

Final Environmental Assessment
Improvements to the
Rio Grande Rectification Project

March 2009

Lead Agency:
United States Section,
International Boundary and
Water Commission
El Paso, Texas



COVER SHEET
FINAL ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT
IMPROVEMENTS TO THE RIO GRANDE
RECTIFICATION PROJECT

Lead Agency: United States Section, International Boundary and Water Commission (USIBWC)

Proposed Action: Improvements to the Rio Grande Rectification Project (RGRP) to increase flood protection, and to restore normal flow capacity of the river channel.

Report Designation: Environmental Assessment

Abstract: The RGRP is a flood control and water delivery project completed in 1938 along the Rio Grande in west Texas. The proposed action to improve functionality of the RGRP has two components, raising the levee system along various river segments to meet current flood control requirements, and dredging the river channel to restore normal flow capacity.

To increase flood containment capacity, fill material would be added on top of the levee system to bring height to its original design specifications, or to meet current flood control requirements. Various sections of the RGRP levee system along the United States margin of the Rio Grande would be raised up to 4 feet, using fill material obtained from commercial sources. Height increase would result in expansion of the levee footprint, up to a maximum of 12 feet on each side of the levee, to retain current slope design values. The expansion would take place along the levee service corridor currently utilized for levee maintenance, and entirely within the RGRP right-of-way. Excavation outside the levee structure is not an anticipated need.

In addition to flood control, the RGRP was constructed to efficiently deliver water for irrigation and other uses, both in Mexico and in the United States. Normal flow capacity of the river, reduced by sediment deposition, would be restored to ensure efficient water delivery and comply with existing agreements between the two countries. Dredging to be conducted by the USIBWC would cover three Rio Grande segments with an approximate combined length of 45 miles.

This Environmental Assessment assesses potential impacts of the Proposed Action and the No Action Alternative. Both alternatives are evaluated in terms of potential impacts on water, natural, cultural, and other resources, along with adopted mitigation measures, when applicable. A Finding of No Significant Impact was issued for the Proposed Action based on a review of the facts and analyses contained in the Environmental Assessment.

FINDING OF NO SIGNIFICANT IMPACT

IMPROVEMENTS TO THE RIO GRANDE RECTIFICATION PROJECT IN EL PASO AND HUDSPETH COUNTIES, TEXAS

LEAD AGENCY: United States Section, International Boundary and Water Commission, United States and Mexico (USIBWC).

BACKGROUND

The RGRP is a flood control and water delivery project completed in 1938 along the Rio Grande in El Paso and Hudspeth Counties, Texas. The RGRP, extending approximately 91 miles from El Paso to Fort Quitman, consists of a flood control levee system along the United States and Mexico margins of the Rio Grande, a maintained floodway enclosed by the levee system, and a dredged river channel.

The USIBWC identified the RGRP as a priority area to improve flood containment and restore normal flow capacity of the river channel. Flood control is the core mission of the RGRP whose economic benefits have been estimated at over \$140 million in terms of protection of residential, industrial, and commercial structures, and agricultural use. The RGRP was also built to ensure efficient delivery of water for irrigation and other uses in the United States and Mexico. A need has been identified to restore normal flow capacity of the river, reduced by sediment deposition, to improve irrigation water delivery and comply with existing agreements between the two countries.

PROPOSED ACTION

The proposed action to improve functionality of the RGRP has two components, raising the levee system along various river segments to meet current flood control requirements, and dredging the river channel to restore normal flow capacity.

To increase flood containment capacity, fill material would be added on top of the levee system to bring height to its original design specifications, or to meet current flood control requirements. Various sections of the RGRP levee system along the United States margin of the Rio Grande would be raised up to 4 feet, using compatible fill material obtained from commercial sources. Height increase would result in expansion of the levee footprint, up to a maximum of 12 feet on each side of the levee. The expansion would take place along the levee service corridor currently utilized for levee maintenance, and entirely within the RGRP right-of-way. Excavation outside the levee structure is not an anticipated need.

Normal flow capacity of the river, reduced by sediment deposition, would be restored to ensure efficient water delivery and comply with existing agreements between the two countries. Dredging to be conducted by the USIBWC would cover three Rio Grande segments with an approximate combined length of 45 miles within the RGRP.

SUMMARY OF FINDINGS

Pursuant to National Environmental Policy Act (NEPA) guidance (40 Code of Federal Regulations 1500-1508), The President's Council on Environmental Quality issued regulations for NEPA implementation which included provisions for both the content and procedural aspects of the required Environmental Assessment (EA). The USIBWC completed an EA of the potential environmental consequences of improvements to the flood control and water delivery capabilities of the RGRP. The EA, which supports this Finding of No Significant Impact, evaluated the No Action Alternative and Proposed Action.

POTENTIAL ENVIRONMENTAL IMPACTS

NO ACTION ALTERNATIVE

The No Action Alternative was evaluated as the single alternative action to the Proposed Action. The No Action Alternative would retain current conditions of the RGRP in terms of the levee system configuration and sediment deposition in the river channel, with no impacts to biological and cultural resources, land use, or environmental health issues. In terms of flood protection, however, current containment capacity under the No Action Alternative may be insufficient in fully controlling the Rio Grande flooding under severe storm events, with associated risks to personal safety and property. Non-implementation of dredging operations would be detrimental to extensive irrigated areas served by the RGRP due to inefficiency in water deliveries, and would fail to comply with existing boundary agreements between the two countries.

PROPOSED ACTION

Biological Resources

Placement of fill material on the levee would affect herbaceous vegetation present on footprint expansion locations and slope of the levee structure. All expansion would take place along the current levee service corridor, limiting vegetation removal to currently managed areas; this plant cover is expected to rapidly re-establish after project completion.

No significant effects are anticipated on wildlife habitat in the vicinity of the levee system. In areas requiring levee footprint expansion, impacts on vegetation would be limited to non-native managed salt cedar habitats and managed old-field habitats along the levee that are of very limited value as wildlife habitat. Levee expansion may remove some habitat for the Species of Concern Burrowing Owl, but levee expansion would occur outside the breeding season of the owls to reduce impacts. Further, the levee expansion will not be in conflict with the burrowing owl management plan. No jurisdictional wetlands are located within the potential levee expansion area, potential bed down areas or disposal sites.

Dredging operations would remove vegetation along some sections of the riverbanks. The river does not contain wetlands, and the vegetation communities along the river are expected to rapidly re-establish after project completion. Dredging is not expected to have an

effect on wildlife, including T&E species. Sediment disposal areas are outside the floodway, and sediment disposal would not affect sensitive habitats or wetlands.

Levee expansion would not affect aquatic resources of the Rio Grande. Dredging operations would temporarily affect aquatic habitats and resources; however, dredging operations would occur during low- or no-flow conditions. Therefore, aquatic habitats will be minimally affected by dredging operations.

Levee expansion and dredging operations will not affect unique or sensitive areas, including the Rio Bosque Wetlands Park.

Cultural Resources

Levee footprint expansion would take place along the current levee service corridor. The use of heavy equipment in the floodway and staging areas (including equipment yards and soil storage areas) to add and move soil material for levee expansion may cause soil disturbance several inches deep in the service corridor. Based on the results of previous trenching for geoarchaeological investigations in the project area, the upper 10 to 20 inches (25 to 50 centimeters) of the floodway exhibit evidence of leveling and mixing due to disturbances such as the original construction of the RGRP levee in the 1930s and ongoing floodway maintenance. Archaeological resources occurring up to this depth likely lack physical integrity and context and would most likely not be eligible for the National Register of Historic Places (NRHP). Levee footprint expansion may cap more deeply buried, intact archaeological resources with soil and gravel and could result in either a potentially beneficial or a potentially adverse effect to these resources. Architectural resources may be adversely affected by expansion of the levee footprint. Potential effects include vibration and ground disturbance from the use of heavy equipment during construction as well as effects caused by alterations to the levee itself; however, the increased height of the levee is not expected to change the flow of water to or from architectural resources. Under NEPA, there will be no significant impacts (i.e., “unresolvable” adverse effects under NHPA) to cultural resources because archaeological resources in the APE will be identified and architectural resources will be evaluated for NRHP eligibility prior to implementation of levee footprint expansion. Native American resources, including river access and sensitive Native American plant resources, may be altered by the levee improvements; consultation with the Native American tribes will assist in scheduling construction during times when the river and plants are not being used for ceremonial purposes.

There are no anticipated effects of dredging on archaeological resources. Dredging within the river channel will occur to a depth of 3 feet and simply remove silt deposited since previous dredging was conducted. Movement of heavy equipment used to dredge material from the river may disturb soil several inches deep in the floodway along the river and in staging areas, but no NRHP-eligible resources are expected to occur at that depth. If architectural resources (*e.g.*, lateral drain abutments) are in the areas of dredging operations, they would be avoided and would not be affected. Native American resources, including river access and sensitive Native American plant resources, could be adversely affected by dredging operations.

Intensive archaeological and architectural surveys to identify and evaluate cultural resources in the project area will be conducted in accordance with Texas State Historic Preservation Office (SHPO), (Texas Historical Commission [THC]), requirements. Cultural resources in the project area may include archaeological sites as well as levee-related resources, irrigation-related resources, roadway bridges, and culverts.

Water Resources

Improvements to the RGRP levee would increase flood containment capacity with a negligible increase in floodwater surface elevation. Levee footprint expansion would not affect water supply or management, agricultural water uses, or water quality.

Dredging operations would improve water flow within the river. Water supply and water management would be improved by making delivery of irrigation water more efficient. Dredging operations would temporarily affect water quality, but effects would attenuate with distance and would subside at the conclusion of the operations. Dredging operations would be scheduled to occur during low flow or no flow conditions to minimize impacts to water quality.

Land Use

Footprint levee expansion, where required, would take place completely within the existing right-of-way and along the levee service corridor. No urban or agricultural lands would be affected. Dredging operations, including equipment staging, would occur within the existing USIBWC right-of way outside the floodway. Sediment disposal would occur at pre-selected sites along the levee service corridor, outside the floodway, or on farmland by request. Dredged sediment disposed of on farmland could be used as a soil amendment and improve drainage in agricultural fields.

Community Resources

Residents and property along the RGRP would benefit from the continued flood protection. The influx of federal funds into El Paso and Hudspeth Counties from levee improvements and dredging operations would also have a positive local economic impact, largely limited to the construction period. The benefit would be small for El Paso County given its large economic base, less than 1% of the annual county employment, income and sales values. The effect would be more substantial in Hudspeth County because of its small population. No adverse impacts to disproportionately high minority and low-income populations were identified for construction activities. Moderate utilization of public roads would be required during construction, with a temporary increase in access road for equipment mobilization to staging areas.

Environmental Health Issues

Estimated air emissions of five criteria pollutants during construction would be discontinuous and represent less than 0.3 percent of the annual emissions inventory for El Paso County, and less than 1.5 percent for Hudspeth County. There would be a moderate increase in ambient noise levels due to construction activities. Neither long-term nor regular exposure is

expected above noise threshold values. A database search indicated that no waste storage and disposal sites were within proposed work areas, and none would affect, or be affected, by the proposed RGRP improvements.

Best Management Practices

Best management practices and mitigation measures would be implemented as part of the Proposed Action to minimize the potential for impacts to natural resources, and mitigation measures used compensate for potential adverse effects. Best management practices during construction would include use of sediment barriers and soil wetting to minimize erosion and dust.

Levee expansion alignment would be optimized, to the extent possible, to avoid impacts to riparian native wooded vegetation, including mature woody trees, if present. The project would comply with U.S. Environmental Protection Agency (USEPA) requirements for construction and equipment staging areas to avoid impacts on water quality and other aquatic resources. Continued coordination with the Texas Parks and Wildlife Department (TPWD) will be necessary for protection of burrowing owl nesting locations, including schedule modification of levee improvement operations. To protect wildlife, construction activities would be scheduled to occur, to the extent possible, outside the March 1st to August 31st bird migratory season as required by the United States Migratory Bird Treaty Act.

DECISION

Based on my review of the facts and analyses contained in the Environmental Assessment, I conclude that implementation of the Proposed Action to improve the Rio Grande Rectification Project would not have a significant impact. Accordingly, requirements of the National Environmental Policy Act and regulations promulgated by the Council on Environmental Quality are fulfilled and an environmental impact statement is not required.

C. W. Ruth

3/03/09

C.W. Ruth
Commissioner
International Boundary and Water Commission,
United States Section

Date

FINAL ENVIRONMENTAL ASSESSMENT
IMPROVEMENTS TO THE RIO GRANDE RECTIFICATION PROJECT

Lead Agency:

**UNITED STATES SECTION,
INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO**

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MARCH 2009

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ACRONYMS AND ABBREVIATIONS

AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
AQCR	Air Quality Control Regions
BMP	best management practice
CFR	Code of Federal Regulations
cfs	cubic feet per second
dBA	average-weighted sound level in decibels
E.O.	Executive Order
EA	Environmental Assessment
EIS	environmental impact statement
FEMA	Federal Emergency Management Agency
HAER	Historic American Engineering Record
IBWC	International Boundary and Water Commission
MxIBWC	Mexican Section, International Boundary and Water Commission
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O&M	operation and maintenance
PM ₁₀	particulate matter greater than 10 micrometers in size
Programmatic EIS	Programmatic Environmental Impact Statement
RCRA	Resource Conservation and Recovery Act
RGRP	Rio Grande Rectification Project
ROW	right-of-way
SHPO	State Historic Preservation Office
T&E	threatened and endangered
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historic Commission
TPWD	Texas Parks and Wildlife Department
USACE	U.S. Army Corps of Engineers
USBP	U.S. Border Patrol
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USIBWC	United States Section, International Boundary and Water Commission
yd ³	cubic yards

SECTION 1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The United States Section, International Boundary and Water Commission (USIBWC) prepared this Environmental Assessment (EA) for proposed improvements to the Rio Grande Rectification Project (RGRP), located in El Paso and Hudspeth Counties, Texas. The RGRP, extending approximately 91 miles from El Paso to Fort Quitman, Texas, consists of a flood control levee system along the United States and Mexico margins of the Rio Grande, a maintained floodway enclosed by the levee system and a dredged river channel.

The proposed action has two components, raising the height of the levee system in the United States margin of the RGRP to increase its flood containment capacity, and dredging three segments of the river channel to restore normal flow capacity. Figures 1 and 2 show the layout of the upper and lower reaches of the RGRP, along with main geographic features and river-mile markers used as a reference throughout this document.

This EA has been tiered-off from a Programmatic Environmental Impact Statement (Programmatic EIS) recently completed by the USIBWC for long-term improvements to Rio Grande flood control projects operated along the Texas-Mexico border (USIBWC 2008a). Descriptions of environmental conditions along the RGRP presented in this EA are summaries of more detailed information provided in the Programmatic EIS; these descriptions are supplemented in the areas of biological and cultural resources with data from a field evaluation conducted in support of the EA preparation.

Section 1 of the EA discusses the purpose of and need for the Proposed Action; the authority of the USIBWC to conduct the project as part of its mission; the scope of the environmental review; a summary of environmental compliance requirements; and the organization of this document. Subsequent sections discuss in detail the Proposed Action, environmental conditions in the RGRP area, potential impacts identified, and adopted best management practices and mitigation actions.

1.1 PURPOSE OF AND NEED FOR ACTION

The USIBWC identified the RGRP as a priority area to improve flood containment and restore normal flow capacity of the river channel. Flood protection, the core mission of the RGRP, represents a sizable federal investment for protection and enhancement of economic conditions along the Rio Grande. A USIBWC-sponsored study (Sturdivant, *et al.* 2004) evaluated economic benefits derived from the flood control mission of the RGRP. The study concluded that the economic benefit is approximately \$139 million for protection of residential, industrial, and commercial structures, and an additional \$1.25 million was estimated for protection of agricultural use. In addition to the baseline benefits for protection of structures, nearly \$69 million in damage protection was calculated for loss of roads and utilities and emergency response and recovery. Table 1.1 shows the calculated baseline economic benefits of the RGRP.

Table 1.1 Estimated Economic Benefits of the RGRP Operation

Category ¹	Estimated Area (acres)	% of Total Area	Estimated Damages (\$ per acre)	Number of Structures	Total Estimated Damages	% of Total Damages
Agriculture	2,356	30	\$530	--	\$1,249,533	1
Urban						
Residential	2,643	34	\$41,091	4,251	\$108,603,502	78
Commercial	2,759	35	\$9,732	331	\$26,850,544	19
Industrial	32	0	\$74,783	1	\$2,393,060	2
<i>Subtotal Urban</i>	<i>5,434</i>	<i>69</i>	<i>\$125,606</i>	<i>4,583</i>	<i>\$137,847,106</i>	<i>99</i>
TOTAL	7,790	99	\$126,136	4,583	\$139,096,639	100

¹ Based on the data presented in Sturdivant et al. 2004

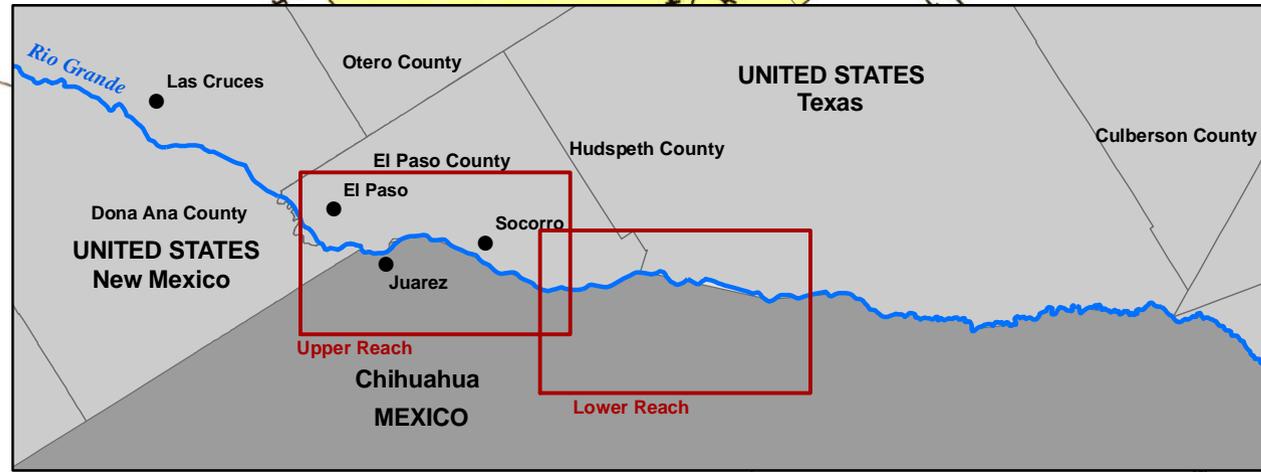
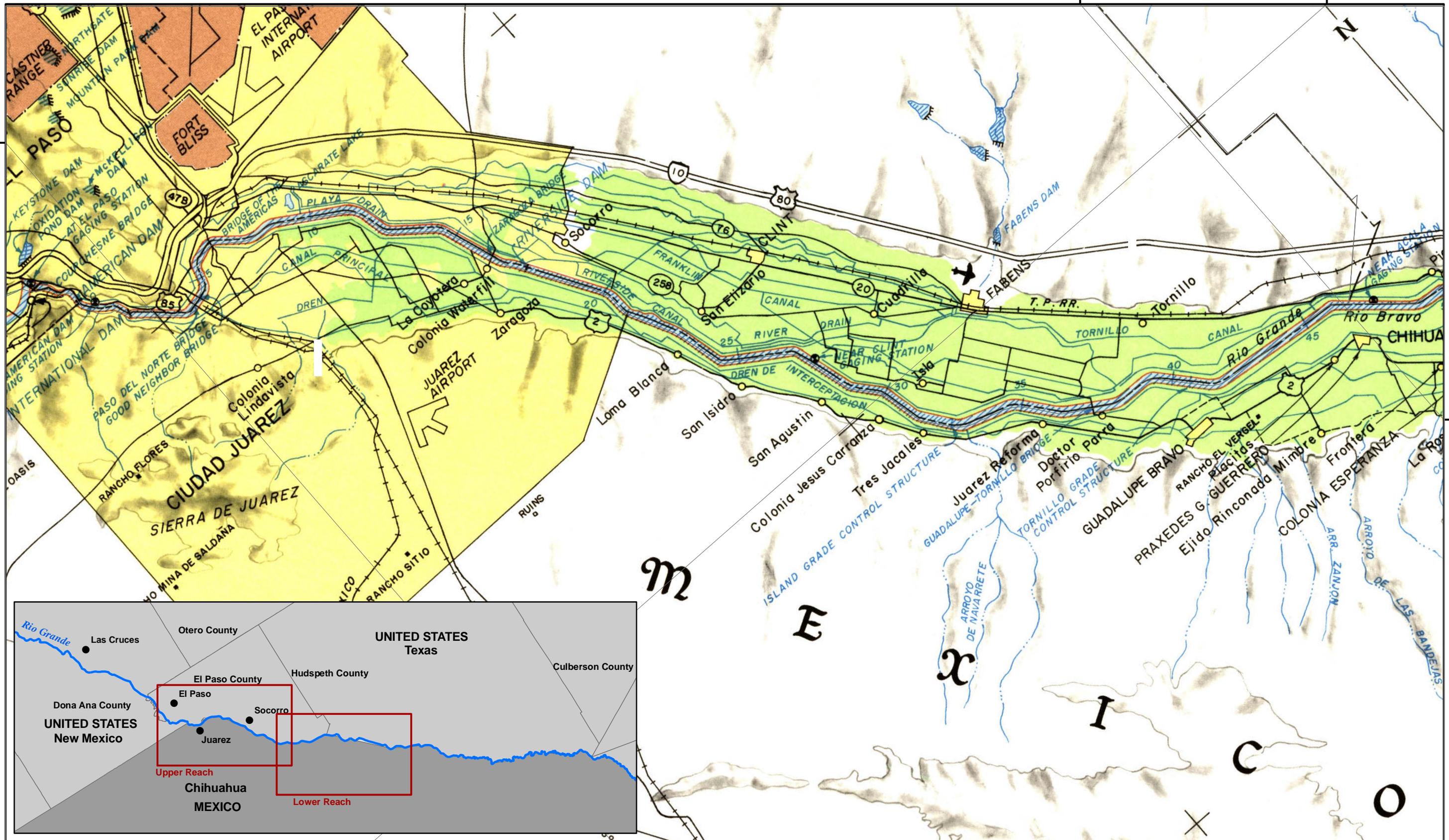
For improved flood control, height of several sections of the 85-mile long levee system would be raised to meet current design criteria. The extent of required improvements was determined from hydraulic modeling of flood containment capacity. Modeling results indicated that, during large flood events, height increases up to 4 feet would be required for flood control. Levee improvements required in the upper 17-mile reach of the RGRP, previously addressed in a separate EA (USIBWC 2007), are not included in this document.

Improvements to the levee system are also needed to retain levee system certification by the Federal Emergency Management Agency (FEMA), used as a criteria for development of Flood Insurance Rate Maps. Draft maps issued by FEMA in spring 2007 would classify extensive areas currently protected by the RGRP levee system as insufficiently protected, where residents would be required to purchase additional flood insurance.

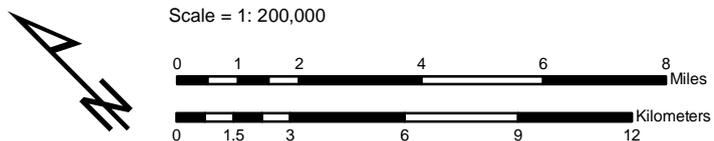
The USIBWC also identified as a high priority the need to perform silt removal along the river channel and arroyos that intersect the main stem of the Rio Grande that have caused interference with normal flows in the river. Efficient delivery of water for irrigation and other uses in the United States and Mexico, along with flood control, is the core mission of the RGRP. Silt removal would be performed by dredging. River channel rectification actions may also be required to modify the existing channel to conform to existing agreements with Mexico.

1.2 USIBWC AUTHORITY

The International Boundary and Water Commission (IBWC), which before 1944 was known as the International Boundary Commission, was created by the Convention of 1889, and consists of a United States Section (USIBWC) and a Mexican Section (MxIBWC). The IBWC was established to apply the rights and obligations the Governments of the United States and Mexico assumed under the numerous boundary and water treaties and related agreements. Application of the rights and obligations are accomplished in a way that benefits the social and economic welfare of the people on both sides of the boundary and improves relations between the two countries.



31°30'0"N 106°30'0"W

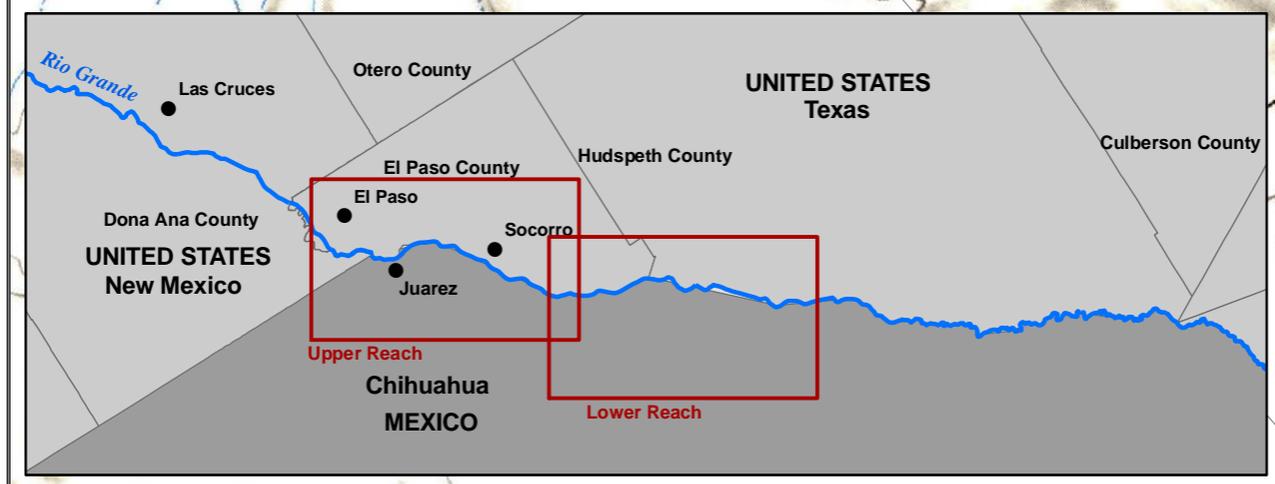
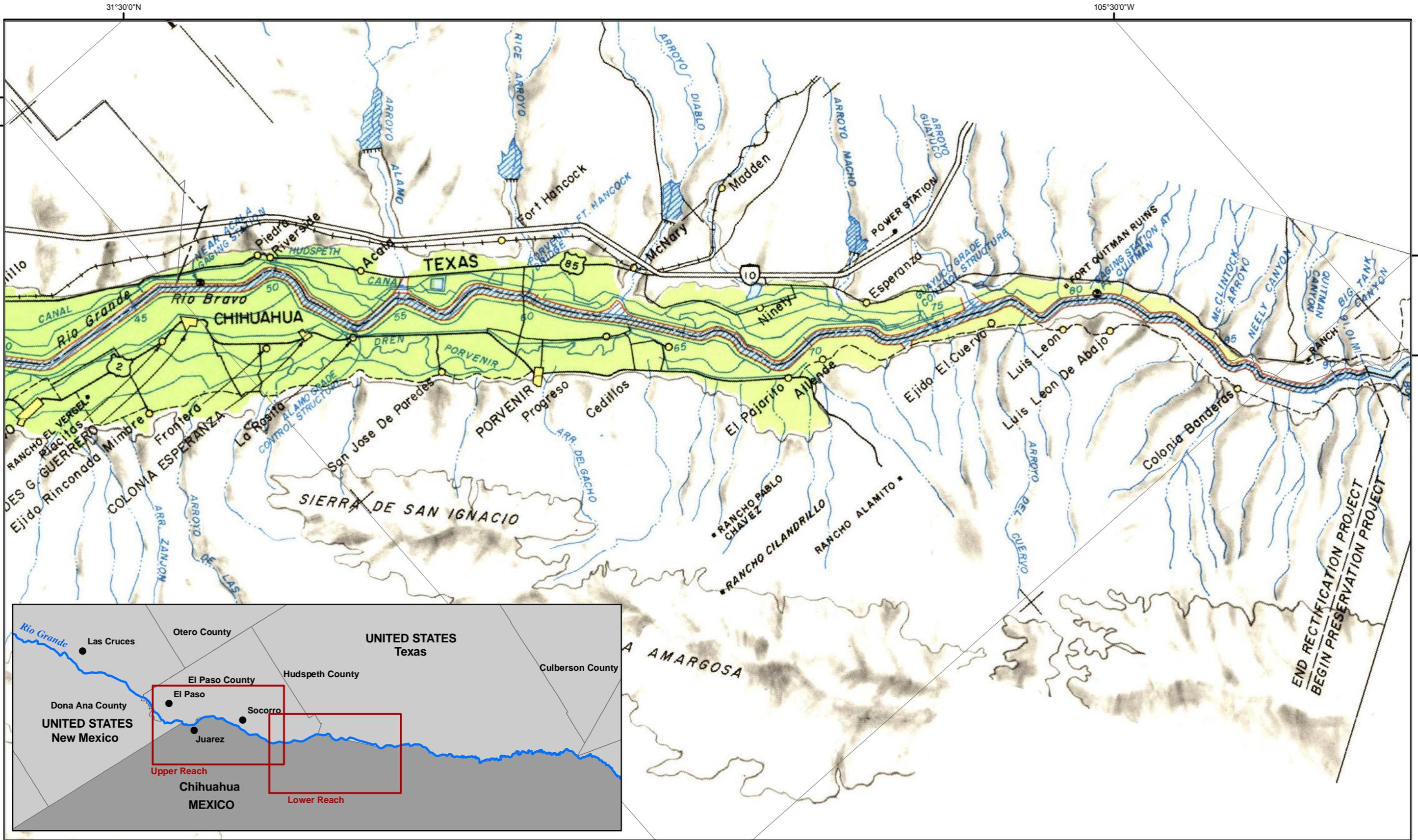


LEGEND

	Irrigated Areas		Urban Areas
	Floodway		Military Reservation



Figure 1
Rio Grande Rectification Project - Upper Reach
 International Boundary and Water Commission,
 United States Section



Scale = 1: 200,000

0 1 2 4 6 8 Miles
0 1.5 3 6 9 12 Kilometers

LEGEND

 Irrigated Areas	 Urban Areas
 Floodway	 Military Reservation

Figure 2
Rio Grande Rectification Project - Lower Reach
 International Boundary and Water Commission,
 United States Section



The mission of the USIBWC has five components:

1. Regulation and conservation of waters of the Rio Grande for use by the United States and Mexico through joint construction, operation, and maintenance of international storage dams and reservoirs and plants for generating hydroelectric energy at the dams, and regulation of the Colorado River waters allocated to Mexico;
2. Distribution of waters of the Rio Grande and the Colorado River between the two countries;
3. Protection of land along the Rio Grande from floods through levee and floodway projects, and solution of border sanitation and other border water quality problems;
4. Preservation of the Rio Grande and Colorado River as the international boundary; and
5. Demarcation of the land boundary.

The third mission of the USIBWC covers the proposed raising of the RGRP levee reach, and the fourth mission covers dredging of the river channel.

1.3 SCOPE OF THE ENVIRONMENTAL REVIEW

1.3.1 Regulatory Compliance Framework

Federal agencies are required to take into consideration the environmental consequences of proposed and alternative actions in the decision-making process under the National Environmental Policy Act (NEPA) of 1969, as amended. The President's Council on Environmental Quality issued regulations to implement NEPA that include provisions for both the content and procedural aspects of the required environmental analysis. In 1978, the Council on Environmental Quality issued regulations implementing the process (40 Code of Federal Regulations [CFR] 1500-1508).

The USIBWC regulations for implementing NEPA are specified in Operational Procedures for *Implementing Section 102 of the National Environmental Policy Act of 1969, Other Laws Pertaining to Specifics Aspects of the Environment and Applicable Executive Orders* (46 FR 44083, September 2, 1981). These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The Council on Environmental Quality regulations require that an EA:

- Briefly provide evidence and analysis to determine whether the Proposed Action might have significant effects that would require preparation of an EIS. If analysis determines that the environmental effects would not be significant, a Finding of No Significant Impact is prepared;
- Facilitate the preparation of an EIS, when required; or
- Aid an agency's compliance with NEPA when no EIS is necessary.

1.3.2 Resource Areas Evaluated

This EA identifies and evaluates the potential environmental consequences that may result from implementation of the Proposed Action and No Action alternative. It also characterizes the affected environment and describes, when required, mitigation measures to prevent or minimize impacts to environmental and cultural resources. Potential environmental consequences of the Proposed Action are discussed by resource area in Section 4 of this EA. The following resource areas and issues are included in the evaluation:

- Biological resources (vegetation, wildlife, threatened and endangered species, wetlands, aquatic habitats, and unique or sensitive areas);
- Cultural resources (archaeological, architectural) and Native American consultation;
- Water resources (flood control, water supply and management, agricultural water use, and water quality);
- Land use (urban development, agricultural use, and other significant uses);
- Community resources (socioeconomics, environmental justice, and transportation); and
- Environmental health (air quality, noise, and public health and environmental hazards).

Analyses of natural and cultural resources for the affected environment and environmental consequences are based on the narrow area surrounding the existing RGRP area. Analyses of environmental consequences also include potential indirect impacts adjacent to the levee and the region depending on the resource and its relationship to the Proposed Action and the No Action Alternative. Reference values for air quality, socioeconomics, and environmental justice are evaluated on a regional basis (county level).

This EA has been tiered-off from a Programmatic EIS prepared by the USIBWC for long-term improvements three Rio Grande flood control projects, including the RGRP (USIBWC 2008a). Descriptions of environmental baseline conditions along the RGRP presented in this EA are summaries of more detailed information provided in the Programmatic EIS.

Descriptions of environmental conditions are supplemented with findings of studies conducted in support of the EA preparation. Those findings are also used in the ongoing update of existing RGRP studies in the areas of biological resources (Parsons 2001) and cultural resources (Brown *et al.* 2003 and Gibbs *et al.* 2005).

1.4 ENVIRONMENTAL COORDINATION AND COMPLIANCE ANALYSIS

Table 1.2 is a summary of regulatory and/or permitting requirements potentially applicable to improvements under consideration, potential compliance issues, and anticipated level of environmental coordination.

Table 1.2 Summary of Environmental Coordination and Compliance by Resource Area

Agency or Organization	Regulation or Issue	Level of USIBWC Coordination
Biological Resources		
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act of 1973 (Public Law 93-205) and amendments of 1988 (Public Law 100-478) USFWS Coordination Act (916 USC 661, <i>et seq.</i>) Migratory Bird Treaty Act of 1918, as amended (16 USC 703-712; Ch. 128; July 13, 1918; 40 Stat. 755)	Consultation to determine whether migratory birds and T&E species could be affected. Section 7 of the Act requires formal consultation if significant adverse impacts to federally listed threatened and endangered species could occur due to the Proposed Action. Requires federal agencies to consult with USFWS regarding impact of Proposed Action.
Texas Parks and Wildlife Department (TPWD)	Chapters 67 and 68 of the TPWD Code, and Section 65.171-65.184 of the Texas Administrative Code	Coordination concerning impacts on wildlife and threatened and endangered species
Cultural Resources		
State Historic Preservation Office (SHPO)	National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470 <i>et seq.</i>) American Indian Religious Freedom Act (AIRFA), 1978 Native American Graves Protection and Repatriation Act (NAGPRA), 1990	Ensure compliance with NHPA, AIRFA and NAGPRA. The Texas Historic Commission (THC) may suggest conditions and mitigation measures following review of the Draft EA.
Water Resources		
U.S. Army Corps of Engineers (USACE)	Section 10 of the Rivers and Harbors Act of 1899 Section 404 of the Clean Water Act (33 USC 1344)	Pre-permit application. If waters of the United States are affected, mitigation plan and permit application would be required.
Texas Commission on Environmental Quality (TCEQ)	Section 401 of the Clean Water Act (33 USC 1344); Section 26.040 of Texas Water Code	Section 401 Certification: conditions and mitigation measures may be stipulated for the 401 permit; coordination is typically a function of the USACE permitting process.
United States Environmental Protection Agency (USEPA)	Section 402 of the Clean Water Act Section 404 of the Clean Water Act	Requirements for National Pollutant Discharge Elimination System construction permit and Storm Water Pollution Prevention Plan preparation. Section 404 Certification; coordination is typically a function of the USACE permitting process.
Other Issues		
Natural Resources Conservation Service (NRCS)	Farmland Protection Policy Act	Determination that no unique or prime farmland would be affected by the federal project.
U.S. Border Patrol (USBP)	Levee Road Usage	Coordination during construction activities.
Irrigation Districts	Modifications to intake channel and construction along irrigation canals	El Paso County Water Improvement District No. 1 Hudspeth County Conservation and Reclamation District No. 1

1.5 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

This Environmental Assessment is composed of the following sections:

Section 1 identifies the purpose of and need for the Proposed Action, defines the scope of the environmental review, and provides an environmental coordination and compliance analysis.

Section 2 describes the Proposed Action and No Action Alternative, and summarizes potential environmental impacts.

Section 3 presents information on the affected environment, providing a basis for analyzing the impacts of the Proposed Action.

Section 4 analyzes the environmental consequences of proposed improvements to the RGRP.

Section 5 describes best management practices for construction and potential mitigation actions.

Section 6 describes agencies and organizations consulted, and contributors to the EA preparation.

Section 7 is a list of cited references and source documents relevant to preparation of the EA.

Support documentation is provided in three appendices, as follows:

Appendix A Detailed maps of levee alignment and potential improvement areas.

Appendix B Biological evaluation update for the RGRP

Appendix C Draft EA review correspondence

SECTION 2 DESCRIPTION OF ALTERNATIVES

This section identifies measures associated with two alternatives for improvements to the Rio Grande Rectification Project: a No Action Alternative, the continued implementation of current operation and maintenance (O&M) practices, and one Proposed Action, including levee improvements and dredging the river channel of the Rio Grande.

2.1 NO ACTION ALTERNATIVE

The RGRP, located in El Paso and Hudspeth Counties, Texas, was constructed between 1934 and 1938. It extends 91 river miles along the Rio Grande in El Paso and Hudspeth County Texas. The RGRP begins approximately 140 feet downstream of the American Diversion Dam in El Paso at the beginning point of the Western Land Boundary between the United States and Mexico, and continues downstream to the Little Box Canyon below Fort Quitman, Texas. The purpose of the project was to stabilize the international river boundary and provide flood protection for both countries in urban, suburban, and agricultural areas. The RGRP also provides irrigation and drainage benefits to agricultural lands in both countries as well as urban areas on both sides of the river.

The 1933 Convention provided for the creation, operation, and maintenance of an artificial channel whose centerline became the new international boundary. The RGRP was constructed by straightening the river channel and developing a narrow floodway by constructing levees on both sides of the river. The channel straightening process removed some meanders and resulted in a reduction in the river length from 155 to 86 miles. In addition, the river gradient was increased from approximately 2 feet per mile to 3.2 feet per mile. To compensate for the increase in river gradient, the following four grade control structures were built: Island, Tornillo, Alamo, and Guayuco. The average channel depth along the RGRP is 3 to 5 feet. The width of the river channel is between 66 and 100 feet and its capacity is 1,000 cubic feet per second (cfs).

The floodway width averages 590 feet and its capacity is 11,000 cfs. The project includes 85.4 miles of levees on the U.S. side, and 83.7 miles of levees on the Mexico side. The average levee height is 7.2 feet, the average top width is 20 feet. The project was designed for the channel to safely contain a 100-year flood event.

2.1.1 Levee System Maintenance

The USIBWC conducts the following activities for maintenance of the RGRP levee system, either routinely or on an as-needed basis:

- Grade and resurface maintenance road on levees
- Mow/cut brush/woody vegetation from levee slopes; repair erosion-related damage
- Maintain grass vegetation

Maintenance of levees includes road maintenance, mowing of slopes, and erosion repairs. Maintenance supervisors drive the length of the U.S. levees each week to check condition, and repairs are conducted as needed. Resurfacing of levee roads, using gravel, takes place in a 20-year cycle that requires annual improvements at selected locations. Slopes are mowed continually with farm tractors and rotary slope mowers. Approximately 100 river miles of levee slope are mowed annually. Bank stabilization is performed as needed or after high flow events, about four to five of which occur per year. Typically after a high flow event, five to six locations are stabilized.

2.1.2 Floodway Maintenance

The USBWC conducts the following activities for maintenance of floodways of the RGRP, either routinely or on an as-needed basis:

- Mow floodway to control weeds and woody vegetation
- Remove debris in floodway on regular basis
- Perform floodway smoothing to reduce flow resistance

Floodways are leveled annually in areas that need it. Mowing takes place at least twice per year prior to July 15th to remove vegetation and other obstructions from the floodway. Mowing is performed along the entire U.S. floodway with farm tractors using rotary slope mowers. The USBWC also does special vegetation clearing at the request of the U.S. Border Patrol (USBP). An informal agreement is in place to facilitate access to the river for ceremonial use purposes by the Tiguas Pueblo, and mowing activities are partially re-scheduled to avoid disruption to ceremonies. Mowing is usually scheduled to occur outside the bird nesting season, which is March through August. If mowing is required during the nesting season, a pedestrian survey is conducted. New lighting was recently installed by the USBP in the floodway from the American Dam to the Zaragoza Bridge.

2.1.3 River Channel Maintenance

The USBWC conducts the following activities for maintenance of the RGRP river channel, either routinely or on an as-needed basis:

- Remove sediment from channel to maintain conveyance capacity and diversion requirements; removal is performed during non-irrigation periods, and disposal is conducted at designated spoil disposal sites currently in use, or outside the floodway under commercial agreements.
- Stabilize banks using riprap revetment and other structural channel linings.
- Perform structural repairs and modifications to dams, bridges, and other structures on an as-needed basis.
- Excavate arroyo mouths to maintain channel grade and conveyance.
- Adjust gates to maintain pool elevation, divert flows, and flush sediment and debris.
- Maintain grade control structures (Island, Tornillo, Alamo, and Guayuco grade control structures).

Sediment removal is done on an as-needed basis. Sediment is deposited at designated locations outside the floodway, uplands, and federal and private land, in accordance with existing agreements. Upstream of the flood control project, very limited dredging has been conducted near the American Dam gates and the Chamizal segment, which is the cement-lined channel of the Rio Grande. Those maintenance activities have been conducted under an USACE nationwide permit.

Riprap revetment is used to stabilize stream banks and repair scour protection of channel invert at utility crossings. Arroyo mouths as well as the main channel are excavated to maintain channel grade and conveyance and ensure irrigation deliveries.

2.2 PROPOSED ACTION

The Proposed Action has two main components, raising levee height to increase the flood containment capacity of the RGRP, and dredging of the Rio Grande to restore normal flow capacity of the river channel. No changes are under consideration in routinely conducted floodplain maintenance activities, such as vegetation management and grading to repair erosion damage and to maintain structural and functional integrity of the levees.

The USIBWC anticipates a phased implementation approach for the Proposed Action. The phased approach would allow planned activities to be executed efficiently and in a timely manner as funding becomes available.

Specific terms used for the Proposed Action are defined as follows:

- Survey area: The area between the Rio Grande and the landside of the levee. This area includes the access maintenance area that is generally located on the landside of the levee.
- Levee Service Corridor: The levee, including the slopes on both sides, and the maintenance road adjacent to the levee. The maintenance road is approximately 20 to 25 feet wide, and is generally located on the landside of the levee.
- Levee footprint: The actual levee, with a road along the top of the levee. In most places, the levee is approximately 20 feet wide on the top, and approximately 70 to 80 feet wide at the base.
- Right-of-way (ROW): The area on the landside of the levee and the levee service corridor owned and managed by the USIBWC. In many locations the levee service corridor extends to the ROW boundary.

2.2.1 Levee Improvements

The existing levee is a raised trapezoidal compacted-earth structure with an average crown width of 20 feet, an average height of 7.2 feet, and an approximate 3:1 side slope ratio (units of horizontal run in feet per foot of vertical rise). The levee crown is an unpaved service road with restricted public access. The existing levee footprint typically ranges from 70 to 80 feet, depending on location.

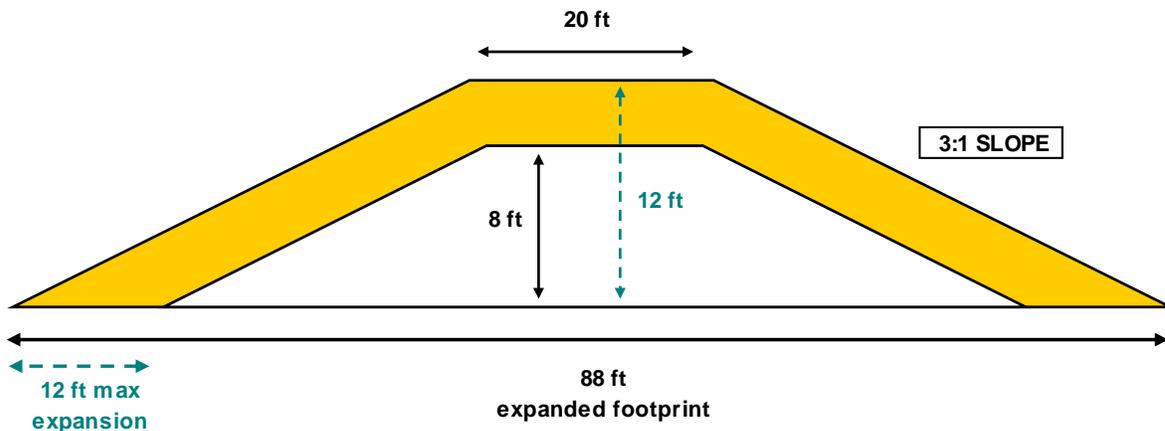
Hydraulic modeling using FLO-2D identified deficiencies of up to 4 feet along non-contiguous segments of the flood control levee system (USACE 2007). The Proposed Action

would increase flood containment capacity by raising levee height as required to ensure that the floodway will safely contain a 100-year flood event as required by FEMA for flood control. Levee rehabilitation would take place on U.S. levees only. The portion of the RGRP levee considered in this EA is the section below the Riverside Dam in El Paso County to the Little Box Canyon, near Fort Quitman, in Hudspeth County. Raising of the RGRP levee between International Dam and Riverside Dam, approximately 17 miles, was evaluated separately in a previous EA (USIBWC 2007), and is not part of this EA.

To raise the levee, fill material obtained from commercial sources would be added to the existing levee to bring the height to its original design specifications, or to meet a 3-foot freeboard design criterion. The need for excavation outside the levee structure is not anticipated. Levee height increases in improvement areas would result in levee footprint expansion.

Typically, footprint expansion would take place on both sides of the levee, retaining the horizontal alignment of the centerline. In some reaches of the levee system, if required by the presence of irrigation structures or other constraints, expansion would be made with an offset centerline, placing the additional footprint on only one side of the existing levee. Up to 4 feet of fill material would be placed on top of the levee, extending the levee footprint up to a maximum of 12 feet on each side from the current toe of the levee. A typical cross-section of an 8-foot tall levee is shown in Figure 3, illustrating a centered footprint expansion for a 4-foot height increase.

Figure 3 Typical Cross-Section of a Levee, Illustrating Footprint Expansion



Footprint expansion would take place along the approximately 20 to 25-foot wide levee service corridor currently utilized for levee maintenance, and entirely within the flood control project ROW. Where height increase is less than 1 foot, no levee footprint expansion would be needed, with a minor adjustment in levee slope. Structural improvements are likely needed in some sections of the RGRP, as indicated by an evaluation conducted for the USIBWC by the U.S. Army Corps of Engineers (USACE 2004). Those improvements, such as placing a slurry wall or an impermeable liner on the riverside slope of the levee, would not result in an expansion of the current levee footprint.

Table 2.1 presents the estimated length of levee improvements. In El Paso County, footprint increases would occur within approximately 19.1 miles of levee. For Hudspeth

County, footprint increases would occur within approximately 34.0 miles of levee. To determine the approximate footprint expansion based on the height increase, the midpoint of the height increase was multiplied by 3 (to maintain 3:1 slope ratio) and multiplied by 2 (two sides of levee, based on centered expansion). For example, for a height increase between 1 and 2 feet, the width increase is 1.5 (midpoint of height) \times 3 (slope ratio) \times 2 = 9 feet. To determine the number of acres affected by the height increase, the length of each height increase is multiplied by the width increase and converted to acres. The geographic distribution of levee improvements is presented in Appendix A, Figures A1 to A6.

Table 2.1 Extent of Potential Levee Footprint Expansion Downstream from Riverside Dam

Levee Height Increase (feet)	Length of Improvements (miles)	Average Width Increase (feet)	Footprint Expansion (acres)
<i>El Paso County</i>			
1 to 2	16.5	9	18.0
2 to 3	2.6	15	4.7
3 to 4	0.0	21	0.0
Total	19.1		22.8
<i>Hudspeth County</i>			
1 to 2	7.7	9	8.5
2 to 3	22.2	15	40.4
3 to 4	4.1	21	10.3
Total	34.0		59.1

2.2.2 Dredging of River Channel

Extent of Dredging

To improve the normal flow of the Rio Grande, sediment removal from the river channel and arroyos would be required. The USIBWC identified the need to perform silt and sediment removal in the floodway and arroyos that intersect the main stem of the Rio Grande that have caused interference with normal flows in the river. Based on the IBWC Minute 313 (*Maintenance in the Rectified Channel of the Rio Grande*; IBWC 2008), the Commissioners from each section concluded that failure to remove silt and attend to other basic maintenance tasks presented a risk of municipal flooding and could result in a change in the river course, thus altering the international boundary. Regularly scheduled maintenance would allow for clear delineation of the international boundary, thus enabling law enforcement authorities in both countries to be more effective in executing their assigned duties.

Sediment and silt removal by the USIBWC would take place in three segments of the Rio Grande from American Dam (River Mile 0), downstream to the end of the RGRP, near Fort Quitman. The estimated removal is approximately 3 million cubic yards (yd³) as tabulated below in Table 2.2. Estimates assume that dredging would increase channel depth from a current average value of approximately 4 feet to a design baseline depth of 6 feet, and include a 10 percent allowance for contingencies.

Table 2.2 Sediment Removal Locations by USIBWC and Estimated Removal Volume

RGRP Reach	Approximate River Miles	Approximate Length (miles)	Kilometer Markers	Estimated Removal Volume (yd ³)
International Dam to Chamizal	2.0 to 5.8	3.8	3+200 to 9+400	273,900
Chamizal to Riverside Dam	8.0 to 17.2	9.2	12+900 to 27+680	592,700
Lower Reach of RGRP	58.5 to 90.9	32.4	94+211 to 146+462	2,095,200
TOTAL		45.4		2,961,800

Timing and extent of sediment removal for each reach of the RGRP is not yet fully defined, as dredging would be conducted as priority improvement areas are determined. For the EA preparation, it was anticipated that sediment removal from the river channel would be conducted over a five-year period; the upper two segments, identified as a higher priority, would be initially completed in consecutive years, followed by dredging in the lower reach over a 3 year period.

Sediment Disposal

Minute 313 indicates that removed sediment is to be placed in the country completing the work, but it allows for the USIBWC to contract dredging and disposal with the MxIBWC. The latter option is under negotiation for the MxIBWC to extend its ongoing dredging operations to upstream RGRP sections assigned to the USIBWC under Minute 313.

When dredged sediment is disposed on the U.S. reach of the RGRP, it would initially be placed in the Chamizal disposal site, located upstream of the Ysleta Port of Entry Bridge, and other disposal sites along the landside of the RGRP currently in use. Subsequently, in the lower reach of the RGRP, sediment would be used for farmland improvement through agreements with land owners.

Sediment disposal needs were estimated on the basis of disposal sites having an available disposal depth of 3 feet. As indicated in Table 2.3, the resulting disposal needs would be 57 acres and 122 acres for years 1 and 2, respectively, and 144 acres per year for three years in the lower reach of the RGRP. Sediment disposal could take place, in part, in Mexico, as agreed by the two IBWC sections, reducing the estimated needs for disposal in the United States presented in Table 2.3.

Farmland identified as future disposal sites are located along the lower portion of the project and may potentially be available, where a number of landowners have expressed an interest in sediment use for farmland improvement. Sediment placement would benefit agricultural fields by raising their elevation for improved drainage, and to serve as a soil amendment. The availability of farmland placement areas, including a 100-acre site, was indicated in comments received during a scoping meeting held on January 20, 2005 for the Programmatic EIS preparation (USIBWC 2008b).

Table 2.3 Estimated Sediment Disposal Needs

Needed Acreage	County	Volume (yd ³)	Acres at 3' Depth	Years of Implementation	Acres Per Year at 3' Depth
International Dam to Chamizal	El Paso	273,900	57	1	57
Chamizal to Riverside Diversion Dam	El Paso	592,665	122	1	122
Lower RGRP - 32.5 miles	Hudspeth	2,095,217	433	3	144
TOTAL		2,961,782	612		323

2.3 OTHER ACTIONS WITH POTENTIAL CUMULATIVE IMPACTS

According to the agreement between the MxIBWC and the USIBWC, Minute 313, the two sections are responsible for sediment removal and disposal along the length of the RGRP. Sediment removal would improve normal flow levels and maintain the international boundary. The MxIBWC has begun to remove sediment along the reaches for which it is responsible, and sediment removal by the USIBWC is contingent upon receipt of funding.

The Department of Homeland Security developed plans and is finalizing contracts to build a border protection fence along the United States-Mexico border, adjacent to the Rio Grande. At present, the fence is proposed to run along the top of the existing RGRP levees. Fence construction may cause impacts to environmental resources through vegetation removal on levee slopes during construction and through transport of sediment and construction debris to the floodway during construction activities. Once built, the border fence will isolate tracts of land located within the river floodplain, and may disrupt Native American access to the river.

2.4 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

2.4.1 No Action Alternative

The No Action Alternative would retain the current conditions of the RGRP levee system and river channel. This alternative would have no impacts to biological and cultural resources, land use, or environmental health issues. In terms of socioeconomic resources, the lack of improvements in RGRP functionality would have a very significant impact due to insufficient flood containment capacity to protect communities and agricultural lands located along the levee system. In addition, inadequate operation of the river channel would result in inefficient delivery of irrigation flows and likely destabilization of the international boundary.

2.4.2 Proposed Action

Proposed improvements would have a very significant socioeconomic benefit for communities protected from flooding by the RGRP. Increased flood protection would ensure that RGRP functionality is maintained, ensuring full utilization of a sizable federal investment for protection and enhancement of economic conditions along the Rio Grande. Agricultural lands would also benefit by the increased efficiency in irrigation water delivery.

Raising the levee would extend the footprint; that expansion would take place along the approximate 20-foot levee service corridor currently utilized for levee maintenance, and entirely within the flood control project ROW. In terms of biological communities, footprint expansion would result in temporary removal of low-quality herbaceous vegetation. Impacts expected in expansion areas are not located within natural resources conservation areas. Similarly, cultural resources would not be impacted as those resources are either located outside the ROW or outside areas where levee footprint expansion would occur. No potential impacts on land use, community resources, or environmental health issues resulting from the levee improvements were identified. Sediment removal and spoil placement would not be expected to have impacts on evaluated resources. Sediment disposal would take place in currently utilized disposal sites within the RGRP right-of-way, and may potentially be used for farmland improvements. Table 2.4 summarizes potential environmental consequences of the proposed RGRP improvements.

Table 2.4 Summary of Environmental Impacts of Proposed Levee Improvements and Dredging Activities in the RGRP

Resource Area	Environmental Impacts
<p>Biological Resources (Subsection 4.1)</p>	<p>Improvements to the levee system would include placement of fill material that would affect vegetated areas at levee footprint expansion locations. All expansion would take place along the current levee service corridor, limiting vegetation removal to managed salt cedar areas and managed old-field communities; this plant cover is expected to be rapidly re-established after project completion.</p> <p>In areas requiring levee footprint expansion, no significant effects are anticipated to wildlife habitat in the vicinity of the levee system, including potential habitat for threatened and endangered species. No jurisdictional wetlands are located within the potential levee expansion area</p> <p>Dredging operations would remove sediment from the river channel and vegetation along the bank of the river. The vegetation along the river is expected to rapidly re-establish after project completion. Dredging is not expected to have an effect on wildlife, including T&E species. Aquatic resources would be minimally affected by dredging operations, but the effects will rapidly attenuate with time and distance from the dredging operations. Sediment disposal areas are outside the floodway, and sediment disposal would not affect sensitive habitats or wetlands.</p>

Resource Area	Environmental Impacts
<p>Cultural Resources (Subsection 4.2)</p>	<p>Levee footprint expansion would take place along the current levee service corridor. The use of heavy equipment in the floodway and staging areas (including equipment yards and soil storage areas) to add and move soil material for levee expansion may cause soil disturbance several inches deep in the service corridor. Based on the results of previous trenching for geoarchaeological investigations in the project area, the upper 10 to 20 inches (25 to 50 centimeters) of the floodway exhibit evidence of leveling and mixing due to disturbances such as the original construction of the RGRP levee in the 1930s and ongoing floodway maintenance. Archaeological resources occurring up to this depth likely lack physical integrity and context and would most likely not be eligible for the National Register of Historic Places (NRHP). Levee footprint expansion may cap more deeply buried, intact archaeological resources with soil and gravel, resulting in a potential beneficial as well as potential adverse effect to these resources. Architectural resources may be adversely affected by expansion of the levee footprint. Potential effects include vibration and ground disturbance from the use of heavy equipment during construction as well as effects caused by alterations to the levee itself; however, the increased height of the levee is not expected to change the flow of water to or from architectural resources. Under NEPA, there will be no significant impacts (i.e., “unresolvable” adverse effects under NHPA) to cultural resources because archaeological resources in the APE will be identified and architectural resources will be evaluated for NRHP eligibility prior to implementation of levee footprint expansion. Native American resources, including river access and sensitive Native American plant resources, may be altered by the levee improvements; consultation with the Native American tribes will assist in scheduling construction during times when the river and plants are not being used for ceremonial purposes.</p> <p>Dredging operations would remove vegetation from the river banks and sediment from the river channel. There are no anticipated effects of dredging on archaeological resources. Dredging within the river channel will occur to a depth of 3 feet and simply remove silt deposited since previous dredging was conducted. Movement of heavy equipment used to dredge material from the river may disturb soil several inches deep in the floodway along the river and in staging areas, but no NRHP-eligible resources are expected to occur at that depth. If architectural resources (e.g., lateral drain abutments) are in the areas of dredging operations, they would be avoided and would not be affected. Native American resources, including river access and sensitive Native American plant resources, could be adversely affected by dredging operations.</p>
<p>Water Resources (Subsection 4.3)</p>	<p>Improvements to the RGRP levee would increase flood containment capacity to control the design flood event with a negligible increase in water surface elevation. Levee footprint expansion would not affect water supply or management, or agricultural water uses, or water quality.</p> <p>Dredging operations would improve water flow within the river. Water supply and water management would be improved by the dredging operations as delivery of irrigation water would be more efficient. Water Quality would be temporarily affected by dredging operations, but the effect would attenuate with distance from the dredging operations and would subside at the conclusion of the operations.</p>

Resource Area	Environmental Impacts
<p>Land Use (Subsection 4.4)</p>	<p>Footprint levee expansion, where required, would take place completely within the existing ROW and along the levee service corridor. No urban or agricultural lands would be affected.</p> <p>Dredging operations, including equipment staging, would occur within the existing floodway and along the levee service corridor. Sediment disposal would occur at pre-selected sites, outside the floodway. If sediment disposal were to occur on farmland, those sites could potentially be improved by use of dredged sediment as a soil amendment, and to improve drainage of agricultural fields.</p>
<p>Community Resources (Subsection 4.5)</p>	<p>In terms of socioeconomic resources, the influx of federal funds into El Paso and Hudspeth Counties from the levee improvement project and dredging operations would have a positive local economic impact. The impact would be largely limited to the construction period. In El Paso County, beneficial effects would represent less than 1% of the annual county employment, income and sales values. The effect would be far more substantial in Hudspeth County given its small population. Levee improvements would allow the USIBWC to certify its levee system, thus reduce the potential need for flood insurance by homeowners adjacent to levees.</p> <p>No adverse impacts to disproportionately high minority and low-income populations were identified for construction activities. Moderate utilization of public roads would be required during construction; a temporary increase in access road use would be required for equipment mobilization to staging areas.</p>
<p>Environmental Health Issues (Subsection 4.6)</p>	<p>Estimated air emissions of five criteria pollutants during construction would be discontinuous and represent less than 0.5% of the annual emissions inventory for El Paso County, and less than 1.4% for Hudspeth County.</p> <p>There would be a moderate increase in ambient noise levels due to construction activities. No long-term and regular exposure is expected above noise threshold values.</p> <p>A database search indicated that no waste storage and disposal sites were within proposed work areas, and none would affect, or be affected, by the proposed RGRP improvements.</p>
<p>Indirect and Cumulative Impacts (Subsection 4.7)</p>	<p>A border protection fence will be built by the Department of Homeland Security adjacent to the Rio Grande, along the RGRP levee system. The impact area of fence construction would overlap and extend beyond the RGRP levee improvement area. The fence project may impact both natural and cultural resources during construction and, once built, it is likely to isolate tracts of land in the floodplain from the river, interfere with wildlife travel corridors, and disrupt Native American access to the river.</p>

SECTION 3 AFFECTED ENVIRONMENT

This section describes resources in the potential area of influence of the levee construction project. The sequence of resource areas presented in this section matches the sequence used in Section 4 to discuss environmental consequences potentially associated with implementation of improvements to the RGRP. Baseline conditions are discussed in this section as follows:

- Biological resources;
- Cultural resources;
- Water resources;
- Land use;
- Community resources; and
- Environmental health.

3.1 BIOLOGICAL RESOURCES

3.1.1 Vegetation

The RGRP area is within the northern Trans-Pecos region of the Chihuahuan Desert. This region is characterized by relatively hot summers, mild winters, and short temperate spring and fall seasons. A detailed description of regional vegetation is provided in the Programmatic EIS (USIBWC 2008a). Adjacent lands along the Rio Grande are primarily agricultural lands for production of food crops, and rangeland for the production of dairy cattle and beef cattle. Due to the extensive clearing of native vegetation for agriculture and urban development, relatively small areas of native vegetation remain.

The levee system grasses are regularly mowed to ensure suitable design flood features and to prevent the encroachment of woody plants, primarily salt cedar, onto the levee slopes. The levee slopes are dominated by invasive grass and forb species, including Bermuda grass, Russian thistle, silverleaf nightshade, and London rocket.

Field surveys were conducted on July 7-11, 2008 to identify plant communities along the RGRP survey area, including potential threatened and endangered (T&E) habitats and locations of potential wetlands that may be impacted by the Proposed Action. Results of field studies conducted in support of this EA will be used to update existing reports on biological resources.

The floodway in the RGRP area is relatively narrow, and therefore, vegetation communities were determined within the U.S. portions of the floodway, from the Rio Grande to the levee. Areas where the levee deficiencies were the greatest, and would therefore require the greatest footprint expansion were surveyed in more detail. Following the field mapping efforts, this expansion area was analyzed using GIS to determine vegetation community composition, based on vegetation mapping within the survey area. Plant community classes were defined based on field observations coupled with the vegetation types identified by Texas Parks and Wildlife Department (TPWD) website references.

In the upper reaches of the project area, the vegetation communities are primarily managed herbaceous, old-field communities, characterized by invasive grasses and forbs, some salt cedar and some immature willows along the margins of the river. The managed herbaceous old-field communities are most common in the upper reaches of the project area, from the American Dam to approximately river mile 45.

Farther downstream, the vegetation communities are primarily managed salt cedar communities, characterized by immature salt cedar (from routine mowing) and Bermuda grass and invasive forbs. The floodway is routinely mowed, and the invasive species rapidly re-grow or re-establish, and the vegetation communities are not altered substantially by mowing. In the upper reaches of the project area, urban and suburban areas are adjacent to the project area, to the landside of the levee. In the lower reaches of the project area, agricultural lands are adjacent to landside of the existing levee. Throughout most of the project area, irrigation canals separate the levee from other lands. Potential jurisdictional wetlands are not present along the RGRP, as discussed in Section 3.1.4.

3.1.2 Wildlife

A limited number of wildlife species are present in the region, primarily due to intensive land use and urbanization in the RGRP area. The mule deer is the only large game animal known to occur in the region. Other common non-game mammals include the coyote, bobcat, spotted skunk, striped skunk, desert cottontail, black-tailed jackrabbit, porcupine, gopher, and several species of rats and mice (Parsons 2001). The Rio Grande is a major migratory flyway for numerous bird species, particularly waterfowl, shore birds, and those associated with riparian habitats. Regional wildlife conditions are discussed in the Programmatic EIS (USIBWC 2008a).

The cleared floodplain provides suitable hunting areas for raptors. Of the variety of birds found in the area, some common species include the great blue heron, red-winged blackbird, western kingbird, burrowing owl, gadwall, mourning dove, and turkey vulture. Due to the intensive land use, insufficient food and cover at most locations of the RGRP survey area, only a small number of reptile and amphibian species are expected to occur.

3.1.3 Threatened and Endangered Species

Habitat requirements and life history for each federal and state-listed species potentially occurring along the RGRP survey area were identified through literature review. Sources of information included T&E species fact sheets published by natural resource agencies, species recovery plans, and scientific literature. The TPWD compiles a list of federal and state-listed species and species of concern. The lists are organized by county (TPWD 2008). Within the RGRP area, there are several species listed as federally threatened or endangered, and several additional species that are listed as threatened or endangered by the State of Texas, or are candidate species for listing (TPWD 2008). The project area is within El Paso and Hudspeth Counties, and there are several federal and state-listed T&E species, as follows:

- Four species of mammals (three species are probably extirpated);
- Three species of reptiles;

- Eight species of birds (four are listed T&E species; one is a candidate for listing; two are federally de-listed as endangered species, but remain state listed, and one is a state listed species-of-concern);
- Two species of fish (probably extirpated); and
- Three species of plants.

A listing of federal and state-listed T&E species is provided in Appendix B, including general habitat descriptions, scientific names of all species, and if the species may be present in the project area. More detailed information is provided in an existing biological assessment report previously prepared for the RGRP (Parsons 2001) that is currently being updated on the basis of a site investigation conducted in support of the EA preparation.

3.1.4 Wetlands

Aerial photography, soil maps, and National Wetlands Inventory data areas and field survey were used to identify potential wetland areas. No jurisdictional wetlands were identified in areas where the levee footprint would be expanded. Non-jurisdictional wetlands within the survey area are described as “Non-jurisdictional water features,” which are typically seasonally or temporarily flooded former borrow pits or artificial settling basins used for irrigation. No wetlands were identified within the areas used for sediment spoil placement.

3.1.5 Aquatic Habitats

Historically, the Rio Grande in the region was characterized by a meandering river channel across a broad floodplain. The vegetation along the Rio Grande was historically composed of cottonwood, willow, and the river channel was characterized by marshes, backwaters, and oxbow pools (USIBWC and El Paso Water Utilities/PSB 2000; USIBWC 2008a). This structural complexity supported a diverse aquatic fauna within the Rio Grande and associated arroyos and tributaries.

Due to the alteration of river flows by upstream reservoirs operation, and minimum flows during the non-irrigation season, low-quality aquatic habitat types are present that support a very limited fish fauna. The river channel is primarily lined with unconsolidated sand that tends to shift downstream during even moderate flows (USIBWC and El Paso Water Utilities/PSB 2000). Further, habitat loss during Rio Grande channel rectification, and conversion of adjacent vegetation to invasive species or open areas, has reduced the structural complexity of the Rio Grande in the area of the RGRP.

The extent of aquatic ecosystems are restricted to discontinuous sections of the main river channel, and the tributaries that flow into the Rio Grande. Surface water in the Rio Grande is fully allocated and tightly managed (USIBWC and El Paso Water Utility/PSB 2000), and during low flow periods, the river channel may be essentially dry as waters are diverted for irrigation. The primary irrigation season is from March through October and the secondary irrigation season is from November through February (USIBWC and El Paso Water Utility/PSB 2000).

In this region, the fish fauna are likely to include small fish, commonly called “minnows,” that live in the tributaries for all or part of their life cycles. The fish species may include two or more species of minnows (*Pimephales* spp.) and red shiner (*Cyprinella lutrensis*), species of sunfish (*Lepomis* spp.), and western mosquitofish (*Gambusia affinis*). In the Rio Grande, the dominant fish species include gizzard shad, red shiner, common carp, river carpsucker, channel and flathead catfish, western mosquitofish, and green sunfish (TPWD 1998; USIBWC and El Paso Water Utilities/PSB 2000). Most of the fish species present in the Rio Grande spawn in the spring or early summer, which coincides with the primary irrigation season (USIBWC and El Paso Water Utilities/PSB 2000), when most of the water is diverted from the Rio Grande to irrigation canals.

3.1.6 Unique or Sensitive Areas

No state or federally owned or managed lands are present within the RGRP study area or ROW. The Rio Bosque Wetlands Park, adjacent to the RGRP, was developed by the City of El Paso on 372 acres of land transferred by the USIBWC in 1973. In 1997 the land was developed as a wetlands park managed by the University of Texas at El Paso, to mitigate removal of wetlands for construction of the American Canal Extension and to mitigate impacts associated with maintenance dredging within the RGRP. The Park provides valuable habitat for migrating bird species; ongoing projects have developed patches of native vegetation and removed large patches of salt cedar. The Park receives tertiary treated wastewater from the Bustamante Wastewater Treatment Plant not allocated to the irrigation districts.

3.2 CULTURAL RESOURCES

Cultural resources are prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for traditional, religious, scientific, or any other reason. Cultural resources are discussed in terms of archaeological sites, which include both prehistoric and historical occupations, architectural resources, and locations of concern to Native Americans, including Traditional Cultural Properties.

Although cultural resources are addressed in NEPA, procedures for their identification, evaluation, and treatment are contained in a series of other federal and state laws and regulations, and agency guidelines. Archaeological, architectural, and Native American resources are protected by a variety of laws and their implementing regulations: the National Historic Preservation Act (NHPA) of 1966 as amended in 2000; the Archeological and Historic Preservation Act of 1974; the Archaeological Resources Protection Act of 1979; the American Indian Religious Freedom Act (AIRFA) of 1978; the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990; and USIBWC Directives on Environmental Management and Compliance, including management of cultural resources under its purview. The Advisory Council on Historic Preservation further guides treatment of archaeological and architectural resources through Section 106 of the NHPA and its implementing regulations, Protection of Historic Properties (36 CFR 800). Historic properties, as defined by the NHPA, represent the subset of cultural resources listed on, or are determined eligible for, inclusion on the National Register of Historic Places (NRHP).

3.2.1 Affected Environment

The Area of Potential Effect (APE) for the RGRP improvements consists of the USIBWC ROW, including levees and adjacent land in the floodway managed by the USIBWC. This ROW is of sufficient width to include any staging areas (including equipment yards and soil storage areas) needed for construction activities associated with the Proposed Action (Appendix A). Heavy vehicles will access the ROW using existing paved or gravel roads.

3.2.2 Previous Cultural Resources Studies

Two previous cultural resources investigations were conducted on behalf of the USIBWC to identify resources in and within a defined distance from the RGRP project area (Brown *et al.* 2003; Gibbs *et al.* 2005). Both investigations included a literature review of previously recorded archaeological, architectural, and Native American resources within and adjacent to the project area, and assessed the probability of undiscovered archaeological sites. Recent studies for Department of Homeland Security (DHS) initiatives at Land Ports of Entry (LPOE) along the Texas border with Mexico (Belfast *et al.* 2008; Mathews and Mooney 2005a; 2005b, 2005c) and for the southern border fence initiative have been conducted in areas partially overlapping and adjacent to the RGRP project area. Data from these investigations were used to supplement general cultural resources background information.

A cultural resources Class I survey and geoarchaeological study of the RGRP provides a detailed analysis of the segment of the Rio Grande between American Dam and Fort Quitman, Texas (Brown *et al.* 2003). This investigation included a site files search of previously recorded cultural resources extending one mile (1.6 km) from the north side of the RGRP segment of the Rio Grande. Due to the proximity of the project area to New Mexico, the one mile search area included portions of Doña Ana County, New Mexico in addition to El Paso and Hudspeth Counties, Texas. The study also included an annotated bibliography of previous projects and reconnaissance survey. Backhoe trenching along pertinent sections of the river and a discussion on geomorphology were used for predicting site locations. The literature review and site files search identified 205 previously identified archaeological sites (207 sites are listed in the archaeological site table in Appendix A of that report), 34 resources listed on the NRHP or State Registers, and six cemeteries in the one mile wide corridor north of the Rio Grande channel. Field reconnaissance confirmed that none of the archaeological sites, NRHP/State Register-listed resources, or cemeteries occurred within the USIBWC ROW.

The second study covering the entire RGRP project area was part of a cultural resources overview of several flood control project areas managed by the USIBWC including the RGRP, prepared in 2005 (Gibbs *et al.* 2005). The site files search for the RGRP area found 60 previously documented cultural resources within one-half mile of the north side of the river, but none within the present APE. Twenty-seven of these resources are NRHP-listed properties or districts associated with the City of El Paso, Texas. NRHP-listed historic districts include the Sunset Heights Historic District, and the San Elizario Historic District. Other NRHP-listed properties are predominantly significant historical buildings concentrated in downtown El Paso, Texas. Two NRHP-listed resources identified in the vicinity of the RGRP are associated with water control and delivery and include the Franklin Canal and the El Paso County Water Improvement District #1 (Ackerly and Phillips 1997a).

3.2.3 Archaeological Resources

No archaeological sites have been identified within the APE for the RGRP.

Prehistoric Sites

No prehistoric sites have been identified within the APE for the RGRP; however, geoarchaeological investigations reveal the potential for certain landforms in the APE to contain buried deposits (Brown *et al.* 2003). Previous geoarchaeological within the RGRP indicates that sites from the more recent cultural periods, dating since the last 2500 years, would be preserved in the upper (<3.3 ft (1 m)) floodplain deposits; however, intact deposits are only anticipated beginning at around 20 in below ground surface. Seventeen segments totaling over 22 miles within the 91-mile RGRP corridor were identified as having landforms with a high potential to contain archaeological resources (Brown *et al.* 2003). Anticipated prehistoric archaeological resources include sites dating from the Late Archaic and the later Puebloan periods. Occupation of the floodplain is expected during the Late Archaic, making these sites somewhat more likely to occur than those of the later Puebloan. During the Puebloan period decreased activities in the floodplain would leave minimal archaeological traces, but sites from this time period may still occur. Overall, intact sites remain difficult to locate due to factors like channel erosion, being deeply buried, and modern disturbances. In the project area, these disturbances include the original construction of the RGRP levee in the 1930s as well as ongoing floodway maintenance. Profiles of trenches excavated during geoarchaeological investigation of the APE exhibit evidence of leveling and mixing in the upper 10 to 20 in (25 to 50 cm), suggesting the low potential for identifying intact archaeological deposits at shallower depths (Brown *et al.* 2003).

Historic Sites

No historic archaeological sites have been identified during site files searches within the APE. Gibbs and others (2005) suggest that historic archaeological sites and features, including Spanish and early American military resources, that may not be deeply buried, may be located within the RGRP project area. Brown *et al.* (2003:71) suggest that historic sites post-dating the rectification of the Rio Grande in 1938 may occur in the floodplain, including areas of former active channels. Broken bottle glass and oxidized iron fragments were encountered in trenches excavated as part of their geomorphological investigation. The likelihood for locating intact resources related to this period of occupation is low due to factors such as previous disturbance and river fluctuation. The upper 20 inches of the floodplain exhibits prior disturbance, so the likelihood for locating intact historic archaeological resources at this depth is low.

3.2.4 Architectural Resources

Thirty-two historic-age or unknown age architectural resources were identified within the APE during field reconnaissance conducted in July 2008 (Table 3.1). Many of the resources in the APE were initially documented as part of the Class I Cultural Resources Survey (Brown *et al.* 2003) and their locations were verified during the July 2008 field reconnaissance conducted in preparation for this EA. The resources include bridges as well as water control structures, including the levee, dams, acequias/irrigation features (drains, canals, laterals and feeders), grade control structures, and pumping and gaging stations, which are associated with the flood

control, water delivery, and boundary stabilization functions of the RGRP.. Some of these resources have been evaluated for NRHP eligibility but the majority have not. Many of the features are related to the early construction and development of the RGRP from 1933-1938; others may have been added or modified to improve the function of the system. Several of the acequias are contributing elements to the NRHP-listed El Paso County Water Improvement District No. 1 or are part of the Hudspeth County Conservation and Reclamation District No. 1 (unevaluated for NRHP eligibility).

Although the levee was originally constructed as part of the RGRP between 1933-1938, its function for flood control has necessitated modifications over time. Portions of the original levee have been previously altered or removed by changes to the original RGRP. The construction of the 4.4-mile concrete-lined Chamizal Channel in 1968 to rectify and stabilize the international boundary resulted in the removal of a portion of the earthen levee along the riverbank and replacement with concrete and chain link fence barriers. Remnant levee portions surrounding the former river channel in this area could be extant, but would be outside the USIBWC RGRP corridor, the APE for this project.

Other alterations to the levee occurred gradually as a result of ongoing maintenance and repair of the levee. Maintenance activities include repairing slumping that could result in slope failure, improving road surface conditions, and removing vegetation. During high flow events, the levee has been breached or damaged, necessitating repairs and modifications. Additional soil has been added in areas where the slope of the levee has been eroded. Slope stabilization is performed as needed or after high flow events, about four to five of which occur per year along the over 400 miles of flood control project areas managed by the USIBWC along the Rio Grande. Typically after a high flow event, five to six locations are stabilized (USIBWC 2008a). The crown of the levee is used as a roadway for vehicles of USIBWC maintenance crews as well as the U.S. Border Patrol agents monitoring activities along the river. The crown has been modified over time to maintain a level surface. Grading and resurfacing of the levee road, using additional soil and gravel, takes place in a 20-year cycle that requires annual improvements at selected locations. Activities of the U.S. Border Patrol require low vegetation to improve the prevention, deterrence, and detection of illegal activities. Levee slopes and the floodway are mowed continually with farm tractors and rotary slope mowers to remove brush and woody vegetation (USIBWC 2008a).

Table 3.1 Architectural Resources in the Area of Potential Effect

Resource Type	Quantity
Building	1
Bridge	1
Dam	2
Grade Control Structure	4
Gaging Station	5
Levee	1
Pumping Station	4
Acequia	12
Other (gate, culvert)	2
Total	32

3.2.5 Native American Resources

Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. Resources may include prehistoric sites and artifacts, contemporary sacred areas, traditional use areas (*e.g.*, native plant or animal habitat), sources used in the production of sacred objects and traditional implements, or traditional cultural properties. Sacred places important to religion may also be present and include mountain peaks, springs, and burial sites. Traditional rituals may prescribe the use of particular native plants, animals, or minerals from specific places. Therefore, activities that may affect sacred areas, their accessibility, or the availability of materials used in traditional practices may be of concern.

Five Native American groups that may have historical ties to the project area have been identified by the USIBWC (Table 3.2). The USIBWC has initiated consultation with these Native American groups, pursuant to 36 CFR 800.2, to ensure that any sites of traditional cultural value are identified and adequately considered under the Proposed Action.

Table 3.2 Native American Groups Identified for RGRP

State	Tribal Name
Texas	Ysleta del Sur Pueblo
New Mexico	Pueblo of Isleta
	Mescalero Apache Tribe
Arizona	White Mountain Apache Tribe
Oklahoma	Fort Sill Apache Tribe

The White Mountain Apache Tribe has indicated that they do not anticipate adverse effects from the proposed project to the Tribe's Cultural Heritage Resources and/or historic properties; however, they recommend monitoring of ground disturbance activities in areas where artifacts are believed to occur (Altaha 2008; Appendix C).

Previous coordination between federal agencies and the Ysleta del Sur Pueblo has resulted in the identification of resources and other concerns to the Tribe in the project area. The USIBWC and the Ysleta del Sur Pueblo have an existing informal agreement to facilitate access to the Rio Grande for ceremonial purposes. Landscape maintenance activities in the RGRP are partially re-scheduled to avoid disruption to ceremonies (USIBWC 2008a). The Ysleta del Sur Pueblo previously expressed concerns related to proposed alterations of the Riverside Dam. They wished to be consulted regarding any proposed changes to the dam and what the effects of those changes would have on the Rio Grande water flow to a TCP in the vicinity. The Pueblo does not want the specific location or identity of the TCP divulged (Brown *et al.* 2003). For upgrades to Riverside Canal (adjacent to the RGRP), proposed by the U.S. Department of Interior (USDOI), Bureau of Reclamation (USBOR) the Ysleta del Sur Pueblo requested that no construction occur between late May and the end of January to mitigate effects of construction on their traditional ceremonies (USDOI 2008). In addition, the USBOR conducted a survey of sacred plants in consultation with the Ysleta del Sur Pueblo to verify that the same species exist in other areas of the river and that sacred plants are not permanently

destroyed by construction activities in the vicinity of Tribal lands. The study resulted in the identification of several sensitive plant species known to exist in or near the location of the Riverside Canal project area that also likely exist in portions of the RGRP ROW.

3.3 WATER RESOURCES

3.3.1 Flood Control

The RGRP was constructed to stabilize the international river boundary and to provide flood protection for both the United States and Mexico in urban, suburban, and agricultural areas. Flood control is a significant asset for communities. A 2004 study sponsored by the USIBWC evaluated the estimated benefits of flood control projects along the Rio Grande (Sturdivant *et al.* 2004). The study provided estimates of benefits for the RGRP. Within the RGRP, land uses were divided into agricultural uses and urban land uses. The estimate, previously presented in Table 1.1, is that the RGRP has an economic benefit of approximately \$139 million for urban and agricultural land uses.

3.3.2 Water Supply and Water Management

The City of El Paso and adjacent county areas rely on groundwater within the Hueco-Mesilla Bolson and surface water supplies from the Rio Grande as common sources for their water supply. The shallow groundwater is closely related to, and greatly influenced by, the Rio Grande and its associated irrigation canals and drains. Repeated agricultural and municipal reuse of these waters along the Rio Grande can lead to increased salinity and can result in exceeding federal and state drinking water standards. Additionally, the increased salinity can influence the quality of the deep aquifers as the Rio Grande discharges into the Hueco Bolson (TPWD 1998).

The base flow below the American diversion dam is minimal throughout the year because the flows are primarily diverted upstream of the RGRP. Most of the water is diverted for irrigation and municipal uses at the American Canal in Texas, and the Acequia-Madre Canal in Mexico. Downstream of El Paso, most of the flow consists of irrigation return flow and treated municipal wastewater from the more than one million persons living in El Paso and neighboring Ciudad Juarez (TPWD 1998). In El Paso County, the Rio Grande's water is diverted into a series of canals (*i.e.*, American, Hudspeth, Riverside, and Franklin) for domestic and irrigation use. The Rio Grande has historically provided significant water for irrigation in southwestern Hudspeth County where the river overlies the Hueco Bolson. Flows throughout Hudspeth County are determined by weather conditions in the upper Rio Grande watershed, and operation of storage and diversion dams located upstream of the City of El Paso.

3.3.3 Agricultural Water Use

Historically, nearly all the Rio Grande surface water released by the Bureau of Reclamation every year from Caballo Dam and Elephant Butte Dam in southern New Mexico was utilized for agricultural purposes. However, a growing trend involves transfers from agriculture to municipal and industrial uses. Under the 1906 Convention for the Equitable

Division of the Waters of the Rio Grande for Irrigation Purposes, 60,000 acre-feet are diverted annually to Mexico during normal years. Drought provisions allow for less than that amount to be diverted to Mexico during years in which the Bureau of Reclamation is forced to release smaller volumes from the New Mexico dams. Such instances occurred on multiple occasions during the mid-1950s, the mid-1960s, the early and late 1970s and, most recently, in 2003.

El Paso County Water Improvement District 1 is the organization that delivers surface water from the Rio Grande to agricultural users within El Paso County (MPRA 2006). The District provides irrigation water to approximately 50,000 acres in El Paso County. The water district's normal water allotment is around 376,000 acre-feet. Its current allotment is about 55,000 acre-feet with an initial allocation of 8 inches per acre. The allocation for 2002 was 48 inches per acre (USDA 2003).

The Hudspeth County Conservation and Reclamation District provides irrigation for agricultural producers for about an 18,000-acre area along the Rio Grande that stretches from El Paso/Hudspeth County line to Fort Quitman. Water diversions from the river are downstream from El Paso, and the diversions are dependent on water the El Paso County Water Improvement District 1 does not use, irrigation tail-water from that district, or releases from water treatment plants. For all practical purposes, Hudspeth County's only reliable source of water at the current time is from individually owned wells. Due to the high salinity content of groundwater in this area, the water should be tested and deemed appropriate for crop use before applying it to insured crops (USDA 2003).

3.3.4 Water Quality

The RGRP runs along water quality management Segments 2307 and 2308 of the Rio Grande, as defined by the TCEQ.

Segment 2308 extends from the International Dam to the Riverside Diversion Dam. Flows in Segment 2308 are limited by water diversions upstream at the American and International dams. The designated uses of this segment include limited aquatic life, and non-contact recreation. These designated uses were fully supported according to the 2003 Regional Assessment of Water Quality in the Rio Grande Basin.

Segment 2307 flows 220 river miles from the Riverside Diversion Dam to the confluence with the Rio Conchos, near Presidio, Texas. Flows in Segment 2307 are also minimal and are composed primarily of agricultural and municipal return flows. Designated uses in this segment include contact recreation, public water supply, high aquatic life use, and fish consumption. Water quality information in the RGRP portion of the segment indicates that surface water quality standards are exceeded for chloride and fecal coliform. In addition, ammonia levels are above screening limits, which may be the result of either point or non-point pollution.

3.4 LAND USE

Current land uses along the RGRP were evaluated along the area potentially affected by the levee improvements and dredging operations in three categories of urban areas, agricultural

lands, and recreational use areas. There are no federal or state natural resources management areas within the RGRP area.

3.4.1 Urban Areas

Approximately 25 percent of the Rio Grande between the American Dam and Fort Quitman is urban, and the remaining 75 percent is rural. The urban areas are between El Paso and Socorro in El Paso County. Approximately 48 miles of the RGRP is located in El Paso County where the river flows along urban areas adjacent to the western and southern portions of El Paso. The remaining 43 miles are located in Hudspeth County, which is entirely rural.

The largest concentration of developed land along the RGRP is in the metropolitan area surrounding the City of El Paso. A few residences are located farther east along the river and major roads, but they are generally isolated and widely spaced. For the portion of the project that runs adjacent to the incorporated City of El Paso and outlying suburban communities, this means a variety of land uses are adjacent to the project. Surrounding land uses in the vicinity are commercial and industrial. San Elizario is the significant suburb of the El Paso metropolitan area in the immediate project vicinity. The 2000 U.S. Census shows the population for this community at 11,406.

East of San Elizario, the character of the project vicinity becomes much more varied, and the developed communities are more widely spaced. Between these communities, the project area contains mostly rural and agricultural uses. Several small communities are located along U.S. Highway 20 and Interstate 10 in eastern El Paso County. Two communities are located approximately 2 miles from the project vicinity: Fabens, with an estimated population of 8,043 for 2000, and Tornillo, with 1,609. The next developed area within the immediate project vicinity is Fort Hancock, located just inside Hudspeth County, Texas. The 2000 U.S. Census shows the population for this community at 1,713.

Currently, there are no recreational areas in the floodplain of the RGRP. Plans for a recreational trail system along the levees within the City of El Paso have been suspended due to the expected border fence, which will limit access to the levees.

3.4.2 Agricultural Land

After the fully developed area of urban El Paso, the project vicinity progresses east into rural and agricultural areas of El Paso and Hudspeth Counties. Although agriculture is not considered a major industry within El Paso County, the majority of land adjacent to the RGRP is used for agriculture. Farming and ranching are the two main economic sources in Hudspeth County. Areas on the U.S. side of the Rio Grande near the town of Socorro, in El Paso County, downstream to Fort Quitman, in Hudspeth County, are used primarily for farming and ranching.

Cultivated agricultural lands occupy a small portion of the general project vicinity. With an average annual rainfall of less than 8 inches, raising crops in this region requires irrigation. Crops in this area include vegetables, cotton, various grain crops, and fruit orchards (primarily pecans). Water diversion from the Rio Grande supplies irrigated farming in the region. Most

farming occurs along the floodplains of the Rio Grande in both El Paso and Hudspeth Counties (FWT-WPG 2006). Rangeland, including areas associated with or suitable for livestock production, is the largest category of land use in the region. The dairy industry is located primarily in Hudspeth County.

3.5 COMMUNITY RESOURCES

3.5.1 Socioeconomics

Flood Protection

Flood control is a significant asset for communities. A 2004 study sponsored by the USIBWC estimated the regional economic benefit of the RGRP, previously presented in Table 1.1, was approximately \$139 million, largely associated with protection of urban areas.

Population

The RGRP is located within El Paso and Hudspeth Counties. Some of the larger cities within these counties adjacent to the levee system include El Paso, Socorro, San Elizario, Faben, Tornillo, Fort Hancock, McNary, and Esperanza. Approximately 25 percent of the area between the American Dam and Fort Quitman is considered to be in urban areas, and the remaining 75 percent is considered rural. The urban areas are between El Paso and Socorro in El Paso County. The area along the Rio Grande in Hudspeth County is entirely rural.

Table 3.3 presents population characteristics, including populations in 2000, as well as projected populations for 2005, 2020, and 2030 and the percent change for these statistical areas. The total population for El Paso County is projected to increase 65 percent from 2000 to 2030, the anticipated increase for Hudspeth County during the same period is 30 percent.

Table 3.3 Population Growth in El Paso and Hudspeth Counties Adjacent to the RGRP

Jurisdiction	2000	2005	2020	2030	Percent Change 2000-2030
El Paso County	681,508 ¹	721,598 ¹	986,443 ²	1,127,206 ²	65%
Hudspeth County	3,344 ²	3,440 ²	4,416 ²	4,314 ²	30%

¹ U.S. Census Bureau 2007

² FWT-WPG 2006

Median household incomes for El Paso and Hudspeth Counties (reported in 1999 dollars) were \$39,927 and \$21,045, respectively, whereas the median family income was \$45,861 and \$22,314, respectively. Per capita income was \$19,617 (reported in 1999 dollars) for El Paso County and \$9,549 for Hudspeth County (U.S. Census Bureau 2007). Approximately 12 percent of all families in El Paso County and 32.6 percent in Hudspeth County were reported to be below the poverty level in the 2000 Census (U.S. Census Bureau 2007).

Table 3.4 Estimated Total Employment for El Paso and Hudspeth Counties

	2000	2005	Percent Change 2000-2005
Employment¹			
El Paso County	256,110	272,445	6.3%
Hudspeth County	1,255	1,257	0.16%
Housing Units²			
El Paso County	210,022	244,193	16%
Hudspeth County	1,471	1,531	4%

¹ Texas Workforce Commission 2007

² U.S. Census Bureau 2007

Housing

According to the 2000 U.S. Census, the housing stock in El Paso County was 210,022 and 1,471 in Hudspeth County. Approximately 31 percent of the housing stock in 2000 was composed of single-family units while multi-family units accounted for the majority of the housing stock in the county. As shown in Table 3.4, the number of housing units in El Paso and Hudspeth Counties increased 16 percent and 4 percent, respectively, from 2000 to 2005.

3.5.2 Environmental Justice

Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, encourages federal facilities to achieve “environmental justice” by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Under E.O. 12898, minority populations are to be identified if: (i) the minority population with the affected area exceeds 50 percent; or (ii) if the minority population age is meaningfully greater than the age in the general population.

The percentage of the population represented by minorities and the poverty rate for each of the selected census tracts in the project area are shown on Table 3.5. The minority population in El Paso and Hudspeth Counties is 52.9 percent and 46.9 percent, respectively. Minority populations of Hispanic nationality dominate in the potential region of influence.

Poverty rates are not separated by ethnic class in this analysis. The U.S. Census Bureau calculates poverty rates based on the total number of people that fall below the poverty level, and the poverty rates are based on the 2000 Census data. The percent of individuals that fall below the poverty level in El Paso and Hudspeth Counties is 23.8 percent and 35.8 percent, respectively.

Table 3.5 Minority Populations and Poverty Rates in the RGRP Area

Ethnic Composition ¹	El Paso County	Percent	Hudspeth County	Percent
White	502,579	47.1	2,917	53.1
Hispanic or Latino (of any race)	531,654	49.8	2,509	45.7
Black	20,809	1.9	11	0.2
Asian	6,633	0.6	6	0.1
American Indian	5,559	0.5	47	0.9
Total Population	1,067,234	100	5,490	100
Total Minority	564,655	53	2,573	47
Poverty Levels ²				
Individuals below poverty level	158,722	23.8	1,180	35.8

¹ Based on 2006 values presented in U.S. Census Bureau, accessed 2007

² Based on 2000 values and percentages presented in U.S. Census Bureau, accessed 2007

3.5.3 Transportation

The levee system for the RGRP extends approximately 85.4 miles from the American Dam in El Paso, Texas, to Fort Quitman, Texas. The levee system traverses the southern portions of El Paso and Hudspeth Counties. Cities within these counties adjacent to the levee system include El Paso, Socorro, San Elizario, Fort Hancock, McNary, and Esperanza.

Local, state, and interstate roadways are located throughout the RGRP area. Many of these roadways run parallel or adjacent to the Rio Grande. The project would generate traffic from construction workers and construction equipment during the proposed construction period. The majority of traffic that would be generated would be from the daily commute of construction workers who are expected to travel to the various levee construction sites from locations within El Paso County and Hudspeth County on these local, state, and interstate roadways. The transportation system for the two-county area is served by a network of federal and state highways that include Interstate Highway 10, and State Highways 85 and 20.

During construction within El Paso County (below approximately river mile 15), access points along the border road are expected to be utilized for construction equipment. In Hudspeth County, the levee has fewer access points, and access to the levee will occur at locations near Ports of Entry bridges (e.g., Fort Hancock, which is accessible from Interstate Highway 10), and then equipment will be moved along the levee. Dredging operations will use similar access points, except in El Paso, where there are more levee access points along Paisano Drive and at the Ports of Entry bridges (e.g. Stanton Street Bridge).

3.6 ENVIRONMENTAL HEALTH

3.6.1 Air Quality

The USEPA classifies air quality within Air Quality Control Regions (AQCR) according to whether the concentrations of criteria air pollutants in the atmosphere exceed primary or

secondary criteria identified as National Ambient Air Quality Standards (NAAQS). Areas within each AQCR are assigned a designation of attainment or nonattainment for each criteria air pollutant. An attainment designation indicates that air quality within an area is as good as or better than the NAAQS.

The levee system for the RGRP area traverses the El Paso and Hudspeth Counties, both located within AQCR 153 (El Paso-Las Cruces-Alamogordo Interstate AQCR) which includes El Paso and Hudspeth Counties. As of April 2005, the USEPA designated air quality within Hudspeth County to be in attainment status for five criteria pollutants: carbon monoxide, volatile organic compounds, nitrogen dioxide, sulfur oxides, and particulate matter greater than 10 micrometers in size (PM₁₀). El Paso County is designated nonattainment, classification moderate, for one of those five contaminants, PM₁₀. In the specific case of the City of El Paso, nonattainment, classification moderate also includes carbon monoxide.

The TCEQ has identified 28 companies and agencies in El Paso and Hudspeth Counties as contributors of point source emissions. Potential stationary point sources of criteria pollutant and hazardous air pollutant emissions within the two counties primarily include manufacturing plants, landfills, refineries, and utilities and gasoline facilities (TCEQ 2006). The combined area and stationary point source emission inventory for El Paso and Hudspeth Counties for calendar year 2001, based on the latest available data from USEPA National Emission Inventory as of August 2005 (USEPA 2006), is as follows:

- Carbon monoxide, 165,718 tons per year;
- Volatile organic compounds, 22,220 tons per year;
- Nitrogen dioxide, 28,115 tons per year;
- Sulfur oxides, 2,154 tons per year; and
- PM₁₀, 16,539 tons per year.

Existing maintenance activities by USIBWC personnel consists of routine inspections of levees and access roads. Periodic maintenance activities of the levees, channels, and floodway require the use of heavy equipment including scrapers, mowers, bulldozers and dump trucks. Use of these heavy equipment and associated vehicles is typically limited to once every three months or less and does not represent a significant source of air pollutants.

3.6.2 Noise

Land-use and zoning classifications surrounding the project areas provide an indication of potential noise impact. Land use in the RGRP area is urban in the upper portions associated with El Paso, while the majority of the remaining areas are agricultural.

Typical outdoor noise sources near the levee system include vehicles, pickup trucks, diesel tractor mowers, and other farm machinery. Noise levels are commonly reported in decibels, using an average-weighted level (dBA). For sources such as mowers at 100 feet, the approximate level is 70 dBA; for diesel trucks or scrapers used to grade levee roads, noise levels at 50 feet are reported at approximately 89 dBA (CERL 1978).

Existing maintenance activities by USIBWC personnel consist of routine inspections of levees and access roads. Use of heavy equipment and associated vehicles is typically limited to once every three months or less and does not represent a significant source of noise. Dredging activities associated with Minute 313 would be of limited duration, and do not represent a significant source of noise.

3.6.3 Public Health and Environmental Hazards

Hazardous materials are those substances defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act and the Toxic Substances and Control Act. Hazardous waste is defined under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA). In general, both hazardous substances and waste include substances that, because of their quantity, concentration, and physical, chemical, or infectious characteristics, may present a danger to public health and/or welfare and to the environment when released or improperly managed.

Waste disposal activities at or near the RGRP area were reviewed to identify areas where industrial processes occurred, solid and hazardous wastes were stored, disposed, or released; and where hazardous materials or petroleum or its derivatives were stored or used. A data search on waste storage and disposal sites was conducted on January 9, 2007 using EnviroMapper for Envirofacts, an internet service provided by USEPA (USEPA 2007a). EnviroMapper combines interactive maps and aerial photography to display facility-based environmental information as filed with state agencies and reported to the USEPA. Information includes air releases, toxic releases, hazardous wastes, water discharge permits, and Superfund sites. Below is a list of the facility types that were queried for the RGRP area.

- Superfund Sites: Indicates the specific facilities designated as Superfund sites by the USEPA (USEPA 2007b).
- Toxic Release Sites: Indicates the specific facilities regulated by the USEPA that release toxic substances into the environment, as found in the Toxics Release Inventory database.
- Water Dischargers: Indicates USEPA regulated municipal and industrial wastewater treatment facilities discharging water into rivers, streams, lakes, and other waterways.
- Hazardous Waste Sites: Indicates RCRA sites and/or facilities regulated by the USEPA that handle materials designated as hazardous waste.
- Multi-Activity Sites: EnviroMapper allows sites that show up on multiple databases to be queried for facility information.

The search extended along the RGRP area, up to 1 mile from the centerline of the levee. No Superfund sites were identified for the RGRP area. Within 1 mile of the levee centerline, 14 toxic release sites, 158 hazardous waste sites, and six multi-activity sites were identified in the query, all of which were located within the City of El Paso. Two water dischargers were identified in the query, one within El Paso and the other near the community of Tornillo.

SECTION 4 ENVIRONMENTAL CONSEQUENCES

Section 4 presents an analysis of the environmental consequences of the No Action Alternative and the Proposed Action, including improvements to the RGRP levees and dredging of the main channel as per the agreement detailed in Minute 313 (IBWC 2008). Resource areas are presented in the same sequence used in Section 3 for the description of the affected environment: biological resources; cultural resources; water resources; land use, community resources; and environmental health issues.

4.1 BIOLOGICAL RESOURCES

4.1.1 Vegetation

No Action Alternative

No changes would be made to improve the levees. The levee slopes would be mowed on an as-needed basis to prevent encroachment of woody vegetation. The plant communities along the levee and within the floodway would remain as managed salt cedar habitats and managed old-field herbaceous habitats. The plant species composition is expected to remain the same, and no additional habitat utilized by wildlife would be added to the project area.

Proposed Action

Levee Improvements. Improvements to the RGRP levee would affect plant communities through fill activities, including removal of some managed salt cedar areas and removal or replacement of some managed old-field herbaceous habitats. Impacts would occur on the levee slopes where fill would be added, and within the expanded levee footprint area. The vegetation communities identified during field surveys fall into one of the following classes: a) Managed Salt Cedar shrub communities, represented by salt cedar, some Bermuda grass, and other weedy plants within the floodway; b) Managed old-field herbaceous communities, represented by a mixture of non-native grasses and forbs.

Levee improvements would impact the grass-covered slopes of the existing levee plus future footprint expansion area. Removal in expansion areas would be along 19.1 miles of levee in El Paso County, and 34 miles of levee in Hudspeth County (Table 2.1).

Dredging of the River Channel. Improvements to the RGRP through dredging the river channel would remove vegetation adjacent to the river where the operations would occur, particularly in areas where sedimentation has caused bank encroachment toward the center of the channel. In addition, river access and staging areas for the equipment would remove some vegetation. The river channel is lined with immature to mature salt cedar, and some willow species. The vegetation is expected to re-establish at the conclusion of the dredging operations. Vegetation along the banks in areas dredged by the MxIBWC in 2007 have recovered quickly, and now sustain willows along the river bank. Sediment disposal would occur on previously used disposal sites, and therefore, there would be a short-term impact to existing vegetation communities due to dredging operations.

4.1.2 Wildlife

No Action Alternative

No changes would be made to improve the levees. The ongoing mowing operations would maintain the managed salt cedar communities and the managed old-field herbaceous communities. These habitats provide little suitable habitat for wildlife species, although songbirds, raptors and shorebirds are routinely observed in the immediate vicinity of the project area.

Proposed Action

Levee Improvements. The value of vegetation to wildlife along the RGRP study area depends on the quantity of habitat and the relative succession stage of the vegetation (quality of habitat). The project area is composed primarily of managed salt cedar scrub communities and managed old-field communities, and is relatively low quality habitat for most wildlife species. Songbirds, raptors, and shorebirds routinely use areas of the floodway; however, the Proposed Action that would raise levees in areas of levee deficiency would have a short-term impact on the wildlife species, and the species present are expected to rapidly re-colonize the area after the work is completed and after the vegetation has been re-established.

Dredging of the River Channel. Vegetation immediately adjacent to the river channel would be removed for the dredging operations. This vegetation provides little wildlife habitat value as it is dominated by salt cedar communities. Further, dredging operations would be completed in stages over a period of years, and therefore, the vegetation would re-establish after each dredging operation and, thus, provide limited habitat for wildlife.

4.1.3 Threatened and Endangered Species

Preferred habitat types for each T&E species potentially occurring in El Paso and Hudspeth Counties were compared to the habitat types identified during field surveys to evaluate their likelihood of occurrence. The habitat determination was categorized according to U.S. Fish and Wildlife Service (USFWS) guidelines as follows:

- Not Likely Present: no suitable habitat identified;
- Potentially Present: habitat present but there are no records of species occurrence in the vicinity;
- Likely Present: habitat present and species are known to occur in the vicinity; and
- Present: observed.

For those species considered potentially or likely present in the area, a determination of the effect of each action on those species was made. The determination of effect includes vegetation that may be altered or removed, water resources used by the species (if appropriate), and the effects of construction activities such as noise and disturbance during breeding activities.

No Action Alternative

No changes would be made to improve the levees. The ongoing mowing operations would maintain the managed salt cedar communities and the managed old-field herbaceous communities. These plant communities provide little suitable habitat for T&E species. Under the No Action Alternative, there would be no improvement to the vegetation communities that would provide habitat for T&E species.

Proposed Action

Levee Improvements. Levee improvements, including fill and equipment staging, would occur on the levee service corridor. There are no known habitats within the study area that are suitable for T&E species. Levee expansion into the levee service corridor would not affect T&E species, nor would the expansion provide any new habitat for T&E species. Ten bird species, two extant mammal species, three reptile species, and three plant species are federally or state listed as threatened, endangered, or candidate species. One bird species, the burrowing owl, is listed as a state species of concern. Of the listed species, seven species have the potential to occur in the project area, and one species (burrowing owl) is present in the project area (both owls and active nests were observed during field surveys). See Appendix B for details of potentially occurring species in the area. Levee expansion areas would remove, at least temporarily, some vegetation within the managed salt cedar habitats and managed old-field herbaceous habitats. This vegetation removal would not affect any federal or state-listed species, except the state-listed species of concern, the burrowing owl.

To protect the burrowing owl, coordination between the TPWD and the USIBWC would move the nests or replace the nests with artificial nests as required (see Section 5.2). Heavy equipment would be used to make levee improvements. This equipment may disturb nesting of the burrowing owl, but improvements would be scheduled to occur outside the breeding season (approximately March to August) to reduce impacts to the owls. The proposed action will not be in conflict with the burrowing owl management plan.

Dredging of the River Channel. Dredging activities would remove vegetation along the river channel, and in some areas adjacent to the channel for river access and equipment staging areas. This vegetation does not provide suitable T&E species habitat. Vegetation would re-establish after dredging is complete, and sediment disposal would be in previously used areas. The dredging operations are not expected to impact the burrowing owl, as evidenced by the current activities of the MxIBWC dredging on the Mexico side of the river channel during the owl breeding season, with no apparent effect on the nesting burrowing owls. Further, dredging by the USIBWC is scheduled to occur during low flow or no flow conditions, generally October through January, which is outside the owl breeding season.

4.1.4 Wetlands

No Action Alternative

There are no jurisdictional wetlands present in the project area and ongoing mowing and maintenance operations would not have an effect on the non-jurisdictional wetlands.

Proposed Action

Within the survey area, there are no jurisdictional wetlands present. Under the Proposed Action, in areas where the levee footprint would be expanded, there are no wetlands that would be affected.

Dredging would remove vegetation adjacent to the river channel, but this vegetation does not include wetlands. Sediment spoils would be placed in areas previously used for sediment disposal outside the floodplain. Sediment disposal areas are not in areas that contain wetlands.

4.1.5 Aquatic Habitats

No Action Alternative

Under the No Action Alternative, levees would not be raised and dredging would not occur. Therefore, aquatic habitats would be adversely affected by heavy equipment or construction activities. However, if sediment is not removed from the Rio Grande River channel, the channel will continue to fill in, and aquatic plants may grow in dense patches, reducing base flow and flood protection.

Proposed Action

Levee footprint expansion would not affect the aquatic habitats of the Rio Grande or adjacent arroyos, due to the use of best management plans (BMP). See Section 5.1 for BMPs.

Dredging operations would temporarily affect aquatic habitats in the Rio Grande where dredging occurs. During dredging operations, suspended sediment is expected to be higher, and general water quality is expected to be lower. These effects are expected to be temporary during the dredging operations, and attenuate downstream and disappear after dredging is completed. Dredging would be scheduled to occur during low flow or no flow conditions, usually from October through January. The aquatic resources within the Rio Grande are considered low quality, and the species present are known to be tolerant of disturbance (USIBWC and El Paso Water Utility/PSB 2000). Therefore, the aquatic habitats and fisheries will be minimally affected for the duration of the project, but because dredging will be performed in low or no flow conditions, aquatic species are not expected to be present during operations. Dredging may in some cases improve aquatic habitats, by creating deeper aquatic habitats and in some areas, ponding may occur during low-flow conditions, which would provide water resources when much of the water is being diverted from the Rio Grande.

4.1.6 Unique or Sensitive Habitats

No Action Alternative

The Rio Bosque Wetlands Park is adjacent to the RGRP. Under the No Action Alternative, levees would not be raised and dredging would not occur. Therefore, the Rio Bosque Wetlands Park would not be adversely affected.

Proposed Action

If portions of the levee near to the Rio Bosque Wetlands Park are raised and the footprint expanded, the activities would occur outside the breeding season for migratory birds, so there is minimal disruption to species that may utilize the Park. Further, use of BMPs would prevent transport of sediment or construction debris to the Park.

Dredging operations would remove some vegetation adjacent to the Rio Grande; however, this vegetation removal would be on the opposite side of the levee from the Rio Bosque Wetlands Park, and therefore, the Park would not be affected by sediment in the river or by transport of the sediment to disposal sites. Further, dredging operations would occur outside the breeding season for migratory birds, so there is minimal disruption to species that may utilize the Park.

4.2 CULTURAL RESOURCES

An undertaking has an effect on a cultural resource when that action “may alter the characteristics of the property that may qualify the property for inclusion in the National Register” (36 CFR 800.5 (a)(1)). An undertaking is considered to have an adverse effect when the effect “may diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.” Adverse effects as defined by Section 106 of the NHPA include, but are not limited to:

1. Physical destruction, damage, or alteration of all or part of the property;
2. Isolation of the property from or alteration of the character of the property’s setting when that character contributes to the property’s qualification for the National Register;
3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
4. Neglect of a property resulting in its deterioration or destruction; and
5. Transfer, lease, or sale of the property (36 CFR 800.5 (a)(2)).

For purposes of this EA, a significant impact under NEPA is defined as an unresolvable “adverse effect” under Section 106 of the NHPA. Adverse effects will be resolved by identifying and evaluating resources prior to project initiation.

4.2.1 Archaeological Resources

Impacts to archaeological sites include physical disturbance through reconstruction of the levee, and use of staging areas, including equipment yards and soil storage areas, for heavy equipment, supplies, and temporary soil storage. Heavy equipment, such as trackhoes, bulldozers, mini-excavators, and dump-trucks, may create churning of surface or shallow subsurface deposits, which may be particularly severe during rainy periods. Any ground-disturbing activity in the area of an NRHP-eligible or potentially eligible archaeological site, or modification to such a site, could disturb or destroy the integrity of the archaeological site, resulting in alteration or destruction of those characteristics or qualities that make it potentially eligible for inclusion in the NRHP.

No Action Alternative

Under the No Action Alternative, operation and maintenance would continue, the current levee configuration would be retained, and sediment would continue to accumulate in the river channel. No adverse effects to archaeological resources differing from the baseline condition would be expected. Existing conditions and natural degradation of archaeological resources would continue from increased flooding and erosion potential along the Rio Grande floodplain where deeply buried archaeological sites may occur. Cultural resources would continue to be managed in accordance with Sections 106 and 110 of the NHPA and USIBWC Directives.

Proposed Action

Levee Improvements. Proposed improvements to the RGRP levee system may adversely affect unrecorded prehistoric or historic archaeological sites. No archaeological resources have been previously identified within the APE; however, an intensive archaeological survey has not been completed within the project area. Geoarchaeological investigations of the RGRP identified segments of high archaeological potential associated with older Holocene river meanders, alluvial fans, and relict terraces. Within these segments, archaeological resources are anticipated to occur within the upper 3.3 feet of the floodplain, or below 6.6 feet. However, trenching during previous geoarchaeological investigation demonstrates that the upper 20 inches of the floodplain exhibits leveling and mixing, disturbances likely associated with the original construction of the RGRP levee in the 1930s as well as ongoing floodway maintenance.

Although no excavation is planned in the floodplain along either side of the levee, the use of heavy equipment, including trackhoes, bulldozers, mini-excavators, and dump trucks to aid in the addition and movement of soil for the levee footprint and height increases, could result in ground disturbance from the creation of track and tire ruts extending several inches below ground surface. Archaeological resources on the surface or shallow subsurface deposits may be adversely affected by the use of heavy mechanical equipment in the APE and along access routes; however, surface and shallow subsurface archaeological resources likely lack stratigraphic integrity due to previous disturbance and would not likely be considered eligible for the NRHP. In addition, USIBWC has previously added material dredged from the river along the landside of the levee to the edge of the USIBWC ROW. Archaeological deposits may be more deeply buried and may not be affected by the use of heavy equipment along the levee.

Archaeological resources may also be adversely affected by burial under the expanded levee footprint. If present, archaeological resources in the floodway have already been capped (buried) by the addition of spoil dredged from the river channel. This fill material was added to the surface of the floodway and used to create the earthen levee during the original construction of the RGRP in the 1930s. Unrecorded archaeological sites may be capped by the addition of soil and gravel used to extend the width (footprint) of the existing levee in deficient locations along the RGRP. In areas of levee deficiencies, the footprint may be expanded from 6 to 12 feet from the existing toe to accommodate height increases from 2 to 4 feet.

In some instances, capping may provide a beneficial impact to identified or potential archaeological resources. Capping archaeological sites using soil and gravel, although not permanent, may be viewed as one method to preserve archaeological resources in place and

prevent their inadvertent exposure or destruction. The THC has developed recommendations for appropriate techniques to intentionally bury archaeological sites to avoid potential adverse effects to these resources (THC 1999). In accordance with Best Management Practices in Section 5, these procedures can be applied to the potential capping of archaeological resources that may be identified as part of the cultural resources survey that could occur as a result of levee expansion. Commercial material, compatible in physical and chemical characteristics with the existing material comprising the levee (and surrounding floodway), will be used for the expansion. Existing use of the restricted-access levee road will continue with no increase in traffic that could result in additional impacts (*e.g.*, soil compaction). Lastly, the depth of additional capping material will not exceed 6.6 ft (2m). Figure 3 schematically illustrates how soil will be added to the existing crown and slopes to expand the levee. Activities associated with levee expansion may result in adverse effects to archaeological resources.

Dredging of the River Channel. Dredging of up to 3 feet of sediment in the river channel to improve water flow is part of the Proposed Action. Dredging is not anticipated to result in any adverse effects to archaeological sites due to the low probability for archaeological resources located in the river channel within the proposed dredging depths. Archaeological resources on the surface or shallow subsurface deposits may be adversely affected by the use of heavy mechanical equipment in the APE; however, surface and shallow subsurface archaeological resources likely lack stratigraphic integrity due to previous disturbance and would not likely be considered eligible for the NRHP.

Material removed from dredging activities would be placed in locations where spoil material from previous dredging activities (from routine maintenance) has been located. These areas include land between the landside of the levee and the edge of the USIBWC ROW as well as the privately owned properties of farmers adjacent to the USIBWC ROW. The addition of soil in these areas may result in burial of potential archaeological resources which could result in an adverse effect.

4.2.2 Architectural Resources

Potential impacts to architectural resources include alteration of architectural traits by modification to existing structures, structural instability to existing structures from erosion, and physical disturbance and vibration effects through the use of heavy equipment. Any alteration of architectural traits or loss of structural stability can affect the physical integrity of an NRHP-eligible or potentially eligible architectural resource, resulting in alteration or destruction of those characteristics or qualities that make it potentially eligible for inclusion in the NRHP.

No Action Alternative

Under the No Action Alternative, O&M would continue and the current levee configuration would be retained and sediment would continue to accumulate in the river channel. No adverse effects to architectural resources differing from the baseline condition would be expected. Existing conditions and natural degradation of architectural resources would continue from increased flooding and sedimentation, which reduces the structural integrity of water control structures (*e.g.*, breaches of levee, dams and screw gates, siltation of lateral drains, and collapse of box culverts supporting the levee over drains and arroyos).

Cultural resources would continue to be managed in accordance with Sections 106 and 110 of the NHPA and USIBWC Directives.

Proposed Action

Levee Improvements. Proposed improvements to the RGRP levee system may have the potential to adversely affect architectural resources associated with the NRHP-listed El Paso County Water Improvement District No. 1, and the Hudspeth County Conservation and Reclamation District No. 1 and the RGRP (both unevaluated for NRHP eligibility). Under the Proposed Action, construction associated with rehabilitation of the levee (toe/footprint expansion) would occur in proximity to architectural resources (*e.g.*, lateral drains, screw gates, and box culverts under the levee), some of which may be considered eligible for the NRHP. The use of heavy equipment, including trackhoes, bulldozers, mini-excavators, and dump trucks to aid in the addition and movement of soil for the levee footprint and height increases, could result in ground disturbance and vibration effects to architectural resources. If structures located on USIBWC property are determined not eligible after evaluation and the THC concurs, the structures can be modified, removed or replaced.

The current Proposed Action does not include any alterations to the levee inconsistent with previous maintenance and repair practices (Section 3.2.3). Soil has previously been added along the levee slopes to improve stability and along the crown surface to level the access road. No major modifications will be made to the levee's slope ratio or shape. The improvements to levee will increase, not diminish, its functional integrity and are not likely to be detrimental to the aspects that could make it eligible for the NRHP.

Increasing the height and width of the levee is not expected to alter the flow of water to or from architectural resources in the APE. Rainfall events occur infrequently in the RGRP area. Based on existing conditions in the project area, water flow and runoff toward architectural features is minimal. Water flow and runoff will not be re-routed as a result of levee improvements.

Levee improvements may have potentially adverse effects to architectural resources caused by ground disturbance and vibration effects from heavy machinery used during construction as well as modifications to the levee itself.

Dredging of the River Channel. Dredging operations are not expected to adversely affect architectural resources, except where lateral drains and the concrete abutments to the drains intersect the Rio Grande. Material removed from dredging activities may be placed in floodway locations where spoil material from previous dredging activities (from routine maintenance) has been located.

4.2.3 Native American Resources

Impacts to Native American resources may potentially include destruction of traditional resources, burials, and sacred sites, and plant or animal habitat through ground-disturbing activities such as riverbed dredging and levee reconstruction. During construction, a temporary audio and visual intrusion may adversely affect the visual and audio landscape or the viewshed of these resources as well as disturb any associated ceremonial activities. These types of

physical disturbance have the potential to disturb or destroy unidentified Native American resources.

Native American consultation has been initiated with the Ysleta del Sur Pueblo, the Pueblo of Isleta, the Mescalero Apache Tribe, the White Mountain Apache Tribe, and the Fort Sill Apache Tribe to identify any Native American resources or concerns.

No Action Alternative

Under the No Action Alternative, O&M would continue and the current levee configuration would be retained and sediment would continue to accumulate in the river channel. Native American access to ceremonial sites and use of sensitive Native American plant resources would continue. However, if sediment accumulation in the river channel altered the hydrology or water flow to such an extent that the vegetation communities were altered, it is possible there could be a loss of sensitive Native American plant resources, resulting in an adverse affect to Native American Pueblos.

Proposed Action

Levee Improvements. The Ysleta del Sur Pueblo previously indicated concern over reduced access to the Rio Grande channel and associated plant resources for ceremonial purposes as a result of actions proposed by the USBWC and other federal agencies. Activities related to levee improvements in the RGRP would result in limited access to segments of the river during levee reconstruction and would result in adverse effects to river and resource accessibility for Native Americans. The USBOR conducted a survey of sacred plants in consultation with the Ysleta del Sur Pueblo to verify that the same species exist in other areas of the river and that sacred plants are not permanently destroyed by construction activities in the vicinity of Tribal lands. The study resulted in the identification of several sensitive plant species known to exist in or near the location of the Riverside Canal project area that also likely exist in portions of the RGRP ROW.

Dredging of the River Channel. Dredging activities consist of removing all plant resources and silt up to depths of 3 feet in the Rio Grande bed and along the river's edge. Sensitive Native American plant resources would be removed during dredging. The ability or length of time for sensitive Native American plant resources to re-emerge in dredged areas may result in a loss or reduction availability of these resources to Native American groups and would result in an adverse effect.

4.3 WATER RESOURCES

4.3.1 Flood Control

No Action Alternative

The No Action Alternative would retain the current configuration of the RGRP project area, and maintain the current level of protection currently associated with this system. Under severe storm events, current containment capacity may be insufficient in fully controlling Rio Grande flooding with risks to personal safety and property.

Proposed Action

Improvements to the levee system would increase flood containment capacity to control the design flood event as evaluated by hydraulic modeling. A minimum change in water elevation, less than 1 inch, would be anticipated as a result of the levee height increase for the RGRP area. In areas where there are structural deficiencies in the levee system, the proposed levee expansion would address those deficiencies during construction to improve the overall performance of the RGRP levee system. Improvements to the levee system would increase flood containment capacity to control the design flood event. The improvements would allow the USIBWC to certify the levee segment and meet FEMA requirements.

Dredging operations would remove sediment from the river channel. By removing accumulated sediment, during high flow events, the river would remain primarily within the channel and floodway, and would slow channel movement throughout the floodway.

4.3.2 Water Supply and Water Management

No Action Alternative

Under the No Action Alternative, no impacts to water flow are anticipated as the current levee configuration would be retained. However, due to sedimentation in the river channel, water flow has been reduced. Under the No Action Alternative, no dredging would occur, and continued sedimentation would further decrease water flow in the area, and may alter the international boundary.

Proposed Action

For the Proposed Action, improvements to the RGRP levees would not affect water flow or downstream water bodies. Dredging under the Proposed Action, as described in Minute 313 (IBWC 2008) would remove accumulated sediment, improve water flow, particularly water flow during high water events, and would maintain the international boundary.

4.3.3 Agricultural Water Use

No Action Alternative

Under the No Action Alternative, agricultural water would be diverted at the American diversion dam to the irrigation districts. Water available for irrigation in Hudspeth County would rely primarily on upstream irrigation return flows.

Proposed Action

The levee improvements would not affect water diversion to irrigation districts. Water available for irrigation in Hudspeth County would rely primarily on upstream irrigation return flows. Dredging operations would improve efficiency of water delivery to irrigation districts. Water available for irrigation in Hudspeth County would rely primarily on upstream irrigation return flows.

4.3.4 Water Quality

No Action Alternative

Under the No Action Alternative, water quality in the Rio Grande would remain approximately the same. Water diversions at American diversion dam would maintain a generally dry riverbed throughout the year, and water quality would not be affected.

Proposed Action

Levee improvements would be conducted using BMPs to prevent sediment or construction debris from being transported to the Rio Grande. There are no anticipated effects of the levee improvements.

Dredging operations would remove vegetation along the river channel and sediment from within the river channel of the Rio Grande. Due to the nature of the removal, there would be increased suspended solids in the river channel. The dredging operations would occur in limited reaches at a time, and the effects of increased suspended solids are expected to attenuate with distance from the site of the dredging, and to decrease once the dredging operations have been completed. Vegetation along the banks of the Rio Grande is expected to re-establish, which would prevent erosion of exposed soil into the river.

4.4 LAND USE

4.4.1 Urban Areas

No Action Alternative

Land uses in the area of the RGRP would continue as at present. The urban and suburban areas of El Paso County would support a variety of land uses, including residential, commercial, and recreational.

Proposed Action

Under the Proposed Action, expansion of the RGRP levees would occur entirely within the ROW, and maintain current levee alignment. No urban areas would be affected by the levee footprint expansion.

Dredging operations would clear the river channel and maintain the international boundary, but would not affect surrounding land uses.

4.4.2 Agricultural Areas

No Action Alternative

The agricultural uses of southern El Paso County and Hudspeth County would continue unchanged.

Proposed Action

Under the Proposed Action, expansion of the RGRP levees would occur entirely within the ROW, and maintain current levee alignment. Along limited reaches, the presence of irrigation canals to the landside of the levee may require adjustment of the centered footprint expansion to the riverside; levee expansion would not impact agricultural lands along the RGRP project vicinity.

Dredging operations would have a positive impact on farmlands along the RGRP due to the increased efficiency in irrigation water delivery. In addition, dredged sediment could be used as a soil amendment and to improve drainage in agricultural fields.

4.5 COMMUNITY RESOURCES

4.5.1 Socioeconomics

No Action Alternative

Flood protection, the core mission of the RGRP, represents a sizable federal investment for protection and enhancement of economic conditions along the Rio Grande. Without proposed improvements, a very significant economic impact is anticipated due to potential flood damage. The estimated regional benefit of the RGRP operation is discussed below for the Proposed Alternative.

In terms of other economic impacts, current maintenance practices for the RGRP would continue to provide a steady, long-term benefit by continuing to inject revenue in wages and expenditures into the regional economy every year. The RGRP currently employs a permanent staff at the American Dam and in the Fort Hancock Field Office. Assistance from other USIBWC field offices is provided for recurring maintenance operations. In terms of O&M practices, no change would occur under the No Action Alternative of the RGRP. This alternative would not generate additional business sales, income, or employment from construction.

Proposed Action

Flood Protection: The RGRP is a sizable federal investment for protection and enhancement of economic conditions along the Rio Grande. A USIBWC-sponsored study (Sturdivant, *et al.* 2004) estimated economic benefits from the RGRP flood control mission at approximately \$139 million for protection of residential, industrial, and commercial structures; \$1.25 million for protection of agricultural use; and nearly \$69 million in damage protection of roads and utilities, and costs of emergency response and recovery. An itemized description of those benefits was previously presented in Table 1.1. Levee system improvements would also benefit communities along RGRP by eliminating the need to purchase additional flood insurance once the levee system meets FEMA certification criteria.

Other Socioeconomic Indicators. In addition to flood protection, direct and indirect employment, business sales volume and income are indicator criteria of socioeconomic impacts of proposed RGRP improvements. Annual values of these indicators at a county level were

compared to costs per year for implementation of RGRP improvements. Tables 4.1 and 4.2 present estimates of potential economic impacts of improvements at a county level in terms of employment, income and sales volume, and reference annual values for El Paso and Hudspeth Counties.

The unit cost value for RGRP improvements, based on projects previously completed by the USIBWC, is \$1 million per mile of levee. Representative unit values of the three economic indicators per \$1 million of levee improvements are: 31 jobs potentially generated; \$1,007,280 in potential income; and \$3,389,013 increase in sales volume (USIBWC 2008a).

For the required extent of levee improvements in El Paso County, 9.55 miles per year for two years, the average annual economic influx would be approximately \$32.4 million and \$9.6 million in terms of increased sales volume and income, respectively. At a county level, impacts from the economic influx of RGRP improvements would be beneficial but minor, and limited to the construction period. Calculated increases in employment, business sale volume and income per year would be less than 0.2 percent of annual values for El Paso County (Table 4.1).

Table 4.1 Potential Economic Impacts of Improvements to the RGRP Levee in El Paso County

Evaluation Criteria	Unit Value Per Mile of Levee Improvement ^a	Total for Levee Improvements	Annual Value for El Paso County	Change Relative to El Paso County
Local Expenditures	\$1,000,000	\$9,550,000	Not applicable	
Direct Employment	19	181		
Indirect Employment	12	114.6		
Total Employment	31	296	272,445 ^b	0.11%
Direct Sales Volume	\$1,274,065	\$12,167,321		
Indirect Sales Volume	\$2,114,948	\$20,197,753		
Total Sales Volume	\$3,389,013	\$32,365,074	\$ 19,816,513,980 ^c	0.16%
Direct Income	\$554,814	\$5,298,474		
Indirect Income	\$452,466	\$4,321,050		
Total Income	\$1,007,280	\$9,619,524	\$14,155,587,970 ^d	0.07%

^a Unit data for levee construction from USIBWC Rio Grande Canalization Project (Parsons 2004).

^b Total of the labor force (16 years and older) employed in 2005 (Texas Workforce Commission 2007)

^c Estimated Gross sales for El Paso County in 2005 (Texas Comptroller of Public Accounts 2005).

^d Based on a 2000 per capita income of \$19,617 and an El Paso County population of 721,598.

In Hudspeth County, improvements to 11.3 miles of levee per year over a three-year period would result in an average annual economic influx would be approximately \$38.4 million and \$11.4 million in terms of increased sales volume and income, respectively. Given its small population, the economic influx of RGRP improvements to Hudspeth County would be more significant than in El Paso County. As indicated in Table 4.2, a potential increase in employment and income would represent nearly one-third of current levels in Hudspeth County. The relative increase would be more significant in terms of sales volume, the third economic indicator. An important consideration in interpreting the potential for job generation

in Hudspeth County is that benefits at a local level would be applicable only to the construction period, and largely limited to residents given the small workforce availability in Hudspeth County.

Table 4.2 Potential Economic Impacts of Improvements to the RGRP Levee in Hudspeth County

Evaluation Criteria	Unit Value per mile of Levee Improvement ^a	Total for Levee Improvements	Annual Value for Hudspeth County	Change Relative to Hudspeth County
Local Expenditures	\$1,000,000	\$11,333,333	Not applicable	
Direct Employment	19	215		
Indirect Employment	12	136		
Total Employment	31	351	1,257 c	28.0%
Direct Sales Volume	\$1,274,065	\$14,439,403		
Indirect Sales Volume	\$2,114,948	\$23,969,411		
Total Sales Volume	\$3,389,013	\$38,408,814	\$14,471,860 d	264%
Direct Income	\$554,814	\$6,287,892		
Indirect Income	\$452,466	\$5,127,948		
Total Income	\$1,007,280	\$11,415,840	\$32,848,560 e	34.8%

^a Unit data for levee construction from USIBWC Rio Grande Canalization Project (Parsons 2004).

^b Total of the labor force (16 years and older) employed in 2005 (Texas Workforce Commission 2007)

^c Estimated Gross sales for El Paso County in 2005 (Texas Comptroller of Public Accounts 2005).

^d Based on a 2000 per capita income of \$9,549 and a Hudspeth County population of 3,440.

Dredging operations would require the use of heavy equipment to remove vegetation and sediment, and equipment to dispose of sediment. The cost of dredging per cubic yard is estimated to be \$15 per cubic yard if conducted by USIBWC, or \$5 if delegated to the MxIBWC for implementation. Dredging of the river channel is not likely to be a significant economic influx at a county level given the large population of El Paso County, and likely minimum utilization of local workforce in Hudspeth County.

4.5.2 Environmental Justice

No Action Alternative

Executive Order 12898 requires that each federal agency analyze the human health, economic, and social effects of federal actions, including the effects on minority communities and low-income communities. An impact to environmental justice would be considered significant if the federal action had disproportionately high and/or adverse human health or environmental effects on minority and low-income populations.

The affected area is the footprint of land where potential adverse impacts could result from a planned activity. For this project, these are the areas that could be affected by flood waters of the Rio Grande.

Environmental justice impacts can arise as a result of the uncontrolled flood waters that may cause damage to property. The No Action Alternative would result in the continued

control of flood waters using current maintenance practices in accordance with applicable regulatory requirements and, therefore, would not result in any increased in flood and associated health hazards to the immediate community.

No adverse impacts to biological resources, geologic resources (*e.g.*, soil), air quality, noise, and cultural resources would occur for the No Action Alternative. For these reasons, there is no potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations.

Proposed Action

Data indicate that El Paso and Hudspeth Counties have high minority (approximately 47.1% and 53.1%, respectively) and family incomes below the poverty level (23.8% and 35.8%, respectively); however, construction activities would not occur in residential or workplace areas associated with these populations. A small but positive economic input to the local community would occur as a result of the levee improvements. As a result, no adverse impacts to disproportionately high minority and low-income populations are expected from improvements to the RGRP levee.

Similar to levee improvements, dredging operations would occur outside the floodway, and sediment disposal would take within the RGRP right-of-way, or placed in farmland for soil improvements.

4.5.3 Transportation

No Action Alternative

No impacts are anticipated, as the current levee system configuration would be retained. Residential, commercial, and agricultural transportation systems would not change.

Proposed Action

Proposed improvements to the RGRP levee would have moderate impacts on local transportation. Heavy construction equipment (dump trucks, front-end loaders, graders) in the reach of the RGRP near El Paso and the surrounding communities would likely be driven to the construction site from local areas using local highways and surface streets, and due to the limited number of access points to the levee, construction equipment would be moved along the levee.

During levee construction, a temporary increase in use of the access roads would take place during placement of equipment in the staging areas. Subsequent construction activities would also temporarily increase local transportation, as fill material would be imported from sources outside the levee system. Levee construction activities, including staging activities, would occur within the existing ROW. Transportation of construction equipment and the use of personal vehicles would mainly occur within the levee ROW and along the levee road system within the floodway. Following completion of the levee improvement projects, the levee roads would continue providing access for USIBWC maintenance activities and USBP surveillance activities.

Dredging operations would have similar, moderate impacts on local transportation as the levee improvements. Heavy construction equipment would be staged within the existing ROW, following a short-term increase of public roads to access the area.

4.6 ENVIRONMENTAL HEALTH

4.6.1 Air Quality

Impacts to air quality in attainment areas would be considered significant if pollutant emissions associated with the Proposed Action result in increases of more than 10 percent of the affected counties emissions inventory, or contributed to exceedance of national, state, or local air quality standards. In non-attainment areas, impacts would also be considered significant if additional emissions result in exceedance of threshold values specified for each criteria pollutant.

Hudspeth County is an attainment area for sulfur dioxides, nitrogen dioxides, carbon monoxide, volatile organic compounds, and particulate matter. El Paso County is also an attainment area for criteria pollutants except for particulate matter; for particulate matter, the county is classified as non-attainment area, category moderate. The applicable threshold criterion for particulate matter emissions in the county, as a non-attainment area, is 100 tons per year (USEPA 1996).

No Action Alternative

No impacts are anticipated, as the current configuration of the levee system would be retained, and no changes would be made to routine maintenance of the river channel.

Proposed Action

Table 4.3 summarizes potential air emissions for each county, along with applicable reference values. Air emissions estimates for the Proposed Action are based on per-mile values derived from emission factors reported by USEPA (USEPA 1996), and pollutant emission levels for common construction practices and methods (Means 2005). A detailed documentation of unit values for air emissions, as well as reference values used in the evaluation of air quality impacts, is provided in the Programmatic EIS for long-term improvements to the RGRP (USIBWC 2008a).

Improvements to the RGRP would not impact air quality in El Paso or Hudspeth Counties. In both cases there would be only small increases in criteria air pollutants, not significant at a regional level. In El Paso County, increased emissions under the Proposed Action for all criteria pollutants would be less than 0.25 percent of the county inventory, and less than 1.5 percent in the case of Hudspeth County. The emissions for particulate matter in El Paso County, as a non-attainment area, would be below the threshold value of 100 tons per year.

Table 4.3 Potential Air Emissions of RGRP Improvements

	Emissions (tons per year)				
	Sulfur Oxides	Nitrogen Dioxides	Carbon Monoxide	Volatile Organic Compounds	Particulate Matter (PM ₁₀)
Unit emissions per mile	0.16	1.27	8.68	0.44	3.27
El Paso County					
Potential emissions for 9.6 miles of construction per year	1.5	12.1	82.9	4.2	31.2
Total annual source emissions for El Paso County	1,991	24,391	146,871	20,823	13,991
<i>Potential emissions as a Percent of El Paso County Emissions Inventory</i>	<i>0.08%</i>	<i>0.05%</i>	<i>0.06%</i>	<i>0.02%</i>	<i>0.22%</i>
Hudspeth County					
Potential emissions for 11.3 miles of construction per year	1.8	14.4	98.4	5.0	37.1
Total annual source emissions for Hudspeth County	163	3,724	18,847	1,397	2,548
<i>Potential emissions as a Percent of Hudspeth County Emissions Inventory</i>	<i>1.1%</i>	<i>0.39%</i>	<i>0.52%</i>	<i>0.36%</i>	<i>1.5%</i>

In terms of dredging operations, the potential for emissions on a per-mile basis is considered similar to that of levee improvements. For the possible but unlikely scenario that both dredging and levee improvements were conducted concurrently, it was assumed that the increase in air emissions would be proportional to the length of both activities combined.

In Hudspeth County, dredging along the RGRP would cover 32.9 miles, a similar length to required levee improvements (34.0 miles). Emission levels for both activities combined would result in a two-fold increase of values listed in Table 4.3, for each of the five criteria pollutants. This increased emission value for those pollutants would account for less than 3.0 percent of the Hudspeth County annual inventory of the five criteria pollutants under consideration.

For El Paso County, dredging would extend over a 13-mile segment, equivalent to approximately 70 percent of the extent of levee improvements (19.1 miles). The increased emission values for both activities combined would increase the percent contribution of proposed RGRP improvements to values presented in Table 4.3 would represent less than 0.4 percent of the county annual inventory for any of the five criteria pollutants.

4.6.2 Noise

No Action Alternative

No impacts from noise are anticipated, as the current levee configuration would be retained. No additional sources of noise, outside of routine levee maintenance activities, are expected.

Proposed Action

Improvements to the RGRP levee would increase ambient noise levels through the use of trucks to bring additional fill material to the site and fill activities associated with the levee improvement project. For the purposes of this EA, it is estimated that the shortest distance between an equipment noise source and a receptor in a rural area would be a person(s) 100 feet off-site. In Hudspeth County, given the rural nature of the area, it is also unlikely a person other than a worker would be within 100 feet of the site boundary during activities. However, if a person were within this distance, the person could be exposed to noise as high as 74 to 83 dBA.

It is anticipated that construction activities would occur between 7:30 a.m. and 5:00 p.m., five days per week for the duration of the project. However, individuals would not be exposed during the entire noise-producing period. Under these conditions, persons would not be exposed to long-term and regular noise above 75 dBA. As stated in Subsection 3.6.2, 75 dBA during the noise event indicates a good probability for frequent speech disruption, producing ratings of “barely acceptable” for intelligibility of spoken material. Therefore, nearby persons should not experience loss of hearing, but may experience frequent speech disruption.

Dredging operations would have similar effects on ambient noise levels as levee improvements. Dredging operations include use of heavy equipment for sediment removal and trucks for sediment disposal. Dredging operations are expected to occur between 7:30 a.m. and 5:00 p.m., five days per week, for the duration of the project. Nearby persons and workers should not experience loss of hearing, but may experience frequent speech disruption.

4.6.3 Public Health and Environmental Hazards

No Action Alternative

No impacts from waste storage and disposal sites are anticipated, as the current levee configuration would be retained.

Proposed Action

Improvements, both levee improvements and dredging operations, to the RGRP would not be affected by waste storage and disposal sites (USIBWC 2008a).

4.7 INDIRECT AND CUMULATIVE IMPACTS

The Department of Homeland Security developed plans and is finalizing contracts to build a border protection fence along the U.S.-Mexico Border, adjacent to the Rio Grande. At present, the fence is proposed to run along the top of the existing U.S. levees. Fence construction may cause impacts to environmental resources through vegetation removal on levee slopes during construction and through transport of sediment and construction debris to the floodway during construction activities. Once built, the border fence will isolate existing tracts of natural resources areas located on the riverside of the levee system, and may disrupt Native American access to the river. The border fence will limit access to the levee by local residents, farmers, and non-agency personnel.

According to the agreement between the MxIBWC and the USIBWC, Minute 313, the two sections are responsible for sediment removal and disposal along the length of the RGRP. Sediment removal would improve normal flow levels and maintain the international boundary. The MxIBWC has begun removing sediment along the reaches for which it is responsible, and sediment removal by the USIBWC is contingent upon receipt of funding.

SECTION 5 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

Section 5 describes BMPs and mitigation measures to be implemented as part of the Proposed Action for RGRP improvements. Best management practices represent specific actions to minimize the potential for impacts to natural and cultural resources. Best management practices are organized within the engineering, natural resources, and cultural resources categories. Mitigation measures compensate for potential adverse effects of the Proposed Action that cannot be prevented through BMPs.

5.1 ENGINEERING MEASURES

Levee footprint expansion will take place within the existing ROW, retaining current levee alignment. In some instances footprint expansion alignment would be optimized, to the extent possible, to avoid impacts to natural and cultural resources. Best management practices to avoid construction impacts on resources near levee improvement areas include:

- A storm water pollution prevention plan would be developed during project design to minimize impacts to receiving water, as specified by USEPA regulations for construction projects. The storm water pollution prevention plan would include construction areas along the levee system, as well as equipment staging areas. To prevent sedimentation, sediment fences and/or sediment barriers around adjacent irrigation canals and non-jurisdictional wetlands would be installed while construction occurs in affected areas.
- During project construction, methods such as wetting the soil would be employed to prevent erosion from unvegetated slopes and/or levee service corridors.
- During project construction, existing access points to the levee road would remain in service; because no significant modifications would be made to the levee 3:1 slope ratio, lateral access to the levee road would continue as currently available.
- Material used to expand the levee will be consistent in physical and chemical make-up with existing soil (obtained from previous dredging operations) as appropriate and will not exceed a depth of 6.6 feet (2 meters) above existing conditions to avoid potential adverse effects to unidentified archaeological resources.

Dredging operations would occur within the Rio Grande river channel, and equipment staging would be within the existing ROW. Best management practices to avoid impacts from the dredging operations on adjacent resources would be used. A dredging management plan would be developed and delivered as part of a USACE permit. The plan will include information on:

- Dredge material sample and testing plan
- Location of dredging
- Proposed bed down areas and equipment staging
- Estimated quantities of dredge material

- Dredging BMPs
- Disposal sites

5.2 NATURAL RESOURCES

Some vegetation, including managed salt cedar communities and managed old-field communities, would be removed during levee expansion. These communities are expected to rapidly re-establish upon project completion. Re-establishment of vegetation along the river channel is also expected following completion of dredging operations. For additional protection of sensitive vegetation and wildlife, the following BMPs would be utilized:

- Construction activities and levee expansion may occur in areas where burrowing owls nest in holes in the levee. Construction and fill would remove these nesting locations. Construction would occur outside the breeding season. Ongoing coordination between the USIBWC and the TPWD would survey nesting locations, and move the nesting burrows, or provide artificial nest boxes away from the levee.
- The equipment would be staged and used away from large, mature trees, particularly the cottonwood trees between river miles 45 and 48. Staging equipment away from the trees would prevent incidental damage to the tree or compression of the root base.
- Dredging operations, including sediment removal, would occur outside the burrowing owl breeding and nesting season. While the owls are tolerant of some activity, extensive nearby dredging activities may cause nest abandonment.
- Dredging activities would be conducted according to a USACE permit issued under Section 10 of the Rivers and Harbors Act. The required permit would address BMPs for construction activities and protection of water quality according to USACE and TCEQ requirements.
- Dredging activities and construction activities are not expected to require direct mitigation for loss of resources, but if mitigation is required, ongoing coordination between the USIBWC and the Rio Bosque Wetlands Park may use portions of the park as mitigation sites.

5.3 CULTURAL RESOURCES

Best Management Practices are identified to reduce potential effects on cultural resources. The assumed and preferred approach is avoidance. Avoidance preserves the integrity of cultural resources and protects their research potential (i.e., their NRHP eligibility) and also avoids costs and potential construction delays associated with data recovery. Best Management Practices to minimize potential effects on archaeological resources are incorporated into Section 5.1 Additional measures to avoid potential effects to archaeological, architectural, and Native American resources are described below.

Archaeological Resources

Because intact archaeological resources that may contain sufficient information to be NRHP eligible may occur in the APE and have the potential to be adversely affected by the

Proposed Action, a Phase I archaeological survey will be conducted prior to ground-disturbing activities.

A Work Plan for the Phase I survey will be developed and submitted to the Texas State Historic Preservation Office (SHPO) for review and approval. The Phase I survey will include shovel testing for shallowly buried deposits, artifact analysis, and report preparation to identify archaeological sites and to determine their extent and integrity. If intact archaeological sites are identified during Phase I investigations, Phase II cultural resources studies should be designed in consultation with the Texas SHPO, and implemented to determine the NRHP eligibility of the cultural resources. If NRHP-eligible resources occur and cannot be avoided through project redesign, data recovery investigations should be designed in consultation with the Texas SHPO and implemented prior to construction. Historically, data recovery of archaeological sites through professional techniques such as surface collection, mapping, photography, subsurface excavation, technical report preparation, and dissemination, has been the standard mitigation measure. Under the revised Section 106 regulations (36CFR800.5(a)(2)(i)), data recovery conducted as mitigation is now considered, in and of itself, an adverse effect.

Application of appropriate techniques for intentional site burial will minimize potential adverse effects to archaeological resources from their capping as a result of expanding the levee footprint or the deposition of material dredged from the river channel in the floodway. Two of these techniques are incorporated in Section 5.1 and involve the type and depth of soil to be used in levee expansion. No increased traffic is anticipated after levee expansion so any change in use that could result in additional impacts (*e.g.*, soil compaction) is not anticipated. Further, spoil dredged from the river channel that may be deposited along the floodway will also be compatible with existing material in the floodway, will not exceed the depths specified in Section 5.1, and will not be subject to increased compaction.

Architectural Resources

Project engineering plans would take into account the locations of listed, eligible, or unevaluated architectural resources associated with the NRHP-listed El Paso County Water Improvement District No. 1, the Hudspeth County Conservation and Reclamation District No. 1, and the RGRP (unevaluated for eligibility). These resources would be avoided through project redesign (*e.g.*, narrowing the levee expansion in those areas, or incorporating alternative levee structural improvements) to minimize adverse effects.

Architectural studies to determine the NRHP eligibility of unevaluated architectural resources in the APE will be conducted prior to project activities. If NRHP-eligible resources occur and cannot be avoided through project redesign, Phase III investigations would be designed in consultation with the Texas SHPO and implemented prior to construction. Mitigation measures may include, but not be limited to, renovation using architecturally compatible design and materials and documentation through the Historic American Engineering Record (HAER) program administered by the National Park Service. Documentation of structures to HAER standards preserve the contextual and architectural information of the resource even if the resource is demolished.

Native American Resources

Measures for reducing effects to Native American resources would be determined in consultation with the Ysleta del Sur Pueblo, Pueblo of Isleta, Mescalero Apache Tribe, White Mountain Apache Tribe, Fort Sill Apache Tribe, and the Texas SHPO. Established USIBWC consultation procedures would be followed during this consultation process. Based on previous coordination with the Ysleta del Sur Pueblo for projects in the area of the RGRP, examples of appropriate mitigation measures to minimize effects to Native American resources may include:

- Scheduling dredging and levee improvement activities in coordination with Native American groups to ensure their access to the river and plant resources for ceremonial purposes during levee reconstruction;
- Identifying sensitive Native American plant resources to ensure their availability/accessibility along portions of the river that would not be affected by dredging activities (or that would recover if dredging were conducted in stages);
- Ensuring that sensitive Native American plant resources would recover/re-emerge in natural habitats in dredged areas; or
- Providing alternative habitat(s) for sensitive Native American plant resources to ensure their continued availability during and after levee reconstruction. This may include the preparation or development of new habitat areas or the use of an existing managed wetland habitat adjacent to the RGRP, such as the Rio Bosque Wetlands Park.

SECTION 6 ENVIRONMENTAL COMPLIANCE AND COORDINATION

6.1 CONSULTATION

6.1.1 Draft EA Distribution

The Draft EA has been sent for a 30-day public review period to representatives of the following agencies or organizations:

U.S. Fish and Wildlife Service Ecological Services	Upper Rio Grande State Planning Region 8 Executive Director
Texas Parks and Wildlife Department Wildlife Habitat Assessment Program	El Paso Water Utilities/ Public Service Board General Manager
Texas Parks and Wildlife Department Environmental Review Coordinator	El Paso County Water Improvement District No. 1 General Manager
U.S. Army Corps of Engineers Albuquerque District	Hudspeth County Conservation and Reclamation District No. 1 General Manager
Texas Commission on Environmental Quality Section 401 Coordination	Ysleta del Sur Pueblo Environmental Director
Texas Historical Commission Historic Division	Pueblo of Isleta Governor
Texas Historical Commission Archaeological Division	Mescalero Apache Tribe Tribal Historic Preservation Officer
Natural Resources Conservation Service, USDA-NRCS Soil Survey Section	White Mountain Apache Tribe Chairman
U.S. Border Patrol El Paso, Texas	Fort Sill Apache Tribe Chairman
Upper Rio Grande State Planning Region 8 Chairman	
Rio Bosque Wetlands Park Land Manager	

6.1.2 Draft EA Comments and Responses

Comments on the Draft EA were received from Dr. John Sproul of the Rio Bosque Wetlands Park; Ms. Theresa Taylor of the Bureau of Reclamation; Ms. Roxanne Runkel of the National Park Service; Ms. Debra L. Beene of the Texas Historical Commission (comments were received past the 30-day comment period of September 02, 2008); comments are included as part of the Administrative Record for this EA); Mr. Mark T. Altaha of the White Mountain Apache Tribe; and Mr. Kevin Bixby.

Comments received are provided in Appendix C, along with the USIBWC responses. Those comments were addressed in the Final EA, as indicated in the responses to comments also included in Appendix C.

6.2 LIST OF CONTRIBUTORS

Tables 6.1 list contributors to the preparation of this Environmental Assessment for improvements to the RGRP and dredging operations within the RGRP, and development of technical support studies.

Table 6.1 Environmental Assessment Preparation Technical Team

Name	Organization	Degree	Years Experience	Project Role
Lisa Santana	USIBWC	Ph.D., Biology	7	Project manager; NEPA compliance; document review
Daniel Borunda	USIBWC	M.S. Fisheries and Wildlife Science	11	NEPA compliance; document review
Cesar Boisselier	USIBWC	B.S., Civil Engineering	16	Acting Area Operations Manager; document review
Carlos Victoria-Rueda	Parsons	Ph.D., Environmental Engineering	22	Project manager; water resources and environmental health evaluation
James Hinson	Parsons	M.S., Wildlife Science	16	Vegetation and wildlife analyses; field studies supervision
Jill Noel	Parsons	M.S., Botany	8	Vegetation, threatened and endangered species
Susan Bupp	Parsons	M.A., Anthropology	32	Cultural resources specialist, Section 106 compliance, Document Review
Rachael Mangum	Parsons	M.A., Anthropology	9	Cultural resources specialist, field reconnaissance, cultural resources technical sections
Taylor Houston	Parsons	M.S., Geography-Environmental Resources	7	Wetlands, natural resources mapping, land use
Sherrie Keenan	Parsons	B.A., Journalism	28	Technical editor

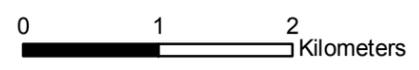
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**APPENDIX A
DETAILED MAPS OF LEVEE ALIGNMENT AND
POTENTIAL IMPROVEMENT AREAS**



Legend

- MileMarker
- Flood Control Levees
- Rio Grande

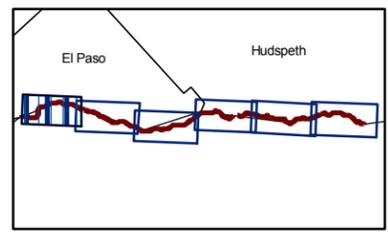
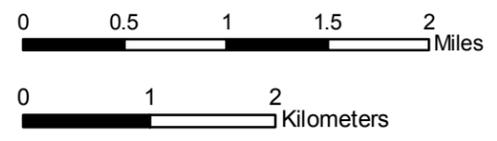


Figure A1
River Miles 1-15

Rio Grande Rectification Project EA
International Boundary and Water Commission,
United States Section



- MileMarker
- Flood Control Levees
- Rio Grande

Legend

Potential Levee Height Increase

 Up to 1 foot	 2 - 3 foot
 1 - 2 foot	 3 - 4 foot

*Note: Expansion Corridor is not shown to scale

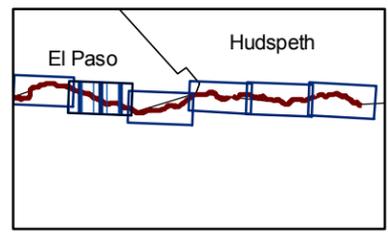
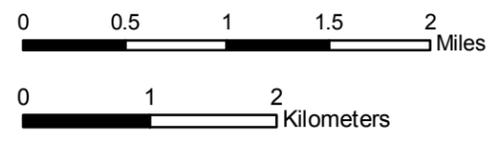


Figure A2
River Miles 15-30
 Rio Grande Rectification Project EA
 International Boundary and Water Commission,
 United States Section



- MileMarker
- Flood Control Levees
- Rio Grande

Legend

Potential Levee Height Increase

■ Up to 1 foot	■ 2 - 3 foot
■ 1 - 2 foot	■ 3 - 4 foot

*Note: Expansion Corridor is not shown to scale

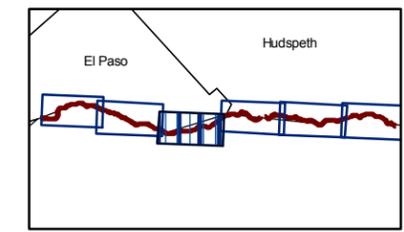
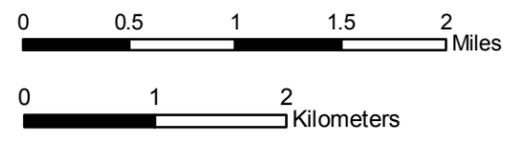


Figure A3
River Miles 30-45
 Rio Grande Rectification Project EA
 International Boundary and Water Commission,
 United States Section



- MileMarker
- Flood Control Levees
- Rio Grande

Legend

Potential Levee Height Increase

■ Up to 1 foot	■ 2 - 3 foot
■ 1 - 2 foot	■ 3 - 4 foot

*Note: Expansion Corridor is not shown to scale

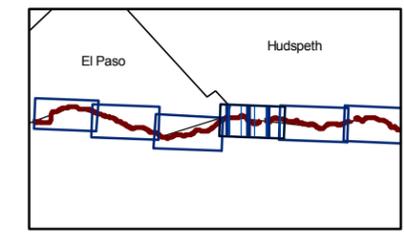
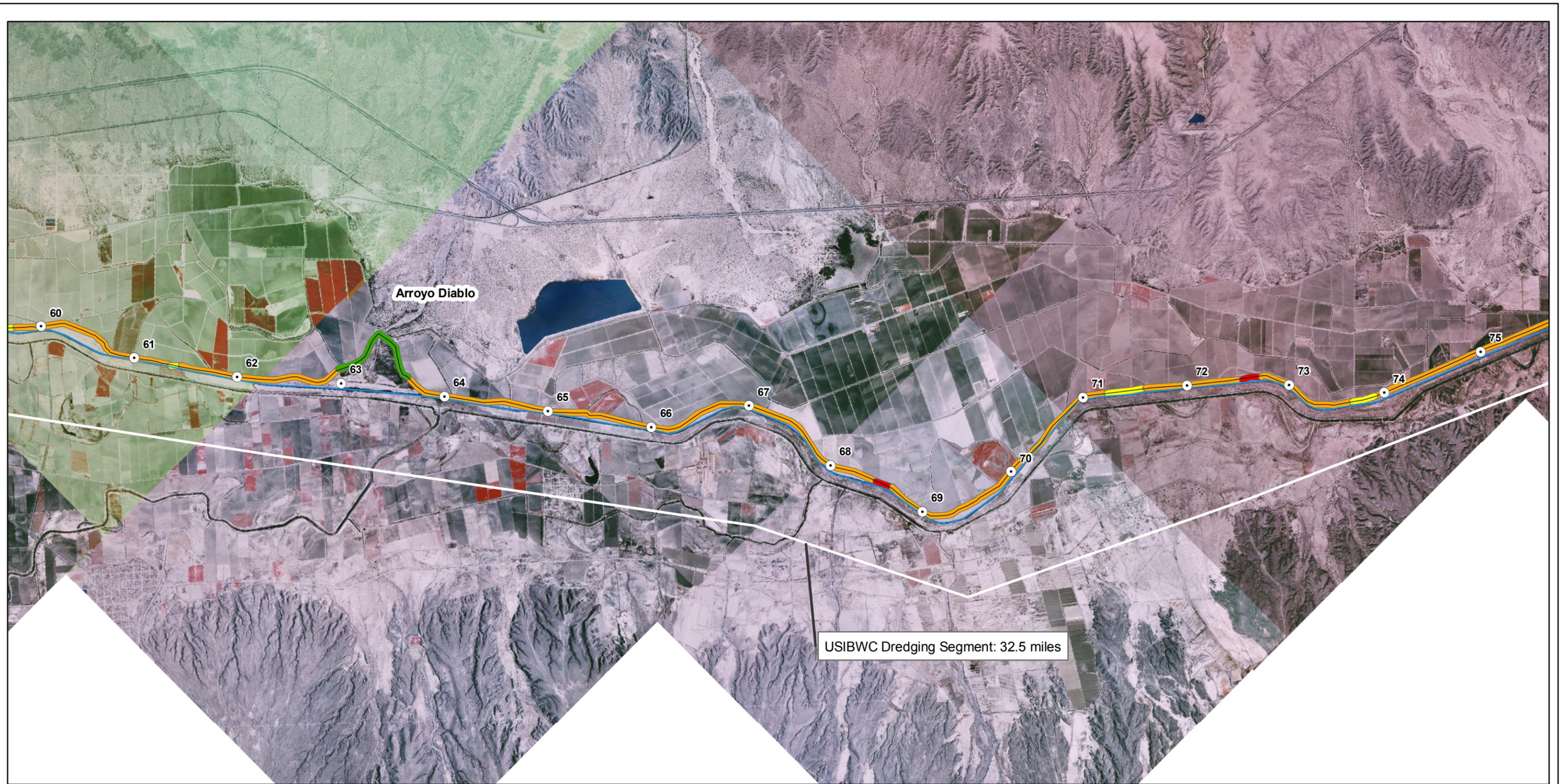
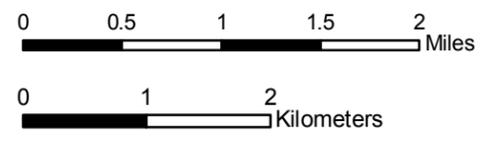


Figure A4
River Miles 45-60
 Rio Grande Rectification Project EA
 International Boundary and Water Commission,
 United States Section



USIBWC Dredging Segment: 32.5 miles



- MileMarker
- Flood Control Levees
- Rio Grande

Legend

Potential Levee Height Increase

■ Up to 1 foot	■ 2 - 3 foot
■ 1 - 2 foot	■ 3 - 4 foot

*Note: Expansion Corridor is not shown to scale

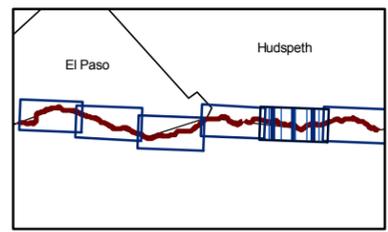
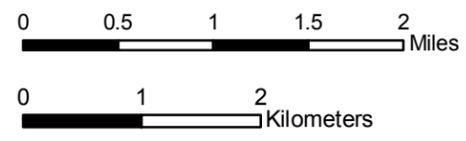
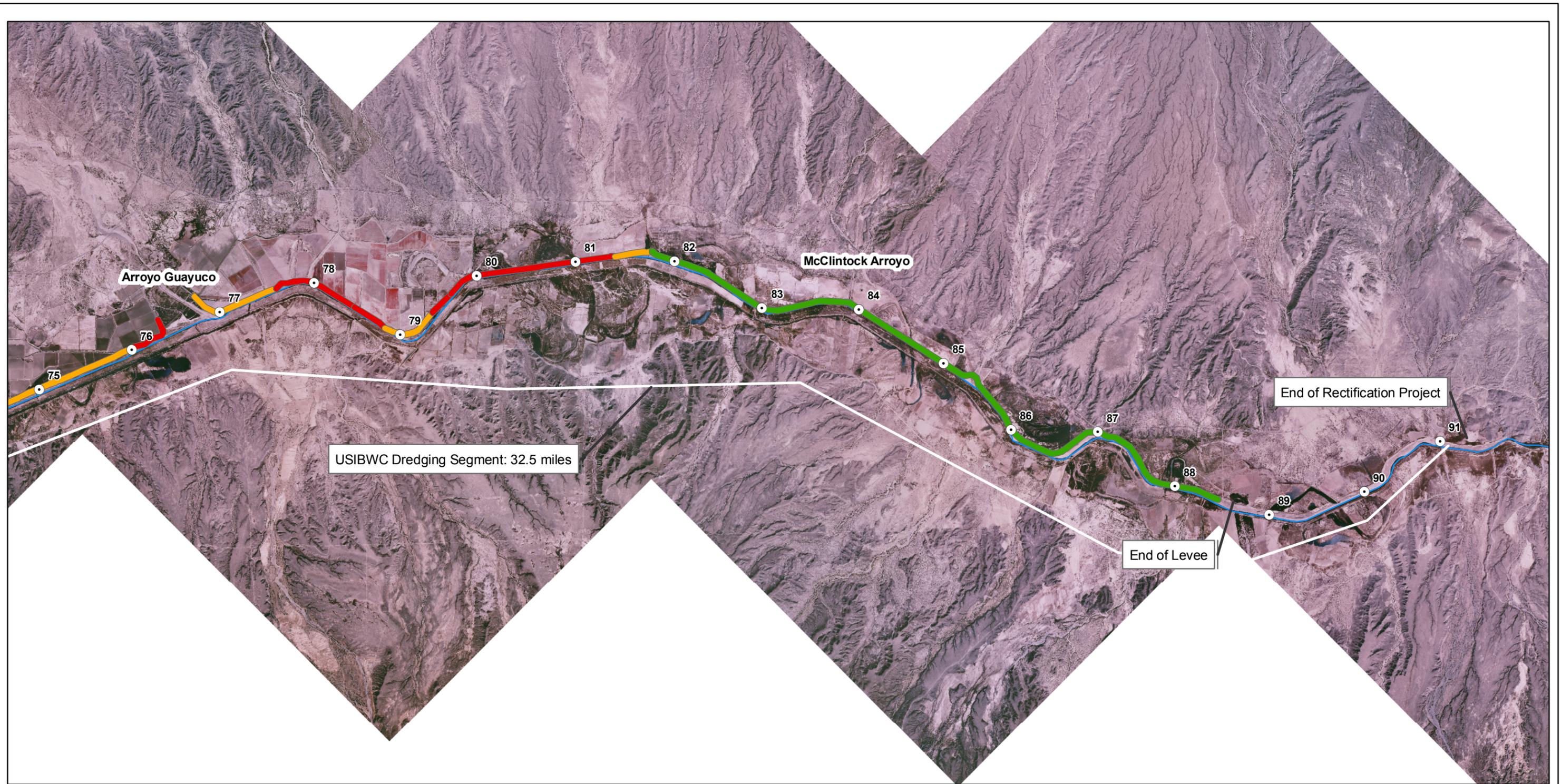


Figure A5
River Miles 60-75
 Rio Grande Rectification Project EA
 International Boundary and Water Commission,
 United States Section



- MileMarker
- Flood Control Levees
- Rio Grande

Legend

Potential Levee Height Increase

■ Up to 1 foot	■ 2 - 3 foot
■ 1 - 2 foot	■ 3 - 4 foot

*Note: Expansion Corridor is not shown to scale

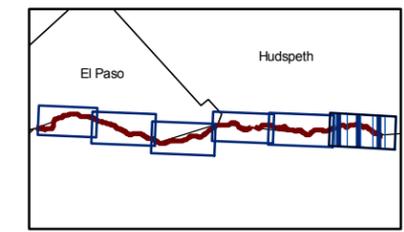


Figure A6
River Miles 75-91
 Rio Grande Rectification Project EA
 International Boundary and Water Commission,
 United States Section

APPENDIX B BIOLOGICAL EVALUATION UPDATE FOR THE RGRP

APPENDIX B

BIOLOGICAL EVALUATION UPDATE FOR THE RIO GRANDE RECTIFICATION PROJECT AREA

SECTION 1 INTRODUCTION

A Biological Assessment (BA), *USIBWC Rio Grande Projects: American Dam to Fort Quitman, Texas* was completed in 2001. The BA was conducted to evaluate the effects of river maintenance practices along the Rio Grande on species listed under the Endangered Species Act (ESA). The study area of the BA was the United States portion of a 91-mile segment of the Rio Grande maintained and operated by the USIBWC that extends from American Dam downstream to Fort Quitman, Texas.

A field reconnaissance study was conducted to update the previous BA information. The field reconnaissance was used to determine what vegetation types were present and which vegetation types were present in the study area. Determining the current vegetation types allowed a prediction of habitats available for wildlife, including T&E species, that occur, or may occur, in the project area. The field reconnaissance was also used to determine if wetlands were present in the project area.

SECTION 2 SUMMARY OF PREVIOUS INVESTIGATION

The BA, prepared for the USIBWC (Parsons 2001), included four major components:

- a habitat survey (April 17 – 21, 2000);
- a survey for Interior least terns and associated habitat (July 24 – 28, 2000);
- an aquatic characterization survey (October 20 -22, 200); and
- an avian survey (January 16 – 17, 2001).

The land cover analysis of the BA indicated that the area was dominated (>58% of land surveyed) by transitional herbaceous vegetation, including such species as bermudagrass (*Cynodon dactylon*), saltgrass (*Distichlis spicata*), and several forbs. In addition to herbaceous vegetation within the floodway, the BA also identified woodland/shrubland communities in approximately 10 percent of land surveyed. These woodland/shrubland communities were characterized as low-quality wildlife habitat dominated by salt cedar (*Tamarix spp.*), with limited native vegetation, including cottonwood (*Populus spp.*) and willow (*Salix spp.*). Although salt cedar woodlands/shrublands are considered low quality wildlife habitat, the areas were initially considered as potential habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*). The native cottonwoods and willows were isolated along the Rio Grande, and were narrow in width immediately adjacent to the river. Because the native vegetation was so limited, it was considered in the BA to be low-quality wildlife habitat. For the BA, a total of 42 locations were surveyed, and none contained suitable vegetation for nesting of T&E species, including the southwestern willow flycatcher.

In addition to the vegetated classes described above, the BA identified open water and unconsolidated sandbars that occupy approximately 19 percent of the area surveyed. The open water was primarily the Rio Grande and irrigation return flows. The open water areas in the

study area were surveyed for fish species during the aquatic characterization survey. The aquatic characterization study indicated that fish species diversity in the Rio Grande was limited. The vegetation along the river banks is narrow in width and limited to willows and salt cedar, and in many portions of the survey area only herbaceous vegetation was present adjacent to the river. The lack of riparian structural diversity can lead to lack of faunal diversity within the river and other aquatic habitats. Based on flow regimes, the area considered to be unconsolidated sandbars can vary considerably, but the unconsolidated sandbars were the focus of the interior least tern (*Sterna antillarum athalassos*) survey. No suitable habitat for nesting interior least terns was identified in the focused survey of the area.

There were limited wetlands in the survey area identified in the BA. The wetlands included palustrine shrublands (e.g., nontidal wetlands dominated by trees, shrubs, and other vegetation in this area, typically immature salt cedar) and emergent marshes (e.g., semi-permanently or seasonally flooded areas dominated by such species as cattail (*Typus spp.*)).

SECTION 3 CURRENT INVESTIGATION

The current investigation is a survey of the project area from American Dam to Fort Quitman. The proposed action has two major components, including raising the levee in some areas and dredging the main river channel of the Rio Grande. There were four specific resources included in the survey that included vegetation, wetlands, wildlife habitat, and habitat for T&E species. Each resource was surveyed to assess the effects of both components of the proposed action, and the results for each resource are described separately below.

3.1 Survey locations

The entire reach of the RGRP was visually inspected during a pedestrian survey of the project area on July 8 through July 10, 2008.

The survey, including photo-documentation of the entire reach, including portions of the Rio Grande, the floodway, the U.S. levee, and adjacent habitats on the landside of the levee, if these areas appeared to be different. The survey included the entire project area between the river and the riverside of the levee (i.e., the entire floodway on the U.S. side of the Rio Grande).

Levee improvements required in the upper 17-mile reach of the RGRP (from American Dam to the Riverside Diversion Dam), previously addressed in a separate EA (USIBWC 2007), and this area was only surveyed to determine the potential effects of channel dredging in this reach of the river. Figure A1 in Appendix A shows the locations of USIBWC dredging operations in the upper reach of the RGRP study area. The project area downstream of the Riverside Diversion Dam was surveyed for both the potential effects of raising the levee and channel dredging. Dredging locations and potential levee height increases are shown in Figures A2 through A6 of Appendix A.

The survey did not target specific locations for detailed occurrence records for plants, wildlife, or T&E species, but rather, a broad classification of vegetation within the floodway was developed. This vegetation classification was used to determine if habitat for wildlife, including T&E species, was present.

The survey did not specifically include inspection of the Mexico side of the Rio Grande, except incidentally, to note dominant plant communities and possible effects of ongoing dredging operations by the MxIBWC.

3.2 Survey Procedures

The survey procedures included a visual inspection and pedestrian survey of the reach of the Rio Grande from the American Dam to near Fort Quitman.

The following definitions are used in the description of the habitats present in the project area.

- **River habitats**: The Rio Grande water body and the water in the tributaries that drain to the Rio Grande. The river habitats include only the water, and does not include riparian habitats, vegetated islands, or sandbars within the river. The river habitats include all aquatic species.
- **Riparian habitats**: The transitional vegetation between the drier, upland portions of the area and the river or tributaries to the river.
- **Floodway**: The area between the river and the levees on either side of the river. In this survey, the floodway was restricted to the area between the river and the U.S. levee. The floodway between the river and the Mexico levee was not surveyed.
- **Other habitats (vegetated islands, sandbars)**: These habitats include areas that have been subject to sediment deposition. If the sediment remains exposed above the river water levels for extended periods of time, hydric vegetation may be established.
- **Irrigation canals**: The canals that provide water from the Rio Grande to irrigate agricultural lands and return flows from irrigated fields to the Rio Grande.
- **Riverside of levee**: The area between the U.S. levee and the Rio Grande.
- **Landside of levee**: The area from the center of the U.S. levee toward the U.S. outside of the floodway. The landside of the levee is generally not subject to the same flooding conditions as the floodway unless the levee is overtopped.
- **Levee Service Corridor**: The levee, including the slopes on both sides, and the maintenance track adjacent to the levee. The maintenance track is approximately 20 to 25 feet wide, and is generally located on the landside of the levee. The maintenance track is frequently dragged with tires by the U.S. Border Patrol to monitor and track illegal crossings from Mexico to the United States.
- **Right-of-way (ROW)**: The area on the landside of the levee and the levee service corridor owned and managed by the USIBWC. In many locations the levee service corridor extends nearly to the ROW boundary.
- **Study Area**: The area from American Dam to Fort Quitman, from the Rio Grande to the U.S. levee (Riverside), and from the U.S. levee to approximately the edge of the ROW (Landside).

Color infrared orthoimagery, aerial photographs, and wetland maps (National Wetland Inventory) were used to create preliminary vegetation maps along the 91-mile study corridor. See the attached Photo Log for pictures of the entire survey area.

SECTION 4 VEGETATION

4.1 Regional Vegetation

The RGRP is within the northern Trans-Pecos region of the Chihuahuan Desert. This region includes all sections of the Chihuahuan Desert in the United States and the northernmost sections of the desert of Mexico (MacMahon 1988). The regional vegetation has been described in other documents (MacMahon 1988; McClaran 1995; Crawford et al., 1996; USIBWC 2008). The Trans-Pecos region of the Chihuahuan Desert is historically a mosaic of grasslands and desert shrublands (MacMahon 1988; McClaran 1995), with dense riparian vegetation along areas where washes or rivers, including the Rio Grande, are present. In the recent past, riparian areas have been degraded, and the invasive salt cedar (*Tamarix spp.*) has attained dominance in many locations (Crawford et al. 1996; Parsons 2001).

As a result of clearing native vegetation for agriculture and urban development, relatively small areas of native vegetation remain. El Paso is the most developed urban center within the project area. Lands adjacent to the Rio Grande are primarily urban and suburban in El Paso County. In Hudspeth County, adjacent lands along the Rio Grande are primarily agricultural lands (for production of food crops) and rangeland (for the production of dairy cattle and beef cattle).

4.2 Vegetation within Project Area

Riparian Vegetation Associations

The riparian portions of the project area include an approximate 15-foot band of vegetation adjacent to the Rio Grande. The riparian vegetation includes native and non-native woody vegetation, primarily willows and salt cedar. The riparian woody vegetation is relatively small-statured due to routine mowing. The riparian woody vegetation on the Mexico side of the Rio Grande, in many locations, is denser and the trees are larger because routine clearing is not done by the MxIBWC. Interspersed with woody vegetation in the riparian zone are several native and non-native species of herbaceous vegetation, including bermudagrass and silverleaf nightshade (*Solanum elaeagnifolium*).

During dredging operations, vegetation along the riverbanks will be removed. This vegetation is primarily salt cedar, and some reaches of the river have immature willows in the riparian areas. The vegetation in these areas is expected to rapidly re-establish at the conclusion of the dredging operations. The MxIBWC performed dredging operations in the project area, and willows grow in the riparian areas along the river banks within a few months after dredging operations.

Improving the levee, including capping the levee to raise levee deficiencies, will not affect riparian vegetation.

Floodway Vegetation Associations

The riparian vegetation grades into the floodway vegetation. The U.S. floodway, from the center of the Rio Grande to the toe of the levee, is characterized primarily by two vegetation types. In the upper reaches of the RGRP, from the International Dam to approximately Fort Hancock Port of Entry (approximately river mile 60), the vegetation in the floodway is

generally considered managed herbaceous, old-field communities. This vegetation type is characterized by invasive grasses and forbs, but limited woody plants within the floodway.

Farther downstream, the vegetation communities are primarily managed salt cedar communities characterized by immature salt cedar (from routine mowing) and Bermuda grass and invasive forbs. There are more woody plants within the floodway in the lower reaches of the project area.

In one section of the project area, approximately river miles 45 to 48, there are several large, mature cottonwood trees adjacent to the levee. While these trees are not considered a separate vegetation type, they are among the largest woody vegetation in the area, and are probably utilized to some extent by local wildlife species. Several trees have scars at their bases from beavers, and have been fenced to prevent beavers from killing the trees.

See attached Photo Log for pictures representing the vegetation types described above.

The vegetation communities of the floodway may be affected by raising the levee deficiencies, because the levee footprint will be expanded. The floodway vegetation is expected to rapidly re-establish after expansion operations are completed. The floodway vegetation is primarily rapidly growing non-native herbaceous and woody vegetation.

Dredging operations are not expected to affect floodway vegetation, except in limited areas where staging areas for equipment are placed. As for the levee expansion, the vegetation is expected to rapidly re-establish after the operations are completed.

Vegetation on the Levees

The levees that were installed to provide flood protection are raised trapezoidal compacted earth structures. The levee slopes are covered with invasive grass and forb species, including bermudagrass, Russian thistle (*Salsola kali*), and silverleaf nightshade (*Solanum elaeagnifolium*). The levee slopes are frequently mowed to prevent encroachment of woody plants onto the levee slopes.

Levee improvements, including levee expansion, will remove the primarily invasive, rapidly growing herbaceous vegetation on the levee slopes, and is expected to rapidly re-establish after operations are complete. This expectation is based on the re-establishment of vegetation after routine mowing, and the reach of the levee from American Dam to the International Dam that has been raised. The levee slopes of that portion of the RGRP are covered in herbaceous vegetation.

4.3 Comparison of Current Vegetation to Previous Study

The current vegetation along the floodway is consistent with the vegetation described in the BA (Parsons 2001). The herbaceous transitional lands described (Parsons 2001) are consistent with the managed old-field communities of the present study. The herbaceous species and limited woody vegetation are similar for both studies.

SECTION 5 WETLANDS

5.1 Regional Wetlands

Wetlands perform valuable functions in restoring and maintaining the quality of the nation's waters. These functions include flood water storage, sediment trapping, nutrient removal, chemical detoxification, aquatic food chain support, fish and wildlife habitat, and groundwater recharge. Desert wetlands shelter endemic desert fish, reptiles, and invertebrates, and are especially important to the region's diverse bird life (TPWD 1997). In Texas, wetlands are among the most valuable resources (TPWD 1997), and wetlands in Texas provide one of the most important wintering areas for waterfowl in North America (Stutzenbaker and Weller 1989). Wetlands are also important breeding areas, and provide cover for nesting waterfowl and other birds (TPWD 1997). Although wetlands comprise less than 5 percent of its total land area, Texas has the fourth greatest wetlands acreage in the lower 48 states, following Florida, Louisiana, and Minnesota (Dahl 1990).

The USFWS estimates that from the 1780s to the 1980s, wetland acreage in Texas decreased by 52 percent from about 16 million to about 7.6 million acres (Dahl 1990). Wetlands of every type have been affected. Some of these losses can be attributed to natural causes, but large percentages of the losses were caused by human activities. In rural areas, losses can be attributed to conversion to cropland, declining water levels due to pumping for irrigation, and overgrazing of wetland vegetation by livestock. Other activities that can cause wetland losses are filling, water diversion, drainage and river channelization, lowering or disturbing the shallow water table, and the construction of dams, reservoirs, flood control ditches, levees, and irrigation canals. Wetlands degradation also results from the discharge of inadequately treated sewage and industrial waste into wetlands (TPWD 1997).

Some land use practices led to the creation of new wetlands or the enlargement of existing wetlands; for example, the Rio Bosque wetlands. However, those gains have not offset the state-wide loss of natural wetlands, function, and value. The wetlands once present along the Rio Grande have been altered due to water control projects and clearing of native vegetation. Although wetlands in the Rio Grande Valley have been altered, various sizes and types of wetlands exist throughout the project area. Wetlands in the project area can be classified into three separate systems: lacustrine, palustrine, and riverine, as described below. In addition to these wetlands, there are other man-made waters such as settling basins, ditches, canals, reservoirs, and man-made lakes throughout the project area. These man-made waters are primarily designed for flood control and irrigation purposes; however, these structures are often lined with dense vegetation that supports wildlife and serves as travel corridors for many species.

Lacustrine systems are composed of deepwater habitats and associated wetlands situated in topographic depressions or dammed river channels. Lacustrine wetlands are common in the region and are associated with the open water of resacas, ponds, lakes, reservoirs, and settling basins. Resacas are old, abandoned river channels that measure from 1 to 6 feet deep and 30 to 150 feet wide, and may only hold water for part of the year. Cattails and willows often dominate the resacas. Siltation has become a major problem within resacas due to the absence of scouring and the increase in urban runoff, shoreline erosion, and general degradation of water quality (Ramirez 1986).

Palustrine systems are all nontidal wetlands dominated by trees, shrubs, and other vegetation, and are very limited within the project area. Palustrine systems are often found around resacas and riparian habitat along the Rio Grande (Moulton *et al.* 1997).

Riverine systems are all wetlands and deepwater habitats within a river channel. The Rio Grande is the dominant riverine system in the project area. Small riverine systems associated with canals and ditches also exist in the project area.

5.2 Wetlands within the Project Area

Wetlands within the project area are primarily wetlands associated with riverine systems. The riverine wetlands are associated with the riparian vegetation, and the riparian vegetation is restricted to an area within the ordinary high water mark. That is, riparian vegetation is a limited corridor that does not extend more than 10 to 15 feet from the ordinary high water mark. Some of the riparian habitat, and therefore the vegetation associated with riverine wetlands, may be removed during dredging, but this vegetation is expected to rapidly re-establish upon completion of dredging operations. This expectation is based on the previous dredging operations performed by the MxIBWC, where willows have established within a few months after completion of the operations.

Palustrine and Lacustrine wetlands may be associated with resacas on the landside of the levee. None of these wetlands would be affected by either dredging or levee improvement activities.

Several ephemeral arroyos and washes terminate at the Rio Grande within the project area. Although the strictly ephemeral washes do not have sufficient moist soil conditions necessary for hydrophytic or riparian vegetation, the washes contribute substantial amounts of sediment during episodic rain events.

5.3 Comparison of Current Wetlands to Previous Study

The wetlands in the study area are typical of riverine habitats, and include palustrine wetlands vegetation along the narrow corridor of wetlands vegetation along the Rio Grande. Within the study area, the emergent marsh wetlands described in the BA (Parsons 2001) were not observed during the surveys associated with the present study. There were limited emergent marsh wetlands in resacas on the landside of the levee, generally outside the ROW of the study area.

SECTION 6 WILDLIFE

6.1 Regional Wildlife

A limited number of wildlife species are present in the region, primarily due to intensive land use and urbanization in the RGRP area, and wildlife species have been described in other reports (USIBWC and EPWU/PSB 2000; USIBWC 2008). The mule deer (*Odocoileus hemionus*) is the only large game animal known to occur in the region. Mammals in the region may include the coyote (*Canis latrans*), bobcat (*Lynx rufus*), western spotted skunk (*Spilogale gracilis*), striped skunk (*Mephitis mephitis*), desert cottontail (*Sylvilagus auduboni*), black-tailed jackrabbit (*Lepus californicus*), porcupine (*Erethizon dorsatum*), and several species of rats and mice (Parsons 2001). Furbearing mammals include the kit fox (*Vulpes*

macrotis), gray fox (*Urocyon cinereoargenteus*), long-tailed weasel (*Mustela frenata*), raccoon (*Procyon lotor*), ringtail (*Bassariscus astutus*), badger (*Taxidea taxus*), beaver (*Caster Canadensis*), nutria (*Myocastor coypus*), and muskrat (*Ondatra zibethicus*).

The Rio Grande is a major migratory flyway for numerous bird species, particularly waterfowl, shore birds, and those associated with riparian habitats. The cleared floodplain provides suitable hunting areas for raptors of many species. Of the variety of birds found in the area, some common species include the great blue heron (*Ardea herodias*), red-winged blackbird (*Agelaius phoeniceus*), western kingbird (*Tyrannus verticalis*), burrowing owl (*Athene cunicularia*), gadwall (*Anas strepera*), mourning dove (*Zenaida macroura*), and turkey vulture (*Cathartes aura*).

Due to the intensive land use, insufficient food and cover at most locations of the RGRP survey area, only a small number of reptile and amphibian species are expected to occur (USIBWC and EPWU/PSB 2000; USIBWC 2008). The reptile species that may occur include such lizard species as whiptails (*Cnemidophorus spp.*), spinys (*Sceloporus spp.*), and collared (*Crotaphytus spp.*) lizards. Snakes in the region may include species such as coachwhips (*Masticophis spp.*), kingsnakes (*Lampropeltis spp.*), Trans-Pecos ratsnake (*Bogertophis subocularis*), and several species of rattlesnake (*Crotalus spp.*). Turtle species in the area may include the Western Painted Turtle (*Chrysemys picta bellii*), and sliders (*Trachemys spp.*). There are fewer amphibians in the region, but may includes such species as toads (*Bufo spp.*), tiger salamander (*Ambystoma tigrinum*), and the introduced bullfrog (*Rana catesbeiana*).

6.2 Wildlife in Project Area

Wildlife habitats in the project area are generally limited to the invasive herbaceous communities and limited woody vegetation of the riparian areas. Although the vegetation communities are not considered high quality wildlife habitat, due to urbanization and agriculture outside the project area, there are a number of species that utilize the floodway. During the field survey, a number of wildlife species were observed, including coyote, jackrabbit, and a number of shore birds, and burrowing owls (see Subsection 7.2). Evidence of other species was present as well, including raccoons (tracks), mice or rats (scat), and beaver (scraped bark on mature cottonwood trees). The species that inhabit the area adjacent to the Rio Grande will be tolerant of human activity (vehicles on the levees, mowing operations, border patrol activities), and will be relatively mobile.

6.3 Comparison of Current Wildlife Habitat to Previous Study

Although wildlife habitat in the area is limited in space and quality, it does not differ from the wildlife habitat observed in the BA. The overall extent of the wildlife habitat has not been altered since the previous study, and routine maintenance activities (e.g., mowing of the floodway, sediment removal operations) have been on-going since the previous study. Therefore, the wildlife currently present in the area is not likely to be substantially different than the wildlife present during the previous study.

SECTION 7 THREATENED AND ENDANGERED SPECIES

7.1 Regional Threatened and Endangered Species

Habitat requirements and life history for each federal and state-listed species potentially occurring along the RGRP survey area were identified through literature review (USIBWC and EPWU/PSB 2000; TPWD 2008). Sources of information included T&E species fact sheets published by natural resource agencies, species recovery plans, and scientific literature. The TPWD compiles a list of federal and state-listed species and species of concern. The lists are organized by county (TPWD 2008).

Within the RGRP area, there are several species listed as federally threatened or endangered, and several additional species listed as threatened or endangered by the State of Texas, or are candidate species for listing (TPWD 2008). The project area is within El Paso and Hudspeth Counties. Each listed species is briefly described below, including breeding and foraging habitats. If the species is potentially present in the study area, it is summarized in Table B1.

Peregrine Falcon

Two subspecies of the Peregrine falcon, the American peregrine falcon (*Falco peregrinus anatum*), and the Arctic peregrine falcon (*Falco peregrinus tundrius*), have been federally delisted, but remain state listed as endangered (TPWD 2008). The American peregrine falcon is sometimes a year round resident and local breeder in west Texas, but may also be migratory, and generally nests in cliff eyries. Both subspecies migrate through Texas from more northern breeding areas, and occupy a wide range of habitats during migration. The falcons forage in areas where prey (medium-size passerines up to small waterfowl) concentrates, including farmlands, marshes, lakeshores, river mouths, and river valleys, and may also forage in cities and airports (NatureServe 2008).

Northern Aplomado Falcon

The Northern Aplomado Falcon (*Falco femoralis septentrionalis*) is a federally and state listed endangered species (TPWD 2008). The species was nearly extirpated, but a re-introduction program has produced some nesting pairs since the 1990s, primarily in New Mexico. The species inhabits open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains, and valleys with scattered mesquite, yucca, and cactus (TPWD 2008). The species capture small birds, insects, rodents, and reptiles, and initiate capture from tree perches using a horizontal flight pattern. The species utilizes stick nests created by other species (crows, ravens, and hawks). They prefer open terrain with scattered trees or shrubs (USFWS 1990a).

Interior Least Tern

The interior least tern is a federally and state listed endangered species, but the subspecies is listed only when inland (more than 50 miles from a coastline) (TPWD 2008). The species nests along sand and gravel bars within braided streams and rivers, and is also known to nest on man-made structures such as inland beaches, wastewater treatment plants, and gravel mines. They eat small fish and crustaceans, and when breeding, forage within a few hundred feet of colony (TPWD 2008). The interior least tern builds the nest as a shallow, inconspicuous

depression in an open, sandy area, gravelly patch, or exposed flats. The nesting sites are sparsely vegetated areas within a wide, unobstructed river channel (USFWS 1990b).

Mexican Spotted Owl

The Mexican Spotted Owl (*Strix occidentalis lucida*) is federally and state-listed as threatened. It generally occurs within remote, shaded canyons of coniferous mountain woodlands (pine and fir), and roosts during the day in densely spaced tree habitats, rocky areas, or caves. The Mexican spotted owl is a nocturnal predator of mostly small and medium-sized rodents, including woodrats, peromyscid mice, and microtine voles (TPWD 2008; USFWS 1995). Mexican spotted owls typically locate prey from an elevated perch by sight or sound, and then pounce on the prey and capture with their talons (USFWS 1995).

Southwestern Willow Flycatcher

The Southwestern willow flycatcher (*Empidonax traillii extimusi*) is federally and state-listed as endangered. It generally occurs in dense riparian habitats (TPWD 2008; USFWS 2002). Nesting occurs in native vegetation where available, but the species also nests in thickets dominated by dense stands of non-native salt cedar, or mixtures of native vegetation and non-native vegetation (USFWS 2002). Salt cedar eradication may cause loss of suitable nesting habitats when there is no plan for suitable vegetation replacement of the salt cedar (USFWS 2002).

Western Yellow-billed Cuckoo

The Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a federal candidate for listing as threatened, for the western population west of the Pecos River (TPWD 2008). The species breeds in riparian habitats and associated drainages where mesic vegetation is present. A dense understory is important for nest site selection, and the species may construct nests in willows, mesquite, and cottonwoods (TPWD 2008), and will forage in stands of the same vegetation (USFWS 2007a). It appears the species does not nest or forage in dense salt cedar stands (USFWS 2007a).

Western Burrowing Owl

The Western burrowing owl (*Athene cunicularia hypugaea*) is a state species of concern (TPWD 2008). The burrowing owl inhabits open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports. The species nests and roosts in abandoned burrows, and there are several known active nesting burrows within the project area. The species appears to be relatively tolerant of human activity, as evidenced by the presence of active burrows along the levee, where there is vehicle traffic, border patrol activities, and nearby construction activities.

Bluntnose Shiner

The bluntnose shiner (*Notropis simus*), is listed as a state threatened species (TPWD 2008), but has likely been extirpated from the Rio Grande. The species was probably most common in the main channel of the Rio Grande, and similar subspecies are found in low-velocity water that is shallow (17 to 41 cm deep), over a sand substrate (USFWS 1992). It is presumed that damming and irrigation factors that remove most of the water from the main channel, and

siltation have been major factors in the decline and presumed loss of the species within the project area (TPWD 2008).

Rio Grande Silvery Minnow

The Rio Grande silvery minnow (*Hybognathus amarus*) is state and federally listed as endangered (TPWD 2008; USFWS 2007b), but has probably been extirpated from its historic range in the Rio Grande. The species is found in waters with little or no water velocity, relatively shallow waters (less than 20 cm), over a silt substrate (USFWS 2007b). The species has probably been lost from historic habitats in the Rio Grande due to the effects of damming (creating deep water habits), and water diversions (eliminating many habitats in the main stem of the river when the water is diverted, or when water is present in the river, it is moving at higher velocities than tolerated by the species). Several related species with similar life history have also been extirpated from the main stem of the Rio Grande (USFWS 2007b).

Black Bear

The black bear (*Ursus americanus*) is federally listed as threatened by similarity of appearance and state-listed as threatened. The species is similar to the Louisiana black bear (similarity of appearance designation) (TPWD 2008), and occupies large tracts of inaccessible forested areas, which are not present in the area. Further, like many large predators, the species has been extirpated from the region of El Paso.

Black-footed Ferret

The black-footed ferret (*Mustela nigripes*) is federally and state-listed as endangered (TPWD 2008), but has been extirpated from the region. The black-footed ferret historically inhabited prairie dog towns in the general area, which have been eliminated due to urbanization and agricultural development.

Gray Wolf

The gray wolf (*Canis lupus*) is federally and state-listed as endangered (TPWD 2008), but has been extirpated from the region. The gray wolf was historically present in the western two-thirds of the state in forests, brushlands, or grasslands, but like other large predators, has been extirpated from the region of El Paso.

Long-legged Bat

The long-legged bat (*Myotis volans*) is state-listed as endangered (TPWD 2008). The species occupies habitats in the Trans-Pecos region that include high, open woods and mountainous terrain. The long-legged bat nursery colonies (which may contain several hundred individuals) form in summer in buildings, crevices, and hollow trees, and they do not use caves (TPWD 2008).

Chihuahuan Desert Lyre Snake

The Chihuahuan desert lyre snake (*Trimorphodon vilkinsonii*) is a state-listed threatened species (TPWD 2008). The species generally occupies habitats in limestone crevices, where there are large boulders and rock faults. The species primarily feeds on lizards, but it is a secretive species and little is known about its life history (TPWD 2008).

Mountain Short-Horned Lizard

The mountain short-horned lizard (*Phrynosoma hernandesi*) is a state-listed threatened species (TPWD 2008). The historic range of the short-horned lizard is from southern New Mexico and Texas to as far north as Alberta, Canada. The species generally occupies habitats that include open shrubby or open wooded areas with sparse vegetation at ground level. The species burrows into sandy soil or occupies rodent burrows when not actively feeding, and the diet consists of ants, spiders, snails, and other invertebrates. Habitat loss and degradation (through urbanization and conversion to agriculture) have caused local declines in the populations (NatureServe 2008). The species is well camouflaged and occurrence records are based primarily on the presence of suitable habitats, rather than direct observation.

Texas Horned Lizard

The Texas horned lizard (*Phrynosoma cornutum*) is a state-listed threatened species (TPWD 2008) that generally occupies open arid and semiarid regions with sparse vegetation (NatureServe 2008). The historic range of the Texas horned lizard is generally restricted to Texas and southern New Mexico, northward through Kansas. The species burrows into sand or occupies rodent burrows when not actively feeding, and the diet consists primarily of harvester ants (*Pogonomyrmex spp.*), although they will eat other insects (NatureServe 2008). Population declines are due to urbanization and conversion to agriculture, and there is some evidence that over-collection of the Texas horned lizard for the pet trade has led to population declines. In addition, the introduction of red imported fire ants (*Solenopsis invicta*) has led to decline of the preferred food source harvester ants, and therefore a decline in the Texas horned lizard populations.

Comal Snakewood

The Comal snakewood (*Colubrina stricta*) is a state-listed threatened deciduous shrub species (family Rhamnaceae) (TPWD 2008). There is one known population of the species at the base of an igneous rock outcrop in the Chihuahuan desert east of El Paso (TPWD 2008). The plant flowers from late spring to early summer, and little is known about the reasons for population declines in the region, but presumably urbanization and conversion to agriculture have led to population declines.

Texas False Saltgrass

The Texas false saltgrass (*Allolepis texana*) is a state-listed endangered grass species (family Poaceae) (TPWD 2008). The species is known from fewer than 10 occurrences in southwestern Texas and northern Mexico. The species historically occupied alluvial areas adjacent to rivers, in areas that were seasonally wet. The decline of the species is probably due to livestock use of riparian and mesic areas and conversion to agriculture (NatureServe 2008).

Sneed's Pincushion Cactus

The Sneed's pincushion cactus (*Escobaria sneedii var sneedii*), is a federally and state-listed endangered cactus species (TPWD 2008). It is known from a limited number of populations in western Texas and adjacent New Mexico. The species is generally found on dry limestone outcrops in desert mountains, at 1220 to 1800 meters in elevation. The declines in population may be due to collection and urbanization (NatureServe 2008).

Table B.1 Federally and State-listed Threatened and Endangered Species in El Paso and Hudspeth Counties, Texas

Common Name	Scientific Name	Federal Status ²	State Status		Habitat description ²	Classification of Habitat Present in project area ³
			El Paso	Hudspeth		
BIRDS						
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	DL	E	E	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in U.S. and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	Potentially present
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	DL	T	T	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	Potentially present
Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>	LE		E	Open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains and valleys with scattered mesquite, yucca, and cactus; nests in old stick nests of other bird species.	Potentially present
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	LE	E	E	Thickets of willow, cottonwood, mesquite, and other species along desert streams.	Not likely present

Common Name	Scientific Name	Federal Status ²	State Status		Habitat description ²	Classification of Habitat Present in project area ³
			El Paso	Hudspeth		
BIRDS (...continued)						
Interior Least Tern	<i>Sterna antillarum athalassos</i>	LE	E	E	Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also known to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc.); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony.	Not likely present
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	LT	T	T	Remote, shaded canyons of coniferous mountain woodlands (pine and fir); nocturnal predator of mostly small rodents and insects; day roosts in densely vegetated trees, rocky areas, or caves.	Not likely present
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C;NL			Status applies only to western population beyond the Pecos River Drainage; breeds in riparian habitat and associated drainages; springs, developed wells, and earthen ponds supporting mesic vegetation; deciduous woodlands with cottonwoods and willows; dense understory foliage is important for nest site selection; nests in willow, mesquite, cottonwood, and hackberry; forages in similar riparian woodlands; breeding season mid-May-late September.	Potentially present (Particularly within Rio Bosque Wetlands Park)
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>		SOC	SOC	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests, and roosts in abandoned burrows.	Present

Common Name	Scientific Name	Federal Status ²	State Status		Habitat description ²	Classification of Habitat Present in project area ³
			El Paso	Hudspeth		
FISH						
Bluntnose shiner	<i>Notropis simus</i>		T	T	Extirpated; Rio Grande; main river channel, often below obstructions over substrate of sand, gravel, and silt; damming and irrigation practices presumed major factors contributing to decline.	Not likely present
Rio Grande silvery minnow	<i>Hybognathus amarus</i>	LE	E	E	Extirpated; historically Rio Grande and Pecos River systems and canals; pools and backwaters of medium to large streams with low or moderate gradient in mud, sand, or gravel bottom; ingests mud and bottom ooze for algae and other organic matter; probably spawns on silt substrates of quiet coves.	Not likely present
MAMMALS						
Black bear	<i>Ursus americanus</i>	T/SA;NL	T	T	Bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state-listed Threatened.	Not likely present
Black-footed ferret	<i>Mustela nigripes</i>	LE	E	E	Extirpated; inhabited prairie dog towns in the general area.	Not likely present
Gray wolf	<i>Canis lupus</i>	LE	E	E	extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands.	Not likely present
Long-legged bat	<i>Myotis volans</i>		E		In Texas, Trans-Pecos region; high, open woods and mountainous terrain; nursery colonies (which may contain several hundred individuals) form in summer in buildings, crevices, and hollow trees; apparently do not use caves as day roosts, but may use such sites at night; single offspring born June-July.	Not likely present

Common Name	Scientific Name	Federal Status ²	State Status		Habitat description ²	Classification of Habitat Present in project area ³
			El Paso	Hudspeth		
REPTILES						
Chihuahuan Desert lyre snake	<i>Trimorphodon vilkinsonii</i>		T	T	Mostly crevice-dwelling in predominantly limestone-surfaced desert northwest of the Rio Grande from Big Bend to the Franklin Mountains, especially in areas with jumbled boulders and rock faults/fissures; secretive; egg-bearing; eats mostly lizards.	Not likely present
Mountain short-horned lizard	<i>Phrynosoma hernandesi</i>		T	T	Diurnal, usually in open, shrubby, or openly wooded areas with sparse vegetation at ground level; soil may vary from rocky to sandy; burrows into soil or occupies rodent burrow when inactive; eats ants, spiders, snails, sowbugs, and other invertebrates; inactive during cold weather; breeds March-September.	Potentially present
Texas horned lizard	<i>Phrynosoma cornutum</i>			T	Open, arid, and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rocks when inactive; breeds March-September.	Potentially present
PLANTS						
Comal snakewood	<i>Colubrina stricta</i>		T		Only known Texas population lies at the base of an igneous rock outcrop in the Chihuahuan Desert east of El Paso; flowering late spring or early summer.	Not likely present
Texas false saltgrass	<i>Allolepis texana</i>		E		Sandy to silty soil of valley bottoms and river floodplains; flowering July-October	Potentially present
Sneed's pincushion cactus	<i>Escobaria sneedii</i> var <i>sneedii</i>	LE	E	E	Dry limestone outcrops on rocky slopes in desert mountains of the Chihuahuan Desert; flowering April-September, peak season in April.	Not likely present

- 1 Only species which are federally or State-listed as threatened, endangered, candidate species or species of concern are included in the table.
LE/LT federally listed as endangered or threatened.
DL federally de-listed as an endangered species.
T/SA federally listed as threatened by similarity of appearance.
E/T State-listed as endangered or threatened.
- 2 Habitat descriptions from TPWD. Accessed <http://www.tpwd.state.tx.us/huntwild/wild/species/endang/index.phtml>; June 30, 2008.
- 3 Habitat classification based on USFWS categories.
Not likely present (no suitable habitat identified).
Potentially present (Habitat present but no species records).
Likely Present (Habitat present and species known to occur in area).
Present (species observed).

7.2 Threatened and Endangered Species within Project Area

The only listed species observed within the project area during the survey is the Species of Concern, the western burrowing owl. There were active burrows and individuals protecting nests along the length of the levee, from American dam to near Fort Hancock. The dredging activities and levee improvements will occur outside the breeding season, and the USIBWC will work with the TPWD on nest surveys and nest relocation, if necessary, to protect the burrowing owl.

The interior least tern may use open or sparsely vegetated sandbars within the river for nesting and foraging. However, river damming and other alterations, including dredging, have reduced the quantity and quality of sandbars in the project area, and the species seems to be using other sites for nesting (Parsons 2001).

The southwestern willow flycatcher may use some monotypic stands of salt cedar for nesting, but the preferred habitats include a mixture of native and non-native species that are relatively tall and dense. There is salt cedar within the riparian areas of the project area, but the salt cedar stands do not meet suitable patch size or stem density for breeding of the southwestern willow flycatcher (Parsons 2001). Further, frequent mowing prevents the riparian areas from developing into suitable habitat for the southwestern willow flycatcher.

7.3 Comparison of Current Threatened and Endangered Habitat to Previous Study

The study conducted in 2001 included a targeted survey for Interior least terns, and no suitable nesting sites were observed in the previous study. The present study did not include a targeted survey for T&E species; however, during the pedestrian survey of the entire reach of the RGRP project area, no suitable habitats (including unconsolidated sandbars) were observed. Due to the routine mowing activities, any suitable nesting habitat is not likely present for any T&E species, with the exception of the Western burrowing owl. Due to on-going dredging operations or high flow that scoured the river channel since the previous study, suitable sandbars for interior least terns have likely been removed, if they were present.

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APPENDIX B: PHOTO LOG



Photo 1: River mile zero. American Diversion Dam, looking west



Photo 2: River mile zero. From American Diversion Dam, looking west; Rio Grande in center; Monument No. 1 in background. Mexico to the left of Monument, U.S. (New Mexico) to right of Monument.



Photo 3: River mile 0.5. Crossing used for water sampling. Looking northwest, upstream, Mexico on left of river



Photo 4: River mile 0.5. Vegetation adjacent to Rio Grande, looking downstream; bullrushes in foreground, salt cedar, sunflowers on Mexico bank



Photo 5: River mile 0.5 – 1.0. MxIBWC dredging operations, salt cedar in foreground. Note removal of vegetation along banks.



Photo 6: River mile 1.5. International dam, looking to Mexico. Note culvert upstream of International Dam for transfer of water to Mexico.



Photo 7: River mile 8.5. Burrowing Owl, active nest site in levee.



Photo 8: River mile 8.5. Burrowing owl on fence, adjacent to American canal.



Photo 9: River mile 17. Riverside Canal. Note homes of Ysleta del Sur pueblo in background.



Photo 10: River mile 17. Riverside Diversion Dam, looking downstream. Water is considered excess from recent rain, not diverted to US or Mexico.



Photo 11: River mile 18. Vegetation along Rio Grande, aquatic vegetation on Mexico bank, salt cedar on U.S. bank (foreground).



Photo 12: River mile 20. Vegetation in floodway, managed old-field community; note riparian vegetation adjacent to Rio Grande.



Photo 13: River mile 33. Arroyo De Navarrete from Mexico. Managed old-field community in floodway in foreground.



Photo 14: River mile 33 – 34. MxIBWC dredging operations. Note vegetation removal on banks.



Photo 15: River mile 33 – 33. MxIBWC dredging operations. Note vegetation removal along bank, and vegetation downstream (primarily salt cedar on both banks).



Photo 16: River mile 35. Blue Grosbeak in floodway.



Photo 17: River mile 36. MxIBWC completed dredging operations. Note dense vegetation (primarily salt cedar) along Rio Grande downstream of dredging operations, and widening of main channel.



Photo 18: Mature cottonwoods adjacent to riverside of levee, looking downstream. Mexico to right.



Photo 19: River mile 46. MxIBWC completed dredging operations; managed old-field community in foreground.



Photo 20: River mile 46. MxIBWC completed dredging operations; USBP drag lines in floodway. Managed old-field community between drag line and Rio Grande.



Photo 21: River mile 48-50. MxIBWD dredging operations; note bank cut back of at least 10 feet, and bank vegetation removal.



Photo 22: River mile 53.5. Screw gates on landside of levee at Alamo Grade. Snowy egret on left.



Photo 23: River mile 53.5. Opposite of screw gates at Alamo Grade.



Photo 24: River mile 53.5. Alamo Grade Control structure.



Photo 25: River mile 53.5. Alamo Grade Control structure, looking downstream. High water levels due to upstream flooding in New Mexico.



Photo 26: River mile 53.5. Alamo grade, tricolored heron.



Photo 27: River mile 56. Alamo Arroyo, looking northeast.



Photo 28: River mile 56. Alamo Arroyo, looking southwest.



Photo 29: River mile 56. Alamo Arroyo, Desert Willow flower



Photo 30: River mile 56. Alamo Arroyo, screw gate from Hudspeth Main Canal.



Photo 31: River mile 62.5.
Vegetated island in Rio Grande,
looking upstream (Mexico on left).
Note dense vegetation on banks.



Photo 32: River mile 72. White
flower forb in floodway, possible
"ice plant".



Photo 33: River mile 73.
Pepperwort (or Peppergrass) in
floodway



Photo 34: River mile 75. Guayuco Grade Control Structure, looking upstream



Photo 35: River mile 75. Guayuco Grade Control, salt cedar detail; Phragmites mixed with salt cedar, cattail to right in foreground



Photo 36: River mile 75. Drain to Rio Grande at Guayuco Grade Control; cattail, hydrophytic vegetation, salt cedar



Photo 37: River mile 75. Pump on river side of levee at Guayuco Grade Control structure.



Photo 38: River mile 77.5. Broken Box Culvert Drain, view of floodway.



Photo 39: River mile 77.5. Broken Box Culvert Drain.



Photo 40: River mile 77.5. Broken Box Culvert Drain, Raccoon footprints.



Photo 41: River mile 77.5. Broken Box Culvert Drain, Rio Grande, looking downstream. Note mature salt cedar on opposite bank.



Photo 42: River mile 80. Floodway, juvenile Tamarisk, mowed within past 3 weeks, mature Tamarisk on Mexico side of Rio Grande



Photo 43: River mile 80. Rio Grande, looking downstream; salt cedar in foreground mowed within last 3 weeks.



Photo 44: River mile 80. Rio Grande, looking upstream, mature salt cedar on Mexico side of Rio Grande.



Photo 45: River mile 80.5. Old resaca on landside of levee.



Photo 46: River mile 81. Drain to Rio Grande; Bermuda grass, salt cedar.



Photo 47: River mile 81. Drain to Rio Grande; Bermuda grass, salt cedar.



Photo 48: River mile 81. Salt cedar detail



Photo 49: River mile 80.5.
McClintock Arroyo, old resaca.



Photo 50: River mile 81.75.
McClintock Arroyo, old resaca.



Photo 51: River mile 89. Burned
Tamarisk, looking east of Rio
Grande, outside IBWC ROW.



Photo 52: River mile 91. Salt cedar lining Rio Grande, looking to west, into Mexico.



Photo 53: River mile 91. Uplands, adjacent to Rio Grande; looking east; Salt cedar and Screw bean mesquite in foreground.



Photo 54: River mile 91. Honey Mesquite detail.



Photo 55: River mile 91. Salt cedar, growth since mowing within last 3 weeks.



Photo 56: River mile 91. Floodway and uplands of Rio Grande, looking east.



Photo 57: River mile 91. Rio Grande, looking south; top of Little Box Canyon. Note mature salt cedar lining both sides of River.

**APPENDIX C
DRAFT EA REVIEW CORRESPONDENCE**



September 3, 2008

Ms. Lisa Santana
Environmental Management Division
U.S. Section, International Boundary and Water Commission
4171 North Mesa Street, C-100
El Paso, TX 79902

*The Center for
Environmental
Resource
Management*

Re: Draft Environmental Assessment
Improvements to the Rio Grande Rectification Project

Dear Ms. Santana:

Thank you for this opportunity to provide input to the draft environmental assessment (EA) for improvements to the Rio Grande Rectification Project.

The University of Texas at El Paso manages Rio Bosque Wetlands Park, adjacent to the Rectification Project, on behalf of the City of El Paso. As noted in the draft EA, the U.S. Section of the International Boundary and Water Commission (USIBWC) has long been closely involved with this unique and sensitive area. The USIBWC played a central role in launching the ecological restoration effort now underway at Rio Bosque, and we greatly appreciate its many contributions to the success of this project.

As stated in Section 3.1.6 (Unique or Sensitive Areas) of the draft EA, the wetland project at Rio Bosque was mitigation for habitat loss associated with the Rio Grande American Canal Extension (RGACE). In addition, it is our understanding the project was also intended to serve as mitigation for maintenance dredging on the Rectification Project. The Rio Grande Rectification Project Mitigation Assessment that the USIBWC submitted to the U.S. Army Corps of Engineers in July 1995 stated:

“The USIBWC is obligated by the RGACE final environmental assessment and finding of no significant impact (USIBWC, 1993) to replace hectares lost as a result of the RGACE by construction of wetland area 12.1 hectares in size....The USIBWC commitment for RGACE mitigation is 12.1 hectares, and the development of Rio Bosque Park will result in nearly ten times more shallow water wetlands (120 hectares). The USIBWC believes this coordinated effort is of such vital importance to this area that we are prepared to increase our level of participation in the Rio Bosque Park wetland project to mitigate for the permitted excavation of sediment from the Rectification Project.”

*500 W. University Ave.
El Paso, Texas
79968-0684
(915) 747-8663
FAX: (915) 747-5145
www.cerm.utep.edu*

Ms. Lisa Santana
September 3, 2008
Page 2

In light of this mitigation commitment, we suggest revising the third sentence in Section 3.1.6 as follows:

In 1997 the land was developed as a wetlands park managed by the University of Texas at El Paso, to mitigate removal of wetlands for construction of the American Canal Extension and to mitigate impacts associated with maintenance dredging on the Rectification Project.

The programmatic environmental impact statement on which the draft EA is tiered identifies increased water supply to Rio Bosque during the growing season as a possible “water use and conservation” improvement for the Rectification Project. We continue to pursue strategies for achieving such an increased water supply. We respectfully encourage the USIBWC to lend its full support to these efforts to help ensure their success.

Thank you for your consideration of these comments. If you have any questions, please feel free to contact me at 915-747-8663.

Very truly yours,



John Sproul
Program Coordinator/Manager
Rio Bosque Wetlands Park

Fwd Re ER 08806 Draft EAFONSI for Improvements to the RioGrande Rectification Project.txt

On 9/2/2008 at 2:25 PM, in message <s8bd4d06.001@ibr8gateway.doi.usbr.gov>, "Theresa Taylor" <ttaylor@do.usbr.gov> wrote:
** High Priority **

Dear Lori and Robert:

I talked with Lisa Santana of IBWC. She said that they sent consultation letters to all Native American Tribes that would be affected which included Ysleta del Sur Pueblo (in El Paso) and Pueblo of Ysleta. Deborah Beene, Deputy SHPO in Texas, received a copy of all letters that were sent to the Native American Tribes. IBWC initiated consultation with the SHPO when the draft was released. We should still send a letter forward expressing our concern so it is on the administrative record. Would you draft the letter and have your Area Manager sign off on it with a copy to me and to Ken Havran at the Department of the Interior in DC.

Please let me know if I can help.
Thanks,
Theresa 303-445-2806

>>> Lori Robertson 9/2/2008 1:19:07 PM >>>
Hi Theresa,

Robert is on vacation but before he left we talked about one area that we needed to comment on. We recommend the IBWC ensures that government to government consultation is conducted and that the needs of the Ysleta Pueblo are met regarding the sacred plants and religious site.

>>> Theresa Taylor 09/02/08 1:10 PM >>>
Dear Nancy, Lori and Bert,

Will Reclamation have comments on this document? Our thoughts are due today. Please advise.

Thanks,
Theresa 303-445-2806

Please see the attached:
Assignment Memo from the Department Notice of Availability and Draft Environmental Assessment/FONSI Please take a look at this and see if Reclamation is affected and should provide comments. If we are affected, please reply by September 2, 2008 with a copy to me and Ken Havran. If we have no comments, please let me know that as well.

Thanks.
Theresa 303-445-2806

>>> <oepchq@ios.doi.gov> 8/5/2008 12:49 PM >>>

This e-mail alerts you to an ER request from the Office of Environmental Policy and Compliance (OEPC). To access electronic ERs visit the OEPC Natural Resources Management Team website at: <http://www.doi.gov/oepc/nrm.html> Under Quick Links select: Environmental Review Distributions (Bureau ER Notifications). For assistance, please contact the Natural Resources Management Team, at 202-208-5464.

On 9/3/2008 at 10:12 AM, in message <s8be6348.069@i br8gateway. do. usbr. gov>, "Theresa Taylor" <ttaylor@do.usbr.gov> wrote:
Dear Lisa,

I talked with Lori Robertson of our Albuquerque Area Office this morning. She was satisfied with your response that the Yselta Tribe in New Mexico had been contacted as part of your Environmental Assessment process. As a result, we won't be sending any further comment on the EA.

Thanks for your help.
Theresa

Theresa Taylor, 84-55000
Environmental Protection Specialist
Bureau of Reclamation
Office of Program and Policy Services
Denver, Colorado
(303) 445-2806
FAX: (303) 445-6683
ttaylor@do.usbr.gov

Fwd No Comment ER.txt

On 8/28/2008 at 1:24 PM, in message
<0F029CE834.D6ACF26F-0N872574B3.006A47DA-872574B3.006AA64F@nps.gov>,
<Roxanne_Runkel@nps.gov> wrote:

The National Park Service has no comments on:

ER-08/0806 - Rio Grande Rectification Improvements Project

Thank you,
Roxanne

Roxanne Runkel
National Park Service
Planning & Environmental Quality
IMDE - OPE
12795 W. Alameda Pkwy.
Lakewood, CO 80228-2822
Phone: (303) 969-2377 FAX: (303) 969-2063
roxanne_runkel@nps.gov



**TEXAS
HISTORICAL
COMMISSION**

The State Agency for Historic Preservation

RICK PERRY, GOVERNOR

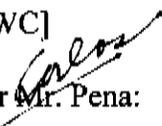
Rio Grande Rectification Project

OFFICIAL PROJECT CHAIRMAN 1/2
F. LAWRENCE OAKS, EXECUTIVE DIRECTOR

September 02, 2008

Carlos Pena, Jr. P.E.
Division Engineer
Environmental Management Division
United States Section, IBWC
4171 N. Mesa, Suite C-100
El Paso, Texas 79902

Re: Project review under Section 106 of the National Historic Preservation Act of 1966,
Draft EA: Rio Grande Rectification Project, El Paso and Hudspeth Counties, Texas
[IBWC]


Dear Mr. Pena:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

With regard to the architectural resources, our History Programs review staff, led by Rachel Leibowitz, has the following comments. In Section 3.2.3 of this document (pages 3-5 through 3-6), it is stated that twenty-nine historic-age or unknown age architectural resources were identified within the area of potential effect (APE) during a field survey conducted in July 2008. These resources include bridges, water control structures, including dams, acequias, other irrigation features (including drains, canals, laterals, and feeders), grade control structures, and pumping and gaging stations. The Draft EA further states that while some of these twenty-nine resources have been evaluated for National Register eligibility, the majority have not. It is the responsibility of the federal agency or their consultants (trained architectural historians meeting the Secretary of the Interior's Professional Qualifications Standards) to assess the cultural significance of all twenty-nine resources, with which our office will make the determinations of eligibility.

In order for our staff to review and respond to your recommendations of eligibility, a copy of the report for the July 2008 field survey should be provided to our agency. The survey report should include the historic RGRP levee itself as a resource, and a determination of its eligibility should be made. The NR-listed Franklin Canal is closely related to the RGRP levee system, and we believe that this levee system, built during the New Deal era between the years of 1933 and 1938, may itself be eligible for listing in the National Register.

As stated in the Draft EA, the El Paso County Water Improvement District, which includes 104 structures, is listed in the National Register; it is possible that the Hudspeth County Conservation and Reclamation District No. 1 is eligible for NR-listing as well, but more information is needed in order to determine this. Several of the acequias mentioned in the Draft EA are contributing elements to both of these districts.

More information will also be needed for our architectural review staff to provide determinations of effect for the proposed undertaking. When evaluating your assessments, we ask that you provide information regarding how increasing the levee height and width will direct water away or to the potentially affected resources.

With regard to the archeological resources, our Archeology Division review staff, led by Debra Beene, has the following comments. The authors state that the levee widening may protect cultural resources as a result of capping with soil and gravel. It is our opinion that the levee widening (24' beyond the current levee footprint) has the potential to affect significant buried cultural resources through compression and degradation resulting from changes in the soil chemistry and density. Our '*Site Burial as Preservation*' guidelines may be appropriate after potential cultural resources have been identified and assessed. In addition, the proposed 45-miles of dredging, equipment yards, heavy vehicle access, and soil storage areas, have the potential to affect significant cultural resources. The author states that any cultural resources discovered would be avoided; these should be identified prior to construction.

It isn't clear whether surveys are planned. The authors state that, prior to ground disturbing activities, IBWC will consult with our office to determine the need for surveys in high probability areas and will complete all assessments of the yet to be evaluated architectural resources. At the same time, the authors have requested our concurrence that the project will not have an effect on historic properties; we lack the data (identified above) needed to concur at this time.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your assistance in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Debra L. Beene at 512/463-5865 or Rachel Leibowitz at 512/463-6046**

Sincerely,

for
F. Lawrence Oaks, State Historic Preservation Officer

Attachment: *Intentional Site Burial*, News & Views, THC, Vol. 11, No. 1, May 1999

cc: Lisa Santana, Ph.D., Environmental Protection Specialist, IBWC

FLO/dlb

ATTACHMENT: INTENTIONAL SITE BURIAL 4 pages

Cultural Resource Management

NEWS & VIEWS

Texas Historical Commission

MAY 1999

VOLUME 11, NO. 1

from the editor

FINAL ISSUE

This is the final edition of *CRM News & Views*. However, this *does not* mean that you will stop receiving a semiannual newsletter from the Texas Historical Commission (THC) devoted to archeology. In September, a new newsletter will be forthcoming that includes the best of both worlds. The Archeological Steward's newsletter will be combined with this one to create a newsletter that discusses the projects being conducted by professional and avocational archeologists alike. This combined newsletter is a logical outgrowth of the THC restructuring that created the Archeology Division from two departments last year.

CRM News & Views has changed and grown over the years. What began as an eight-page departmental newsletter in 1988 under the title *APR News &*

Views (produced by the old Department of Archeological Planning & Review), grew to include all facets of cultural resource management. By 1994, the length had grown to 24 pages and each edition included reports on important research performed by contract archeologists across the state, information on changes in state and federal laws that affect the practice of CRM, and editorials from respected researchers in the Texas archeological community. The size and content of each issue continued to grow until the average issue was 36 pages by 1998. The new newsletter will continue to include the same kinds of information important to professionals who practice contract archeology in the state, but by including information on Stewards and the activities of Regional Archeologists, it will also foster a better relationship between professionals and avocationalists. We are committed to producing a publication that will serve the entire archeological community.

REGIONAL ARCHEOLOGY INITIATIVE PROPOSED

Last year's merger of all the archeologists at the Texas Historical Commission (THC) into a single Archeology Division (AD) prompted us to examine and reevaluate our existing archeological programs. After much discussion among AD staff and input from archeologists outside the agency, we propose to regionalize our nonregulatory, public outreach programs.

(see *Regional*, page 2)

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INTENTIONAL BURIAL OF SITES AS A PRESERVATION TOOL

Burying sites with fill to preserve them has been a well-established practice in Texas archeology for many years. It seems axiomatic that burying a site will help protect the general structural integrity of the site, as well as the artifacts and other cultural deposits within it. This notion has been a working assumption of many Texas archeologists for several decades, and until just a few years ago, burial of sites was routinely approved by the THC Archeology Division as a means of mitigation of adverse effect. However, scientific investigations that have examined the chemical and physical effects of placing fill over buried archeological components have caused the THC to reexamine its policy on the use of intentional site burial.

Researchers working with Texas A&M engineering geologist Dr. Christopher C. Mathewson have conducted several pioneering studies on site burial in Texas and other states (cf. Mathewson n.d., 1992, 1993, 1994, 1995; Mathewson and Albertson n.d., 1997; Mathewson and Gonzalez 1991; Mathewson et al. 1991, 1992). In different parts of the state, they buried simulated archeological artifacts that were buried under varying soil types, to various depths, and subjected to different impact conditions. The interred items included clay pots with stress and fracturing properties similar to those of archeological ceramics, metal sheets, glass rods, and charcoal sticks. After burial, objects of varying masses, from pedestrian and horse traffic to road graders and bulldozers, were passed over the intentionally buried deposits. When the interred items were exhumed and examined, the specific degree of damage to each category of item for each type of impact was revealed. Similar studies conducted in other states have produced similar results (c.f., US Army Engineer Waterway Experiment Station 1988a).

Mathewson's research teams distinguished over a dozen factors that have the potential to affect the preservation of buried archeological materials, including soil pH, moisture regime, microorganism

and macroorganism content, oxygen levels, freezing and thawing cycles, compression, and movement. One major conclusion of these studies was that the material used for capping must have basically the same physical and chemical properties as the original soil matrix. Otherwise, site contents may be damaged by chemical reactions and structural alterations as the native and imported soils interact over time. The researchers also concluded that burying sites for preservation should be tailored to the soil, artifact content, and proposed impacts involved in each case: "The implementation of site burial as a preservation technique is, therefore, the design and construction of a 'custom-made' engineering cover that will induce the environment most favorable for the protection of discrete site components and/or spatial relationships [Mathewson et al. 1992:12]."

One of Mathewson's studies (Mathewson 1994) was performed for a TxDOT project in Montague County at the request of the THC to evaluate the effectiveness of site burial as a protective measure. In this case, many tons of fill were deposited to elevate the highway, and portions of two Late Prehistoric sites were buried. The sites contained a variety of artifacts (bone, shell, lithics and ceramics) from the surface to a depth of about 125 cm. Controlled experiments were conducted at the Heavy Equipment Training School in Brazos County to measure artifact breakage due to the effects of strain (displacement) and stress (load). The results of this study indicated that, in some cases, greater compressive breakage was caused by the construction of a 36-inch thick protective cover than by the cover plus vehicle loading (Mathewson 1994:12). Since then, the THC has been discouraging the use of site burial as a form of mitigation of adverse effect — which has confused many archeologists who suddenly were seeing their recommendations for site burial questioned by THC reviewers.

In some cases, attempts to protect sites have been made not by covering them with soil, but by

Intentional Site Burial Policy

LEGEND		Archeological Material												
		Animal Bone	Shell	Plants	Charcoal	Crystalline Lithics	Granular Lithics	Ceramics	Features	Soil Attributes	Metals	Context	Isotope Content	Topography
Process	Acid Environment	A	A	E	N	N	A	N	N	A	A	N	A	N
	Basic Environment	E	E	A	N	N	E	N	N	A	A	N	N	N
	Dry (Continuous)	E	E	E	E	N	E	N	N	N	E	N	E	N
	Wet Anaerobic (Cont.)	E	E	E	A	A	A	A	A	A	A	N	A	A
	Compression	A	A	A	A	N	N	A	A	A	N	A	N	A
	Movement	N	N	N	A	N	N	N	A	A	N	A	N	A
	Wet-Dry	A	A	A	A	A	A	A	A	A	A	N	A	A
	Microorganisms	A	A	A	A	N	A	N	A	A	N	A	N	N
	Wet Aerobic	A	A	A	A	N	A	A	A	A	A	N	A	N
	Freeze-Thaw	A	A	A	A	A	A	A	A	A	N	A	A	A
	Freeze	A	A	A	A	N	A	A	N	E	N	A	E	N
	Thaw	N	N	N	N	N	A	N	N	A	N	A	A	N

Mathewson's matrix shows the post-burial effects of physical, chemical, and biological processes on materials.

using concrete — with varying degrees of success. For example, a layer of gunite was installed over the deposits at Bear Creek Shelter at Lake Whitney to protect them from the erosion induced by wave action (US Army Engineer Waterway Experiment Station 1988b). Unfortunately, two years after the gunite was installed, large cracks were evident and soil loss was continuing. In another instance, an entire Caddo cemetery that was suffering the effects of looting was covered with a large concrete slab that extended well beyond the limits of the known graves. Now, five years later, no evidence of new looting has been found.

Mathewson suggests that site-specific soil engineering studies will usually be needed to determine the feasibility of site burial, and that maintenance or monitoring programs will also often be required to ensure that the preservation effort is achieving its goals. However, in many cases, the costs involved in site-specific engineering studies could exceed the cost of large-scale excavations. After considering the body of research and the nature of impacts that are typically involved whenever site burial is proposed as a mitigation measure in Texas, we offer the following site burial policy.

Mathewson's studies determined that about 1 to 2 m of fill prevented most physical alterations of the artifact categories tested when the fill had physical and chemical characteristics similar to those of the original matrix. Using his conclusions as a guide, the THC believes that site burial should be considered as a substitute for excavation when:

- ♦ the proposed impacts are light — limited to foot or golf cart traffic,
- ♦ the fill used to cap the site is composed of the same type of soil that contains the archeological deposits, and
- ♦ the fill placed on top of the site is limited to between 1 and 2 m in depth.

For sites on steep slopes, special measures are needed. A case in point is the Richard Beene site at the defunct Applewhite Reservoir, where a 35-ft.-deep spillway trench was cut through the site, exposing the deposits to the elements. Stabilization, drainage modification, and flow monitoring to control runoff and erosion may be required. Generally, the use of permeable geotextiles or plant covers on slope faces, installation of erosion barriers and artificial drains at water collection points, and, in some cases, installation of monitoring wells will be needed. The estimated duration and frequency of impacts will be a major factor in determining the depth of capping, stabilization, and drainage modifications required on slopes.

If you are convinced that preservation of a site can best be accomplished by burying it with fill, present your proposal to the Archeology Division for review. We will consider requests for site burial on a case-by-case basis. Consult the references listed below and present a rationale derived from the results of these studies (or other similar studies). We may concur outright, but in some cases we may reply that an engineering study should be conducted or that excavation is the most appropriate means of mitigation.

Intentional Site Burial References

- | | |
|--|--|
| <p>Mathewson, C. C.
n.d. <i>Planning, Implementation and Management of an Archaeological Site Burial Project</i>. Center for Engineering Geosciences, Texas A&M University, College Station.</p> <p>1993 <i>In situ Preservation of the Brown Bluff Archaeological Site, Washington County, Arkansas</i>. Arkansas State Highway and Transportation Department, Environmental Division, Little Rock.</p> <p>1994 <i>Intentional Burial of Two Archaeological Sites in Montague County, Texas as a Means of Site Protection: Analysis of Dynamic Loading During Construction</i>. Texas Department of Transportation, Division of Highway Design, Environmental Section, Austin.</p> <p>1995 <i>Preservation of Cultural Materials at Culloden Point, East Hampton, New York</i>. Report of Investigation to Grossman and Associates, New York.</p> <p>Mathewson, C. C., and P. E. Albertson
n.d. <i>Protection of Miller Cave (23PU2), Fort Leonard Wood, Missouri</i>. Archeological Sites Protection and Preservation Notebook Technical Notes. U. S. Army Engineer Waterways Experiment Station, Vicksburg.</p> <p>1997 <i>Rationale for Selection and Design of Archaeological Site Preservation Activities</i>. Paper presented at the International Symposium on Engineering Geology and the Environment, Athens Greece.</p> | <p>Mathewson, C. C., and T. Gonzalez
1991 <i>Decay of Archaeological Sites Buried for Protection and Preservation</i>. Center for Engineering Geosciences, Texas A&M University, College Station.</p> <p>Mathewson, C. C., T. Gonzalez, and J. S. Eblen
1991 <i>Preservation of Archaeological Sites Through Burial: Physical and Chemical Effects</i>. Center for Engineering Geosciences, Texas A&M University, College Station.</p> <p>1992 <i>Burial as a Method of Archaeological Site Protection</i>. Contract Report EL-92-1, US Army Engineer Waterways Experiment Station, Vicksburg.</p> <p>US Army Engineer Waterways Experiment Station
1988a <i>Experiments on the Effects of Site Burial on Archeological Materials</i>. Archeological Sites Protection and Preservation Notebook Technical Notes. US Army Engineer Waterways Experiment Station, Vicksburg.</p> <p>1988b <i>Preservation at Bear Creek Rock Shelter, Lake Whitney, Texas</i>. Archeological Sites Protection and Preservation Notebook Technical Notes. US Army Engineer Waterways Experiment Station, Vicksburg.</p> |
|--|--|

FORT ST. LOUIS READY FOR EXCAVATION

by Mike Davis and Jim Bruseth

After extensive hand-clearing, the site of Fort St. Louis (41VT4) now looks like a 4.1-acre park amidst the dense, thorny brush country of South Texas. It is ready for several preliminary investigations that will precede full-scale excavation, set to begin in March 2000. This baseline work is designed to locate the compound of five French buildings shown on a map drawn in 1689 by the Alonso de Leon expedition, and to find the French cemetery, as well as the later Spanish presidio.

Rob Huggins, Vice President of Geometrics, a California firm that manufactures remote-sensing devices, conducted a magnetometer survey in early May. Rob is familiar with Texas archeology, having worked with Jim Bruseth and Bill Martin at Richland-Chambers Reservoir in the early 1980s. The results at Fort St. Louis were astounding — the map of magnetic anomalies shows what appears to be the presidio as a ring of discarded material surrounding a parade ground that is nearly devoid of anomalies. Most intriguing were two faint lines forming a right angle that were visible within the hypothesized parade ground. They may represent the remains of the stockade from Fort St. Louis. In June and July, approximately 250 50 x 50 cm test pits will be dug across the site to assess subsurface artifact distribution. At the same time, 1 x 1 m units will be excavated to evaluate the remote-sensing anomalies.

White Mountain Apache Tribe Heritage Program
PO Box 507 Fort Apache,AZ 85926

To: Lisa Santana, USIBWC – Environmental Protection Project Manager
Date: August 20, 2008
Proposed Project: EA Assessment for Proposed Flood Control Improvements along the Rio Grande Rectified Project located within El Paso and Hudspeth Counties, Texas.

.....

The White Mountain Apache Historic Preservation Office (THPO) appreciates receiving information on the proposed project, dated July 25, 2008. In regards to this, please attend to the checked items below;

► ***There is no need to send additional information unless project planning or implementation results in the discovery of sites and/or items having known or suspected Apache Cultural affiliation.***

The proposed project is located within an area of probable cultural or historical importance to the White Mountain Apache Tribe (WMAT). As part of the effort to identify historical properties that maybe affected by the project we recommend an ethnohistorical study and interviews with Apache Elders. The Cultural Resource Director, **Mr. Ramon Riley** would be the contact person at (928) 338-4625 should this become necessary.

The proposed project is located within or adjacent to a known historic property of cultural concern and/or historical importance to the White Mountain Apache Tribe and will most likely result in adverse affect to said property. Considering this, please refrain from further steps in project planning and/or implementation.

► Please refer to the attached additional notes in regards to the proposed project:

We have received and reviewed information regarding USIBWC's proposal to conduct flood control improvements along the existing Rio Grande Rectification Project , and we've determined the proposed action **should not have an effect** to the White Mountain Apache tribe's Cultural Heritage Resources and/or historic properties. The project may proceed with the understanding that all ground disturbance should be monitored **if** there are reasons to believe subsurface artifacts are present, and in the event subsurface materials and/or human remains are encountered all construction activities are to be stopped and the proper authorities and/or affiliated tribe(s) be notified to evaluate the situation.

We look forward to continued collaborations in the protection and preservation of places of cultural and historical significance.

Sincerely,

Mark T. Altaha
White Mountain Apache Tribe
Historic Preservation Officer
1 (928) 338-3033 Fax: 338-6055

Fwd comments on proposed Improvements to th Rio Grande Rectification Project.txt

On 9/2/2008 at 4:01 PM, in message <48BDB7B8.8010507@zianet.com>, Kevin Bixby <swec@zianet.com> wrote:

Dear Ms. Santana:

Please accept these comments on the proposed improvements to the Rio Grande Rectification Project.

- 1) We do not agree with the Finding of No Significant Impact. We believe dredging of 45 river miles will adversely affect aquatic habitats and aquatic organisms in the river. If the proposed action is implemented, what will USIBWC do for mitigation?
- 2) How does USIBWC determine if a need to dredge exists, and to what extent? Are any objective criteria used in making this determination? What is the basis for determining that a need for the proposed action exists? We are opposed to dredging that is not justified on the basis of objective criteria since it causes harm to aquatic life. We did not find such criteria discussed in the draft EA.
- 3) If the proposed dredging is based on the need to provide flood protection, how does this comport with the results of recent flood modeling done for the Rectification Project? Does that analysis show that dredging will have any appreciable effect on channel capacity? If not, how does USIBWC reconcile its proposed action with that analysis?
- 4) Did the USIBWC-sponsored study of the economic benefits of flood control in the RGRP also look at costs, specifically environmental costs? If not, it is an inappropriate justification for the proposed action.

Thank you for the opportunity to comment.



OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

October 6, 2008

Dr. John Sproul
Manager Rio Bosque Wetlands Park
University of Texas at El Paso
500 W. University Ave.
El Paso, Texas 79968-0684

Subject: Response to Comments on the Environmental Assessment for Flood Control
Improvements along the Rio Grande Rectification Project (RGRP) in El Paso and
Hudspeth Counties, Texas

Dear Dr. Sproul:

Thank you for providing comments of the Draft Environmental Assessment for the proposed RGRP project. Section 3.1.6 has been modified as recommended, indicating The Rio Bosque Wetlands Park may be used as a wetlands mitigation site for impacts associated with maintenance dredging. Text has been included in the natural resources mitigation section (Section 5.2 of the Environmental Assessment) to indicate that wetlands mitigation for dredging, if required, may be accomplished through a cooperative agreement between the Rio Bosque Wetlands Park managers and the U.S. International Boundary and Water Commission.

If you have any questions or concerns, please contact Dr. Lisa Santana at (915) 832-4707 or by emailing lisasantana@ibwc.gov.

Sincerely,

Carlos Peña, Jr., P.E.
Division Engineer
Environmental Management Division



INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

October 6, 2008

Mr. Kevin Bixby
Executive Director
Southwest Environmental Center
275 North Downtown Mall
Las Cruces, NM 88001

Subject: Response to Comments on the Environmental Assessment for Flood Control
Improvements along the Rio Grande Rectification Project (RGRP) in El Paso and
Hudspeth Counties, Texas

Dear Mr. Bixby:

Thank you for submitting comments on the Environmental Assessment for flood control improvements along the Rio Grande Rectification Project (RGRP). Responses to your four comments are provided below:

Comment 1 - We do not agree with the Finding of No Significant Impact. We believe dredging of 45 river miles will adversely affect aquatic habitats and aquatic organisms in the river. If the proposed action is implemented, what will U.S. International Boundary and Water Commission (USIBWC) do for mitigation?

Response: Dredging will be performed during low- or no-flow conditions, so that water quality is not affected during the operations. Further, RGRP aquatic communities are very limited due to periodic drying of the streambed, and unconsolidated substrate. Text has been added to Section 3.1.5 of the Environmental Assessment to clarify that the aquatic habitat is very limited in this reach of the Rio Grande. Further, text has been added to Section 4.1.5 that indicates that dredging of low quality aquatic habitat will not affect existing communities, and may improve aquatic communities by creating deeper waters that would support aquatic habitat during the low-flow time periods. If mitigation for dredging is required as part of the U.S. Army Corps of Engineers (USACE) permitting process, the Rio Bosque Wetlands Park has been identified as a potential mitigation site.

Comment 2 - How does USIBWC determine if a need to dredge exists, and to what extent? Are any objective criteria used in making this determination? What is the basis for determining that a need for the proposed action exists? We are opposed to dredging that is not justified on the basis of objective criteria since it causes harm to aquatic life. We did not find such criteria discussed in the draft EA.

Response: The need to dredge the RGRP was determined by a Joint Report of the Principal Engineers of the IBWC, Mexican Section and the USIBWC, summarized in Minute 313. Minute 313 was used as the basis for the need for dredging the RGRP, and was referenced several times within the text of the EA. Dredging the river channel will slightly improve flood conveyance,

and will maintain the international boundary, and may remove some invasive plants, which may allow native plant species to establish in riparian areas. Dredging is not expected to harm the low-quality aquatic habitat present in the RGRP, because dredging operations will occur during low- or no-flow conditions.

Comment 3 - If the proposed dredging is based on the need to provide flood protection, how does this comport with the results of recent flood modeling done for the Rectification Project? Does that analysis show that dredging will have any appreciable effect on channel capacity? If not, how does USIBWC reconcile its proposed action with that analysis?

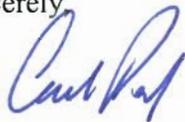
Response: The primary goal of dredging is to improve efficiency of water delivery and stabilize the international boundary. Dredging would only partially increase the flood containment in the channel, as most of the flood flow is carried over the entire floodway, with only a fraction of that flow carried by the river channel. The updated EA text has been modified to clarify this.

Comment 4 - Did the USIBWC-sponsored study of the economic benefits of flood control in the RGRP also look at costs, specifically environmental costs? If not, it is an inappropriate justification for the proposed action.

Response: The study specifically evaluated the extent of socio-economic benefits of flood control. A cost-benefit analysis associated with other environmental issues was not a goal of the study. However, EA findings indicate that no significant impacts are likely for water and biological resources.

Thank you for your interest in USIBWC projects. All your comments are appreciated and we value your opinion. If you have any questions or concerns, please contact Dr. Lisa Santana at (915) 832-4707 or by emailing lisanantana@ibwc.gov.

Sincerely



Carlos Peña, Jr., P.E.
Division Engineer
Environmental Management Division



INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

October 6, 2008

Mr. F. Lawrence Oaks
Executive Director and State Historic Preservation Officer
Texas Historical Commission
Attn: Debra Beene
Project Review Coordinator
P.O. Box 12276
Austin, TX 78711-2276

Subject: Response to Comments on the Environmental Assessment for Flood Control
Improvements along the Rio Grande Rectification Project (RGRP) in El Paso and
Hudspeth Counties, Texas

Dear Mr. Oaks:

This letter is in response to the electronic mail received September 03, 2008 and the mailed letter postmarked September 5, 2008 by the Texas Historical Commission (THC) on the Draft Environmental Assessment (EA) for the Rio Grande Rectification Project (RGRP) which were both received after the September 2, 2008 30-day comment period. I'd like to clarify the United States International Boundary and Water Commission's (USIBWC) approach for the evaluation of potential impacts on cultural resources along the levee improvement areas of the RGRP. I also want to emphasize that the USIBWC will seek resolution with the THC to ensure full compliance is met for the levee improvement project in accordance with Section 106 requirements for protection of cultural resources. As a federal agency, we acknowledge our responsibility to identify and evaluate resources under Section 110 of the National Historic Preservation Act for all USIBWC projects along the Texas boundary, to be completed as appropriate and in coordination with your office.

The cultural resources assessment provided in the EA was performed to narrow down potentially affected high probability areas for archaeological sites and the presence of architectural resources within the current proposed project area from those identified in a programmatic floodway study commissioned by the USIBWC in 2008 for all Rio Grande Flood Control Projects along the Texas-Mexico Border. The assessment provided in the Draft EA included a field reconnaissance conducted to verify the location of previously identified cultural resources and to identify additional resources in the project area not necessarily identified in the 2008 programmatic floodway study conducted at a larger scale.

As indicated in the Best Management Practices and Mitigation Measures described in Section 5 of the EA, we will implement measures such as use of appropriate equipment around architectural resources listed on, eligible for, or unevaluated for listing on the National Register of Historic Places none of which were found within the Area of Potential Effect; use of appropriate techniques for capping areas with archaeological potential; and continued consultation with Native American Tribes that have identified sensitive resources in the project

area. These measures will ensure the continued protection of cultural resources in the project area during and after implementation of the proposed project.

I and several members of my staff would like to personally meet with you and any of your staff to discuss comments associated to this effort and all USIBWC projects along the Texas-Mexico limitrophe. Our agency is committed to stewardship and sustainability of all resources to include cultural resources within our project areas.

Thank you for your comments and interest in USIBWC projects. All your comments are appreciated and we value your opinion. If you have any questions or concerns, please contact Dr. Lisa Santana at (915) 832-4707 or by emailing lisasantana@ibwc.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Carlos Peña, Jr.', is positioned above the typed name.

Carlos Peña, Jr. P.E.
Division Engineer
Environmental Management Division



TEXAS
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F. LAWRENCE OAKS, EXECUTIVE DIRECTOR

December 15, 2008

Carlos Pena, Jr. P.E.
Division Engineer
Environmental Management Division
United States Section, IBWC
4171 N. Mesa, Suite C-100
El Paso, Texas 79902

Re: Project review under Section 106 of the National Historic Preservation Act of 1966,
Draft EA: Rio Grande Rectification Project, El Paso and Hudspeth Counties, Texas
[IBWC]

Dear Mr. Pena:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Debra L. Beene, has completed its review. It is our opinion that the levee improvements have the potential to affect significant cultural resources; therefore, an intensive cultural resources survey is needed. We understand that the above-referenced EA is undergoing revisions to address our earlier review comments and the intensive cultural resources survey will be conducted prior to the proposed levee improvements. IBWC has agreed to submit the report to our office for review and comment as well as follow our recommendations regarding any potential testing or mitigation investigations necessary to complete the Section 106 consultation. As long as IBWC commits to the above procedures, we have no further cultural concerns with the draft EA.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your assistance in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Debra L. Beene at 512/463-5865 or Rachel Leibowitz at 512/463-6046**

Sincerely,

A handwritten signature in cursive script, appearing to read "F. Lawrence Oaks".

for
F. Lawrence Oaks, State Historic Preservation Officer

cc: Lisa Santana, Ph.D., Environmental Protection Specialist, IBWC

FLO/dlb