalotis*), Western mosquitofish (*Gambusia affinis*), fathead minnow (*Pimephales promelas*), bullhead minnow (*Pimephales vigilax*), flathead catfish (*Pylodictis olivaris*), red shiner (*Cyprinella lutrensis*), longnose dace (*Rhinichthys cataractae*), spotted bass (*Micropterus punctulatus*), threadfin shad (*Dorosoma petenense*), white bass (*Morone chrysops*), and yellow perch (*Morone Americana*), (USIBWC 2004). The Rio Grande shiner (*Notropis jemezianus*) and speckled chub (*Macrhybopsis aestivalis*) are extirpated from the Canalization Project (WWF et al. 2001).

The following mammals and reptiles were observed in the Canalization Project area during USIBWC field surveys in 2004, either by direct identification or identification of burrows or tracks: coachwhip (*Masticophis flagellum*), desert striped whipsnake (*Masticophis taeniatus*), western diamondback rattlesnake (*Crotalus atrox*), eastern fence lizard (*Scleroporos undulatus*), New Mexico whiptail (*Cnemidophorus neomexicanus*), beaver (*Castor canadensis*), gopher (*Thomomys* spp.), kangaroo rat, mice (*Perognathus* and *Peromyscus* spp.), raccoon (*Procyon lotor*), rock squirrel (*Spermophilus variegatus*), spotted ground squirrel (*Spermophilus pilosoma*), and wood rat (*Neotoma* spp.). Mature

and immature western burrowing owls (*Athene cunicularia hypagaea*), a Texas state listed rare species, have also been observed during USIBWC field surveys and by Texas Parks and Wildlife personnel. Burrows were located in the side of a levee road and in irrigation ditch embankments.

Other mammals of the area are beaver (*Castor canadensis*) and gray fox (*Urocyon cinereargentus*). Migratory birds of the area include Clark's and Western grebe (*Aechmophorus clarkii* and *A. occidentalis*), neotropical cormorant (*Phalacrocorax olivaceus*), and eared grebe (*Podiceps nigricollis*), which all can be found on impoundments. Neotropical migratory birds such as common yellowthroat (*Geothlypis trichas*), yellow warbler (*Dendroica petechia*), and olive-sided flycatcher (*Contopus borealis*) also use the riparian areas. Western kingbirds (*Tyrannus verticalis*) are common (WWF et al. 2001).

Appendix B, Item 2, is a list of birds that were observed during the 2004 USIBWC field surveys in the Canalization Project.

2.2.3 Threats to Vegetation and Wildlife Communities

Flow in the Rio Grande in the Canalization Project is interrupted on a seasonal basis. Periods of complete dryness occur, and these are a challenge for aquatic and water-dependent wildlife. When there is flow in the reach it has little of the variation that would be typical of a natural stream hydrograph. Although sediment-free water is released from Caballo Dam the flow quickly picks up sediment and deposits it in both the Canalization and Rectification projects. Arroyos also deposit sediment in the main channel that is not removed by the stable river flow. This sediment is manually removed. Salinity can reach high levels when there is water in the river. The salt build up in the soils, and poor water quality pose challenges in the restoration of the riparian habitat (Fullerton and Batts 2003, WWF et al. 2001).

Much of the vegetation in the floodplain is noxious and/or invasive, including salt cedar and Russian olive, the spread of which is controlled by mowing.

Human activities and development in the floodplain such as levees, communities, agriculture, and water and transportation infrastructure has hindered the ability of vegetation and wildlife to thrive in the area by disconnecting portions of the floodplain and hindering natural geomorphic channel evolution (Fullerton and Batts 2003). Overgrazing has also affected floodplains in some areas (WWF et al. 2001).

2.2.4 Threatened and Endangered Species

The Fish and Wildlife Coordination Act (FWCA), 16 USC 661 *et seq.*, requires federal agencies involved in actions that will result in the control or structural modification of any natural stream or body of water for any purpose, to take action to protect the fish and wildlife resources that may be affected by the action.

The Endangered Species Act (ESA), 16 USC 1536 *et seq.*, provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The United States Fish and Wildlife Service (USFWS) of the

Department of the Interior maintains the species list, which currently contains 988 endangered species (599 are plants) and 276 threatened species (147 are plants).

Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. Anyone can petition the USFWS to include a species on this list. The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Taking is defined by the USFWS as harming, hunting, capturing, or killing, where harming includes altering the habitat to the point that it kills or injures endangered or threatened species through the impairment of its breeding, reproductive, and feeding behaviors. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

In the State of New Mexico, the New Mexico Department of Fish and Game has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations. In Texas the Texas Parks and Wildlife Department has similar jurisdiction. Both the states of New Mexico and Texas maintain lists of endangered, threatened, and rare or sensitive species apart from the Federal lists.

2.2.4.1 Federal

The project lies in two states and three counties: Sierra and Doña Ana Counties, New Mexico and El Paso County, Texas. Approximately seven river miles are in Sierra County, 80 are in Doña Ana County, and 18 are in El Paso County.

Based on current listings under the Endangered Species Act of 1973, nine federally listed endangered species may occur in Sierra, Dona Ana, or El Paso Counties, as well as three federally listed threatened species and two federally listed candidate species. Not all species on the federal or state county lists share the same probability of occurring in the county. Some are migrants and may only pass through the county seasonally. Others are only known to occur in the county historically, or are considered extirpated (no longer present). There are no federally designated critical habitats in the project area. The federally listed species and their classifications are presented in Table 2-1. The codes in the "habitat presence" column classify each species according to the presence or absence of habitat in the flood control project area. These classifications are based on available previous studies, general knowledge of the typical habitat of the species, and of typical conditions along the Rio Grande in the project area. They describe the general conditions of the project as a whole and are not meant to replace the results of field surveys.

Table 2-1. Federally Listed Species for Sierra, Dona Ana, and El Paso Counties

Species Name	Federal Status	Habitat Presence	Counties Listed
Birds			
Bald eagle (<i>Haliaeetus leucocephalus</i>)	AD, T	1	Sierra; Dona Ana
Interior least tern (<i>Sterna antillarum</i>)	E	2	Dona Ana; El Paso
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T	5	Sierra; Dona Ana; El Paso
Northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	5	Sierra; Dona Ana; El Paso
Southwestern willow flycatcher (<i>Empidonax traillii estimus</i>)	E	1	Sierra; Dona Ana; El Paso
Whooping crane (<i>Grus americana</i>)	E, EXPN	5	Sierra
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	C	4	Sierra; Dona Ana; El Paso
Fishes			
Gila trout (<i>Oncorhynchus gilae</i>)	E	5	Sierra
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	E	3	Sierra; Dona Ana
Plants			
Sneed pincushion cactus (<i>Coryphantha sneedii</i>)	E	5	Dona Ana; El Paso
Todsen's pennyroyal (<i>Hedoma todsenii</i>)	E	5	Sierra
Mammals			
Black-footed ferret (<i>Mustela nigripes</i>)	E, EXPN	5	Sierra
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	C	5	Sierra
Amphibians			
Chiricahua leopard frog (<i>Rana chiricahuensis</i>)	T	5	Sierra

Source: United States Fish & Wildlife Service 2004

E-endangered, T-threatened, C-candidate, AD-proposed delisting, SAT-similarity of appearance to a threatened taxon, DM-delisted recovered and being monitored first five years; EXPN-non-essential experimental population

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3-species believed to be extirpated from project area; 4-project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project

In January of 2004, the USIBWC published a Biological Assessment for the River Management Alternatives for the Rio Grande Canalization Project. In this document, the presence or absence of suitable habitat for state and federal endangered and threatened species in the Rio Grande Canalization Project was determined based on a literature review and field surveys. Of the 14 species listed above, eight (northern aplomado falcon, Mexican spotted owl, whooping crane, Gila trout, sneed pincushion cactus, todsen's pennyroyal, black-footed ferret, and chiricahua leopard frog) do not have suitable habitat present in the Canalization Project, according to the 2004 biological assessment. The remaining six species may have suitable habitat in the Canalization project, since they were not ruled out in the 2004 Biological Assessment. Habitats for these species are described below.

Bald eagles live in areas similar to the riparian shrubland and woodland, and plaustrine woodland in the Canalization Project. The potential habitat is found mostly in the northern part of the Project, in southern Sierra County. Bald eagles have previously been sighted in this part of the Canalization Project (USIBWC 2004).

Interior least terns live on river sandbars and beaches. These types of sandbars exist in the Canalization Project. At least one interior least tern was observed in September of 2000 in the Canalization project, both flying and resting on sand bars. Although there are not thought to be suitable nesting areas for the interior least tern in the Project, the area can be used for feeding and resting during migration (USIBWC 2004).

The southwestern willow flycatcher breeds in dense riparian habitats that include shrubs and medium sized trees, and has been observed in the Seldon Canyon region of the Rio Grande living in a salt cedar community. In the Canalization Project but

outside of Seldon Canyon, there are no salt cedar communities large enough and dense enough to support the southwestern willow flycatcher (USIBWC 2004).

The black-tailed prairie dog, yellow-billed cuckoo, and Rio Grande silvery minnow were not addressed in the 2004 biological assessment. Their general habitats are described below.

The black-tailed prairie dog lives in large family groups in dry, flat, short grassland with sparse vegetation that may be overgrazed (TPW 2004).

The yellow-billed cuckoo requires riparian areas for survival, and dense understory foliage for nesting. The bird nests in willow, mesquite, cottonwood, and hackberry (*Celtis pallida*) (TPW 2004).

The Rio Grande silvery minnow has historically lived in the Rio Grande and Pecos river systems and canals, in the pools and backwaters of medium to large streams with low or moderate gradient. Stream bottoms can be mud, sand, or gravel. The fish eats algae and organic matter in the bottom mud and ooze (TPW 2004).

2.2.4.2 State

The species in Table 2-2 for Doña Ana and Sierra Counties are listed by the New Mexico Department of Fish and Game, and may occur in the Rio Grande watershed between Caballo Dam and El Paso according to the Natural Heritage New Mexico database. The area corresponds to the 8-digit Hydrologic Unit Code (HUC) No. 13030102. The species listed for El Paso County are endangered or threatened and may occur in El Paso County according to the Texas Parks and Wildlife Department.

Table 2-2. New Mexico State Listed Species for Rio Grande Watershed Caballo Dam through El Paso; and Texas State Listed Species for El Paso County

Species Name	State Status	Habitat Presence	Counties Listed
Birds			
American peregrine falcon (<i>Falco peregrinus anatum</i>)	T	2	Doña Ana
Arctic peregrine falcon (<i>Falco peregrinus tundrius</i>)	T	2	El Paso
Broad-billed hummingbird (<i>Cyanthus latirostris</i>)	T	4	Doña Ana
Common black hawk (<i>Buteogallus anthracinus</i>)	T	4	El Paso
Common ground-dove (<i>Columbina passerina</i>)	E	4	Doña Ana; Sierra
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T	5	El Paso
Northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	5	Doña Ana; El Paso
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	E	1	Doña Ana; Sierra; El Paso
Zone-tailed hawk (<i>Buteo albonotatus</i>)	T	4	El Paso
Mollusks			
Dona Ana talussnail (<i>Sonorella todseni</i>)	T	5	Doña Ana
Ovate vertigo (<i>Vertigo ovata</i>)	T	5	Doña Ana; Sierra
Fishes			
Bluntnose shiner (<i>Notropis simus pecosensis</i>)	T	3	El Paso
Mexican tetra (<i>Astyanax mexicanus</i>)	T	3	Doña Ana
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	E	3	Doña Ana; El Paso
Mammals			
Black bear (<i>Ursus americanus</i>)	T	5	El Paso
Black-footed ferret (<i>Mustela nigripes</i>)	E	5	El Paso
Desert bighorn sheep (<i>Ovis canadensis mexicana</i>)	E	5	Doña Ana; Sierra

Table 2-2. New Mexico State Listed Species for Rio Grande Watershed Caballo Dam through El Paso; and Texas State Listed Species for El Paso County

Species Name	State Status	Habitat Presence	Counties Listed
Gray wolf (<i>Canis lupus</i>)	E	5	El Paso
Organ Mountains Colorado chipmunk (<i>Tamias quadrivittatus australis</i>)	T	5	Doña Ana
Reptiles			
Chihuahuan desert lyre snake (<i>Trimorphodon vilkinsonii</i>)	T	4	El Paso
Chihuahuan mud turtle (<i>Kinosternon hirtipes</i>)	T	4	El Paso
Gila monster (<i>Heloderma suspectum</i>)	E	5	Doña Ana
Texas horned lizard (<i>Phrynosoma cornutum</i>)	T	1	El Paso
Trans-Pecos black-headed snake (<i>Tantilla cucullata</i>)	T	4	El Paso
Plants			
Branching penstemon (<i>Penstemon ramosus</i>)	S	5	Doña Ana; Sierra
Mosquito plant (<i>Agastache cana</i>)	S	5	Doña Ana; Sierra
Night-blooming cereus (<i>Peniocereus greggii</i> var. <i>greggii</i>)	E	4	Doña Ana; Sierra
Nodding rockdaisy (<i>Perityle cernua</i>)	S	5	Doña Ana
Organ evening-primrose (<i>Oenothera organensis</i>)	S	5	Doña Ana
Organ Mountain foxtail-cactus (<i>Escobaria organensis</i>)	E	5	Doña Ana
Pink flower flameflower (<i>Talinum longipes</i>)	S	5	Doña Ana; Sierra
Plank's catchfly (<i>Silene plankii</i>)	S	5	Doña Ana; Sierra
Sand prickly-pear (<i>Opuntia arenaria</i>)	E	5	Doña Ana
Smooth bur-cucumber (<i>Sicyos glaber</i>)	S	5	Doña Ana
Smooth figwort (<i>Scrophularia laevis</i>)	S	5	Doña Ana
Sneed's pincushion cactus (<i>Coryphantha sneedii</i> var. <i>sneedii</i>)	E	5	Doña Ana; El Paso
Standley's whitlow-grass (<i>Draba standleyi</i>)	S	5	Doña Ana
Villard's pincushion cactus (<i>Escobaria villardii</i>)	E	5	Doña Ana

Source: Natural Heritage New Mexico 2004

E-endangered, T-threatened, S-Sensitive Plant

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3- species believed to be extirpated from project area; 4- project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project

In addition to the species listed above, a white-faced ibis (*Plegadis chihi*) was spotted in April of 2000 during a field survey on a vegetated sandbar in the Canalization Project area. The white-faced ibis is threatened according to the state of Texas, but is not listed as potentially occurring in El Paso County or in the Rio Grande watershed below Caballo Dam in New Mexico. The Canalization Project provides little of the marsh habitat used for the bird's nesting, but the sandbars and wetlands in the project may be in use for feeding and resting (Parsons 2001).

2.3 Rectification Project

The Rio Grande Rectification Project was constructed between 1934 and 1938 and extends 86 river miles from El Paso to Fort Quitman, Texas. The purpose of the project is to stabilize the international river boundary and to provide flood protection for both countries in urban, suburban, and agricultural areas. The main components of the project were strengthening the river channel by constructing a new channel and developing a floodway by constructing levees on both sides of the river. The channel strengthening process entailed removing meanders and resulted in a reduction in the river length from 155 to 86 miles. The Rectification Project reduced the sinuosity from 2 to 1.1, and increased the gradient to 3.3 ft/mi. The current channel has a sand bed and receives minimal upstream flows, with a base flow created by agricultural returns

and wastewater effluent. Peak flows are a result of the tributary flooding (Fullerton and Batts 2003). From El Paso to Haciendita, Texas, at the start of the Presidio/flood control project, the river is nearly de-watered.

2.3.1 Vegetation Communities

The project lies in the Trans-Pecos region of Texas, in the Chihuahuan biotic province. Natural vegetation is arid and consists of desert shrub communities.

Most of the natural vegetation in the Rio Grande corridor in El Paso and Hudspeth counties has been replaced by cropland and urban development. The natural vegetation community that exists to the east of the Rio Grande is called Mesquite-Sandsage Shrub (*Prosopis glanulosa-Artemisia filifolia*) according to the Texas state system (Texas Parks and Wildlife (TPW) 1984). In Hudspeth County some of the natural vegetation to the east of the Rio Grande is Creosote Bush-Lechuguilla Shrub (*Larrea tridentate-Agave lecheguilla*). Table 2-3 lists plant life that can be found in these communities.

Table 2-3. Plants Typical Of Mesquite-Sandsage Shrub And Creosote Bush-Lechuguilla Shrub

Mesquite-Sandsage Shrub		Creosote Bush-Lechuguilla Shrub	
El Paso and Hudspeth Counties		Hudspeth County	
Black grama	<i>Bouteloua eriopoda</i>	Allthorn	<i>Koeberlinia spinosa</i>
Blue grama	<i>Bouteloua gracilis</i>	Black grama	<i>Bouteloua eriopod)</i>
Broom snakeweed	<i>Gutierrezia sarothrae</i>	Catclaw	<i>Acacia greggii</i>
Chino grama	<i>Bouteloua breviseta</i>	Cenizo	<i>Leucophyllum candidum</i>
Devil's claw	<i>Harpagophytum procumbens</i>	Chino grama	<i>Bouteloua breviseta</i>
Fourwing saltbush	<i>Atriplex canescens</i>	Fuffgrass	<i>Erioneuron pulchellum</i>
Mormon tea	<i>Ephedra trifurca</i>	Guayacan	<i>Guaiaicum angustifolium</i>
Palmella	<i>Palmellales</i>	Javelina bush	<i>Condalia ericoides</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>	Lotebush	<i>Ziziphus obtusifolia</i>
Spike dropseed	<i>Sporobotus cryptandrus</i>	Mariola	<i>Parthenium incanum</i>
Sotol	<i>Dasyilirion wheeleri</i>	Mesquite	<i>Prosopis Sp.</i>
		Ocotillo	<i>Fouqueiria splendens</i>
		Pitaya	<i>Hylocereus undatus</i>
		Pricklypear	<i>Cactoblastis cactorum</i>
		Tasajillo	<i>Opuntia leptocaulis</i>
		Range ratany	<i>Krameria erecta</i>
		Skeletonleaf goldeneye	<i>Viguiera stenoloba</i>
		Tarbush	<i>Flourensia cernua</i>
		Whitebrush	<i>Aloysia gratissima</i>
		Whitethorn acacia	<i>Acacia constricta</i>
		Yucca	<i>Yucca filamentosa</i>

Source: McMahan et al. 1984

In this reach the salt cedar has invaded much of the riparian area, and it has been estimated that only 60 acres of cottonwood-willow remain between El Paso and Candelaria due to soil salinity (Fullerton and Batts 2003).

This remaining cottonwood- willow contains scattered mature or over-mature Fremont cottonwood and Gooding willow. The understory is a dense mix of seepwillow, grasses, forbs and dock. Some screwbean mesquite- wolfberry communities similar to those in the Canalization Project can be found in the reach between El Paso and Candelaria. They are typically in the floodplains outside bands of salt cedar next to the river. Indicator species are black-tailed gnatcatcher (*Polioptila*

melanura), crissal thrasher (*Toxostoma crissale*), loggerhead shrike (*Lanius ludovicianus*) and verdin. In some areas, the upland vegetation has invaded the floodplain creating patches of thorny scrub where soil moisture levels are reduced. The dominant salt cedar community contains trees that exceed 30 feet in height. The same birds that nest in cottonwood-willow communities also use salt cedar. In one study in the Rio Grande Valley, salt cedar supported 489 birds per 100 acres while cottonwood-willow supported 786 birds per 100 acres. White-winged dove (*Zenaida asiatica*) will nest in salt cedar at about 28 nests per acre per nesting season (Fullerton and Batts 2003).

2.3.2 Wildlife Communities

In El Paso and Hudspeth Counties, 7 species of wood warblers, 10 species of sparrows and towhees, 9 species of swans, geese, and ducks, 5 species of tyrant flycatchers, and 50 other bird species can be found. Eleven species of bats, rats, mice and squirrels can be found in the counties, plus 10 other mammal species including deer, gophers, black-tailed jackrabbit (*Lepus californicus*), and desert cottontail (*Sylvilagus auduboni*). Six species of toads, spade-foots, and frogs occur in the counties. In addition, 17 species of reptiles, mostly snakes with some lizards (e.g., several species of whiptails) can be found. Most of the birds occur in riparian environments, while most of the other animals occur mainly in desert and grassland areas (USACE 1999).

In the Rio Grande between El Paso and Alamito Creek near Presidio, fish species include 22 native species and four introduced species. These include a variety of gars, herrings, carps, minnows, suckers, characins, bullhead catfishes, pupfishes, livebearers, and silversides. Many of these are considered relatively common (USACE 1999).

Burrowing owls (*Athene cunicularia*) have been observed by Texas Parks and Wildlife personnel living in burrows in the levees of the Rectification project. The Western burrowing owl (*Athene cunicularia hypugaea*) is listed by the Texas Parks and Wildlife Department as a rare species.

2.3.3 Threats to Vegetation and Wildlife Communities

Flow in the Rio Grande in the Rectification Project is interrupted on a seasonal basis. Periods of complete dryness are a challenge for aquatic and other water-dependent wildlife. Salinity can reach high levels when there is water in the river. Flows are released from the Elephant Butte Reservoir during irrigation season with little of the variation that would be typical of a natural stream hydrograph. The primary abiotic and biotic process needed for a functioning riparian habitat include scouring floods, sediment transport, overbank spring floods that flush salts and enhance seed dispersion, and native plant seed sources (Fullerton and Batts 2003). The same drawbacks due to human activities and development as in the Canalization Project also apply for this stretch of the river.

The downstream end of the project is highly salt-cedar dominant, providing less wildlife habitat than would a native riparian community.

2.3.4 Endangered and Threatened Species

2.3.4.1 Federal

The project lies in two Texas counties: El Paso and Hudspeth. Approximately half of the river miles in the project are in El Paso County and half are in Hudspeth County.

Based on the Endangered Species Act of 1973, four federally listed endangered species may occur in El Paso or Hudspeth Counties, as well as one federally listed threatened species and one federally listed candidate species. Not all species on the federal or state list for El Paso and Hudspeth Counties share the same probability of occurring in the county. Some are migrants and may only pass through the county seasonally. Others are only known to occur in the county historically, or are considered extirpated. There are no federally designated critical habitats in the project area. The federally listed species and their classifications are presented in Table 2-4. The “habitat presence” classifications are based on available previous studies, general knowledge of the typical habitat of the species, and of typical conditions along the Rio Grande in the project area. They describe the general conditions of the project as a whole and are not meant to replace the results of field surveys.

Table 2-4. Federally Listed Species for El Paso and Hudspeth Counties

Species Name	Federal Status	Habitat Presence	Counties Listed
Birds			
Interior least tern (<i>Sterna antillarum</i>)	E	2	El Paso
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T	5	El Paso; Hudspeth
Northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	5	El Paso; Hudspeth
Southwestern willow flycatcher (<i>Empidonax traillii estimus</i>)	E	1	El Paso; Hudspeth
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	C	4	El Paso; Hudspeth
Plants			
Sneed pincushion cactus (<i>Coryphantha sneedii</i>)	E	5	El Paso

Source: United States Fish & Wildlife Service 2004

E-endangered, T-threatened, C-candidate

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3-habitat exists in project but is disturbed and may be unusable; 4-project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project; 6-species believed to be extirpated from project area

The interior least tern lives on river sandbars and beaches. The southwestern willow flycatcher breeds in dense riparian habitats that include shrubs and medium sized trees, including willow, cottonwood, and mesquite (USIBWC 2004). The Mexican spotted owl lives in coniferous woodlands with dense vegetation, rocky areas, or caves. The northern aplomado falcon tends to live in open woodland or savannah, or grassy plains and valleys with scattered mesquite, yucca, and cactus. The yellow-billed cuckoo lives in riparian areas with cottonwood, willow, mesquite, and hackberry (TPW 2004).

The sneed pincushion cactus grows in dry limestone outcrops on rocky slopes in Chihuahuan Desert mountains (TPW 2004).

2.3.4.2 State

There are six endangered species listed by the State of Texas that may occur in El Paso or Hudspeth Counties, as well as ten threatened species. These species and their classifications are presented in Table 2-5.

Table 2-5. Texas State Listed Species for El Paso and Hudspeth Counties

Species Name	State Status	Habitat Presence	Counties Listed
Birds			
Arctic peregrine falcon (<i>Falco peregrinus tundrius</i>)	T	2	El Paso; Hudspeth
Common black hawk (<i>Buteogallus anthracinus</i>)	T	4	El Paso; Hudspeth
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T	5	El Paso; Hudspeth
Northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	5	El Paso; Hudspeth
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	E	1	El Paso; Hudspeth
Zone-tailed hawk (<i>Buteo albonotatus</i>)	T	4	El Paso; Hudspeth
Fishes			
Bluntnose shiner (<i>Notropis simus pecosensis</i>)	T	3	El Paso; Hudspeth
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	E	3	El Paso; Hudspeth
Mammals			
Black bear (<i>Ursus americanus</i>)	T	5	El Paso; Hudspeth
Black-footed ferret (<i>Mustela nigripes</i>)	E	5	El Paso; Hudspeth
Gray wolf (<i>Canis lupus</i>)	E	5	El Paso; Hudspeth
Reptiles			
Chihuahuan desert lyre snake (<i>Trimorphodon vilkinsonii</i>)	T	4	El Paso; Hudspeth
Chihuahuan mud turtle (<i>Kinosternon hirtipes</i>)	T	4	El Paso; Hudspeth
Texas horned lizard (<i>Phrynosoma cornutum</i>)	T	4	El Paso; Hudspeth
Trans-Pecos black-headed snake (<i>Tantilla cucullata</i>)	T	4	El Paso; Hudspeth
Plants			
Sneed pincushion cactus (<i>Coryphantha sneedii</i> var. <i>sneedii</i>)	E	5	El Paso

Source: TPW 2004

E-endangered, T-threatened

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3- species believed to be extirpated from project area; 4-project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project

Habitats for the above State listed species are described below, except for those that were already described in the previous section on Federally listed species.

The Arctic peregrine falcon stops in Texas twice a year during migration to the coast. The common black hawk and zone-tailed hawk tend to inhabit the banks of waterways and floodplains (TPW 2004).

The black bear has historically inhabited Louisiana and eastern Texas, in large tracts of undeveloped forest, but can also inhabit desert lowlands. The black-footed ferret lives in the same areas as prairie dogs. Black-footed ferrets historically occurred over much of New Mexico and northern and western Texas. They are now rarely observed. Black-footed ferrets prefer prairie dog towns where they prey upon the inhabitants. Destruction of prairie dog towns has undoubtedly led to adverse impacts on black-footed ferrets. The gray wolf inhabits forests, brushlands, or grasslands (TPW 2004).

The Chihuahuan desert lyre snake lives in limestone-surfaced desert, mostly in crevices. The Chihuahuan mud turtle is semi-aquatic. The Texas horned lizard lives in open arid and semi-arid regions with sparse vegetation including areas of cactus and brush. The Trans-Pecos black-headed snake lives in mesquite-creosote and piñon-juniper-oak communities.

2.4 Presidio Project

The Presidio Project lies within the Presidio-Ojinaga valley formed by the Rio Grande from Haciendita to the confluence with the Brito Creek, a distance of about 13 miles. The total levee length, including spur levees is 15.2 miles. The Rio Conchos, the largest tributary to the international section of the Rio Grande, and the Rio de la Zanja join the Rio Grande from Mexico in this reach, while Cibolo Creek joins the Rio Grande from Presidio County in Texas. Just downstream of the Presidio Project, Alamito Creek also joins the Rio Grande from Presidio County.

The Flood Protection Project was implemented based on IBWC Minute 247, adopted in February 7, 1975. The purpose of this project was to protect productive agricultural lands in the Presidio-Ojinaga Valley against frequent flooding. In addition, the project was intended to establish the international boundary per the Boundary Treaty of 1970. The project provided flood protection by augmenting the capacity of the river channel through the construction of cleared berms and levees on both sides of the river. A rectification also took place at the time of project construction, reducing the channel length by about 6.3 miles.

Sections 2.4.1 and 2.4.2 provide descriptions of vegetation and wildlife communities, respectively, based on recent and historical information obtained from the literature. These descriptions are supplemented by recent onsite observations made during the June 2005 biological survey conducted for the Presidio project. The results of this survey are summarized in Section 2.4.5, with additional information presented in Appendices C (list of species observed) and D (photo log). Section 2.4.3 discusses general threats to vegetative and wildlife communities, and Section 2.4.4 reveals the federal and state species of concern for the project area.

2.4.1 Vegetation Communities

The area is situated in the Trans-Pecos region of Texas, which lies within the Chihuahuan biotic province. The elevation in Presidio ranges from 2,555 feet at the Rio Grande to 2,840 feet on the East Mesa to the southwest. The climate in this area is arid, hot during the summer and cold during the winter. Average annual rainfall is about 10 inches, with 65 to 80 percent of the annual precipitation normally falling between June and September. January through May is the driest time of year (Parsons 2002).

Four primary vegetation community types can be found in the floodplain (USIBWC 1978):

- Salt cedar community – salt cedar dominant
- Cottonwood-willow community – salt cedar dominant with cottonwood and willow

- Screwbean mesquite-wolfberry community – screwbean mesquite, honey mesquite, and wolfberry dominant
- Thorny shrub – variety of desert shrubs

A more recent account says that the vegetation along the Rio Grande is mostly creosote and mesquite with little or no understory, and that further from the river there is yucca, prickly pear, agave, Spanish dagger (*Yucca treculeana*), mesquite, and occasional ocotillos (Parsons 2002).

The Texas State System is another method for classifying vegetation communities. The vegetation that has not been replaced by cropland or urban development along the Rio Grande is classified as Mesquite-Saltcedar Brush/Woods (*Proposis glanulosa-Tamarix*) according to the Texas State System (Texas Parks and Wildlife (TPW) 1984). To the east of the Rio Grande is Creosote Bush-Lechuguilla Shrub (*Larrea tridentate-Agave lecheguilla*). Table 2-6 lists plant life that can be found in these communities.

Table 2-6. Plants Typical Of Mesquite-Saltcedar Brush/Woods And Creosote Bush-Lechuguilla Shrub

Mesquite-Saltcedar Brush/Woods		Creosote Bush-Lechuguilla Shrub	
Adjacent to Rio Grande		East of Rio Grande	
Alkali sacaton	<i>Sporobolus airoides</i>	Allthorn	<i>Koeberlinia spinosa</i>
Australian saltbush	<i>Atriplex semibaccata</i>	Black grama	<i>Bouteloua eriopod</i>
Burrobrush	<i>Hymenoclea monogyra</i>	Catclaw	<i>Acacia greggii</i>
Bushy bluestem	<i>Andropogon glomeratus</i>	Cenizo	<i>Leucophyllum frutescens</i>
Cattail	<i>Typha spp. L.</i>	Chino grama	<i>Bouteloua breviseta</i>
Chino grama	<i>Bouteloua ramose</i>	Fuffgrass	<i>Erioneuron pulchellum</i>
Common buttonbush	<i>Cephalanthus occidentalis</i>	Guayacan	<i>Guaiaacum angustifolium</i>
Cottonwood	<i>Populus deltoids</i>	Javelina bush	<i>Condalia ericoides</i>
Creosotebush	<i>Larrea tridentate</i>	Lotebush	<i>Ziziphus obtusifolia</i>
Desert willow	<i>Chilopsis liniaris</i>	Mariola	<i>Parthenium incanum</i>
Fourwing saltbush	<i>Atriplex canescens</i>	Mesquite	<i>Prosopis Sp.</i>
Giant reed	<i>Heracleum mantegazzianum</i>	Ocotillo	<i>Fouqueiria splendens</i>
Guayacan	<i>Guaiaacum angustifolium</i>	Pitaya	<i>Hylocereus undatus</i>
Johnsongrass	<i>Sorghum halepense</i>	Pricklypear	<i>Cactoblastis cactorum</i>
Lotebush	<i>Ziziphus obtusifoli</i>	Tasajillo	<i>Opuntia leptocaulis</i>
Mexican devil-weed	<i>Ageratina adenophora</i>	Range ratany	<i>Krameria erecta</i>
Tasajillo	<i>Cylindropuntia leptocaulis</i>	Skeletonleaf goldeneye	<i>Viguiera stenoloba</i>
Saltgrass	<i>Distichlis spicata</i>	Tarbrush	<i>Flourensia cernua</i>
Seepwillow	<i>Baccharis salicifolia</i>	Whitebrush	<i>Aloysia gratissima</i>
Whitethorn acacia	<i>Acacia constricta</i>	Whitethorn acacia	<i>Acacia constricta</i>
Wolfberry	<i>Acacia angustissima</i>	Yucca	<i>Yucca filamentosa</i>

Source: McMahan et al. 1984

2.4.2 Wildlife Communities

Mammals typical of the area are desert pocket gopher, yellow-faced pocket gopher (*Cratogeomys castanops*), Nelson’s kangaroo rat, Nelson’s pocket mouse, southern grasshopper mouse (*Onychomys torridus*), Goldman’s woodrat (*Neotoma goldmani*), Texas antelope squirrel (*Ammospermophilus interpres*), desert pocket mouse (*Perognathus longimembris*), desert shrew (*Notiosorex crawfordi*), desert mule deer (*Odocoileus hemionus crooki*), pronghorn (*Antilocapra Americana*), desert bighorn sheep (*Ovis canadensis spp.*), merriam’s kangaroo rat (*Dipodomys merriami*), and desert cottontail. The most common birds in the region are scaled quail and white-necked raven. Other birds include mourning dove, roadrunner, lesser nighthawk, Scott’s oriole, cactus wren, curve-billed thrasher, and black-throated sparrow. Typical

reptiles are Texas banded gecko, reticulated gecko (*Coleonyx switaki*), greater earless lizard (*Cophosaurus texanus*), several species of spiny lizard, fringe-footed lizard (*Uma inornata*), little striped (*Cnemidophorus inornatus*) and marbled whiptails, Trans-Pecos ratsnake, western hooknose snake, Texas black-headed snake, whipsnake, western diamondback rattlesnake, and Bolson tortoise (*Gopherus flavomarginatus*) (Parsons 2002).

In the Rio Grande between El Paso and Alamito Creek downstream of Presidio and the Rio Conchos are found 22 native fish species and four introduced fish species. Relatively common types of fish include gars, herrings, carps, minnows, suckers, characins, bullhead catfishes, pupfishes, livebearers, and silversides (USACE 1999).

The most common fish species collected in 1977 from the Rio Grande in Hudspeth and Presidio Counties were red shiner (*Notropis lutrensis*), common carp, gizzard shad, mosquitofish, and green sunfish. The red shiner was the most abundant of these five species. Other species collected were channel catfish, blue catfish (*Ictalurus furcatus*), longear sunfish, and white bass (*Morone chrysops*). The density and diversity of fish upstream of the Rio Conchos was considered low in 1977. This was thought to be because of high salinity in the Rio Grande and periodic drought conditions that dried up portions of the river (USIBWC 1978).

Ten species of aquatic snails, four species of bivalve mollusks and one species of terrestrial crustacean, were identified in the Rio Grande in Hudspeth and Presidio Counties in 1978. Nine species of xeric land snails were also found in the Rio Grande floodplains (USIBWC 1978).

The diversity of aquatic invertebrates in the Rio Grande is low in much of Hudspeth and Presidio Counties, but improves in the Presidio project area because just upstream of Haciendita the river receives return agricultural flows from lands irrigated with the Rio Conchos. The Rio Conchos water provides a more stable habitat for aquatic fauna, with fewer drought events. Four species of mollusks, *Anodonta imbecillis*, *A. musculium transversum*, *A. antillorbis sonorensis*, and *A. micromenetus dilatatus*, were found only in a 2-mile reach just upstream of Haciendita during the 1977 study.

2.4.3 Threats to Vegetation and Wildlife Communities

Upstream of the confluence with the Rio Conchos, flow in the Rio Grande is interrupted on a seasonal basis. Periods of complete dryness are a challenge for aquatic and other water-dependent wildlife. Salinity can reach high levels when there is water in the river. Flows at Candelaria, about 50 miles upstream of Presidio, are believed to be one-tenth the pre-development levels (Fullerton and Batts 2003). High pesticide levels have been found near the confluence with the Rio Conchos (WWF et al. 2001).

Non-native fish such as bluegill and carp threaten the native fish species and environment in the Rio Grande. Exotic species such as salt cedar negatively affect the flood plains.

Activities in the Rio Conchos watershed such as timber harvesting, agriculture, road construction and mining, as well as urban and industrial development influence water quantity and quality in the Rio Grande downstream of the confluence. Along the Rio Grande, development, channelization and water diversion have negatively affected the river and the floodplain (WWF et al. 2001).

2.4.4 Threatened and Endangered Species

2.4.4.1 Federal

Based on the Endangered Species Act of 1973, three federally listed endangered species may occur in Presidio County, as well as two federally listed threatened species and one federally listed candidate species. Not all species on the federal or state list for Presidio County share the same probability of occurring in the county. Some are migrants and may only pass through the county seasonally. Others are only known to occur in the county historically, or are considered extirpated. There are no federally designated critical habitats in the project area. The federally listed species and their classifications are presented in Table 2-7. The “habitat presence” classifications are based on available previous studies, general knowledge of the typical habitat of the species, and of typical conditions along the Rio Grande in the project area. They describe the general conditions of the project as a whole and are not meant to replace the results of field surveys.

Table 2-7. Federally Listed Species for Presidio County

Species Name	Federal Status	Habitat Presence	County Listed
Birds			
Northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	4	Presidio
Southwestern willow flycatcher (<i>Empidonax traillii estimus</i>)	E	1	Presidio
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	C	4	Presidio
Plants			
Hinckley oak (<i>Quercus hinckleyi</i>)	T	5	Presidio
Lloyd’s mariposa cactus (<i>Echinomastus mariposensis</i>)	T	5	Presidio
Mammals			
Mexican Long-nosed Bat (<i>Leptonycteris nivalis</i>)	E	5	Presidio

Source: United States Fish & Wildlife Service 2004

E-endangered, T-threatened, C-candidate

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3-habitat exists in project but is disturbed and may be unusable; 4-project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project; 6-species believed to be extirpated from project area

The southwestern willow flycatcher breeds in dense riparian habitats that include shrubs and medium sized trees, including willow, cottonwood, and mesquite (USIBWC 2004). The northern aplomado falcon tends to live in open woodland or savannah, or grassy plains and valleys with scattered mesquite, yucca, and cactus. The yellow-billed cuckoo lives in riparian areas with cottonwood, willow, mesquite, and hackberry (TPW 2004).

Hinckley oak can be found on arid limestone slopes in the Chihuahuan Desert (TPW 2004). Lloyd’s mariposa cactus grows in creosote-lechuguilla shrublands on rocky, gravelly soils on arid slopes and flats in the Chihuahuan Desert.

The only known colony of Mexican long-nosed bats in the United States is found in a large cave on Mt. Emory in Big Bend National Park, over 50 miles to the southeast.

2.4.4.2 State

There are seven endangered species listed by the State of Texas that may occur in Presidio County, as well as fifteen threatened species. These species and their classifications are presented in Table 2-8.

Table 2-8. Texas State Listed Species for Presidio County

Species Name	State Status	Habitat Presence	County Listed
Birds			
Arctic peregrine falcon (<i>Falco peregrinus tundrius</i>)	T	2	Presidio
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T	5	Presidio
Northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	4	Presidio
Southwestern willow flycatcher (<i>Empidonax traillii estimus</i>)	E	1	Presidio
Zone-tailed hawk (<i>Buteo albonotatus</i>)	T	4	Presidio
Fishes			
Blue sucker (<i>Cycleptus elongatus</i>)	T	5	Presidio
Bluntnose shiner (<i>Notropis simus pecosensis</i>)	T	5	Presidio
Chihuahua shiner (<i>Notropis Chihuahua</i>)	T	1	Presidio
Conchos pupfish (<i>Cyprinodon eximius</i>)	T	4	Presidio
Mexican stoneroller (<i>Campostoma ornatum pricei</i>)	T	5	Presidio
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	E	3	Presidio
Mammals			
Black bear (<i>Ursus americanus</i>)	T	5	Presidio
Black-footed ferret (<i>Mustela nigripes</i>)	E	5	Presidio
Gray wolf (<i>Canis lupus</i>)	E	3	Presidio
Greater long-nosed bat (<i>Leptonycteris nivalis</i>)	E	5	Presidio
Reptiles			
Chihuahuan desert lyre snake (<i>Trimorphodon vilkinsonii</i>)	T	4	Presidio
Chihuahuan mud turtle (<i>Kinosternon hirtipes</i>)	T	4	Presidio
Reticulated gecko (<i>Coleonyx reticulata</i>)	T	1	Presidio
Texas horned lizard (<i>Phrynosoma cornutum</i>)	T	1	Presidio
Trans-Pecos black-headed snake (<i>Tantilla cucullata</i>)	T	4	Presidio
Plants			
Hinckley's oak (<i>Quercus hinckleyi</i>)	T	5	Presidio

Source: TPW 2004

E-endangered, T-threatened

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3- species believed to be extirpated from project area; 4-project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project

Habitats for the above State listed species are described below, except for those that were already described in the previous section on Federally listed species.

The Arctic peregrine falcon stops in Texas twice a year during migration to the coast. The Mexican spotted owl lives in coniferous woodlands with dense vegetation, rocky areas, or caves. The zone-tailed hawk tends to inhabit the banks of waterways and floodplains (TPW 2004).

The blue sucker inhabits channels and flowing pools with a moderate current, usually with an exposed bedrock bottom, sometimes combined with hard clay, sand or gravel. The bluntnose shiner lives in main river channels, often under obstructions and over bottoms of sand, gravel and silt. The Chihuahua shiner inhabits creeks and small rivers in the Big Bend region, or sandy and rocky pools. The Conchos pupfish inhabits the channels and mouths of creeks, or sloughs, backwaters and margins of larger streams. The Mexican stoneroller lives in the Big Bend region in clear, fast riffles, chutes, and pools of small to medium sized creeks with gravel or sand bottoms. The Rio Grande silvery minnow is considered extirpated from Presidio County, but historically inhabited the Rio Grande and Pecos river systems (TPW 2004).

The black bear has historically inhabited Louisiana and eastern Texas, in large tracts of undeveloped forest, but can also inhabit desert lowlands. The black-footed ferret lives in the same areas as prairie dogs. Black-footed ferrets historically occurred over much of New Mexico and northern and western Texas. They are now rarely observed. Black-footed ferrets prefer prairie dog towns where they prey upon the inhabitants. Destruction of prairie dog towns has undoubtedly led to adverse impacts on black-footed ferrets. The gray wolf inhabits forests, brushlands, or grasslands. The greater long-nosed bat is a cave-dweller inhabiting deep caverns in the Big Bend region (TPW 2004).

The Chihuahuan desert lyre snake lives in limestone-surfaced desert, mostly in crevices. The Chihuahuan mud turtle is semi-aquatic. The reticulated gecko lives in rocky desert areas of the Big Bend region. The Texas horned lizard lives in open arid and semi-arid regions with sparse vegetation including areas of cactus and brush. The Trans-Pecos black-headed snake lives in mesquite-creosote and piñon-juniper-oak communities.

2.4.5 Biological Survey - June 2005

A biological survey was conducted on June 22 and 23 by USIBWC and CDM staff. The purpose of this survey was to document the current conditions of the project area relative to biological resources. Tasks included describing the major vegetative communities; observing animal species present onsite; assessing habitat type, suitability, and availability for species of concern; and describing factors affecting habitat quality. Both aquatic and terrestrial biota were observed, and a simple screening level sampling of the aquatic ecosystem was conducted at multiple sampling locations in the Rio Grande within the project area.

Appendix C provides a list of all bird species observed during the two-day survey. The dominant plant communities and other vertebrates observed are discussed below. Appendix D is a log of photographs taken during the two-day biological survey.

The survey was conducted within the Rio Grande riparian area. Photo 3 provides a general view of the riparian area along the Rio Grande, Photo 4 shows the confluence of the Rio Grande and the Rio Conchos. Photo 7 shows the Rio Grande at the International Bridge connecting Presidio and Ojinaga.

The surveyed area included the United States side of the Rio Grande from near the Haciendita Cemetary northwest of Presidio downstream to approximately Alamito Creek, a distance of about 13.5 miles. The lateral extension of the survey was the United States/Mexican International Boundary to the limits of the USIBWC right-of-way near the base of the levee opposite the Rio Grande. Air temperatures during the survey ranged from about 68°F in the early morning to over 100°F in the afternoon. The survey was conducted during dry sunny weather, but a significant rain event occurred within the upper watershed 48-72 hours prior to the survey. On the afternoon of the first day of the survey the flow in the Rio Grande increased substantially as a result of this rain event in the upper watershed. Aquatic sampling was completed at low flow conditions, prior to the significant flow increase from the aforementioned rain event.

2.4.5.1 Aquatic Ecosystem Observation

The biological resources of the Rio Grande within the project area were assessed using a two-step approach. These include the following:

- Observe and record aquatic and riparian habitat quality using a Low Gradient Stream Habitat Field Data Sheet designed specifically for arid western environments.
 - These data sheets allow for documentation of flow conditions (e.g., dry season, low flow; ephemeral); substrate; pool/riffle/run data; channel morphology, and riparian and bank structure.
 - A quantitative score is derived for each sampling station, and these scores reflect aquatic/riparian habitat quality ratings for Poor, Good, or Excellent.
- Conduct timed kick-net sampling to derive a list of the types of aquatic macroinvertebrates occurring at each location.
 - These Screening Level Field Investigation forms allow documentation of relative total abundance (number of individual organisms per timed sample) and diversity (number of taxa) of benthic macroinvertebrates collected within the timed sampling time.
 - Any other biota observed while conducting the aquatic sampling are also noted on these forms.
 - Sampling was conducted for one minute at each sampling station, based on the results of sampling at the most upstream station (shorter times resulted in too few organisms and longer times resulted in too many organisms to count or identify).

Sampling was conducted at four stations, and these are:

- RG-1 (Rio Grande-1) – downstream of the confluence of Arroyo Chillon with the Rio Grande, just downstream of Haciendita Cemetary (Photo 1).
- RG-2 – downstream of RG-1, at the gauging station, upstream of Rio Conchos (Photo 2)

- RG-3 – downstream of RG-2, just downstream of Cibolo Creek (Photos 5 and 6)
- RG-4 – downstream of RG-3, at the confluence of Alamito Creek (Photos 8 and 9)

The quantitative results of these sample collections are presented in Table 2-9 below.

Table 2-9. Results of Aquatic Sampling / Habitat Scoring

Sampling Station	Habitat Score (1-63)	Total No. of Organisms	Total No. of Taxa	Other Observations
RG-1	35 (good)	TNTC (14)	8	Bullfrog (<i>Rana catesbiana</i>) Channel catfish (<i>Ictalurus punctatus</i>)
RG-2	37 (good)	TNTC (15)	10	Rio Grande spiny softshell turtle (<i>Apalone spinifera emoryi</i>)
RG-3	42 (good)	TNTC (16)	11	
RG-4	47 (excellent)	TNTC (26)	11	Bullfrog (<i>Rana catesbiana</i>) Red-spotted toad (<i>Bufo punctatus</i>) Rana sp. (presumptive <i>R. berlandieri</i>) Big Bend slider (<i>Trachemys gaigeae</i>)

TNTC – too numerous to count (4 mayfly taxa, all stations, and caddisflies at RG-2)
Value in parentheses following TNTC reflects the total number of organisms not including mayflies (all stations) or caddisflies (RG-2)

The results of the aquatic sampling and habitat descriptions reveal small differences in habitat quality from upstream to downstream, with improvements noted at each successive downstream station. These improvements are mostly based on diversity of microhabitat, such as presence of riffles, runs, and pools as well as diversity in substrate (e.g., sand, gravel, cobble, and boulders). Varying degrees of erosion also decreases the scores in the upper stations. Decreased input from Mexico may be a factor, especially with water quality. However, the physical habitat of RG-4 (nice cobble/boulder/gravel substrates, meanders, etc.) are also probably factors. Finally, being that far downstream of both Ojinaga and Presidio allows for considerable recovery from developed areas, where water quality and sedimentation probably are issues.

All stations are associated with a similar abundance and mix of aquatic invertebrates. At least four types of mayflies dominate all stations, and in all cases these were too numerous to count (>200 organisms/1-minute sample). Other than mayflies, the most abundant types of invertebrates differed between stations. At RG-1, beetles and dipterans were most abundant (not counting mayflies). At RG-2, caddisflies were most abundant, followed by beetles and dragonfly larvae. At RG-3, approximately equal numbers of caddisflies, dipterans, and dragonflies were collected. Finally, at RG-4 dragonfly and damselfly larvae were most abundant (not counting mayflies).

Hemipterans (true bugs, in this case water boatman) were also found at RG-4 but not at the other locations. Organisms generally typical of those found in nutrient-enriched waters were common at all locations, but were most abundant at RG-2. A source of nutrient enrichment was not determined, but the presence of abundant (TNTC) caddisflies and dark, fine-grained silt and odors characteristic of animal or human waste suggests nutrient inputs at or upstream of this station.

Aquatic or water-dependent vertebrates (other than birds) observed at or immediately adjacent to the aquatic sampling locations include channel catfish (RG-1, 2 carcasses), mosquitofish (RG-4), unidentified cyprinid fish (RG-4), bullfrog (heard at RG-1 and RG-4), an unidentified ranid frog (presumptive Rio Grande leopard frog (*Rana berlandieri*, RG-4)), Big Bend slider (RG-4), red-spotted toad (abundant at RG-4), checkered garter snake (*Thamnophis marcianus*, between RG-2 and RG-3), and Texas spiny softshell (RG-4).

In summary, the aquatic sampling indicates good to excellent aquatic habitat quality, with the (slightly) higher quality stations most downgradient. Benthic macroinvertebrate abundance and diversity indices are similar at all stations, with a few relatively minor differences noted. Primary among these are changes in bottom substrates from one station to another. Those stations with the highest quality substrates (RG-3 and RG-4) generally reflect overall higher scores for habitat and slightly better findings for macroinvertebrate abundance and diversity. No state or federal species of concern were observed during this survey.

2.4.5.2 Terrestrial Ecosystem Observations

The terrestrial environment surveyed included the narrow riparian zone along the U.S. side of the Rio Grande from about Arroyo Chillon to Alamito Creek. This narrow zone is bounded by the Rio Grande and by the USIBWC right-of-way boundary that generally follows the levee. The USIBWC right-of-way boundary is most often identified as a fence near and along the non-river side of the levee. The remnants of oxbows are apparent distant from the levee in at least two locations, and these held water at the time of the survey.

The primary plant communities observed in June 2005 include mesquite, willow, and salt cedar thickets immediately adjacent to the Rio Grande. In some areas non-native salt cedar is clearly the dominant vegetative species, while in others mesquite, willow, Russian thistle, and/or salt cedar are abundant and mixed. Disturbed areas more distant from the river are often vegetated with nearly pure stands of Russian thistle. Occasional cottonwoods and palo verde (*Cercidium sp*) are also found in this riparian zone.

Beyond the riparian zone are disturbed areas consisting primarily of roads and levees. On the non-river side of the levee are found agricultural areas, a golf course, residences, and limited amounts of natural habitats. The latter is identified by a relatively diverse vegetative community comprised primarily of various taxa of creosote, yucca, and cacti.

Vertebrates observed during the June 2005 field survey from within the boundaries of or immediately adjacent to the project area included bobcat, hispid cotton rat

(*Sigmodon hispidus*), desert cottontail, black-tailed jackrabbit, raccoon (tracks and scat), ground squirrel, presumptive either spotted ground squirrel or rock squirrel. Other mammals observed outside the project area during the June 2005 field survey include mule deer wild boar (feral pig, *Sus Scrofa*), and javalina or collard peccary (*Pecari tajacu*). Also observed were a wide variety of birds (see Appendix C for a list of all bird species observed). Especially abundant were Swainson's hawk (*Buteo swainsoni*, along the levee and in the adjacent agricultural areas), roadrunner, mourning dove, turkey vulture (*Cathartes aura*), and northern mockingbird (*Mimus polyglottos*).

No state or federal species of concern were observed during this survey. Observed habitats include some that may be suitable for certain species of concern. For example, some of the heavily wooded riparian areas appear at least marginally suitable for southwestern willow flycatcher, but none were observed. The habitat near RG-4 where Alamito Creek enters the Rio Grande appears suitable for the least tern, but none were observed. In addition, this area appears to be outside the expected geographic range of the least tern. The Texas horned lizard might find suitable habitat in a few limited areas where non-native vegetation has not degraded the habitat, but none were observed. Finally, no nocturnal species, such as nocturnal rodents, bats, etc. were observed because the survey was conducted only during daylight hours. The presence or absence of species that are primarily nocturnal cannot therefore be evaluated based on this focused survey.

2.4.5.2 Observed/Potential Threats to Biological Resources

The aquatic environment appears to be most impacted by sedimentation, which is to some extent unavoidable in this region given the climate and soil type. Other impacts are likely to include human and/or animal waste from untreated or marginally treated wastewater, industrial waste from Ojinaga and/or Presidio, and channelization/bank disturbance on either side of the Rio Grande. Aquatic biota that occur in this reach of the Rio Grande are probably adapted to the rapid and seasonally frequent and severe changes in flow. Some individual organisms utilizing the riparian areas may be affected by rapidly rising waters, but such effects are likely to be minor.

For the most part, the riparian habitats are vegetated with a mixture of native and non-native species. In some areas, non-native species such as salt cedar and Russian thistle are dominant species. The unvegetated areas are regularly disturbed by U.S. Border Patrol activities. For example, the Border Patrol drags large truck tires behind a vehicle in the areas between the narrow riparian river bank and the levee to reveal locations where border crossings have taken place. These regular disturbances probably preclude use of these otherwise suitable areas by small burrowing mammals, lizards, and other local wildlife.

Several types of terrestrial organisms that are expected to be common in this area, given the availability of apparently suitable habitat, are notably absent. For example, no lizards were observed at any location within the project area. Various whiptail species (*Cnemidophorus sp.*) would clearly find suitable habitat within the project area, and their absence is curious. However, the very abundant roadrunner population might account for this finding.

The levee and system of dirt roads within the project area can be viewed as disturbed areas from a habitat quality viewpoint. Maintenance of the levee (e.g., brush removal at the toe) and road grading probably results in short-term disturbances that are unlikely to result in significant population or community level impacts.

2.5 Lower Rio Grande Flood Control Project

The Lower Rio Grande Flood Control Project (LRGFCP) extends approximately 180 miles from Peñitas, Texas to the mouth of the river in the Gulf of Mexico. The project was the result of a 1932 agreement between the United States and Mexico to provide flood protection to urban, suburban, and agricultural lands in both countries. The LRGFCP consists of the river channel, flood levees in each country, two diversion dams and off-river floodways in Mexico and the United States. The off-river floodway in the United States begins at the Anzalduas Dam in Hidalgo County and splits into the North Floodway and Arroyo Colorado, both of which pass through Cameron County and end at the Gulf of Mexico in Willacy County. Other components of the project include irrigation weirs, pump intakes, highway and railroad bridges, river gauges, and farm levees.

Various wildlife refuges and parks in the Lower Rio Grande Valley provide habitat for wildlife and recreational opportunities. The Lower Rio Grande Valley National Wildlife Refuge (NWR) is formed by over 100 tracts of land along the United States side of the Rio Grande between the Falcon Dam and the Gulf of Mexico. The total land area of the refuge is 90,000 acres, with tracts in Cameron, Hidalgo, Starr, and Willacy counties. It features 11 distinct biotic communities within the refuge, with a copious and diverse wildlife community (United States Fish and Wildlife Service 2001). As of 2000, the USFWS estimated that the refuge's land holdings included 44 tracts within the USIBWC levee system, totaling about 9,965 acres. Many of these tracts of land are actively farmed, but the NWR is restoring about 750 to 1,000 acres per year to native brush. In 2000, thirty thousand acres of land in the NWR was in need of revegetation (USFWS 2003).

The Falcon State Park is a 573 acre park situated at the south end of Falcon Lake, upstream of the LRGFCP. The park provides opportunities for camping, swimming, fishing, water skiing, boating, and hiking.

The Santa Ana NWR is nestled in a bend of the Rio Grande on an 2,088 acre site about 7.5 miles east of the Hidalgo International Bridge, and is contained entirely within the LRGFCP levee system. Like the Lower Rio Grande Valley NWR, it hosts a diverse wildlife community including some endangered species (United States Fish and Wildlife Service 2001).

The Laguna Atascosa NWR is a 45,000 acre refuge just south of the mouth of the Colorado Floodway at Laguna Madre.

The Bentsen-Rio Grande Valley State Park is located about 9.3 miles to the northwest of the Hidalgo International Bridge, on the banks of the Rio Grande, and is also contained entirely within the LRGFCP levee system. The 588 acre refuge hosts a

similarly diverse wildlife community to the national refuges, but in a subtropical resaca woodland and thicket brush land environment.

The Boca Chica State Park is an undeveloped beach located at the far east end of Highway 4, just north of the mouth of the Rio Grande.

The Anzalduas County Park is located at the Anzalduas Dam and provides wildlife habitat and recreational opportunities including boating access.

The Sabal Palm Grove Sanctuary, located on the Rio Grande southeast of Brownsville and entirely within the USIBWC levee system, contains 172 acres of the best preserved Texas sabal palm forest in the United States. The Sanctuary contains mature vegetation with understory up to five feet tall that acts as a protected staging area and benefits the survival of ocelots and jaguarondi (USIBWC 1992).

The Las Palomas Wildlife Management Area contains 7,686 acres spread among various tracts in Cameron, Hidalgo, Starr, Willacy, and Presidio counties. Five of these tracts, containing about 864 acres, are within the LRGFCP levee system. Native brush vegetation as well as farmland and wetland are contained within the area.

Two major rivers feed the Rio Grande on the Mexican side between the Falcon Dam and the Gulf: Rio Alamo at Ciudad Mier, and the Rio San Juan at Ciudad Camargo. The Rio Alamo is fed by the streams El Macho and Agualeguas before reaching the Rio Grande. The Marte R. Gómez Dam is located on the Rio San Juan between the municipalities of Camargo and Miguel Alemán. The El Cuchillo Dam is located further upstream on the Rio San Juan, in Nuevo León.

2.5.1 Vegetation Communities

The Lower Rio Grande Valley lies within the Tamaulipan Biotic Province, and is in a transition zone between temperate and tropical climates. In the Tamaulipan region, native vegetation consists of mesquite grasslands and thornscrub/brush with occasional savannahs or grasslands. Important plants in the non-riparian areas include mesquite, acacia, desert hackberry, javelina bush, cenizo or purple sage (*Salvia leucophylla*), bee-brush or white brush (*Aloysia gratissima*), Texas prickly pear, and tasajillo (Parsons 2002).

Most of the natural vegetation in southern Hidalgo, Cameron, and Willacy counties has been replaced by cropland and urban development. The natural vegetation community remaining in non-riparian areas is called Mesquite-Blackbrush Brush and Mesquite Granjeno Parks according to the Texas state system. At the mouth of the Rio Grande, there are marsh and grass areas. The Mesquite-Granjeno Parks vegetation community can be found in northern of Hidalgo and Willacy Counties, while the Mesquite Blackbrush Brush can be found in western Hidalgo and northeastern Cameron Counties (Texas Parks and Wildlife (TPW) 1984). Table 2-10 lists plant life that can be found in these communities.

Table 2-10. Plants Typical Of Mesquite-Blackbrush Brush And Mesquite-Granjeno Parks

Mesquite-Blackbrush Brush		Mesquite-Granjeno Parks	
Hidalgo and Cameron Counties		Northern Hidalgo and Willacy Counties	
Allthorn	<i>Koeberlinia spinosa</i>	Bluewood	<i>Condalia hookeri</i>
Bluewood	<i>Condalia hookeri</i>	Bull nettle	<i>Cnidocolus texanus</i>
Cenizo	<i>Leucophyllum frutescens</i>	Coyotillo	Karwinskia humboldtiana
Coldenia	<i>Tiquilia canescens</i>	Croton	<i>Codiaeum variegatum</i>
Desert olive	<i>Forestiera pubescens</i>	Firewheel	<i>Stenocarpus sinuatus</i>
Desert yaupon	<i>Schaefferia cuneifolia</i>	Guayacan	<i>Guaiacum angustifolium</i>
Dogweed	<i>Dyssodia pentachaeta</i>	Hooded windmillgrass	<i>Chloris cucullata</i>
Goatbush	<i>Castela texana</i>	Lotebush	<i>Ziziphus obtusifolia</i>
Granjeno	<i>Celtis pallida</i>	Pan American balsamscale	<i>Elyonurus tripsacoides</i>
Guajillo	<i>Acacia berlandieri</i>	Purple three-awn	<i>Aristida purpurea</i>
Guayacan	<i>Guaiacum angustifolium</i>	Roemer three-awn	<i>Acacia roemeriana</i>
Hairy grama	<i>Bouteloua hirsute</i>	Single-leaf nightshade	<i>Solanum eleagnifolium</i>
Hairy tridens	<i>Erioneuron pilosum</i>	Single-spike paspalum	<i>Peperomia sandwicensis</i>
Kidneywood	<i>Eysenhardtia polystachya</i>	Slender evolvulus	<i>Evolvulus alsinoides</i>
Knotweed leafflower	<i>Phyllanthus polygonoides</i>	Tanglehead	<i>Heteropogon contortus</i>
Leatherstem	<i>Jatropha dioica</i>	Tasajillo	<i>Opuntia kleiniae</i>
Lotebush	<i>Ziziphus obtusifolia</i>	Texas colubrine	<i>Aquilegia sp.</i>
Mat euphorbia	<i>Chamaesyce serpens</i>	Texas lantana	<i>Lantana horrida</i>
Pink pappusgrass	<i>Pappophorum bicolor</i>	Texas pricklypear	<i>Opuntia engelmannii</i>
Purple three-awn	<i>Aristida purpurea</i>	Tumble lovegrass	<i>Eragrostis curvula</i>
Slim tridens	<i>Tridens muticus</i>		
Tasajillo	<i>Opuntia leptocaulis</i>		
Texas pricklypear	<i>Opuntia engelmannii</i>		
Two-leaved senna	<i>Cassia roemeriana</i>		
Whitebrush	<i>Aloysia gratissima</i>		
Yucca	<i>Yucca filamentosa</i>		

Source: McMahan et al. 1984

The United States interior floodway system begins at the Anzalduas Dam as the Main or Banker Floodway, and then branches between the Arroyo Colorado and the North Floodway, which both flow to the Gulf. Much of the off-river floodway system on the United States side is used for agriculture, primarily wheat, sorghum, sugar cane and cotton. Some small ponds and wetlands have been formed in the floodway where depressions in the land have retained water. These wet areas contain bulrush (*Scirpus* spp.), cattail (*Typha latifolia*), and soft rush (*Juncus effusus*). Vegetation is maintained by the USIBWC wherever there is no agricultural production and especially in the upper Arroyo Colorado to prevent trees from growing. These non-agricultural areas contain native and non-native grasses including bermudagrass (*Cynodon dactylon*), bluestems (*Andropogon* spp. and *Bothriocola* spp.), guinea grass (*panicum maximum*), and buffelgrass (*Cenchrus ciliaris*).

The mature vegetation near the Banker Floodway at the Santa Ana NWR, at the "Paso Real" near the Arroyo Colorado, and at the Laguna Atascosa NWR is thought to be important for ocelots (*Leopardus pardalis*) and jaguarundis (*Herpailurus yagouaroundi cacomitli*), two very rare cats whose northernmost range limits include the project area. Large tracts of land provide refuge and the narrow strips provide travel corridors for the cats. Riparian areas along some irrigation canals and drains also may provide suitable jaguarundi and ocelot habitat (USIBWC 1992).

2.5.2 Wildlife Communities

The LRGFCP area contains a rich and diverse wildlife community because of unique soils and climate, and because the range of many tropical and temperate species

overlap within this area. When marine and transitory species are combined, there are nearly 700 different vertebrate species in the region.

There are 67 mammals of potential occurrence in the project area, including 24 rodents and 13 bats. The most common mammals are the raccoon, striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), Mexican ground squirrel (*Spermophilus mexicanus*), and, although rarely seen, bobcat (*Lynx rufus*).

There are 484 species of birds that may occur in the project area, including 44 wood warblers, 30 geese and ducks, 26 sparrows and towhees, 25 raptors, and 25 tyrant flycatchers. Many of the 484 bird species only use the area twice a year during spring and fall migration. Much of the bird diversity comes from the fact that the LRGV is where the Central and Mississippi flyways meet. Some birds most common to the area are the ground-dove (*Columbia passerina*), golden-fronted woodpecker (*Melanerpes aurifrons*), northern mockingbird, great-tailed grackle (*Quiscalus mexicanus*), and groove-billed ani (*Crotophaga ani*). Common seasonal birds are the indigo bunting (*Passerina cyanea*), orchard oriole (*Icterus spurius*), green heron (*Butorides virescens*), black-chinned hummingbird (*Archilochus alexandri*), mallard (*Anas platyrhynchos*), greater yellowlegs (*Tringa melanoleuca*), laughing gull (*Larus atricilla*), belted kingfisher (*Ceryle alcyon*), sharp-shinned hawk (*Accipiter striatus*), scarlet tanager (*Piranga olivacea*), Mississippi kite (*Ictinia mississippiensis*), broad winged hawk (*Buteo platyptera*), Wilson's phalarope (*Phalaropus tricolor*), and Franklin's gull (*Larus pipixcan*).

Of the approximately 80 species of reptiles and amphibians that may occur in the LRGV, 31 are snakes, 20 are lizards, 18 are frogs and toads, six are turtles, four are salamanders, and one crocodylian. The turtles include the red-eared slider (*Trachemys scripta elegans*), Texas spiny soft-shelled turtle (*Apalone spinifera*), ornate box turtle (*Terrapene ornata ornata*), Texas tortoise (*Gopherus berlandieri*), and the yellow mud turtle (*Kinosternon flavescens flavescens*). The American alligator (*Alligator mississippiensis*) has also been recorded in the LRGV. Lizards in the area include whiptails, skinks (*Eumeces spp.*), introduced Mediterranean gecko (*Hemidactylus turcicus*), and the green anole (*Anolis carolinensis*). Snakes include water snakes (*Nerodia spp.*), rat snakes (*Elaphe spp.*), and the venomous western diamondback rattlesnake and the Texas coral snake (*Micrurus fulvius tener*).

Aquatic habitats in the LRGV include the Rio Grande, ox-bow lakes or resacas, arroyos, reservoirs, ponds, irrigation ditches, and other manmade impoundments. These habitats can be divided into lotic (or moving water) and lentic (still water). Lotic water bodies tend to have bottoms of sand or clay, and nutrients come from branches and leaves. Lentic water bodies normally have thick layers of sediment on the bottom, with phytoplankton as a primary source of nutrients. Both lotic and lentic water bodies contain zooplankton as a major component of the food chain.

There are about 178 species of fish that may occur in the LRGFCP area. Ten of these species are sunfishes, nine are carps and minnows (cyprinids), and eight are drums. Fish species in these freshwater environments include red shiner (*Notropis lutrensis*), inland silverside (*Menidia beryllina*), Tamaulipas shiner (*Notropis braytoni*), mosquitofish, sailfin molly (*Poecilia latipinna*), gizzard shad, and threadfin shad

(*Dorosoma petenense*), carp, buffalo, striped mullet (*Mugil cephalus*), catfishes, and sunfishes. The upstream portion of the Rio Grande in the LRGFCP contains freshwater fish, while the downstream portion contains these same upstream fish as well as estuarine and marine fish.

2.5.3 Threats to Vegetation and Wildlife Communities

Changes resulting from human population growth are the largest threat to vegetation communities in the LRGFCP. Land development to support the area's rapid population growth is replacing naturally vegetated areas. It has been estimated by the USFWS (1997) that over 99 percent of the riparian vegetation along the United States side of the Rio Grande has been cleared. Increased introduction of non-native species, which have the potential to spread outside of their original boundaries to interfere with native species, is associated with land development.

Altered flood cycles in the LRGV have contributed to the replacement of riparian woodland trees with dry land species such as mesquite, and have decreased the number of wetlands and oxbow lakes or resacas (Parsons 2002).

The aquatic habitat of the Rio Grande is threatened by two non-native plant species, hyacinth (*Eichhornia crassipes*) and hydrilla (*Hydrilla verticillata*). Together they block the flow of water in the Rio Grande, negatively impacting the aquatic community and impeding the flow of water that is meant to be used for irrigation. Physical and biological means have been used in attempts to remove these plants. International law prevents the use of herbicides in international waters.

Numbers of jaguarundi and ocelots, and likely numerous other rare species, have declined for a variety of reasons mainly related to habitat loss due to clearing of the brush. Of the original native vegetation in the LRGV, less than five percent is thought to be the dense optimal habitat for these cats and other animals dependent on such habitats. Outside of the Laguna Atascosa NWR, many of the tracts of ocelot habitat are smaller than 250 acres and are widely dispersed. Ocelots very rarely cross open fields, so even narrow travel corridors or fence lines in agricultural areas can be very important. Road construction can also adversely affect brush. Some ocelots and jaguarundis have also been killed in road accidents, or as a result of hunting, trapping, or poisoning of coyotes and bobcats (USIBWC 1992).

Certain United States Border Patrol activities may have affected or be affecting cat habitat. Bright lights in the brush vegetation can cause the cats to avoid certain areas. Multiple roads and drag roads between the Rio Grande channel and the levee can fragment habitat. Loss of habitat has also been caused by construction of new ports of entry.

2.5.4 Threatened and Endangered Species

2.5.4.1 Federal

The project lies in three Texas counties: Hidalgo, Cameron, and Willacy. The main Rio Grande channel runs through Hidalgo and Cameron Counties, while the off-river floodways run through Hidalgo, Cameron, and Willacy Counties.

Based on the Endangered Species Act of 1973, 10 federally listed endangered species may occur in Hidalgo, Cameron, and Willacy Counties. There are also four federally listed threatened species, one of which has been proposed for delisting. There are also two formerly listed species that have been delisted within the past five years. Not all species on the federal or Texas county lists share the same probability of occurring in the county. Some are migrants and may only pass through the county seasonally. Others are only known to occur in the county historically, or are considered extirpated. There are no federally designated critical habitats in the project area. The federally listed species are presented in Table 2-11. The “habitat presence” classifications are based on available previous studies, general knowledge of the typical habitat of the species, and of typical conditions along the Rio Grande in the project area. They describe the general conditions of the project as a whole and are not meant to replace the results of field surveys.

Table 2-11. Federally Listed Species for Hidalgo, Cameron, and Willacy Counties

Species Common Name	Federal Status	Habitat	Counties Listed
Birds			
Bald eagle (<i>Haliaeetus leucocephalus</i>)	AD, T	1	Cameron
Brown pelican (<i>Pelecanus occidentalis</i>)	DM, E	1	Cameron; Willacy
Northern aplomado falcon (<i>Falco femoralis septentrionalis</i>)	E	1	Hidalgo; Cameron; Willacy
Piping plover (<i>Charadrius melodus</i>)	T	1	Cameron; Willacy
Mammals			
Gulf coast jaguarundi (<i>Herpailurus yagouaroundi cacomitli</i>)	E	3	Hidalgo; Cameron; Willacy
Ocelot (<i>Leopardus pardalis</i>)	E	3	Hidalgo; Cameron; Willacy
Plants			
South Texas ambrosia (<i>Ambrosia cheiranthifolia</i>)	E	4	Cameron
Star cactus (<i>Astrophytum asterias</i>)	E	3	Hidalgo; Cameron
Texas ayenia (<i>Ayenia limitaris</i>)	E	4	Hidalgo; Cameron; Willacy
Walker's manioc (<i>Manihot walkerae</i>)	E	4	Hidalgo
Reptiles			
American alligator (<i>Alligator mississippiensis</i>)	DM, SAT	4	Cameron; Willacy
Green sea turtle (<i>Chelonia mydas</i>)	T	5	Cameron; Willacy
Hawksbill sea turtle (<i>Eretmochelys imbricate</i>)	E	5	Cameron; Willacy
Kemp's Ridley sea turtle (<i>Lepidochelys kempii</i>)	E	5	Cameron; Willacy
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	E	5	Cameron; Willacy
Loggerhead sea turtle (<i>Caretta caretta</i>)	T	5	Cameron; Willacy

Source: United States Fish & Wildlife Service 2004

E-endangered, T-threatened, AD-proposed delisting, SAT-similarity of appearance to a threatened taxon, DM-delisted recovered and being monitored first five years

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3- species believed to be extirpated from project area; 4- project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project

Bald eagles can be found across most of North America, and nest in the tops of tall trees near rivers, lakes, marshes, and other wetlands. The northern aplomado falcon tends to live in open grassland or savannah with scattered trees and shrubs. Its numbers have been reduced from pesticides entering the food chain, and also by habitat alteration when rangeland is overgrazed or turned into farmland (TPW 2004). Brown pelicans live in coastal areas near shorelines. Piping plovers also live in coastal areas including beaches, and the Texas Gulf Coast bayside mud or salt flats (TPW 2004).

Ocelots and Gulf Coast jaguarundis are both endangered mainly because the dense brush where they live has been cleared for agriculture and urban growth. The

jaguarundi is just slightly larger than a domestic cat, while the ocelot, also a feline, is about 3 feet long and weighs 15 to 30 pounds (TPW 2004).

South Texas ambrosia lives in open prairies and shrublands on deep clay soils (TPW 2004).

Star cactus is thought to be extirpated from Hidalgo County, and now is believed to inhabit only one site along a creek in Starr County. Much of the decline in population is believed to be due to collection of the small spineless cactus for decorative purposes, while conversion of wild land to agricultural and urban uses is also partially blamed. The cactus lives in sparsely vegetated areas in gravelly, saline clays or loams (TPW 2004).

The Texas ayenia is found on terraces and in floodplains, in subtropical woodland communities. The only known population in the United States is in Hidalgo County, where about 20 plants are thought to reside. It is thought to depend on flooding for nutrient deposition and seed dispersal. Its numbers were reduced due to habitat loss, non-native species invasion, and possibly flood control (TPW 2004).

Walker’s manioc lives in areas of sandy loam with underlying caliche, or in open undisturbed brushy areas. It has an edible root about 10 centimeters (4 inches) long. Its numbers have been reduced due to clearing of its native brush habitat (TPW 2004).

The Rio Grande is at the far western end of the range of the American alligator within the United States.

The five sea turtles on the list are salt-water creatures that inhabit the Gulf of Mexico (TPW 2004).

2.5.4.2 State

There are 16 endangered species and 35 threatened species listed by the State of Texas that may occur in Hidalgo, Cameron, or Willacy Counties. Two of the endangered species are considered extirpated from the counties in which they are listed. These species and their statuses are presented in Table 2-12.

Table 2-12. Texas State Listed Species for Hidalgo, Cameron and Willacy Counties

Species Common Name	State Status	Habitat Presence	Counties Listed
Amphibians			
Black spotted newt (<i>Notophthalmus meridionalis</i>)	T	4	Hidalgo; Cameron; Willacy
Mexican treefrog (<i>Smilisca baudinii</i>)	T	4	Hidalgo; Cameron
Sheep frog (<i>Hypopachus variolosus</i>)	T	4	Hidalgo; Cameron; Willacy
South Texas siren – large form (<i>Siren sp.</i>)	T	4	Hidalgo; Cameron; Willacy
White-lipped frog (<i>Leptodactylus labialis</i>)	T	4	Hidalgo; Cameron
Birds			
Arctic peregrine falcon (<i>Falco peregrinus anatum</i>)	T	2	Hidalgo; Cameron; Willacy
Brown pelican (<i>Pelecanus occidentalis</i>)	E	1	Cameron; Willacy
Cactus ferruginous pygmy-owl (<i>Glaucidium brasilianum cactorum</i>)	T	4	Hidalgo; Cameron; Willacy
Common black hawk (<i>Buteogallus anthracinus</i>)	T	1	Hidalgo; Cameron; Willacy
Gray hawk (<i>Asturina nitida</i>)	T	4	Hidalgo; Willacy
Interior least tern (<i>Sterna antillarum athalassos</i>)	E	1	Hidalgo; Willacy

Table 2-12. Texas State Listed Species for Hidalgo, Cameron and Willacy Counties

Species Common Name	State Status	Habitat Presence	Counties Listed
Northern Aplomado falcon (<i>Falco femoralis septentrionalis</i>)	T	1	Cameron; Willacy
Northern beardless-tyrannulet (<i>Falco femoralis septentrionalis</i>)	T	1	Hidalgo; Cameron; Willacy
Piping plover (<i>Charadrius melodus</i>)	T	1	Cameron; Willacy
Reddish egret (<i>Egretta rufescens</i>)	T	5	Hidalgo; Cameron; Willacy
Rose-throated becard (<i>Pachyramphus aglaiae</i>)	T	4	Hidalgo; Cameron
Sooty tern (<i>Sterna fuscata</i>)	T	5	Cameron; Willacy
Texas botteri's sparrow (<i>Aimophila botterii texana</i>)	T	4	Cameron; Willacy
Tropical parula (<i>Parula pitiayuma</i>)	T	4	Hidalgo; Cameron; Willacy
White-faced ibis (<i>Plegadis chihi</i>)	T	4	Hidalgo; Cameron; Willacy
White-tailed hawk (<i>Buteo albicaudatus</i>)	T	4	Hidalgo; Cameron; Willacy
Wood stork (<i>Mycteria americana</i>)	T	4	Hidalgo; Cameron; Willacy
Zone-tailed hawk (<i>Buteo albonotatus</i>)	T	4	Hidalgo; Cameron
Fishes			
Blackfin goby (<i>Gobionellus atripinnis</i>)	T	4	Cameron
Opossum pipefish (<i>Micropphis brachyurus</i>)	T	4	Cameron; Willacy
River goby (<i>Awaous banana</i>)	T	4	Hidalgo; Cameron
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	E	3	Hidalgo; Cameron
Mammals			
Coues' rice rat (<i>Oryzomys couesi</i>)	T	4	Hidalgo; Cameron; Willacy
Jaguar (<i>Panthera onca</i>)	E	3	Hidalgo; Cameron; Willacy
Jaguarundi (<i>Herpailurus yaguarondi</i>)	E	3	Hidalgo; Cameron; Willacy
Ocelot (<i>Leopardus pardalis</i>)	E	3	Hidalgo; Cameron; Willacy
Southern yellow bat (<i>Lasiurus ega</i>)	T	4	Hidalgo; Cameron; Willacy
West Indian manatee (<i>Trichechus manatus</i>)	E	5	Cameron; Willacy
White-nosed coati (<i>Nasu narica</i>)	T	4	Hidalgo; Cameron; Willacy
Reptiles			
Atlantic hawksbill sea turtle (<i>Eretmochelys imbricata</i>)	E	5	Cameron; Willacy
Black striped snake (<i>Coniophanes imperialis</i>)	T	4	Hidalgo; Cameron; Willacy
Green sea turtle (<i>Chelonia mydas</i>)	T	5	Cameron; Willacy
Indigo snake (<i>Drymarchon corais</i>)	T	4	Hidalgo; Cameron; Willacy
Kemp's Ridley sea turtle (<i>Lepidochelys kempii</i>)	E	5	Cameron; Willacy
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	E	5	Cameron; Willacy
Loggerhead sea turtle (<i>Caretta caretta</i>)	T	5	Cameron; Willacy
Northern cat-eyed snake (<i>Leptodeira septentrionalis</i>)	T	4	Hidalgo; Cameron; Willacy
Reticulate collared lizard (<i>Crotaphytus reticulatus</i>)	T	4	Hidalgo
Speckled racer (<i>Drymobius margaritiferus</i>)	T	4	Hidalgo; Cameron
Texas horned lizard (<i>Phrynosoma cornutum</i>)	T	4	Hidalgo; Cameron; Willacy
Texas tortoise (<i>Gopherus berlandieri</i>)	T	4	Hidalgo; Cameron; Willacy
Plants			
South Texas ambrosia (<i>Ambrosia cheiranthifolia</i>)	E	4	Cameron
Star cactus (<i>Astrophytum asterias</i>)	E	3	Hidalgo; Cameron
Texas ayenia (<i>Ayenia limitaris</i>)	E	4	Hidalgo; Cameron; Willacy
Walker's manioc (<i>Manihot walkerae</i>)	E	4	Hidalgo

Source: TPW 2003

E-endangered, T-threatened

1-habitat exists in project; 2-migratory species, seasonal habitat exists in project; 3- species believed to be extirpated from project area; 4- project area lies within geographic species range and is likely to include habitat; 5-suitable habitat does not exist in project

Habitats for the above State listed species are described below, except for those that were already described in the previous section on Federally listed species.

The black spotted newt and the large form of the South Texas siren live in wet or periodically wet places such as arroyos, canals and ditches. In Texas they can be

found south of San Antonio. The Mexican treefrog (*Smilisca baudinii*) lives in the subtropical southernmost part of Texas and requires rain pools to lay its eggs. The sheep frog lives in grassland and savannah in the moistest parts of arid areas. The white-lipped frog lives in southern Texas, in a variety of habitats including grasslands, farmland, and ditches (TPW 2003).

The Arctic peregrine falcon stops in Texas twice a year during migration to feed on the coast. The cactus ferruginous pygmy-owl lives in trees, brush, palms, and mesquite thickets. The common black hawk is thought to have formerly bred in South Texas, and inhabits cottonwood or willow tree lined streams or parts of the Lower Rio Grande floodplain. The gray hawk lives in mature river valley forest, and surrounding mesquite and scrub grasslands. The interior least tern inhabits sandy and gravelly areas along riverbanks including the Rio Grande and lake and reservoir shorelines in the United States during the summer, and builds its nest in shallow holes in the ground in these areas. The northern beardless-tyrannulet lives in cottonwood, willow, elm, leadtree, and mesquite woodlands near the Rio Grande. The reddish egret is a Texas Gulf coast dweller that frequents brackish marshes, shallow salt ponds, and tidal flats. The rose-throated becard lives in forest, scrub, and mangroves. The sooty tern feeds on fish and squid in open oceans. The Texas botteri's sparrow inhabits areas of grassland and short-grass plains with scattered bushes and shrubs including sagebrush, mesquite, or yucca. The Tropical parula lives in woodlands, undergrowth, and brush along riverbanks. The white-faced Ibis lives in freshwater or brackish water marshes, sloughs, or irrigated rice fields. The white-tailed hawk can be found on prairies, cordgrass flats, among live oak, or of savannas. The wood stork is a waterbird that breeds in temperate zones and spends the winter in middle America. The zone-tailed hawk prefers rough, deep, rocky canyons and can be found mainly on the Edwards plateau, in Jeff Davis County, and in the Big Bend area (TPW 2003, 2004).

The blackfin goby lives in brackish and freshwater coastal streams. Opossum pipefish use fresh or low salinity waters for brooding and live in saline waters during the rest of their lives. The river goby tends to occupy the southern Texas coastal area and can enter brackish or ocean water. It prefers a sandy or hard bottom, clear water, and a slow to moderate current (Garrett 2002, TPW 2003). The Rio Grande silvery minnow has historically been found in the Rio Grande and pecos rivers, but is considered extirpated from Cameron, Willacy and Hidalgo Counties. It prefers pools and backwaters of medium to large streams in areas with a mud, sand, or gravel bottom. (TPW 2003).

Coues' rice rat lives in grasses near the shorelines of marshes, both fresh and salt water. The jaguar, like the ocelot and jaguarondi, lives in thick brushlands or chaparral. The jaguar is considered extirpated from Hidalgo, Cameron, and Willacy Counties. The Southern yellow bat lives in trees, especially palm trees in Brownsville. The white-nosed coati is a carnivore similar to a raccoon but more slender and with a longer tail that lives in woodland areas. Those found in Texas are probably transient from Mexico (TPW 2003). The West Indian manatee lives in the Gulf of Mexico and bay system (TPW 2004).

The black striped snake lives in south Texas in moist sandy soils of the semi-arid coastal plain. The indigo snake also inhabits south Texas and prefers thornbush-chaparral woodlands but can survive in suburban areas and irrigated croplands. The northern cat-eyed snake and the speckled racer snake, also south Texas dwellers, live in woodlands and thickets bordering ponds and streams where their preferred prey (frogs) are abundant. The reticulate collared lizard inhabits brushy areas with rock outcrops (TPW 2003). The Texas horned lizard or “horny toad” prefers flat, open, semi-arid areas with loose rocky, sandy, and loamy soils. The Texas tortoise keeps cool in shallow burrows it makes in the shade of brush, cacti, and grass, eating grass and prickly pear.

2.6 Tijuana River Flood Control Project

The Tijuana River Flood Control Project, located in the United States portion of the Tijuana River, extends 2.3 miles along the Tijuana River downstream from the international boundary. This project represents a continuation of the flood control project located in Mexico, and provides flood protection to areas of San Diego, California, in the United States. The channel consists of four sections: a 1,223 foot long concrete lined channel, a 1,695 foot long energy dissipater of grouted stone, an 824 foot long energy dissipater of dumped stone, and an 8,202 foot long unlined channel. Total levee length in the project, including the north and south levees is 3.4 miles.

Ninety-four percent of the Tijuana River Valley and Estuary is located within the Multiple Species Conservation Plan (MSCP) Multiple Habitat Planning Area (MHPA). The City of San Diego targets these MHPA lands for conservation and considers them to be sensitive biological resources because of their habitat quantity, quality and connectivity.

The Tijuana Estuary is located about one mile west of the Tijuana River Flood Control Project. It extends for 2.5 miles along the shoreline and 1.5 miles inland from the mouth of the Tijuana River. It was designated a National Estuarine Research Reserve in 1982 and contains 2,531 acres of tidally flushed wetlands, riparian lands, and upland habitats. Three fourths of its watershed is in Mexico. In February of 2005 the estuary was designated a “Wetland of International Importance Within the Nation” by the Convention on Wetlands of International Importance, better known as the Ramsar Convention. The 1,051 acre Tijuana Slough National Wildlife Refuge (NWR) is contained within the Tijuana River National Estuarine Research Reserve (USACE 1999). The Border Field State Park is located southwest of the estuary.

Habitat types within the Tijuana River Valley and Tijuana Estuary include beach, saltpan, southern foredunes, tidal estuary, coastal salt marsh, riparian wetlands, coastal sage scrub, southern maritime chaparral, maritime succulent scrub, southern willow scrub, and mulefat scrub (USFWS 2005).

2.6.1 Vegetation Communities

The Tijuana River Flood Control Project lies within the Californian biotic province and is part of the warm-temperate scrublands biotic community. More specifically, these scrublands are dominated by coastal sage scrub communities. Coastal sage

scrub extends along the entire coastline of San Diego County, except for urban and developed areas and some small coastal cypress/pine areas, salt marshes, and other non-scrub areas. The most common species in the coastal sage scrub community are California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), white sage (*Salvia apiana*), and black sage (*Salvia mellifera*). Other common species are coyote brush (*Baccharis pilularis*), California brittlebush (*Encelia californica*), white brittlebush (*Encelia farinosa*), golden yarrow (*Eriophyllum confertiflorum*), sunflower (*Helianthus sp.*), sawtooth goldenbush (*Hazardia squarrosa*), coast goldenbush (*Isocoma menziesii*), horkelia (*Horkelia sp.*), sea fig (*Carpobrotus chilensis*), opuntia (*Opuntia sp.*), lemonadeberry (*Rhus integrifolia*), laurel sumac (*Rhus laurina*), pitcher sage (*Lepechinia calycina*), and Our Lord's candle (*Yucca whipplei*) (USACE 1999).

USIBWC land in the United States portion of the Tijuana River Project upstream of Dairy Mart Road is considered disturbed floodplain and agricultural. Downstream of Dairy Mart Road there are areas of Southern Willow Scrub land, Mule Fat Scrub and freshwater marsh, interspersed with disturbed floodplain and other types of disturbed land.

The South Bay International Wastewater Treatment Plant (SBIWTP) site and the Hofer site adjacent to and west of the SBIWTP site contain a total of 75 acres of developed land, disturbed non-native grassland, and disturbed/ruderal land. The non-native grassland is a sensitive vegetation community according to the City of San Diego because it provides foraging habitat for raptors. Therefore, even though this habitat is not dominated by native plant species, it is considered an important habitat based on use. On the SBIWTP and Hofer site land, the following plant species have been recorded: giant reed (*Arundo donax*), Australian saltbush (*Atriplex semibaccata*), mule-fat or seep willow (*Baccharis salicifolia*), gray broom baccharis (*Baccharis sarothroides*), mustard (*Brassica sp.*), ripgut grass (*Bromus diandrus*), crown daisy (*Chrysanthemum coronarium*), horseweed (*Conyza canadensis*), California buckwheat (*Eriogonum fasciculatum*), telegraph weed (*Heterotheca grandiflora*), coast goldenbush (*Isocoma menziesii*), laurel sumac (*Malosma laurina*), horehound (*Marrubium vulgare*), tree tobacco (*Nicotiana glauca*), pine (*Pinus sp.*), castor bean (*Ricinus communis*), Russian thistle, tumbleweed (*Salsola tragus*), Peruvian pepper tree (*Schinus molle*), Brazilian pepper tree (*Schinus terebinthifolius*), tamarisk (*Tamarix sp.*), and fan palm (*Washingtonia filifera*) (Parsons 2004).

Sensitive plant species that may be found in the general vicinity of the Tijuana River Flood Control Project where the coastal salt marsh and coastal sage scrub native plant communities are present include goldenspined cereus (*Bergerocactus emoryi*), sea dahlia (*Coreopsis maritima*), Orcutt's bird's-beak (*Cordylanthus orcuttianus*), and wart-stemmed ceanothus (*Ceanothus verrucosus*). Other plant species with the potential to occur in the in the area include San Diego barrel cactus (*Ferocactus viridescens*), San Diego marsh elder (*Iva hayesiana*), and San Diego County viguiera (*Viguiera laciniata*).

2.6.2 Wildlife Communities

On the combined 75 acre SBIWTP and Hofer site, the following avian species have been recorded: white-tailed kite (*Elanus leucurus*), killdeer (*Charadrius vociferus*)

vociferus), mourning dove, rock dove (*Columbina livia*), Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans semiatra*), Cassin's kingbird (*Tyrannus vociferans vociferans*), American crow (*Corvus brachyrhynchos hesperis*), yellow-rumped warbler (*Dendroica coronata*), California towhee (*Pipilo crissalis*), song sparrow (*Melospiza melodia*), and white-crowned sparrow (*Zonotrichia leucophrys*). The white-tailed kite, observed foraging in non-native grassland at the Hofer site in October of 2004, is a California fully protected species (Parsons 2004).

The habitat along the Tijuana River to the west of the Dairy Mart Road Bridge may support the federally listed endangered least Bell's vireo (*Vireo bellii pusillus*). Other sensitive species that may be found in the general vicinity of the Tijuana River Flood Control Project where suitable habitat is present include coastal California gnatcatcher (*Polioptila californica californica*), western burrowing owl (*Speotyto cunicularia hypugaea*), Belding's orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and red-shouldered hawks (*Buteo lineatus elegans*) (Parsons 2004, USFWS 2005).

The Tijuana River Estuary, located about one mile west of the Tijuana River Flood Control Project, is home to at least 370 species of birds, 320 of which are migratory, including the California least tern (*Sterna antillarum browni*), least Bell's vireo, light-footed clapper rail (*Rallus longirostris levipes*), California brown pelican (*Pelecanus occidentalis californicus*), and occasionally the peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), and golden eagle (*Aquila chrysaetos*). Mammals that inhabit the estuary land include mice, California ground squirrels (*Otospermophilus beecheyi*), and rabbits. The estuary's small tidal creeks and channels contain at least 20 species of fish, plus crabs, rove beetles (*Staphylinus Sp.*), tiger beetles (*Cicindela sp.*), and wandering skippers (*Panoquina errans*) (Parsons 2004, USFWS 2005).

The Southwestern willow flycatcher, western snowy plover (*Charadrius alexandrinus nivosus*), and salt marsh birds beak (*Cordylanthus maritimus ssp. maritimus*) may also be supported by the habitats in the Tijuana Estuary and the Tijuana River Valley (USFWS 2005).

2.6.3 Threats to Vegetation and Wildlife Communities

At the Tijuana River Flood Control Project, the river often contains trash and sediment that becomes lodged in the vegetation at the downstream end of the mowed portion of the project (USFWS 2005). The river valley is an important biological resource with a large diversity of species, but the disturbed nature of much of the land in the project reduces the quantity and quality of available habitat.

2.6.4 Threatened and Endangered Species

2.6.4.1 Federal

Based on current listings under the Endangered Species Act of 1973, 32 federally listed endangered species may occur in San Diego County, as well as 11 federally listed threatened species and three federally listed candidate species. Not all species on the federal or state county lists share the same probability of occurring in the county. Some are migrants and may only pass through the county seasonally. Others are only known to occur in the county historically, or are considered extirpated (no longer

present). The federally listed species and their classifications are presented in Table 2-13.

Table 2-13. Federally Listed Species for San Diego County

Species Name	Federal Status	Critical Habitat
Birds		
Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	T	RP
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	C	
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	E	RV
Bald eagle (<i>Haliaeetus leucocephalus</i>)	T	
Brown pelican (<i>Pelecanus occidentalis</i>)	E	
Short-tailed albatross (<i>Phoebastria albatrus</i>)	E	
Coastal California gnatcatcher (<i>Poliopitila californica californica</i>)	T*	RP
Light-footed clapper rail (<i>Rallus longirostris levipes</i>)	E	
California least tern (<i>Sterna antillarum browni</i>)	E	
Least Bell's vireo (<i>Vireo bellii pusillus</i>)	E	D-94
Desert pupfish (<i>Cyprinodon macularius</i>)	E	D-86
Tidewater goby (<i>Eucyclogobius newberryi</i>)	E	D-PV-00
Unarmored threespine stickleback (<i>Gasterosteus aculeatus williamsoni</i>)	E	
Southern steelhead (<i>Oncorhynchus mykiss</i>)	E	
San Diego thornmint (<i>Acanthomintha ilicifolia</i>)	T	
San Diego ambrosia (<i>Ambrosia pumila</i>)	E	
Del Mar manzanita (<i>Arctostaphylos glandulosa</i> ssp. <i>grassifolia</i>)	E	
Peirson's milk-vetch (<i>Astragalus magdalenae</i> var. <i>peirsonii</i>)	T	D-04
Coastal dunes milk-vetch (<i>Astragalus tener</i> var. <i>titi</i>)	E	
Encinitas baccharis (<i>Baccharis vanessae</i>)	T	
Nevin's barberry (<i>Berberis nevini</i>)	E	
Thread-leaved brodiaea (<i>Brodiaea filifolia</i>)	T	
Orcutt's spineflower (<i>Chorizanthe orcuttiana</i>)	E	
Salt marsh bird's beak (<i>Cordylanthus maritimus</i> ssp. <i>maritimus</i>)	E	
Otay tarplant (<i>Deinandra (Hemizonia) conjugens</i>)	T	D-02
San Diego button celery (<i>Eryngium aristulatum</i> var. <i>parishii</i>)	E	
Mexican flannelbush (<i>Fremontodendron mexicanum</i>)	E	
Orcutt's hazardia (<i>Hazardia orcuttii</i>)	C	
Willow monardella (<i>Monardella linoides</i> ssp. <i>viminea</i>)	E	
Spreading navaretia (<i>Navaretia fossalis</i>)	T	
California Orcutt grass (<i>Orcuttia californica</i>)	E	
Brand's phacelia (<i>Phacelia stellaris</i>)	C	
San Bernardino bluegrass (<i>Poa atropurpurea</i>)	E	
San Diego mesa mint (<i>Pogogyne abramsii</i>)	E	
Otay mesa mint (<i>Pogogyne nudiuscula</i>)	E	
Gambel's watercress (<i>Rorippa gambellii</i>)	E	
Mammals		
Stephens' kangaroo rat (<i>Dipodomys stephensi</i>)	E	
Southern sea otter (<i>Enhydra lutris nereis</i>)	T	
Peninsular bighorn sheep (<i>Ovis canadensis</i>)	E	D-01
Pacific pocket mouse (<i>Perognathus longimembris pacificus</i>)	E	
Invertebrates		
San Diego fairy shrimp (<i>Branchinecta sandiegonensis</i>)	E	RP
Quino checkerspot butterfly (<i>Euphydryas editha quino</i>)	E	D-02
Laguna Mountains skipper (<i>Pyrgus ruralis lagunae</i>)	E	
Riverside fairy shrimp (<i>Streptocephalus woottoni</i>)	E	RP
Amphibians		
Arroyo toad (<i>Bufo californicus</i>)	E	RP
California red-legged frog (<i>Rana aurora draytoni</i>)	T	RP

Source: United States Fish & Wildlife Service 2004

E-endangered, T-threatened, T*-proposed threatened DPS, C-candidate, D-designated critical habitat, RP-critical habitat remanded and now re-proposed, D-PV-critical habitat designated and partially vacated, RV-critical habitat remanded and designation vacated

Of the 14 species listed above with final or proposed federally designated critical habitat, the Tijuana Flood Control Project is within the designated critical habitat area for one species, the least Bell's vireo. The Tijuana River Flood Control Project is regularly mowed. Actual habitat for the bird does not exist in the mowed area, but probably exists in adjacent unmowed areas.

The regular mowing and border patrol activities in the entire project area and the small size of project area not paved or grouted suggest that habitat presence within the project for any federally or state listed endangered, threatened or rare species is unlikely.

2.6.4.2 State

The State of California Department of Fish and Game maintains its own list of Threatened and Endangered species, and Species of Concern. This list, which includes species that may be found in any part of the State, is accompanied by a positive sightings database that lists species that have been sighted and positively identified in each 7.5 minute United States Geological Survey (USGS) quadrangle.

The Tijuana River Flood Control Project in the United States lies entirely within the Imperial Beach USGS quadrangle. The species in Table 2-14 are listed by the California Department of Fish and Game, and have been spotted in the Imperial Beach quadrangle. These species have potential to occur within the project area if suitable habitat is present.

**Table 2-14. California State Listed Species Sighted in Imperial Beach
USGS 7.5 Minute Quadrangle**

Species Common Name	State Status
Birds	
Belding's savannah sparrow (<i>Passerculus sandwichensis beldingi</i>)	E
Burrowing owl (<i>Athene cunicularia</i>)	SC
California least tern (<i>Sterna antillarum browni</i>)	E
Coastal cactus wren (<i>Campylorhynchus brunneicapillus sandiegensis</i>)	SC
Coastal California gnatcatcher (<i>Polioptila californica californica</i>)	SC
Cooper's hawk (<i>Accipiter cooperii</i>)	SC
Gull-billed tern (<i>Sterna nilotica</i>)	SC (U)
Least Bell's vireo (<i>Vireo bellii pusillus</i>)	E
Light-footed clapper rail (<i>Rallus longirostris levipes</i>)	E
Northern harrier (<i>Circus cyaneus</i>)	SC
Orange-throated whiptail (<i>Aspidoscelis hyperythra</i>)	SC
Southern California rufous-crowned sparrow (<i>Aimophila ruficeps canescens</i>)	SC
Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	SC
Mammals	
American badger (<i>Taxidea taxus</i>)	SC
Northwestern San Diego pocket mouse (<i>Chaetodipus fallax fallax</i>)	SC
Pacific pocket mouse (<i>Perognathus longimembris pacificus</i>)	SC
San Diego black-tailed jackrabbit (<i>Lepus californicus bennettii</i>)	SC
San Diego desert woodrat (<i>Neotoma lepida intermedia</i>)	SC
Amphibians	
Western spadefoot (<i>Spea (=Scaphiopus) hammondi</i>)	SC
Reptiles	
Coast (San Diego) horned lizard (<i>Phrynosoma coronatum (blainvillei)</i>)	SC

**Table 2-14. California State Listed Species Sighted in Imperial Beach
USGS 7.5 Minute Quadrangle**

Species Common Name	State Status
Coronado skink (<i>Eumeces skiltonianus interparietalis</i>)	SC (U)
Northern red-diamond rattlesnake (<i>Crotalus ruber ruber</i>)	SC
Silvery legless lizard (<i>Anniella pulchra pulchra</i>)	SC (U)
Two-striped garter snake (<i>Thamnophis hammondi</i>)	SC (U)
Plants	
Baja California birdbush (<i>Ornithostaphylos oppositifolia</i>)	E
Blochman's dudleya (<i>Dudleya blochmaniae</i> ssp. <i>blochmaniae</i>)	R
Brand's phacelia (<i>Phacelia stellaris</i>)	R
California Orcutt grass (<i>Orcuttia californica</i>)	E
Coast woolly-heads (<i>Nemacaulis denudata</i> var. <i>denudata</i>)	R
Coulter's goldfields (<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>)	R
Estuary seablite (<i>Suaeda esteroa</i>)	R
Mexican flannelbush (<i>Fremontodendron mexicanum</i>)	R
Nuttall's lotus (<i>Lotus nuttallianus</i>)	R
Nuttall's scrub oak (<i>Quercus dumosa</i>)	R
Orcutt's pincushion (<i>Chaenactis glabriuscula</i> var. <i>orcuttiana</i>)	R
Otay Mesa mint (<i>Pogogyne nudiuscula</i>)	E
Otay tarplant (<i>Deinandra conjugens</i>)	E
Parry's tetracoccus (<i>Tetracoccus dioicus</i>)	R
Robinson's pepper-grass (<i>Lepidium virginicum</i> var. <i>robinsonii</i>)	R
Salt marsh bird's beak (<i>Cordylanthus maritimus</i> ssp. <i>maritimus</i>)	E
San Diego ambrosia (<i>Ambrosia pumila</i>)	R
San Diego button-celery (<i>Eryngium aristulatum</i> var. <i>parishii</i>)	E
San Diego goldenstar (<i>Muilla clevelandii</i>)	R (U)
Plants	
San Diego sand aster (<i>Corethrogyne filaginifolia</i> var. <i>incana</i>)	R
San Diego thorn-mint (<i>Acanthomintha ilicifolia</i>)	E
Small-leaved rose (<i>Rosa minutifolia</i>)	E
Snake cholla (<i>Opuntia californica</i> var. <i>californica</i>)	R
South Coast saltscale (<i>Atriplex pacifica</i>)	R
Spreading navarretia (<i>Navarretia fossalis</i>)	R
Variegated dudleya (<i>Dudleya variegata</i>)	R

Source: California Department of Fish and Game, 2004

E-endangered, R-Rare, SC-Species of Concern, S-Special, (U)-Unprocessed Data

2.7 Data Gaps and Plan to Address

Descriptions of existing habitats are based on previous studies. These studies are as recent as 2004 for the South Bay International Wastewater Treatment Plant Draft EIS and the Canalization Biological Assessment, and as old as 1984 for the Texas Parks and Wildlife Vegetation Types of Texas classification. The habitats described above may have changed since the previous studies if there have been major changes in land use in the project areas. Information from studies more than five to eight years old should be field verified to document changes in species or habitat presence. The field investigation of the Presidio Flood Control Project was conducted precisely because of the age of existing data. Much of the biological information available for the Rectification project dates back to 1999, indicating that a new survey of the Rectification project area during the next two years, if Federal action is planned, would be beneficial. Field surveys for the Canalization, Lower Rio Grande Valley, and

Tijuana flood control projects would need to be redone approximately five years from now upon any new Federal action.

The state and federal lists of endangered, threatened, etc. species in this report are current as of July of 2005. These lists should be checked for updates with the appropriate state and federal agencies at the time of their use.

Section 3

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May 3, 2005

Mr. Mike Buntjer
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Subject: Programmatic Environmental Impact Statement (PEIS) for the Rio Grande and Tijuana River
Flood Control Projects in New Mexico, Texas, and California

Dear Mr. Buntjer:

As discussed in recent mailings and public meetings, the International Boundary and Water Commission, United States Section (USIBWC), is in the process of preparing a Programmatic Environmental Impact Statement (PEIS) for management activities in the Rio Grande and Tijuana River Flood Control Projects in the states of New Mexico, Texas, and California. Within those two main projects, there are five flood control projects, four on the Rio Grande and one on the Tijuana River, include:

- 1) Canalization Project, extending 105.4 river miles from Percha Diversion Dam in New Mexico to American Diversion Dam in El Paso County, Texas;
- 2) Rectification Project, extending 86 river miles from American Diversion Dam to Fort Quitman, Texas;
- 3) Presidio-Ojinaga Flood Control Project, extending over a total length of 15.2 river miles including the Rio Grande and spur levees at Cibolo Creek and Brito Creek in Presidio, Texas;
- 4) Lower Rio Grande Flood Control Project, extending 186 river miles on the Rio Grande from the town of Peñitas, Texas, to the Gulf of Mexico, and including 119.9 miles of interior floodway; and
- 5) Tijuana River Flood Control Project, located in the United States portion of the Tijuana River, with 2.3 miles of channel starting at the international boundary.

A brief project description is attached to this letter that includes objectives and preliminary action alternatives that may be considered. The draft alternatives and objectives are updated from those sent out in previous mailings.

Per the requirements of the PEIS Scope of Work, the USIBWC's consultant, Camp Dresser & McKee Inc. (CDM), is conducting a literature review to identify relevant biological resources in the five project areas. The search area includes the longitudinal extent of each of the flood control projects, as well as the floodplains, levees, and any adjacent riparian ecosystems that may be affected by the project actions.

Mr. Mike Buntjer

Mr. Mike Buntjer
Page 2 of 2
May 3, 2005

The USIBWC is seeking additional information and preliminary input from your agency related to the search area, particularly issues and concerns related to those species and habitats within the flood control project area of your jurisdiction. For example, it is critical that we identify early in the PEIS process any concerns that your agency may have with respect to the species on the state and federal lists of threatened and endangered species that may occur in the project area counties, species that may be proposed for listing, or any other species that may not have been identified by the above referenced literature review. Finally, any information regarding critical habitat is being sought at this time. If necessary, please provide comments and recommendations to mitigate or avoid impacts to potentially affected species.

In addition, CDM will conduct a physical survey of the Presidio-Ojinaga project area. The scope of the physical survey may depend on comments received as a response to this letter from agencies with jurisdiction in the Presidio, Texas area. The Texas Parks and Wildlife Department and United States Fish and Wildlife Service-Austin Ecological Services Office, are specifically requested to comment on those issues, species, or areas that are the most pertinent for investigation during the field survey of the Presidio-Ojinaga project.

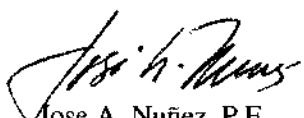
Please share this information with other members of your local or regional team as you deem appropriate. We would appreciate a response within 30 calendar days from the date of this letter.

All correspondence can be mailed to the following:

Mr. Daniel Borunda
Environmental Protection Specialist
Environmental Compliance Section, USIBWC
4171 North Mesa Street, Bldg. C-100
El Paso, Texas 79902

If you have any questions, please contact Mr. Borunda at (915) 832-4701 or via email at danielborunda@ibwc.state.gov. Thank you for your assistance.

Sincerely,



Jose A. Nunez, P.E.
Lead Environmental Engineer
Environmental Compliance Section

Attachments:
As Stated

Mr. Beau Hardegree
United States Fish and Wildlife Service
Ecological Services
c/o Texas A&M University at Corpus Christi
6300 Ocean Drive, Campus Box 338
Corpus Christi, Texas 78412

Mr. Robert Pine
Austin Ecological Service Office
United States Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin, Texas 78758

Ms. Therese O'Rourke
Carlsbad Fish and Wildlife Office
United States Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

Mr. Charles F. Raysbrook
California Department of Fish and Game
South Coast Region 5
4949 Viewridge Avenue
San Diego, CA 92123

Dr. Bruce Thompson, Director
New Mexico Department of Game and Fish
P.O. Box 25112
Santa Fe, NM 87504

Ms. Kathy Boydston
Texas Parks and Wildlife Department
Wildlife Habitat Assessment Program
4200 Smith School Road
Austin, Texas 78744-3291

**UNITED STATES SECTION, INTERNATIONAL BOUNDARY AND WATER
COMMISSION
ALTERNATIVES REPORT AND
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
FOR RIO GRANDE AND TIJUANA RIVER FLOOD CONTROL PROJECTS
NEW MEXICO, TEXAS AND CALIFORNIA**

The United States Section, International Boundary and Water Commission (USIBWC) will prepare an Alternatives Report and Programmatic Environmental Impact Statement (PEIS) for its flood control projects in: (1) certain segments of the Rio Grande, from Percha Dam in New Mexico to the Gulf of Mexico in Texas, and; (2) in the United States portion of the Tijuana River in the San Diego California area.

Background

The five flood control projects, four on the Rio Grande and one on the Tijuana River, are:

- 1) Canalization Project, extending 105.4 river miles from Percha Diversion Dam in New Mexico to American Diversion Dam in El Paso County, Texas;
- 2) Rectification Project, extending 86 river miles from American Diversion Dam to Fort Quitman, Texas;
- 3) Presidio-Ojinaga Flood Control Project, extending over a total length of 15.2 river miles including the Rio Grande and spur levees at Cibolo Creek and Brito Creek in Presidio, Texas;
- 4) Lower Rio Grande Flood Control Project, extending 186 river miles on the Rio Grande from the town of Peñitas, Texas, to the Gulf of Mexico, and including 119.9 miles of interior floodway; and
- 5) Tijuana River Flood Control Project, located in the United States portion of the Tijuana River, with 2.3 miles of channel starting at the international boundary.

Purpose and Need

The purpose of the proposed federal action is to identify, re-evaluate, and implement alternatives for the management of existing flood control projects in the Rio Grande and Tijuana Rivers that would allow USIBWC to comply with its mandate for flood protection, water deliveries, and/or boundary stabilization, while creating opportunities to enhance environmental and recreational resources.

Project specific purpose and need associated with individual components of the program are provided below.

The **Canalization Project** was constructed between 1938 and 1943 with the objective of providing flood control and facilitating water deliveries to the Rincon and Mesilla Valleys in New Mexico, El Paso Valley in Texas, and the Juarez Valley in Mexico, in accordance with the 1906 Convention Between the United States and Mexico for the Equitable Distribution of the Waters of the Rio Grande.

The **Rectification Project** was constructed between 1934 and 1938 to stabilize the international river boundary and to provide flood protection for both countries in urban, suburban, and agricultural areas, as required by the 1933 Convention.

The **Presidio-Ojinaga Flood Control Project** was implemented based on IBWC Minute No. 247 (February 7, 1975). The purpose of this project was to protect productive agricultural lands in the Presidio-Ojinaga Valley against frequent flooding; to establish the international boundary per the Boundary Treated of 1970; and to ensure water deliveries to agricultural users in the United States and to Mexico, in accordance with international treaty obligations and agreements.

The **Lower Rio Grande Flood Control Project** was the result of a 1932 agreement between the United States and Mexico to provide flood protection to urban, suburban, and agricultural lands in both countries. In addition, the project has the objective of ensuring water deliveries to agricultural users in the United States and to Mexico, and to provide boundary stabilization requirements set forth in international agreements

The **Tijuana River Flood Control Project** was constructed as a result of IBWC Minutes No. 225 (June 19, 1967) and No. 236 (July 2, 1970) with the purpose of ensuring adequate flood protection for areas of San Diego in the United States in proximity to the river.

Alternatives to be Considered

Preliminary alternatives and options to be evaluated in the Alternatives Formulation Report of the PEIS may include, but are not limited to:

1) No Action Alternative

- Baseline alternative
- Mowing to control weeds & and woody vegetation
- No mow zones
- Repair levees
- Remove debris in channel & floodway
- Manage grazing leases
- Sediment removal & disposal
- Bank stabilization
- Pilot habitat structure program
- Structural repairs and adjustments
- Coordination with NWRs and parks

2) Provide flood control and ensure water deliveries

- Assess USIBWC ability to meet obligations (national & international) to deliver water supply and provide flood control. Modify O&M practices in areas where obligations are not being met or ability to meet obligations is marginal.
- Reanalyze design flow hydrology and assess reasonableness of established design flows. Revise design flows in areas where such flows appear unreasonable.
- Modify O&M activities to address known or potential flood control deficiencies.
- Assess adequacy of existing levee system to contain design flows. Provide levee increased maintenance of levees determined to be in disrepair or inadequate.
- Modify operation of water delivery structures to decrease deposition of sediment in pool areas created by such structures. Develop methods for moving sediment through water delivery and flood control structures.
- Apply erosion control practices to reduce sediment load in depositional reaches..
- Utilize non-structural floodplain management strategies to limit damage potential
- Adjust channel geometry to effectively transport sediment and limit erosion
- Modify excavated sediment disposal actions to eliminate fill in floodway (reducing conveyance capacity of floodway) or in eroding reaches to create a “sacrificial” sediment resupply so that the river doesn’t need to attack its channel bed and bank to achieve sediment transport balance in aggradational reaches.

3) Integrated Land Management

- Take into consideration habitat and recreational impacts of current and proposed flood control and water delivery O&M practices. Identify habitat enhancements or recreational opportunities that can be incorporated into planned O&M activities.
 - Obtain water rights for flow control
- Incorporate environmental measures in conjunction with flood control, erosion control and sediment removal actions
 - Purchase real property or conservation easements outside of USIBWC right-of-way to provide additional floodplain
 - Utilize grazing, irrigation and stormwater Best Management Practices to improve river water quality
- Utilize natural channel bed and bank stabilization techniques for habitat enhancement
 - Utilize old meanders as off-channel backwater wetlands
 - Investigate the use of bio-engineered techniques to stabilize channel banks
 - Investigate feasibility of establishing diverse, naturalized low flow channel morphology incorporating habitat structures such as riffles and pools that benefit native wildlife.

- Promote native vegetation management practices and exotic species control techniques that support native faunal habitat.
 - Increase no-mow zones with the intent of providing migration corridors between identified high quality habitat areas (e.g., National Wildlife Refuges, parks, wetlands, etc.)
 - Revegetation activities should include native species exclusively that benefit native wildlife.
 - O&M activities should include, as a component, Removal of invasive, non-native species
- Minimize impact from water supply and flood control facilities and practices on aquatic and riparian migration pathways and water quality
 - Employ non-structural flood control techniques
 - Allow increased overbank flows through bank shaving and establishment of flood storage areas in disconnected meanders.

4) River Channel and Floodplain Restoration

- Reestablish natural, functioning river channel with connected floodplain
 - Remove levees.
 - Expand floodway through purchase floodprone areas.
- Allow river channel to laterally migrate through reestablished floodplain
- Allow river to reestablish sediment transport balance.
- Allow naturally varying hydrology with low and high flows that are a natural response to short- and long-term climate fluctuations.

Draft Objectives and Performance Measures for Evaluating Alternatives

Alternatives will be evaluated by taking into consideration input received during the scoping process, and by considering the following draft objectives and performance measures:

Objectives	Performance measure	Units of measurement
Provide flood control in accordance with regional and international obligations	Maintain or reduce flood storage capacity	Water surface elevation
Ensure water deliveries in accordance with regional and international obligations	Efficient operation of water delivery structures including canals, weirs, gates, etc.	Percent of water diverted that is returned to river
Provide environmental and cultural/archeological enhancements	Modification/elimination of O&M practices that have the potential to damage archeological/cultural resources that have been identified.	Acres of sites avoided by O&M practices that can damage archeological/cultural resources
	Connection of currently isolated habitat areas	Acres of riparian habitat connected

Objectives	Performance measure	Units of measurement
	Re-establishment of habitat in areas where currently absent	Acres of riparian habitat created
	Reduction of invasive species	Acres of areas managed for invasive species
	Increased abundance, distribution and diversity of native vegetation	Number of species (diversity); Number of different species per a randomly selected unit area (distribution); Area of native vegetation cover (abundance)
	Aquatic habitat enhancement (abundance, distribution and diversity)	Length of aquatic habitat created (abundance); percentage of project covered by habitat (distribution); Number of habitat types (diversity)
	Reduction of aquatic invasive species	Reach of river managed to reduce aquatic invasive species.
	Water quality improvement	Relative increase in water quality (scored 1 to 5)
Provide recreational opportunities	Establishment of areas for active recreation (hunting blinds, hiking and biking trails, etc.)	Acres (sites), Miles (trails); Number of facilities
	Establishment of areas for passive recreation (wildlife viewing areas and blinds, etc.)	Acres (sites); number of facilities
Ensure cost-effectiveness	Construction costs are within IBWC budget constraints	Dollars
	O&M costs are within IBWC budget constraints	Dollars
Facilitate Interagency cooperation	Level of impact on other agencies activities and operations	Relative impact on other agency's international border and river activities s and responsibilities (Score 1 to 5)

Environmental Issues

The USIBWC, as Lead Agency, proposes to collect information necessary for the preparation of the PEIS, which will identify, describe, and evaluate the existing environmental, cultural, sociological and economic, and recreational resources; describe the flood protection program; and evaluate the impacts associated with the proposed action and alternatives under consideration. Significant issues that will be addressed in the PEIS include, but are not limited to, impacts to: water quantity, water quality, cultural and biological resources, threatened and endangered species, land use, socioeconomics, environmental justice, and recreation.

Environmental Review Process

The environmental review of this project will be conducted in accordance with the requirements of Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended, CEQ Regulations (40 CFR Parts 1500-1508), other appropriate regulations, and the USIBWC procedures for compliance with those regulations.

Copies of the PEIS will be transmitted to federal and state agencies and other interested parties for comments and will be filed with the Environmental Protection Agency in accordance with 40 CFR Parts 1500-1508 and USIBWC procedures.



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To:
FWS-SDG-4363.1

FEB 7 2005

Mr. Daniel Borunda
Environmental Protection Specialist
USIBWC, Environmental Management Division
4171 North Mesa Street, C-310
El Paso, Texas 79902

Re: International Boundary and Water Commission's Notice of Intent to Prepare a
Programmatic Environmental Impact Statement for Flood Control Projects within the Rio
Grande and the Tijuana River Basins

Dear Mr. Borunda:

The U.S. Fish and Wildlife Service in Carlsbad, California (Service) has reviewed the International Boundary and Water Commission (USIBWC) Notice of Intent (NOI) to prepare a Programmatic Environmental Impact Statement (PEIS) for its flood control projects within the Rio Grande and Tijuana River Basins. The Service also attended the public scoping meeting for the NOI on January 27, 2005. USIBWC proposes to analyze flood protection measures and alternatives to current management practices, including structural and non-structural alternatives, watershed-oriented alternatives, and collaborative measures with other agencies and landowners to determine to what extent project management can provide adequate flood protection, facilitate water deliveries, and provide boundary stabilization. The projects also would support restoration of native riparian and aquatic habitats and the development of recreational opportunities. This letter addresses the Tijuana River portion of the PEIS, which represents a continuation of the flood control project located in Tijuana, Baja California, Mexico and provides flood protection to the San Diego, California area in the United States. The Tijuana River Flood Control Project is located in the United States portion of the Tijuana River and extends 2.3 river miles from the international boundary.

The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and endangered animals and plants occurring in the United States. The Service's operates under the authority, and in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended, 16 U.S.C. 661 et seq.), the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.), and other authorities mandating Department of Interior concern for environmental values.

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IN AMERICA** 

The Service recommends that the PEIS incorporate a thorough analysis of how each project alternative may affect sensitive resources in the Tijuana Estuary and Tijuana River Valley, located downstream of the project area. The Tijuana Estuary and Tijuana River Valley comprise one of the largest and most important wetland systems in San Diego County. This area is a very special place for wildlife as it supports a high diversity of native habitats and species. It contains multiple habitat types including beaches, saltpan, southern foredunes, tidal estuary, coastal salt marsh, riparian wetlands, coastal sage scrub, southern maritime chaparral, maritime succulent scrub, southern willow scrub, and mulefat scrub. These habitats support a number of species known to be sensitive, including the federally listed as endangered least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), light footed clapper rail (*Rallus longirostris levipes*), western snowy plover (*Charadrius alexandrinus nivosus*), California least tern (*Sterna antillarum browni*), salt marsh birds beak (*Cordylanthus maritimus* ssp. *maritimus*), and California brown pelican (*Pelecanus occidentalis*), and the federally listed as threatened California gnatcatcher (*Poliophtila californica californica*). As such, the Tijuana Estuary and Tijuana River Valley is designated as a core biological area of the Multiple Species Conservation Program (MSCP), which is a comprehensive habitat conservation planning program that addresses multiple species habitat needs and the preservation of native vegetation communities in southwestern San Diego County. The Multiple Habitat Planning Area (MHPA) of the City of San Diego's MSCP, which delineates core biological resources areas and corridors targeted for conservation, is designated over much of the Tijuana Estuary and Tijuana River Valley. The MHPA is partly within, adjacent and downstream to the flood control project.

On February 2, 2004, Carolyn Lieberman of my staff noted while in the Tijuana River Valley that sediment and trash had accumulated along the riparian vegetation at the downstream end of where vegetation is mowed by USIBWC west of Dairy Mart Road Bridge. We recommend that the PEIS evaluate how their current flood control practices contribute to this occurrence. We suspect that current management of the flood control channel, including the mowing of vegetation, may facilitate sediments and trash to be deposited into the downstream sensitive habitats because there is little in the way to slow water flow velocities. We recommend that the USIBWC consider alternatives that will improve the existing conditions in the Tijuana Estuary and Tijuana River Valley with regard to deposition of sediment and trash, and water quality. For example, USIBWC could incorporate a sedimentation basin/trash trap into the concrete lined channel and remove accumulated sediments and trash from the basin/trap on a regular basis and/or when necessary to reduce sedimentation and deposition of trash into the downstream sensitive habitats.

The Service recommends that the PEIS incorporate a comprehensive hydrological analysis of how each project alternative may affect the hydrology within the Tijuana River and the Tijuana River Valley located downstream. The Tijuana Estuary Tidal Restoration Program, conducted in association with the California Coastal Conservancy, has conducted a comprehensive hydrological analysis and model of the Tijuana River Valley in planning their restoration program. As this information may assist in your analysis, we recommend that you coordinate with the California Coastal Conservancy on your analyses.

To assist us in our review of the PEIS, we request that the PEIS contain the following information:

1. A complete discussion of the purpose and need for the project and each of the project alternatives.
2. A complete description of the proposed project, including all practicable alternatives that have been considered to reduce project impacts to sensitive habitats, biological resources, federal and state listed threatened and endangered species, narrow endemic species, and the MHPA. The alternatives section of the PEIS should focus on alternatives that avoid or substantially lessen any of the significant biological effects of the proposed project. If an alternative is included that would result in one or more significant effects in addition to those that would be caused by the proposed project, the PEIS should discuss the impacts in sufficient detail to facilitate an informed review of the proposal. In addition, the discussion under such an alternative should adequately address the measures that would be necessary to mitigate significant biological impacts.
3. A description of the consistency of the project with the MSCP. Refer to the MSCP documentation for guidance on land use adjacency guidelines and compatible uses within the MHPA.
4. An implementation schedule for all project components. We recommend that mitigation for impacts to biological resources be initiated before and/or concurrent with project impacts.
5. A biological technical report that includes survey methods (including survey personnel, dates, times, and climate conditions), survey results, impact analysis, and proposed mitigation. The report should describe the biological resources associated with each habitat type. These descriptions should include both qualitative and quantitative assessments of the resources present on, adjacent, and downstream of the proposed subject property and include complete species lists for all biological resources. At a minimum, the following should be included:
 - a. A list of federally listed, proposed, or candidate species; state listed and candidate species; locally sensitive species; and narrow endemic species that occur on, or in habitat contiguous with, the subject property. A detailed discussion of these species, including information pertaining to their local status and distribution, should be included.
 - b. Specific acreage and description of the types of riparian, wetland, non-wetland waters of the U.S., southern maritime chaparral, maritime succulent scrub, coastal sage scrub, and other sensitive habitats that may be affected by each project alternative. Maps and tables should be included to summarize such information.

- c. A map showing potential wildlife corridors through and/or adjacent to the subject property.
- d. Results of early and late spring plant surveys of sensitive spring blooming annuals, which includes the rationale for why species with a high potential for occurrence may not have been detected.
- e. Figures that depict each project alternative, biological data, and the relationship of the subject property to the MHPA.
- f. An assessment of direct, indirect, and cumulative project impacts to fish and wildlife species and associated habitats within the project area and on adjacent properties. This assessment should address all facets of the project (e.g., construction, implementation, operation) and include the following:
 - i. A complete hydrological analysis for each project alternative to evaluate potential changes to hydrology, and how those changes may affect riparian areas, wetlands, and the MHPA.
 - ii. A thorough analysis of adverse impacts resulting from increased encroachment of humans and noise into habitat supporting wildlife.
 - iii. An analysis of how project-induced impacts may fragment open space, isolate wildlife and native vegetation communities, and affect wildlife movement at local and regional scales.
- g. Specific mitigation plans to fully offset each project alternative's direct, indirect, and cumulative impacts to sensitive biological resources.
 - i. Describe methods to be employed to prevent soil erosion and siltation of habitats.
 - ii. Describe methods to be employed to prevent discharge and disposal of toxic and/or caustic substances from the proposed project.
 - iii. Description of how project will avoid and minimize impacts to sensitive resources. For example, maintenance should be conducted outside the bird breeding season in or adjacent to nesting habitat to avoid impacts to nesting birds.
 - iv. Project impacts should be mitigated through the preservation, creation, restoration, and/or enhancement of affected habitat types.
 - v. Mitigation plans, if proposed, should be prepared by persons with specific expertise on southern California ecosystems and native plant revegetation

techniques. Each plan should include, at a minimum: (a) the location of the mitigation site; (b) the plant species to be used; (c) a schematic layout depicting the mitigation area; (d) time of year that planting will occur; (e) a description of the irrigation methodology to be employed; (f) measures to control exotic vegetation on site; (g) a detailed monitoring program which includes provisions for replanting areas where planted materials have not survived; (h) success criteria; (i) contingency measures in the event of mitigation failure; and (j) identification of the agency that will guarantee successful creation of the mitigation habitat and provide for the conservation of the restoration site in perpetuity.

- vi. Identify measures to be taken to perpetually protect habitat values of preserved and/or mitigation areas. Issues that should be addressed include: enforcement of restrictions on vehicle, equestrian, and people access; proposed land dedications; monitoring and management programs; control of illegal dumping; restrictions on lighting near mitigation areas; and consistency with the MHPA land use adjacency guidelines of the MSCP, etc.

The Service appreciates the opportunity to comment on the NOI. We are available to work with the USBWC in evaluating proposed project alternatives to avoid or otherwise minimize impacts to biological resources, the Tijuana Estuary and Tijuana River Valley, and the MHPA. If you have questions regarding this letter please contact Carolyn Lieberman at (760) 431-9440 extension 240.

Sincerely,



Therese O'Rourke
Assistant Field Supervisor
U.S. Fish and Wildlife Service

cc: San Diego Regional Water Quality Control Board, Mike Porter
U.S. Army Corps of Engineers, Terry Dean
California Department of Fish and Game, Libby Lucas
California Coastal Conservancy, Karen Bane
San Diego National Wildlife Refuge Complex, Slader Buck

Guemez, Sarah

From: Lopez-Cordova, Salvador
Sent: Wednesday, June 01, 2005 9:27 AM
To: Guemez, Sarah; Gendusa, Tony
Subject: FW: Re: Programmatic EIS Monthly Progress meeting CANCELLED

From: Daniel Borunda [mailto:danielborunda@ibwc.state.gov]
Sent: Wednesday, June 01, 2005 8:15 AM
To: Lopez-Cordova, Salvador
Cc: Daniel Borunda
Subject: Fwd: Re: Programmatic EIS Monthly Progress meeting CANCELLED

Salvador

This is the first set of comments received on the coordination letter to fish and game agencies regarding the Bio Survey.

Daniel

>>> <Mike_Buntjer@fws.gov> 06/01/2005 9:11:51 AM >>>
Hello Daniel:

Regarding your May 3, 2005, letter requesting additional information and/or preliminary input on the PEIS. We do not have any comments at this time. I am still having ongoing discussions with our Corpus Christi Field Office and their potential participation in this project -- our Austin Field Office will not be involved. I will let you know when I hear back from them. Thanks.

Mike

----- Forwarded by Mike Buntjer/R2/FWS/DOI on 06/01/2005 09:07 AM -----

Mike Buntjer

To: "Daniel Borunda" <danielborunda@ibwc.state.gov>
05/24/2005 10:39 AM cc:

Subject: Re: Programmatic EIS Monthly Progress meeting CANCELLED

(Document link: Mike

Buntjer)

GOVERNOR
Bill Richardson



STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8008
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STATE GAME COMMISSION
Guy Riordan, Chairman
Albuquerque, NM

Dr. Tom Arvas, Vice-Chairman
Albuquerque, NM

Alfredo Montoya, Commissioner
Alcalde, NM

David Henderson, Commissioner
Santa Fe, NM

Peter Pino, Commissioner
Zia Pueblo, NM

Leo Sims, Commissioner
Hobbs, NM

M. H. "Dutch" Salmon, Commissioner
Silver City, NM

DIRECTOR AND SECRETARY
TO THE COMMISSION
Bruce C. Thompson

Visit our website at www.wildlife.state.nm.us
For basic information or to order free publications: 1-800-862-9310.

June 2, 2005

Mr. Daniel Borunda, Environmental Protection Specialist
Environmental Compliance Section, USIBWC
4171 North Mesa Street, Bldg. C-100
El Paso, Texas 79902

Re: Programmatic Environmental Impact Statement for the Rio Grande Flood Control Projects in New Mexico
NMGF No. 10088

Dear Mr. Borunda,

In response to your letter dated May 3, 2005, regarding the above referenced project, the New Mexico Department of Game and Fish (Department) wishes to comment on the Rio Grande Canalization Project of the Programmatic Environmental Impact Statement (PEIS) for the Rio Grande Flood Control Projects in New Mexico. The Department supports evaluation and implementation of the Integrated Land Management options and River Channel and Floodplain Restoration options.

Information on relevant biological resources in the Rio Grande Canalization Project Area is contained in the Draft Environmental Impact Statement and Biological Assessment for the River Management Alternatives for the Rio Grande Canalization Project. Environmental analyses done for the River Management Alternatives for the Rio Grande Canalization Project are pertinent to the PEIS for the Rio Grande Flood Control Projects in New Mexico.

For up-to-date information on listed and other species of concern in the Rio Grande Canalization Project Area, contact the following sources:

1. New Mexico Wildlife of Concern by Counties List:
http://www.wildlife.state.nm.us/conservation/share_with_wildlife/documents/speciesofconcern.pdf
2. Habitat Handbook Project Guidelines:
http://wildlife.state.nm.us/conservation/habitat_handbook/index.htm
3. For custom, site-specific database searches on plants and wildlife. Go to Data then to Free On-Line Data and follow the directions go to: <http://nmmhp.unm.edu>
4. New Mexico State Forestry Division (505-827-5830) or <http://nmrareplants.unm.edu/index.html> for state-listed plants
5. For the most current listing of federally listed species **always** check the U.S. Fish and Wildlife Service at (505-346-2525) or <http://ifw2es.fws.gov/EndangeredSpecies/lists/>.

The 2004 Biennial Review of T&E Species of New Mexico is attached to this letter to provide you with up-to-date information on State-listed species that occur in the Project Area.

Thank you for the opportunity to review and comment on your project. We look forward to a review of the draft PEIS. If you have any questions, please contact Randy Floyd at (505) 476-8091 or rfloyd@state.nm.us.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa Kirkpatrick". The signature is fluid and cursive, with the first name "Lisa" written in a larger, more prominent script than the last name "Kirkpatrick".

Lisa Kirkpatrick, Chief
Conservation Services Division

LK/rif

xc: Susan MacMullin, New Mexico Ecological Services, USFWS
Luis Rios, SW Area Operations Chief, NMGF
Pat Mathis, SW Area Habitat Specialist, NMGF

Appendix B: Item 1

Plant Species in the Canalization Project

Palustrine Woodland

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Grasses and Forbes				
Alkali sacaton	<i>Sporobolus airoides</i>	FAC	Native	
Amamastla	<i>Rumex chrysocarpus</i>	FACW; NI	Native	
Bermudagrass	<i>Cynodon dactylon</i>	FACU+; FACU	Introduced	Noxious and Invasive
Broom snakeweed	<i>Gutierrezia sarothrae</i>	NI	Native	Invasive
Bulrush	<i>Scirpus maritimus</i>	OBL	Native	
Canada rye	<i>Elymus canadensis</i>	FAC+; FAC	Native	
Carelessweed	<i>Amaranthus palmeri</i>	FACU-; FACU	Native	Invasive
Cattail	<i>Typha latifolia</i>	OBL	Native	Invasive
Cocklebur	<i>Xanthium strumarium</i>	FAC-; FAC	Native	Noxious and Invasive
Common reed	<i>Phragmites australis</i>	FACW; FACW+	Introduced	Noxious and Invasive
Cutgrass	<i>Leersia oryzoides</i>	OBL	Native	
Dandelion	<i>Taraxacum officinale</i>	FACU+; FACU	Introduced	Invasive
Giant cane	<i>Arundinaria gigantea</i>	FACW	Native	
Globe mallow	<i>Sphaeralcea incana</i>	NI	Native	
Goldenrod	<i>Solidago</i> spp.		Native	
Guara	<i>Gaura</i> spp.		Native	
Johnsongrass	<i>Sorghum halepense</i>	FACU; FACU+	Introduced	Noxious and Invasive
Needle grama	<i>Bouteloua aristidoides</i>	NI	Native	
Peppergrass	<i>Lepidium montanum</i>	UPL	Native	
Pigweed	<i>Amranthus albus</i>	FACU	Native	Invasive
Purple aster	<i>Machaeranthera canescens</i>	NI; UPL	Native	Invasive
Red bladderpod	<i>Sphaerophysa salsula</i>	FACU	Introduced	Noxious and Invasive
Russian thistle	<i>Salsola kali</i>	FACU	Introduced	Noxious and Invasive
Sand dropseed	<i>Sporobolus Cryptandrus</i>	FACU-	Native	Invasive
Sedge	<i>Carex</i> spp.		Native	
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>		Native	Noxious and Invasive
Skeleton plant	<i>Lygodesmia</i> spp.		Native	
Spikerush	<i>Eleocharis</i> spp.		Native	
Squirrel tail	<i>Elymus longifolium</i> (<i>E. elimoides</i>)	FACU-; UPL	Native	
White sweet clover	<i>Melilotus albus</i>	FACU; FACU+	Introduced	Invasive
Wild licorice	<i>Galium lanceolatum</i>		Native	
Windmillgrass	<i>Chloris</i> spp.		Native	
Witchgrass	<i>Panicum capillare</i>	FAC	Native	Invasive
Yellow bristlegrass	<i>Setaria geniculata</i>	FAC	Native	Invasive
Shrubs and Vines				
Aromatic sumac	<i>Rhus aromatica</i>	NI	Native	
Baccharis	<i>Baccharis glutinosa</i> (<i>B. salicifolia</i>)	FACW	Native	

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Mint	<i>Mentha arvensis</i>	FACW	Native	Invasive
Needle grama	<i>Bouteloua aristidoides</i>	NI	Native	
Paspalum	<i>Paspalum</i> spp.		Native	
Peppergrass	<i>Lepidium montanum</i>	UPL	Native	
Plantain	<i>Plantago</i> sp.		Native	
Purple aster	<i>Machaeranthera canescens</i>	NI; UPL	Native	Invasive
Rabbitfoot grass	<i>Polypogon monspeliensis</i>	FACW+	Introduced	Invasive
Red bladderpod	<i>Sphaerophysa salsula</i>	FACU	Introduced	Noxious and Invasive
Russian thistle	<i>Salsola kali</i>	FACU	Introduced	Noxious and Invasive
Saltgrass	<i>Distichlis spicata</i>	FACW	Native	Invasive
Salt heliotrope	<i>Heliotropium curassavicum</i>	FACW; FACW+	Native	
Sand dropseed	<i>Sporobolus Cryptandrus</i>	FACU-	Native	Invasive
Sedge	<i>Carex</i> spp.		Native	
Sideoats grama	<i>Bouteloua curtipendula</i>		Native	
Silver bluestem.	<i>Bothriochloa barbinodis</i>	NI	Native	
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>		Native	Noxious and Invasive
Skeleton plant	<i>Lygodesmia</i> spp.		Native	
Sprangletop	<i>Leptochloa fascicularis</i>	FACW; FACW+	Native	Invasive
Squirrel tail	<i>Elymus longifolium</i> (<i>E. elimoides</i>)	FACU-; UPL	Native	
White sweet clover	<i>Melilotus albus</i>	FACU; FACU+	Introduced	Invasive
Wild licorice	<i>Galium lanceolatum</i>		Native	
Windmillgrass	<i>Chloris</i> spp.		Native	
Witchgrass	<i>Panicum capillare</i>	FAC	Native	Invasive
Yellow bristlegrass	<i>Setaria geniculata</i>		Native	Invasive
Shrubs and Vines				
Aromatic sumac	<i>Rhus aromatica</i>	NI	Native	
Baccharis	<i>Baccharis glutinosa</i> (<i>B. salicifolia</i>)	FACW	Native	
Fourwing saltbush	<i>Atriplex canescens</i>	UPL	Native	
Indigobush	<i>Psoralea</i> spp.		Native	
Milkweed vine	<i>Sarcostemma</i> spp.		Native	
Pale wolfberry	<i>Lycium pallidum</i>		Native	
Prickly pear	<i>Opuntia</i> spp.		Native	
Puncture vine	<i>Tribulus terrestris</i>		Introduced	Noxious and Invasive
Purple sage	<i>Salvia dorrii</i>		Native	
Turpentine bush	<i>Ericameria laricifolia</i>		Native	
Narrowleaf yucca	<i>Yucca angustissima</i>		Native	
Trees				
Honey mesquite	<i>Prosopis glandulosa</i>	FACU-; FACU	Native	Invasive
Littleleaf sumac	<i>Rhus microphylla</i>		Native	
Peachleaf willow	<i>Salix amygdaloides</i>	FACW	Native	
Rio Grande cottonwood	<i>Populus wislizenii</i> (<i>P. fremontii</i>)	FACW-; FACW	Native	
Russian olive	<i>Elaeagnus angustifolia</i>	FAC; FACW-	Introduced	Invasive
Salt Cedar	<i>Tamarix ramosissima</i>	FACW; FACW+	Introduced	Noxious and

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Screwbean mesquite	<i>Prosopis pubescens</i>	FAC+; FACW-	Native	Invasive
Siberian elm	<i>Ulmus pumila</i>	NI	Introduced	Invasive
Southwestern black willow	<i>Salix gooddingii</i>	FACW+; OBL	Native	
Torrey berry	<i>Lycium torreyi</i>	NI	Native	
velvet ash	<i>Fraxinus velutina</i>	FAC; FAC+	Native	
Whitethorn acacia	<i>Acacia constricta</i>	NI	Native	

Riparian Shrubland

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Grasses and Forbes				
Alkali mallow	<i>Malvella leprosa</i>	FACW	Native	Noxious and Invasive
Alkali sacaton	<i>Sporobolus airoides</i>	FAC	Native	
Bermudagrass	<i>Cynodon dactylon</i>	FACU+; FACU	Introduced	Noxious and Invasive
Black grama	<i>Bouteloua eriopoda</i>		Native	
Broom snakeweed	<i>Gutierrezia sarothrae</i>	NI	Native	Invasive
Buffalo gourd	<i>Cucurbita foetidissima</i>	NI	Native	Invasive
Bulrush	<i>Scirpus maritimus</i>	OBL	Native	
Cattail	<i>Typha latifolia</i>	OBL	Native	Invasive
Cocklebur	<i>Xanthium strumarium</i>	FAC-; FAC	Native	Noxious and Invasive
Gumweed	<i>Grindelia</i> spp.		Native	
Jointfir	<i>Ephedra</i> spp.		Native	
Jimson-weed	<i>Datura Stramonium</i>	NI	Introduced	Noxious and Invasive
Johnsongrass	<i>Sorghum halepense</i>	FACU; FACU+	Introduced	Noxious and Invasive
Koehria	<i>Koehria</i> spp.			
Morning glory	<i>Convolvulus</i> spp.			
Paspalum	<i>Paspalum</i> spp.		Native	
Pigweed	<i>Amaranthus albus</i>	FACU	Native	Invasive
Purple aster	<i>Machaeranthera canescens</i>	NI; UPL	Native	Invasive
Purple threeawn	<i>Aristida purpurea</i>		Native	Invasive
Rush	<i>Juncus</i> spp.		Native	
Russian thistle	<i>Salsola kali</i>	FACU	Introduced	Noxious and Invasive
Sand dropseed	<i>Sporobolus Cryptandrus</i>	FACU	Native	Invasive
Sideoats grama	<i>Bouteloua curtipendula</i>		Native	
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>		Native	Noxious and Invasive
Skeleton plant	<i>Lygodesmia</i> spp.		Native	
Sprangletop	<i>Leptochloa fascicularis</i>	FACW; FACW+	Native	Invasive
Split-leaf brickellbush	<i>Brickellia laciniata</i>		Native	
Spikerush	<i>Eleocharis</i> spp.		Native	

Common Name	Scientific Name	Wetland Indicator Status	Nativity	Notes
Goldenrod	<i>Solidago</i> spp.		Native	
Green sprangletop	<i>Leptochloa dubia</i>		Native	
Guara	<i>Gaura</i> spp.		Native	
Gumweed	<i>Grindelia</i> spp.		Native	
Horsetail	<i>Equisetum arvense</i>	FACW-	Native	Noxious and Invasive
Jimson-weed	<i>Datura Stramonium</i>	NI	Introduced	Noxious and Invasive
Johnsongrass	<i>Sorghum halepense</i>	FACU; FACU+	Introduced	Noxious and Invasive
Jointfir	<i>Ephedra</i> spp.		Native	
Koehria	<i>Koehria</i> spp.		Native	
Little bluestem	<i>Schizachyrium scoparium</i>	FACU	Native	
Marsh fleabane	<i>Pluchea purpurascens</i> (<i>P. odorata</i> var. <i>odorata</i>)	OBL(6); FACW+	Native	
Mustard	<i>Brassica</i> spp.		Introduced	Noxious and Invasive
Narrow spike dropseed	<i>Sporobolus contractus</i>		Native	
Needle grama	<i>Bouteloua aristoides</i>	NI	Native	
Panic grass	<i>Panicum</i> spp.			
Peppergrass	<i>Lepidium montanum</i>	UPL	Native	
Pigweed	<i>Amaranthus albus</i>	FACU	Native	Invasive
Portulaca	<i>Portulacaria</i> spp.		Native	
Purple aster	<i>Machaeranthera canescens</i>	NI; UPL	Native	Invasive
Ragweed	<i>Ambrosia artemisiifolia</i>	FACU-; FACU	Native	Noxious and Invasive
Red bladderpod	<i>Sphaerophysa salsula</i>	FACU	Introduced	Noxious and Invasive
Rush	<i>Juncus</i> spp.		Native	
Russian thistle	<i>Salsola kali</i>	FACU	Introduced	Noxious and Invasive
Saltgrass	<i>Distichlis spicata</i>	FACW	Native	Invasive
Salt heliotrope	<i>Heliotropium curassavicum</i>	FACW; FACW+	Native	
Sand dropseed	<i>Sporobolus Cryptandrus</i>	FACU	Native	Invasive
Scorpionweed	<i>Phacelia integrifolia</i>		Native	
Sedge	<i>Carex</i> spp.		Native	
Silver bluestem	<i>Bothriochloa barbinodis</i>		Native	
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>		Native	Noxious and Invasive
Skeleton plant	<i>Lygodesmia</i> spp.		Native	
Sneezeweed	<i>Helenium Autumnale</i>	FACW	Native	Invasive
Spectacle pod	<i>Dithyrea Wislizenii</i>	NI	Native	
Stickleaf	<i>Mentzelia multiflora</i>	NI	Native	
Sunflower	<i>Helianthus</i> spp.			
Thread-leaf ragwort	<i>Senecio flaccidus</i>		Native	
White sweet clover	<i>Melilotus albus</i>	FACU; FACU+	Introduced	Invasive
Wild licorice	<i>Galium lanceolatum</i>		Native	
Wild rye	<i>Elymus</i> spp.		Native	
Windmillgrass	<i>Chloris</i> spp.		Native	
Witchgrass	<i>Panicum capillare</i>	FAC	Native	Invasive
Yellow aster	<i>Eastwoodia elegans</i>		Native	
Yellow bristlegrass	<i>Setaria geniculata</i>		Native	Invasive
Shrubs and Vines				
Baccharis	<i>Baccharis glutinosa</i> (B. <i>salicifolia</i>)	FACW	Native	
Buckwheat	<i>Eriogonum</i> spp.		Native	
Fourwing saltbush	<i>Atriplex canescens</i>	UPL	Native	
Milkweed vine	<i>Sarcostemma</i> spp.		Native	

Common Name	Scientific Name	Wetland Indicator Status	Nativity	Notes	
Pale wolfberry	<i>Lycium pallidum</i>	FACU	Native	Invasive	
Poisonous milkweed	<i>Asclepias subverticillata</i>		Native		
Prickly pear	<i>Opuntia</i> spp.		Native		
Puncture vine	<i>Tribulus terrestris</i>		Introduced		Noxious and Invasive
Dock	<i>Rumex</i> spp.				
Turpentine bush	<i>Ericameria laricifolia</i>		Native		
Narrowleaf yucca	<i>Yucca angustissima</i>		Native		
Trees					
Desert willow	<i>Chilopsis linearis</i>	UPL	Native	Invasive	
Green ash	<i>Fraxinus pennsylvanica</i>	FACU-; FACU	Native		
Honey mesquite	<i>Prosopis glandulosa</i>		Native		
Live oak	<i>Quercus</i> spp.		Native		
Marsh-elder	<i>Iva</i> spp.		Native		
Peachleaf willow	<i>Salix amygdaloides</i>	FACW	Native		
Rio Grande cottonwood	<i>Populus wislizenii</i> (<i>P. fremontii</i>)	FACW-; FACW	Native		
Russian olive	<i>Elaeagnus angustifolia</i>	FAC; FACW-	Introduced		Invasive
Salt Cedar	<i>Tamarix ramosissima</i>	FACW; FACW+	Introduced		
Screwbean mesquite	<i>Prosopis pubescens</i>	FAC+; FACW-	Native		Noxious and Invasive
Siberian elm	<i>Ulmus pumila</i>	NI	Introduced		
Snakewood	<i>Condalia</i> spp.		Native		Invasive
Southwestern black willow	<i>Salix gooddingii</i>	FACW+; OBL	Native		
Summer cypress	<i>Kochia scoparia</i>	FAC	Introduced		Noxious and Invasive
Whitethorn acacia	<i>Acacia constricta</i>	NI	Native		

Croplands

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Grasses and Forbs				
Alfalfa	<i>Medicago ruthenica</i>	FACW-	Cultivated	Invasive
Barnyardgrass	<i>Echinochloa crus-galli</i>		Introduced	
Bermudagrass	<i>Cynodon dactylon</i>		FACU+; FACU	
Chile			Cultivated	
Cotton	<i>Gossypium</i> spp.		Cultivated	
Crested anoda	<i>Anoda Cristata</i>	FAC	Native	Invasive
Dallisgrass	<i>Paspalum dilatatum</i>	FAC	Introduced	Invasive
Dandelion	<i>Taraxacum officinale</i>	FACU+; FACU	Introduced	Invasive
Downy brome	<i>Bromus tectorum</i>		Introduced	Noxious and Invasive
Globe mallow	<i>Sphaeralcea incana</i>	NI	Native	
Guara	<i>Gaura</i> spp.		Native	
Johnsongrass	<i>Sorghum halepense</i>	FACU; FACU+	Introduced	Noxious and Invasive
Koehria	<i>Koehria</i> spp.		Native	
Lovegrass	<i>Eragrostis</i> spp.			
Mexican sprangletop	<i>Leptochloa fusca</i>	FACW-	Native	Invasive
Pigweed	<i>Amranthus albus</i>	FACU	Native	Invasive

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Sedge	<i>Carex</i> spp.		Native	
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>		Native	Noxious and Invasive
White sweet clover	<i>Melilotus albus</i>	FACU; FACU+	Introduced	Invasive
Windmillgrass	<i>Chloris</i> spp.		Native	
Yellow bristlegrass	<i>Setaria geniculata</i>		Native	Invasive
Trees				
Pecan	<i>Carya illinoensis</i>		Cultivated	

Emergent Marsh

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Grasses and Forbs				
Alkali sacaton	<i>Sporobolus airoides</i>	FAC	Native	
Arrowhead	<i>Sagittaria montevidensis</i>	NI; NI	Introduced	Invasive
Barnyardgrass	<i>Echinochloa crus-galli</i>	FACW-	Introduced	Invasive
Bermudagrass	<i>Cynodon dactylon</i>	FACU+; FACU	Introduced	Noxious and Invasive
Bulrush	<i>Scirpus maritimus</i>	OBL	Native	
Canada rye	<i>Elymus canadensis</i>	FAC+; FAC	Native	
Canarygrass	<i>Phalaris</i> spp.			
Carelessweed	<i>Amaranthus palmeri</i>	FACU-; FACU	Native	Invasive
Cattail	<i>Typha latifolia</i>	OBL	Native	Invasive
Cocklebur	<i>Xanthium strumarium</i>	FAC-; FAC	Native	Noxious and Invasive
Cutgrass	<i>Leersia oryzoides</i>	OBL	Native	
Downy brome	<i>Bromus tectorum</i>		Introduced	Noxious and Invasive
Frogfruit	<i>Phyla incisa</i>		Native	
Giant cane	<i>Arundinaria gigantea</i>		Native	
Giant dropseed	<i>Sporobolus giganteus</i>	UPL	Native	
Guara	<i>Gaura</i> spp.		Native	
Gumweed	<i>Grindelia</i> spp.		Native	
Hall's panic grass	<i>Panicum hallii</i>	FACU	Native	
Horsetail	<i>Equisetum arvense</i>	FACW-	Native	Noxious and Invasive
Johnsongrass	<i>Sorghum halepense</i>	FACU; FACU+	Introduced	Noxious and Invasive
Manzanilla	<i>Coreopsis</i> spp.	NI		
Marsh fleabane	<i>Pluchea purpurascens</i> (<i>P. odorata</i> var. <i>odorata</i>)	OBL; FACW+	Native	
Paspalum	<i>Paspalum</i> spp.		Native	
Pigweed	<i>Amranthus albus</i>	FACU	Native	Invasive
Purple aster	<i>Machaeranthera canescens</i>	NI; UPL	Native	Invasive
Red bladderpod	<i>Sphaerophysa salsula</i>	FACU	Introduced	Noxious/Invasive
Rush	<i>Juncus</i> spp.		Native	
Russian thistle	<i>Salsola kali</i>	FACU	Introduced	Noxious and Invasive
Saltgrass	<i>Distichlis spicata</i>	FACW	Native	Invasive
Salt heliotrope	<i>Heliotropium curassavicum</i>	FACW; FACW+	Native	

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR STATUS	NATIVITY	NOTES
Sedge	<i>Carex</i> spp.		Native	
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>		Native	Noxious and Invasive
Skeleton plant	<i>Lygodesmia</i> spp.		Native	
Spikerush	<i>Eleocharis</i> spp.		Native	
Sprangletop	<i>Leptochloa fascicularis</i>	FACW FACW+	Native	Invasive
Squirrel Tail	<i>Elymus longifolium</i> (<i>E. elimoides</i>)	FACU-; UPL	Native	
Stinging cevalia	<i>Cevalia sinuata</i>			
Wild rye	<i>Elymus</i> spp.		Native	
Witchgrass	<i>Leptoloma cognatum</i>	NI	Native	Invasive
White sweet clover	<i>Mellilotus albus</i>	FACU; FACU+	Introduced	Invasive
Shrubs and Vines				
Aromatic sumac	<i>Rhus aromatica</i>	NI	Native	
Baccharis	<i>Baccharis glutinosa</i> (<i>B. salicifolia</i>)	FACW	Native	
Fourwing saltbush	<i>Atriplex canescens</i>	UPL	Native	
Indigobush	<i>Psoralea</i> spp.		Native	
Milkweed vine	<i>Sarcostemma</i> spp.		Native	
Trees				
Russian olive	<i>Elaeagnus angustifolia</i>	FAC; FACW-	Introduced	Invasive
Salt Cedar	<i>Tamarix ramosissima</i>	FACW; FACW+	Introduced	Noxious and Invasive
Siberian elm	<i>Ulmus pumila</i>	NI	Introduced	Invasive
Southwestern black willow	<i>Salix gooddingii</i>	FACW+; OBL	Native	

OBL	Obligate Wetland	Occurs almost always (estimated probability 99%) under natural conditions in wetlands.
FACW	Facultative Wetland	Usually occurs in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
FAC	Facultative	Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
FACU	Facultative Upland	Usually occurs in non-wetlands (estimated probability 67%-99%), but occasionally found on wetlands (estimated probability 1%-3%)
UPL	Obligate Upland	Almost always occurs (estimated probability 99%) under natural conditions in non-wetlands in regions specified.
NI	No Indicator	Insufficient information was available to determine indicator status.
+	Modifier	Indicates a probability toward the higher end of the category.
-	Modifier	Indicates a probability toward the lower end of the category.

Appendix B: Item 2

Avian Species Observed in the Canalization Project during 2004 USIBWC Field Surveys

COMMON NAME	SCIENTIFIC NAME
American kestrel	<i>Falco sparverius</i>
American robin	<i>Turdus migratorius</i>
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Band-tailed pigeon	<i>Columba fasciata</i>
Barn swallow	<i>Hirundo rustica</i>
Black-chinned hummingbird	<i>Archilochus alexandri</i>
Black-crowned night heron	<i>Nycticorax nycticorax</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Blue-winged teal	<i>Anas discors</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Burrowing owl	<i>Athene cunicularia</i>
Cassin's sparrow	<i>Aimophila cassinii</i>
Cattle egret	<i>Bubulcus ibis</i>
Chihuahuan raven	<i>Corvus verticalis</i>
Cinnamon teal	<i>Anas cyanoptera</i>
Cliff swallow	<i>Petrochelidon pyrrhonata</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
European starling	<i>Sturnus vulgaris</i>
Gadwall	<i>Anas strepera</i>
Gambel's quail	<i>Callipepla gambelii</i>
Golden eagle	<i>Aquila chrysaetos</i>
Great blue heron	<i>Ardea herodias</i>
Greater roadrunner	<i>Geococcyx californianus</i>
Greater yellowlegs	<i>Tringa flavipes</i>
Great-tailed grackle	<i>Quiscalus mexicanus</i>
Green heron	<i>Butorides virescens</i>
House finch	<i>Carpodacus mexicanus</i>
House sparrow	<i>Passer domesticus</i>
Inca dove	<i>Columbina inca</i>
Killdeer	<i>Charadrius vociferus</i>
Ladder-backed woodpecker	<i>Picoides scalaris</i>
Mallard	<i>Anas platyrhynchos</i>
Mourning dove	<i>Zenaida macroura</i>
Northern harrier	<i>Circus cyaneus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Northern shoveler	<i>Anas clypeata</i>
Osprey	<i>Pandion haliaetus</i>
Phainopepla	<i>Phainopepla nitens</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agleaius phoeniceus</i>

COMMON NAME	SCIENTIFIC NAME
Rock dove	<i>Columba livia</i>
Snowy egret	<i>Egretta thula</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Spotted towhee	<i>Pipilo maculatus</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Turkey vulture	<i>Cathartes aura</i>
Western kingbird	<i>Tyrannus verticalis</i>
Western meadowlark	<i>Sturnella neglecta</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
White-faced ibis	<i>Plegadis chihi</i>
White-winged dove	<i>Zenaida asiatica</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Yellow-breasted chat	<i>Icteria virens</i>

Appendix C

Birds observed June 22-23, 2005, Presidio, TX.

Common Name	Latin Name ¹
American coot	<i>Fulica americana</i>
American kestrel	<i>Falco sparverius</i>
Aztec thrush	<i>Ridgwayia pinicola</i> ²
Black phoebe	<i>Sayornis nigricans</i>
Black-throated sparrow	<i>Amphispiza bilineata</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Common nighthawk	<i>Chordeiles minor</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Ferruginous hawk	<i>Buteo regalis</i>
Field sparrow	<i>Spizella pusilla</i>
Gambel's quail	<i>Callipepla gambelii</i>
Great blue heron	<i>Ardea herodias</i>
Great-crested flycatcher	<i>Myiarchus crinitus</i>
Greater roadrunner	<i>Geococcyx californianus</i>
Great-tailed grackle	<i>Quiscalus mexicanus</i>
Green heron	<i>Butorides virescens</i>
House finch	<i>Carpodacus mexicanus</i>
Inca dove	<i>Columbina inca</i>
Indigo bunting	<i>Passerina cyanea</i>
Killdeer	<i>Charadrius vociferus</i>
Ladder-backed woodpecker	<i>Picoides scalaris</i>
Lark sparrow	<i>Chondestes grammacus</i>
Lesser nighthawk	<i>Chordeiles acutipennis</i>
Lesser goldfinch	<i>Carduelis psaltria</i>
Mallard	<i>Anas platyrhynchos</i>
Mexican duck	<i>Anas platyrhynchos diazi</i>
Mourning dove	<i>Zenaida macroura</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern mockingbird	<i>Mimus ployglottos</i>
Painted bunting	<i>Passerina ciris</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Pyrrhuloxia	<i>Cardinalis sinuatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Rock dove	<i>Columba livia</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Turkey vulture	<i>Cathartes aura</i>
Varied bunting	<i>Passerina versicolor</i>
Western kingbird	<i>Tyrannus verticalis</i>
White-eyed vireo	<i>Vireo griseus</i>
White-winged dove	<i>Zenaida asiatica</i>
Yellow breasted chat	<i>Icteria virens</i>

¹ Latin genus species names are in accordance with Robbins, C. S., B. Bruun, and H.S. Zim. 2001. *Birds of North America: A Golden Field Guide* from St. Martin's Press. Revised by J. P. Latimer, K. S. Nolting, and J. Coe. New York, NY:St. Martin's Press.

² For this species only the source of the latin name is in accordance with Peterson, R. T. 1990. *A Field Guide to Western Birds (Peterson Field Guides)*. Houghton Mifflin Company, Boston, MA.

Appendix D - Photograph Log for Presidio Field Survey



Photo 1: Rio Grande RG1- Chione Creek- downstream



Photo 2: Rio Grande RG2- At gaging station- upstream of Rio Conchos



Photo 3: Habitat along the Rio Grande within the floodplain



Photo 4: Confluence of Rio Grande and Rio Conchos



Photo 5: Rio Grande RG3- Rio Grande at Cibolo Creek



Photo 6: Rio Grande RG3- Ro Grande at Cibolo Creek



Photo 7: Rio Grande at the International Bridge



Photo 8: Rio Grande RG4- Rio Grande after Alamito Creek enters



Photo 9: View of area from RG4