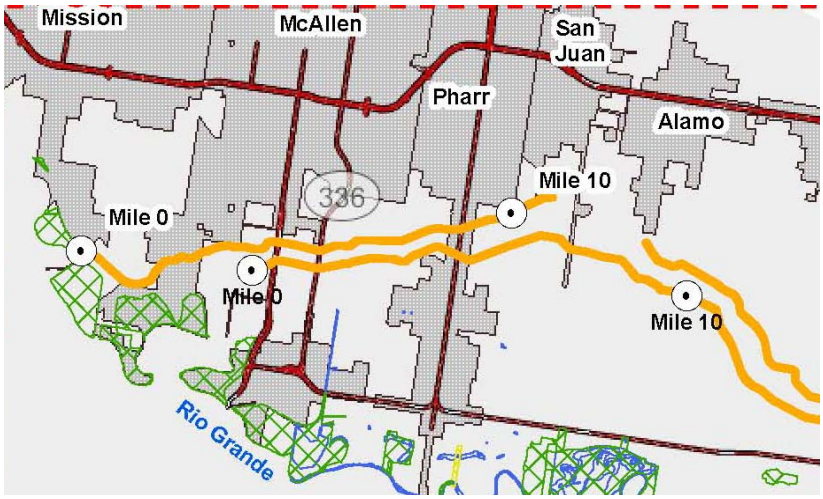
Final Environmental Assessment
Improvements to the North and Main Floodways Levee Systems



Lead Agency:

United States Section, International Boundary and Water Commission

El Paso, Texas

Cooperating Agency:

Texas Parks and Wildlife Department

Austin, Texas

Technical Support:

PARSONS

Austin, Texas

November 2007

COVER SHEET

FINAL ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT

IMPROVEMENTS TO THE
MAIN AND NORTH FLOODWAY LEVEE SYSTEMS

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

Cooperating Agency: Texas Parks and Wildlife Department

Proposed Action: Raising approximately 76 miles of the Main and North Floodway Levee Systems to meet current requirements for flood control.

Report Designation: Final Environmental Assessment

Abstract: The United States Section, International Boundary and Water Commission (USIBWC) is considering raising portions of the 29-mile Main Floodway Levee System and portions of the 46-mile North Floodway Levee System to meet current flood control requirements. The Proposed Action would increase the flood containment capacity of the Main and North Floodways Levee System by raising elevation of a number of levee segments for improved flood protection. Fill material would be added to the existing levee to bring height to its original design specifications, or to meet a 2-foot freeboard design criterion. Typical height increases in improvement areas would be less than 1 foot and would not require expansion of the existing levee footprint.

In some locations, up to 2 feet of fill material would be placed on top of the levee, extending levee footprint up to a maximum of 12 feet form the current toe of the levee. This expansion would take place along the approximately 20 feet service corridor currently utilized for levee maintenance, inside the maintained floodway, and entirely within the flood control project right-of-way. In some instances, adjustment in levee slope would be made to eliminate the need for levee footprint expansion, when required due to engineering considerations or for protection of biological or cultural resources. The need for excavation outside the levee structure is not anticipated.

The Environmental Assessment assesses potential environmental impacts of the Proposed Action and the No Action Alternative. Potential impacts on natural, cultural, and other resources were evaluated, and mitigation measures were incorporated, as applicable, into the Proposed Action. 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 MAIN AND NORTH FLOODWAYS LEVEE SYSTEM IN THE LOWER RIO GRANDE FLOOD CONTROL PROJECT HIDALGO, CAMERON AND WILLACY COUNTIES

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

BACKGROUND

The USIBWC is authorized to construct, operate, and maintain any project or works projected by the United States of America on the Lower Rio Grande Flood Control Project (LRGFCP), as authorized by the Act of the 74th Congress, Sess. I Ch. 561 (H.R. 6453), approved August 19, 1935 (49 Stat. 660), and codified at 22 USC Section 277, 277a, 277b, 277c, and Acts amendatory thereof and supplementary thereto. The LRGFCP was constructed to protect urban, suburban, and highly developed irrigated farmland along the Rio Grande delta in the United States and Mexico.

The USIBWC, in cooperation with the Texas Parks and Wildlife Department (TPWD), prepared this Environmental Assessment for the proposed action to improve flood control along sections of the Main and North Floodways Levee System located in Hidalgo, Cameron, and Willacy Counties, Texas. This levee system is part of the Lower Rio Grande Flood Control Project that extends approximately 180 miles from the Town of Peñitas in south Texas, to the Gulf of Mexico. The Main and North Floodway Levee system extends approximately 75 levee miles, downstream from Anzalduas Dam, and extending near the town of Mercedes to the Laguna Madre northwest of Arroyo City, Texas.

PROPOSED ACTION

The Proposed Action would increase the flood containment capacity of the Main and North Floodways Levee System by raising elevation of a number of levee segments for improved flood protection. Fill material would be added to the existing levee to bring height to its original design specifications, or to meet a 2 feet freeboard design criterion. Typical height increases in improvement areas would be less than 1 foot and would not require expansion of the existing levee footprint.

In some locations, up to 2 feet of fill material would be placed on top of the levee, extending the levee footprint up to a maximum of 12 feet from the current toe of the levee. This expansion would take place along the approximately 20 foot service corridor currently utilized for levee maintenance, inside the maintained floodway, and entirely within the flood control project right-of-way. In some instances, adjustment in levee slope would be made to eliminate the need for levee footprint expansion, when required by engineering considerations or for protection of biological or cultural resources. The need for excavation outside the levee structure is not anticipated.

ALTERNATIVES TO THE PROPOSED ACTION

A No Action Alternative was evaluated for the Main and North Floodways Levee System. This alternative would retain the existing configuration of the system, as designed over 30 years ago, and the current level of protection currently associated with this system. Under severe storm events, current containment capacity may be insufficient to fully control Rio Grande flooding, with risks to personal safety and potential property damage.

SUMMARY OF FINDINGS

Pursuant to 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. The USIBWC completed an EA of the potential environmental consequences of raising the Main and North Floodways Levee System to meet current requirements for flood control. The EA, which supports this Finding of No Significant Impact, evaluated the Proposed Action and No Action Alternative.

LEVEE SYSTEM EVALUATION

NO ACTION ALTERNATIVE

The No Action Alternative was evaluated as the single alternative action to the Proposed Action. The No Action Alternative would retain the current configuration of the Main and North Floodways Levee System, with no impacts to biological and cultural resources, land use, community resources, or environmental health issues. In terms of flood protection, however, current containment capacity under the No Action Alternative may be insufficient to fully control Rio Grande flooding under severe storm events, with associated risks to personal safety and property.

PROPOSED ACTION

Biological Resources

Improvements to the levee system would entail placement of fill material that would affect grassed areas at locations where levee footprint expansion is required. All expansion would take place along the current levee service corridor, limiting vegetation removal to invasive-species grasslands; this grass cover is expected to be rapidly re-established after project completion.

No significant effects are anticipated on wildlife habitat in the vicinity of the levee system, including potential habitat for threatened and endangered species. While approximately 17 percent of levee system is adjacent to natural resources conservation areas, only a small fraction would fall within levee improvement areas. In areas requiring levee footprint expansion, no woodland communities would be impacted; impacts on

vegetation would be limited to non-native grasslands along the levee, of very limited value as wildlife habitat. No wetlands are located within the potential levee expansion area.

Cultural Resources

Improvements to the Main and North Floodways Levee System are not expected to adversely affect known archaeological or historical resources. Typically, placement of fill material over the existing levee would not expand levee footprint; when levee footprint expansion is needed, expansion would take within the service corridor currently used for levee maintenance. High-Probability Areas (HPAs) identified along the levee system would be located outside the improvement areas, with minor exceptions. In areas where HPAs are located near improvement areas, the need for footprint expansion would be eliminated by adjusting levee slope to retain current location of the toe of the levee.

Cultural resources located in the general vicinity of the levee system include historic age structures. Potential historic-age resources near the levee system would not be affected because most of those resources are located outside of the floodway, and away from potential levee footprint expansion areas. Only irrigation canals and minor irrigation structures, such as weir gates and standpipes, are located within or near the levee service corridor where footprint expansion would take place; both irrigation canals and nearly all irrigation structures would be retained in their current condition.

Water Resources

Improvements to the levee system 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 resources.

Land Use

Footprint levee expansion, where required, would take place completely within the existing floodway and along the levee service corridor. No urban or agricultural lands would be affected. Impacts to natural resources conservation areas would be limited to non-native grassland areas.

Community Resources

In terms of socioeconomic resources, the influx of federal funds into Hidalgo, Cameron, and Willacy Counties from the levee improvement project would have a positive but minor local economic impact. The impact would be limited to the construction period, and represent less than 1 percent of the annual county employment, income and sales values. No adverse impacts to disproportionately high minority and low-income populations were identified for construction activities. A moderate increase in 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.

Environmental Health Issues

Estimated air emissions of five criteria pollutants during construction represent less than 1.1 percent of the annual emissions inventory of Hidalgo, Cameron, and Willacy Counties. 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. A database search indicated that no waste storage and disposal sites were within the proposed Main and North Floodway Levee Project area, and none would affect, or be affected, by the levee improvement project.

Best Management Practices

When warranted due to engineering considerations, or for protection of biological or cultural resources, the need for levee footprint expansion would be eliminated by levee slope adjustment. Best management practices during construction would include development of a storm water pollution prevention plan to avoid impacts to receiving waters, and use of sediment barriers and soil wetting to minimize erosion and dust.

To protect vegetation cover, both the modified levee and construction corridor would be re-vegetated with native herbaceous species. To protect wildlife, construction activities would be scheduled to occur, to the extent possible, outside the March to August bird migratory season.

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 Main and North Floodways Levee System 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.

Carlos Marin, Commissioner
International Boundary and Water Commission,
United States Section

11/20/07
Date

FINAL ENVIRONMENTAL ASSESSMENT

IMPROVEMENTS TO THE MAIN AND NORTH FLOODWAY LEVEE SYSTEMS

Lead Agency:

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

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USIBWC Contract IBM04D0002, Task Order IBM06T0020

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TABLE OF CONTENTS

SECTION 1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION 1-1
1.1 Purpose of and Need for Action 1-1
1.2 USIBWC Authority 1-1
1.3 Scope of the Environmental Review 1-2
1.4 Environmental Coordination and Compliance Analysis 1-3
1.5 Organization of the Environmental Assessment 1-5

SECTION 2 DESCRIPTION OF PROPOSED ACTION 2-1
2.1 Levee System Description 2-1
2.2 Proposed Action 2-2
2.3 Alternatives Considered and Eliminated from Detailed study 2-8
2.4 Other Actions With Potential Cumulative Impacts 2-8
2.5 Summary Comparison of Environmental Consequences of the Alternatives 2-9
2.5.1 No Action Alternative 2-9
2.5.2 Proposed Action 2-9

SECTION 3 AFFECTED ENVIRONMENT 3-1
3.1 Biological Resources 3-1
3.1.1 Vegetation 3-1
3.1.2 Wildlife 3-4
3.1.3 Threatened and Endangered Species 3-6
3.1.4 Wetlands and Aquatic Habitat 3-6
3.2 Cultural Resources 3-8
3.2.1 Previous Cultural Resources Studies 3-9
3.2.2 Historic and Prehistoric Archaeological Resources 3-11
3.2.3 Historic-age Resources 3-13
3.2.4 Cemeteries 3-13
3.3 Water Resources 3-16
3.3.1 Regional Flood Control 3-16
3.3.2 Water Flow 3-17
3.4 Land Use 3-19
3.4.1 Natural Resources Management Areas 3-19
3.4.2 Agricultural Land 3-19
3.4.3 Urban Areas 3-19
3.5 Community Resources 3-20
3.5.1 Socioeconomics 3-20
3.5.2 Environmental Justice 3-23
3.5.3 Transportation 3-23
3.6 Environmental Health 3-24
3.6.1 Air Quality 3-24

3.6.2 Noise 3-25
3.6.3 Hazardous and Toxic Waste 3-26

SECTION 4 ENVIRONMENTAL CONSEQUENCES 4-1
4.1 Biological Resources 4-1
4.1.1 Vegetation 4-1
4.1.2 Wildlife 4-1
4.1.3 Threatened and Endangered Species 4-4
4.1.4 Jurisdictional Wetlands and Aquatic Habitat 4-5
4.1.5 Cumulative Effects 4-5
4.2 Cultural Resources 4-6
4.2.1 Historic and Prehistoric Archaeological Resources 4-6
4.2.2 Historic-age Resources 4-6
4.3 Water Resources 4-8
4.3.1 Flood Control 4-8
4.3.2 Water Flow 4-9
4.4 Land Use 4-9
4.5 Community Resources 4-10
4.5.1 Socioeconomics 4-10
4.5.2 Environmental Justice 4-12
4.5.3 Transportation 4-12
4.6 Environmental Health 4-13
4.6.1 Air Quality 4-13
4.6.2 Noise 4-13
4.6.3 Hazardous and Toxic Waste 4-14
4.7 Indirect and Cumulative Impacts 4-14

SECTION 5 BEST MANAGEMENT PRACTICES 5-1
5.1 Engineering Measures 5-1
5.2 Natural Resources 5-1
5.3 Cultural Resources 5-2

SECTION 6 ENVIRONMENTAL COMPLIANCE AND COORDINATION 6-1
6.1 Consultation 6-1
6.1.1 Cooperating Agency Review 6-1
6.1.2 Public Review of Draft EA 6-1
6.2 List of Contributors 6-2

SECTION 7 REFERENCES 7-1

APPENDICES

Appendix A Detailed Maps of Levee Alignment, Right-of-Way and Potential Improvement Areas

Appendix B Habitat of Threatened and Endangered Species Potentially Occurring Within Counties Intersecting the Levee System

Appendix C Detailed Maps of Cultural Resources Along the Main and North Floodway Levee Systems Study Corridor

Appendix D Comment Letters on the Draft EA

Appendix E Cultural Resources Evaluation (Sundenmeyer *et a*l. 2007).

Appendix F Technical Support Studies Report (Parsons 2007)

[*Appendices E and F are provided in the attached CD-ROM*]

LIST OF TABLES

Table 1.1 Summary of Environmental Coordination and Compliance..... 1-3

Table 2.1 Summary of Environmental Impacts of Proposed Improvements to the Main and North Floodways..... 2-10

Table 3.1 Acreages of Plant Communities along the Levee Systems..... 3-5

Table 3.2 Wetlands within Main and North Floodway Levee ROW..... 3-7

Table 3.3 Known Archaeological Resources and HPAs Identified Within or Near the Study Corridor..... 3-12

Table 3.4 Historic-age Resources Identified Within the Study Corridor 3-14

Table 3.5 State and Federal Conservation Lands Located Along the Main and North Floodway Levee Systems..... 3-20

Table 3.6 Population Growth in Cameron, Hidalgo, and Willacy Counties Adjacent to the Main and North Floodway Levee Systems..... 3-21

Table 3.7 Percentage of Minority Populations and Poverty Rates in the Main and North Floodway Levee Area..... 3-21

Table 3.8 Estimated Total Employment for Cameron, Hidalgo, and Willacy Counties 3-22

Table 3.9 Summary Search Report for the Main and North Floodway Levee Systems, McAllen, Texas Vicinity..... 3-27

Table 3.10 Summary Search Report for the Main and North Floodway Levee Systems, Santa Monica, Texas Vicinity 3-28

Table 4.1 Potential Impacts to Vegetation within Improvement Areas of the Main and North Floodway Levee Systems..... 4-2

Table 4.2 Levee Improvement Areas along State and Federal Conservation Lands..... 4-3

Table 4.3 Potential for impacts to Known Archaeological Resources and HPAs Identified Within the Study Corridor..... 4-7

Table 4.4 Potential for impacts on Historic-age Resources Identified Within the Study Corridor 4-8

Table 4.5 Potential Economic Impacts Improvements to the Main and North Floodway Levee Systems for Hidalgo County 4-10

Table 4.6 Potential Economic Impacts Improvements to the Main and North Floodway Levee Systems for Cameron County 4-11

Table 4.7 Potential Economic Impacts Improvements to the Main and North Floodway Levee Systems for Willacy County 4-11

Table 4.8 Air Emissions for Improvements to the Main and North Floodway Levee Systems..... 4-13

Table 4.9 Potential Cumulative Impacts of Ongoing and Planned TPWD Initiatives 4-15

Table 6.1 Preparers of the Environmental Assessment and Technical Studies 6-2

Table 6.2 Technical Review of the Environmental Assessment..... 6-3

LIST OF FIGURES

Figure 2.1 Main and North Floodway Levee Systems Location Map 2-3

Figure 2.2 Levee Miles 0 – 20..... 2-4

Figure 2.3 Levee Miles 20 – 36..... 2-5

Figure 2.4 Levee Miles 36 – 57..... 2-6

Figure 2.5 Levee Miles 55 – 69..... 2-7

Figure 3.1 Index of Detailed Cultural Resources Maps along the Study Corridor Provided in Appendix C 3-10

ACRONYMS AND ABBREVIATIONS

AQCR	air quality control region
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
cfs	cubic feet per second
db	decibel
dbA	A-weighted sound level in decibels
DNL	day-night average sound level
EA	environmental assessment
EIS	environmental impact statement
EO	executive order
ERNS	Emergency Response Notification System of Spills
ESA	Endangered Species Act
FM	farm-to-market
GENS	generator of hazardous waste
GIS	geographic information system
GPS	global positioning system
HPA	High probability areas
IBWC	International Boundary and Water Commission
LRGCC	Lower Rio Grande Canal Company
LRGFCP	Lower Rio Grande Flood Control Project
LRGV	Lower Rio Grande Valley
m	meter
MxIBWC	Mexican Section, International Boundary and Water Commission
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
NPL	National Priority List
NRCS	Natural Resources Conservation Service
NWR	national wildlife refuge
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way
T&E	threatened and endangered
TCEQ	Texas Commission on Environmental Quality
THSA	Texas Archeological Sites Atlas
TPWD	Texas Parks and Wildlife Department
TSD	transport, storage, and disposal
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USIBWC	United States Section, International Boundary and Water Commission
UST	underground storage tank
WMA	wildlife management area

SECTION 1
PURPOSE OF AND NEED FOR THE PROPOSED ACTION

This section discusses the purpose of and need for the Proposed Action; the authority of the United States Section, International Boundary and Water Commission (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.

1.1 PURPOSE OF AND NEED FOR ACTION

The USIBWC, in cooperation with the Texas Parks and Wildlife Department (TPWD), prepared this Environmental Assessment (EA) for the Proposed Action of raising sections of the Main and North Floodway Levee Systems located in Hidalgo, Cameron, and Willacy Counties, Texas. These two levee systems are part of the Lower Rio Grande Flood Control Project (LRGFCP) that extends approximately 180 miles from the Town of Peñitas in south Texas to the Gulf of Mexico. The Proposed Action would increase the flood containment capacity of the Main and North Floodways Levee System by raising elevation of a number of levee segments for improved flood protection. Fill material would be added to the existing levee to bring height to its original design specifications, or to meet a 2-foot freeboard design criterion. In some locations, where up to 2 feet of fill material would be placed on top of the levee, the current levee footprint could be extended up to a maximum of 12 feet. This expansion would take place along the approximate 20-foot service corridor currently utilized for levee maintenance, inside the maintained floodway, and entirely within the flood control project right-of-way (ROW). The need for excavation outside the levee structure is not anticipated.

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. The mission of the USIBWC is to assure:

- 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;
- Distribution of waters of the Rio Grande and the Colorado River between the two countries;

- 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;
- Preservation of the Rio Grande and Colorado River as the international boundary; and
- Demarcation of the land boundary.

The mission of the USIBWC has five components, the third of which covers the proposed raising of the Main and North Floodway Levee Systems.

1.3 SCOPE OF THE ENVIRONMENTAL REVIEW

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; Appendix 501-A). 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 environmental impact statement (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.

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 resources. The following resource areas are analyzed for potential environmental consequences: biological resources; cultural resources; water resources; land use; and community resources (socioeconomics, environmental justice, and transportation). Environmental health issues are also evaluated (air quality, noise, and hazardous and toxic waste).

The analysis of environmental resources for the affected environment and environmental consequences was based on a potential impact corridor around the existing Main and North Floodway Levee Systems.

Analyses of environmental consequences also include potential indirect impacts adjacent to the levee corridor and the region depending on the resource and its relationship to the Proposed Action and alternatives. Reference values for air quality, cultural resources, socioeconomics, and environmental justice are evaluated on a regional basis (county level).

Results of studies conducted in support of the EA preparation were reported in the document *Technical Support Studies for the Environmental Assessment of Flood Control Improvements to the Main and North Floodway Levee Systems* (Parsons 2007). Findings of these studies were used to document baseline conditions for biological resources, cultural resources, wetlands, and waste storage and disposal. The report also documents potential performance of the levee system based on hydraulic model simulations, and an evaluation of environmental compliance requirements and coordination activities.

Recent published information is used for impact analyses that is based for the time period covered during construction and subsequent flood control improvement conditions. Potential environmental consequences of the Main and North Floodway Levee Systems for each resource area are discussed separately in Section 4 of this EA.

1.4 ENVIRONMENTAL COORDINATION AND COMPLIANCE ANALYSIS

Table 1.1 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 1.1 Summary of Environmental Coordination and Compliance

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, *et seq.)*	Section 7 of the Act requires formal consultation if significant adverse impacts to federally listed threatened and endangered species, and migratory birds, could occur. Consultation with USFWS regarding impacts on various units of the LRGV National Wildlife Refuge adjacent to the levee systems.
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 with Wildlife Division concerning potential impacts of the levee-raising project to wildlife. Coordination with State Parks Division concerning potential impacts on park tracts.

Agency or Organization	Regulation or Issue	Level of USIBWC Coordination
Cultural Resources		
Texas Historic Commission (THC)	National Historic Preservation Act of 1966, as amended (16 USC 470, *et seq.*)	Compliance with Section 106 requirements for potential impacts to archaeological and historic resources.
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)	Permit application if waters of the United States are affected. Mitigation plan and permit application for potential impacts to wetlands.
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 NPDES construction permit and Storm Water Pollution Prevention Plan preparation. Section 404 Certification; coordination is typically a function of the USACE permitting process.
Other Issues		
Texas Coastal Zone Management	Section 306 of the Federal Coastal Zone Management Act	Compliance with General Land Office (GLO) for project compatibility with coastal zone management for Cameron and Willacy Counties.
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. Customs and Border Patrol	Levee Road Usage	Coordination during construction activities.
Irrigation Districts	Modifications to intake channel and construction along irrigation canals	McAllen, San Juan, Donna, and Progreso Irrigation Districts in Hidalgo County: levee construction along segments of the Main Floodway. Mercedes and Santa Maria Irrigation Districts in Hidalgo County; La Feria, Adams Garden, and Harlingen Irrigation Districts in Cameron County: levee construction along the North Floodway.

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 the flood control improvements of the Main and North Floodway Levee Systems.

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

Section 6 describes the consultation process and lists persons and agencies 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 appendices, as follows:

- Appendix A: detailed maps of levee alignment, right-of-way, and potential improvement areas.
- Appendix B: habitat of Threatened and Endangered Species potentially occurring within counties intersecting the levee system.
- Appendix C: maps of cultural resources located near the levee system.
- Appendix D: review comments on the Draft EA
- Appendices E and F contain, respectively, the Cultural Resources Evaluation and Technical Support Studies Report prepared in support of the EA development. Appendices E and F are provided in the attached CD-ROM.

SECTION 2
DESCRIPTION OF PROPOSED ACTION

This section presents a description of the Proposed Action for improvements of the Main and North Floodway Levee Systems. An overview of the Main and North Floodway Levee Systems is presented in Figures 2.1 to 2.5. Appendix A presents detailed maps of levee alignment, potential levee improvement areas, and land use in the levee system vicinity. A summary of potential environmental impacts, subsequently discussed in Section 4, is provided at the end of Section 2.

2.1 LEVEE SYSTEM DESCRIPTION

The LRGFCP was constructed to protect urban, suburban, and highly developed irrigated farmlands in the Rio Grande delta from floods, in both the United States and Mexico. The LRGFCP includes 102 miles of grass-covered earthen structures along the United States margin of the Rio Grande and Anzalduas Diversion Dam. The dam diverts floodwaters into a United States interior floodway system flanked by 168 miles of levees. A second dam, Retamal Diversion Dam, routes Rio Grande floodwaters into Mexico's interior floodway. The distance between the United States and Mexican levees along the Rio Grande ranges from approximately 400 feet to 3 miles.

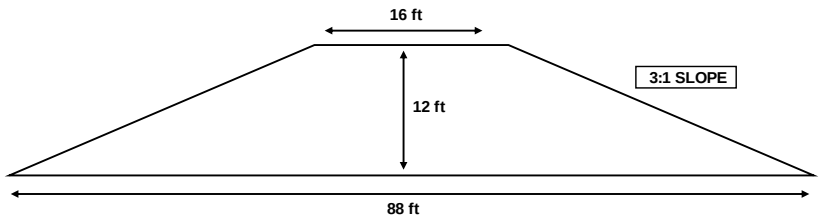
The LRGFCP interior floodway system is composed of the Main, North and Arroyo Colorado Floodways. Floodwater flows from the Rio Grande are diverted eastward from Anzalduas Dam into the Main Floodway that, at the City of Mercedes, divides into the North and Arroyo Colorado Floodways. The North Floodway extends northward from Mercedes, and turns eastward near La Villa to a terminal point north of Arroyo City, near the Laguna Madre. Sections of the interior floodway system were identified by hydraulic modeling as priority areas to improve flood containment. The hydraulic evaluation indicated that an increase in levee height, up to 2 feet, would be needed in a number of sections of the Main and North Floodways to meet design criteria for flood protection (USIBWC 2003a).

The Main Floodway extends approximately 29 miles east from the Banker Weir near the Anzalduas Dam. Near the town of Mercedes, the Main Floodway diverges into the North Floodway and the Arroyo Colorado. The North Floodway is approximately 46 miles long. The levee ROW for both the Main and North Floodways runs primarily through agricultural areas. The interior floodway systems have a total area of 27,013 acres between the levees in Hidalgo, Cameron, and Willacy Counties.

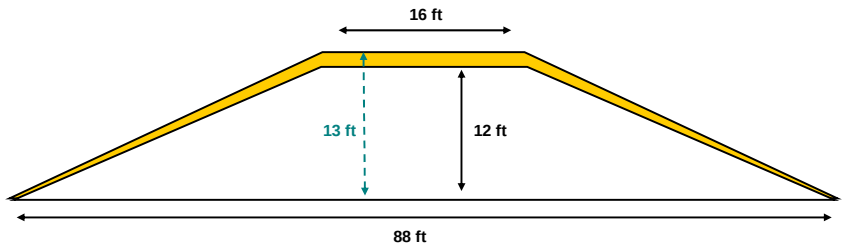
The levee systems run largely along agricultural areas and natural resources management lands. Those lands include the Estero Llano Grande State Park and units of the Las Palomas Wildlife Management areas operated by the TPWD, and two national wildlife refuges (NWRs) maintained by the U.S. Fish and Wildlife Service (USFWS), the Lower Rio Grande NWR and the Laguna Atascosa NWR. Urban development in the Main Floodway System vicinity is primarily limited to the portions of McAllen, Weslaco, and Mercedes. Along the North Floodway System, there are some residential areas located between Weslaco and Mercedes. No residential developments are allowed within the floodways, largely used for agriculture.

2.2 PROPOSED ACTION

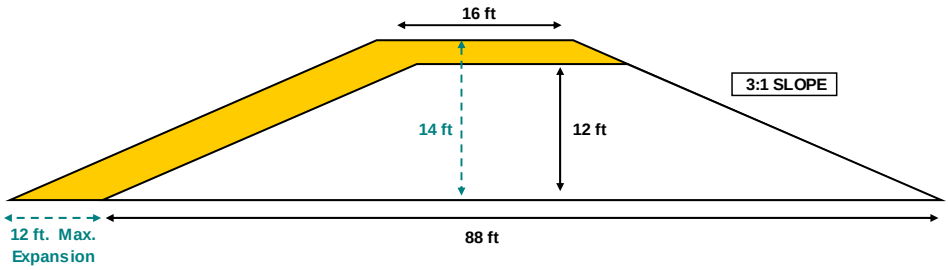
The existing levee is a raised trapezoidal compacted-earth structure with a crown width of 16 feet, a typical height ranging from 10 to 15 feet, and an approximate 3:1 side slope ratio (units of horizontal run in feet per foot of vertical rise). The levee crown is an unpaved service road with restricted public access. The existing levee footprint typically ranges from 70 to 100 feet, depending on location. A typical levee cross-section is shown in the diagram below.



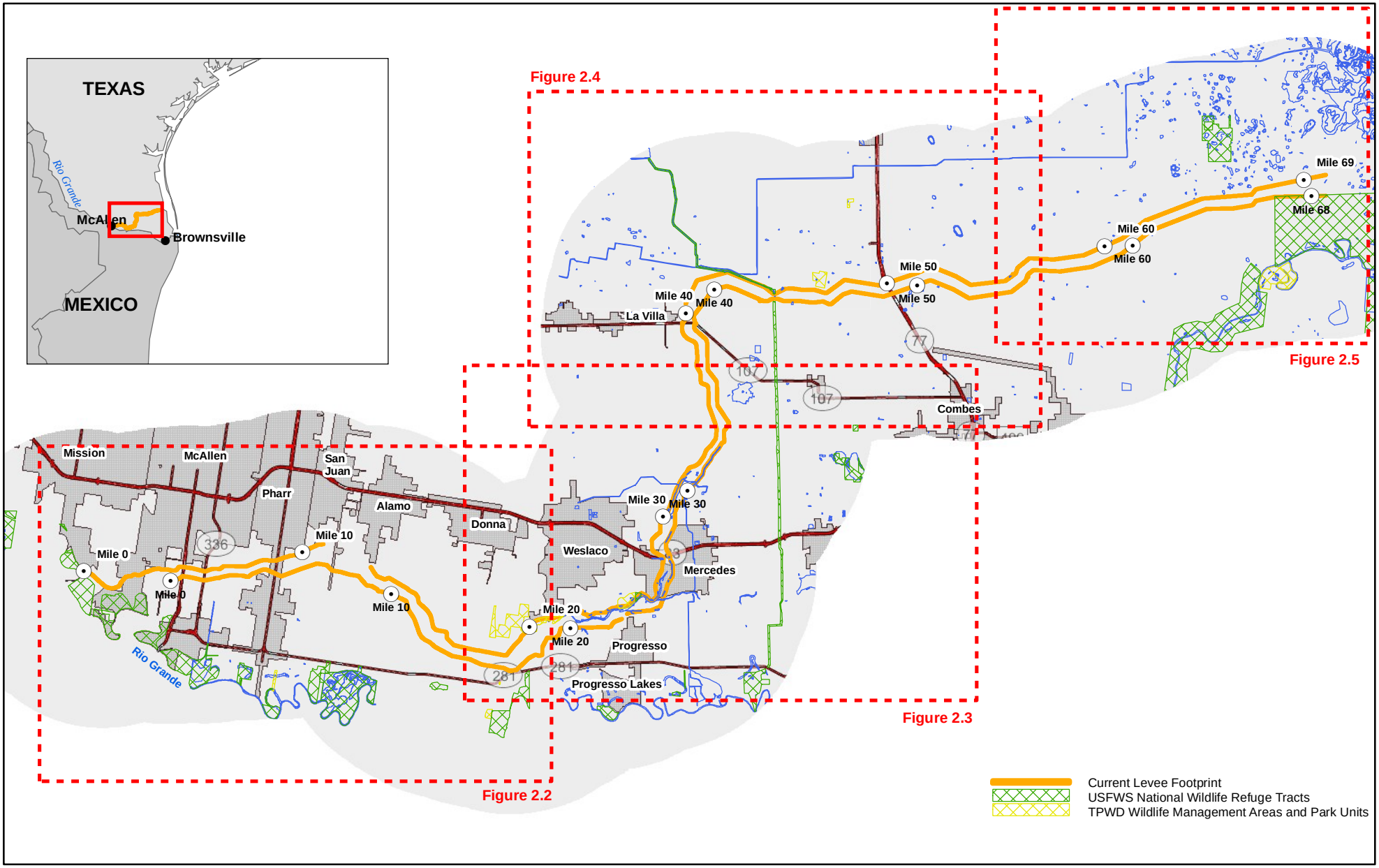
The Proposed Action would increase flood containment capacity by raising elevation of a number of levee segments for improved flood control. Fill material would be added to the existing levee to bring height to its original design specifications, or to meet a 2-foot freeboard design criterion. Typical height increases in improvement areas would be less than 1 foot and would not require expansion of the existing levee footprint.



In some locations, up to 2 feet of fill material would be placed on top of the levee, potentially extending levee footprint. For a typical levee cross-section, shown in the diagram below, a 2-foot increase in levee height would result in a maximum 12-foot increase in the footprint. The need for excavation outside the levee structure is not anticipated.



Figures 2.2 to 2.5 present an overview of the Main and North levee systems. Along each levee system, potential material fill additions are indicated for the 0 to 1-foot range (green line), and 1 to 2-foot range (red line). Appendix A presents detailed information for 26 individual segments on levee improvement areas, state and federal natural resources management lands, and locations of wetlands identified during a field survey conducted in support of the EA preparation (Parsons 2007).



0 2.5 5 10 15 20 Miles

0 5 10 20 30 40 Kilometers

Figure 2.1
Main and North Floodways Levee System Location Map

Main and North Floodways Levee System EA
International Boundary and Water Commission,
United States Section

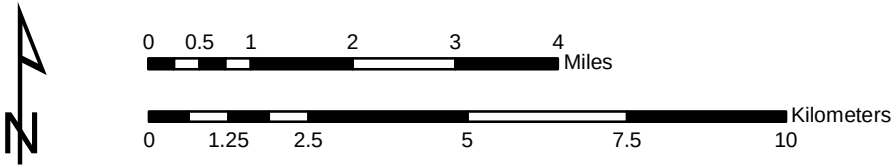
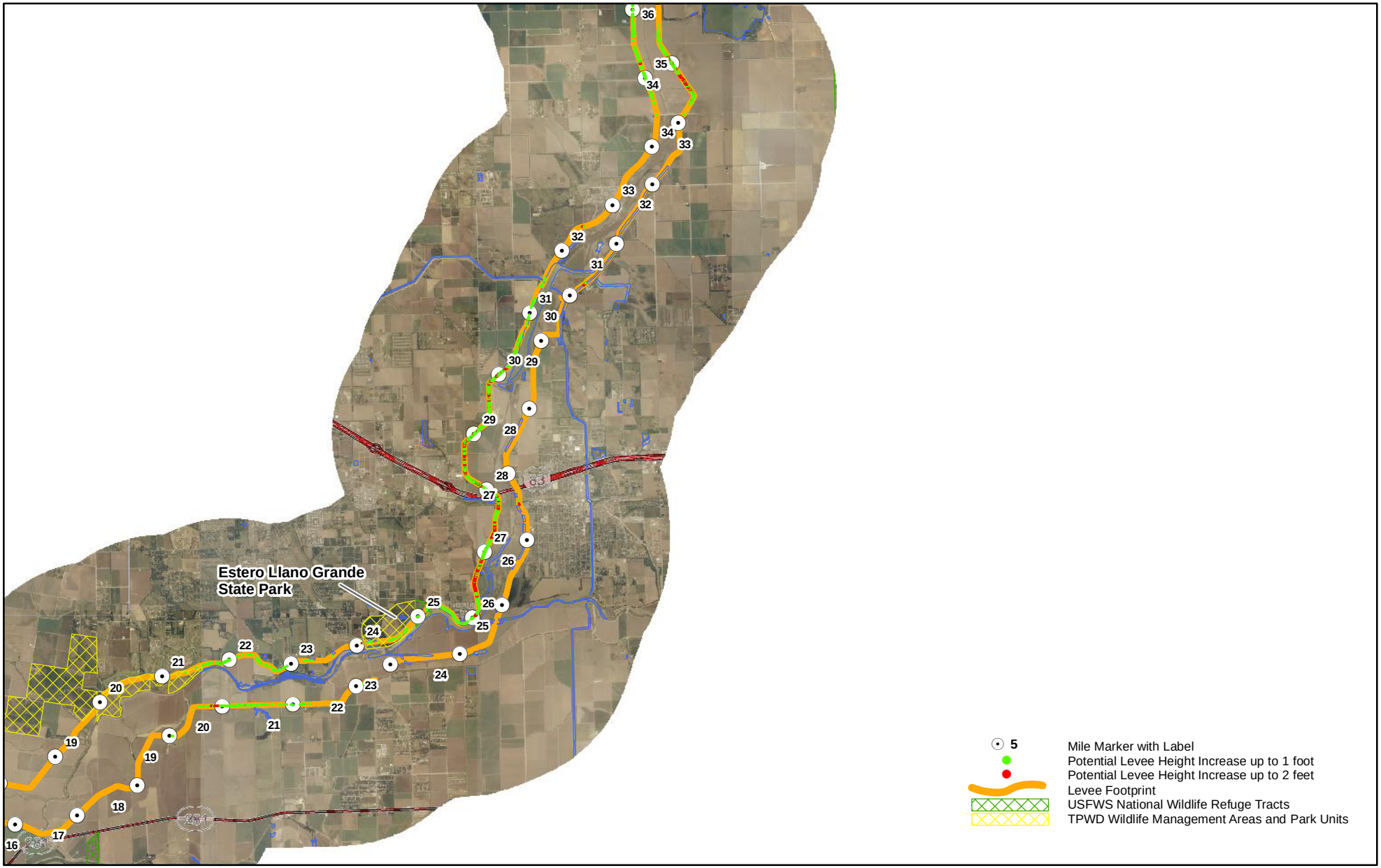


Figure 2.2
Levee Miles 0 - 20

Main and North Floodways Levee System EA
International Boundary and Water Commission,
United States Section



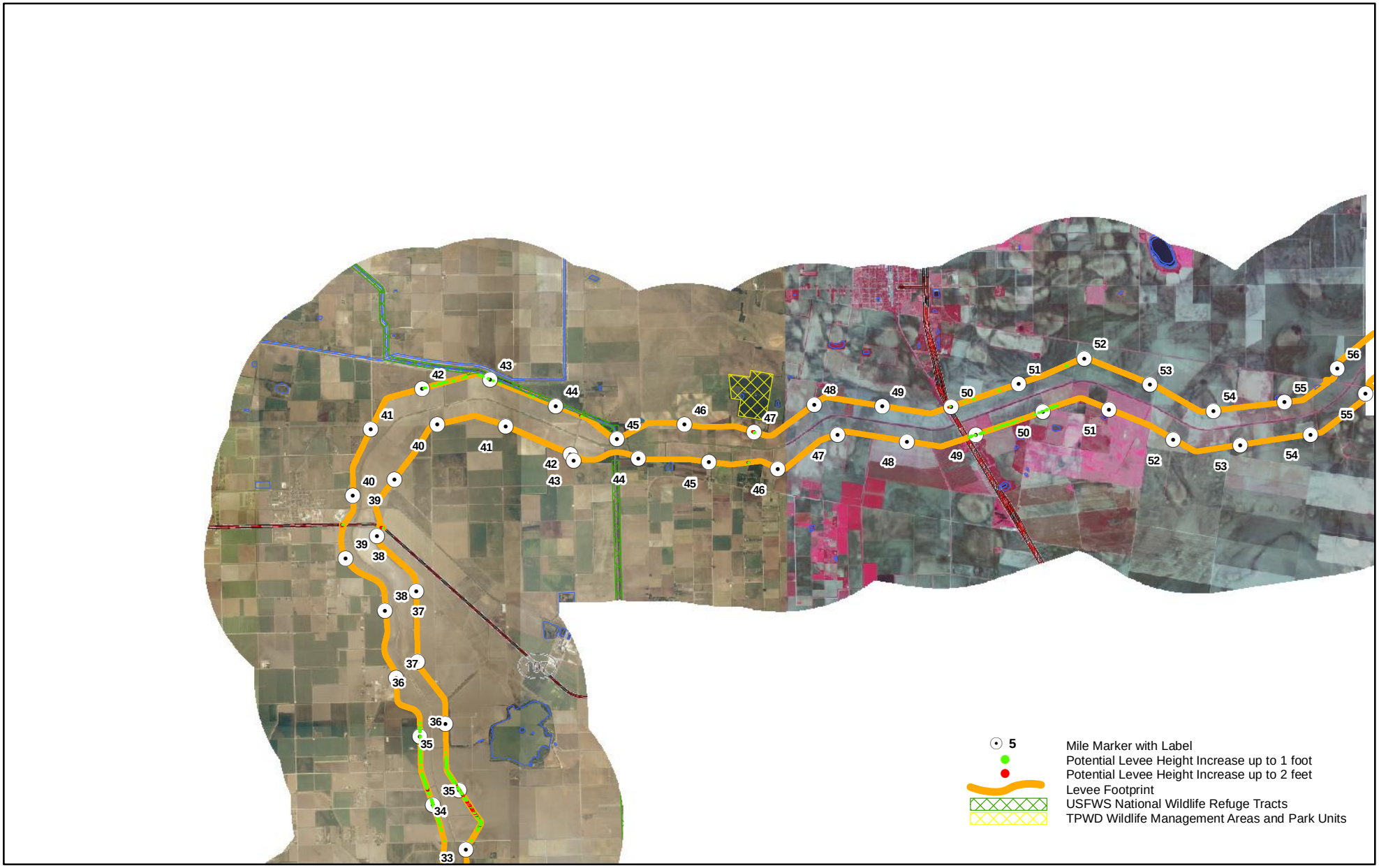
N

0 0.5 1 2 3 4 Miles

0 1.25 2.5 5 7.5 10 Kilometers

Figure 2.3
Levee Miles 20 - 36

Main and North Floodways Levee System EA
International Boundary and Water Commission,
United States Section



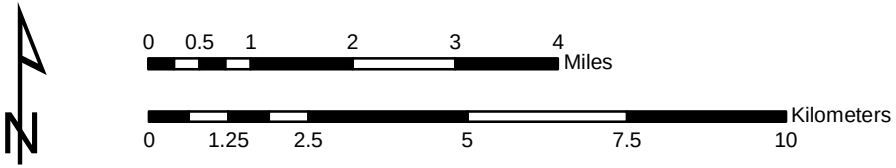
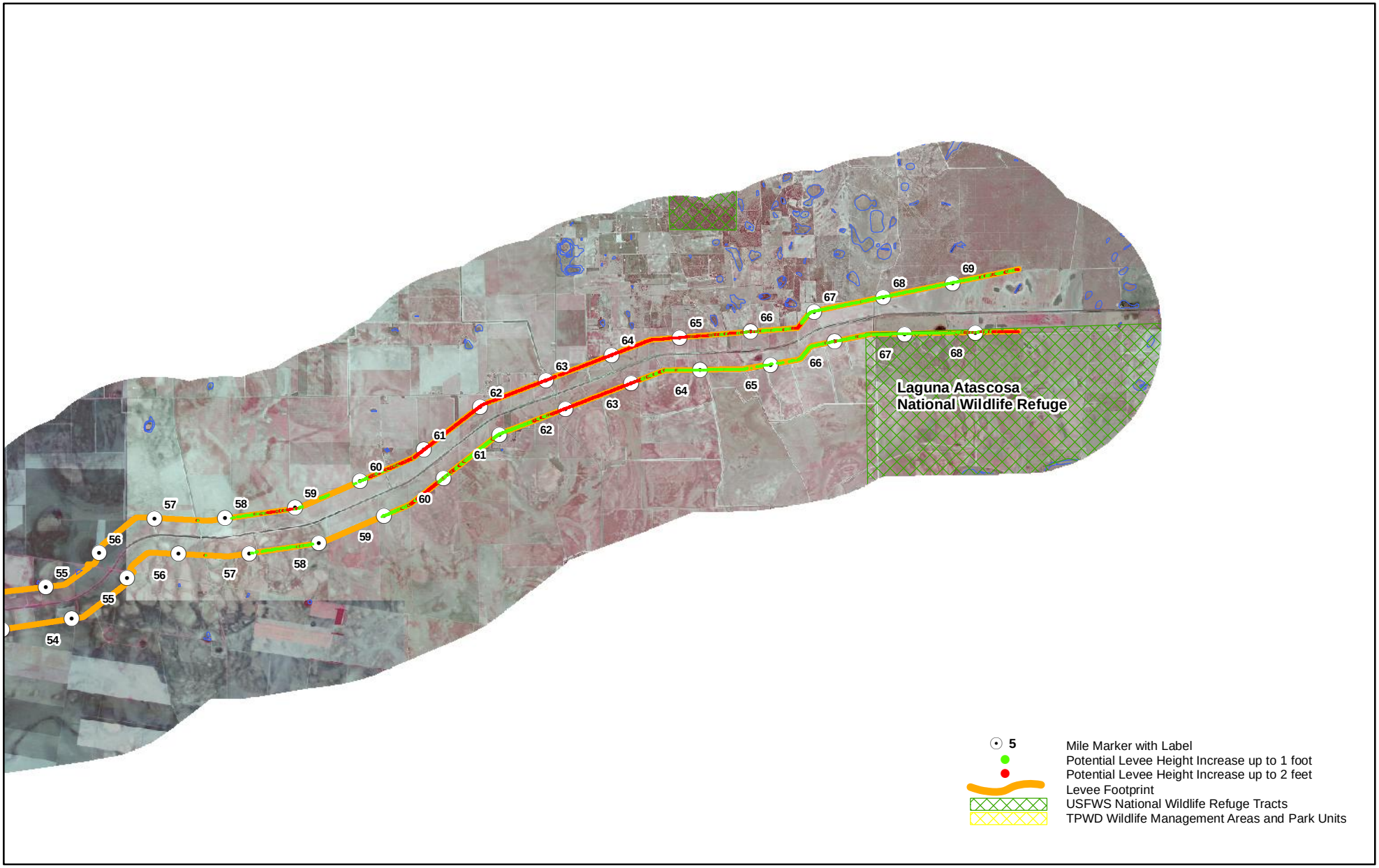


Figure 2.4
Levee Miles 36 - 57

Main and North Floodways Levee System EA
International Boundary and Water Commission,
United States Section



N

0 0.5 1 2 3 4 Miles

0 1.25 2.5 5 7.5 10 Kilometers

Figure 2.5
Levee Miles 55 - 69

Main and North Floodways Levee System EA
International Boundary and Water Commission,
United States Section

Footprint expansion, when required, would take place along the approximate 20-foot service corridor currently utilized for levee maintenance, inside the maintained floodway, and entirely within the flood control project ROW. In some instances, adjustment in levee slope would be made to eliminate the need for levee footprint expansion when required due to construction constraints or for protection of biological or cultural resources. Construction constraints include the presence of irrigation canals along some reaches of the levee system, or urban development in the immediate vicinity of the levee system. Residences are found along the exterior side of the North Levee adjacent to the levee toe. Levee improvement areas adjacent to natural conservation tracts will not require levee footprint expansion.

2.3 ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED STUDY

Levee expansion beyond current flood control project right-of-way was ruled out as a viable, or needed, option for levee improvements.

2.4 OTHER ACTIONS WITH POTENTIAL CUMULATIVE IMPACTS

Complete environmental impact analysis of the alternatives must consider cumulative impacts due to other actions. A cumulative impact, as defined by the Council on Environmental Quality (40 CFR 1508.7), is the "...impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts will be evaluated, regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

A cumulative impact definition in use by USFWS for Section 7 Endangered Species Act (ESA) consultations (50 CFR 402.14) is somewhat narrower in scope than the Council on Environmental Quality definition by only considering non-federal actions. Section 7 of the ESA defines a cumulative effect as "…an effect of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation."

The USIBWC reviewed a number of reasonably foreseeable actions with potential cumulative effects. Two projects were identified along the Main and North Floodway Levee Systems.

- Besides agricultural fields within the floodways, there are some fallow fields owned or managed by the TPWD. The agency has proposed a management plan using native grasses.

- The Arroyo Colorado Watershed Partnership, under the leadership of the Texas Commission on Environmental Quality (TCEQ) and Texas Sea Grant Program developed "*A Watershed Protection Plan for the Arroyo Colorado: Phase* I" (January 2007) that includes several elements, including many involving riparian and wetland preservation and restoration within the watershed in which the Main Floodway is located.

Subsection 4.7 provides an assessment of cumulative effects of these two projects, in conjunction with the Proposed Action.

2.5 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

2.5.1 No Action Alternative

The No Action Alternative would retain the current configuration of the Main and North Floodway Levee Systems with no impacts to biological and cultural resources, land use, community resources, or environmental health issues. In terms of flood protection, however, current containment capacity under the No Action Alternative may be insufficient to fully control flooding within the interior floodway system under severe storm events, with associated risks to personal safety and property.

2.5.2 Proposed Action

The proposed increase in levee height for improved flood protection in some cases would require extension of the levee footprint into the levee service corridor and removal of herbaceous vegetation. No impacts on biological resources are anticipated since footprint expansion areas will not take place along natural resources conservation areas. Similarly, cultural resources will not be impacted as those resources are either located outside the ROW or outside areas where levee footprint expansion will occur. All levee expansion, when required, would take place along the approximate 20-foot service corridor currently utilized for levee maintenance, inside the maintained floodway, and entirely within the flood control project ROW. No potential impacts on land use, community resources, or environmental health issues as a result of the levee improvement were identified. Table 2.1 summarizes the potential environmental consequences of the proposed improvements to the Main and North Floodway Levee Systems.

Table 2.1 Summary of Environmental Impacts of Proposed Improvements to the Main and North Floodways

Resource Area	Environmental Impacts
Biological Resources *(Subsection 4.1)*	Improvements to the levee system would include placement of fill material that would affect grassed areas at levee footprint expansion locations. All expansion would take place along the current levee service corridor, limiting vegetation removal to non-native grasslands; this grass cover is expected to be rapidly re-established after project completion. No significant effects are anticipated on wildlife habitat in the vicinity of the levee system, including potential habitat for threatened and endangered species. While approximately 17% of levee system is adjacent to natural resources conservation areas, only a small fraction would fall within levee improvement areas. In areas requiring levee footprint expansion, no woodland communities would be impacted; impacts on vegetation would be limited to non-native grasslands along the levee, of very limited value as wildlife habitat. No wetlands are located within the potential levee expansion area.
Cultural Resources *(Subsection 4.2)*	Levee improvements are not expected to adversely affect known archaeological or historical resources. Typically, placement of fill material over the existing levee would not expand levee footprint; where required, levee footprint expansion would take place within the service corridor currently used for levee maintenance. High-Probability Areas (HPA) identified along the levee system would be located outside the improvement areas. Most potential historic-age resources near the levee system are located outside of the floodway, and away from potential levee footprint expansion areas. Modifications to irrigation structures are not required.
Water Resources *(Subsection 4.3)*	Improvements to the Main and North Floodway Levee Systems 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 bodies.
Land Use *(Subsection 4.4)*	Footprint levee expansion, where required, would take place completely within the existing floodway and along the levee service corridor. No urban or agricultural lands would be affected. Impacts to natural resources conservation areas would be limited to non-native grassland areas.
Community Resources *(Subsection 4.5)*	In terms of socioeconomic resources, the influx of federal funds into Hidalgo, Cameron, and Willacy Counties from the levee improvement project would have a positive but minor local economic impact. The impact would be limited to the construction period, and represent less than 1% of the annual county employment, income and sales values. 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.
Environmental Health Issues *(Subsection 4.6)*	Estimated air emissions of five criteria pollutants during construction would be discontinuous and represent less than 1.1% of the annual emissions inventory of Hidalgo, Cameron, and Willacy Counties. 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. A database search indicated that no waste storage and disposal sites were within the proposed Main and North Floodway Levee Project area, and none would affect, or be affected, by the levee improvement project.

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 Main and North Floodway Levee Systems. 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

Regional Vegetation

The Lower Rio Grande Valley covers an approximate 150-mile segment of the Rio Grande that extends from Falcon Reservoir Dam to the river opening into the Gulf of Mexico. The Lower Rio Grande Valley is part of the Tamaulipan region of southern Texas and northeastern Mexico where multiple vegetation communities and warm average temperatures provide a highly diversified wildlife habitat. Annual rainfall in the area, ranging from 16 to 35 inches, increases from west to east. Monthly rainfall is lowest in January and February, and highest in May and June.

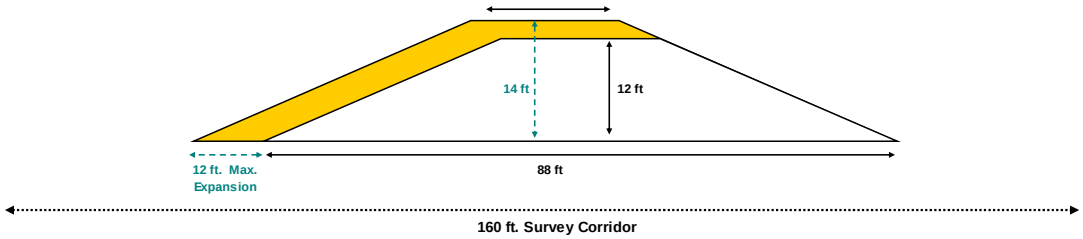
Thorn woodland is predominant in the Tamaulipan region where areas of shallow soil and rapid drainage generally support that type of vegetation. A few species of plants account for the bulk of the brush vegetation, including mesquite (*Prosopis* spp.), various species of acacia (*Acacia* spp.), desert hackberry (*Celtis pallida*), Mexican ash (*Fraxinus* berlandeieriana), cedar elm (*Ulmus crassifolia*), retama (*Parkinsonia aculeate*) javelina–brush (*Microrhamnus ericoides*), cenizo (*Atriplex canescens*), common bee-brush (*Lippia ligustrina*), Texas prickly pear (*Opuntia* spp.), and tasajillo or desert Christmas cactus (*Opuntia leptocaulis*). Parts of the region support grasslands of very diverse composition due to the highly variable soil and moisture conditions, while lines of riparian vegetation are present within the few river valleys (World Wildlife Fund 2001; Lonard, *et al*. 1991). Grassland vegetation was somewhat more extensive prior to the 19th century, but continuous grazing and other factors altered the plant communities (USIBWC 2003b).

Potential Levee Improvement Areas

Vegetation along the levee corridors of the Main and North Floodway Levee Systems were evaluated during field surveys conducted to identify plant communities, T&E species habitat, and potential jurisdictional wetlands, as listed below. Results of the field studies conducted in support of this EA preparation are reported in the document *Technical Support Studies for the Environmental Assessment of Flood Control Improvements to the Main and North Floodway Levee Systems* (Parsons 2007).

- January 15-16, 2007. Reconnaissance of the levee systems, with USIBWC personnel.
- March 1-3, 2007. Delineation of potential jurisdictional wetlands in the immediate vicinity of the levee construction areas along the levee system, and vegetation and habitat surveys.

Vegetation communities were determined within a 160-foot wide buffer centered on the levee centerline along the entire length of the levee to ensure coverage by field survey included the potential levee expansion areas. The 160-foot wide survey corridor includes 2,657 acres. The current levee footprint and maximum levee expansion area for levee height increases would account for 321 acres of herbaceous vegetation within the survey corridor. Potential levee footprint expansion area were determined from USIBWC levee evaluation data (USIBWC 2003a). Following the field mapping efforts, this expansion area was analyzed using GIS to determine vegetation community composition, based on vegetation mapping within the survey corridor. The 160-foot survey corridor and maximum potential levee expansion area are shown on following schematic cross section of a levee location where up to 2 feet of fill material would be added.



Vegetation classifications for the project area are adapted from Diamond (1993) and the 1996 National Vegetation Classification System in use by USFWS and TPWD. Vora (1990) provided some baseline vegetation community information typical of intact riparian forest habitat areas of the Lower Rio Grande. Additional information was provided by vegetation inventories in South Texas by Taylor, *et. al* (1994) and Everitt, *et al.* (2002). Vegetation communities were delineated from color infrared orthoimagery and field-verified using a global positioning system (GPS). Vegetation community maps were developed by interpreting and delineating recent (2004) 1-meter (m) color infrared aerial photography.

Based on literature review and field surveys, the following four vegetation community classifications were identified as occurring within the project area: a) Woodlands/Thornscrub; b) Herbaceous; c) Wetlands/Riparian communities; and d) Agricultural, as described below. In addition to these four plant communities, open waters were also mapped, and developed areas were mapped, including roads, urban areas, and other impervious cover.

Woodlands / Thornscrub

- *Mesquite - Acacia Woodland* – This woodland occurs over moderately to poorly drained soil, primarily in the south Texas Plains and the Coastal Prairie. It is a natural disturbance type of river floodplains and depressions that may succeed to Sugarberry (*Celtis laevigata*) dominated forest, especially on floodplains of major streams. It is an even more widespread anthropogenic disturbance community, with introduced woody species such as Retama (*Parkinsonia aculeata*) and possibly Chinese tallow (*Sapium sebiferum*). In wet areas, Sweet acacia (*Acacia farnesiana*) often forms nearly pure stands or occurs as scattered individuals within a matrix of weedy grasses during the course of secondary succession. This woodland may grade into Black-brush (*Acacia rigidula*) or Guajillo (*Acacia berlandieri*) shrublands in south Texas and Little bluestem (*Schizachyrium scoparium*) grasslands in the Coastal Prairie. More open areas are often actively maintained as rangeland, especially toward the end of the levee system adjacent to the southern portions of the King Ranch.

- *Coastal Sandplain Thornscrub* – This open woodland community occurs over well drained soil, toward the north and east of the project area, adjacent to the King Ranch boundary. Black-brush (*Acacia rigidula*) or Guajillo (*Acacia berlandieri*) shrublands are interrupted by grasslands composed of Little bluestem (*Schizachyrium scoparium*) and other grasses that tolerate saline conditions and well drained sandy soil. Oak mottes also occur throughout the area.

Herbaceous

- *Buffelgrass – Dominant Grassland* – This herbaceous community occupies levee slopes and open grassland area, and is dominated by non-native Buffelgrass (*Cenchrus ciliaris*) and sand dropseed (*Sporobolus cryptandrus*). Other non-native plants present in the area and within the ROW include guineagrass (*Urochloa maxima*) and Russian thistle or tumbleweed (*Salsola kali*). Occurrences of grasses once found in the Cane Bluestem – False Rhodesgrass Grasslands include False rhodesgrass (*Chloris pluriflora*), Cane bluestem (*Bothriochloa barbinodis*), Buffalograss (*Buchloe dactyloides*), Curly mesquite (*Hilaria belangeri*), and Common speargrass (*Heteropogon contortus*). Woody species once common include Honey mesquite (*Prosopis glandulosa*), Sweet acacia (*Acacia farnesiana*), and Black-brush (*Acacia rigidula*).

Wetlands / Riparian Communities

- *Texas Ebony - Anacua Forest* – Occurs in wooded borrow sites, along undisturbed resacas, and in less disturbed areas near the Llano Grande Lake. An evergreen subtropical community once occurred as dense forests with 15-m canopies and large diameter subtropical trees. Remaining examples are described as having no clear dominance. Larger tree species (both in diameter and height) may include Texas ebony (*Pithecellobium ebano*), Anacua (*Ehretia anacua*), and Great leadtree (*Leucaena pulverulenta*). Snake eyes (*Phaulothamnus spinescens*), Haujillo (*Havardia pallens*), Spiny hackberry (*Celtis pallida*), Lotebush (*Ziziphus obtusifolia*), and Honey mesquite (*Prosopis glandulosa*) may occur as tall shrubs or small trees. Most of the former borrow areas within the project area are dominated by Black willow (*Salix nigra*),

Sweet acacia, and Retama. Former borrow areas characterized by infrequent flooding exhibit a stronger mesquite component.

- *Typha/Phragmites Emergent Wetlands (former materials borrow sites)* – Typically found on borrow sites and storm water collection areas. Often dominated by giant reed (*Phragmites* spp. or *Arundo donax*) or Cattail (*Typha* spp.) with a fringe of Sea-oxeye daisy *(Borrichia arborescens)*, and Spikerush (*Scirpus* spp.).
- *Drainage Ditches* – Irrigation ditches, mostly open vegetation, with emergent species such as Cattail, and occasional Honey mesquite.
- *Open Water* – Irrigation channels and flooded borrow pits; water depth exceeds 3 feet.

Agricultural

- *Active Agricultural Field* – Areas currently subject to cultivation of crops. Common crops include corn, cotton, and various garden crops.
- *Fallow Field* - Agricultural areas not currently under cultivation.

Table 3.1 lists acreage by plant community classes along the Main and North Floodway Levee Systems for the entire levee footprint expansion area. Herbaceous communities are predominant in the potential levee expansion area. Agricultural lands are primarily adjacent to the potential levee expansion area. Wetlands are discussed in Section 3.1.4.

3.1.2 Wildlife

Regional Wildlife

From a regional perspective, the proposed levee improvement area is located within the Lower Rio Grande Valley. The levee corridor is adjacent to various units of the LRGV National Wildlife Refuge. The wildlife refuge is a component of a multi-partner effort attempting to connect and protect blocks of habitat, known locally as a Wildlife Corridor (USFWS 2005). The Wildlife Corridor partnership includes USFWS, TPWD, National Audubon Society, The Nature Conservancy, and private owners, and extends over 25,000 acres within Hidalgo County. Additional blocks of habitat are located in Cameron, Willacy, and Starr Counties (USIBWC 2003b).

Common LRGV wildlife species include whitetail deer (*Odocoileus virginianus*), turkey (*Meleagris gallopavo*), javelina (*Pecari tajacu*), bobwhite quail (*Colinus virginianus*), scaled quail (*Callipepla squamata*), white-winged dove (*Zenaida asiatica*), mourning dove (*Zenaida macroura*), cottontail rabbit (*Sylvilagus floridanus*), jackrabbit (*Lepus californicus*), waterfowl, and a variety of nongame birds. The region also provides important wintering habitat for migratory birds, including many species of passerines, raptors, sandhill cranes (*Grus canadensis*), ducks, and geese. In addition to the more common wildlife species, a number of unique and rare animals occur in the region (World Wildlife Fund 2001). The distribution of many wildlife species is limited, either partially or entirely, to the Tamaulipan Biotic Province, and some are found exclusively within the LRGV.

Table 3.1 Acreages of Plant Communities along the Levee Systems

Vegetation Community	Acreage Along Levee System	
	160-Foot Wide Survey Corridor	Levee Footprint and Potential Expansion Area
Woodland / Thornscrub Communities		
Mesquite - Acacia Woodland	309.7	-
Mesquite – Acacia Savanna	135.7	-
Coastal Sand Plain Thornscrub	86.0	-
Total Woodland / Thornscrub	*531.4*	*0*
Herbaceous Community		
Buffelgrass Dominant Grassland	1026.6	320.8
Wetlands / Riparian Communities		
Texas Ebony – Anacua Forest	10.1	-
Typha / Phragmites Emergent	31.3	-
Drainage Ditches	8.1	-
Open Water	55.3	-
Total Wetlands / Riparian	*104.8*	*0*
Agricultural		
Active Agricultural	493.2	-
Fallow Agricultural	396.5	-
Total Agriculture	*889.7*	*0*
Developed / Impervious Cover		
Lined Canal	17.5	-
Road	12.7	1.1
Residential	56.5	-
Commercial / Industrial	17.6	-
Total Developed / Impervious Cover	*104.5*	*1.1*
TOTAL	**2657.0**	**321.9**

There are approximately 67 mammals of potential occurrence in the LRGV, including federally listed species, such as the jaguarundi (*Felis yagouaroundi cacomitli*) and ocelot (*Felis pardalis*). The mammals are dominated by rodents (24 species) and bats (13 species). Some common mammals which may be encountered in the LRGV are the common raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), Mexican ground squirrel (*Spermophilus mexicanus*), and the bobcat (*Felis rufus*), beaver (*Castor canadensisis*), and nutria (*Myocastor coypus*) (USIBWC 2003b).

There are approximately 500 species of birds that potentially occur in the LRGV. The dominant numbers of bird species are represented by wood warblers (44 species), geese and ducks (30 species), sparrows and towhees (26 species), raptors (25 species), and tyrant flycatchers (25 species). Many species pass through the LRGV on their way to summer breeding or wintering grounds because of the convergence of the Central and Mississippi Flyways. The LRGV is the point where many tropical birds reach their northernmost ranges (Fermata 2003).

Amphibians and reptiles are also well represented in the LRGV, with approximately 76 species that potentially occur in Hidalgo County. The reptiles consist of snakes (29 species), lizards (19 species), turtles (six species), and one crocodile. The amphibians consist of frogs and toads (18 species) and salamanders (three species) (USIBWC 2003b).

Levee System Corridor

High quality wildlife habitat in the Main and North Floodway Levee Systems survey corridor was found primarily in tracts of the USFWS national wildlife refuge system and TPWD wildlife management areas and Estero Llano Grande State Park. Plant communities considered high quality habitat include thorn woodlands and wetlands/riparian areas. Grassland habitat and former agricultural sites are dominated by non-native species (primarily buffelgrass), and in some areas of the ROW, the non-native guineagrass and Russian thistle are present. The areas dominated by non-native species are considered low value habitat.

Within Estero Llano Grande State Park near the Main Floodway there is a grassy field on the interior side of the levee. This is considered a high quality habitat because, in the past few years, scattered trees present are used for nesting by White-tailed kites (*Elanus caeruleus*). Viewing these nesting birds is a popular activity by park visitors in the spring.

3.1.3 Threatened and Endangered Species

Habitat requirements and life history for each federal and state-listed species potentially occurring along the Main and North Floodway Levee Systems corridor 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 (USFWS 2005). The TPWD compiles a list of federal and state-listed species and species of concern. The lists are organized by county (TPWD 2007). Appendix B lists federal and state-listed species potentially occurring within Cameron, Hidalgo, and Willacy Counties where the levee system is located. Twenty one species are federally listed as threatened or endangered, and 53 species are on state threatened and endangered species lists. In addition, there are four plant species designated as species of concern that may occur in the project area. A detailed analysis is provided in Section 5 of the Technical Support Studies Report prepared in conjunction with this EA (Parsons 2007).

3.1.4 Wetlands and Aquatic Habitat

A total of 52 individual wetland features were identified during field surveys, 24 of which were in the 160-foot wide survey corridor. Potential wetlands areas were initially identified using aerial photography, soil maps, and National Wetlands Inventory data. Specific wetlands delineations and analysis is provided in Section 4 of the Technical Support Studies Report prepared in conjunction with this EA (Parsons 2007). Table 3.2 lists wetland features identified within the survey corridor, along with a determination of potential jurisdictional waters. Non-jurisdictional wetlands within the survey corridor are described as “Non-jurisdictional water features” which are typically seasonally or temporarily flooded former borrow pits or artificial settling basins used for irrigation. The 24 wetlands identified within the 160-foot wide survey corridor are shown on Appendix A maps. Of these 24 wetlands only six wetlands may be considered jurisdictional (Wetlands B, C, D, E, G, and M) because of their obvious association with resaca features, and account for 18.2 acres within the 160-foot wide survey corridor.

Table 3.2 Wetlands within Main and North Floodway Levee ROW

Wetlands I.D.	Description	Determination as Potentially Jurisdictional	Acreage Within:	
			Survey Corridor	Potential Expansion Area
A	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	18.0	0.0
B	Resaca feature, temporarily flooded, emergent, non-forested with a forested fringe	*Potential jurisdictional wetlands (Regulated under Section 404 of CWA)*	2.7	0.0
C	Resaca feature, temporarily flooded, emergent, non-forested with a forested fringe	*Potential jurisdictional wetlands (Regulated under Section 404 of CWA)*	7.2	0.0
D	Resaca feature, temporarily flooded, emergent, non-forested with a forested fringe	*Potential jurisdictional wetlands (Regulated under Section 404 of CWA)*	1.6	0.0
E	Temporarily flooded, emergent non-forested, with a forested fringe	*Potential jurisdictional wetlands (Regulated under Section 404 of CWA)*	1.0	0.0
F	Temporarily flooded, emergent non-forested	Non-jurisdictional water body, associated with borrow sites	6.0	0.0
G	Resaca feature, temporarily flooded, emergent non-forested	*Potential jurisdictional wetlands (Regulated under Section 404 of CWA)*	0.7	0.0
H	Temporarily Flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	1.0	0.0
I	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	12.0	0.0
J	Temporarily Flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	1.2	0.0
K	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	24.0	0.0
L	Temporarily Flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	8.4	0.0
M	Resaca feature, temporarily flooded, emergent, non-forested	*Potential jurisdictional wetlands (Regulated under Section 404 of CWA)*	5.0	0.0
N	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	0.7	0.0
O	Resaca feature	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	0.7	0.0
P	Resaca feature	Non Jurisdictional wetlands. Water intake into settling basin is artificial (via mechanical pumps).	0.7	0.0
Q	Resaca feature	Non Jurisdictional wetlands. Water intake into settling basin is artificial (via pumps).	2.2	0.0
R	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	3.7	0.0

Wetlands I.D.	Description	Determination as Potentially Jurisdictional	Acreage Within:	
			Survey Corridor	Potential Expansion Area
S	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	1.2	0.0
T	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	1.8	0.0
U	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	3.8	0.0
V	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	0.6	0.0
W	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	0.1	0.0
X	Temporarily flooded, emergent non-forested	Non jurisdictional water feature. Excavated borrow pit not in existence prior to levee construction	0.5	0.0
		Total Potential Jurisdictional Wetlands	*18.2*	*0.0*
		Total Wetlands and Water Body Features	*104.8*	*0.0*

3.2 CULTURAL RESOURCES

The proposed project lies within the Los Caminos del Rio Heritage Project corridor, an area of regional, national, and international prehistoric, historic, and architectural significance (Sánchez 1994). The corridor is located along the lower Rio Grande and lies entirely within Terminal Pleistocene and Holocene fluvial deposits of a wide delta plain. This plain extends from Los Ebanos to the Gulf of Mexico, a distance of approximately 180 miles (Cooper, *et al*. 2002: Figure 16). This delta plain is dominated by deposits of silt and sand, while deposits within old meander loops are dominated by mud (Brewton, *et al*. 1976).

Surface landforms within the delta plain are characterized by meandering tributary channels, crevasse splays and inter-tributary basins. These landforms are believed to be no older than 4,500 years before present based on radiocarbon dates from a proposed terrace landform (Boyd, *et al*. 1994:82). The data are inconclusive, however, as Cooper, *et al*. (2002:86) suggest that the proposed terrace is in fact a natural levee feature located along an old meander loop of the river.

In some segments of the levee system fill material would be added to the existing levee to bring height to its original design specifications, or to meet a 2-foot freeboard design criterion. Typical height increases in improvement areas would be less than 1 foot and would not require expansion of the existing levee footprint. In some locations, up to 2 feet of fill material would be placed on top of the levee, extending levee footprint up to a maximum of 12 feet from the current toe of the levee. This expansion would take place along the approximate 20-foot service corridor currently utilized for levee maintenance, inside the maintained floodway, and

entirely within the flood control project ROW. Adjustment in levee slope would be made to eliminate the need for levee footprint expansion, when required due to engineering considerations or for protection of biological or cultural resources. The need for excavation outside the levee structure is not anticipated.

Appendix C (Exhibits A - Z) indicates locations of cultural resources in the vicinity of the Main and North Floodways Levee Systems. Figure 3.1 presents an index of detailed figures contained in Appendix C. The land area reviewed in this section consists of 80 feet on either side of the center line of the proposed improvement sections of levee sections and is referred to as the project study area. These areas extend slightly beyond the current ROW to include areas of potential cultural resources in the levee system vicinity, but beyond the current ROW and outside the construction area. A 1,000-m buffer was also placed around the project areas for the purposes of discussing previous archaeological resources studies.

3.2.1 Previous Cultural Resources Studies

Eight archeological resource surveys, six aerial and two linear, have been conducted, and one archeological site was recorded adjacent to the current project area. In 2007, Hicks & Company conducted a combination reconnaissance and systematic cultural resources investigation of 4.5 linear miles for the Hidalgo Protective Levee System Rehabilitation Project in Hidalgo County, Texas, on behalf of the USIBWC. No new archaeological sites were recorded during this survey (Texas Historic Sites Atlas [THSA] 2007). This survey bisects the southern levee approximately one-half mile in from the start of the western end of the southern levee. A linear survey also was conducted by the Federal Highway Administration in 1995 but no additional information is available from the THSA. It bisects the northern levee between project miles five and six, and the southern levee at project mile two. Site 41HG30 is a previously recorded multi-component site which lies on the floodway side of the southern levee between project miles four and five. The site contained flint flakes, fresh water mussel shell fragments, bone, chunk burned clay, a tooth fragment, glazed Mexican pottery, glass fragments and additional material. Extensive testing was recommended for this site. An aerial survey was also done in 1972 by THSA around site 41HG30 but no additional information is available (THSA 2007).

An aerial survey was done in 1998 by the USIBWC around the Llano Grande Golf Course, on both sides of Llano Grande Lake, which lies southwest of the town of Mercedes. The survey was done in the floodway between the levees. No additional information is available (THSA 2007). Another survey also was conducted northwest of the town of Mercedes on the north side of U.S. Highway 83 and on the exterior side of the southern levee in 2002. This survey was done by CEI, Inc. for the USDA.

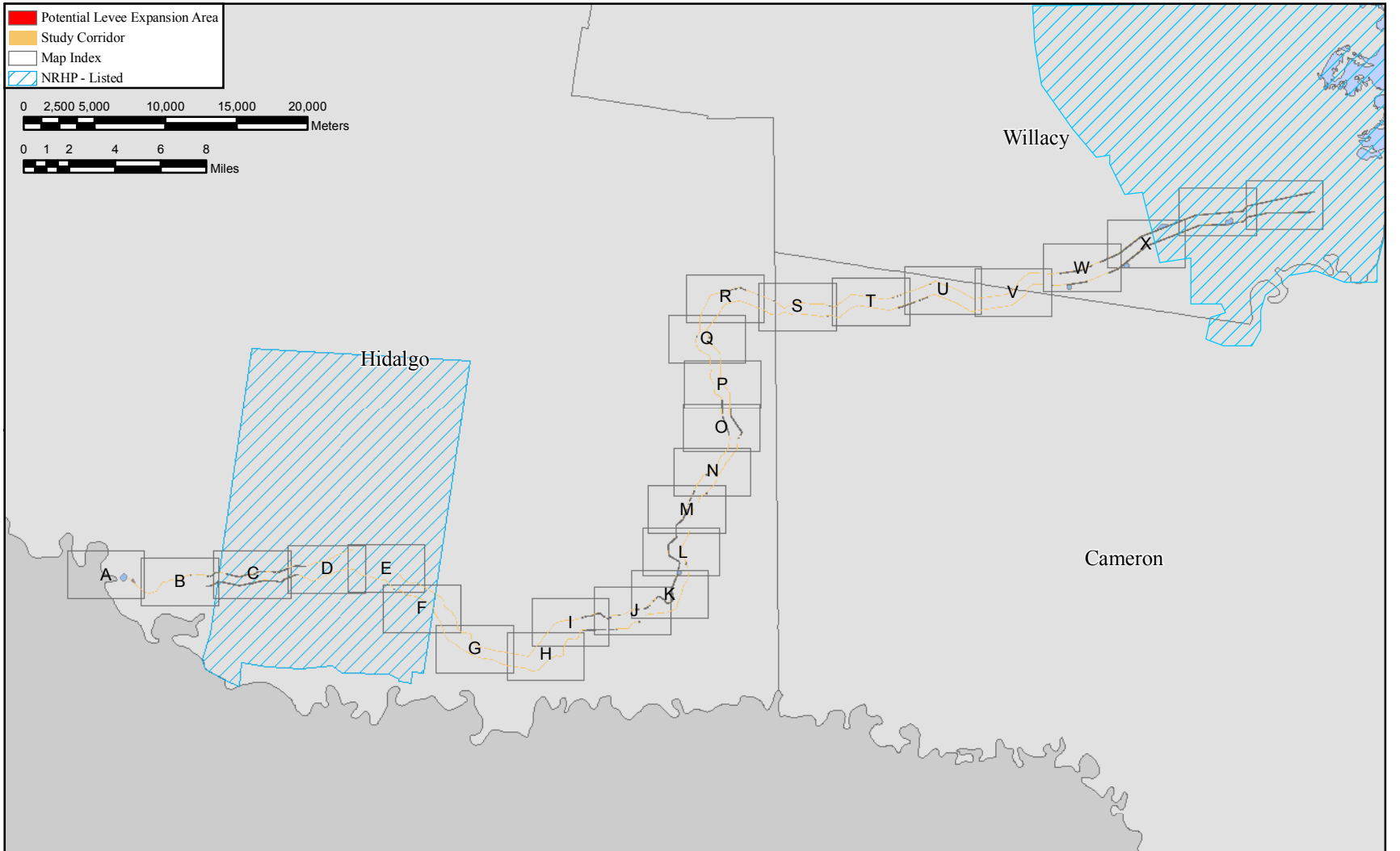
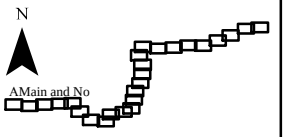


Figure 3.1 Index of detailed cultural resources maps along the Study Corridor provided in Appendix C

.

Basemap Source: USGS 7.5 minute series topographic maps, Donna, Edcouch, Hawk Island, Laleona, Mercedes, Mission, Pasoreal, Pharr, Progreso, San Juan, Santarosa, and Willamar SW.



A linear archeological survey was done by Blanton and Associates of the AEP-LCRA North Pharr to Harlingen Substation Transmission Line Rebuild Project in 2004. The survey extended 25.8 kilometers and 109 shovel tests were executed (THSA 2007). Although one prehistoric site was identified, it was deemed not eligible and is far outside of the project area. This survey bisects the north and south levees just past project mile 34. Two additional surveys, one aerial and one linear, were also conducted by Prewitt and Associates in 1981. Only historic materials from eighteenth century ranches were recovered but the natural topographic features in the area were identified as important to the selection of campsites by prehistoric peoples (THSA 2007). The aerial survey is on the exterior side of the north levee between project mile 34 and 35. The linear survey starts at project mile 35 and runs more or less parallel with the north levee to project mile 41.

More recently, previous archival research and a cultural resources assessment was conducted to determine the potential for archaeological sites along the 180-mile length of the LRGFCP, of which the current Main and North Floodway Levee Systems project is a part (Cooper, *et al.* 2002). The study was commissioned by the USIBWC to evaluate potential impacts of changes in vegetation management in the LRGFCP. Cooper, *et al.* (2002) identified 17 areas as having a high potential to contain cultural resources within the Main and North Floodway Levee Systems project areas, as defined at that time. The areas were designated as High Probability Areas (HPA) (Cooper, *et al.* 2002). Of the 17 HPAs within the interior floodway, only four are adjacent to these levee improvement areas (Table 3.3).

A cultural resources evaluation of the specific Main and North Floodway Levee Systems improvement sections was conducted in support of the EA preparation (Sundermeyer, *et al.* 2007). The evaluation included research from online and archival sources, as well as published reports to supplement previous research by Cooper, *et al.* (2002). Appendix C indicates locations of HPAs and other archaeological resources identified within the study corridor. The full text of the cultural resources evaluation is presented in Appendix E (*attached CD-ROM*).

3.2.2 Historic and Prehistoric Archaeological Resources

Previous studies in the form of archival research and a cultural resources assessment were conducted to determine the potential for archaeological sites along the 180-mile length of the LRGFCP (Cooper, *et al*. 2002). Seven archaeological sites were recorded within the 1,000-foot archaeological buffer adjacent to the current project corridor (Appendix C, Exhibits A-Z). Only one site, however, is adjacent to a proposed expansion area. Site 41HG30 was recorded in 1972 as a prehistoric open camp containing approximately 40 chert flakes, faunal materials in the form of bone and mussel shell, burned clay, and a single ceramic sherd. The site was recommended for further testing.

In addition to the previously recorded archaeological sites and HPAs previously identified (see Cooper, *et al.* 2002: Appendix C, Exhibits A-Z), four new areas were identified as HPAs during the current research (Table 3.3). HPA 1 is recorded as an isolated remnant windmill on a low rise just west of the town of Mercedes. HPAs 2 through 4 are recorded as small playa lakes in the eastern portion of the project area. Similar clay-lined lakes are

ubiquitous in the Southern High Plains and are testaments to prehistoric human occupation in the region. These areas should be considered during the planning phase for levee rehabilitation.

Table 3.3 Known Archaeological Resources and HPAs Identified Within or Near the Study Corridor

Resource Type	Previous Designation (reference)	Primary Source (year)	Description*	Within Study Corridor**	Resource Number	App. C Map Key	Project Mile Marker
HPA	16MI1 (Cooper 2002:E-5)	USGS 1916	historic HPA	no	16MI1	A	0-1
HPA	16PH1 (Cooper 2002:E-7)	Cooper 2002:E-7	historic HPA	no	16PH1	E	11-12
HPA	16PH2 (Cooper 2002:E-7)	USGS 1916	historic HPA	no	16PH2	D	4-5
HPA	16PH3 (Cooper 2002:E-7)	USGS 1916	historic HPA	no	16PH3	D	4-5
HPA	16PH4 (Cooper 2002:E-7)	USGS 1916	historic HPA	no	16PH4	C	3-4
HPA	16PH5 (Cooper 2002:E-7)	USGS 1916	historic HPA	yes	16PH5	C	1, 2
HPA	31SR1 (Cooper 2002:E-7)	USGS 1931	historic HPA	no	31SR1	S	44-45
HPA	33SR1 (Cooper 2002:E-7)	USGS 1933	historic HPA	no	33SR1	U	50-51
HPA	33SR2 (Cooper 2002:B-19)	USGS 1923	historic HPA	yes	33SR2	S	45
Archaeo-logical site	41HG154 (Cooper 2002:E-4)	TARL	prehistoric	no	41HG154	S	44
Archaeo-logical site	41HG170 (Cooper 2002:E-4)	TARL	prehistoric	no	41HG170	J	23-24
Archaeo-logical site	41HG171 (Cooper 2002:E-4)	TARL	multi-component site	no	41HG171	N	33
Archaeo-logical site	41HG28 (Cooper 2002:E-5)	TARL	prehistoric-skeletal material	no	41HG28	O	33-34
Archaeo-logical site	41HG30	TASA 2007	prehistoric	yes	41HG30	D	4
HPA	N/A (Sundermeyer, *et al.* 2007)	N/A	former windmill site	yes	HPA 1	K	27
HPA	N/A (Sundermeyer, *et al.* 2007)	N/A	prehistoric HPA	yes	HPA 2	W	56
HPA	N/A (Sundermeyer, *et al.* 2007)	N/A	prehistoric HPA	yes	HPA 3	X	59
HPA	N/A (Sundermeyer, *et al.* 2007)	Hawker 1926	historic HPA	yes	HPA 4	Y	64
Archaeological site	ISI (Cooper 2002:E-4)	TARL	prehistoric	no	ISI	K	26-27
Archaeological site/ transportation	NF4/TB2 (Cooper 2002:E-7)	N/A	prehistoric lithic scatter /wooden rail-road bridge	yes	NF4/TB2	Q	40
HPA	NF5 (Cooper 2002:E-7)	N/A	historic HPA	yes	NF5	T	48

* *Description is based on field inspection of the resource during reconnaissance conducted in support of the EA preparation (Sundermeyer, et al. 2007).*

** *The study corridor is a 160-foot-wide area centered on the current levee.*

3.2.3 Historic-age Resources

Previous research was conducted to determine if historic-age buildings and structures are known to be present along the LRGFCP (Cooper, *et al*. 2002). Two structures or groups of structures were identified as occurring within the current project area (Table 3.3). These potential sites are 16PH5 (Cooper, *et al.* 2002:E-7), the site of historic structures that appeared on the Pharr 1916 USGS quadrangle (Appendix C, Exhibit C); and 33SR2 (Cooper, *et al*. 2002:B-19), the location of structures that appeared on the Santa Rosa 1933 USGS quadrangle (Appendix C, Exhibit S).

More recent investigations conducted in preparation of this EA indicate other historic-age resources exist within the project ROW (Sundermeyer, *et al*. 2007). These resources are engineering elements of the Main and North Floodway Levee Systems, and residential and agricultural structures located along the floodway. The engineering structures include above- and below-ground canals, elevated ditches, concrete dams, standpipes, other drainage and irrigation-related structures, and 95 weir gates (Sundermeyer, *et al.* 2007). Additional historic-age structures were identified on 1934 aerial photographs (IBC 1934) and on historic soil survey maps (Hawker, *et al.* 1925; Beck, *et al*. 1923; and Hawker, *et al*. 1926) located in the Special Collections of The University of Texas Pan American. Other historic-age structures were identified during the field investigations. These are residential, transportation-related, recreational, industrial, and agricultural structures or complexes located immediately outside of the ROW. A limited field reconnaissance indicates that approximately 11 of these structures or structure complexes are extant. The locations of these historic-age resources are depicted on Exhibits A through Z in Appendix C and listed in Table 3.4. The resources are numbered as follows: a number followed by the letter "N" indicates that the resources is located on the northern levee; the letter "S" indicates location along the southern levee; and the letter "B" indicates that the resource extends through both levees.

In addition to the historic-age resources identified, the project area extends through two areas listed on the National Register of Historic Places (NRHP). As nominated, the Louisiana-Rio Grande Canal Company Irrigation System (LRGCC) is composed of the first-lift pump house (the Hidalgo Irrigation Pump Plant, adjacent to the intake canal on the Rio Grande), the second-lift pump house (about 7 miles northeast, near McAllen), and the above- and below-ground canal system (Weitze 1992). Several of the above- and below-ground elements of the irrigation system are within the project corridor, and are itemized in Table 3.4. The second NRHP-listed area is the King Ranch (THSA 2007), which includes among its vast boundaries the easternmost portion of the project area (Appendix C, Exhibits X-Z). No reconnaissance-level field survey of historic-age resources within the project area has been completed. Topographic and aerial maps indicated, however, that no historic-age resources are likely to be present within that reach of the project area.

3.2.4 Cemeteries

Two cemeteries were identified as occurring adjacent but outside the USIBWC ROW (Sundermeyer, *et al.* 2007): the Tanquesitos Cemetery, possibly associated with Tres Norias

Ranch (Exhibit X of Appendix C, Resource Number 27N), and the Sabino Cemetery with an unknown association (Exhibit Y of Appendix C, Resource Number 39N).

Table 3.4 Historic-age Resources Identified Within the Study Corridor

Resource Type	Previous Designation (reference)	Primary Source (year)	Description*	Resource Number	App. C Map Key	Project Mile Marker
Irrigation Structures						
irrigation and levee structures	N/A (Sundermeyer *et al.* 2007)	USIBWC 2004	weir gate	1N/S	various	22
irrigation structure	Lower Rio Grande Canal Company (LRGCC) (NR Number 95001284)	THSA 2007	McAllen Main Canal	3B	C	5
irrigation structure	LRGCC (NR Number 95001284)	THSA 2007	Pharr-San Juan Main Canal	5B	C	6
irrigation structure	LRGCC (NR Number 95001284)	THSA 2007	unlined canal	6N	D	8
levee structure	N/A (Sundermeyer *et al.* 2007)	N/A	unlined canal	9N	J	24
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	lined canal	14N	L	28
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	unlined canal	15N	N	31
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	pump	16N	O	34
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	canal and pump	17N	O	34
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	canal and pump	18N	R	42
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	pump	19N	R	42
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	elevated ditch	20N	R	43
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	pump	25N	X	63
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	unlined canal	26B	X	63
irrigation structure	LRGCC (NR Number 95001284)	THSA 2007	unlined canal	29S	C	3
irrigation structure	LRGCC (NR Number 95001284)	THSA 2007	concrete dam	30S	C	3
irrigation structures	LRGCC (NR Number 95001284)	THSA 2007	concrete dams	31S	C	3
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	elevated ditch	32S	J	20
irrigation structure	N/A (Sundermeyer *et al.* 2007)	USIBWC 2004	standpipe	33S	J	20
irrigation structure	N/A (Sundermeyer *et al.* 2007)	N/A	unlined canal	34S	J	21

Resource Type	Previous Designation (reference)	Primary Source (year)	Description*	Resource Number	App. C Map Key	Project Mile Marker
irrigation structure	N/A (Sundermeyer *et al*. 2007)	USIBWC 2004	standpipe	35S	J	21
irrigation structure	N/A (Sundermeyer *et al*. 2007)	N/A	standpipe	36S	J	21
Other Engineering Structures						
levee	N/A (Sundermeyer *et al*. 2007)	N/A	North Flood-way Levee	41S	all	all
levee	N/A (Sundermeyer *et al*. 2007)	N/A	South Flood-way Levee	42S	all	all
levee structure	N/A (Sundermeyer *et al*. 2007)	N/A	unlined drainage	23N	W	60
utility structure	N/A (Sundermeyer *et al*. 2007)	N/A	concrete utility structure	10N	K	26
historic-age transportation	N/A (Sundermeyer *et al*. 2007)	N/A	railroad trestle	13B	L	27
transportation	N/A (Sundermeyer *et al*. 2007)	N/A	concrete bridge	21N	R	43
transportation	N/A (Sundermeyer *et al*. 2007)	N/A	concrete bridge	22N	S	44
transportation	N/A (Sundermeyer *et al*. 2007)	N/A	concrete rail-road trestle	37S	T	48
Residential, Agricultural, Industrial						
historic-age residential	N/A (Sundermeyer *et al*. 2007)	IBC 1934	historic-age houses	2N	A	1
historic-age residential	N/A (Sundermeyer *et al*. 2007)	IBC 1934	historic-age houses	4N	C	6
historic-age residential	N/A (Sundermeyer *et al*. 2007)	N/A	historic-age houses	38S	W	56
historic-age agricultural	N/A (Sundermeyer *et al*. 2007)	N/A	farmstead	7N	I	21
historic-age agricultural	N/A (Sundermeyer *et al*. 2007)	N/A	farmstead	8N	J	22
historic-age agricultural	N/A (Sundermeyer *et al*. 2007)	Hawker 1926	Santa Monica	24N	X	63
historic-age agricultural	N/A (Sundermeyer *et al*. 2007)	Hawker 1926	Tres Norias Ranch	40S	X	61
historic agricultural landscape	King Ranch (NR Number 66000820)	TASA 2007	King Ranch Fence	28B	Z	67
historic-age industrial	N/A (Sundermeyer *et al*. 2007)	N/A	industrial complex	11N	K	26
historic-age recreational	N/A (Sundermeyer *et al*. 2007)	N/A	golf course	12N	K	26

* *Description is based on field inspection of the resource during reconnaissance conducted in support of the EA preparation (Sundermeyer* et al. *2007).*

*** The study corridor is a 160-foot-wide area centered on the current levee.*

3.3 WATER RESOURCES

3.3.1 Regional Flood Control

Lower Rio Grande Flood Control Project

In 1932 an agreement was reached between the United States and Mexico to develop a coordinated plan for an international project to protect the Lower Rio Grande Valley against flooding from the Rio Grande in both countries. This agreement, which later resulted in the Lower Rio Grande Flood Control Project, was developed by the IBWC. The USIBWC and MxIBWC are each responsible for meeting treaty obligations within their national boundaries.

The LRGFCP is designed for flood protection of urban, suburban, and highly developed irrigated farm lands in the Rio Grande delta in both countries. The LRGFCP flood levees are grass-covered earthen structures, with a distance between the United States and Mexican levees ranging from approximately 400 feet to 3 miles (USIBWC 1992). The LRGFCP is jointly operated by the USIBWC and MxIBWC to convey excess floodwaters of the Rio Grande to the Gulf of Mexico through the river and United States and Mexican interior floodways.

The LRGFCP facilities on the United States side are located in Hidalgo, Cameron, and Willacy Counties, Texas, with the river levee beginning near the Town of Peñitas at the head of the delta, about 180 river miles from the Gulf of Mexico. The United States interior floodway system is flanked by 168 miles of levees covering the natural channel of the Arroyo Colorado, and 102 miles of levees along the Rio Grande (USIBWC 1980).

The LRGFCP includes the Anzalduas Diversion Dam, completed in 1960, and the Retamal Diversion Dam, completed in 1973. Joint ownership of Anzalduas and Retamal Dams is a responsibility of the United States and Mexico via the USIBWC, and MxIBWC. Operation and maintenance is shared equally between both countries.

The design flood for the LRGFCP is based on a peak flow of 250,000 cubic feet per second (cfs) at Rio Grande City, which attenuates to 235,000 cfs at Peñitas. During the design flood, Anzalduas Diversion Dam and Retamal Diversion Dam would each divert 105,000 cfs into the United States and Mexico, respectively. Flow diversion during the design flood would limit flood flows through the Brownsville-Matamoros area to 20,000 cfs. The USIBWC and MxIBWC coordinate operation of these dams to ensure both dams divert equal flows into the respective countries during significant flood events.

Anzalduas Dam diverts floodwaters to the interior floodway system, located in Hidalgo, Cameron, and Willacy counties. This system allows for the passage of 105,000 cfs in the Main Floodway, 84,000 cfs in the North Floodway, and 21,000 cfs in the Arroyo Colorado. With the exception of one area in Arroyo Colorado and two areas in the North Floodway, the Off-River Floodway System passes the design flood flows with a minimum of two feet freeboard.

Main Floodway Levee System

The USIBWC rectified the pilot channel of the Main Floodway during the 1930s and 1940s. Today the pilot channel of the Main Floodway component of the Arroyo Colorado

originates west of the City of Mission near Farm-to-Market (FM) 2062 where it first receives stormwater runoff and irrigation return flows. It is also near the headwaters of the Main Floodway and floodwaters from the Rio Grande are diverted at Anzalduas Dam through natural and manmade features, known as the Banker Floodway, to the Main Floodway (TWC 1990, as cited in TPWD 2006a). The Main Floodway diverges into the North Floodway and the Arroyo Colorado near the town of Mercedes, Texas.

The Main Floodway Levee is approximately 29 levee miles long. The levee ROW runs primarily through agricultural areas, except in the upper and lower reaches where the levee runs through the Cities of McAllen, Weslaco, and Mercedes. Numerous irrigation canals intersect the exterior side of the levee. The following irrigation districts are located in Hidalgo County: McAllen, San Juan, Donna, Progreso, and Mercedes.

North Floodway Levee System

The North Floodway is approximately 46 levee miles long, extending from near the Town of Mercedes to the Laguna Madre northwest of Arroyo City. The levee ROW runs primarily through agricultural areas, except in the upper reaches where the levee runs through the Cities of Weslaco and Mercedes. Numerous irrigation canals intersect the exterior side of the levee at the following irrigation district in Cameron County: La Feria; Adams Garden; and Harlingen.

Sections of the Main and North Floodway Levee System currently do not meet design criteria for the design flood event. The need for improvements to the 75-mile levee system and current levee elevation data was generated during the levee structural condition study conducted in October 2003 by the USIBWC. Water flood elevations were obtained from hydraulic model results. A 2-foot freeboard value is the design criterion for the Main Floodway Levee System. At some locations, the current levee elevation would not meet this freeboard requirement (USIBWC 2003a).

Structural Condition

The USIBWC commissioned the USACE Engineer Research and Development Center to assess structural integrity of the entire LRGFCP levee system. The study indicated that the overall structural condition of the Main and North Floodway levees fell in the good and adequate categories (USACE 2003); a need for structural improvements is not anticipated.

3.3.2 Water Flow

Flow of the Rio Grande is highly variable and tightly managed. Along the LRGFCP, the flow is dictated by the needs of agriculture and crop watering schedules. Low water flow conditions characterize the river, with minimum values from September to February. Severely reduced flows occur, frequently due to increased water demands from a growing urban and industrial population, reduced riparian habitat and ground cover, proliferation of exotic aquatic vegetation, and recent drought conditions. Rio Grande water is currently fully allocated, with agricultural use constituting 82 to 90 percent of the water in the LRGV (USIBWC 2003b).

Two other factors that impact flow in the Rio Grande are water storage and storms. There are two large international reservoirs on the lower Rio Grande: International Amistad Reservoir, near Del Rio, Texas, and International Falcon Reservoir, near Zapata, Texas. These reservoirs store water for agricultural use, public water supply, and recreational activities, and provide storage capacity for control of floods. Storm water is managed by 270 miles of levees that channel flow into and out of diversions and floodways. During non-flood conditions, irrigation/municipal water and local drainage flow into the floodways through irrigation and drainage structures.

The Main Floodway flows into Llano Grande Lake, a shallow depression located southwest of the City of Mercedes in southeast Hidalgo County, and divides into the North Floodway and the Arroyo Colorado. The North Floodway was constructed by the USIBWC in 1942 as part of the Lower Rio Grande Flood Control Project. The North Floodway separates from the Llano Grande Lake at its northern end. The North Floodway drains the vast majority of Willacy County, a significant portion of northern and eastern Hidalgo County, and a small portion of northwestern Cameron County. The North Floodway empties into the Laguna Madre north of the dredged Arroyo Colorado mouth. The North Floodway has a high channel bottom and therefore does not receive any flow from Llano Grande except during flood conditions. The flood control features at this site are used to divert a significant portion of flood waters conveyed by the Main Floodway to the North Floodway during flood events. The Arroyo Colorado downstream of Llano Grande can carry a maximum flow of 595 cfs, while the North Floodway can carry 84,000 cfs. When flow in the Arroyo Colorado exceeds 40 cfs, the flood waters are divided between the Arroyo Colorado and the North Floodway. The last time flood waters were diverted to the North Floodway was in 2005 during flooding associated with Hurricane Emily (TPWD 2006a).

Floodway overflows from the Rio Grande into the Main Floodway are rare (Allan Plummer Associates, Inc. 2006). Flows in the Main and North Floodways and the Arroyo Colorado are mostly wastewater discharges, irrigation return flows, storm water runoff, and base flows from shallow groundwater. Cities of McAllen and Mission discharge treated wastewater and runoff to the Mission Inlet where it enters the Main Floodway just south of McAllen. This system has six gated structures that are controlled by USIBWC. Treated wastewater from the Mercedes wastewater treatment plant is discharged into an unnamed drainage ditch that empties into the Arroyo Anacuitas which in turn discharges into the Arroyo Colorado above Tidal Segment No. 2202 (Allan Plummer Associates, Inc. 2006).

The Mercedes wastewater treatment plant discharges to Segment 2202-03 of the Arroyo Colorado Above Tidal, and eventually into Segment 2491 of the Laguna Madre Estuary. The 2006 Texas 303(d) List, issued by the TCEQ on March 19, 2007, lists Segment 2202 as an impaired water body not meeting the applicable water quality standards or is threatened for one or more designated uses by one or more pollutants. In 2006, the TCEQ listed 33 permitted municipal and domestic outfalls and five industrial outfalls for Segment 2202 (TCEQ 2006).

Flow into the interior floodways is controlled by the USIBWC with adjustable gates that are closed during high storm events. This could cause flood water to back up into agricultural drainages. A number of pumps are located on top of the levee to remove ponded water. A divider dike splits the base flows between the Main and North Floodways, with a partial routing of North Floodway water into Arroyo Colorado. The TPWD is currently developing strategies

to enhance both water quality and habitat in the Arroyo Colorado. According to the TPWD, the agency desires to improve water quality associated with habitat enhancement within the on-channel segment since Llano Grande is located within a TPWD State Park (Allan Plummer Associates, Inc. 2006).

3.4 LAND USE

Current land use along the Main and North Floodway Levee Systems were evaluated along a corridor potentially affected by the levee improvement project using three main categories: natural resources management areas, agricultural lands, and urban areas.

3.4.1 Natural Resources Management Areas

Land set aside specifically for natural resource management activities are important for threatened and endangered (T&E) species recovery, habitat preservation, and the emerging eco-tourism economy in South Texas. Tracts of lands along the LRGFCP levee system are managed by the USFWS, TPWD, Texas Chapter of the Nature Conservancy, and National Audubon Society. Along the Main and North Floodways, the USFWS maintains several units of the Lower Rio Grande Valley (LRGV) National Wildlife Refuge and Laguna Atascosa National Wildlife Refuge, while TPWD maintains the Estero Llano Grande State Park and units of the Las Palomas Wildlife Management Areas. Table 3.5 lists state and federal conservation lands along the ROW.

3.4.2 Agricultural Land

Agricultural land flanks approximately 90 percent of the floodway (interior side of the levee systems). On the exterior expansion side of the south levee, agricultural parcels intermixed with natural resources management areas account for approximately 75 percent of the land adjacent to the levee.

3.4.3 Urban Areas

Urban development in the vicinity of the Main and North Floodway Levee Systems is limited to portions of McAllen, Weslaco, and Mercedes and unincorporated towns located on the levee boundaries. All residential areas are located on the exterior expansion side of the levee. No residential developments are allowed within the levee system ROW; however, several mobile homes were found along the exterior side of the North Levee adjacent to the levee toe between mile markers 31 and 32 (*Technical Support Studies for the Environmental Assessment of Flood Control Improvements to the Main and North Floodway Levee Systems*, Parsons 2007).

Table 3.5 State and Federal Conservation Lands Located Along the Main and North Floodway Levee Systems

Management Area and Tract*	System	Location	Size (acres)	Mile Markers	Miles Along Levee
Las Palomas WMA - TPWD					
Taormina Unit	Main Floodway	north levee, exterior side	600.5	20	0.32
Chapote Unit	Main Floodway	north levee, interior side	220	20 - 22	1.61
Estero Llano Grande State Park - TPWD					
McWhorter Unit	Main Floodway	north levee, exterior side	n/a	23	n/a
Main Park	Main Floodway	north levee, interior and exterior sides	219.1	24 - 25	0.85
Mercedes Unit (leased from USFWS)	Main Floodway	north levee, interior and exterior sides	38	25	0.34
Lower Rio Grande Valley NWR - USFWS					
Unnamed tract	North Floodway	north levee, exterior side	122.8	43	0.44
Unnamed tract	North Floodway	north levee, exterior side	29.8	44 - 45	1.04
Unnamed tract	North Floodway	north levee, exterior side	10.2	45	0.15
Unnamed tract	North Floodway	north levee, exterior side	16.7	45	0.28
Laguna Atascosa NWR - USFWS					
Single unit	North Floodway	south levee, exterior side	173,262	67 - 69	2.18

** Tract boundaries for state park and wildlife management areas (WMAs) from Texas Natural Resource Information Service GIS data clearinghouse (TNRIS 2004). Boundaries for national wildlife refuge (NWR) tracts from USFWS, GIS online data (USFWS 2003).*

3.5 COMMUNITY RESOURCES

3.5.1 Socioeconomics

The Main and North Floodway Levee Systems are located within Cameron, Hidalgo, and Willacy Counties. Some of the larger cities within these counties that are near the levee system include McAllen, Weslaco, Mercedes, and Harlingen.

Population

Table 3.6 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. As shown in Table 3.6, the total county population for Cameron County is projected to

increase 65 percent from 2000 to 2030 while Hidalgo and Willacy Counties are projected to increase 89 percent and 36 percent, respectively.

Table 3.6 Population Growth in Cameron, Hidalgo, and Willacy Counties Adjacent to the Main and North Floodway Levee Systems

Jurisdiction	2000	2005	2020	2030	Percent Change 2000-2030
Cameron County	335,227[1]	371,081[1]	476,992[2]	554,513[2]	65
Hidalgo County	569,463[2]	671,967[2]	879,381[2]	1,078,637[2]	89
Willacy County	20,082	21,927[2]	25,857[2]	27,284[2]	36

[1]U.S. Census Bureau 2007
[2] Texas Water Development Board 2006

Executive Order (EO) 12898 defines a minority as an individual belonging to one of the following population groups: Hispanic, Black (not of Hispanic origin), American Indian or Alaskan Native, Asian or Pacific Islander. Under EO 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. Table 3.7 indicates the percentage of the population represented by minorities and the poverty rate for each of the selected census tracts in the project area. The minority population in Cameron, Hidalgo, and Willacy Counties is 85.7, 89.8, and 88.5 percent, respectively. Minority populations of Hispanic nationality dominate in the potential region of influence.

Table 3.7 Percentage of Minority Populations and Poverty Rates in the Main and North Floodway Levee Area

	Cameron County	Percent	Hidalgo County	Percent	Willacy County	Percent
White	269,139	80.3	442,525	77.7	14,132	70.4
Hispanic (of any race)	282,736	84.3	503,100	88.3	17,209	85.7
Black	1,617	0.5	2,807	0.5	439	2.2
Asian	1,607	0.5	3,375	0.6	22	0.1
American Indian	1,471	0.4	2,402	0.4	101	0.5
Poverty (individuals)	109,288	33.1	201,865	35.9	6,300	33.2
Total Minority		85.7		89.8		88.5

Source: U.S. Census Bureau 2007

Employment

The economy of the three county region is based primarily on the service, retail trade, and government sectors. Each of these industries comprise approximately 22 to 23 percent of the

total employment in the region of impact. In Cameron County, employment was also high in the manufacturing and transportation industries, approximately 11 percent and 4 percent, respectively. Manufacturing (7%), construction (5%), and the agricultural (5%) industries have relatively high employment in Hidalgo County (USIBWC 2003b). Table 3.8 indicates the estimated total employment for the three counties. The estimated total employment for the three counties increased 10.8, 26.6, and 5.1 percent, respectively, from 2000 to 2005.

Table 3.8 Estimated Total Employment for Cameron, Hidalgo, and Willacy Counties

	2000	2005	Percent Change 2000-2030
Cameron County	118,079[1]	130,864[1]	10.8
Hidalgo County	191,542[1]	242,525[1]	26.6
Willacy County	6,552[1]	6,887[1]	5.1

[1] Texas Workforce Commission 2007

Income

Median household incomes for Cameron, Hidalgo, and Willacy Counties (reported in 1999 dollars) was $26,155, $24,863, and $22,114, respectively. The median family income was $27,853, $26,009, and $25,076 for the respective counties. Per capita income was $10,980 for Cameron County, $9,899 for Hidalgo County, and $9,421 for Willacy County (U.S. Census Bureau 2007).

Agricultural Economics

Approximately 34,277 acres of agricultural land lie in the project area along the Rio Grande in Cameron and Hidalgo Counties. Although land is not cultivated immediately along the riverbanks, agricultural land predominates within the floodplain inside the Main and North Floodways levee systems (USIBWC 2003b).

Agricultural industries in the project area often hire migrant and seasonal workers. A seasonal worker is an individual whose principal employment (51% or more) is on a seasonal basis. The definition of a migrant worker is similar; however, a migrant worker establishes a temporary abode for the purpose of employment. Migrant and seasonal farm workers within the region of impact are estimated at 49,719. This is approximately 15 percent of the total labor force within the region of impact (USIBWC 2003b).

There is an estimated 9,219 migrant and seasonal farm workers in Cameron County, comprising approximately 7 percent of the county labor force. Eighty-seven percent (8,012) of these workers are migrants, while seasonal workers comprise 1,207, or 13 percent. Hidalgo County has an estimated 40,500 migrant and seasonal farm workers. These workers comprise approximately 20 percent of the county labor force. In Hidalgo County, 31,894, or approximately 79 percent, of these farm workers are migrant, while 8,606 or 21 percent, are seasonal workers (USIBWC 2003b).

3.5.2 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the president on February 11, 1994. The EO requires a federal agency to make "…achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." As such, a proposed action must be evaluated in terms of an adverse effect that:

- Is predominantly borne by a minority population and/or low-income population; or
- Would be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low income population.

Information from Table 3.7 indicates that Cameron, Hidalgo, and Willacy Counties have disproportionately high minority (approximately 86%, 90%, and 89%, respectively). Approximately 29 percent of all families in three counties were reported to be below the poverty level in the 2000 Census (U.S. Census Bureau 2007).

3.5.3 Transportation

Hidalgo, Cameron, and Willacy Counties are an important throughway for agricultural products. One of the major arteries for highway traffic is U.S. Highway 281, which connects Hidalgo County with cities to the north. Also important is U.S. Highway 83 which traverses Cameron and Hidalgo Counties from east to west, and U.S. Highway 77 in Cameron and Willacy Counties from Brownsville northwest to Harlingen and Raymondville. Hidalgo, Cameron, and Willacy Counties have an extensive network of state and farm-to-market roads. The two spans of the Hidalgo-Reynosa International Bridge over the Rio Grande serve as crossing points between Mexico and the United States. A new bridge, the Anzalduas International Bridge, is in the design phase. Two major rail systems serve the two counties. The only railroad port of entry in the project area is located in Brownsville, Texas.

The crown of the Main and North Floodway levee systems is an unpaved service road with restricted public access throughout most of the system. The service road is utilized by the USIBWC as a service road for levee maintenance and vegetation management. The service road is also used extensively by the U.S. Border Patrol for immigration control, and by the USFWS for access to the LRGV National Wildlife Refuge.

There are numerous secondary and connecting routes that run perpendicular to the Rio Grande and cross the highways to the north, which allows access to the border areas along the river. Numerous farm-to-market roads and unpaved county roads cross the project area. In addition, a large system of dirt roads and jeep trails in various conditions occur along the border area.

Legal ports of entry within the project area are located at Brownsville in Cameron County and McAllen in Hidalgo County.

3.6 ENVIRONMENTAL HEALTH

3.6.1 Air Quality

The Clean Air Act, Title 42, Section 7407 of the U.S. Code, states that Air Quality Control Regions (AQCR) shall be designated in interstate and major intrastate areas as deemed necessary or appropriate by a federal administrator for attainment and maintenance of concentration-based standards called National Ambient Air Quality Standards (NAAQS). The U.S. Environmental Protection Agency (USEPA) classifies air quality within an AQCR according to whether the concentrations of criteria air pollutants in the atmosphere exceed primary or secondary NAAQSs. All areas within each AQCR are assigned a designation of attainment, nonattainment, unclassifiable attainment, or not designated attainment for each criteria air pollutant.

NAAQSs are currently established for six air pollutants (known as "criteria air pollutants") including carbon monoxide, nitrogen dioxide (NO_2), ozone (O_3), sulfur oxides (measured as sulfur dioxide, SO_2), lead, and particulate matter. Particulate matter standards incorporate two particulate classes: 1) particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}), and 2) particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$). Only PM_{10} is regulated by the rule.

An attainment designation indicates that air quality within an area is as good as or better than the NAAQS. The proposed levee improvement area is located within AQCR 213, or the Brownsville-Laredo AQCR. This AQCR is located completely within the State of Texas, covering Cameron County, Hidalgo County, Jim Hogg County, Starr County, Webb County, Willacy County, and Zapata County (CFR 2001). As of December 2006, the USEPA designated air quality within all counties of AQCR 213 to be under attainment status for all criteria pollutants (USEPA 2007a). The emissions data for Cameron, Hidalgo, and Willacy Counties are used for analysis purposes because the activity associated with the alternatives would be localized in the narrow area along the river, and emissions from the activities would not likely affect the more distant counties within the AQCR.

The TCEQ has identified 16 companies in Hidalgo, Cameron, and Willacy Counties as contributors of point source emissions. Potential stationary point sources of criteria pollutant and hazardous air pollutant emissions within the three counties include the Rio Grande Valley Sugar growers, Wil Ron Manufacturing Corporation, several oil mills and refineries, and utilities and gasoline facilities. The combined area and stationary point source emission inventory for Hidalgo, Cameron, and Willacy Counties for calendar year 2001, based on the latest available data from USEPA National Emission Inventory as of March 2007 (USEPA 2007b), is as follows:

- Carbon monoxide, 243,686 tons per year;
- Volatile organic compounds, 47,135 tons per year;
- Nitrogen dioxide, 33,190 tons per year;
- Sulfur oxides, 2,308 tons per year; and
- PM_{10}, 107,102 tons per year.

Existing maintenance activities by USIBWC personnel consists of routine inspections of levees and access roads. Periodic maintenance activities at the levees, channels and floodway results in 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 3 months or less and does not represent a significant source of air pollutants.

3.6.2 Noise

Guidelines

Noise is defined as sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels often change with time. To compare sound levels over different time periods, several descriptors were developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on humans.

The day-night average sound level (DNL) is a measure of the total community noise environment. DNL is the average A-weighted sound level in decibels, or dBA, over a 24-hour period, with a 10 dBA adjustment added to the nighttime levels (between 10:00 p.m. and 7:00 a.m.). This adjustment is an effort to account for increased human sensitivity to nighttime noise events. DNL was endorsed by the USEPA for use by federal agencies. DNL is an accepted unit for quantifying annoyance to humans by general environmental noise, including aircraft noise. The Federal Interagency Committee on Urban Noise developed land use compatibility guidelines for noise (U.S. Department of Transportation 1980). Potential adverse effects of noise include annoyance, speech interference, and hearing loss.

Annoyance. Noise annoyance is defined by the USEPA as any negative subjective reaction to noise by an individual or group. Typically 15 to 25 percent of persons exposed on a long-term basis to DNL of 65 to 70 dBA would be expected to be highly annoyed by noise events, and over 50 percent at DNL greater than 80 (National Academy of Sciences 1977).

Speech Interference. In a noisy environment, understanding speech is diminished when speech signals are masked by intruding noises. Based on a variety of studies, DNL 75 dBA indicates there is good probability for frequent speech disruption. This level produces ratings of “barely acceptable” for intelligibility of spoken material. Increasing the level of noise to 80 dBA reduces the intelligibility to zero, even if the people speak in loud voices.

Hearing Loss. Hearing loss is measured in dBs and refers to a permanent auditory threshold shift of an individual’s hearing. The USEPA (USEPA 1974) recommended limiting daily equivalent energy value of equivalent sound level of 70 dBA to protect against hearing impairment over a period of 40 years. Hearing loss projections must be considered conservative as the calculations are based on an average daily outdoor exposure of 16 hours. It is recommended that no residential uses, such as homes, multi-family dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 dBA. Some commercial and industrial uses are considered acceptable where the noise level exceeds DNL of 65 dBA. For outdoor activities, the USEPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population will be at risk from any of the impacts of noise (USEPA 1974).

Baseline Noise Levels

Land use and zoning classifications in the area surrounding the proposed levee improvement area provide an indication for potential noise impact. Land surrounding the Main and North Floodway Levee Systems is predominantly managed as wildlife refuge areas and agricultural land. No sensitive noise receptors such as schools, churches, and medical facilities are located in or surrounding the Main and North Floodway Levee Systems; however, several mobile home residences were found along the exterior side of the North Levee adjacent to the levee toe between mile markers 31 and 32 during the field reconnaissance conducted for this project.

Typical outdoor noise sources near the levee system include vehicles, pickup trucks, diesel tractor mowers, and other farm machinery. Noise sources such as mowers at 100 feet, a diesel truck, or scrapers used to grade levee roads at 50 feet are approximately 70 dBA, 88 dBA, and 89 dBA, respectively (CERL 1978).

Existing maintenance activities by USIBWC personnel consists of routine inspections of levees and access roads. Periodic maintenance activities at the levees, channels and floodway results in 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 3 months or less and does not represent a significant source of noise.

3.6.3 Hazardous and Toxic Waste

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 proposed levee improvement area were reviewed to identify areas where industrial processes occurred, solid and hazardous waste were stored, disposed, or released; and hazardous materials or petroleum or its derivatives were stored or used. A data search on waste storage and disposal sites along the Main and North Floodway Levee Systems was conducted by Banks Information Systems, Inc. (2007). The search extended along major portions of the potential levee expansion area, up to 0.5 mile from the levee corridor centerline. Detailed data are reported in the document *Technical Support Studies for the Environmental Assessment of Flood Control Improvements to the Main and North Floodway Levee Systems* (Parsons 2007).

The identification of hazardous and toxic waste disposal and the storage site near the project area included the following databases:

- The National Priority List (NPL);

- RCRA Corrective Actions and associated Transport, Storage, and Disposal (TSD) list;
- State equivalent priority list;
- State equivalent Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list;
- Sites currently or formerly under review by the USEPA;
- RCRA-permitted transport, storage, and disposal facilities;
- RCRA-registered generator of hazardous waste (GENS);
- Registered underground storage tanks, including leaking underground storage tanks;
- Registered aboveground storage tanks;
- Sites permitted as solid waste landfills, incinerators, or transfer stations;
- Emergency Response Notification System of Spills (ERNS) list; and
- State spills list.

Results of the data search along the Main and North Floodway Levee System, including the search radius (up to 1/2 mile) by individual database, are shown in Tables 3.9 and 3.10. No waste storage and disposal sites were identified within the 160-foot wide survey corridor or within one-half mile from the levee system. Registered underground storage tanks (UST) were located in Pharr; however, due to the considerable distance away from the project area, these sites would not affect, nor be affected by, the levee construction project.

Table 3.9 Summary Search Report for the Main and North Floodway Levee Systems, McAllen, Texas Vicinity

Database	Database Updated	Search Radius	Levee Corridor	1/8 Mile	1/4 Mile	1/2 Mile	Total
NPL	12-08-06	1.00	0	0	0	0	0
CERCLIS	12-08-06	0.50	0	0	0	0	0
NFRAP	12-08-06	0.25	0	0	0	0	0
RCRA TSD	6-06-06	0.50	0	0	0	0	0
RCRA COR	6-06-06	1.00	0	0	0	0	0
RCRA GENS	6-06-06	0.50	0	0	0	-	0
ERNS	12-31-05	0.25	0	0	0	-	0
State Sites	05-14-06	1.00	0	0	0	0	0
SWL	05-14-06	0.50	0	0	0	0	0
Spills	05-15-05	0.25	0	0	0	-	0
Other	03-14-06	0.25	0	0	0	-	0
Regular UST/AST	06-28-06	0.25	0	0	0	-	0
Leaking UST	06-28-06	0.50	0	0	0	0	0
Brownfields	1-19-06	0.50	0	0	0	0	0
Total Sites			**0**	**0**	**0**	**0**	**0**

Table 3.10 Summary Search Report for the Main and North Floodway Levee Systems, Santa Monica, Texas Vicinity

Database	Database Updated	Search Radius	Levee Corridor	1/8 Mile	1/4 Mile	1/2 Mile	Total
NPL	12-08-06	1.00	0	0	0	0	0
CERCLIS	12-08-06	0.50	0	0	0	0	0
NFRAP	12-08-06	0.25	0	0	0	0	0
RCRA TSD	6-06-06	0.50	0	0	0	0	0
RCRA COR	6-06-06	1.00	0	0	0	0	0
RCRA GENS	6-06-06	0.50	0	0	0	-	0
ERNS	12-31-05	0.25	0	0	0	-	0
State Sites	05-14-06	1.00	0	0	0	0	0
SWL	05-14-06	0.50	0	0	0	0	0
Spills	05-15-05	0.25	0	0	0	-	0
Other	03-14-06	0.25	0	0	0	-	0
Regular UST/AST	06-28-06	0.25	0	0	0	-	0
Leaking UST	06-28-06	0.50	0	0	0	0	0
Brownfields	1-19-06	0.50	0	0	0	0	0
Total Sites			**0**	**0**	**0**	**0**	**0**

SECTION 4
ENVIRONMENTAL CONSEQUENCES

Section 4 presents an analysis of the environmental consequences of the No Action Alternative and proposed improvements to the Main and North Floodway Levee Systems. 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 continue to be mowed on an as-needed basis, which would maintain the vegetation as non-native grasses.

Proposed Action

Improvements to the Main and North Floodway Levee Systems would affect herbaceous plant communities through fill activities, but not wooded areas. Impacts would occur on the levee sidewalls 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) Woodlands/Thornscrub, represented primarily by Mesquite-Acacia Woodlands; b) Herbaceous, represented primarily by Buffelgrass-dominant grassland; c) Wetlands/Riparian communities, represented primarily by Phragmites – Arundo Emergent and Semi-emergent; and d) Agricultural. Table 4.1 shows potential acreage removed and impacts to each vegetation community for the Main and North Floodway levee. Near the proposed levee improvement areas, several tracts of land are owned and/or managed by federal, state, or non-governmental agencies. Table 4.2 shows the location of the conservation lands along the levee, the length of the tracts of conservation land adjacent to the levees, and if the conservation land is adjacent to the potential levee expansion area.

4.1.2 Wildlife

No Action Alternative

No changes would be made to improve the levees. The ongoing mowing operations would maintain the non-native grasses on the levee slopes, which provides little suitable wildlife habitat, except as transit corridors.

Table 4.1 Potential Impacts to Vegetation within Improvement Areas of the Main and North Floodway Levee Systems

Vegetation Community	Acreage Within 160-Foot Wide Survey Corridor	Acreage Within Current Levee Footprint and Potential Expansion Areas	Potential Impact Characterization
Woodland / Thornscrub Communities			
Mesquite - Acacia Woodland	309.7	-	Woodlands along the levee systems are in varying stages of succession. There would be no removal of thorn woodland along the Main and North Floodway Levee systems.
Mesquite - Acacia Savanna	135.7	-	
Coastal Sand Plain Thornscrub	86.0	-	
Total Woodland / Thornscrub	*531.4*	*0*	
Herbaceous Community			
Buffelgrass Dominant Grassland	*1026.6*	*320.8*	Short-term impact on grassland communities in the areas of the existing levee and potential expansion areas would occur. An invasive species, Buffelgrass, is predominant throughout the herbaceous areas. Herbaceous vegetation will be rapidly re-established when construction activities are complete.
Wetlands / Riparian Communities			
Texas Ebony – Anauco Forest	10.1	-	Along the Main and North Floodway Levee system, none of the potential jurisdictional wetlands fall within the potential expansion corridor.
Typha / Phragmites Emergent	31.3	-	
Drainage Ditches	8.1	-	
Open Water	55.3	-	
Total Wetlands / Riparian	*104.8*	*0*	
Agricultural			
Active Agricultural	493.2	-	No agricultural areas are located within the Main and North Floodway Levee potential expansion corridor.
Fallow Agricultural	396.5	-	
Total Agriculture	*889.7*	*0*	
Developed / Impervious Cover			
Canals, roads, residential, commercial	104.5	1.1	
TOTAL	***2657.0***	***321.9***	

Table 4.2 Levee Improvement Areas along State and Federal Conservation Lands

Management Area and Tract*	System	Location	Size (acres)	Mile Marker	Miles Along Levee	Improvement Areas Location Relative to Conservation Lands
Las Palomas WMA - TPWD						
Taormina Unit	Main Floodway	north levee, exterior side	600.5	20	0.32	No improvement areas adjacent to WMA lands
Chapote Unit	Main Floodway	north levee, interior side	220	20 - 22	1.61	0.1 miles of WMA unit adjacent to improvement areas; no levee footprint expansion
Estero Llano Grande State Park - TPWD						
McWhorter Unit	Main Floodway	north levee, exterior side	n/a	23	n/a	Park unit adjacent to improvement areas; no levee footprint expansion
Main Park	Main Floodway	north levee, interior and exterior sides	219	24 - 25	0.85	0.3 miles of the park unit adjacent to improvement areas; no levee footprint expansion
Mercedes Unit (leased from USFWS)	Main Floodway	north levee, interior and exterior sides	38	25	0.34	0.2 miles of the park unit adjacent to improvement areas; no levee footprint expansion
Lower Rio Grande Valley NWR - USFWS						
Unnamed tract	North Floodway	north levee, exterior side	122.8	43	0.44	0.1 miles of NWR unit adjacent to improvement areas; no levee footprint expansion
Unnamed tract	North Floodway	north levee, exterior side	29.8	44 - 45	1.04	No improvement areas adjacent to NWR lands
Unnamed tract	North Floodway	north levee, exterior side	10.2	45	0.15	No improvement areas adjacent to NWR lands
Unnamed tract	North Floodway	north levee, exterior side	16.7	45	0.28	No improvement areas adjacent to NWR lands
Laguna Atascosa NWR - USFWS						
Single unit	North Floodway	south levee, exterior side	173,262	67 - 69	2.18	improvement areas along the entire NWR, 1.5 miles without levee footprint expansion, and 0.7 miles with footprint expansion into the floodway; expansion along interior side of the levee, away from NWR lands.

** Tract boundaries for state park and wildlife management areas (WMAs) from Texas Natural Resource Information Service, GIS data clearinghouse (TNRIS 2004). Boundaries for national wildlife refuge (NWR) tracts from USFWS, GIS online data (USFWS 2003).*

Proposed Action

The value of vegetation to wildlife along the Main and North Floodway Levee depends on the quantity of habitat and the relative successional stage of the vegetation (quality of habitat). The thorn woodlands and wetlands areas along the Main and North Floodway Levee Systems may provide the best quality wildlife habitat. The herbaceous and agricultural areas are dominated by invasive or cultivated species, and provide little suitable habitat for most wildlife species. Some wildlife species may utilize these areas as transit corridors, but the usage is likely limited. There are natural resource conservation areas along the length of the project area, in discreet units. Although some tracts are very large, the length of the conservation areas adjacent to the levee that might be affected by levee improvements totals 7.57 miles, or 10 percent of the 75 miles total levee length.

The Main and North Floodway Levee expansion would not remove any Mesquite-Acacia thorn woodland that occurs within the 160-foot wide survey corridor. If levee expansion is required in these areas, it will not extend into these sensitive areas.

A total of 1,026.6 acres of herbaceous vegetation are present within the 160-foot wide survey corridor; 320.8 acres are within the potential levee expansion area. This herbaceous non-native vegetation is considered relatively low-quality wildlife habitat and the non-native grasses are expected to rapidly re-establish after construction. No herbaceous wildlife habitat would be lost.

4.1.3 Threatened and Endangered Species

Preferred habitat types for each T&E species potentially occurring in Hidalgo, Cameron, and Willacy Counties were compared to the habitat types identified during field surveys to evaluate their likelihood of occurrence. The habitat determination was categorized according to 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. Table 4.1 lists potential impacts of the Main and North Floodway Levee Systems improvements to vegetation communities along the levee corridors, which may be utilized by threatened and endangered species.

No Action Alternative

No changes would be made to improve the levees. The ongoing mowing operations would maintain the non-native grasses on the levee slopes, which provides little suitable T&E habitat, except as transit corridors.

Proposed Action

Levee expansion activities of the Main and North Floodway Levee would occur in the service corridor used for levee maintenance adjacent to the existing levee, and not encroach on habitat suitable for T&E species. Twenty-one species are federally listed as threatened or endangered, and 53 species are on state threatened and endangered species lists that have a potential to occur within the project area. because levee expansion activities would not remove suitable T&E habitat, no adverse effects would be expected from the levee expansion. The majority of habitat subject to removal includes non-native grasslands dominated by buffelgrass. No adverse modification of habitat for listed species is expected to occur as a result of levee expansion activities.

Unforeseen adverse effects may be prevented by timing construction activities to avoid breeding and nesting seasons of T&E species. Consultation with TPWD and USFWS would be needed to schedule construction activities to minimize potential impacts on species and species habitat (see Appendix B). In particular, in the area of the Estero Llano Grande State Park, where the White-tailed Kites nest in the spring, the timing of construction activities would need to occur outside the nesting season, to protect the birds and to occur when tourists are not present to view the birds.

4.1.4 Jurisdictional Wetlands and Aquatic Habitat

No Action Alternative

There are no anticipated impacts to jurisdictional wetlands or aquatic habitat due to ongoing operations.

Proposed Action

Within the 160-foot wide survey corridor, there were a total of 18.2 acres of potential jurisdictional wetlands; no wetlands were observed within the potential levee expansion area during the field survey (see Table 3.2 and Figures 3.1 through 3.4 in Subsection 3.1.4). Subsequent GIS analysis using the USIBWC levee deficiency study data (USIBWC 2003a) confirmed that none of these wetlands fall within the potential expansion area. Therefore, no impacts to jurisdictional wetlands are anticipated from levee expansion activities associated with the Main and North Floodways Levee Systems.

4.1.5 Cumulative Effects

The two projects identified in Subsection 2.4 are non-federal actions; therefore, fall under the cumulative effects definition used in the USFWS consultation process for Section 7 of the ESA. The TPWD action would involve grassland enhancements in herbaceous vegetation

communities on the 1,240 acres of wildlife management units and state park units along the levee corridors. These TPWD tracts are listed in Table 4.2. The TCEQ-led Arroyo Colorado Watershed Partnership would involve water quality and wetlands/aquatic habitat improvements within the Arroyo Colorado watershed. Floodwaters in the watershed are controlled by the Arroyo Colorado levee system, a component of the LRGFCP interior floodway system.

The two projects would occur along the interior floodways levee corridor and within the floodways on private and state lands. The stated goals of the projects include habitat and water quality improvement within the floodways; therefore, the projects considered in the cumulative effects analysis for biological resources relevant to Section 7 ESA consultation are expected to beneficially affect listed species and other biological resource areas.

4.2 CULTURAL RESOURCES

4.2.1 Historic and Prehistoric Archaeological Resources

No Action Alternative

Under the No Action Alternative, operation and maintenance would continue and the current levee configuration would be retained. No adverse effects to historic or prehistoric archaeological resources are anticipated.

Proposed Action

Proposed improvements to the Main and North Floodway Levee Systems are not expected to affect unrecorded archaeological sites and HPAs that may contain historic or prehistoric archaeological materials. Ten HPAs were previously identified in Table 3.3 as being located within the study corridor during the site reconnaissance conducted in support of the EA preparation (Sundermeyer et al. 2007).

As summarized in Table 4.3, four of those archaeological resources (16PH5, 41HG30, NF5 and HPA2) are located outside the floodway and away from the levee system; two other resources are located outside levee improvement areas (NF4/TB2 and 33SR2); and the remaining resources are located in areas where addition of fill material will not expand the current levee footprint (HP1, HP3 and HP4). The need for excavation outside the current levee location is not anticipated.

4.2.2 Historic-age Resources

No Action Alternative

Under the No Action Alternative, operation and maintenance would continue. No adverse effects to historic-age resources are anticipated.

Proposed Action

Proposed improvements to the Main and North Floodway Levee Systems are not likely to adversely affect historic-age resources. Historic-age resources near the Main and North

Floodway Levee Systems, previously identified in Table 3.4, are located either outside the levee system ROW, or outside improvement areas where fill material would be added to increase levee height.

Table 4.4 lists historic-age resources identified within the study corridor, along with an evaluation of potential for impacts resulting from proposed levee improvements. None of the six categories evaluated would be impacted by the project. Historic-age residential and agricultural resources, as well as cemeteries, are located outside the floodway and away from the levee system. No modifications will be required for irrigation canals, concrete dams, pump and other existing irrigation structures. In a few locations, minor modifications to weir gates maybe required. Transportation and other infrastructure are located outside the levee improvement areas and will not be affected by the proposed addition of fill material to sections of the Main and North Floodway levee systems.

Table 4.3 Potential for impacts to Known Archaeological Resources and HPAs Identified Within the Study Corridor

Resource Type	Previous Designation (reference)	Resource Number	Location (Appendix C map key)	Potential for Impacts?	
				Y / N	Comments
Historic HPA	16PH5 (Cooper, *et al.* 2002:E-7)	16PH5	south levee, mile 2 (App. C, map C)	No	HPA is located outside the floodway and away from the levee system
Known archaeological site	41HG30	41HG30	south levee, mile 4 (App. C, map D)	No	site is located outside the floodway and away from the levee system
HPA: former windmill site	N/A (Sundermeyer *et al.* 2007)	HPA 1	north levee, mile 27 (App. C, map K)	No	levee improvement to be designed without footprint expansion
prehistoric lithic scatter / wooden bridge	NF4/TB2 (Cooper, *et al*. 2002:E-7)	NF4/TB2	south levee, mile 40 (App. C, map Q)	No	HPA is not located in a proposed levee improvement area
Historic HPA	33SR2 (Cooper, *et al.* 2002:B-19)	33SR2	south levee, mile 46 (App. C, map S)	No	HPA is not located in a proposed levee improvement area
Historic HPA	NF5 (Cooper, *et al*. 2002:E-7)	NF5	south levee, mile 48 (App. C, map T)	No	HPA is located outside the floodway and away from the levee system
Prehistoric HPA	N/A (Sundermeyer *et al.* 2007)	HPA 2	south levee, mile 56 (App. C, map W)	No	HPA is located outside the floodway and away from the levee system
Prehistoric HPA	N/A (Sundermeyer *et al.* 2007)	HPA 3	south levee, mile 60 (App. C, map X)	No	levee improvement to be designed without footprint expansion
Historic HPA	N/A (Sundermeyer *et al.* 2007)	HPA 4	south levee, mile 64 (App. C, map Y)	No	levee improvement by placement of fill material without footprint expansion

Table 4.4 Potential for impacts on Historic-age Resources Identified Within the Study Corridor

Historic-age Resources	Description	Resource Numbers (Appendix C)	Potential for Impacts?	
			Y / N	Potential for Impacts?
Irrigation canals	Lined and unlined canals, including McAllen Main Canal and Pharr-San Juan Main Canal	3B; 5B; 6N; 9N; 14N; 15N; 17N; 18N; 20N; 23N; 26B; 29S; 32S; 34S	No	no irrigation canals will be modified or affected by the levee improvement project
Other irrigation/levee structures	Concrete dams, pumps, weir gates, standpipes, concrete utility boxes	1N/S; 19N; 25N; 30S; 31S; 33S; 35S; 36S	No	changes to irrigation structures are not required
Other historic-age infrastructure	Concrete bridges and railroad trestle; concrete utility boxes; golf course; industrial complex	10N; 11N; 12N; 13B; 21N; 22N; 37S	No	structures are located outside improvement areas and will not be modified
Historic-age residential	Historic-age houses	2N; 4N; 38S	No	resources are located outside the floodway and away from the levee system
Historic-age agricultural	Santa Monica Ranch, Tres Norias Ranch and King Ranch fence; farmstead	7N; 8N; 24N; 28B; 40S	No	resources are located outside levee system and/or levee improvement areas
Cemeteries	Sabino and Tanquesitos cemeteries	27N, 39S	No	both located outside the floodway and away from the levee system

4.3 WATER RESOURCES

4.3.1 Flood Control

No Action Alternative

The No Action Alternative would retain the current configuration of the Main and North Floodway Levee System, as designed over 30 years ago, and maintain the current level of protection currently associated with this system. Under severe storm events, current containment capacity may be insufficient to fully control 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 Main and North Floodway Levee System. 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 Main and North Floodway Levee along this reach of the LRGFCP.

4.3.2 Water Flow

No Action Alternative

Under the No Action Alternative, no impacts are anticipated as the current levee configuration would be retained.

Proposed Action

For the Proposed Action, improvements to the Main and North Floodway Levee Systems would not affect water flow or downstream water bodies.

4.4 LAND USE

No Action Alternative

No impacts are anticipated, as the current levee configuration would be retained.

Proposed Action

Potential impacts were evaluated in terms of natural resources management areas, agricultural lands, and urban areas. Expansion of the Main and North Floodway Levee Systems would occur entirely within the ROW and into the floodway. The presence of irrigation canals or residential developments may preclude expansion, requiring adjustment of levee slope to increase height.

Natural Resources Management Areas. The proposed levee expansion project of the Main and North Floodway Levee Systems would impact mostly herbaceous vegetation dominated by non-native species (320.8 acres). No thorn woodland, a higher quality habitat, would be removed.

Agricultural Land. No agricultural areas are located within the proposed levee expansion project of the Main and North Floodway Levee System.

Urban Areas. Urban development in the vicinity of the Main and North Floodway Levee Systems is limited to portions of McAllen, Weslaco, and Mercedes and unincorporated towns located on the levee boundaries. The Proposed Action would not affect urban development in these areas.

4.5 COMMUNITY RESOURCES

4.5.1 Socioeconomics

No Action Alternative

No impacts to community resources are anticipated, as the current levee configuration would be retained.

Proposed Action

The analyses of impacts of the footprint expansion on socioeconomic resources and environmental justice were based on changes in employment, income, and business volume as indicator criteria, as well as the disproportionate number of minority or low-income populations potentially affected by the proposed levee improvements.

The direct influx of federal funds would be $5,167,000 on the basis of construction costs, assuming a third of the levee system expansion project would be constructed in Hidalgo County. This influx of funds would have a small but positive local economic impact, representing an increase of $17,511,035 in direct and indirect sales. Job creation is estimated at 160 in direct and indirect employment. The positive impact would be limited to the duration of the construction period. Table 4.5 illustrates the magnitude of the economic influx relative to reference values for Hidalgo County.

Table 4.5 Potential Economic Impacts Improvements to the Main and North Floodway Levee Systems for Hidalgo County

Evaluation Criteria	Unit Value for Rio Grande Levees [a]	Raising of Main and North Floodway Levee	Annual Value for Hidalgo County	Increase Relative to County
Local Expenditures	$1,000,000	$5,167,000	Not applicable	
Direct Employment	10	98		
Indirect Employment	6	62		
Total Employment	16	160	242,525 [b]	0.07%
Direct Sales Volume	$1,274,065	$6,583,100		
Indirect Sales Volume	$2,114,948	$10,927,935		
Total Sales Volume	$3,389,013	$17,511,035	$ 10,375 million [c]	0.17%
Direct Income	$554,814	$2,866,724		
Indirect Income	$452,466	$2,337,892		
Total Income	$1,007,280	$5,204,616	$6,652 million [d]	0.08%

a Unit data for levee construction from the 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 Hidalgo County in 2005 (Texas Comptroller 2005).
d Based on a 2000 per capita income of $9,899 and an Hidalgo County population of 671,967.

The direct influx of federal funds for Cameron and Willacy Counties would be the same as Hidalgo County, or $5,167,000 on the basis of construction costs, assuming a third of the levee expansion project would be constructed in both counties. The positive impact would be limited to the duration of the construction period. Tables 4.6 and 4.7 illustrate the magnitude of the economic influx relative to reference values for Cameron and Willacy Counties.

Table 4.6 Potential Economic Impacts Improvements to the Main and North Floodway Levee Systems for Cameron County

Evaluation Criteria	Unit Value for Rio Grande Levees [a]	Raising of Main and North Floodway Levee	Annual Value for Cameron County	Increase Relative to County
Local Expenditures	$1,000,000	$5,167,000	Not applicable	
Direct Employment	10	98		
Indirect Employment	6	62		
Total Employment	16	160	130,864 [b]	0.12%
Direct Sales Volume	$1,274,065	$6,583,100		
Indirect Sales Volume	$2,114,948	$10,927,935		
Total Sales Volume	$3,389,013	$17,511,035	$ 5,064 million [c]	0.35%
Direct Income	$554,814	$2,866,724		
Indirect Income	$452,466	$2,337,892		
Total Income	$1,007,280	$5,204,616	$4,074 million [d]	0.13%

a Unit data for levee construction from the 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 Cameron County in 2005 (Texas Comptroller 2005).
d Based on a 2000 per capita income of $10,980 and an Cameron County population of 371,081.

Table 4.7 Potential Economic Impacts Improvements to the Main and North Floodway Levee Systems for Willacy County

Evaluation Criteria	Unit Value for Rio Grande Levees [a]	Raising of Main and North Floodway Levee	Annual Value for Willacy County	Increase Relative to County
Local Expenditures	$1,000,000	$5,167,000	Not applicable	
Direct Employment	10	98		
Indirect Employment	6	62		
Total Employment	16	160	6,887 [b]	2.32%
Direct Sales Volume	$1,274,065	$6,583,100		
Indirect Sales Volume	$2,114,948	$10,927,935		
Total Sales Volume	$3,389,013	$17,511,035	$ 10,375 million [c]	0.17%
Direct Income	$554,814	$2,866,724		
Indirect Income	$452,466	$2,337,892		
Total Income	$1,007,280	$5,204,616	$6,652 million [d]	0.08%

a Unit data for levee construction from the 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 Willacy County in 2005 (Texas Comptroller 2005).
d Based on a 2000 per capita income of $9,421 and an Willacy County population of 21,927.

4.5.2 Environmental Justice

No Action Alternative

Under the No Action Alternative, current condition of minority and low-income populations for all three counties would remain unchanged, as improvements to the levee system would not occur.

Proposed Action

Data indicate that Hidalgo, Cameron, and Willacy Counties have disproportionately high minority (approximately 90%, 86%, and 89%, respectively) and low-income populations (families–29%, 28%, and 29%, 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 construction of the Main and North Floodway Levee improvements.

4.5.3 Transportation

No Action Alternative

No impacts are anticipated, as the current levee system configuration would be retained.

Proposed Action

Proposed improvements to the Main and North Floodway Levee would have moderate impacts on local transportation. Heavy construction equipment (dump trucks, front-end loaders, graders) in the reach of the Main Floodway near McAllen, Weslaco, and Mercedes would likely be driven to the construction site from local areas using State Highways 83 and 281. The North Floodway starting at Mercedes and extending northward can be assessed using FM 491, which generally parallels the floodway. The remainder of the North Floodway that extends northeasterly can be accessed using State Highway 77, FM 506, FM 507, and FM 1420, all of which run perpendicular to the floodway.

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. Most of these construction activities, however, would not require public road use as, material borrow sites would be located in the vicinity of the construction sites. All construction activities would occur within the existing ROW. Transportation of construction equipment and the use of personnel vehicles would mainly occur within the levee ROW and along the levee road system within the floodway. New easements would have to be obtained by USIBWC if levee footprints are increased from existing conditions. Following completion of the levee improvement project, the levee road would continue providing service for USFWS and Border Patrol activities, and limited public access.

4.6 ENVIRONMENTAL HEALTH

4.6.1 Air Quality

No Action Alternative

No impacts are anticipated, as the current configuration of the levee system would be retained.

Proposed Action

Improvements to the levee system would impact air quality through excavation and fill activities. Potential impacts would be a slight increase in criteria air pollutants within Hidalgo, Cameron, and Willacy Counties. Table 4.8 summarizes the additional estimated criteria pollutants associated with the Proposed Action, as well as the percent increase above the existing Hidalgo, Cameron, and Willacy Counties' emissions inventory. Estimates were calculated for 47.0 miles of levee construction for the levee height increase (27.5 miles for the North Levee and 19.5 miles for the South Levee). Unit air emissions estimates for these activities followed common construction practices and methods (Means 2005) and emission factors reported by USEPA (USEPA 1996) as applied to a similar levee expansion project in an upper reach of the Rio Grande (Parsons 2003). Estimated emissions for all five criteria pollutants represent less than 1.12 percent of the Hidalgo, Cameron, and Willacy Counties' annual emissions inventory.

Table 4.8 Air Emissions for Improvements to the Main and North Floodway Levee Systems

Parameter	Emissions (tons per year)				
	Sulfur Oxides	Nitrogen Dioxides	Carbon Monoxide	Volatile Organic Compounds	Particulate Matter (PM_{10})
Unit emissions per mile of levee height increase*	0.55	5.05	2.11	0.4	5.61
Floodway Levee Systems (14.0 miles)	25.85	237.35	99.17	18.80	263.67
Hidalgo, Cameron, and Willacy Counties emissions inventory**	2,308	33,190	243,686	47,134	107,102
Floodway Levee Systems Emissions as a Percent of Hidalgo, Cameron, and Willacy Counties' Emissions	1.12%	0.72%	0.04%	0.04%	0.25%

** Unit data for levee construction from the USIBWC Rio Grande Canalization Project EIS (Parsons 2003: Table 4.11-1).*
*** USEPA 2007b, the most recent available data as of March 2007.*

4.6.2 Noise

No Action Alternative

No impacts from noise are anticipated, as the current levee configuration would be retained.

Proposed Action

Improvements to the Main and North Floodway Levee Systems 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. 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., 5 days per week for the duration of the project. However, individuals would not be exposed during entire noise-producing period. Under these conditions, persons would not be exposed to long-term and regular noise above 75 BA. As stated in Subsection 3.6.2, DNL 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.

4.6.3 Hazardous and Toxic Waste

No Action Alternative

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

Proposed Action

Improvements to the Main and North Floodway Levee Systems would not be affected by waste storage and disposal sites. No waste storage and disposal sites were identified within the proposed Main and North Floodway Levee project area. Registered underground storage tanks were located in Pharr; however, due to the considerable distance away from the project area, these sites would not affect, nor be affected by the levee construction project.

4.7 INDIRECT AND CUMULATIVE IMPACTS

Following completion of the proposed levee improvement project, the levee road would continue providing service for agencies, farmers and adjacent landowners. Subsection 2.4 identifies two projects for consideration for cumulative impacts, and Subsection 4.1.5 considers these actions relevant to the Section 7 ESA consultation process. The two projects include:

- *TPWD native grassland management activities*: Besides agricultural fields within the floodways, there are some fallow fields owned or managed by the TPWD (by Llano Grande State Park). TPWD has proposed a management plan using native grasses.

- *The Arroyo Colorado Watershed Partnership:* The Arroyo Colorado Watershed Partnership, under the leadership of the TCEQ and Texas Sea Grant Program

developed "A Watershed Protection Plan for the Arroyo Colorado Phase I", (January 2007) that includes several elements, including many involving riparian and wetland preservation and restoration within the watershed in which the Main Floodway is located.

TPWD's ongoing and planned grassland and habitat restoration and enhancement projects --as well as the Arroyo Colorado Watershed Partnership's recommended habitat restoration elements included in its Watershed Protection Plan-- should benefit threatened and endangered species and other wildlife resources associated with the floodways. It should be noted that little habitat or wetlands work has been recommended to occur within the floodway itself. Some habitat improvement can be expected on natural resource managed lands within the floodways, and as a result of best management practices for ongoing agricultural activities within the floodways. Table 4.9 summarizes the expected cumulative impacts for each resource area considered in this EA.

Table 4.9 Potential Cumulative Impacts of Ongoing and Planned TPWD Initiatives

Resource Area	Potential Cumulative Effect of Initiatives
Biological Resources	On natural resource managed lands within the floodways, some habitat improvement can be expected. The use of native species in re-vegetation activities of newly constructed levee slopes would support the beneficial effects of these actions.
Cultural Resources	TPWD's ongoing and planned initiatives would not have any significant cumulative effects in conjunction with the Proposed Action.
Water Resources	TPWD's ongoing and planned initiatives would benefit water quality within the floodways. Newly constructed wetlands within the floodways, however, would be in conflict with the 3-foot vegetation height requirement for optimum flood control.
Land Use	TPWD's ongoing and planned initiatives would not have any significant cumulative effects in conjunction with the Proposed Action. Some active and fallow fields may be converted to conservation management.
Community Resources	TPWD's ongoing and planned initiatives would not have any significant cumulative effects in conjunction with the Proposed Action.
Environmental Health	TPWD's ongoing and planned initiaives would not have any significant cumulative effects in conjunction with the Proposed Action.

SECTION 5
BEST MANAGEMENT PRACTICES

Section 5 describes best management practices to be implemented as part of the Proposed Action for Improved Flood Control of the Main and North Floodway levee systems. 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.

5.1 ENGINEERING MEASURES

Levee expansion alignment would be optimized, to the extent possible, to avoid impacts to wooded vegetation, wetlands, and other natural resources. Levee footprint expansion is not anticipated along natural resources management areas, or areas with a potential to contain cultural resources areas. Best management practices to avoiding construction impacts on resources near levee improvement areas:

- 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 wetlands would be installed while construction occurs in affected areas.

- During the project construction, methods such as wetting the soil would be employed to prevent erosion from unvegetated slopes and/or corridors.

- During the 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.

5.2 NATURAL RESOURCES

Fill material placement but no levee footprint expansion is anticipated along USFWS and TPWD natural resources management areas. For additional protection of vegetation and wildlife habitat, the following best management practices would be utilized:

- After construction is complete, the expanded levee, as well as any required construction corridor, would be re-vegetated with native herbaceous vegetation.

- Construction activities along natural resources management areas would be coordinated with the USFWS and TPWD. Activities would be scheduled to occur outside the March through July migratory bird nesting season.

5.3 CULTURAL RESOURCES

Material fill placement but no levee footprint expansion is anticipated along sections of improvement areas near areas identified as potentially containing cultural resources. Those resources include reported HPAs, as well as other potential HPAs identified within the study corridor during the site reconnaissance conducted in support of the EA preparation (Sundermeyer et al. 2007).

While no impacts on HPAs were identified, there is a possibility that an accidental discovery of archaeological resources may be encountered during construction. If buried cultural materials were encountered during construction, the contractor would cease work in the immediate area and notify the State Historic Preservation Officer.

SECTION 6
ENVIRONMENTAL COMPLIANCE AND COORDINATION

6.1 CONSULTATION

6.1.1 Cooperating Agency Review

The Preliminary version of the Draft EA was reviewed by the TPWD as cooperating agency in the preparation of the document. The proposed action was modified to minimize potential impacts on natural resources identified by the agency.

6.1.2 Public Review of Draft EA

Copies of the Draft EA were distributed for a 30-day public review period, ending October 22, 2007, to agency representatives and general managers of irrigation districts listed below. Review letters on the Draft EA were received from the USFWS, TCEQ, THC, and USACE. Those letters are provided in Appendix D.

Biological Resources

Russell Hooten
Texas Parks and Wildlife Department
Wildlife Habitat Assessment Program

Kay Jenkins
Texas Parks and Wildlife Department
State Parks Division

Steve Benn, Manager
Las Palomas Wildlife Management Area Texas Parks and Wildlife Department

Ken Merritt, Manager
Lower Rio Grande Valley National Wildlife Refuge
U.S. Fish and Wildlife Service

Ernesto Reyes
Ecological Services
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Cultural Resources

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Texas Historical Commission

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State and Federal Regional Points of Contact

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Michael P. Jansky
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Irrigation Districts

- Adams Garden Irrigation District
- Donna Irrigation District (Hidalgo County No. 1)
- Harlingen Irrigation District
- La Feria Irrigation District (Cameron County No. 3)
- Mercedes Irrigation District (Hidalgo and Cameron County No. 9)
- Progreso Irrigation District
- San Juan Irrigation District (Hidalgo County No. 1)
- Santa Maria Irrigation District (Cameron County No. 4)

6.2 LIST OF CONTRIBUTORS

Tables 6.1 and 6.2 list contributors to the preparation of this Environmental Assessment for improvements to the Main and North Floodway Levee System, and development of technical support studies.

Table 6.1 Preparers of the Environmental Assessment and Technical Studies

Name	Organization	Degree	Years Experience	Project Role
R.C. Wooten	Parsons	Ph.D. Biology/Ecology	34	Technical director; NEPA compliance
Carlos Victoria-Rueda.	Parsons	Ph.D., Environmental Engineering	22	Project manager; water resources evaluation
James Hinson	Parsons	M.S., Wildlife Science	16	Vegetation and wildlife analyses; field studies supervision
Anthony Davis	Parsons	B.S., Civil Engineering	30	Air quality, noise, environmental health, socioeconomics
Taylor Houston	Parsons	M.S., Geography-Environmental Resources	6	Wetlands, natural resources mapping, land use
Jill Noel	Parsons	M.S., Botany	8	Vegetation, threatened and endangered species
Sherrie Keenan	Parsons	B.A., Journalism	28	Technical editor
Scott Sundermeyer	LGGROUP	B.A., Archaeology	16	Cultural resources evaluation

Table 6.2 Technical Review of the Environmental Assessment

Name	Agency	Degree	Years Experience	Project Role
Daniel Borunda	USIBWC Environmental Protection Division	M.S. Fisheries and Wildlife Science	10	Project manager; NEPA compliance; document review
Carlos Peña	USIBWC Environmental Protection Division	M.S. Environmental Engineering	17	NEPA compliance; document review
Raymundo Aguirre	USIBWC Engineering Division	Ph.D. Civil Engineering	49	Engineering, hydraulics and hydrology; document review
Enrique Reyes	USIBWC O&M Division	B.S., P.E., Civil Engineering	32	LRGFCP Project Manager; document review
Russell Hooten	TPWD, Habitat Assessment Program	M.S. Biology	15	Natural resources; document reviedw
Kay Jenkins	TPWD, State Parks Division	M.S. Biology	18	Natural resources; document review

SECTION 7
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APPENDIX A

DETAILED MAPS OF LEVEE ALIGNMENT, RIGHT-OF-WAY AND POTENTIAL IMPROVEMENT AREAS

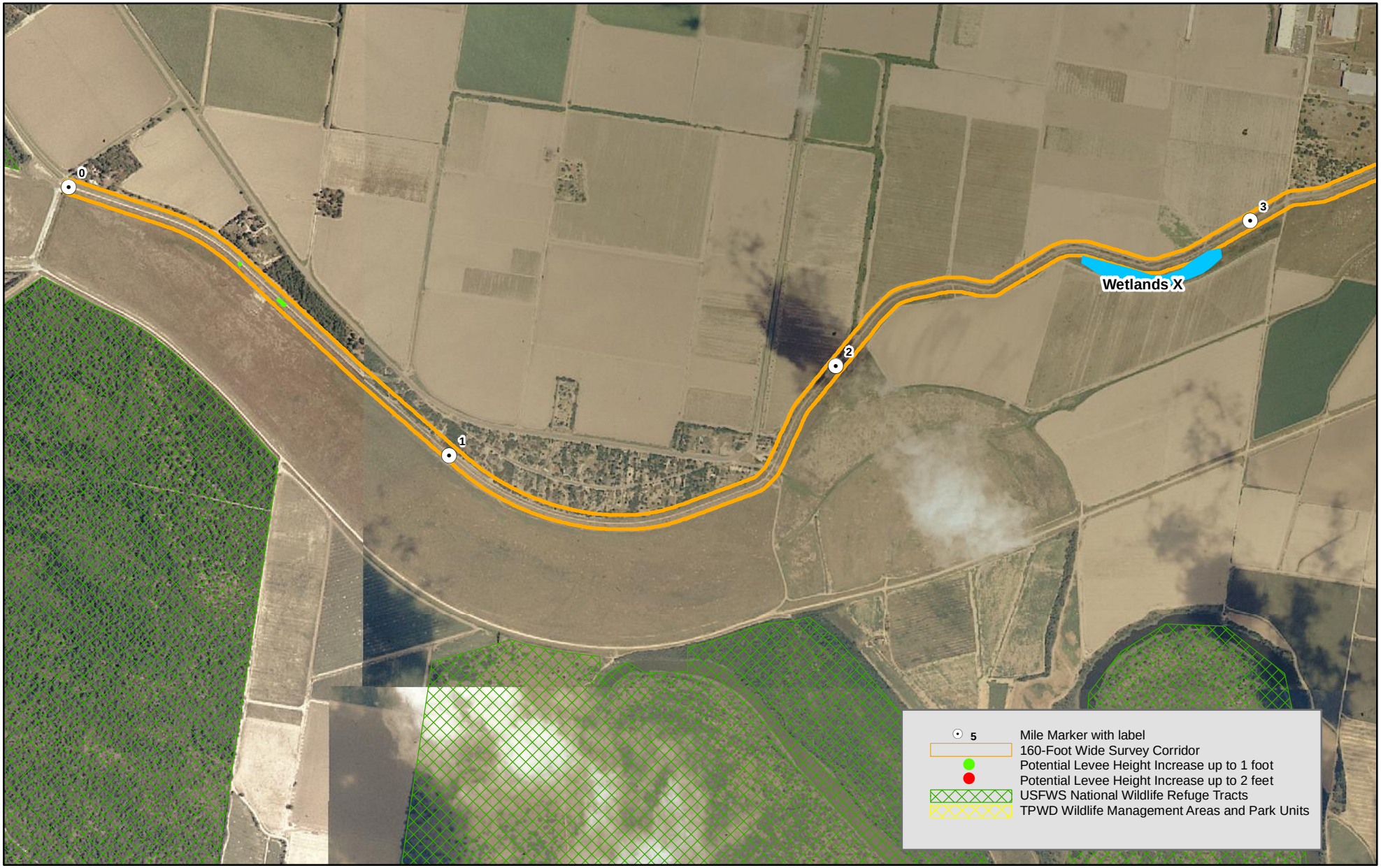

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Figure A-1
Miles 0 - 3

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

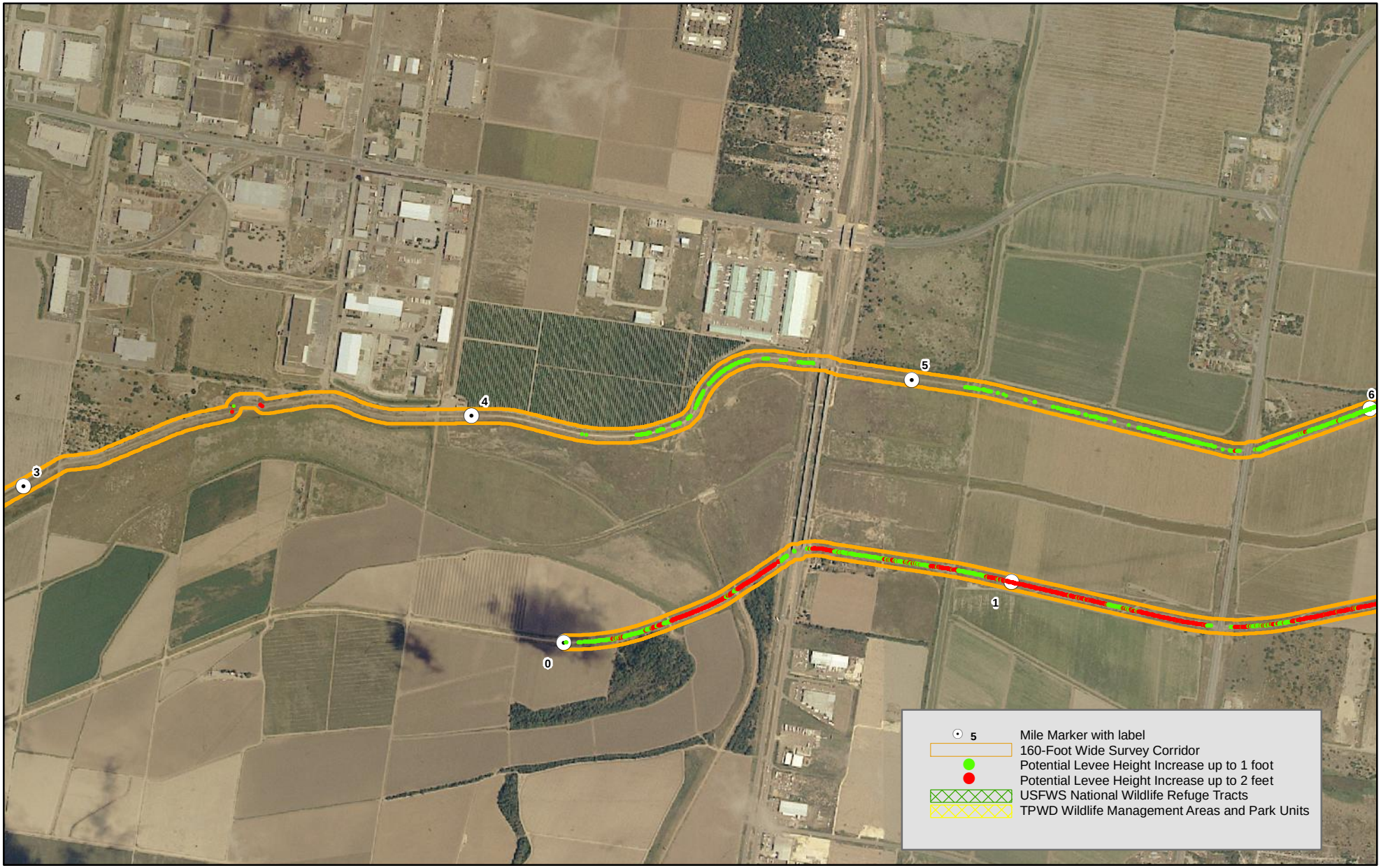

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Figure A-2
Miles 3 - 5

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United States Section

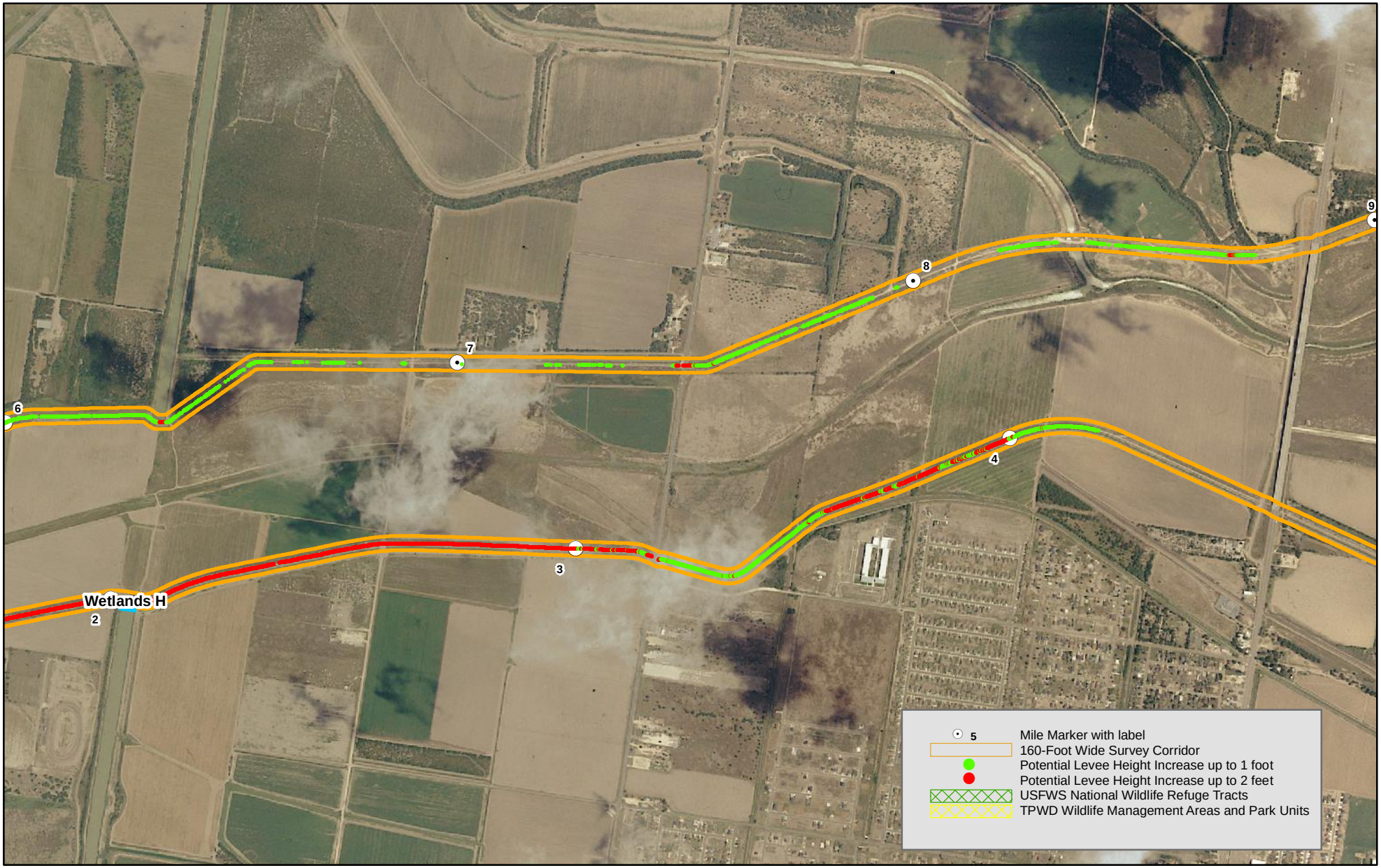

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Figure A-3
Miles 5 - 8

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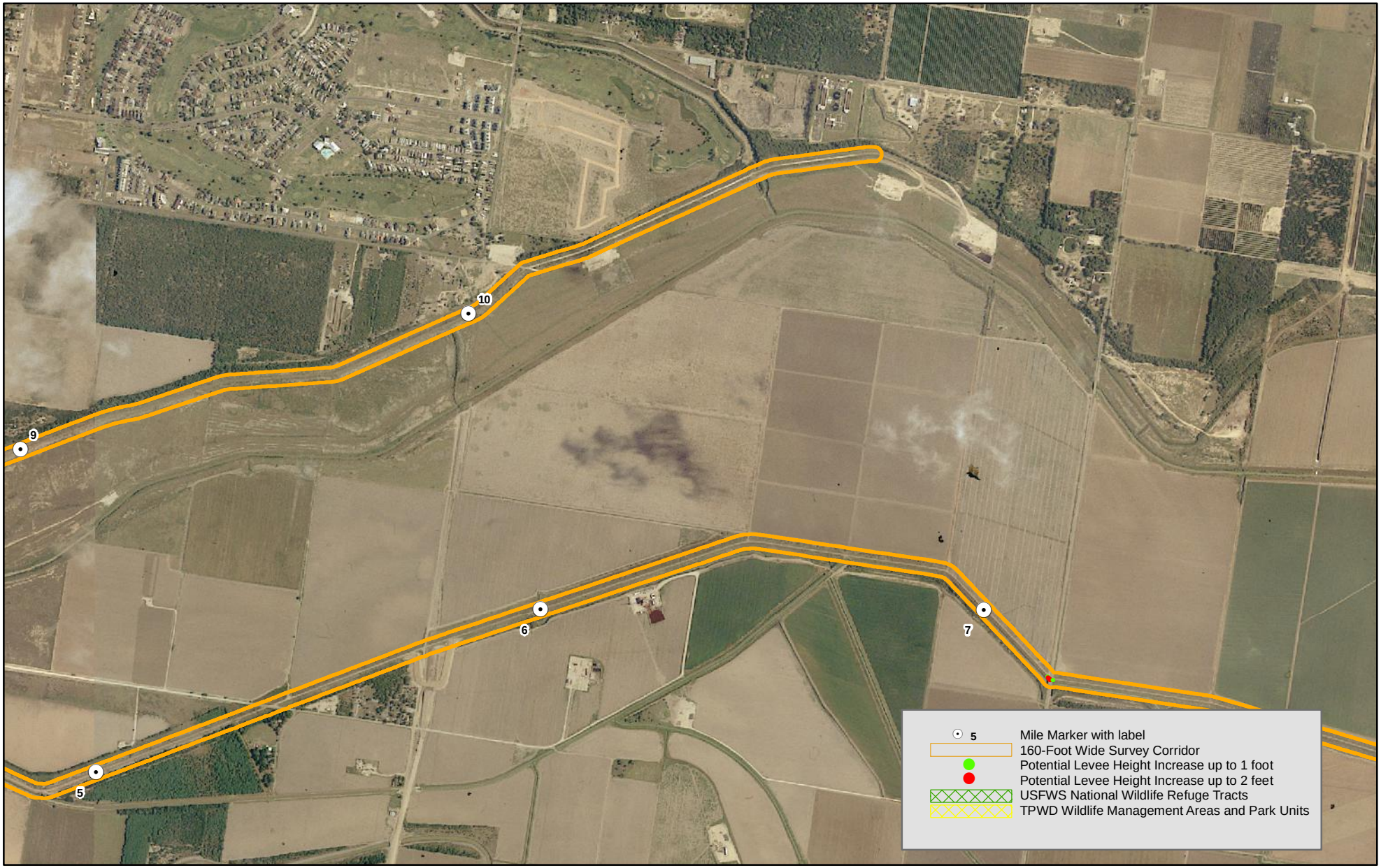

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Figure A-4
Miles 8 - 10

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Figure A-5
Miles 11 - 14

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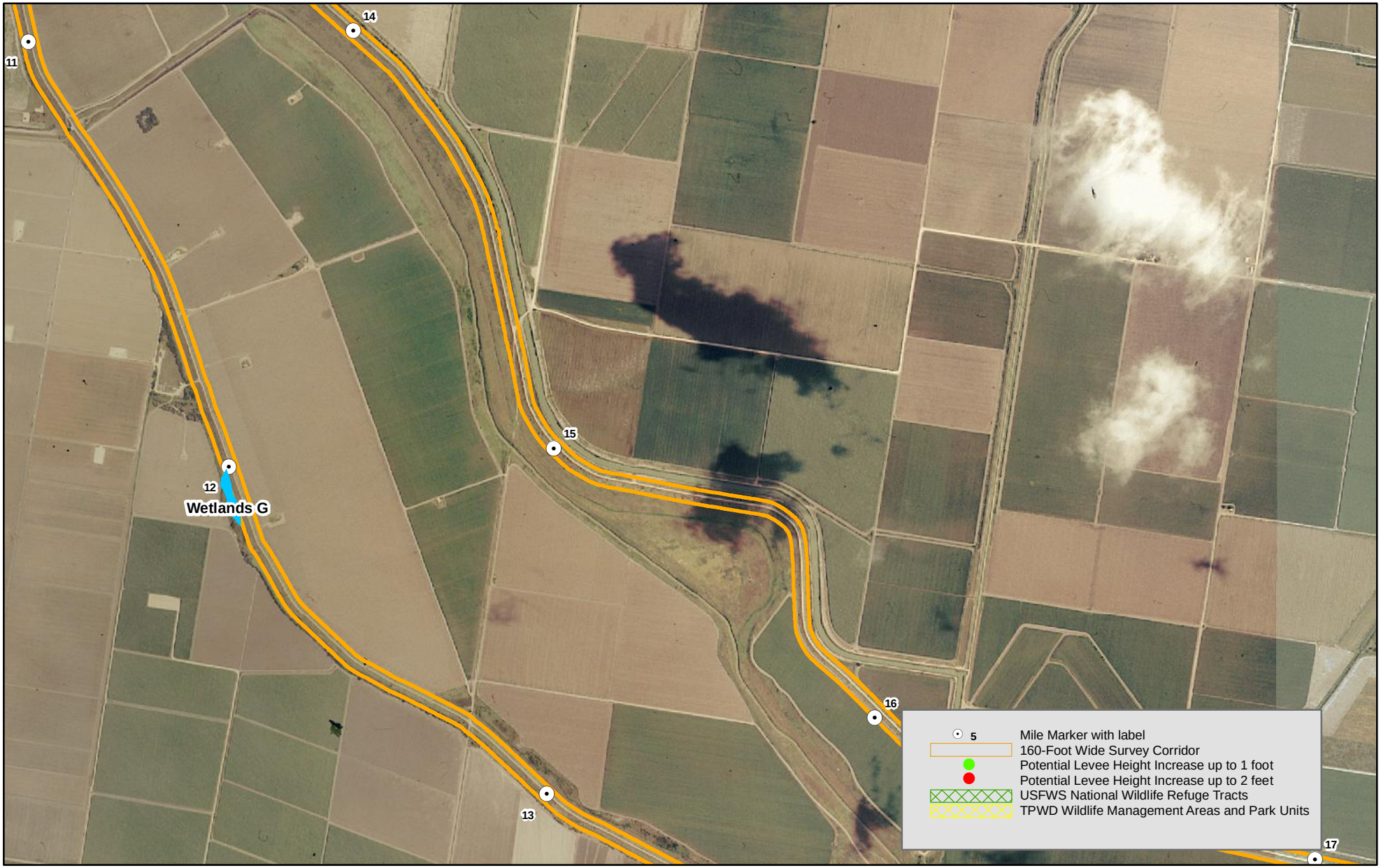

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Figure A-6
Miles 14 - 17

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United States Section

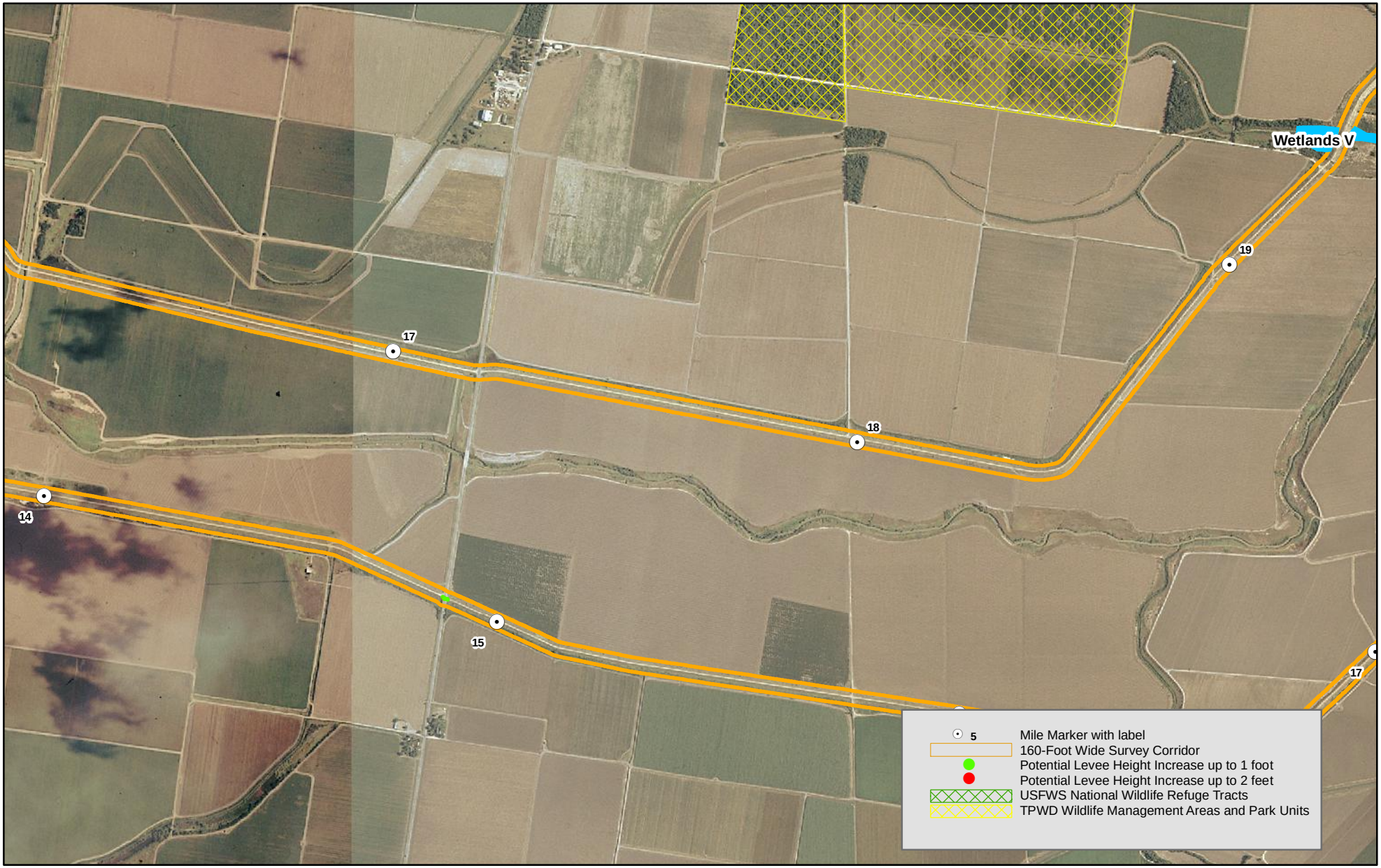

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Figure A-7
Miles 17 - 19

Main and North Floodways Levee Systems EA
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United States Section

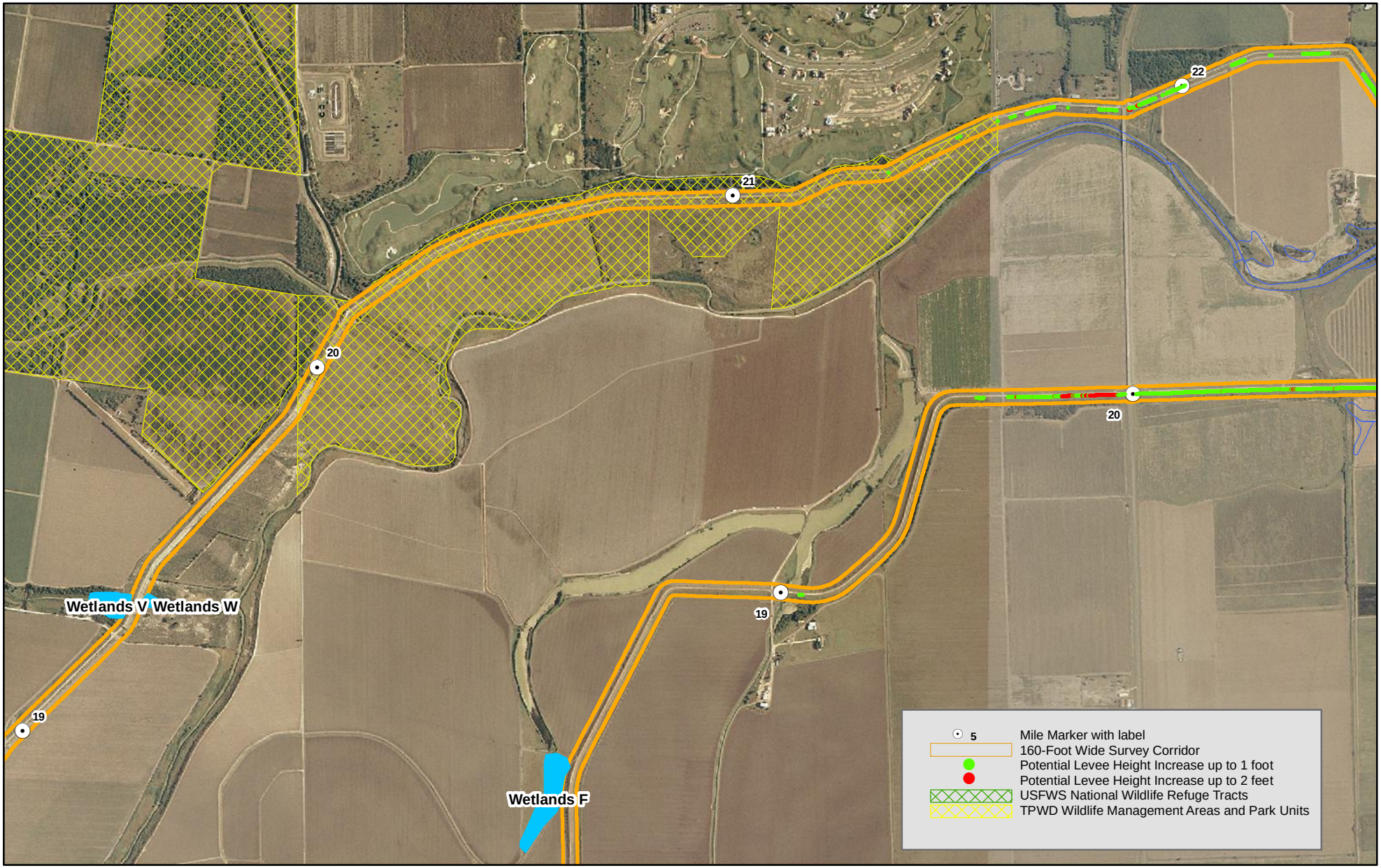

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Figure A-8
Miles 19 - 22

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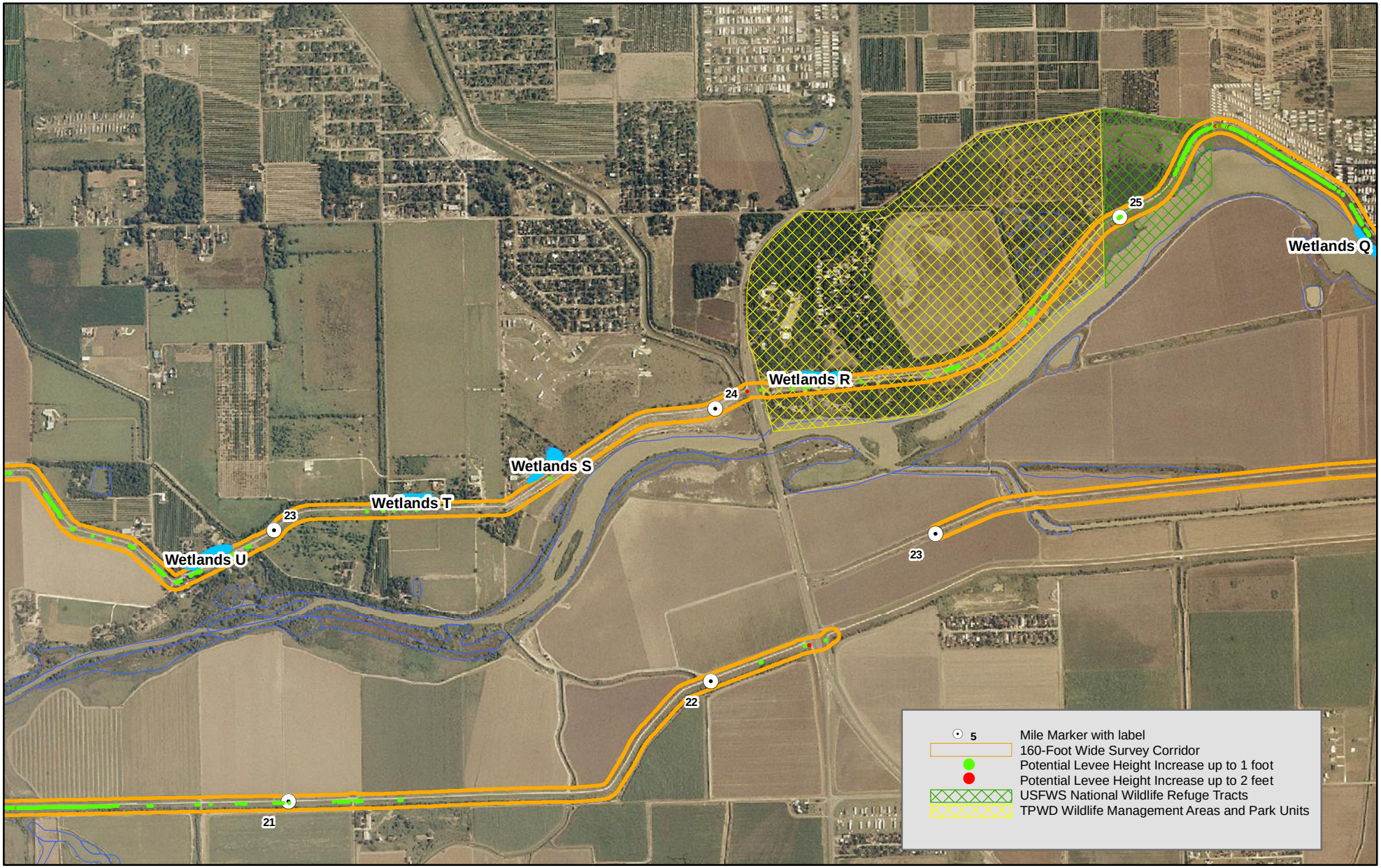

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Figure A-9
Miles 22 - 25

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United States Section

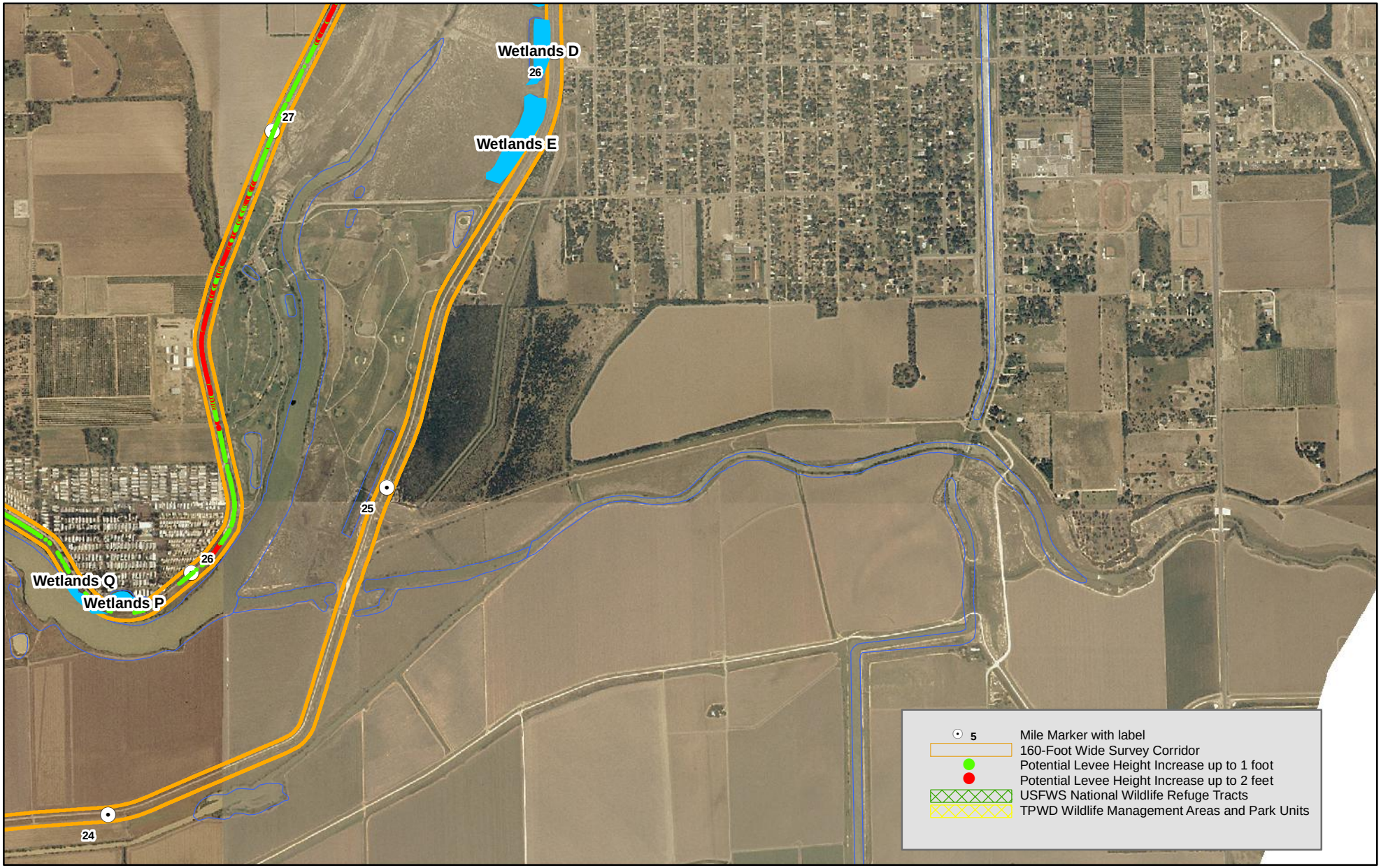

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Figure A-10
Miles 25 - 26

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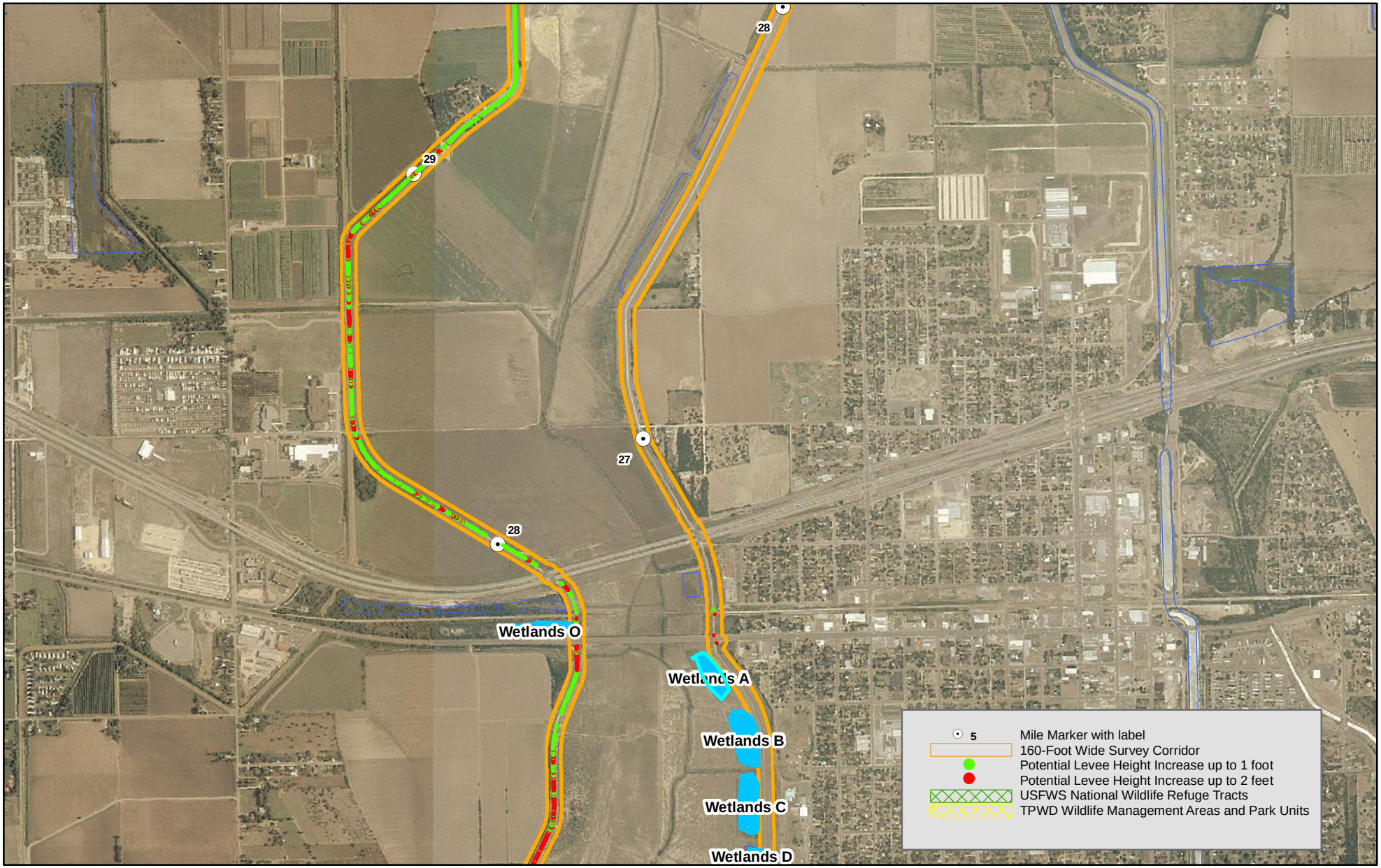

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Figure A-11
Miles 29 - 30

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United States Section

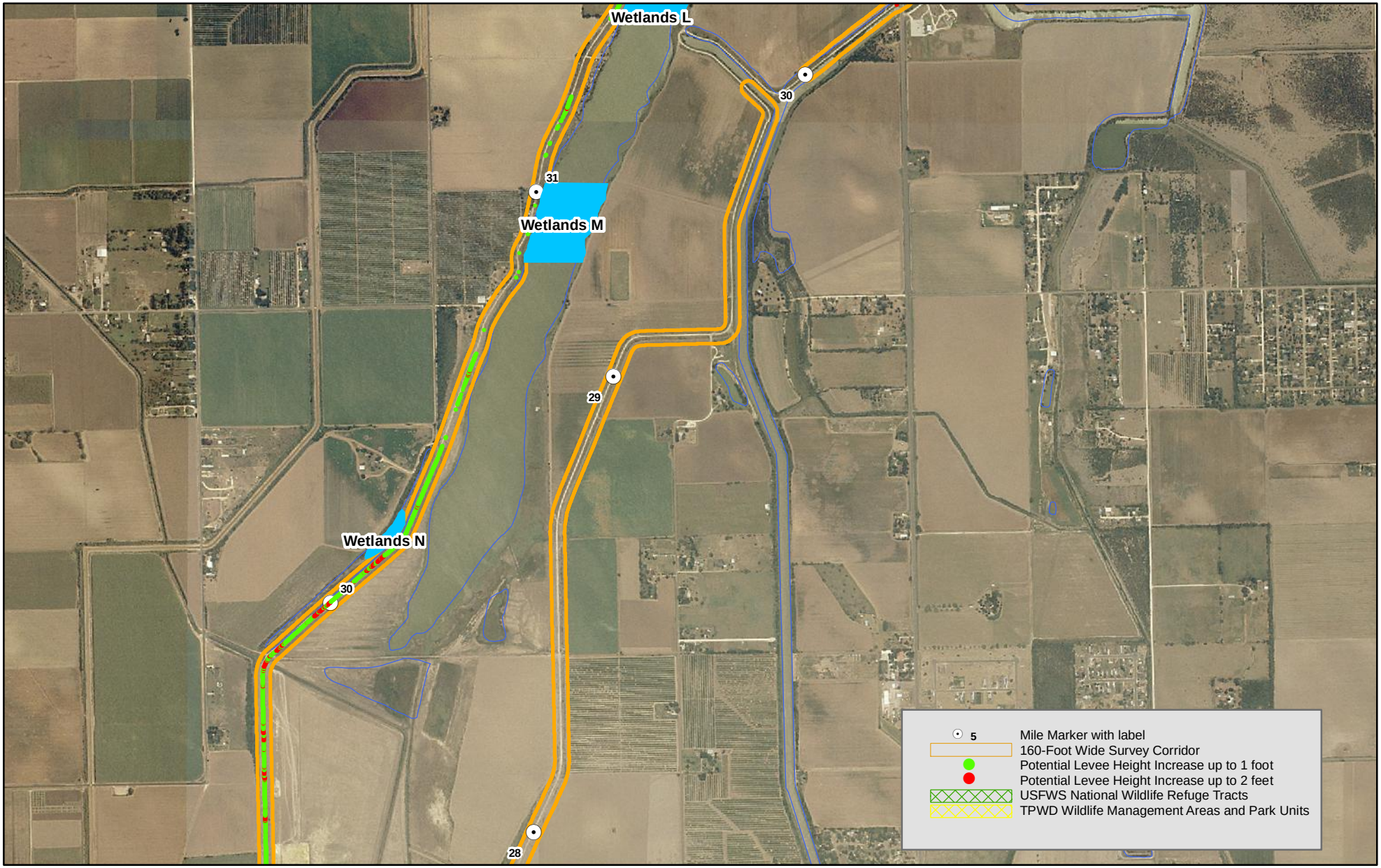

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Figure A-12
Miles 30 - 31

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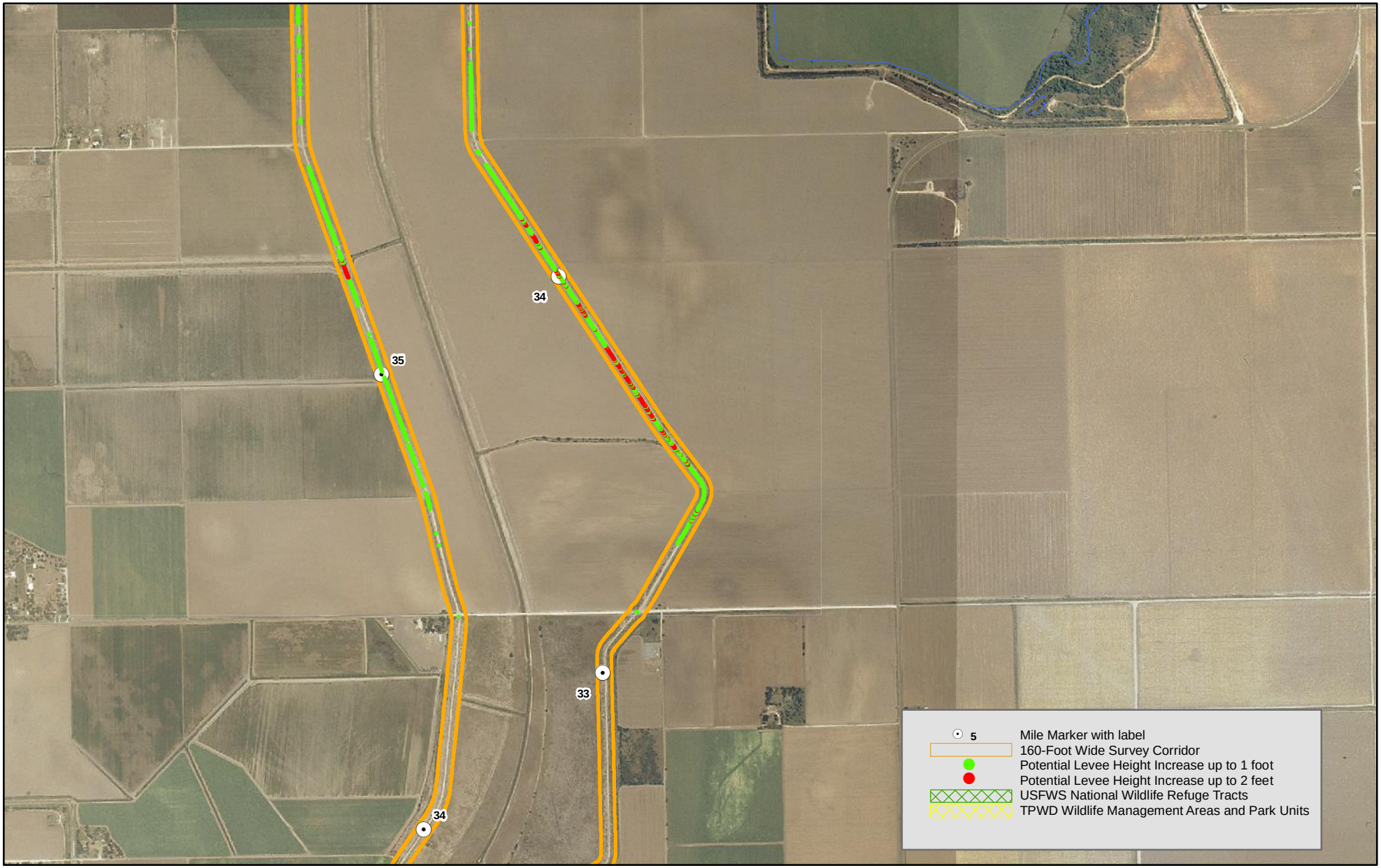

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Figure A-13
Miles 31 - 33

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

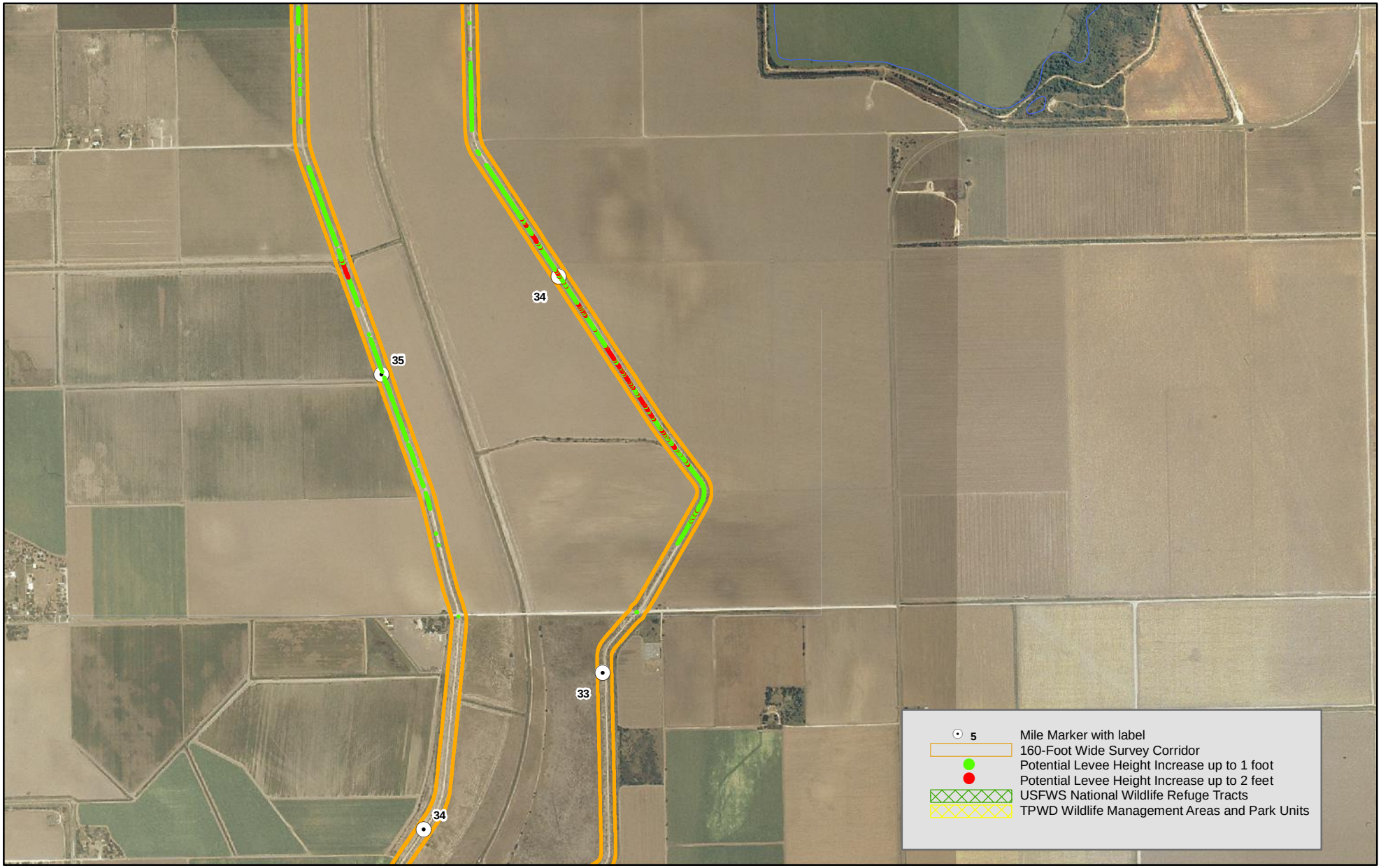

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Figure A-14
Miles 34 - 36

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United States Section

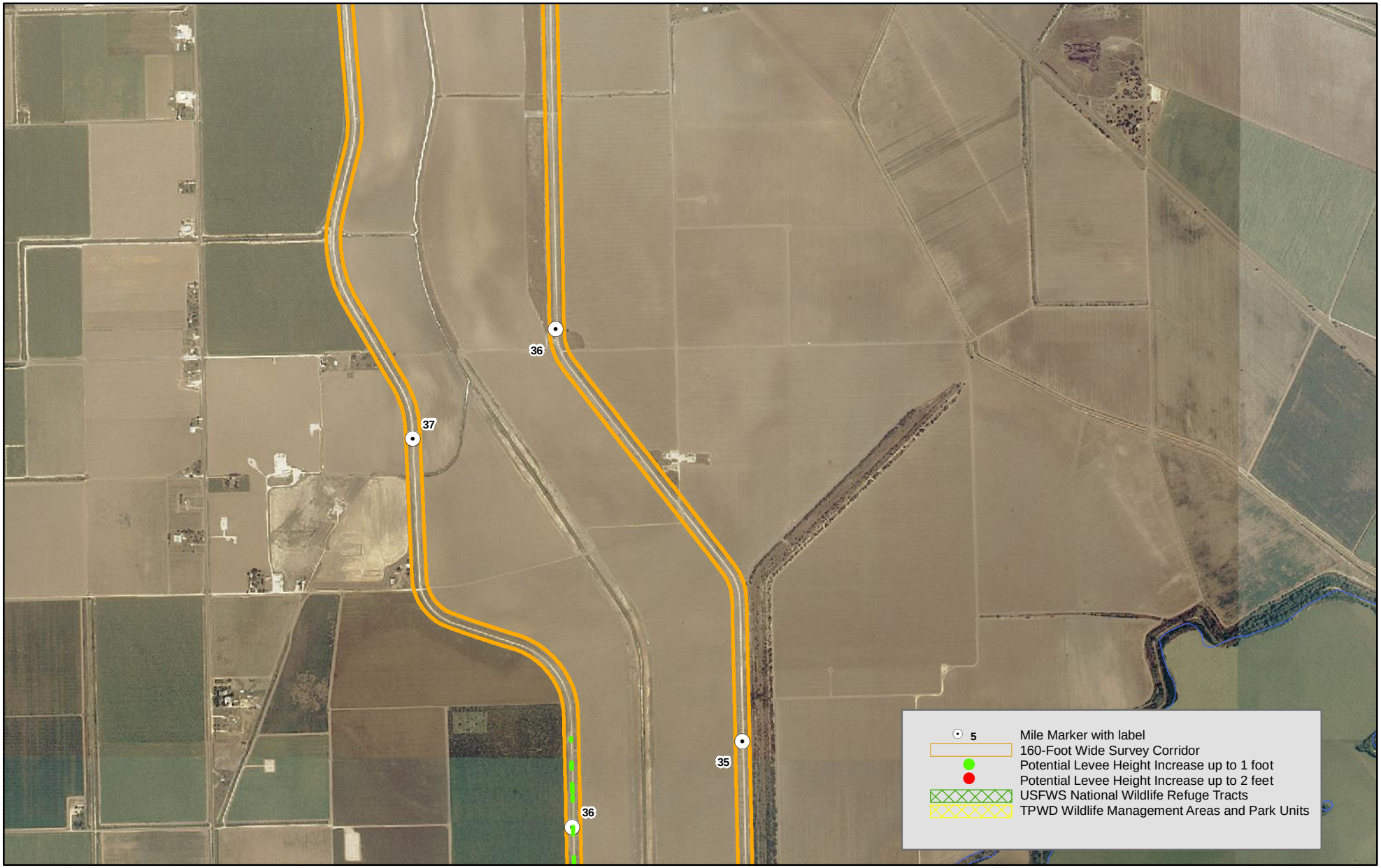

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Figure A-15
Miles 36 - 38

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

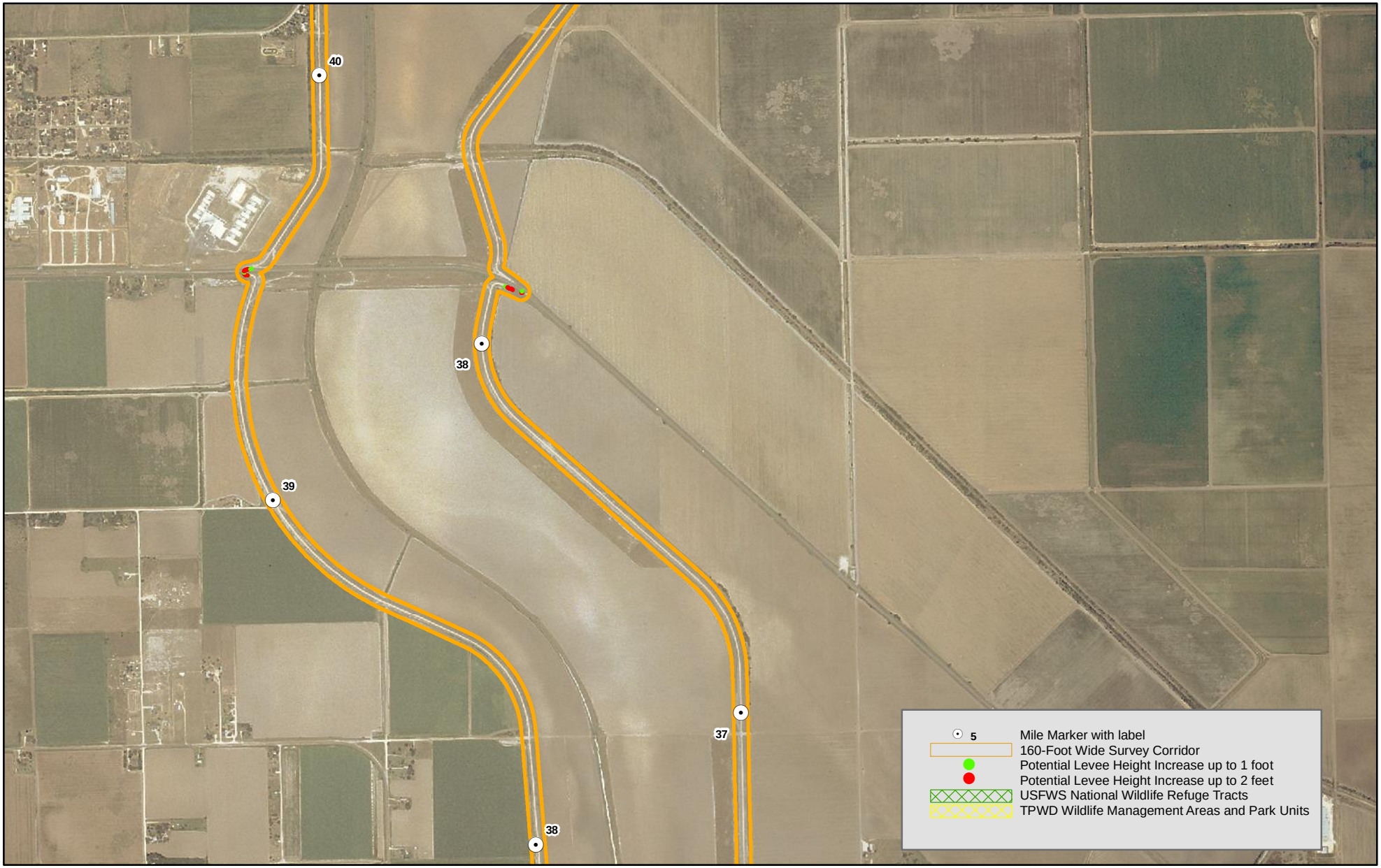

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Figure A-16
Miles 38 - 40

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United States Section

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Figure A-17
Miles 40 - 44

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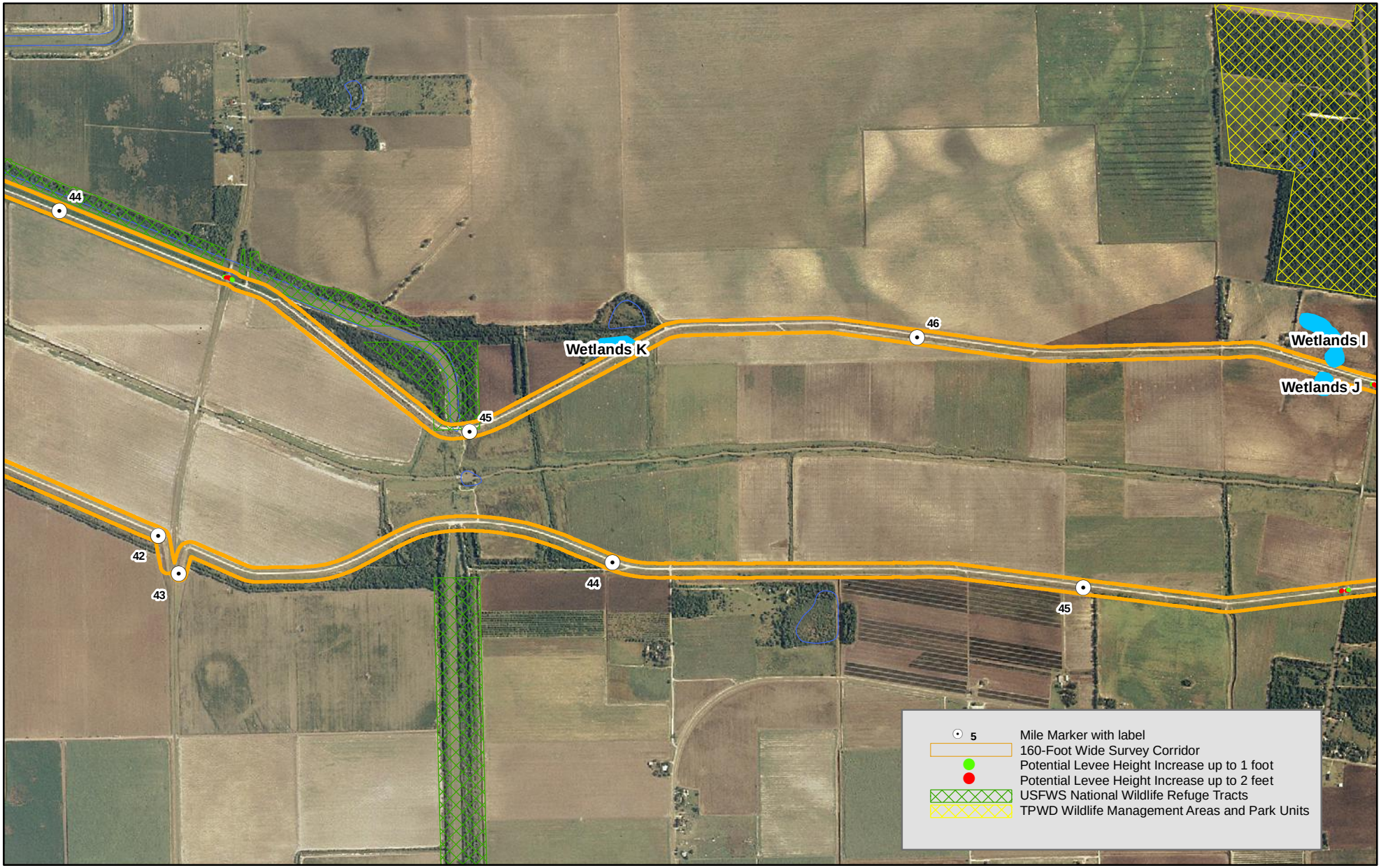

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Figure A-18
Miles 44 - 47

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

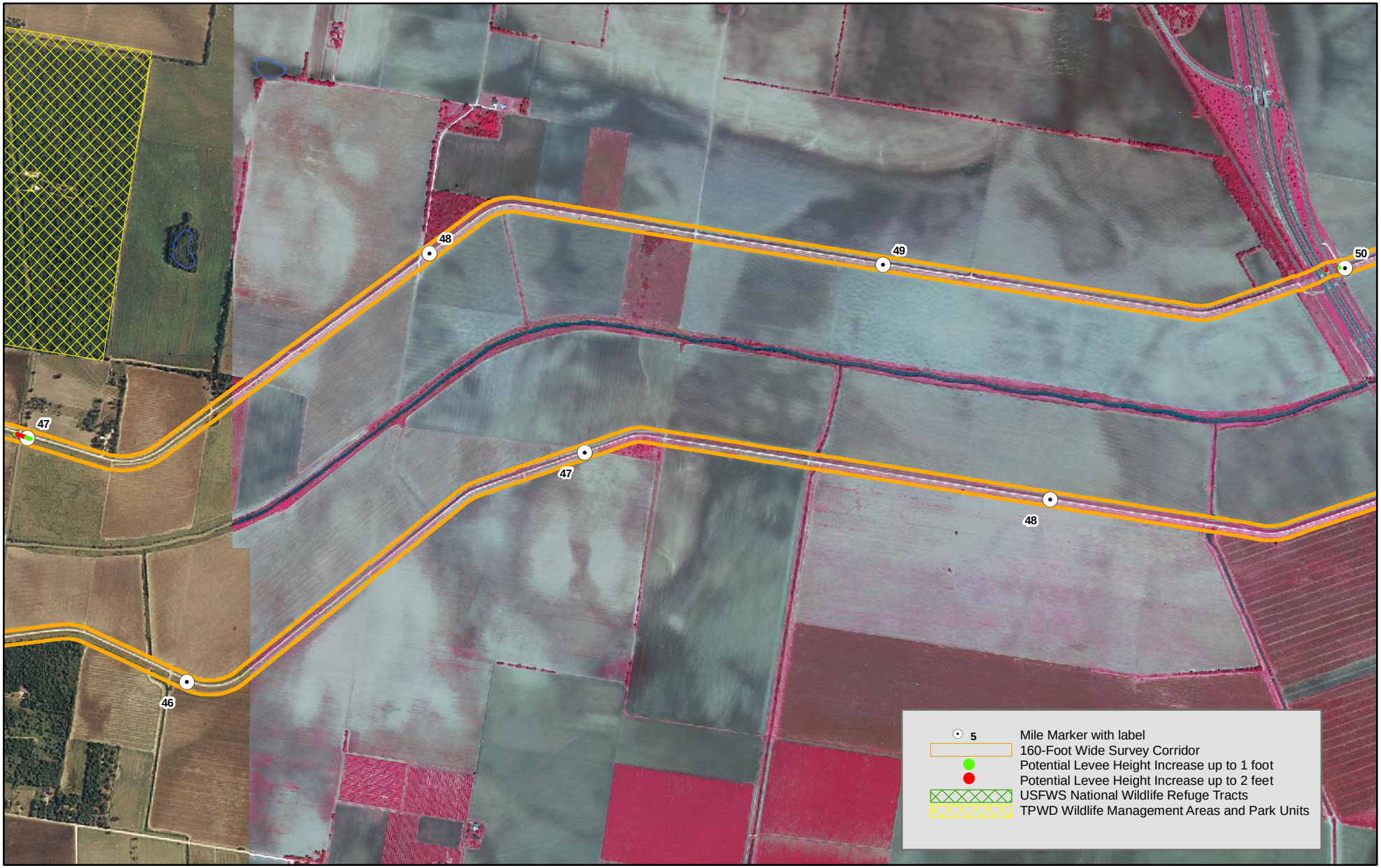

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Figure A-19
Miles 47 - 50

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

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Figure A-20
Miles 50 - 53

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

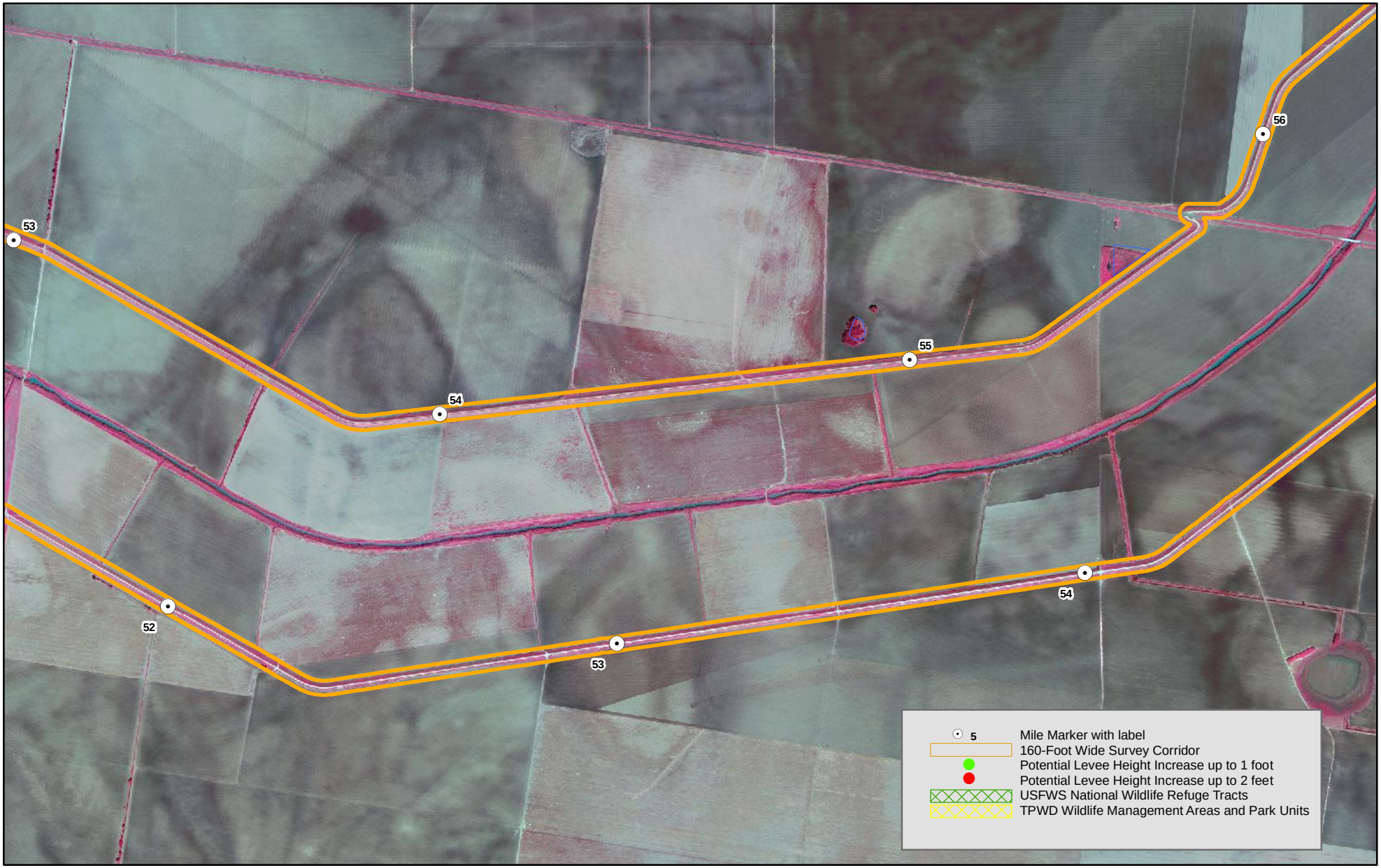

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Figure A-21
Miles 53 - 56

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

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Figure A-22
Miles 56 - 59

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International Boundary and Water Commission,
United States Section

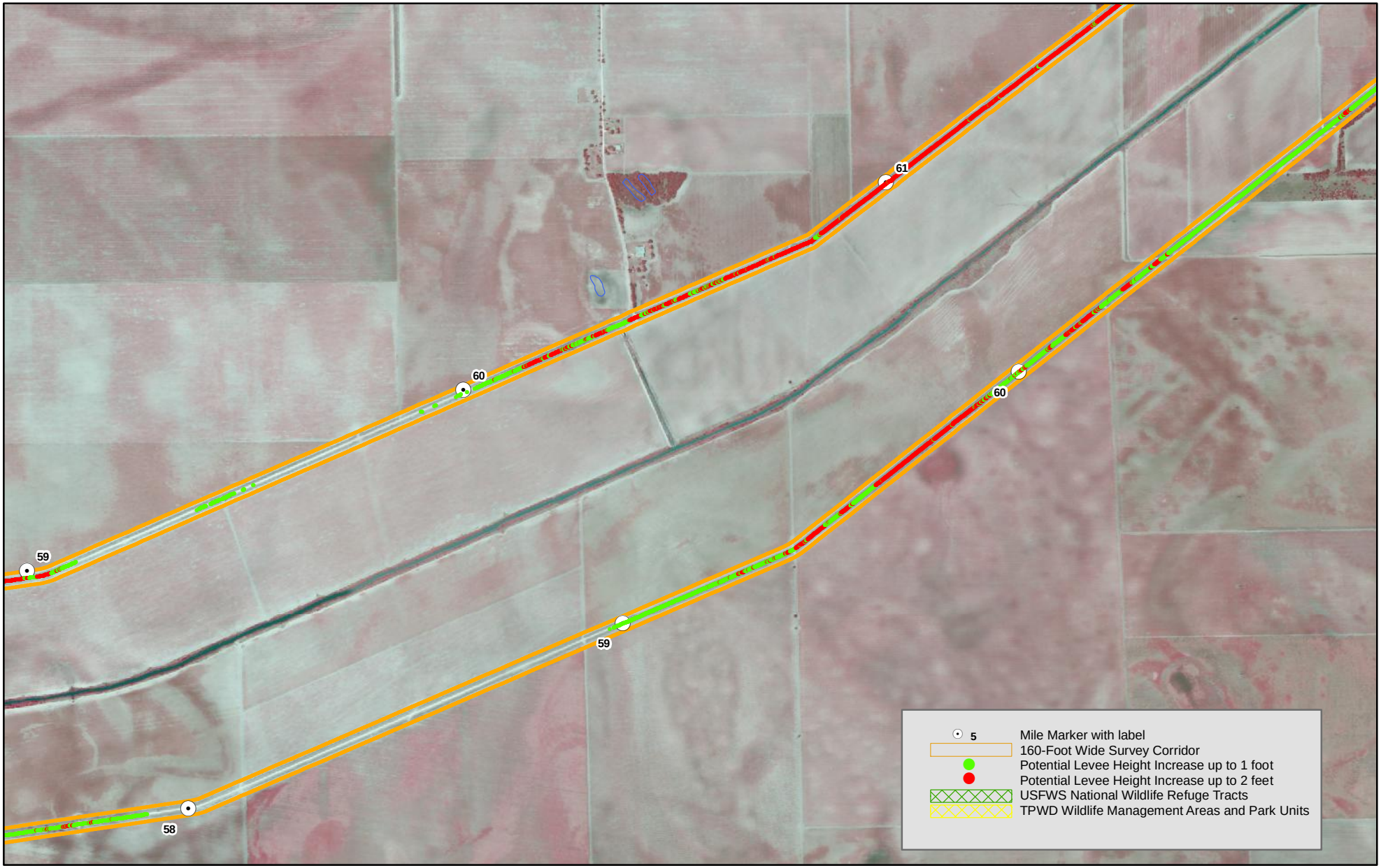

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Figure A-23
Miles 59 - 61

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

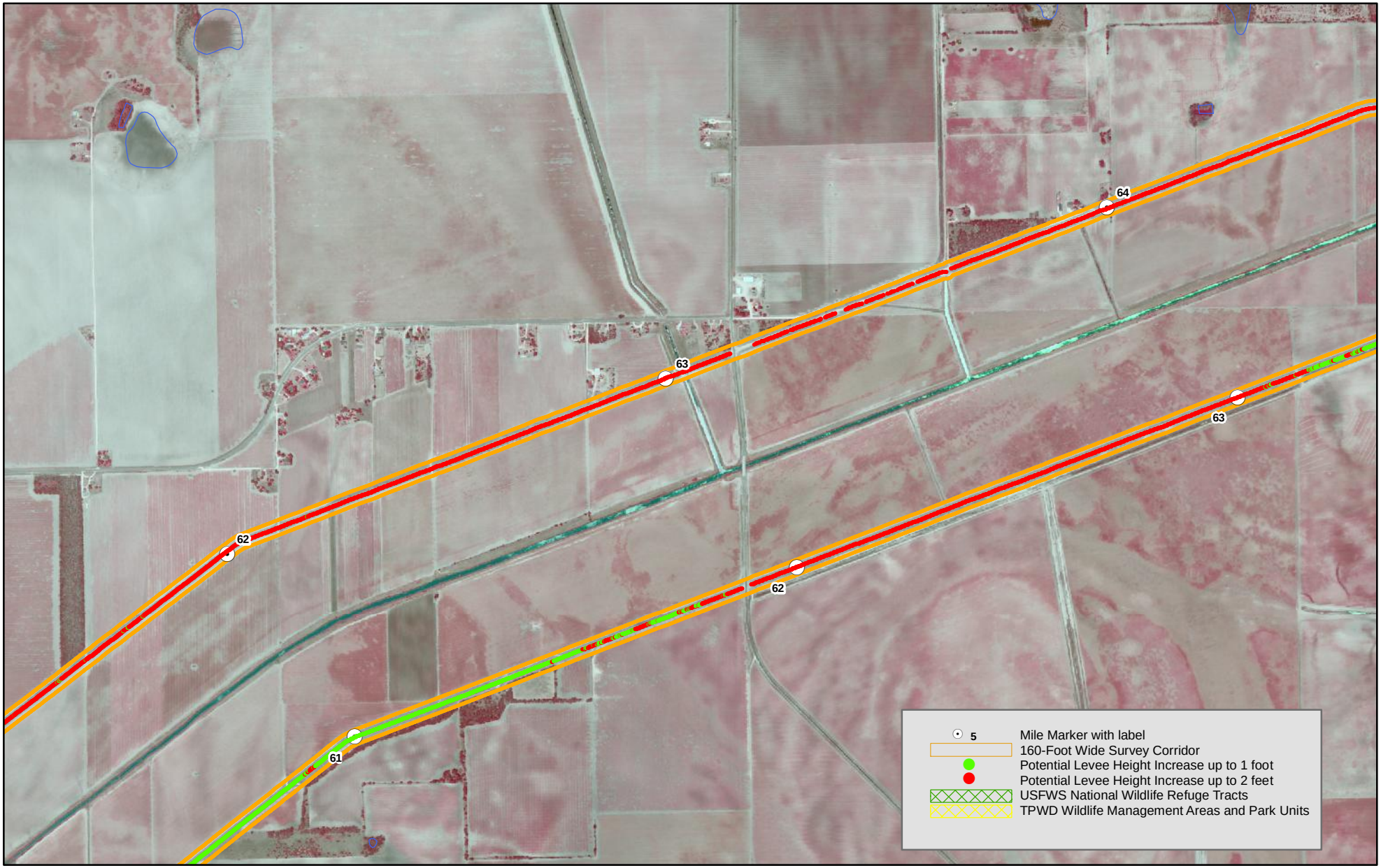

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Figure A-24
Miles 62 - 64

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

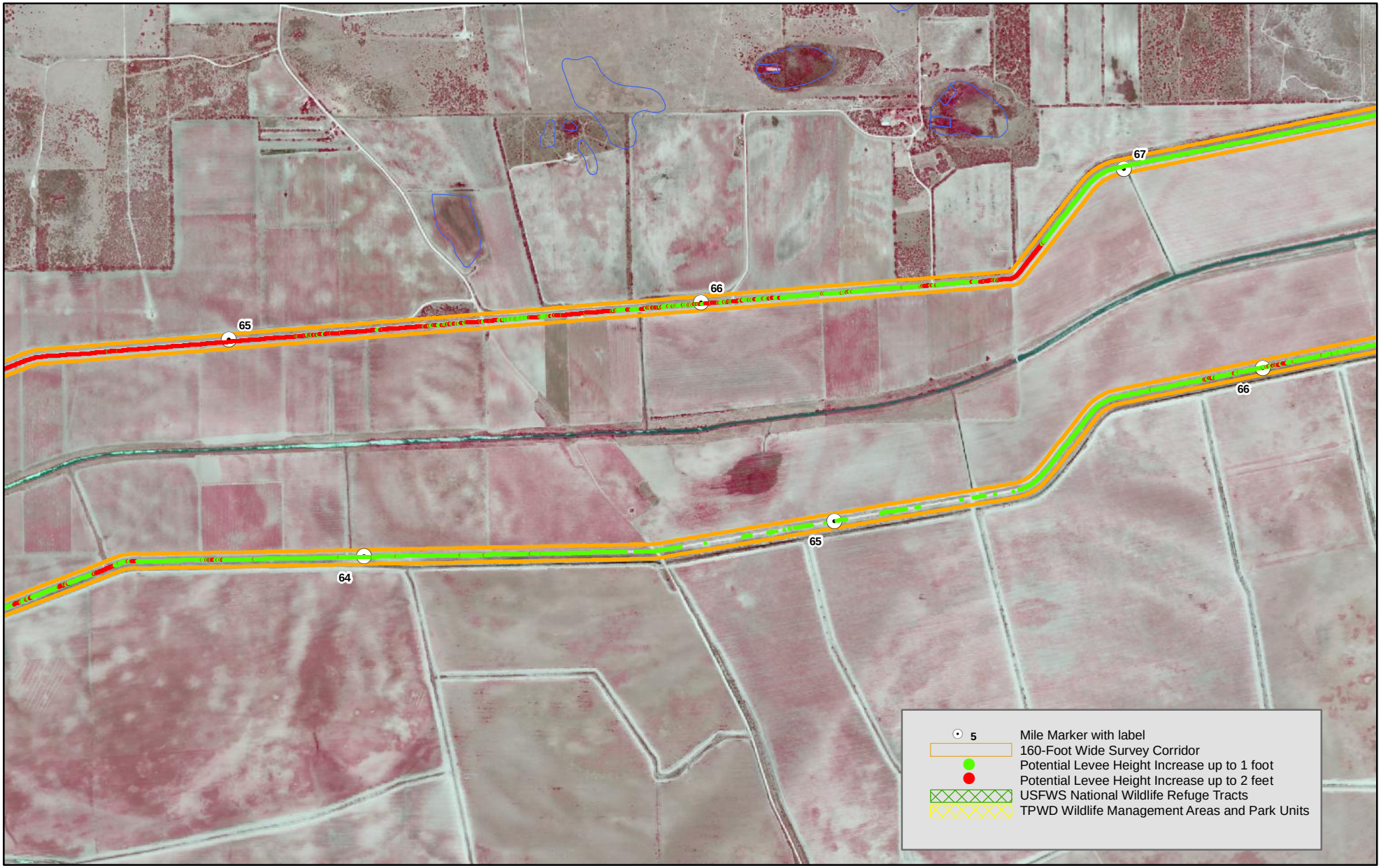

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Figure A-25
Miles 64 - 67

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

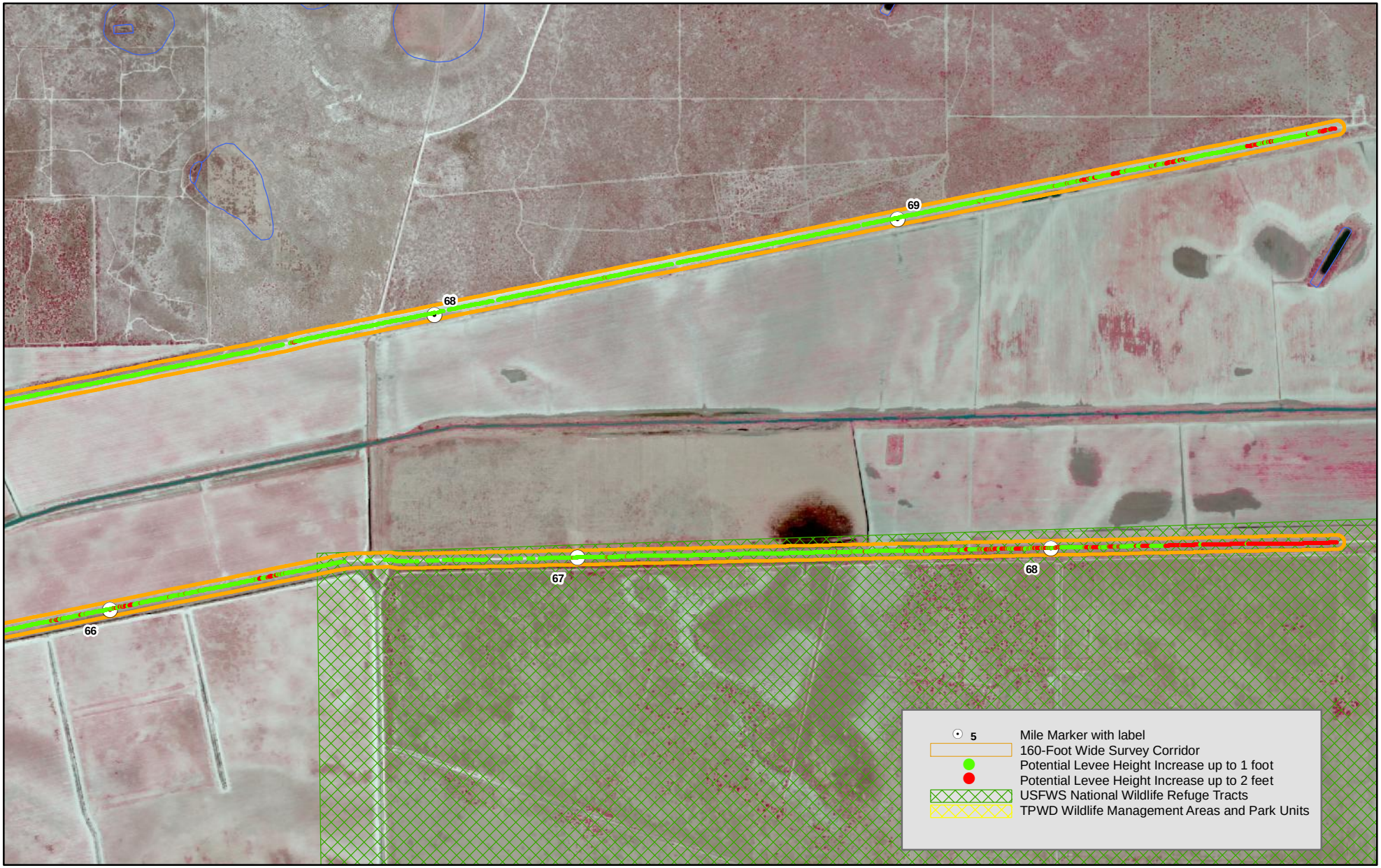

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Figure A-26
Miles 67 - end

Main and North Floodways Levee Systems EA
International Boundary and Water Commission,
United States Section

APPENDIX B
HABITAT OF THREATENED AND ENDANGERED SPECIES POTENTIALLY OCCURRING WITHIN COUNTIES INTERSECTING THE LEVEE SYSTEM

Table B.1 T&E Plant Species Potentially Occurring near the Project Area

Common Name	Scientific Name	Federal Status	State Status	Hidalgo County	Cameron County	Willacy County	Occurrence near project area? [1]	Description
South Texas ambrosia	*Ambrosia cheiranthifolia*	LE	E		X			open prairies and various scrublands on deep clay soil; flowering July-November
Star cactus	*Astrophytum asterias*	LE	E	X	X			gravelly saline clays or loams over the Catahoula and Frio formations, on gentle slopes and flats in grasslands or shrublands; flowering in May
Texas ayenia	*Ayenia limitaris*	LE	E	X	X	X	yes	woodlands on alluvial deposits on floodplains and terraces along the Rio Grande; flowering throughout the year with sufficient rainfall
Walker's manioc	*Manihot walkerae*	LE	E	X			yes	periphery of native brush in sandy loam; also on caliche cuestas; flowering April-September (following rains?)
In addition to the state listed threatened and endangered species provided in the table, there are four plant species listed as Species of Concern that may occur in the project area. These Species of Concern include Bailey's ballmoss (*Tillandsia baileyi*), Mexican mud-plantain (*Heteranthera mexicana*), Runyon's water-willow (*Justica runyonii*), and Vasey's adelia (*Adalia vaseyi*).								

[1] Occurrences of the species were documented on and/or possibly within 1.5 miles of the project route. Occurrence records provided by TPWD.

Table B.2 T&E Fish and Aquatic Invertebrate Species Potentially Occurring near the Project Area

Common Name	Scientific Name	Federal Status	State Status	Hidalgo County	Cameron County	Willacy County	Occurrence near project area? [1]	Description
Opossum pipefish	*Microphis brachyurus*		T			X		brooding adults found in fresh or low salinity waters and young move or are carried into more saline waters after birth; southern coastal areas
Blackfin goby	*Gobionellus atripinnis*		T		X			Southern coastal area; brackish and freshwater coastal streams
Rio Grande silvery minnow	*Hybognathus amarus*	LE	E	X	X			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
River goby	*Awaous banana*		T	X	X		yes	Southern coastal waters; clear water with slow to moderate current, sandy or hard bottom, and little or no vegetation; also enters brackish and ocean waters
Texas hornshell	*Popenaias popeii*	C		X	X			Mollusk species inhabits both ends of narrow shallow runs over bedrock, in areas where small-grained materials collect in crevices, along river banks, and at the base of boulders; not known from impoundments; Rio Grande Basin and several rivers in Mexico

[1] Occurrences of the species were documented on and/or possibly within 1.5 miles of the project route. Occurrence records provided by TPWD.

Table B.3 T&E Amphibian Species Potentially Occurring near the Project Area

Common Name	Scientific Name	Federal Status	State Status	Hidalgo County	Cameron County	Willacy County	Occurrence near project area? [1]	Description
Black-spotted newt	*Notophthalmus meridionalis*		T	X	X	X	yes	can be found in wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods; Gulf Coastal Plain south of the San Antonio River
Mexican treefrog	*Smilisca baudinii*		T	X	X	X		subtropical region of extreme southern Texas; breeds May-October coinciding with rainfall, eggs laid in temporary rain pools
Sheep frog	*Hypopachus variolosus*		T	X	X	X		predominantly grassland and savanna; moist sites in arid areas
South Texas siren (large form)	*Siren sp 1*		T	X	X	X	yes	wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods, but does require some moisture to remain; southern Texas south of Balcones Escarpment; breeds February-June
White-lipped frog	*Leptodactylus labialis*		T	X	X			grasslands, cultivated fields, roadside ditches, and a wide variety of other habitats; often hides under rocks or in burrows under clumps of grass; species requirements incompatible with widespread habitat alteration and pesticide use in south Texas

[1] Occurrences of the species were documented on and/or possibly within 1.5 miles of the project route. Occurrence records provided by TPWD.

Table B.4 T&E Reptilian Species Potentially Occurring near the Project Area

Common Name	Scientific Name	Federal Status	State Status	Hidalgo County	Cameron County	Willacy County	Occurrence near project area? [1]	Description
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	LE	E		X	X		Gulf and bay system
Black-striped snake	*Coniophanes imperialis*		T	X	X	X		extreme south Texas; semi-arid coastal plain, warm, moist micro-habitats and sandy soil; proficient burrower; eggs laid April-June
Green sea turtle	*Chelonia mydas*	LT	T		X	X		Gulf and bay system
Indigo snake	*Drymarchon corais*		T	X	X	X	yes	Texas south of the Guadalupe River and Balcones Escarpment; thornbush-chaparral woodlands of south Texas, in particular dense riparian corridors; can do well in suburban and irrigated croplands if not molested or indirectly poisoned; requires moist microhabitats, such as rodent burrows, for shelter
Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	E		X	X		Gulf and bay system
Leatherback sea turtle	*Dermochelys coriacea*	LE	E		X	X		Gulf and bay system
Loggerhead sea turtle	*Caretta caretta*	LT	T		X	X		Gulf and bay system
Northern cat-eyed snake	*Leptodeira septentrionalis septentrionalis*		T	X	X	X		Gulf Coastal Plain south of the Nueces River; thorn brush woodland; dense thickets bordering ponds and streams; semi-arboreal; nocturnal

Reticulate collared lizard	*Crotaphytus reticulatus*		T	X				requires open brush-grasslands; thorn-scrub vegetation, usually on well-drained rolling terrain of shallow gravel, caliche, or sandy soil; often on scattered flat rocks below escarpments or isolated rock outcrops among scattered clumps of prickly pear and mesquite
Speckled racer	*Drymobius margaritiferus*		T	X	X	X	yes	extreme south Texas; dense thickets near water, Texas palm groves, riparian woodlands; often in areas with much vegetation litter on ground; breeds April-August
Texas horned lizard	*Phrynosoma cornutum*		T	X	X	X		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 rock when inactive; breeds March-September
Texas scarlet snake	*Cemophora coccinea lineri*		T		X	X		mixed hardwood scrub on sandy soil; feeds on reptile eggs; semi-fossorial; active April-September
Texas tortoise	*Gopherus berlandieri*		T	X	X	X	yes	open brush with a grass understory is preferred; open grass and bare ground are avoided; when inactive occupies shallow depressions at base of bush or cactus, sometimes in underground burrows or under objects; longevity greater than 50 years; active March-November; breeds April-November

[1] Occurrences of the species were documented on and/or possibly within 1.5 miles of the project route. Occurrence records provided by TPWD.

Table B.5 T&E Bird Species Potentially Occurring near the Project Area

Common Name	Scientific Name	Federal Status	State Status	Hidalgo County	Cameron County	Willacy County	Occurs near project area? [1]	Description
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	T	X	X	X		currently potential migrant through most of state, winters along gulf coast
Brown Pelican	*Pelecanus occidentalis*	LE	E		X	X		largely coastal and near shore areas, where it roosts and nests on islands and spoil banks
Cactus Ferruginous Pygmy-owl	*Glaucidium brasilianum cactorum*		T	X	X	X		riparian trees, brush, palm, and mesquite thickets; during day also roosts in small caves and recesses on slopes of low hills; breeding April to June
Common Black-Hawk	*Buteogallus anthracinus*		T	X	X	X		cottonwood-lined rivers and streams; willow tree groves on the lower Rio Grande floodplain; formerly bred in south Texas
Eskimo Curlew	*Numenius borealis*	LE	E		X	X		historic; nonbreeding: grasslands, pastures, plowed fields, and less frequently, marshes and mudflats
Gray Hawk	*Asturina nitida*		T	X	X		yes	locally and irregularly along U.S.-Mexico border; mature riparian woodlands and nearby semiarid mesquite and scrub grasslands; breeding range formerly extended north to southernmost Rio Grande floodplain of Texas
Interior Least Tern	*Sterna antillarum athalassos*	LE	E	X	X			subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know 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
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	LE	E		X	X		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
Northern Beardless-tyrannulet	*Camptostoma imberbe*		T	X	X	X		mesquite woodlands; near Rio Grande frequents cottonwood, willow, elm, and great leadtree; breeding April to July
Peregrine Falcon	*Falco peregrinus*	DL	E T	X	X	X		subspecies (*F p tundrius*) potential migrant through most of state, winters along coast; subspecies (*F p anatum*) resident, nests in west Texas

Piping Plover	*Charadrius melodus*	LT	T			X		wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats
Reddish Egret	*Egretta rufescens*		T	X	X	X		resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear
Rose-throated Becard	*Pachyramphus aglaiae*		T	X	X	X	yes	riparian trees, woodlands, open forest, scrub, and mangroves; breeding April to July
Sooty Tern	*Sterna fuscata*		T			X		predominately 'on the wing'; does not dive, but snatches small fish and squid with bill as it flies or hovers over water; breeding April-July
Texas Botteri's Sparrow	*Aimophila botterii texana*		T	X	X	X		grassland and short-grass plains with scattered bushes or shrubs, sagebrush, mesquite, or yucca; nests on ground of low clump of grasses
Tropical Parula	*Parula pitiayumi*		T	X	X	X		dense or open woods, undergrowth, brush, and trees along edges of rivers and resacas; breeding April to July
White-Faced Ibis	*Plegadis chihi*		T	X	X	X		prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats
White-Tailed Hawk	*Buteo albicaudatus*		T	X	X	X		near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May
Wood Stork	*Mycteria americana*		T	X	X	X		forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (*i.e.*, active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960
Zone-Tailed Hawk	*Buteo albonotatus*		T	X	X	X		arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions

[1] Occurrences of the species were documented on and/or possibly within 1.5 miles of the project route. Occurrence records provided by TPWD.

Table B.6 T&E Mammal Species Potentially Occurring near the Project Area

Common Name	Scientific Name	Federal Status	State Status	Hidalgo County	Cameron County	Willacy County	Occurrence near project area? [1]	Description
Coues' rice rat	*Oryzomys couesi*		T	X	X	X		cattail-bulrush marsh with shallower zone of aquatic grasses near the shoreline; shade trees around the shoreline are important features; prefers salt and freshwater, as well as grassy areas near water; breeds April-August
Jaguar	*Panthera onca*	LE	E	X	X	X		extirpated; dense chaparral; no reliable Texas sightings since 1952
Jaguarundi	*Herpailurus yaguarondi*	LE	E	X	X	X	yes	thick brushlands, near water favored; 60 to 75 day gestation, young born sometimes twice per year in March and August, elsewhere the beginning of the rainy season and end of the dry season
Ocelot	*Leopardus pardalis*	LE	E	X	X	X	yes	dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas; breeds and raises young June-November
Southern yellow bat	*Lasiurus ega*		T	X	X	X		associated with trees, such as palm trees (*Sabal mexicana*) in Brownsville, which provide them with daytime roosts; insectivorous; breeding in late winter
White-nosed coati	*Nasua narica*		T	X	X	X		woodlands, riparian corridors and canyons; most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade
West Indian manatee	*Trichechus manatus*	LE	E		X	X		Gulf and bay system; opportunistic, aquatic herbivore

[1] Occurrences of the species were documented on and/or possibly within 1.5 miles of the project route. Occurrence records provided by TPWD.

APPENDIX C

DETAILED MAPS OF CULTURAL RESOURCES ALONG THE MAIN AND NORTH FLOODWAY LEVEE SYSTEMS SURVEY CORRIDOR

(NOT FOR PUBLIC DISTRIBUTION)

APPENDIX D

REVIEW COMMENT ON DRAFT EA

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Ecological Services - LRGV SubOffice
Phone: (956) 784-7560 Fax: (956) 787-0547
Rt. 2 Box 202-A
Alamo, TX 78516
October 5, 2007

Mr. Daniel Borunda
U.S International Boundary and Water Commission
The Commons Building C, Suite 100
4171 N. Mesa Street
El Paso, Texas 79902

Consultation No. 21410-2008-TA-0013

Dear Mr. Borunda:

This responds to a letter received on September 20, 2007 regarding the effects of the proposed flood control improvements on species federally listed or proposed for listing as threatened or endangered occurring within Cameron, Hidalgo and Willacy County, Texas. In addition, your project was evaluated with respect to wetlands and other important fish and wildlife resources. You have sent a Draft Environmental Assessment (EA) for our review.

It's Service's understanding that the U.S International Boundary and Water Commission (USIBWC) is considering raising portions of the 29-mile Main Floodway Levee System and portions of the 46-mile North Floodway Levee System to meet current flood control requirements. This levee system is part of the Lower Rio Grande Flood Control Project that extends 180 miles from the Town of Peñitas in South Texas, to the Gulf of Mexico. The Main and North Floodway Levee system, extends approximately 75 levee miles, downstream from Anzalduas Dam, and extending near the town of Mercedes to the Laguna Madre northwest of Arroyo City, Texas. Sections of the interior floodway system were identified by hydraulic model as priority areas to improve flood containment. The Proposed Action would increase the flood containment capacity of the Main and North Floodways Levee System by raising elevation of a number of levee segments for improved flood protection. Fill material would be added to the existing levee to bring height to its original design specifications, or to meet a 2-foot freeboard design criterion for flood protection (USIBWC 2003a). Typical height increases in improvement areas would be less than 1 foot and would not require expansion of the existing levee footprint.

In some locations, up to 2 feet of fill material would be placed on top of the levee, extending levee footprint up to a maximum of 12 feet from the current toe of the levee. This expansion would take place along the approximately 20 feet service corridor currently utilized for levee maintenance, inside the maintained floodway, and entirely within the flood control project right-of-way. In some instances, adjustment in levee slope would be made to eliminate the need for levee footprint expansion, when required due to engineering considerations or for protection of biological or cultural resources. The need for excavation outside the levee structure is not anticipated.

While approximately 17 percent of the levee system is adjacent to natural resources conservation areas, only a small fraction of those conservation areas would fall within levee improvement areas. The levee systems run largely along agricultural areas and natural resource management lands. Those lands include the Estero Llano Grande State Park and units of the Las Palomas Wildlife Management areas operated by TPWD, and two national wildlife refuges (NWRs) maintained by the U.S. Fish and Wildlife Service (USFWS), the Lower Rio Grande Valley NWR and the Laguna Atascosa NWR. In areas requiring levee footprint expansion, no woodland communities would be impacted; impacts on vegetation would be limited to non-native grasslands along the levee slope. No wetlands are located within the potential levee expansion area. To protect vegetation cover, both the modified levee and construction corridor would be re-vegetated with native herbaceous species.

It appears that there are three tracts of land that fall within Lowe Rio Grand Vally and Laguna Atascosa NWR ownership that are within the levee system. If there is an expansion of the levee or if access is required on the Refuge, then a ROW permit will be required. The three tracts of land include the Mercedes tract, Otha Holland Wildlife Corridor and Laguna Atascosa NWR. Please coordinate with the LRGVNWR Manager (Bryan Winton) for the Mercedes tract and Otha Holland Wildlife Corridor at (956) 784-7521 and the LANWR Manager (John Wallace) at (956) 748-3607 for the Laguna Atascosa tract.

Regarding other important fish and wildlife resources, please keep in mind that many bird species protected under the Migratory Bird Treaty Act may nest in any area containing trees or other suitable habitat. As the Federal agency responsible for the protection of migratory birds, the Service recommends vegetation disturbances potentially associated with these activities avoid the general nesting period of March through August <u>or</u> that areas proposed for disturbance be surveyed first for nesting birds, in order to avoid the inadvertent destruction of nests, eggs, etc.

The Service recommends any revegetation efforts within the project area should be with native grasses and forbs.

We appreciate the opportunity to provide pre-planning information and look forward to providing any further assistance.

If we can be of further assistance, please contact Ernesto Reyes at the above letterhead and telephone number.

Sincerely,

Ernesto Reyes Jr.

Ernesto Reyes Jr.
Senior Fish & Wildlife Biologist
For
Allan M. Strand
Field Supervisor

cc:
Field Supervisor, U.S. Fish and Wildlife Service, Corpus Christi, TX

Kathleen Hartnett White, *Chairman*
Larry R. Soward, *Commissioner*
H. S. Buddy Garcia, *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 19, 2007

Mr. Daniel Borunda
United States Section International
Boundary and Water Commission
4171 North Mesa, Suite C-100
El Paso, Texas 79902

Re: Draft Environmental Assessment: Improvements to the North and Main Floodways Levee Systems

Dear Mr. Borunda:

The applicant, United States Section International Boundary and Water Commission (USIBWC), proposes to increase the levee height in some sections of the levee system of the Main and North Floodways in Hidalgo, Cameron, and Willacy Counties, Texas, up to two feet, to meet current design criterion for flood protection.

After preliminary review of this project, the Texas Commission on Environmental Quality (TCEQ) has no objection to this project since no surface water features will be impacted by the project. However, if new concerns are identified from comments, the TCEQ will submit a comment letter to identify those concerns.

The TCEQ looks forward to receiving and evaluating other agency or public comments during or after the comment period. Please provide any agency comments, public comments, as well as the applicant's comments regarding water quality issues, to Ms. Lili Lytle of the Water Quality Division MC-150, P.O. Box 13087, Austin, Texas 78711-3087. Ms. Lytle may also be contacted by e-mail at *llytle@tceq.state.tx.us*, or by telephone at (512) 239-4596.

Sincerely,

L'Oreal W. Stepney, Director
Water Quality Division

LWS/LL/jp

TEXAS HISTORICAL COMMISSION

The State Agency for Historic Preservation

RICK PERRY, GOVERNOR

JOHN L. NAU, III, CHAIRMAN

F. LAWERENCE OAKS, EXECUTIVE DIRECTOR

October 24, 2007

Daniel Borunda
International Boundary and Water Commission
The Commons, Bldg. C, Suite 310
4171 N. Mesa Street
El Paso, TX 79902

Re: ***Project review under Section 106 of the National Historic Preservation Act of 1966***
Main& North Floodway Improvements, Cameron County (106/USIBWC)
(also Hidalgo and Willacy Counties)

Dear Mr. Borunda,

Thank you for providing a draft Environmental Assessment (EA) for the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer (SHPO), the Executive Director of the Texas Historical Commission (THC).

Your project documentation was received on September 24, 2007. Our review staff has provided general comments for the draft report contents and for the subsequent Section 106 federal review. Though your report notes that minimal changes are being proposed, our staff will need to see more specific information to provide determinations of eligibility and effect when your team is ready to initiate a Section 106 review.

Our Archeology Division, led by Debra Beene, has the following comments:

- We concur with your recommendation that Site 41HG30, located adjacent to a proposed expansion area, be tested for NRHP eligibility;
- Misuse of 'survey' for 'assessment' or 'study'; this should be corrected (ex: p 5-2, third line; legend for topographic maps in Appendix C...);
- Mixing 'archeological resources' with 'sites' and 'HPAs'; each of these refers to something different and should be edited for accuracy;
- Suggest that you include the Sundermeyer et al. report as an Appendix; and
- We concur that the project should not have an effect on significant cultural resources if the sterile fill material is brought from off site and the levee foot print is not expanded in the area of any known cultural resources or high probability areas for such resources (HPAs). As well, the few proposed levee footprint expansions are to take place only within the service corridor currently utilized for levee maintenance.

When ready to proceed with the Section 106 review, our staff will need the following information to determine whether your proposed project will adversely affect historic properties.

- An accurate map of the entire project area, preferably a USGS topographic quad sheet, with the area of potential effect (APE) indicated;

- Please provide any known history of the cultural resources and their uses (including buildings, bridges, fences, pumping stations, irrigation canals, levees, reservoirs and basins, etc.) within this APE;
- Current original photographs of the structures, and, if possible, copies of historic photographs;
- A written description of the visual impacts of the proposed project on the historic built environment.

Thank you for including our agency in the early stages of this project. It would be helpful if your office could provide a list of ongoing projects and their current status. Our staff would like to provide a team response for all of these projects and it would be good to know how the projects are progressing.

Yours truly,

Amy Hammons, Project Reviewer
for: F. Lawerence Oaks, State Historic Preservation Officer

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
Corpus Christi Regulatory Field Office
5151 Flynn Parkway, Suite 306
Corpus Christi, Texas 78411-4318

REPLY TO
ATTENTION OF

November 14, 2007

Regulatory Branch

SUBJECT: SWG-2007-1657

International Boundary and Water Commission
Attention: Daniel Borunda
4171 N. Mesa Street Suite C-100
El Paso, Texas 79902-1432

Gentlemen:

This is in reference to your letter, submitted September 20, 2007, concerning the proposal to raise portions of the 29-mile Main Floodway Levee System and portions of the 46-mile North Floodway Levee System to increase the flood containment capacity of the levees. The project will include raising the levee height an additional 1-2 feet along the approximately 20-foot-wide service corridor currently utilized for levee maintenance. The work will occur along the Main Floodway which extends from the Banker Weir near the Anzalduas Dam to the town of Mercedes in Hidalgo County, and from there splits into the North Floodway and the Arroyo Colorado Floodway. The North Floodway extends from Mercedes to a terminal point north of Arroyo City passing through Hidalgo and Cameron Counties, Texas.

According to the information you submitted, fill material will be added to the existing levee to increase it's height by approximately one foot, or to meet a 2-foot freeboard design criterion, and will not require expansion of the existing levee footprint. In some areas, up to 2 feet of fill material will be placed on top of the levee, and the levee footprint will be extended up to a maximum of 12 feet from the current toe of the levee. The work will occur in the 20-foot-wide service corridor inside the maintained floodway and entirely within the flood control project right-of-way, and none of levee expnsion will occur in open water areas or wetlands. Based on our review of the information you submitted we have determined that the proposed work, as shown on the enclosed plans in three sheets will not impact waters of the U.S. Only activities that will impact navigable waters or involve fill into waters of the U.S., including wetlands, require a Department of the Army permit. Should you determine that any activities related to your proposed work will involve the placement of fill into waters of the U.S., including wetlands, you should submit plans for our review prior to the initiation of the project.

This determination has been conducted to identify the limits of the Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provision of the Food Security Act of 1985, as amended. If the owner or their tenant are USDA program participants or anticipate participation in the USDA programs, then they should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a combined Notification of Administrative Appeal Options and Process (NAP) and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the Southwestern Division Office at the following address:

James E. Gilmore, Appeal Review Officer
Southwestern Division, CESWD-CMO-E
1100 Commerce Street, Suite 831, Room 8E9
Dallas, Texas 75242-1317

Telephone: 469-487-7061; FAX: 469-487-7190

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 C.F.R. part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by January 14, 2008.

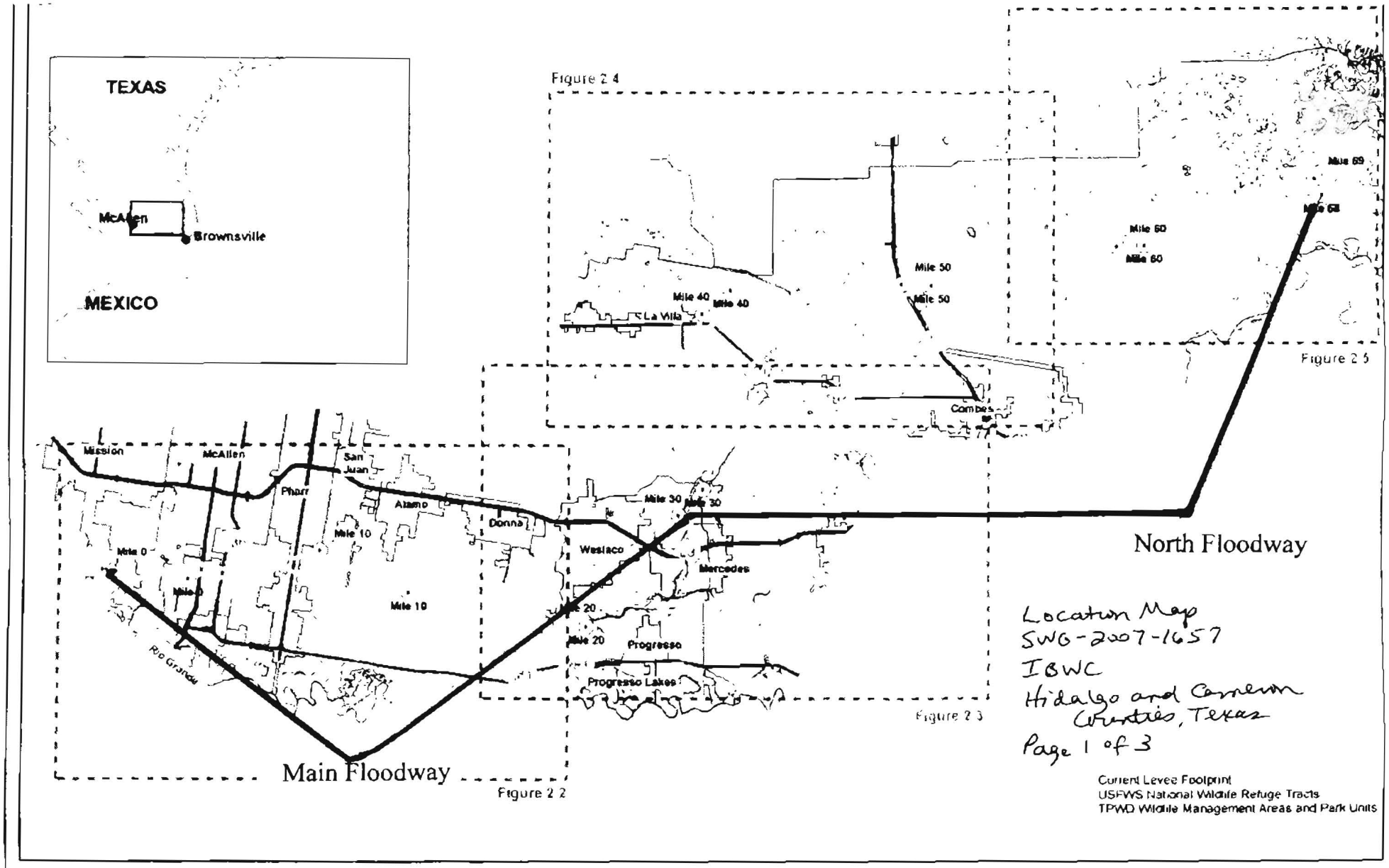
It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter.

This approved determination is valid for five years from the date of this letter unless new information warrants revision before the expiration date. Please reference the determination number SWG-2007-1657 in future correspondence pertaining to this project. If you have questions concerning this matter, please contact Marie C. Pattillo at the letterhead address or by telephone at 361-814-5847.

Sincerely,

for Lloyd Mullins
Unit Leader,
Corpus Christi Regulatory Field Office

Enclosures



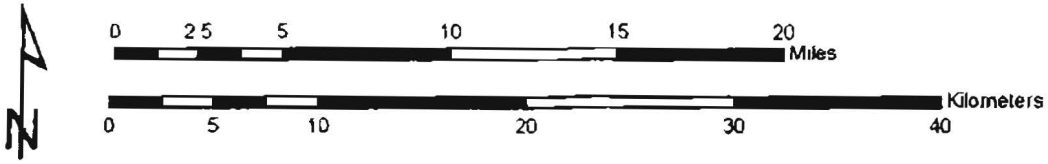
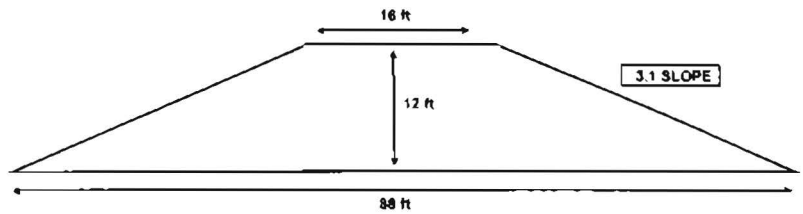


Figure 2.1
Main and North Floodways Levee System
Location Map

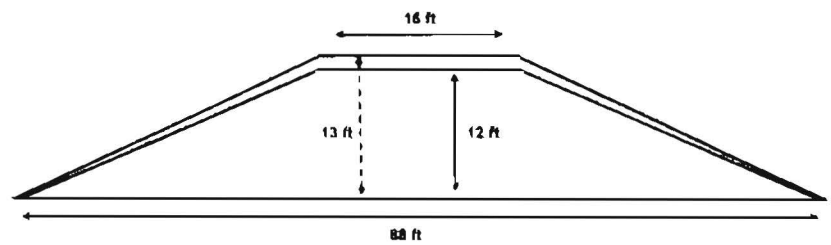
Main and North Floodways Levee System EA
International Boundary and Water Commission,
United States Section

SWG-2007-1657

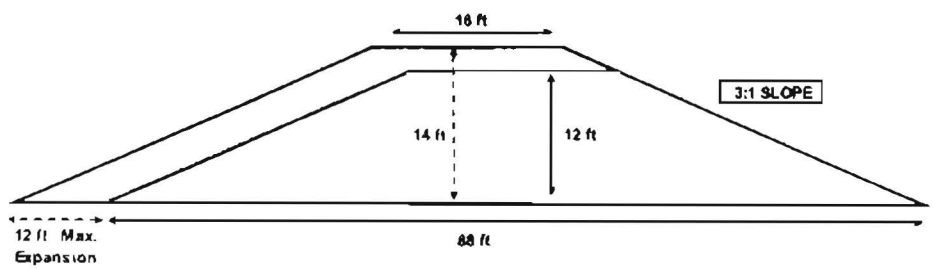
The existing levee is a raised trapezoidal compacted-earth structure with a crown width of 16 feet, a typical height ranging from 10 to 15 feet, and an approximate 3:1 side slope ratio (units of horizontal run in feet per foot of vertical rise). The levee crown is an unpaved service road with restricted public access. The existing levee footprint typically ranges from 70 to 100 feet, depending on location. A typical levee cross-section is shown in the diagram below.



The Proposed Action would increase flood containment capacity by raising elevation of a number of levee segments for improved flood control. Fill material would be added to the existing levee to bring height to its original design specifications, or to meet a 2-foot freeboard design criterion. Typical height increases in improvement areas would be less than 1 foot and would not require expansion of the existing levee footprint.



In some locations, up to 2 feet of fill material would be placed on top of the levee, potentially extending levee footprint. For a typical levee cross-section, shown in the diagram below, a 2-foot increase in levee height would result in a maximum 12-foot increase in the footprint. The need for excavation outside the levee structure is not anticipated.

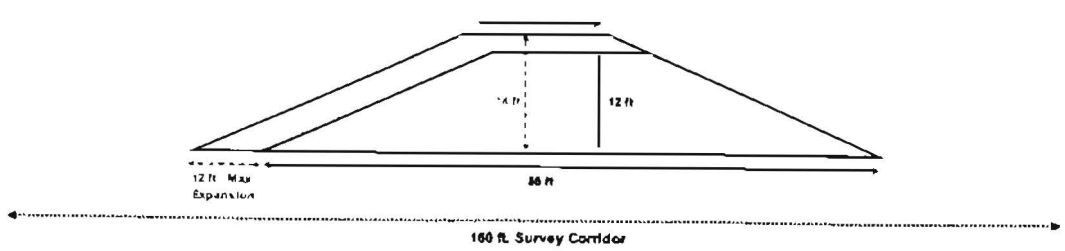


Cross Section Views
SWG-2007-1657
IBWC
Hidalgo and Cameron Counties, Texas
Page 2 of 3

Table 3.1 Acreages of Plant Communities along the Levee Systems

Vegetation Community	Acreage Along Levee System	
	160-Foot Wide Survey Corridor	Levee Footprint and Potential Expansion Area
Woodland / Thornscrub Communities		
Mesquite - Acacia Woodland	309.7	-
Mesquite – Acacia Savanna	135.7	-
Coastal Sand Plain Thornscrub	86.0	-
Total Woodland / Thornscrub	*531.4*	*0*
Herbaceous Community		
Buffelgrass Dominant Grassland	1026.6	320.8
Wetlands / Riparian Communities		
Texas Ebony – Anacua Forest	10.1	-
Typha / Phragmites Emergent	31.3	-
Drainage Ditches	8.1	-
Open Water	55.3	-
Total Wetlands / Riparian	*104.8*	*0*
Agricultural		
Active Agricultural	493.2	-
Fallow Agricultural	396.5	-
Total Agriculture	*889.7*	*0*
Developed / Impervious Cover		
Lined Canal	17.5	-
Road	12.7	1.1
Residential	56.5	-
Commercial / Industrial	17.6	-
Total Developed / Impervious Cover	*104.5*	*1.1*
TOTAL	**2657.0**	**321.9**

Vegetation communities were determined within a 160-foot wide buffer centered on the levee centerline along the entire length of the levee to ensure coverage by field survey included the potential levee expansion areas. The 160-foot wide survey corridor includes 2,657 acres. The current levee footprint and maximum levee expansion area for levee height increases would account for 321 acres of herbaceous vegetation within the survey corridor. Potential levee footprint expansion area were determined from USIBWC levee evaluation data (USIBWC 2003a). Following the field mapping efforts, this expansion area was analyzed using GIS to determine vegetation community composition, based on vegetation mapping within the survey corridor. The 160-foot survey corridor and maximum potential levee expansion area are shown on following schematic cross section of a levee location where up to 2 feet of fill material would be added.



Survey Method & Results
SWG-2007-1657
IBWC
Hidalgo & Cameron Counties, Texas
Page 3 of 3

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: International Boundary and Water Commission		File #: SWG-2007-1657	Date: 14 Nov. 2007
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)		A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)		B
	PERMIT DENIAL		C
X	APPROVED JURISDICTIONAL DETERMINATION		D
	PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg/ Or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved jurisdictional determination (JD) or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Marie C. Pattillo, Project Manager U.S. Army Corps of Engineers, CESWG-PE-RCC Corpus Christi Regulatory Field Office 5151 Flynn Parkway, Suite 306 Corpus Christi, Texas 78411-4318 Telephone 361-814-5847; FAX 361-814-5912	If you only have questions regarding the appeal process you may also contact: James E. Gilmore, Appeal Review Officer CESWD-CMO-E, 1100 Commerce Street, Suite 831 Room 8E9 Dallas, Texas 75242-0216 Telephone: 214-767-2457; FAX: 214-767-9021 Email: James.E.Gilmore@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or authorized agent.	Date:	Telephone number:

APPENDIX E

CULTURAL RESOURCES EVALUATION
(Sundermeyer et al. 2007)

[Appendix is provided in attached CD-ROM]

APPENDIX F

TECHNICAL SUPPORT STUDIES REPORT
(Parsons 2007)

[Appendix is provided in attached CD-ROM]