# DRAFT ENVIRONMENTAL ASSESSMENT

# ARROYO COLORADO AT HARLINGEN FLOOD FLOW IMPROVEMENT PROJECT

# CAMERON COUNTY, TEXAS

Prepared for:
United States Section, International Boundary and Water Commission
El Paso, Texas

Prepared by:
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Austin, Texas

June 2020

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# DRAFT ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

## Arroyo Colorado at Harlingen Flood Flow Improvement Project, Cameron County, Texas

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

**Preferred Alternative:** Expanded Vegetation Removal and Sediment Removal along the Arroyo Colorado Floodway

**Report Designation**: Draft Environmental Assessment (EA)

**Abstract:** The USIBWC is considering several options that would restore the full flood conveyance capabilities to a 6.3-mile reach of Arroyo Colorado between U.S. Highway 77 Business (US 77 Business) and Cemetery Road. The Preferred Alternative would dredge sediment from the channel throughout the reach and expand existing vegetation management operations. Vegetation management currently occurs along a 3.7-mile reach of Arroyo Colorado between US 77 Business and Farm-to-Market Road 509 (FM 509). The Preferred Alternative would expand vegetation management operations to include the 2.6-mile reach from FM 509 to Cemetery Road. These actions are intended to restore Arroyo Colorado's design flood conveyance capacity of 21,000 cubic feet per second.

The draft EA evaluates potential environmental impacts of the No Action Alternative and the Preferred Alternative. Two additional alternatives were considered and evaluated but were removed from consideration because they were either not effective or not feasible. Potential impacts on natural, cultural, and other resources were evaluated. A Finding of No Significant Impact has been prepared for the Preferred Alternative based on a review of the facts and analyses contained in the EA.

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# DRAFT FINDING OF NO SIGNIFICANT IMPACT

## Arroyo Colorado at Harlingen
## Flood Flow Improvement Project, Cameron County, Texas

**LEAD AGENCY:**

United States Section, International Boundary and Water Commission (USIBWC).

**BACKGROUND**

The USIBWC oversees the Lower Rio Grande Flood Control Project (LRGFCP), which conveys floodwater through Hidalgo, Cameron, and Willacy Counties. The LRGFCP uses a system of levees, diversion dams, and interior floodways to reduce flood impacts on residential, commercial, and agricultural lands. The LRGFCP's interior floodway consists of the Main Floodway, which splits near Mercedes, Texas, into the North Floodway and the Arroyo Colorado Floodway. As part of the LRGFCP, the Arroyo Colorado Floodway is relied upon to convey a "design flood" of 21,000 cubic feet per second (cfs) while maintaining water surface elevations that do not present undue risk to adjacent properties. The Arroyo Colorado Floodway's design flood conveyance capacity has been reduced by accumulation of sediment and increases in vegetation. The USIBWC has recently undertaken several projects, including targeted sediment excavation and vegetation removal, in an effort to restore and maintain design flood conveyance capacity. Despite this recent work, diminished flood flow capacity still exists in some parts of the system, including a reach along Arroyo Colorado in the vicinity of Harlingen. USIBWC is considering several options that would restore the full design flood conveyance capabilities to Arroyo Colorado in this area.

**ALTERNATIVE ACTIONS**

The No Action Alternative for Arroyo Colorado would continue targeted sediment excavation and vegetation management operations between US 77 Business and FM 509. This approach would likely lead to increased sediment build up in areas outside of the targeted removal areas and would likely lead to increased vegetation growth in areas outside of vegetation management operations. Therefore, the No Action Alternative would not restore Arroyo Colorado's design flow of 21,000 cfs and would likely lead to additional reductions in flood flow conveyance capacity and higher water surface elevations during flood events.

The Preferred Alternative would continue vegetation management operations in the 3.7-mile reach of Arroyo Colorado between US 77 Business and FM 509 and extend them along a 2.6-mile reach from FM 509 to Cemetery Road. In addition to continuing targeted sediment removal operations on an ongoing basis, the Preferred Alternative would conduct a one-time sediment-dredging operation along the entire 6.3-mile reach between US 77 Business and Cemetery Road. These actions are intended to restore Arroyo Colorado's design flood conveyance capacity of 21,000 cfs and reduce water surface elevations during flood events.

## SUMMARY OF FINDINGS

Pursuant to National Environmental Policy Act (NEPA) guidance (40 Code of Federal Regulations 1500–1508), the President's Council on Environmental Quality issued regulations for NEPA implementation that included provisions for both the content and procedural aspects of the required EA. The USIBWC completed an EA of the potential environmental consequences of sediment and vegetation removal to meet current requirements for flood control in the Arroyo Colorado Floodway. The EA, which supports this Finding of No Significant Impact, evaluated the No Action Alternative and the Preferred Alternative, which would satisfy the purpose and need of the action.

## SEDIMENT AND VEGETATION REMOVAL EVALUATION

### *NO ACTION ALTERNATIVE*

The No Action Alternative would continue the ongoing targeted sediment removal and vegetation management operations. This level of effort has not been effective in restoring the 21,000 cfs design flood conveyance capacity. Under the No Action Alternative, flooding under severe storm events may increase, with associated risks to personal safety and property. No additional resource-specific impacts are anticipated beyond those associated with the previously established and ongoing vegetation and sediment maintenance operations.

### *PREFERRED ALTERNATIVE*

#### *Biological Resources*

Impacts would occur to riparian vegetation over the 6.3-mile reach of the Arroyo Colorado Floodway. The removal and replanting operations would affect approximately 186 acres of native and non-native riparian vegetation. Additional areas would be affected by sediment disposal. Vegetation disturbance will be scheduled outside of the bird breeding season of March through August. Appropriate avoidance measures would be taken if work would be done during nesting season to avoid the inadvertent destruction of nests, eggs, and young. All disturbed areas would be appropriately revegetated.

#### *Cultural Resources*

No archeological resources are known from the archeological resource area of potential effects (APE). No structures are known from the historic resource APE. Therefore, no direct impacts to cultural resources are anticipated. Cameron County Irrigation District No. 2 irrigation district, which was previously determined eligible for listing in the National Register of Historic Places, is within the historic resource APE. The proposed project is not expected to result in direct or indirect impacts to this potentially eligible historic property.

#### *Water Resources*

Impacts are expected due to sediment removal activity in the Arroyo Colorado Floodway. Impacts associated with sediment removal are expected to be temporary and include disruption of benthic habitat, water quality degradation during dredging operations, and disturbance of streambank vegetation and soils during sediment and equipment transport.

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***Environmental Justice and Other Resources***

No significant impacts are anticipated to environmental justice due to the minimal economic effect of the proposed action. USIBWC determined that land use and environmental health issues, such as air quality and noise, were negligible and are not further evaluated.

## DECISION

Based on my review of the facts and analyses contained in the EA, I conclude that the implementation of the Preferred Alternative to continue vegetation management activities along the current extent of the 3.7-mile reach of Arroyo Colorado from US 77 Business to FM 509 and the expansion of those activities to include the 2.6-mile reach of Arroyo Colorado between FM 509 and Cemetery Road; to conduct a one-time dredging of the stream channel; and to continue routine vegetation management and targeted sediment removal into the foreseeable future would not have a significant impact. Accordingly, requirements of NEPA and regulations promulgated by the Council on Environmental Quality are fulfilled and an environmental impact statement is not required.

_____ _____

Jayne Harkins, P.E. Date
Commissioner
International Boundary and Water Commission
United States Section

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# DRAFT ENVIRONMENTAL ASSESSMENT:

# ARROYO COLORADO AT HARLINGEN FLOOD FLOW IMPROVEMENT PROJECT, CAMERON COUNTY, TEXAS

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*Prepared for:*

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

*Prepared by:*

**COX|McLAIN ENVIRONMENTAL CONSULTING, INC.**
**AUSTIN, TEXAS**

**JUNE 2020**

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACS | American Community Survey |
| ACWP | Arroyo Colorado Watershed Protection Plan |
| APE | area of potential effects |
| cfs | cubic feet per second |
| CFR | Code of Federal Regulations |
| CMEC | Cox\|McLain Environmental Consulting |
| CTA | Council of Texas Archeologists |
| CY | cubic yard |
| EA | environmental assessment |
| FM | Farm-to-Market Road |
| GSRC | Gulf South Research Corporation |
| IBWC | International Boundary and Water Commission |
| LRGFCP | Lower Rio Grande Flood Control Project |
| MBTA | Migratory Bird Treaty Act |
| NEPA | National Environmental Policy Act |
| NRHP | National Register of Historic Places |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| THC | Texas Historical Commission |
| TPWD | Texas Parks and Wildlife Department |
| TXNDD | Texas Natural Diversity Database |
| U.S. | United States |
| USACE | U.S. Army Corps of Engineers |
| U.S.C. | U.S. Code |
| USCB | U.S. Census Bureau |
| USDA | U.S. Department of Agriculture |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USIBWC | International Boundary and Water Commission, United States Section |

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# SECTION 1 PURPOSE OF AND NEED FOR ACTION

## 1.1 BACKGROUND OF THE LOWER RIO GRANDE FLOOD CONTROL PROJECT

The International Boundary and Water Commission (IBWC) is made up of the Mexican Section and the U.S. Section. The IBWC's mission is to provide binational solutions to issues that arise during the application of U.S.–Mexico treaties related to boundary demarcation, national ownership of waters, sanitation, water quality, and flood control in the border region.

The United States Section of the IBWC (USIBWC) oversees the Lower Rio Grande Flood Control Project (LRGFCP). LRGFCP staff are responsible for maintaining levees, removing obstructions from floodways, and maintaining and operating diversion dams and irrigation structures. The LRGFCP conveys Rio Grande River floodwater through Hidalgo, Cameron, and Willacy Counties using a system of levees, diversion dams, and interior floodways to reduce flood impacts on residential, commercial, and agricultural lands. A portion of the LRGFCP that comprises the Main Floodway, the North Floodway, and the Arroyo Colorado Floodway is shown in **Figure 1**.

During river flooding, Anzalduas Dam south of Mission, Texas, diverts floodwater from the Rio Grande into the Main Floodway. The Main Floodway splits near Mercedes, Texas, where about 80 percent of flows continue northward through the Northern Floodway to the Laguna Madre. A diversion structure diverts the remaining flow (20 percent) into Arroyo Colorado. Arroyo Colorado is a natural channel confined by high banks in most areas, but levees help contain floodwaters in other areas, especially near Mercedes.

As part of the LRGFCP, the Arroyo Colorado Floodway is intended to convey a "design flood" of 21,000 cubic feet per second (cfs) while maintaining water surface elevations that do not present undue risk to adjacent properties. The Arroyo Colorado Floodway's design flood conveyance capacity has been reduced by accumulation of sediment and increases in vegetation. The USIBWC has recently undertaken several projects, including targeted sediment excavation and vegetation removal, in an effort to restore and maintain design flood conveyance capacity. Despite this recent work, diminished flood flow capacity still exists in some parts of the system, including a reach along Arroyo Colorado in the vicinity of Harlingen. USIBWC is considering several options that would restore the full design flood conveyance capabilities to Arroyo Colorado in this area.

## 1.2 PURPOSE AND NEED

Improvements to Arroyo Colorado's flood conveyance capabilities are needed because, in its current condition, the arroyo may not provide adequate flood protection to adjacent properties and because its reduced capacity may affect function in other parts of the LRGFCP system.

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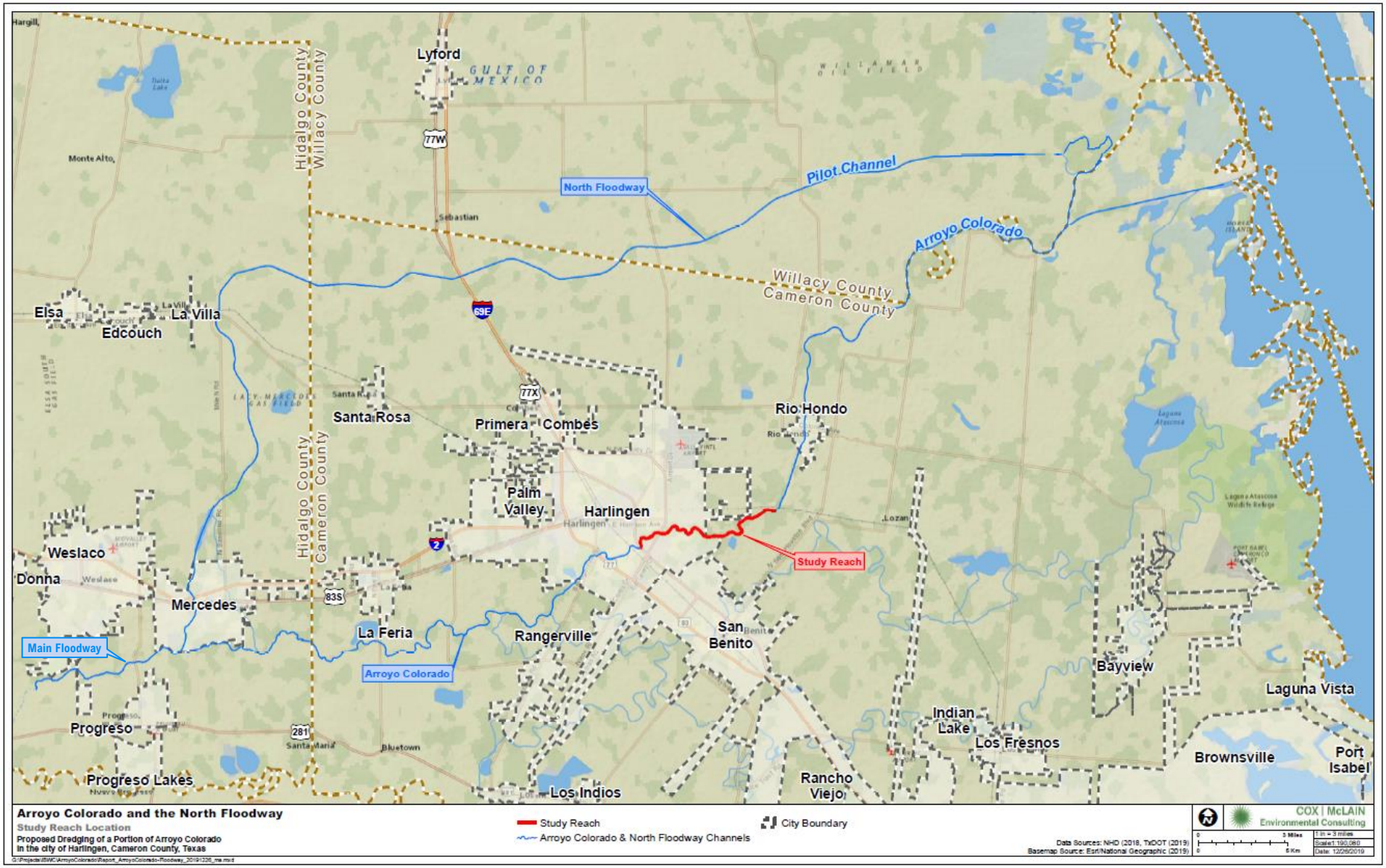
*Figure 1: Inland portion of the LRGFCP.*



Arroyo Colorado is a natural waterway that serves as part of the LRGFCP's interior floodway system. To serve its function within the interior floodway system, Arroyo Colorado is intended to carry flows of 21,000 cfs, which is referred to as the "design flood" of the arroyo. This design flood has an associated water surface elevation that allows for the inundation of the arroyo's floodplain but minimizes flood impacts on adjacent developed properties. Increases in vegetation and sediment in Arroyo Colorado decrease its capacity to carry floodwaters. Mature woody vegetation growing in the floodplain slows floodwater velocities, decreases flood conveyance, and raises water surface elevations. Additionally, slower floodwater velocities result in increased sediment deposition, which further reduces capacity. Flood models indicate that more than 50 percent of its capacity had been lost due to vegetation and sediment buildup (USIBWC, 2014a). Hydraulic models have indicated that vegetation removal could restore as much as 82 percent of Arroyo Colorado's flood conveyance capacity (USIBWC, 2014b).

When the arroyo's capacity to carry flood water is reduced, the water surface elevation associated with a flow of 21,000 cfs rises to a level that may impact adjacent developed properties. This increases the flood risk of residential, agricultural, and commercial properties. This also results in more flood impacts to public systems including drinking water, wastewater, stormwater, and roadways.

The purpose of the proposed project is to restore Arroyo Colorado's flood conveyance capabilities and to reduce the potential for flood impacts to surrounding areas.

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

USIBWC has prepared this Environmental Assessment (EA) to identify and evaluate the potential environmental consequences that may result from implementation of four alternatives: three action alternatives, including the Preferred Alternative and the No Action Alternative. The selection process for the Preferred Alternative is presented in the following sections. The following resource areas are analyzed in this EA for potential environmental consequences: biological resources, cultural resources, water resources, and environmental justice.

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# SECTION 2 DESCRIPTION OF PROPOSED ALTERNATIVES

## 2.1 ALTERNATIVES ANALYZED

USIBWC has developed and analyzed four alternatives to determine which best addresses the need and purpose described above. The alternatives are the No Action Alternative, the Off-Channel Storage Alternative, the Expanded Vegetation Management Alternative, and the Expanded Vegetation Management and Channel Dredging Alternative. All but the Off-Channel Storage Alternative consist of key activities that would be carried out along specific reaches of Arroyo Colorado. These activities are (1) targeted sediment removal, (2) channel dredging, and (3) vegetation management, which are described in Sections 2.1.1 through 2.1.3.

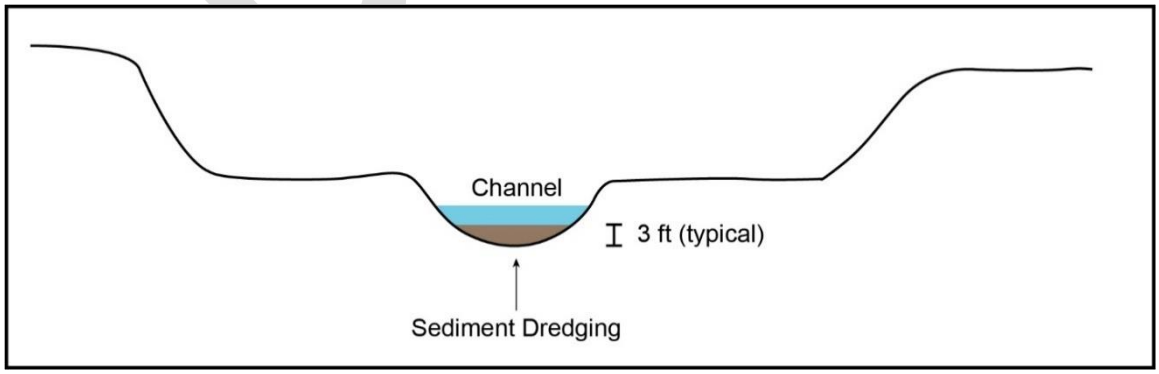
### 2.1.1 Targeted Sediment Removal

Targeted sediment removal refers to the excavation of accumulated sediment from the channel of Arroyo Colorado. These operations focus on key infrastructure elements in and adjacent to Arroyo Colorado, including bridges and stormwater outfalls. Long-reach, mechanical excavators positioned on the banks of Arroyo Colorado remove sediment deposits for disposal. These operations are conducted on an ongoing basis as needs arise and are conducted in accordance with Nationwide Permit 19, Minor Dredging, as administered by The U.S. Army Corps of Engineers (USACE), Galveston District. These operations have previously been carried out in select areas of Arroyo Colorado, including some areas within the study reach.

### 2.1.2 Channel Dredging

Channel dredging refers to the removal of accumulated sediment from the bottom of the channel of Arroyo Colorado. These operations would be carried out along continuous reaches of Arroyo Colorado, which may include the entire study reach. These operations have not been conducted previously, but USIBWC has commissioned research into available methods. The 2018 Appropriate Dredging Technology Review (TRC, 2018) presents the results of the research. Given the depth and width of the arroyo, the desire to minimize bank and floodplain disturbance, and the nature of the sediment, a small barge equipped with a hydraulic dredge would likely be most appropriate (TRC, 2018). Based on hydraulic analyses and models (USIBWC, 2014a, 2014b), the depth of dredging operations is expected to average three feet (**Figure 2**).

*Figure 2: Channel dredging in Arroyo Colorado.*

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### 2.1.3 Vegetation Management

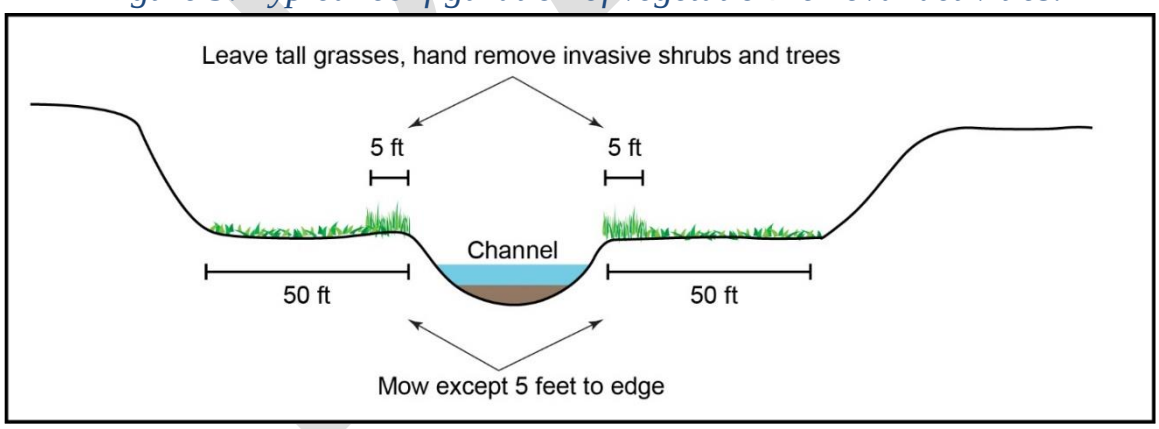
Vegetation management refers to phased operations that remove unwanted vegetation, replant with desirable species, and maintain vegetation on an ongoing basis. Woody vegetation growing in the floodplain slows floodwaters down, decreases flood conveyance capacity, and raises water surface elevations. The conversion from woody vegetation to herbaceous vegetation is carried out to counteract these effects. Vegetation management activities are not carried out on areas with steep slopes because the potential ground disturbance could lead to increased erosion. Sediment from eroded areas could impact water quality, and in extreme cases, could lead to bank failure. Native woody species are preserved and/or planted immediately adjacent to the channel to provide potential migration corridors for protected wildlife.

These vegetation management protocols were developed in conjunction with various stakeholder groups, including the U.S. Fish and Wildlife Service (USFWS) (USFWS, 2015), and are described in the *2016 Final Vegetation Management Plan* (Gulf South Research Corporation [GSRC], 2016). Vegetation management is carried out in three phases: vegetation removal, vegetation replanting, and vegetation maintenance, as described below. These operations were initiated in a portion of the study reach after the development of the *2016 Final Vegetation Management Plan* (GSRC, 2016).

***Vegetation Removal***

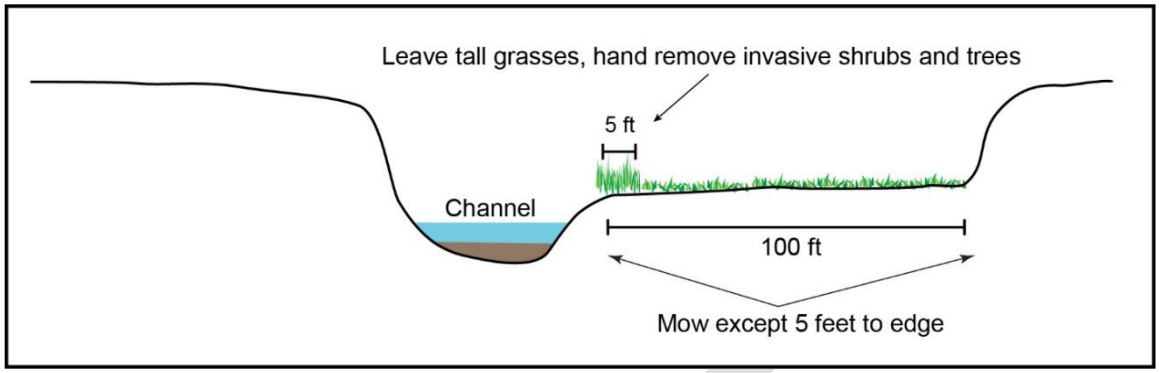
Vegetation removal activities target a 50-foot buffer on both sides of the channel where light vegetation is removed through mowing and woody vegetation is removed through hand cutting and cut-stump herbicide applications (**Figure 3**).

*Figure 3: Typical configuration of vegetation removal activities.*




The typical configuration shown above is not possible in certain locations and may be modified based on site conditions. In instances where site conditions prevent work in the full 50-foot buffer on one side, additional area may be added to the opposite side. For instance, if a steep slope prevents all work on one side, an equivalent buffer may be added to the opposite side resulting in a buffer of up to 100 feet on one side of Arroyo Colorado (**Figure 4**).

*Figure 4: Example of slope-restricted, modified vegetation removal area.*

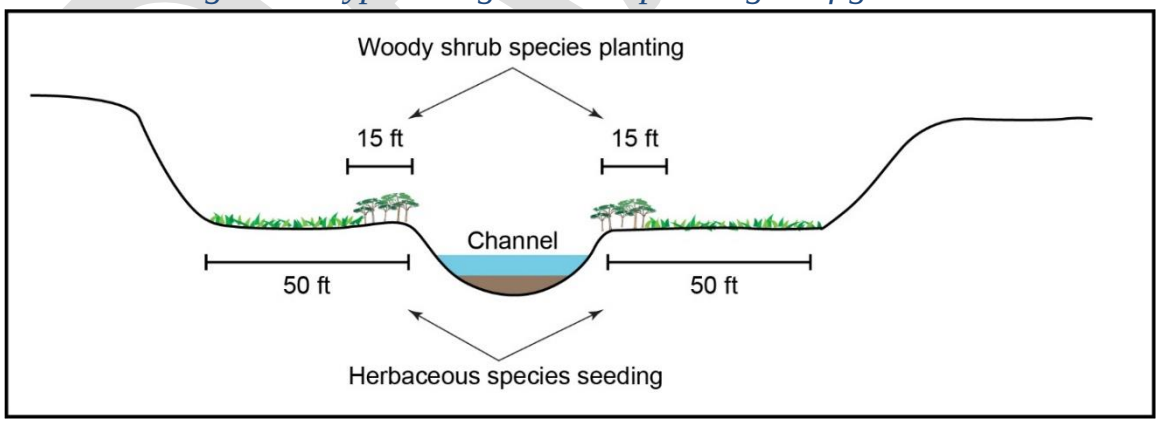



Additional protocols, including those for the handling of invasive species and the disposal of plant material, would follow those prescribed by the *2016 Final Vegetation Management Plan* (GSRC, 2016).

***Vegetation Replanting***

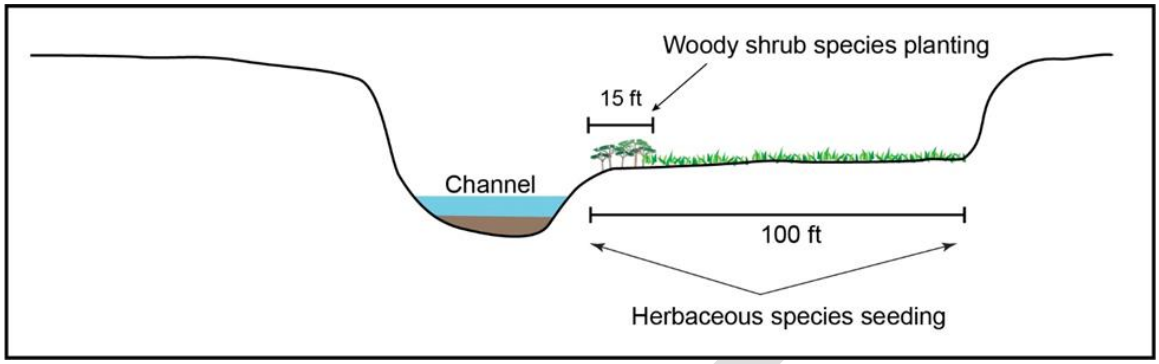
In areas where vegetation removal operations occur, vegetation replanting would follow. The *2016 Final Vegetation Management Plan* (GSRC, 2016) provides lists of native species that would be used during replanting. These species were selected, in part, based on their suitability to the site and their growth form (e.g., low herbaceous species, woody shrub species). The species are planted strategically to meet the goals of flood management and wildlife protection. Specifically, the herbaceous species planted in the floodplain maximize flood flow capabilities, and the woody species preserved and/or planted adjacent to the channel provide potential migration corridors (**Figure 5**).

*Figure 5: Typical vegetation replanting configuration.*




Similar to vegetation removal activities, the configuration of vegetation replanting areas would be determined by site conditions (**Figure 6**).

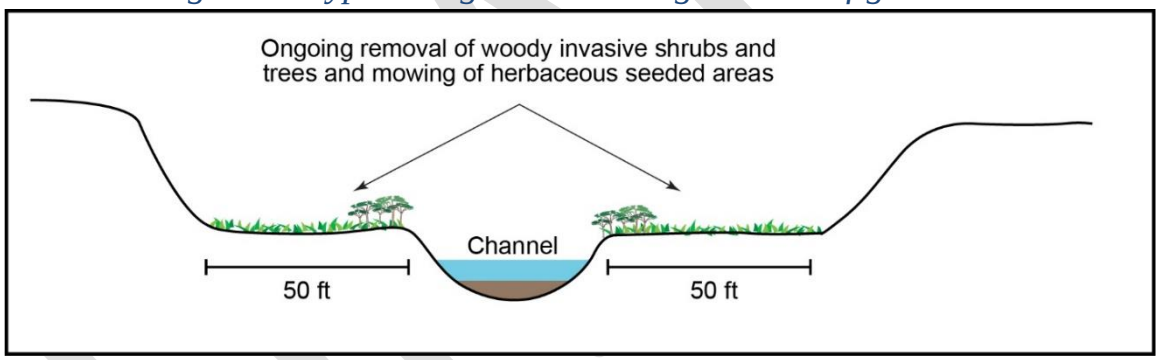
*Figure 6: Modified vegetation replanting configuration.*




***Vegetation Maintenance***

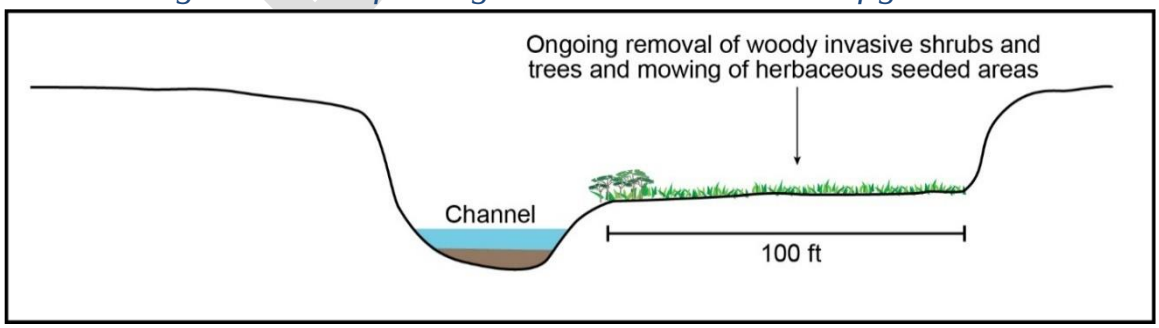
Vegetation maintenance is the final phase of vegetation management operations. Vegetation management is intended to occur continually, as programmatic conditions allow. Crews mow herbaceous vegetation and hand-remove non-native species and woody species that establish outside of the migration corridors (**Figure 7**).

*Figure 7: Typical vegetation management configuration.*




Vegetation management occurs in the areas where vegetation removal and vegetation replanting previously occurred and follows the same modified configurations, where needed (**Figure 8**).

*Figure 8: Modified vegetation maintenance configuration.*



The *2016 Final Vegetation Management Plan* (GSRC, 2016) prescribes techniques for vegetation removal and additional propagation, when necessary.

**Table 1** summarizes the alternatives, and **Table 2** briefly addresses each alternative's potential effects on flood conveyance capacity and flood risk. The study reach for this analysis is shown in **Figure 9**. These alternatives are discussed in greater detail in **Sections 2.2** and **2.3**.

Table 1: Alternatives Under Consideration

| Alternative | Near-Term Action | Long-Term Action |
|---|---|---|
| **No Action** | None. | Current vegetation management and targeted sediment removal operations would continue in the 3.7-mile reach between US 77 Business and FM 509. Vegetation management would affect approximately 53 acres of floodplain vegetation, and targeted sediment removal would continue near bridges and other structures. |
| **Off-Channel Storage** | Design, acquisition, and construction of upstream, off-channel reservoir to store excess floodwater. | Current vegetation management and targeted sediment removal operations would continue in the 3.7-mile reach between US 77 Business and FM 509. Vegetation management would affect approximately 53 acres of floodplain vegetation, and targeted sediment removal would continue near bridges and other structures. Operation and maintenance activities would begin at the detention basin. |
| **Expanded Vegetation Management** | Vegetation removal and vegetation replanting between FM 509 and Cemetery Road. | Current vegetation management and targeted sediment removal operations would continue in the 3.7-mile reach between US 77 Business and FM 509. Similar operations would begin in the 2.6-mile reach between FM 509 and Cemetery Road. Vegetation management would affect up to 183 acres of floodplain vegetation (as dictated by flood conveyance goals), and targeted sediment removal would continue near bridges and other structures. |
| **Expanded Vegetation Management and Channel Dredging** | Vegetation removal and vegetation replanting between FM 509 and Cemetery Road. Channel dredging between US 77 Business and Cemetery Road. | Current vegetation management and targeted sediment removal operations would continue and would be expanded downstream to Cemetery Road, as described in the "Expanded Vegetation Removal" option, above. |

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Table 2: Effects on Conveyance and Flood Risk

| Alternative | Effect on Flood Conveyance Capacity | Effect on Flood Risk |
|---|---|---|
| **No Action** | No change. | None. Increased risk would continue. |
| **Off-Channel Storage** | No change. | Increased flood risk largely removed. |
| **Expanded Vegetation Management** | Conveyance capacity increased. However, full flood conveyance capacity may not be restored. | Increased flood risk partially removed. |
| **Expanded Vegetation Management and Channel Dredging** | Conveyance capacity increased. This alternative would provide full restoration of flood conveyance capacity | Increased flood risk fully removed. |

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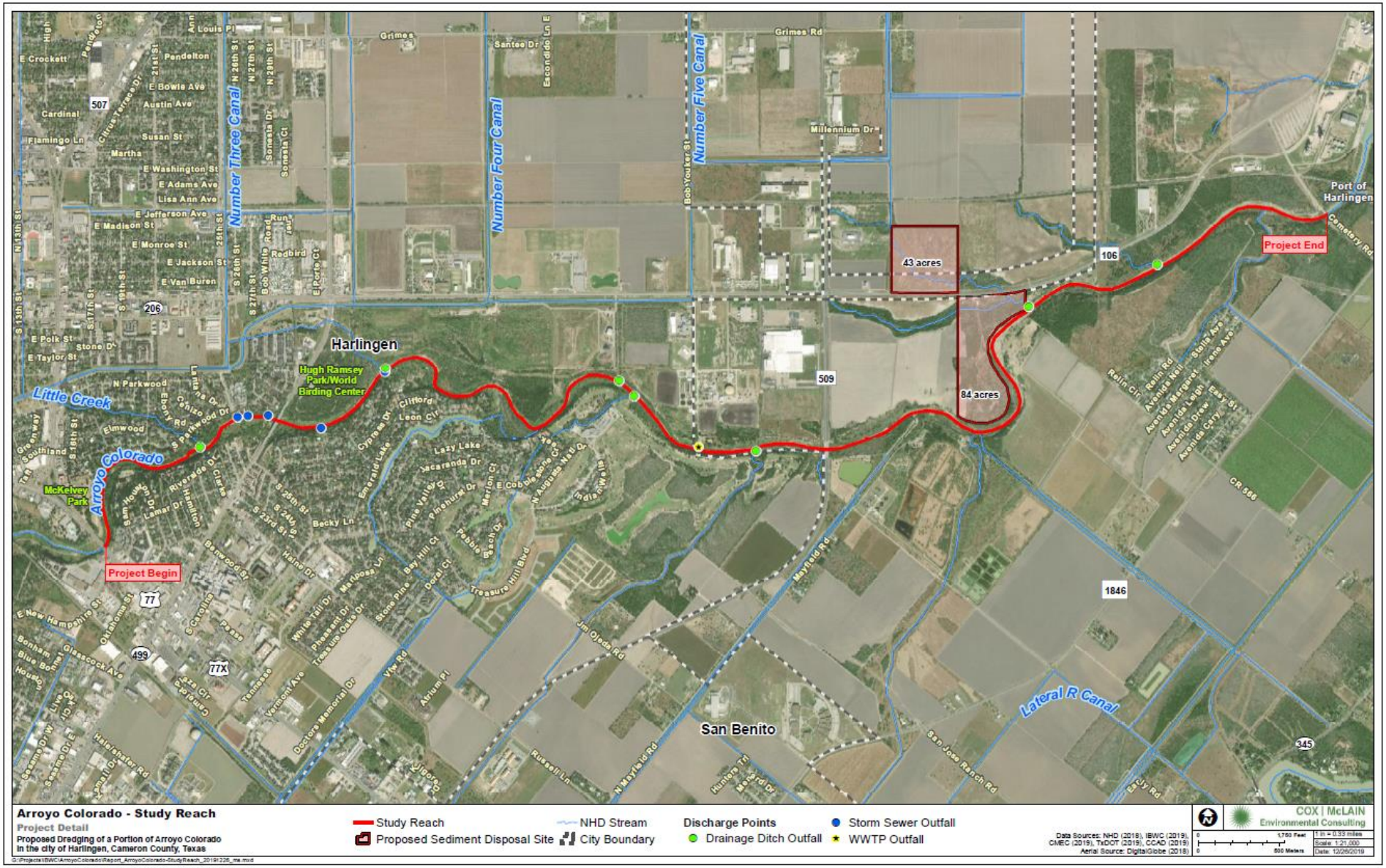
*Figure 9: Arroyo Colorado study reach.*

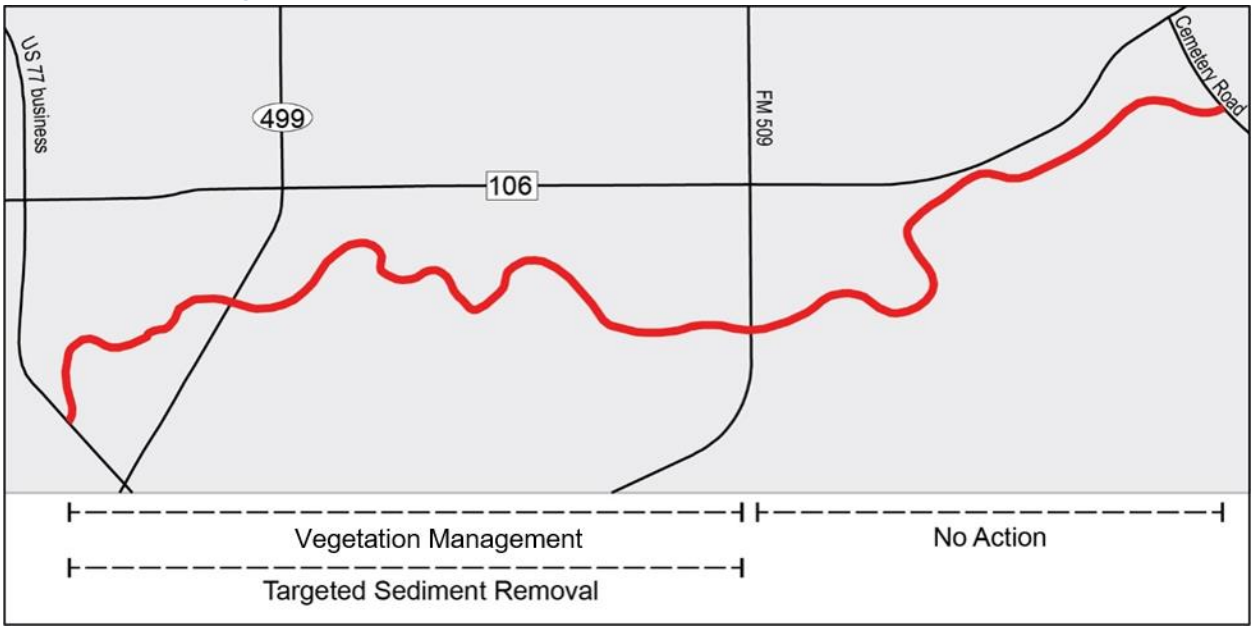


## 2.2 ALTERNATIVES UNDER CONSIDERATION

### 2.2.1 No Action Alternative

Under this alternative, ongoing vegetation management and targeted sediment removal activities would continue along the 3.7-mile reach between US 77 Business and FM 509, and no additional management activities would be initiated (**Figure 10**). Ongoing operations conducted in accordance with the Final Vegetation Management Plan (GSRC, 2016) affect approximately 53 acres of floodplain vegetation.

*Figure 10: Activities and extents, No Action Alternative.*



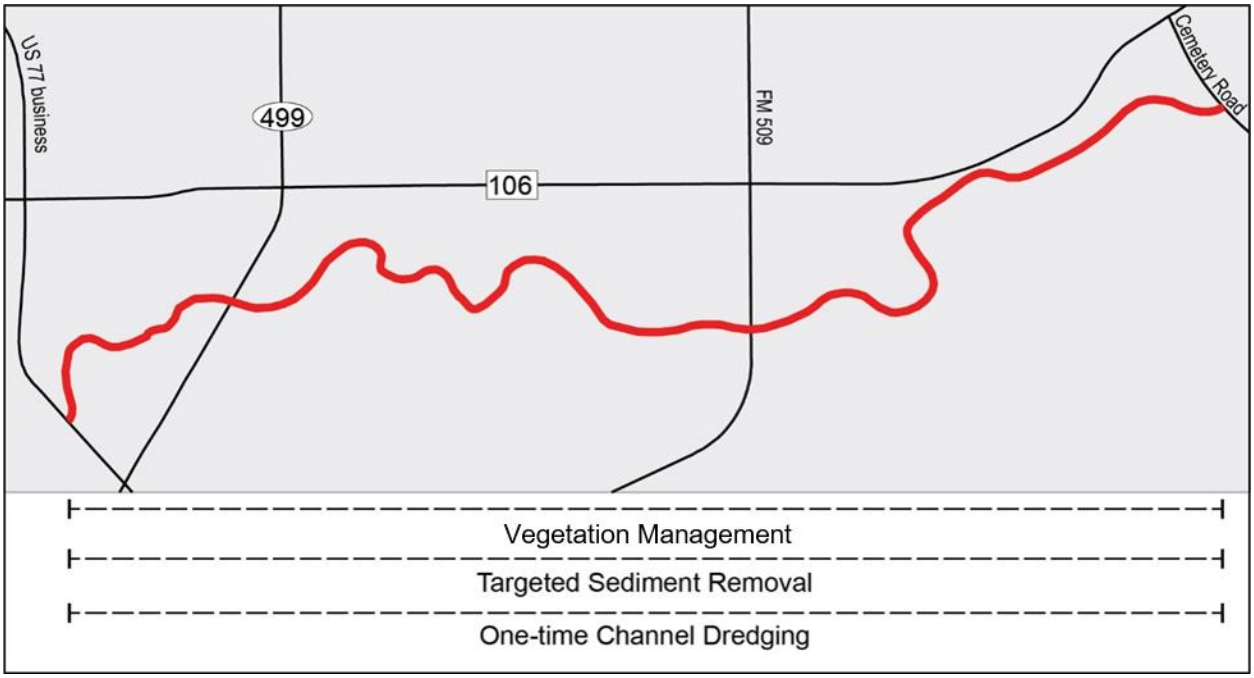

The No Action Alternative would not meet the need of improving Arroyo Colorado's flood conveyance capability and would not fulfill the purpose of restoring design flood capacity or reducing flood risk (USIBWC, 2014a, 2014b).

### 2.2.2 Preferred Alternative: Expanded Vegetation Management and Channel Dredging

The Preferred Alternative would continue the vegetation management activities and extend them an additional 2.6 miles beginning at FM 509 and ending at Cemetery Road (Highway 574).

The Preferred Alternative would also continue the ongoing targeted sediment removal operations. In addition to these sediment management operations, the Preferred Alternative would conduct a one-time sediment removal and disposal operation (i.e., channel dredging) along the 6.3-mile reach from US 77 Business to Cemetery Road (**Figure 11**).

*Figure 11: Activities and extents, Preferred Alternative.*




Under this alternative, approximately130 additional acres of floodplain vegetation would be subject to vegetation management activities. However, the total number of acres affected would be determined by flood flow conveyance goals. If flood flow conveyance capacity goals can be met by initiating vegetation management activities on less than the full area, then the full 130 acres would not be affected.

Hydraulic models indicate that the removal of approximately 300,000 cubic yards (CY) of sediment would be required. This would be accomplished by deepening the arroyo by approximately three feet (see **Figure 2**) along the 6.3-mile reach. USIBWC has identified potential upland sediment disposal sites on two parcels near the project area. One potential disposal site is on an 84-acre property adjacent to Arroyo Colorado, and the other potential disposal site is on a 43-acre property north of FM 106 / East Harrison Avenue (**Figure 9**).

In August 2019, preliminary environmental investigations (e.g., protected species habitat, cultural resources, Waters of the U.S.) were conducted by Cox|McLain Environmental Consulting (CMEC) to assess the suitability of the proposed sediment disposal sites. As part of these investigations, CMEC wetland scientists performed a Waters of the U.S. determination and delineation and identified an ephemeral drainage that flows from northwest to southeast bisecting the 43-acre potential sediment disposal site. The drainage measures approximately 2,000 linear feet and includes a linear wetland that covers approximately 0.22 acres. The drainage's only discernable ordinary high water mark was within portions of the wetland. CMEC wetland scientists have preliminarily determined that the wetland would be considered a Waters of the U.S. and would be subject to regulation per Section 404 of the Clean Water Act. USIBWC intends to avoid the ephemeral drainage and its wetland during sediment disposal operations. A preliminary buffer

has been identified along the drainage that covers approximately 6.4 acres. Areas within this buffer would be avoided. Approximately 38 acres of suitable area remain on the 43-acre parcel.

Similar investigations were conducted on a 28.2-acre portion of the 84-acre potential sediment disposal site. Of this area, approximately 4.65 acres were found to be on the lowest terrace adjacent to Arroyo Colorado and would be unsuitable for sediment disposal. Additionally, two wetlands were identified within the site that measured 0.02 acres and 0.06 acres. These areas are assumed unsuitable for sediment disposal, although fill may be placed in these areas through coordination with the USACE. Lastly, approximately 3.14 acres were found to be on a vegetated bluff that would not be suitable for sediment disposal. Preliminary investigations have determined that approximately 20.33 acres of the 84-acre property are suitable for sediment disposal.

Preliminary calculations, provided below in **Table 3**, indicate that the two potential disposal sites could accommodate in excess of 300,000 CY if the dredged material is stored 4 feet thick:

Table 3: Capacity of Potential Disposal Sites

| Site | Suitable Area (acres) | Suitable Area (square yards) | Storage Depth | Storage Capacity (cubic yards) |
|---|---|---|---|---|
| **84-acre Property** | 20.33 | 98,252 | 4 feet (1.33 yard) | 130,675 |
| **43-acre Property** | 38.00 | 183,920 | 4 feet (1.33 yard) | 244,613 |
| | | | **Total Capacity** | **375,288** |

On October 22, 2019, the U.S. Environmental Protection Agency (USEPA) and the Department of the Army published the proposed Navigable Waters Protection Rule to define Waters of the U.S., and on April 21, 2020, the final rule was published in the Federal Register. If enforced as written, it is likely that the wetland features identified in the potential sediment disposal sites would no longer be regulated under the Clean Water Act. Arroyo Colorado and any wetlands on the lowest terraces would likely be regulated. After construction logistics have been determined but prior to the initiation of construction activities, the USIBWC would perform additional Waters of the U.S. determination and delineation investigations, quantify impacts to regulated aquatic features, and coordinate with the USACE, as appropriate. The Preferred Alternative would meet the need of improving Arroyo Colorado's flood conveyance capability and would fulfill the purpose of fully restoring design flood conveyance capacity and the purpose of reducing flood risk (USIBWC, 2014a, 2014b).

## 2.3 ALTERNATIVES REMOVED FROM FURTHER CONSIDERATION

### 2.3.1 Off-Channel Storage Alternative

Under this alternative, a portion of the flood flow in Arroyo Colorado would be diverted to an off-channel reservoir that would be constructed between Mercedes and Harlingen. When high flows result in floodwaters that are higher than the water surface elevation of the design flow, the excess water would flow over a spillway (i.e., a lateral weir) and into the reservoir. The amount of water

diverted to the reservoir would depend on the amount of the floodwater and the arroyo's conveyance capacity.

To determine potential storage needs, USIBWC performed flood modeling based generally on flows associated with Hurricane Beulah. The flows were "scaled down" such that the peak flow matched the 21,000 cfs design flow. The arroyo's capacity was assumed to match the current condition where previous vegetation management activities have restored a portion of the design flood conveyance capacity. Under these conditions, the water surface elevation was high enough for excess flows to flow into the off-channel reservoir for 70 hours. If a reservoir 10 feet deep had been receiving this excess flow, it would have required an area of approximately 3.4 square miles (2,204 acres) to provide sufficient storage capacity (USIBWC, 2014a, 2014b).

An assessment of land adjacent to Arroyo Colorado showed that it would be difficult to identify enough available land with appropriate elevations for the reservoir. The August 2019 Land Value Summary, produced by the U.S. Department of Agriculture's (USDA's) National Agricultural Statistics Service, reported the average value of cropland in Texas as $1,930 per acre (USDA, 2019). Given the information above, the cost of acquisition for the reservoir would be approximately $4.3 million. Additional costs for the market value of land at time of acquisition, design, construction, and operation are likely to result in significantly greater costs associated with the implementation of this alternative.

The Off-Channel Storage Alternative would result in additional environmental impacts associated with construction of the reservoir and lateral weir. These impacts could include permanent habitat loss and potential displacements of residences or commercial/agricultural operations.

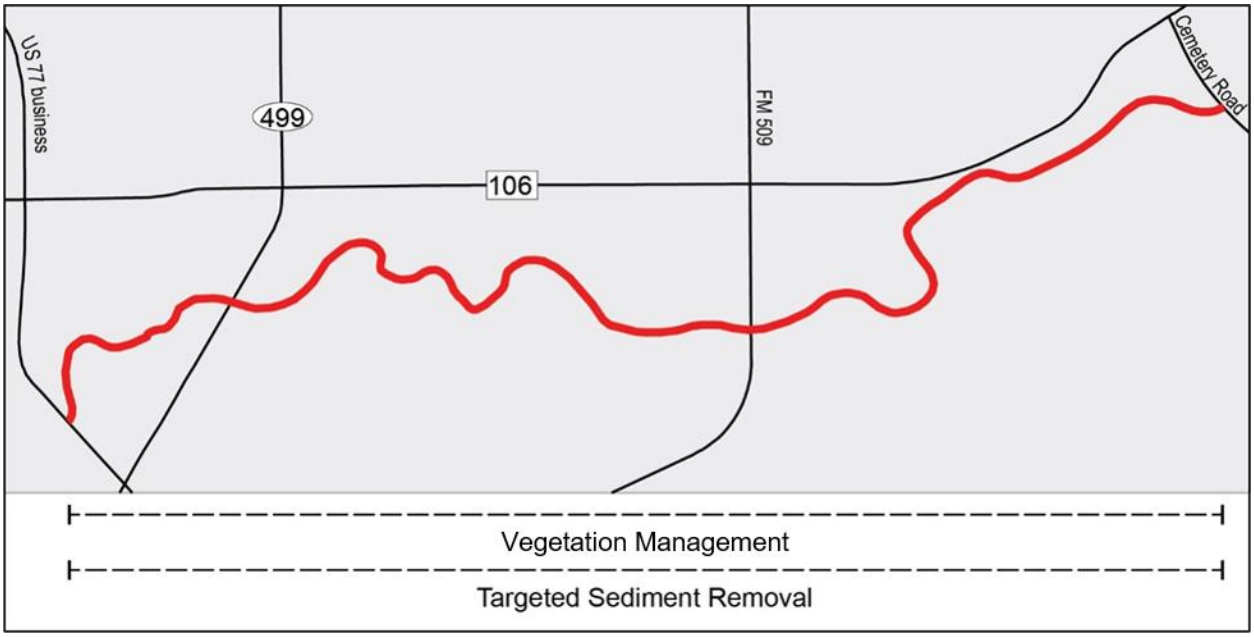
The Off-Channel Storage Alternative would meet the need of improving Arroyo Colorado's flood conveyance capabilities. It would also fulfill the purpose of restoring flood conveyance capacity by adding temporary storage of excess flood water and fulfill the purpose of reducing flood risk, which would be largely removed.

Despite meeting the need and purpose of the action, the Off-Channel Storage Alternative was removed from further consideration due to fiscal and physical constraints associated with reservoir acquisition, construction, and maintenance.

### 2.3.2 Expanded Vegetation Management Alternative

Similar to the Preferred Alternative, this alternative would continue vegetation management activities along the reach of Arroyo Colorado from US 77 Business to FM 509 and extend them an additional 2.6 miles beginning at FM 509 and ending at Cemetery Road. Unlike the Preferred Alternative, the Expanded Vegetation Management Alternative would not be paired with a one-time, channel dredging operation (**Figure 12**).

*Figure 12: Activities and extents, Expanded Vegetation Management Alternative.*




Flood model results indicate that previous vegetation removal activities would restore as much as 82 percent of Arroyo Colorado's design flood conveyance capacity. Direct observations of water surface elevation at the stream gage at US 77 (approximately one mile upstream from US 77 Business) during the June 2018 flood did not support those model predictions. Gage readings showed elevated values, which indicated that the previous vegetation management operation had not reduced water surface elevations as predicted.

Impacts associated with these operations would be similar to those assessed in environmental reviews of the previous operations; however, the impacts would be extended to the area between FM 509 and Cemetery Road. Impacts would include removal of woody vegetation and associated habitat, potential impacts to migratory birds, and temporary water quality impacts resulting from the erosion of disturbed soils.

The Expanded Vegetation Removal Alternative would partially meet the need of improving Arroyo Colorado's flood conveyance capacity and would partially fulfill the purposes of restoring design flood conveyance capacity and reducing flood risk (USIBWC, 2014a, 2014b).

The Expanded Vegetation Removal Alternative would only partially meet the need and purpose of the action; therefore, it was removed from further consideration.

# SECTION 3 AFFECTED ENVIRONMENT

This section describes resources in the potential area of influence of the project. Resources have been identified through field observations and records research.

## 3.1 BIOLOGICAL RESOURCES

### 3.1.1 Vegetation

The area of potential influence for vegetation includes the vegetation management areas adjacent to Arroyo Colorado along the reach between US 77 Business and Cemetery Road and the two potential spoil disposal sites.

The project area is located in the Lower Rio Grande Alluvial Floodplain, which is a subset of the Western Gulf Coastal Plain. Historically, this area had abundant palm trees and subtropical upland forests that included broadleaved and evergreen trees. Changes in land use have converted the land into cropland and developed urban areas. Due to these land use changes, hydrology and natural flooding cycles have been highly altered. Changes in the flood cycles have further devastated mesic riparian woodlands and caused them to shift to more xeric species. The grassland areas are dominated by Bermudagrass (*Cynodon dactylon*), buffelgrass (*Cenchrus ciliaris*), Kleberg bluestem (*Dichanthium annulatum*), guinea grass (*Megathyrsus maximus*), and other grass species. The dominant riparian species are hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), giant ragweed (*Ambrosia trifida*), common reed (*Phragmites australis*), and many-spiked flat sedge (*Pycreus polystachyos*). Forested upland areas are dominated by Texas ebony (*Ebenopsis ebano*), lead tree (*Leucaena leucocephala*), little head gum weed (*Grindelia microcephala*), and dewberry (*Rubus trivialis*). In the recent past, riparian areas have been degraded, and the invasive salt cedar (*Tamarix* sp.) has attained dominance in many locations (GSRC, 2015, 2016).

Based on literature review and field surveys, the following four vegetation communities were identified as occurring within the vegetation survey corridor: riparian community, grass upland community, forested upland community, and urban community, as described below.

***Riparian Community***

Riparian areas in the region are generally characterized by woody and herbaceous species growing along the riverbanks. Riparian areas were characterized by common reed, giant ragweed, American germander (*Teucrium canadense*), baccharis (*Baccharis salicifolia*), green ash, maidencane (*Panicum hemitomon*), many-spiked flat sedge, purple marsh fleabane (*Pluchea odorata*), Rio Grande dewberry (*Rubus riograndis*), Rio Grande palmetto (*Sabal mexicana*), sea oxeye daisy (*Borrichia frutescens*), sprawling lippie (*Lippia alba*), and hackberry. Two invasive species, salt cedar and carrizo cane (*Arundo donax*), have gained dominance in many riparian areas (GSRC, 2015, 2016).

***Grass Upland Community***

Grass upland areas along the Arroyo Colorado Floodway are characterized by vegetation dominated by buffelgrass, Kleberg bluestem, and guinea grass. Other species occurring in the vegetation community include Carolina wolfberry (*Lycium carolinianum*), deer pea (*Vigna*

*luteola*), depression weed (*Baccharis neglecta*), hachinal (*Heimia salicifolia*), hairypod cowpea (*Vigna luteola*), honey mesquite (*Prosopis glandulosa*), huisache (*Acacia farnesiana*), retama (*Parkinsonia aculeata*), scorpion weed (*Heliotropium angiosermum*), shrubby blue sage (*Salvia ballotiflora*), Torrey's croton (*Croton incanus*), velvet leaf Indian mallow (*Abutilon theophrasti*), shrub morning glory (*Ipomoea leptophylla*), and chandelier plant (*Kalanchoe delagoensis*). In areas where disturbance has occurred and in urban community areas, Bermudagrass is dominant (GSRC, 2015, 2016).

***Forested Upland Community***

Forested upland areas are characterized by larger woody species with scattered herbaceous understory. Dominant species identified in this community include blue mistflower (*Chromolaena odorata*), dewberry, little head gum weed, possum grape (*Ampelopsis cordata*), Texas ebony, Brazilian peppertree (*Schinus terebinthifolia*), castor bean (*Ricinus communis*), tree tobacco (*Nicotiana glauca*), Chinaberry (*Melia azedarach*), Chinese tallow (*Triadica sebifera*), and lead tree. Historically, there may have been other species in the forested areas, but changes in water (e.g., lowered water tables) and urban development (e.g., clearing wooded areas) have reduced the extent of this vegetation in the area and altered the species composition (GSRC, 2015, 2016).

Of the protected species whose potential range encompasses the study reach, three are plants that are federally and state listed as endangered. Presence/absence surveys were conducted in 2015, and no potential habitat for south Texas ambrosia (*Ambrosia cheiranthifolia*), Texas ayenia (*Ayenia limitaris*), or star cactus (*Astrophytum asterias*) was present within any portion of the vegetation clearing areas. The USIBWC has determined that south Texas ambrosia, Texas ayenia, and star cactus are **not likely present** within the project area. Field surveys of the Arroyo Colorado Floodway vegetation were conducted on September 14–17, 2015 (GSRC, 2016). The field surveys of vegetation largely determined wildlife habitats for common and threatened and endangered species. Field surveys of potential spoil disposal sites were conducted in August 2019. No potential habitat for the species listed above was observed.

Vegetation in management areas along the reach between US 77 Business and FM 509 would be managed as it has been in the recent past. Therefore, no substantial changes to vegetation in these areas are anticipated. Vegetation in the potential management areas along the reach between FM 509 and Cemetery Road is similar to the pre-management vegetation immediately upstream. As part of the development of the vegetation management protocols, USIBWC contracted GSRC to conduct vegetation surveys. Dominant species in riparian environments were reported as common reed (*Phragmites australis*), carrizo cane (*Arundo donax*), retama (*Parkinsonia aculeata*), depression weed (*Baccharis neglecta*), castor bean (*Ricinus* communis), saltcedar (*Tamarix* sp.), Texas ebony (*Chloroleucon ebano*), huisache (*Acacia farnesiana*), hackberry (*Celtis laevigata*), honey mesquite (*Prosopis glandulosa*), and leadtree (*Leucaena leucocephala*) (GSRC, 2015). Vegetation in suitable disposal areas within the 43-acre sediment disposal site consisted of scant woody species and a variety of grasses typical of fallow agricultural land. Vegetation within suitable portions of the 84-acre sediment disposal site was dominated by non-woody species, and canopy coverage was light and non-continuous.

Surveys focused on but did not find specimens of or suitable habitat for the federally listed south Texas ambrosia, Texas ayenia, or star cactus. Surveys also focused on vegetation composition and structure that may be suitable as habitat or migration corridors for the federally listed Gulf Coast

jaguarundi (*Herpailurus yagouaroundi*) and ocelot (*Leopardus paradalis*). A determination was made that pre-management vegetation in the Arroyo Colorado floodplain presented low-quality potential habitat for Gulf Coast jaguarundi and ocelot. This determination was based on the observations that species composition was marginally suitable (i.e., some preferred species present), but canopy cover was suboptimal (i.e., less than 95 percent coverage). Furthermore, literature review supported the use of narrow strips of shrub or forest by these species for migration (GSRC, 2015).

**Figure 13** shows riparian vegetation along Arroyo Colorado, as seen from the FM 509 bridge looking west (upstream). The low terraces in this area are dominated by common reed, and higher elevations are dominated by woody species.

*Figure 13: Riparian vegetation along Arroyo Colorado.*

**Figure 14** shows woody vegetation and common reed on the steep banks in the distance and herbaceous species dominating the low bank in the foreground.

*Figure 14: Herbaceous and woody vegetation along Arroyo Colorado.*

**Figure 15** shows a transitional area between three vegetation types. In the foreground to the right, grasses and other herbaceous species dominate. In the left of frame, woody species typical of riparian areas dominate, and in the background right of frame, woody species are transitioning to species typical of upland areas.

*Figure 15: Transitional area along Arroyo Colorado.*

Additional representative photographs are presented in **Appendix A**.

### 3.1.2 Wildlife

The Arroyo Colorado Floodway region has great species diversity due in part to a climate that is a mix of subtropical, temperate, and coastal. The region is home to many rare plants and animals, including south Texas ambrosia, star cactus, ocelot, and Gulf Coast jaguarundi. Some common animal species that may be encountered in the region include armadillo (*Dasypus novemcinctus*), white-tailed deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus*), southern plains woodrat (*Neotoma micropus*), and Hoary bat (*Lasiurus cinereus*) (GSRC, 2015, 2016; Texas Parks and Wildlife Department [TPWD], 2020).

Two flyways, Central and Mississippi, merge through this area and provide a rich diversity of bird species that includes neotropical migratory birds, shorebirds, and waterfowl. The Arroyo Colorado open floodplain also provides suitable hunting areas for raptors. The diverse bird community has made this area popular for birding. Bird species that may be encountered include green jay (*Cyanocorax yncas*), brown pelican (*Pelecanus occidentalis*), tricolored heron (*Egretta tricolor*), black-necked stilt (*Himantopus mexicanus*), and magnolia warbler (*Setophaga magnolia*) (GSRC, 2015, 2016; TPWD, 2020).

Additionally, the Arroyo Colorado channel is home to a variety of fish, invertebrates, amphibians, and reptile species. Fish species that may occur include spotted sea trout (*Cynoscion nebulosus*), red drum (*Sciaenops ocellatus*), catfish (*Siluriformes* spp.), silver perch (*Bairdiella chrysoura*), and black drum (*Pogonias cromis*). Amphibian species that may occur in the area include western tiger and tiger salamander (*Ambystoma tigrinum*), Rio Grande leopard frog (*Lithobates*

*berlandieri*), squirrel tree frog (*Hyla squirella*), Gulf Coast toad (*Incilius valliceps*), Hunter's spadefoot (*Scaphiopus hurterii*), and several other frog and toad species. Reptile species that may occur in the area include American alligator (*Alligator mississippiensis*), brown anole (*Anolis sagrei*), Texas tortoise (*Gopherus berlandieri*), rat snake (*Pantherophis obsoletus*), and western ribbon snake (*Thamnophis proximus*) (GSRC, 2015, 2016; TPWD, 2020).

### 3.1.3 Identification of Federal and State-Listed Species

In all, 52 state and federally listed threatened and endangered species, 5 federally listed threatened species, 14 federally listed endangered species, 2 candidates for federal listing, 14 state-listed endangered species, and 36 state-listed threatened species were identified as having the potential to occur in Cameron County (TPWD, 2020; USFWS, 2020). Threatened and endangered species identified by USFWS and TPWD are presented in **Table 4**. Habitat descriptions for these species are presented in **Appendix B**.

Table 4: Threatened and Endangered Species Potentially Present in Project Area

| Common Name (*Scientific Name*) | Federal Status | State Status | Effect Determination |
|---|---|---|---|
| Black-spotted Newt (*Notophthalmus meridionalis*) | — | T | May impact |
| Mexican Treefrog (*Smilisca baudinii*) | — | T | May impact |
| Sheep Frog (*Hypopachus variolosus*) | — | T | May impact |
| South Texas Siren (*Siren* sp.) | — | T | May impact |
| White-lipped Frog (*Leptodactylus fragilis*) | — | T | May impact |
| Black Rail (*Laterallus jamaicensis*) | T | — | No effect |
| Botteri's Sparrow (*Peucaea botterii*) | — | T | May impact |
| Eskimo Curlew (*Numenius borealis*) | E | E | No effect |
| Golden-cheeked Warbler (*Setophaga chrysoparia*) | E | E | No effect |
| Gray Hawk (*Buteo plagiatus*) | — | T | No effect |
| Least Tern (*Sternula antillarum*) | E | — | No effect |
| Northern Aplomado Falcon (*Falco femoralis septentrionalis*) | E | E | No effect |
| Northern Beardless-tyrannulet (*Camptostoma imberbe*) | — | T | No impact |
| Piping Plover (*Charadrius melodus*) | T | T | No effect |
| Red Knot (*Calidris canutus rufa*) | T | — | No effect |
| Red-crowned Parrot (*Amazona viridigenalis*) | C | — | No effect |
| Reddish Egret (*Egretta rufescens*) | — | T | No impact |

| Common Name (*Scientific Name*) | Federal Status | State Status | Effect Determination |
|---|---|---|---|
| Rose-throated Becard (*Pachyramphus aglaiae*) | — | T | No impact |
| Sooty Tern (*Onychoprion fuscatus*) | — | T | No impact |
| Swallow-tailed Kite (*Elanoides forficatus*) | — | T | No impact |
| Texas Botteri's Sparrow (*Peucaea botterii texana*) | — | T | No impact |
| Tropical Parula (*Setophaga pitiayumi*) | — | T | May impact |
| White-faced Ibis (*Plegadis chihi*) | — | T | May impact |
| White-tailed Hawk (*Buteo albicaudatus*) | — | T | No impact |
| Wood Stork (*Mycteria americana*) | — | T | No impact |
| Zone-tailed Hawk (*Buteo albonotatus*) | — | T | No impact |
| Mexican Goby (*Ctenogobius claytonia*) | — | T | No impact |
| Opossum Pipefish (*Microphis brachyurus*) | — | T | No impact |
| River Goby (*Awaous banana*) | — | T | No impact |
| Smalltooth Sawfish (*Pristis pectinate*) | — | E | No impact |
| Coues' Rice Rat (*Oryzomys couesi*) | — | T | May impact |
| Gulf Coast Jaguarundi (*Herpailurus yagouaroundi*) | E | E | May affect, not likely to adversely affect |
| Humpback Whale (*Megaptera novaeangliae*) | E | E | No effect |
| Ocelot (*Leopardus pardalis*) | E | E | May affect, not likely to adversely affect |
| Southern Yellow Bat (*Lasiurus ega*) | — | T | No impact |
| West Indian Manatee (*Trichechus manatus*) | T | E | No effect |
| White-nosed Coati (*Nasua narica*) | — | T | No impact |
| Mexican Fawnsfoot (*Truncilla cognata*) | — | T | No impact |
| Salina Mucket (*Potamilus metnecktayi*) | — | T | No impact |
| Texas Hornshell (*Popenaias popeii*) | C | T | No impact |

| Common Name (*Scientific Name*) | Federal Status | State Status | Effect Determination |
|---|---|---|---|
| South Texas Ambrosia (*Ambrosia cheiranthifolia*) | E | E | No effect |
| Star Cactus (*Astrophytum asterias*) | E | E | No effect |
| Texas Ayenia (*Ayenia limitaris*) | E | E | No effect |
| Black-striped Snake (*Coniophanes imperialis*) | — | T | May impact |
| Green Sea Turtle (*Chelonia mydas*) | E | T | No effect |
| Hawksbill Sea Turtle (*Eretmochelys imbricate*) | E | E | No effect |
| Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) | E | E | No effect |
| Leatherback Sea Turtle (*Dermochelys coriacea*) | E | E | No effect |
| Loggerhead Sea Turtle (*Caretta caretta*) | T | T | No effect |
| Northern Cat-eyed Snake (*Leptodeira septentrionalis*) | — | T | May impact |
| Speckled Racer (*Drymobius margaritiferus*) | — | T | May impact |
| Texas Horned Lizard (*Phrynosoma cornutum*) | — | T | May impact |
| Texas Indigo Snake (*Drymarchon melanurus*) | — | T | May impact |
| Texas Tortoise (*Gopherus berlandieri*) | — | T | May impact |

Source: TPWD, 2020; USFWS, 2020

The Texas Natural Diversity Database (TXNDD) was consulted for information regarding occurrences of listed and rare species on January 29, 2020, using data obtained from TPWD's live version of the TXNDD. TXNDD provides known historical records for rare, threatened, and endangered species. Information files were reviewed for the known locations of species in the *Harlingen, Rio Hondo, Laguna Atacosa, La Leona, Paso Real, Willamar SW, Los Fresnos, Olmito, La Paloma, Santa Maria, La Feria,* and *Santa Rosa, Texas* U.S. Geological Survey 7.5-minute topographical quadrangle maps (which include the project area and surrounding vicinity). Although it provides valuable information regarding recorded occurrences of listed or rare species, it is important to note that TXNDD cannot be used for presence/absence determinations.

### 3.1.4 Migratory Bird Treaty Act of 1918

All native birds present within the Arroyo Colorado Floodway are protected under the Migratory Bird Treaty Act of 1918 (MBTA). MBTA makes it unlawful to "pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for

shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird… or any part, nest, or egg of any such bird" (16 U.S.C. 703).

## 3.2 CULTURAL RESOURCES

The proposed project is a federal undertaking with the potential to affect historic properties under 36 CFR 800.3(a). An integral part of the National Historic Preservation Act Section 106 process is the delineation of the area within which archeological and architectural resources would be affected or are likely to be affected. The archeological area of potential effects (APE) consists of the footprint of the two potential sediment disposal sites. The historical built-environment APE consists of that footprint plus a 300-foot buffer around the potential sediment disposal sites. The Texas Historical Commission (THC) concurred with the historical built-environment APE on September 17, 2019. Detailed survey methodology, contextual information, survey results and THC correspondence are provided in the cultural resource assessment report (CMEC, 2020). A summary of findings is provided below.

### 3.2.1 Archeological Resources

CMEC archeologists conducted an intensive survey of the archeological APE per 13 Texas Administrative Code (TAC) 26.20 and using the definitions in 13 TAC 26.5. Field methods and strategies complied with the requirements of 13 TAC 26.20, as elaborated by the THC and the Council of Texas Archeologists (CTA). A survey strategy, including pedestrian examination augmented by shovel test units placed throughout the APE, was utilized to provide adequate coverage of the APE and relevant deposits. In accordance with THC/CTA survey standards, shovel test units were placed where ground surface visibility was below 30 percent, soils appeared to be of sufficient depth to contain subsurface cultural materials, and/or previous disturbance appeared to be minimal. All shovel tests were excavated in natural levels to subsoil, disturbance, or 31.5 inches (80 centimeters), whichever was encountered first. Excavated matrix was screened through 0.25-inch (0.635-centimeter) hardware cloth. Deposits were described using conventional texture classifications and Munsell color designations.

No previously recorded sites or surveys are known within the archeological APE. The intensive survey conducted by CMEC archeologists in August 2019 found no cultural materials on or below the surface.

### 3.2.2 Historic Resources

Prior to fieldwork, CMEC architectural historians conducted a review of Cameron County Appraisal District data, aerial photographs, and historic maps in order to identify resources 45 years or older (constructed in 1975 or earlier) in the historical built-environment APE; no buildings, structures, or objects 45 years old or older were identified. Background research identified one historic property in the historical built-environment APE: the Cameron County Irrigation District (CCID) No. 2. This irrigation district was previously determined eligible for listing in the National Register of Historic Places (NRHP) by USIBWC in 2019 during Section 106 consultation with THC for the Donna-to-Brownsville Protection Levee System Rehabilitation Project.

CMEC cultural resource specialists conducted a windshield survey of the 300-foot APE for all historical built-environment resources. There are no buildings, structures, or objects (canals, gates, pipelines, etc.) associated with CCID No. 2 within the project APE. No other buildings, structures, or objects 45 years old or older were identified in the windshield survey within the project APE.

## 3.3 WATER RESOURCES

The Arroyo Colorado is separated into two water quality management segments, segment 2201 (tidal) and segment 2202 (above tidal). The project is located within segment 2202 of the Nueces–Rio Grande Coastal River Basin, as defined by the Texas Commission on Environmental Quality (TCEQ). Segment 2202 is an ancient distributary channel of the Rio Grande that extends about 90 miles from Mission, Texas, to the Laguna Madre in the Lower Rio Grande Valley. The water system is a major source of freshwater to the lower Laguna Madre and is an economically and ecologically important resource. Flows are sustained by wastewater discharges, agricultural runoff, urban runoff, and base flows from shallow groundwater. It averages 40 feet wide and is approximately two to three feet deep. The designated use of the segment is contact recreation, intermediate aquatic life, and fish consumption. The most recent surface water–quality data are from TCEQ in its *2017 Arroyo Colorado Watershed Protection Plan*. Impairments and concerns include high bacterial concentrations, high total phosphorus and nitrate concentrations, and legacy pollutants that remain in the environment (TCEQ, 2017, 2020).

## 3.4 ENVIRONMENTAL JUSTICE

According to 2010 U.S. Census Bureau data, the Arroyo Colorado study reach transects or abuts five census tracts. Minority populations are present within the five census tracts and range from approximately 54.9 to 86.1 percent, which is lower than the Cameron County minority population average of approximately 89.3 percent. The racial makeup of the minority census geographies is majority Hispanic (U.S. Census Bureau, 2010).

The USEPA EJScreen Tool (USEPA, 2020) provides access to data from the American Community Survey (ACS), which is a program that collects demographic data between census counts to provide an indication of changes in population metrics. The tool was queried for three different geographies: the five census tracts mentioned above, the City of Harlingen, and a 0.25-mile buffer along the Arroyo Colorado study reach. The query returned results based on the 2013–2017 ACS.

EJScreen data indicate that the minority population is increasing in these tracts and now ranges from 62 to 87 percent minority with a total among the tracts of 79 percent (USEPA, 2020). The percent minority population in the City of Harlingen is 84 percent, and within the 0.25-mile buffer of the study reach the minority population is 62 percent of the total (USEPA, 2020).

Although the total of percent minority varies among the geographies, each is majority minority. Some geographies are majority low income as well (USEPA, 2020). Reports generated through EJScreen queries are included in **Appendix C**, and they indicate that demographic patterns in the project support the consideration of environmental justice issues.

# SECTION 4 ENVIRONMENTAL CONSEQUENCES BY RESOURCE

## 4.1 BIOLOGICAL RESOURCES

### 4.1.1 Vegetation

***No Action Alternative***

No impacts are anticipated beyond those associated with the previously established and ongoing vegetation and sediment maintenance operations.

***Preferred Alternative***

The Preferred Alternative would affect approximately 130 acres of additional floodplain vegetation along an additional reach of Arroyo Colorado that is approximately 2.6 miles long. This alternative would also affect approximately 56 acres of upland vegetation in the proposed sediment disposal sites. The proposed vegetation removal operations would affect native and non-native vegetation. The proposed revegetation plan would support the design flood conveyance and will implement seeding and plantings of native vegetation. Sediment disposal areas would be left to revegetate naturally at the discretion of the landowners.

### 4.1.2 Wildlife

***No Action Alternative***

No impacts are anticipated beyond those associated with the previously established and ongoing vegetation and sediment maintenance operations.

***Preferred Alternative***

Wildlife habitat is expected to be impacted under the Preferred Alternative. Extended vegetation management activities would convert floodplain vegetation as described in previous sections. This could lead to loss of habitat associated with woody vegetation (e.g., potential bird nesting sites). However, the area would remain undeveloped, and novel habitat opportunities would be presented.

USIBWC must comply with the MBTA. The MBTA protects migratory birds, their parts, nests, and the eggs thereof during their nesting season. The USFWS has determined that the nesting season for the region including the Lower Rio Grande Valley is March 1 through August 15 and may be extended to September 1 if birds are still nesting. Work will be planned to occur outside of the bird nesting season, which is typically from March through August.

Machinery movement and other operations associated with vegetation clearing and replanting have the potential to directly and indirectly impact wildlife. However, these impacts would be temporary, and precautions such as project phasing (i.e., MBTA avoidance measures) would be undertaken to minimize impacts.

Dredging operations associated with sediment removal have the potential to directly and indirectly impact aquatic species. However, highly mobile species (e.g., fish) are expected to be able to seek refuge in areas outside of active dredging operations. Less mobile species may be more at risk for

direct impacts. Indirect impacts may result from increases in turbidity. These potential impacts would be temporary in nature and would not reoccur in the foreseeable future.

Sediment disposal operations have the potential to cover ground-nesting and burrowing animals. The sites would be available for recolonization after operations have ceased, dependent upon the subsequent actions of landowners.

### 4.1.3 Threatened and Endangered Species

***No Action Alternative***

No impacts are anticipated beyond those associated with the previously established and ongoing vegetation and sediment maintenance operations.

***Preferred Alternative***

Per previous investigations and recent USFWS discussions, no adverse effects to federally listed species are anticipated. No potential habitat is present for star cactus, Texas ayenia, or south Texas ambrosia. Additionally, riparian habitat has been classified as low quality for the Gulf Coast jaguarundi and ocelot. The additional areas proposed for vegetation management are similarly poorly suited habitat for these species. The proposed sediment disposal sites do not contain suitable habitat for these species. Therefore, direct impacts to these species are not expected. The project area has not provided and is not expected to provide suitable habitat for the listed plant species. Riparian areas may have provided poor-quality migration corridors in the past. Migration potential will be preserved through the protection of woody vegetation along the banks of Arroyo Colorado. No suitable habitat for federally listed species was present in the proposed sediment disposal sites.

## 4.2 CULTURAL RESOURCES

***No Action Alternative***

No impacts are anticipated beyond those associated with the previously established and ongoing vegetation and sediment maintenance operations.

***Preferred Alternative***

No archeological resources of any kind were identified. As a result, no impacts to cultural resources are expected, and no further work is recommended prior to the proposed project's commencement. In addition, no historical built-environment resources were identified. Although the NRHP-eligible CCID No. 2 is located within the project APE, none of the contributing features nor any of the structural components that compose CCID No. 2 are within the project APE. The soil placement areas pose no direct effects to CCID No. 2 since it is located outside the footprint of the placement areas. In addition, the soil placement areas pose no adverse visual or indirect effects to the NRHP-eligible CCID No. 2. No buildings or structures will be placed at these locations, and the placement of soil at a height of 10 feet or higher will not be a visual intrusion to the irrigation district. These findings are under review by the THC, and any agency direction or requests will be considered when appropriate.

## 4.3 WATER RESOURCES

***No Action Alternative***

No impacts are anticipated beyond those associated with the previously established and ongoing vegetation and sediment maintenance operations.

***Preferred Alternative***

Impacts are expected due to sediment removal activity in Arroyo Colorado. Anticipated impacts include disruption of benthic habitat, water quality degradation during dredging operations, and disturbance of streambank vegetation and soils during sediment and equipment transport. These impacts would be temporary in nature.

Wetland impacts would be minimized to the greatest extent practicable. Avoidance measures have already been identified. Additional impacts may result from staging, transport, and access activities during dredging operations. These potential impacts are yet to be determined, and any unavoidable impacts would be coordinated with the USACE through the Section 404 permitting program.

## 4.4 ENVIRONMENTAL JUSTICE

***No Action Alternative***

No impacts are anticipated beyond those associated with the previously established and ongoing vegetation and sediment maintenance operations.

***Preferred Alternative***

No adverse impacts are anticipated. The proposed project would cause minimal economic disruptions and would potentially benefit environmental justice populations through the reduction of flood risk.

## 4.5 CUMULATIVE IMPACTS

While several watershed-level actions are being discussed by various stakeholders, none have sufficient support or funding to be deemed reasonably foreseeable. These actions typically relate to regional stormwater management goals and would likely focus on slowing the concentration and conveyance of stormwater to Arroyo Colorado. These measures would reduce peak flows through the system. Ongoing efforts that affect Arroyo Colorado include stakeholder partnerships that focus on water quality. The Arroyo Colorado Watershed Protection Plan (ACWP, 2017) was developed by the Arroyo Colorado Watershed Partnership (ACWP) and describes the accomplishments and goals of the group. These efforts are intended to continue into the future; however, the relationship between the proposed flood flow conveyance project and the potential actions of the ACWP is unclear. The proposed flood flow conveyance project is not expected to prevent the work or hinder the goals of the ACWP. USIBWC is unaware of other actions in the area that would have cumulative impacts on the watershed.

# SECTION 5 PUBLIC INVOLVEMENT

## 5.1 AGENCY COORDINATION

This section discusses consultation and coordination that has occurred during the preparation of this document, some of which is ongoing. This includes contacts made during development of the proposed action, other alternatives considered, and preparation of the draft EA. A list of agencies and stakeholders to be contacted is presented in **Appendix D**, and any comments received will be included in the final EA. Formal and informal coordination will be conducted with the following agencies:

- State Historic Preservation Office
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Army Corps of Engineers (USACE)
- City of Harlingen

## 5.2 PUBLIC INFORMATION AND REVIEW

An open-house public scoping meeting was held for the proposed project on December 12, 2019, at the Harlingen Community Center located at 201 E. Madison Avenue, Harlingen, Texas 78552. Notifications of the meeting and instructions to access materials and provide comment electronically were sent by mail to approximately 200 recipients. Recipients included adjacent landowners, regional and local representatives of federal and state resource agencies, interested Native American tribes, and local elected officials. Additionally, notifications were posted in newspapers of local circulation and on City of Harlingen and USIBWC media outlets during the first week of December.

In all, 35 attendees signed in and 13 comments were received within the comment period. Approximately seven commenters stated that they were in general support of the Expanded Vegetation & Sediment Removal Alternative (i.e., the Preferred Alternative). One commenter expressed support for a combination of the three actions that would include Off-Channel Storage, Expanded Vegetation Removal, and Expanded Vegetation & Sediment Removal**.** The remaining five comments proposed additional actions outside of the scope of this project that may be considered more thoroughly at a later date. A full transcript of all comments and responses is included in **Appendix E**.

In accordance with NEPA, a 30-day review period of the draft EA has been provided; a Notice of Availability has been posted in the Federal Register, posted on the USIBWC website, and sent via direct local mailing. Additional outreach materials and responses will be included in **Appendix D** of the final EA.

# SECTION 6 LIST OF PREPARERS

| Name | Agency | Degree | Years of Experience | Role |
|---|---|---|---|---|
| Walt Meitzen | CMEC | M.S. Environmental Management | 22 | Preparer |
| Jarrod J. Powers | CMEC | M.S. Aquatic Ecology | 11 | Preparer |
| Madeline Harris | CMEC | M.A. Regional and City Planning | 1 | Preparer |
| Scotty Moore | CMEC | M.A. Anthropology | 21 | Preparer |
| Adrienne Campbell | CMEC | M.S. Historic Preservation | 16 | Preparer |
| Kelly Blough | USIBWC | B.A. Geology | 32 | Reviewer/ Coordinator |
| Elizabeth Verdecchia | USIBWC | Master of Applied Geography | 20 | Reviewer |

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# APPENDIX A:

# Project Area Photographs

Photo 1: View northeast from near East Harrison Road across the 43-acre proposed sediment disposal site. The green vegetation is an ephemeral drainage.

Photo 2: View east along the ephemeral drainage.

Photo 3: View southeast from near the northwest corner of the 43-acre proposed sediment disposal site. The ephemeral drainage lies to the right of frame.

Photo 4: View east from near the northwest corner of the 43-acre proposed sediment disposal site.

Photo 5: View south across the 84-acre proposed sediment disposal site.

Photo 6: Representative view of a wetland identified in the 84-acre proposed sediment disposal site.

# APPENDIX B:

# Protected Species' Habitat Descriptions

| Common Name (Scientific Name) | Habitat Description |
|---|---|
| Black-spotted Newt (Notophthalmus meridionalis) | The species can be found in the Western Gulf Coastal Plains ecoregion of the Tamaulipan biotic province in south Texas. It inhabits permanent and temporary water sources such as arroyos, canals, ponds, roadside ditches, stream pools, or shallow depressions with an abundance of macrophytic vegetation. |
| Mexican Treefrog (*Smilisca baudinii*) | The species occurs in xerophytic vegetation and savannahs in semi-arid regions, in lowlands and foothills, and in the vicinity of ponds, pools, canals, and flooded fields. |
| Sheep Frog (*Hypopachus variolosus*) | The species inhabits grasslands, savannahs, and woodland margins occurring in the Western Gulf Coastal Plains ecoregion of the Tamaulipan biotic province in south Texas. Burrows are located under fallen trees, or other debris that may retain soil moisture, often using existing burrows such as pack rat nests. Preferred habitat for the sheep frog is includes vegetated field margins, drainages, and other areas that are not regularly plowed. |
| South Texas Siren (*Siren* sp.) | Occurs in southern Texas south of the Balcones Escarpment. Prefers quiet bodies of water with or without submergent vegetation. Occurs in perennial and seasonally flooded features such as arroyos, canals, ditches, or even shallow depressions. The species aestivates in the ground during dry periods but does require some moisture. |
| White-lipped Frog (*Leptodactylus fragilis*) | Found in southern Texas, the species is highly adaptable and occurs in a variety of habitat types including montane forest, humid lowlands, and near marshes, ponds, and temporary lentic pools of water. Highly adaptable to open and disturbed sites, it is found in grasslands, cultivated fields, and roadside ditches. |
| Black Rail (*Laterallus jamaicensis*) | Black rails are year-round residents of on the central and upper coast and migrants in the eastern part of the state. The species nests in salt, brackish, and freshwater marshes, pond borders, wet meadows, and wetlands with hydrophytic grass species. Water depth is an important and key habitat component, as the species typically is found where water is less than two to four centimeters deep. Other significant habitat factors may include vegetation density, distance to open water, and water regime stability. Nesting typically occurs in the highest sections of the marsh, which have mesic to hydric soils and are flooded by only the highest tides. Nests are built in areas with saturated or shallowly flooded soils and dense vegetation on damp ground, on mat of previous year's dead grasses, or over shallow water. In salt or brackish marshes, typical habitat includes dense stands of cordgrasses (*Spartina* sp.), spikegrasses (*Distichlis* sp.), and needlerush (*Juncus* sp.), or, in more upland saltbush communities along marsh edges. Typical freshwater habitat includes species such as cattail (*Typha*) and bulrush (*Scirpus* sp.). Non-breeding habitat is thought to be similar to breeding habitat. |
| Botteri's Sparrow (*Peucaea botterii*) | The species occurs in desert grasslands, coastal prairies, and short-grass plains with scattered bushes or shrubs, sagebrush, mesquite (*Prosopis glandulosa*), or yucca in south Texas. The species avoids true deserts, heavily grazed areas, or recently burned areas. In Texas, the species is primarily found in coastal or arid grassland areas with relatively tall grass and scattered taller shrubs. |
| Eskimo Curlew (*Numenius borealis*) | Over-wintering populations, once common throughout the Texas coast, have not been documented since the 1960s in Galveston. Historical habitat in Texas consisted of native grasslands for foraging during migration from the Arctic tundra to the coast, where the species utilized open salt flats and beaches. |

| Common Name (Scientific Name) | Habitat Description |
|---|---|
| Golden-cheeked Warbler (*Setophaga chrysoparia*) | This migratory species breeds in central Texas along the Balcones Escarpment on the eastern edge of the Edwards Plateau and ranges from southwest of Fort Worth to northeast of Del Rio. Breeding habitat consists of juniper-oak woodlands dominated by Ashe juniper (*Juniperus ashei*) and various oak (*Quercus* sp.) species and deciduous trees found in areas with steep slopes, canyon heads, draws, and adjacent ridgetops. The species is dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are generally placed in upright forks of mature Ashe junipers or various deciduous species. Occupied sites usually contain junipers at least 40 years old. |
| Gray Hawk (*Buteo plagiatus*) | Two populations of gray hawks occur within Texas; year-round residents occur in south Texas and summer residents occur in the Trans-Pecos region. The species is closely associated with mature riparian woodlands (primarily cottonwood (*Populus deltoides*) and willow (*Salix* sp.) species) and adjacent semi-arid mesquite (*Prosopis glandulosa*) thickets near major river systems, such as the Rio Grande, up to 4600 feet in elevation. |
| Least Tern (*Sternula antillarum*) | The smallest of North American terns, this migratory colonial-nesting species is found along on beaches, flats, bays, inlets, lagoons, and islands. The interior population (subspecies *athalassos*) nests on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs. It occasionally nests on man-made structures such as sand and gravel pits or gravel rooftops. Preferred habitat includes sand and gravel bars within a wide unobstructed river channel, or open flats along shorelines of lakes and reservoirs. Colony sites can move annually, depending on landscape disturbance and vegetation growth at established colonies. It is known to nest at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, and along the Red River. |
| Northern Aplomado Falcon (*Falco femoralis septentrionalis*) | In Texas, the species inhabits arid grassy plains with scattered mesquite, yucca, and cacti within the South Texas Plains and the Trans-Pecos ecoregions. Optimal habitat requirements consist of open grasslands with scattered islands of shrubs, trees, or woodland and forest borders. In the South Texas Plains, individuals have been recorded utilizing vegetated salt flats dominated by sea oxeye daisy, saltwort, glasswort, and Carolina wolfberry. |
| Northern Beardless-tyrannulet (*Camptostoma imberbe*) | This year-round resident species occurs in the Lower Rio Grande Valley and south Texas oak forests. Preferred habitat includes riparian forest with clay soils and species such as cottonwood, sycamore (*Platanus occidentalis*), willow, elm (*Ulmus* spp.), and tepeguaje (*Leucaena pulverulenta*). The species also occupies oak-mesquite (*Quercus-Prosopis glandulosa*) woodlands with sandy soils where it forages in canopies of species such as live oak (*Quercus virginiana*), sugar hackberry (*Celtis laevigata*), and cedar elm (*Ulmus crassifolia*). Epiphytes are necessary for breeding habitat. Nests are constructed in clumps of ball-moss, Spanish moss (*Tillandsia usneoides*), or mistletoe (*Phoradendron leucarpum*). Areas without epiphytes will not be inhabited by this species. |

| Common Name (Scientific Name) | Habitat Description |
|---|---|
| Piping Plover (*Charadrius melodus*) | This migratory species overwinters in Texas, where it occurs on beaches, ephemeral sand flats, barrier islands, sand, mud, algal flats, washover passes, salt marshes, lagoons, and dunes along the Gulf Coast and adjacent offshore islands, including spoil islands in the Intracoastal Waterway. Algal flats appear to be the highest quality habitat because of their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low or very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. |
| Red Knot (*Calidris canutus rufa*) | The species is a winter resident and migrant in Texas. It is primarily found in marine habitats such as sandy beaches, saltmarshes, lagoons, mudflats of estuaries and bays, and mangrove swamps during winter months. It primarily occurs along the Gulf Coast on tidal flats and beaches and less frequently in marshes and flooded fields. It has occasionally been observed along shorelines of large lakes and freshwater marshes. |
| Red-crowned Parrot (*Amazona viridigenalis*) | This non-migratory species occurs in Texas along the Rio Grande from the Gulf to San Ygnacio and occasionally as far north as San Marcos. It occurs in forested regions, lowland deciduous forest, and pine-oak woodlands, while foraging in adjacent cultivated land. During the breeding season it prefers to nest in higher cavities in Washingtonian palms, but it also uses low cavities found in palms and other trees. It can be found in urban areas where introduced. |
| Reddish Egret (*Egretta rufescens*) | A year-round resident of the Texas Gulf Coast, the species inhabits saline, hypersaline, or brackish coastal habitats including barren sand or mud tidal flats, salt ponds, lagoons, and open mangrove communities. It occurs less frequently in other habitats such as coastal beaches, sparsely-vegetated freshwater marshes, and the shores of lake and reservoirs. It nests on the ground or low in mangroves or other terrestrial vegetation (e.g. mesquite [*Prosopis glandulosa*], yucca [*Yucca* sp.], or prickly-pear [*Opuntia* sp.]) on natural islands or man-made dredge spoil islands, but it also occasionally nests on the coastal mainland. It forages in shallow water usually less than 15 centimeters deep. |
| Rose-throated Becard (*Pachyramphus aglaiae*) | The species is an uncommon visitor to south Texas, which represents the northern edge of its range. It generally occurs in open forest, woodland, scrubby areas, open areas with scattered trees, plantations, mangroves, riparian corridors, and occasionally open understory of dense forest. In Texas, preferred habitat is riparian forest near the Rio Grande. It formerly nested in closed-canopy subtropical evergreen forest of mature Texas ebony (*Ebenopsis ebano*) and tepehuaje (*Leucaena pulverulenta*) in Santa Ana National Wildlife Refuge, where trees averaged 16.1 meters in height. |
| Sooty Tern (*Onychoprion fuscatus*) | Primarily a pelagic species, it occasionally occurs along the Texas coast from late March to early October. Breeding occurs between late April and early July, usually on remote outlying islands on sandy beaches, bare ground, or coral in areas above flood tide. It prefers flat sparsely vegetated and fairly open areas with scattered grasses or bushes present. |
| Swallow-tailed Kite (*Elanoides forficatus*) | This migratory species breeds in the South-Central Plains of east Texas and throughout the southeastern U.S. In Texas, breeding habitat occurs between sea level and 230 meters in elevation in bottomland forests, cypress swamps, pine glades, and freshwater marshes skirting large lakes. It nests near the tops of trees that are higher than the surrounding stand, often near a clearing or the edge of a forest or woodland. It prefers to nest in pines, but occasionally uses species such as bald cypress (*Taxodium distichum*), water oak (*Quercus nigra*), or cottonwood (*Populus deltoides*). |

| Common Name (Scientific Name) | Habitat Description |
|---|---|
| Texas Botteri's Sparrow (*Peucaea botterii texana*) | The species is found in south Texas from March to early October. Breeding habitat occurs from near sea level to 40 feet in elevation, typically 20 miles to the Gulf Coast. Preferred habitat includes bunch grass with scattered mesquite (*Prosopis glandulosa*), yucca (*Yucca* spp.), and huisache (*Acacia farnesiana*). |
| Tropical Parula (*Setophaga pitiayumi*) | The species is a summer resident of south Texas and northern Tamaulipas between mid-March and September, breeding from mid-April to mid-July. It is found in thick woods near edges of lagoons or resacas. Nesting habitat occurs in mixed deciduous riparian woodlands in closed or partially closed-canopy dominated by cedar elm, sugar hackberry, Texas ebony (*Ebenopsis ebano*), anaqua (*Ehretia anacua*), and Mexican ash (*Fraxinus berlandieri*). Nests are built on trees 2 to 13 meters from ground level on the pendant mass of epiphytic growth. Forests with abundant Spanish moss (*Tillandsia usneoides*), or other epiphytic species are required for breeding habitat. |
| White-faced Ibis (*Plegadis chihi*) | The species is found in the Western Gulf Coastal Plains ecoregion of Texas. Preferred habitat includes freshwater wetlands, marshes, ponds, rivers, irrigated land, and sloughs, but it occasionally forages in brackish or saltwater marshes. It nests in marshes in low trees, on the ground in bulrushes (*Scirpus* sp.) or reeds, or on floating mats. |
| White-tailed Hawk (*Buteo albicaudatus*) | This year-round resident species occurs throughout the Western Gulf Coastal Plain ecoregion of Texas and less frequently farther inland in the East Central Texas Plains and South Texas Plains regions. Near the coast, preferred habitat includes prairies, cordgrass flats, and live oak scrub. Further inland it inhabits prairies, mesquite and oak savannas, and mixed savanna-chaparral. Breeding occurs within open savannas with short trees and shrubs, such as mesquite (*Prosopis glandulosa*), hackberry (*Celtis laevigata*), and oak (*Quercus* sp.), with an average height of 12 feet and canopy diameter of 18 feet. Suitable coastal prairie habitat is similar to desirable range condition for cattle grazing. |
| Wood Stork (*Mycteria americana*) | The species breeds in Mexico, and nesting sites have not been recorded in Texas since 1960. However, post-breeding migrants disperse into Texas in the summer. Foraging habitat includes freshwater prairie ponds, flooded pastures or fields, ditches, and other shallow standing water with an open canopy, occasionally including brackish wetlands. The species typically roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries). |
| Zone-tailed Hawk (*Buteo albonotatus*) | The species occurs in arid open country, especially open deciduous or pine-oak woodland, mesa, and mountain country, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains. It nests in a variety of sites including small trees in lower desert, giant cottonwoods in riparian areas, and mature conifers in high mountain regions. Nests are typically constructed in large trees like cottonwoods (*Populus deltoides*), usually along streams near cliffs or steep hillsides. |
| Mexican Goby (*Ctenogobius claytonia*) | The species inhabits streams and estuaries and fresh to brackish water along the Gulf of Mexico. Habitat includes fresh and brackish lagoons, coastal streams, and rivers, in clear to muddy water with moderate to no current, and substrates of mud, clay, sand, or (rarely) gravel, and vegetation typically absent or sparse. |
| Opossum Pipefish (*Microphis brachyurus*) | In Texas, the species occurs in coastal counties from Galveston to Willacy Counties. It is an anadromous species (lives in the ocean but enters freshwater to breed). It prefers relatively shallow, still to moderately flowing freshwater streams, rivers, and estuaries. In the open ocean, individuals occur in patches of floating Sargassum algae. Breeding occurs in freshwater tributaries with dense emergent vegetation. |

| Common Name (Scientific Name) | Habitat Description |
|---|---|
| River Goby (*Awaous banana*) | In Texas, the species is known only to occur in the Rio Grande where individuals were collected from a small pool with moderate to swift flowing water and low turbidity. The species also occurs in both freshwater and estuarine habitats associated with rivers and streams. Adults are intolerant of high salinity, while juveniles can occur in marine and brackish water. The species typically prefers clear flowing waters over sand and gravel substrate. |
| Smalltooth Sawfish (*Pristis pectinate*) | This circumglobal inshore and intertidal species is rarely encountered in shallow coastal, estuarine, and freshwater habitats; often in brackish water near river mouths and large embayments, in deeper holes on bottoms of mud or muddy sand. Juveniles occur in water less than 1 meter deep, temperature over 30°C, and shoreline habitats with overhanging vegetation. Adults regularly occur in waters deeper than 50 meters. |
| Coues' Rice Rat (*Oryzomys couesi*) | Found in south Texas, the species occurs within cattail-bulrush marshes and near mesic environments associated with riparian areas. Cattail-bulrush marshes occur in shallower zones of aquatic habitat and are the preferred nesting habitat. The species will also utilize grassy areas under the shade of trees around resaca edges. It tolerates both salt and freshwater and will nest in trees if water is too high. Nests are built 1 meter above water and 1 meter from the shoreline. |
| Gulf Coast Jaguarundi (*Herpailurus yagouaroundi*) | The species historically occurred in south Texas where it inhabited a broad range of open, closed, and edge habitats with varied vegetation including scrub, swamp, savannah, woodland, and dense forests within its range. In Texas, preferred habitat typically consists of mixed thornshrub. Optimal habitat has at least 95 percent canopy cover, where marginal habitat contains 75-95 percent canopy cover, with a dense shrub layer below six feet. Habitat near water is preferred, but not required. The species may be extirpated from Texas. |
| Humpback Whale (*Megaptera novaeangliae*) | The species occurs in open ocean and coastal waters and is occasionally found in bays. Sightings of the species near the Texas coast are rare, as the species generally inhabits high latitude waters during the spring and summer and migrates to Caribbean waters during winter. |
| Ocelot (*Leopardus pardalis*) | The ocelot is typically found in the Lower Rio Grande Valley in association with dense thornshrub consisting of mixed Tamaulipan shrub and tree species. Optimal habitat exhibits at least 95 percent canopy cover of shrubs, while marginal habitat has 75 to 95 percent canopy cover. Tracts of at least 100 acres of isolated dense brush, or 75 acres of brush interconnected with other habitat tracts by brush corridors, are considered very important. Brushy fence lines, water courses, and other brush strips connecting areas of habitat are very important for dispersal cover. |
| Southern Yellow Bat (*Lasiurus ega*) | The species occurs in a variety of forest habitats throughout its global range, but in Texas it occurs in natural groves of palm trees along the Rio Grande near Brownsville, and in ornamental palms from the Lower Rio Grande Valley north to the Corpus Christi area. It is known to utilize palm trees, holes and crevices in buildings, and roofs constructed with palm for roost sites. |
| West Indian Manatee (*Trichechus manatus*) | Found throughout the Gulf of Mexico, the species utilizes marine, brackish, and freshwater systems in coastal and riverine areas throughout their range. Preferred habitat consists of areas near the shore with sea grass and eel grass beds and access to deep-water channels. Winter range, due to low cold tolerance, is restricted to the southern Florida peninsula. Manatees are attracted to accessible areas where industrial plants discharge large volumes of heated discharge water. During the summer, their range expands along the Atlantic Coast and Gulf Coast, traveling by shoreline and along channels. Records of manatees in Texas are rare, with years between reported sightings. |

| Common Name (Scientific Name) | Habitat Description |
|---|---|
| White-nosed Coati (*Nasua narica*) | This generalist species occurs in a wide range of habitats, but primarily favors woodlands and open forests. In Texas, it is typically found in oak (*Quercus* sp.) woodlands, riparian corridors, or rocky canyons that enter mountains from the lowlands. |
| Mexican Fawnsfoot (*Truncilla cognata*) | Freshwater mussel currently found only in the middle Rio Grande River basin. This benthic species occurs in medium to large rivers with sand or gravel substrates. The species has not been reported from reservoirs suggesting intolerance of impoundment. |
| Salina Mucket (*Potamilus metnecktayi*) | A freshwater mussel that is currently known only from the Lower Canyons portion of the Rio Grande. It prefers moderate-sized streams and rivers in flowing water with sand and gravel substrates. It also occurs in submerged soft sediment (clay and silt) along riverbanks and appears to be intolerant of impoundments. |
| Texas Hornshell (*Popenaias popeii*) | A freshwater mussel currently known only from the middle and lower portions of the Rio Grande. The species occurs at the head and terminus of shallow, narrow run habitat over travertine bedrock where small-grained substrata (clays, silts, sands, and gravel) collect in undercut riverbanks, crevices, shelves, and at the base of large boulders. It often occurs in colonies in sand and sand-cobble accumulated in cracks at the base of large boulders between 1 and 4.5 feet in depth. |
| South Texas Ambrosia (*Ambrosia cheiranthifolia*) | This perennial herb is endemic to south Texas coastal counties and northern Tamaulipas in Mexico. It occurs in grasslands and mesquite-dominated shrublands on various soils. Typically found on unplowed but managed remnant stands of short-grass prairie. |
| Star Cactus (*Astrophytum asterias*) | This cactus is endemic to south Texas and Tamaulipas and Nuevo Leon, Mexico. It is found on gentle slopes and flats in sparsely vegetated openings between shrub thickets within mesquite grasslands or mesquite-blackbrush (*Acacia rigidula*) thorn shrublands. The species generally occurs on gravelly clays or loams, possibly of the Catarina Series (deep, droughty, saline clays), over the Catahoula and Frio formations. |
| Texas Ayenia (*Ayenia limitaris*) | This perennial thornless shrub is found in south Texas in Cameron, Hidalgo, and Willacy Counties, and Coahuila, Durango, and Tamaulipas, Mexico. It is generally found on the edges or openings of subtropical thorn woodlands or tall shrublands of the Rio Grande Delta on well-drained loamy soils. |
| Black-striped Snake (*Coniophanes imperialis*) | The species occurs in semi-arid coastal plains and prefers native thorn-thicket habitat along arroyos and resacas. It is highly tolerant of habitat disturbance and can be found near developed areas if preferred habitat is present. The species prefers loose soils with scattered piles of decaying cacti for burrowing through and seeking refuge. |
| Green Sea Turtle (*Chelonia mydas*) | Highly migratory marine species, green sea turtles feed in shallow waters with abundant sea grasses and algae and build nests on coastal beaches where waters are greater than 77 degrees Fahrenheit. |
| Hawksbill Sea Turtle (*Eretmochelys imbricate*) | This cosmopolitan species occurs offshore of mainland and island shelves, where coral reef formations are present. Foraging habitat includes coastal waters comprised of coral reefs, sea grass and algal beds, mangroves, tidal creeks, bays, or mudflats. |
| Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) | The species prefers the open ocean gulf waters with the females only coming ashore to lay eggs. A successful nesting population occurs on Padre Island National Seashore. |
| Leatherback Sea Turtle (*Dermochelys coriacea*) | The species prefers the open ocean and is a rare visitor to the Texas Gulf Coast, only moving inshore following concentrations of jellyfish. |

| Common Name (Scientific Name) | Habitat Description |
|---|---|
| Loggerhead Sea Turtle (*Caretta caretta*) | Found worldwide, loggerhead sea turtles are highly adaptable to varying saline conditions and can be found in estuaries, brackish waters of coastal lagoons and river mouths where water temperature is above 50 degrees Fahrenheit. They are rare visitors to the Texas coast and only a few isolated nests have been documented in the Gulf of Mexico. |
| Northern Cat-eyed Snake (*Leptodeira septentrionalis*) | In Texas, the species occurs in semi-arid, thornshrub habitat near permanent water bodies such as ponds or streams in the Tamaulipan biotic province. |
| Speckled Racer (*Drymobius margaritiferus*) | Found in the Lower Rio Grande Valley, the species occurs in dense thickets near water, Texas palm groves, and riparian woodlands. It is typically found in areas with high concentration of vegetative ground litter. |
| Texas Horned Lizard (*Phrynosoma cornutum*) | The species is found in semi-arid open areas with scattered vegetation comprised of bunchgrass, cacti, yucca, mesquite, acacia, juniper, or other woody shrubs and small trees commonly found in loose sandy or loamy soils. |
| Texas Indigo Snake (*Drymarchon melanurus*) | The species primarily occurs in thornshrub and woodlands of south Texas, particularly in dense riparian corridors and areas near permanent bodies of water. It can also occur in coastal plain mesquite shrublands, prairies, coastal sandhills, limestone desert, suburban areas, and irrigated croplands. It requires moist microhabitats and often uses rodent burrows for shelter and egg-laying. |
| Texas Tortoise (Gopherus berlandieri) | Restricted to the Southern Texas Plains, the species occurs in scrub forest and arid habitats with well-drained soils. It is typically found in open brush with a grass understory; areas of open grass and bare ground are usually avoided. |

# APPENDIX C:

# Socioeconomic Data

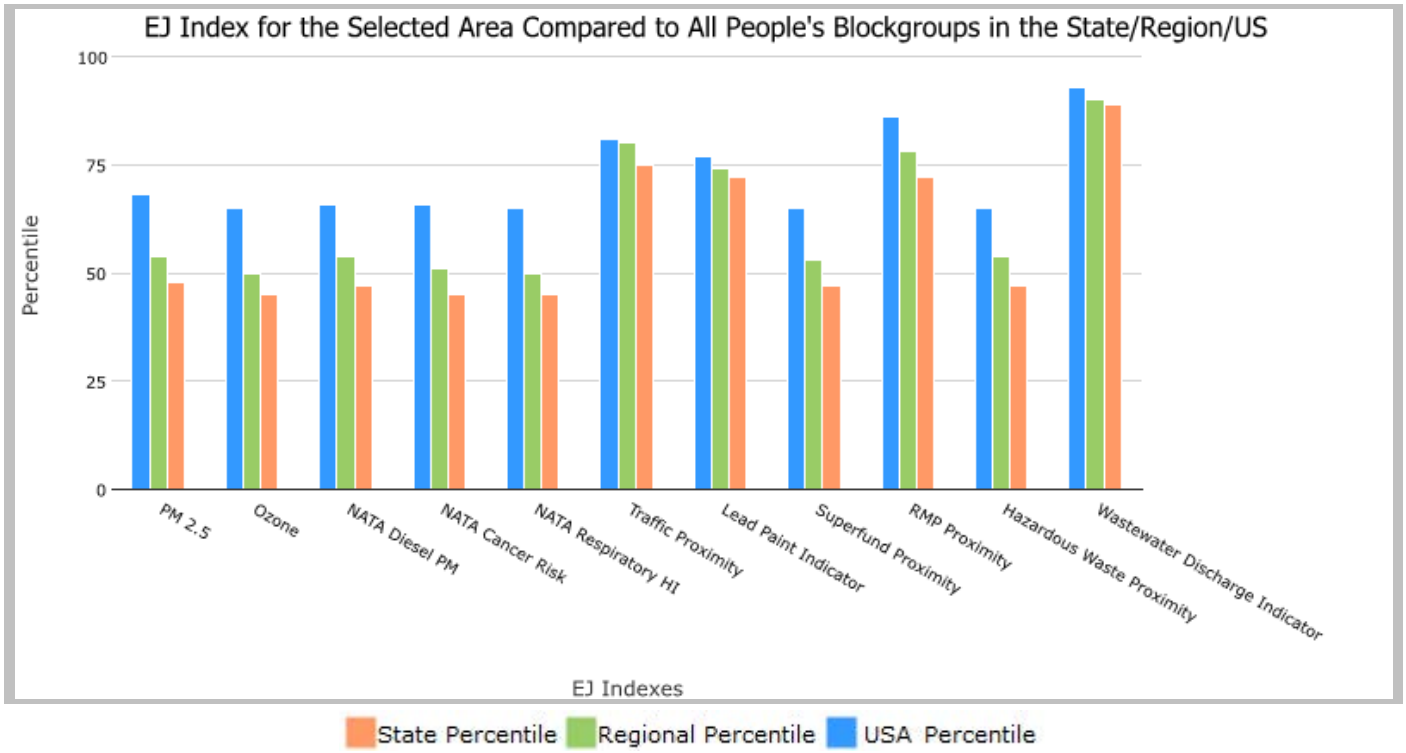
# EJSCREEN Report (Version 2019)

**Tract: 48061011301, TEXAS, EPA Region 6**

**Approximate Population: 1,675**

**Input Area (sq. miles): 0.52**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 48 | 54 | 68 |
| EJ Index for Ozone | 45 | 50 | 65 |
| EJ Index for NATA* Diesel PM | 47 | 54 | 66 |
| EJ Index for NATA* Air Toxics Cancer Risk | 45 | 51 | 66 |
| EJ Index for NATA* Respiratory Hazard Index | 45 | 50 | 65 |
| EJ Index for Traffic Proximity and Volume | 75 | 80 | 81 |
| EJ Index for Lead Paint Indicator | 72 | 74 | 77 |
| EJ Index for Superfund Proximity | 47 | 53 | 65 |
| EJ Index for RMP Proximity | 72 | 78 | 86 |
| EJ Index for Hazardous Waste Proximity | 47 | 54 | 65 |
| EJ Index for Wastewater Discharge Indicator | 89 | 90 | 93 |

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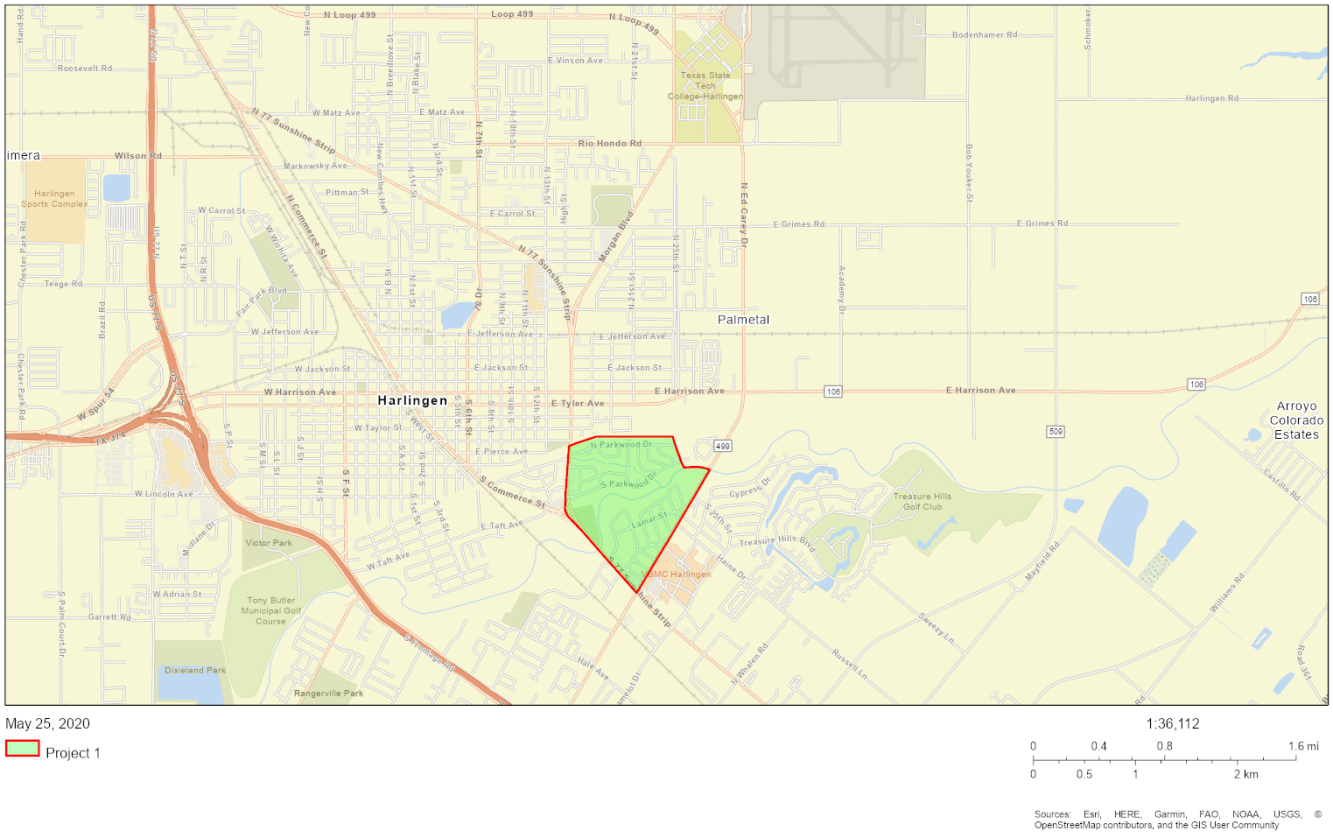
# EJSCREEN Report (Version 2019)

**Tract: 48061011301, TEXAS, EPA Region 6**

**Approximate Population: 1,675**

**Input Area (sq. miles): 0.52**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 0 |

# EJSCREEN Report (Version 2019)

**Tract: 48061011301, TEXAS, EPA Region 6**

**Approximate Population: 1,675**

**Input Area (sq. miles): 0.52**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.95 | 8.43 | 23 | 8.37 | 24 | 8.3 | 37 |
| Ozone (ppb) | 26.6 | 38.4 | 1 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.276 | 0.429 | 28 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 23 | 35 | 5 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.27 | 0.43 | 4 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 1100 | 470 | 90 | 400 | 91 | 750 | 83 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.34 | 0.15 | 83 | 0.17 | 82 | 0.28 | 65 |
| Superfund Proximity (site count/km distance) | 0.024 | 0.085 | 31 | 0.081 | 33 | 0.13 | 21 |
| RMP Proximity (facility count/km distance) | 2.8 | 0.91 | 93 | 0.82 | 94 | 0.74 | 95 |
| Hazardous Waste Proximity (facility count/km distance) | 0.17 | 0.83 | 34 | 0.75 | 38 | 4 | 32 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.085 | 0.19 | 91 | 9.8 | 91 | 14 | 89 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 52% | 47% | 58 | 44% | 63 | 36% | 75 |
| Minority Population | 68% | 57% | 58 | 51% | 66 | 39% | 77 |
| Low Income Population | 36% | 36% | 54 | 37% | 51 | 33% | 60 |
| Linguistically Isolated Population | 5% | 8% | 55 | 6% | 64 | 4% | 73 |
| Population With Less Than High School Education | 16% | 17% | 57 | 16% | 59 | 13% | 71 |
| Population Under 5 years of age | 4% | 7% | 22 | 7% | 23 | 6% | 30 |
| Population over 64 years of age | 14% | 12% | 67 | 13% | 60 | 15% | 50 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

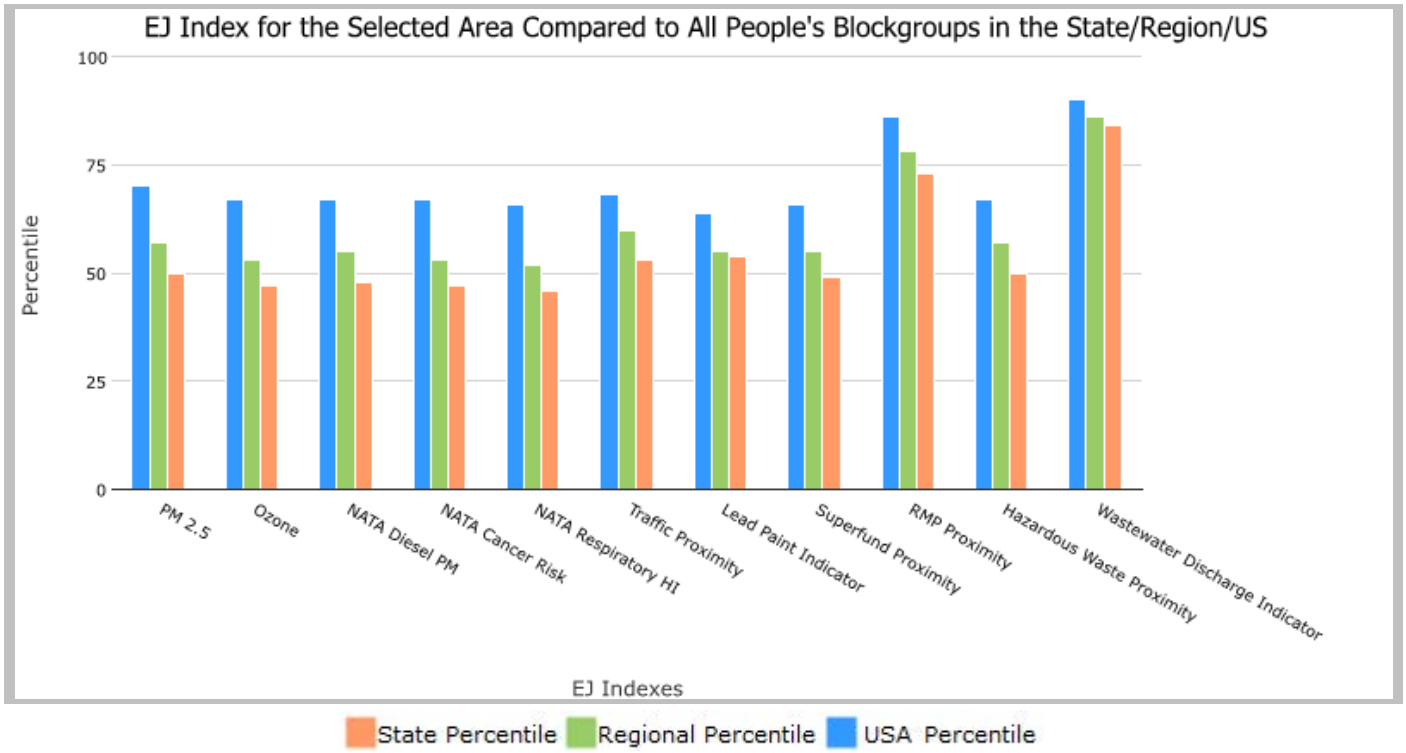
# EJSCREEN Report (Version 2019)

**Tract: 48061011302, TEXAS, EPA Region 6**

**Approximate Population: 4,315**

**Input Area (sq. miles): 1.23**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 50 | 57 | 70 |
| EJ Index for Ozone | 47 | 53 | 67 |
| EJ Index for NATA* Diesel PM | 48 | 55 | 67 |
| EJ Index for NATA* Air Toxics Cancer Risk | 47 | 53 | 67 |
| EJ Index for NATA* Respiratory Hazard Index | 46 | 52 | 66 |
| EJ Index for Traffic Proximity and Volume | 53 | 60 | 68 |
| EJ Index for Lead Paint Indicator | 54 | 55 | 64 |
| EJ Index for Superfund Proximity | 49 | 55 | 66 |
| EJ Index for RMP Proximity | 73 | 78 | 86 |
| EJ Index for Hazardous Waste Proximity | 50 | 57 | 67 |
| EJ Index for Wastewater Discharge Indicator | 84 | 86 | 90 |

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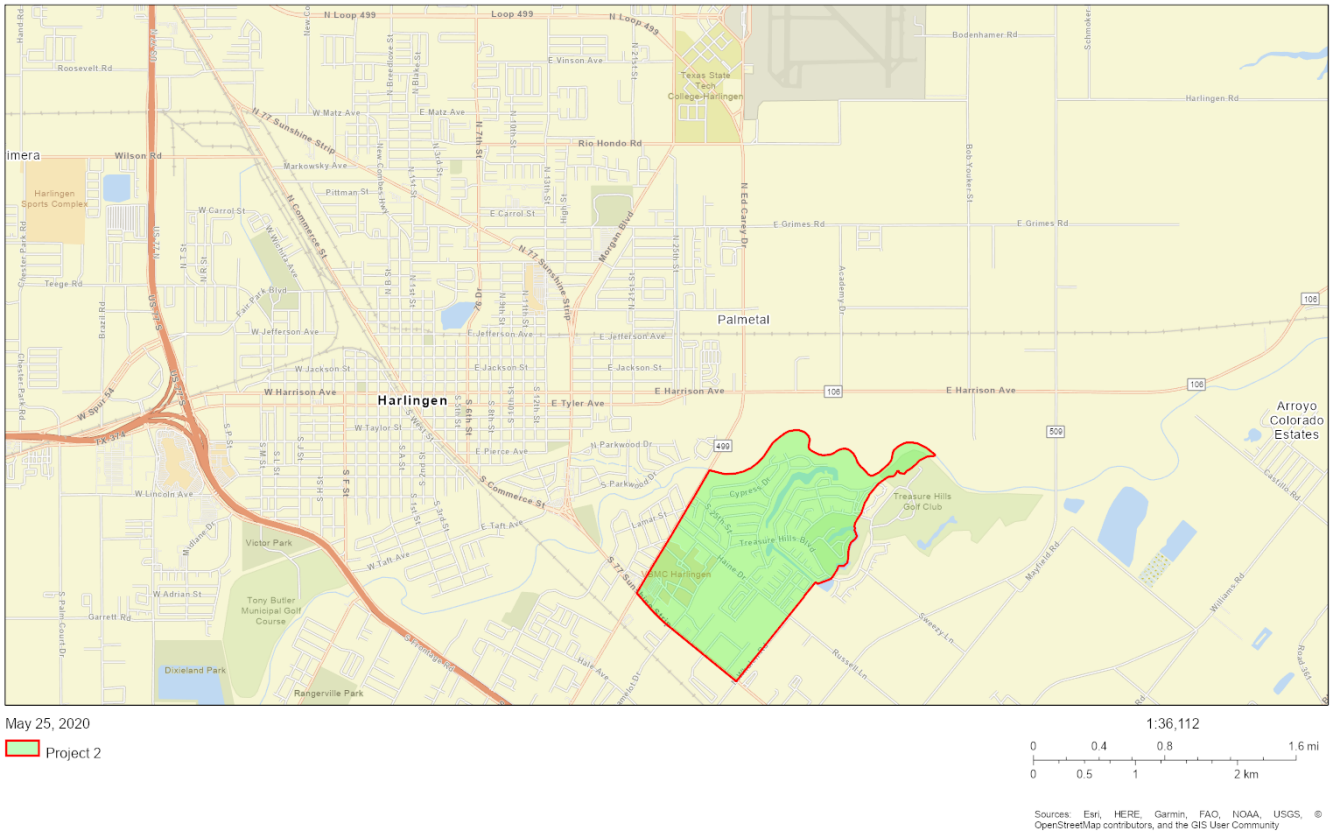
# EJSCREEN Report (Version 2019)

**Tract: 48061011302, TEXAS, EPA Region 6**

**Approximate Population: 4,315**

**Input Area (sq. miles): 1.23**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 0 |

# EJSCREEN Report (Version 2019)

**Tract: 48061011302, TEXAS, EPA Region 6**

**Approximate Population: 4,315**

**Input Area (sq. miles): 1.23**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.94 | 8.43 | 23 | 8.37 | 23 | 8.3 | 37 |
| Ozone (ppb) | 26.5 | 38.4 | 1 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.241 | 0.429 | 24 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 22 | 35 | 4 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.26 | 0.43 | 3 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 230 | 470 | 57 | 400 | 62 | 750 | 51 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.015 | 0.15 | 34 | 0.17 | 27 | 0.28 | 15 |
| Superfund Proximity (site count/km distance) | 0.023 | 0.085 | 30 | 0.081 | 32 | 0.13 | 21 |
| RMP Proximity (facility count/km distance) | 2.2 | 0.91 | 90 | 0.82 | 91 | 0.74 | 92 |
| Hazardous Waste Proximity (facility count/km distance) | 0.22 | 0.83 | 41 | 0.75 | 46 | 4 | 38 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.037 | 0.19 | 87 | 9.8 | 87 | 14 | 86 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 45% | 47% | 50 | 44% | 55 | 36% | 68 |
| Minority Population | 62% | 57% | 54 | 51% | 62 | 39% | 74 |
| Low Income Population | 27% | 36% | 39 | 37% | 36 | 33% | 45 |
| Linguistically Isolated Population | 4% | 8% | 47 | 6% | 57 | 4% | 66 |
| Population With Less Than High School Education | 9% | 17% | 36 | 16% | 35 | 13% | 46 |
| Population Under 5 years of age | 7% | 7% | 55 | 7% | 58 | 6% | 67 |
| Population over 64 years of age | 21% | 12% | 88 | 13% | 86 | 15% | 80 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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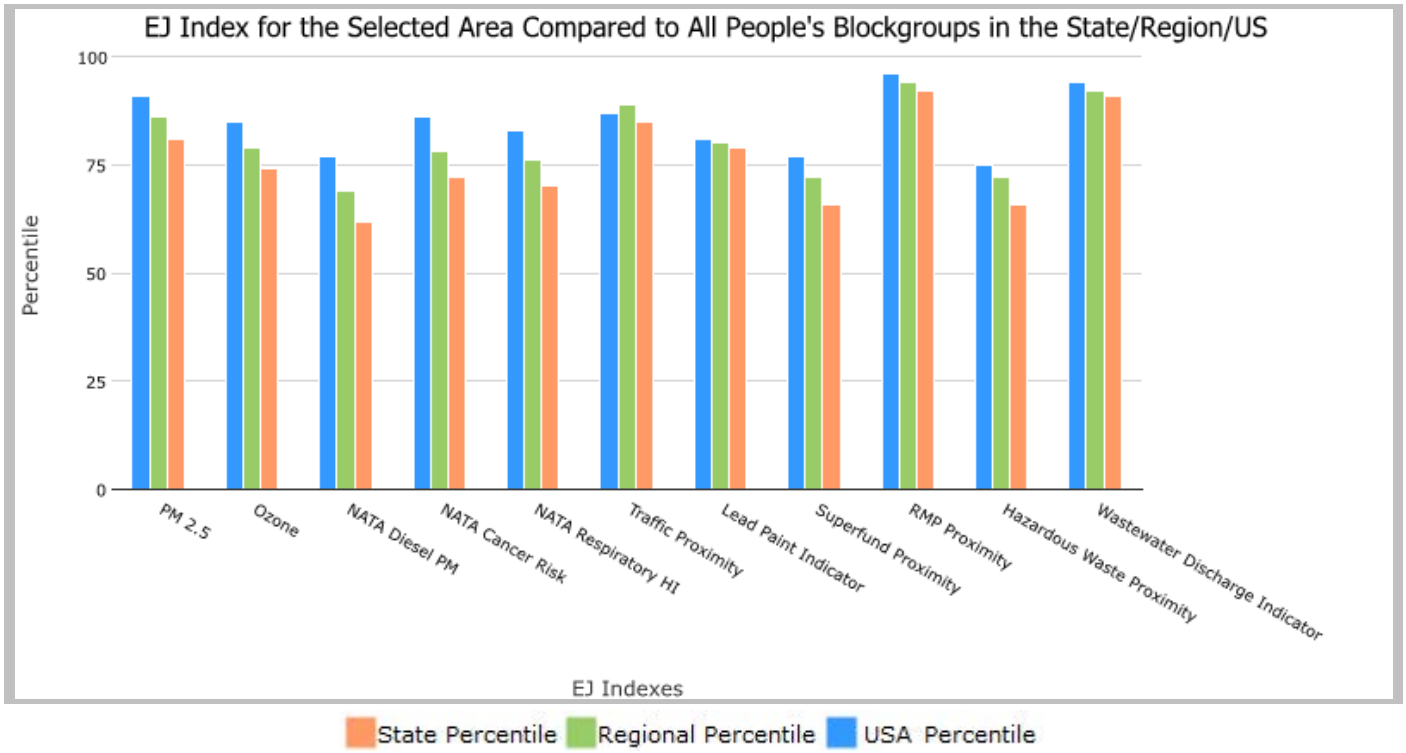
# EJSCREEN Report (Version 2019)

**Tract: 48061010800, TEXAS, EPA Region 6**

**Approximate Population: 7,430**

**Input Area (sq. miles): 9.49**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 81 | 86 | 91 |
| EJ Index for Ozone | 74 | 79 | 85 |
| EJ Index for NATA* Diesel PM | 62 | 69 | 77 |
| EJ Index for NATA* Air Toxics Cancer Risk | 72 | 78 | 86 |
| EJ Index for NATA* Respiratory Hazard Index | 70 | 76 | 83 |
| EJ Index for Traffic Proximity and Volume | 85 | 89 | 87 |
| EJ Index for Lead Paint Indicator | 79 | 80 | 81 |
| EJ Index for Superfund Proximity | 66 | 72 | 77 |
| EJ Index for RMP Proximity | 92 | 94 | 96 |
| EJ Index for Hazardous Waste Proximity | 66 | 72 | 75 |
| EJ Index for Wastewater Discharge Indicator | 91 | 92 | 94 |

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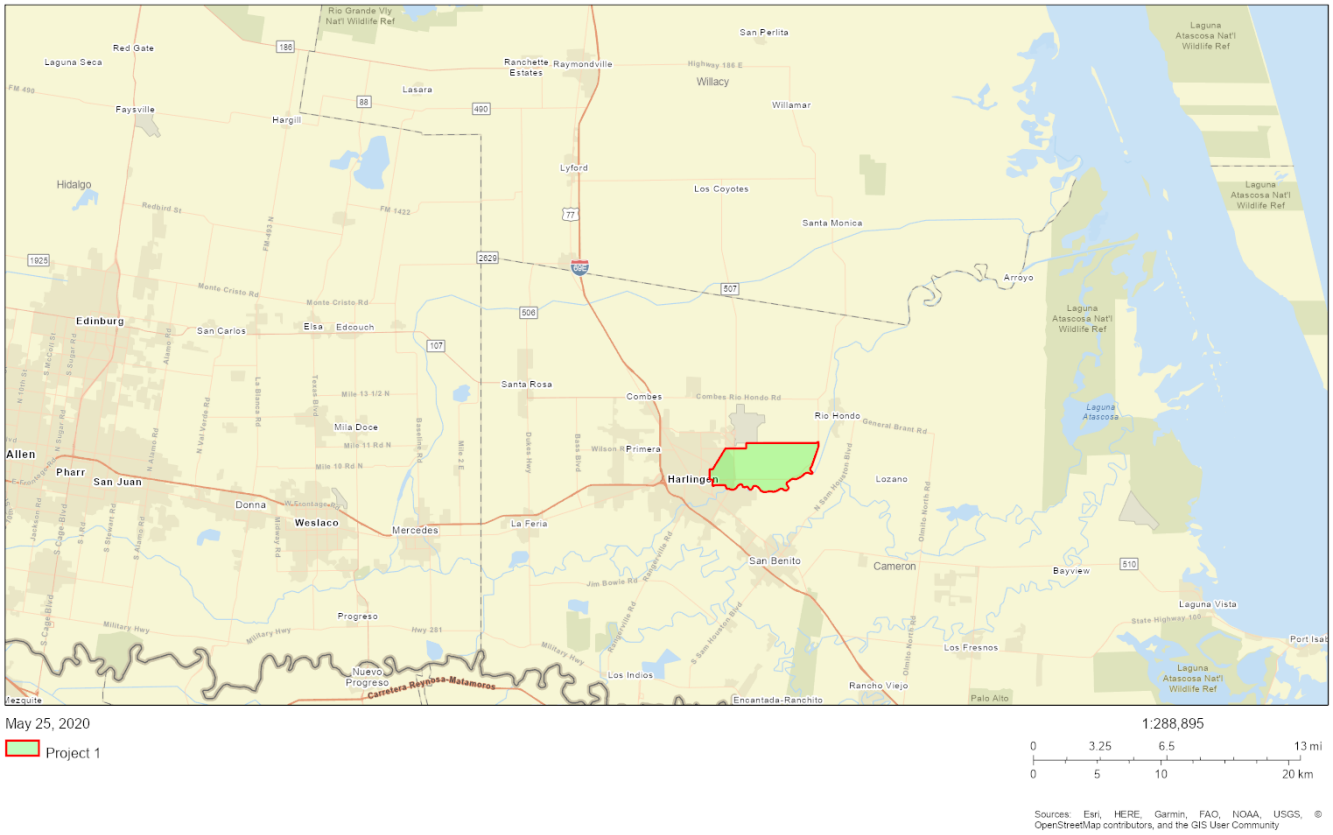
# EJSCREEN Report (Version 2019)

**Tract: 48061010800, TEXAS, EPA Region 6**

**Approximate Population: 7,430**

**Input Area (sq. miles): 9.49**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 1 |

# EJSCREEN Report (Version 2019)

**Tract: 48061010800, TEXAS, EPA Region 6**

**Approximate Population: 7,430**

**Input Area (sq. miles): 9.49**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.85 | 8.43 | 20 | 8.37 | 21 | 8.3 | 35 |
| Ozone (ppb) | 26.4 | 38.4 | 1 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.169 | 0.429 | 13 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 22 | 35 | 4 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.26 | 0.43 | 4 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 390 | 470 | 70 | 400 | 74 | 750 | 62 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.15 | 0.15 | 69 | 0.17 | 65 | 0.28 | 45 |
| Superfund Proximity (site count/km distance) | 0.023 | 0.085 | 31 | 0.081 | 33 | 0.13 | 21 |
| RMP Proximity (facility count/km distance) | 2.3 | 0.91 | 90 | 0.82 | 91 | 0.74 | 92 |
| Hazardous Waste Proximity (facility count/km distance) | 0.19 | 0.83 | 37 | 0.75 | 42 | 4 | 34 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.02 | 0.19 | 83 | 9.8 | 84 | 14 | 83 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 70% | 47% | 79 | 44% | 82 | 36% | 89 |
| Minority Population | 83% | 57% | 73 | 51% | 78 | 39% | 86 |
| Low Income Population | 57% | 36% | 79 | 37% | 79 | 33% | 85 |
| Linguistically Isolated Population | 12% | 8% | 75 | 6% | 82 | 4% | 86 |
| Population With Less Than High School Education | 22% | 17% | 67 | 16% | 70 | 13% | 80 |
| Population Under 5 years of age | 16% | 7% | 97 | 7% | 97 | 6% | 98 |
| Population over 64 years of age | 9% | 12% | 42 | 13% | 35 | 15% | 25 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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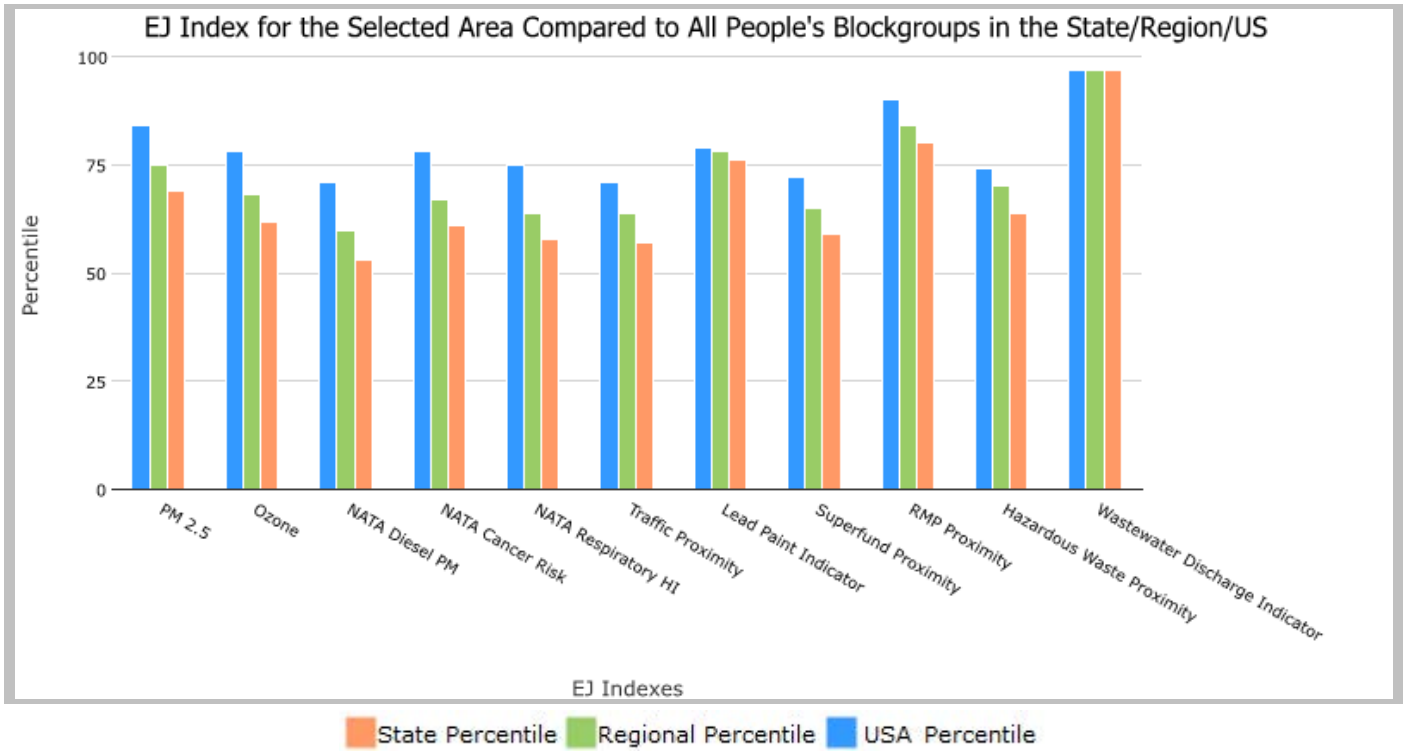
# EJSCREEN Report (Version 2019)

**Tract: 48061011400, TEXAS, EPA Region 6**

**Approximate Population: 6,656**

**Input Area (sq. miles): 20.96**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 69 | 75 | 84 |
| EJ Index for Ozone | 62 | 68 | 78 |
| EJ Index for NATA* Diesel PM | 53 | 60 | 71 |
| EJ Index for NATA* Air Toxics Cancer Risk | 61 | 67 | 78 |
| EJ Index for NATA* Respiratory Hazard Index | 58 | 64 | 75 |
| EJ Index for Traffic Proximity and Volume | 57 | 64 | 71 |
| EJ Index for Lead Paint Indicator | 76 | 78 | 79 |
| EJ Index for Superfund Proximity | 59 | 65 | 72 |
| EJ Index for RMP Proximity | 80 | 84 | 90 |
| EJ Index for Hazardous Waste Proximity | 64 | 70 | 74 |
| EJ Index for Wastewater Discharge Indicator | 97 | 97 | 97 |

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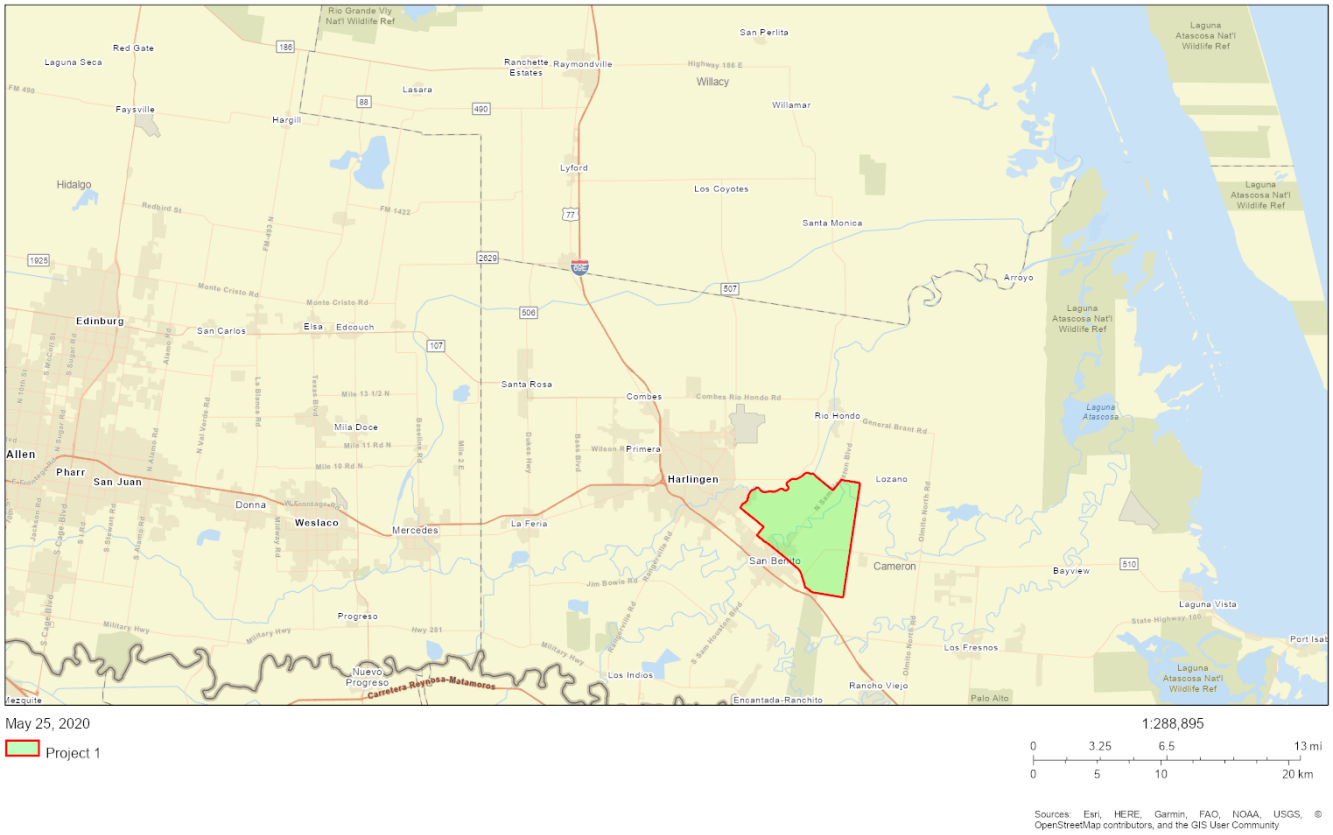
# EJSCREEN Report (Version 2019)

**Tract: 48061011400, TEXAS, EPA Region 6**

**Approximate Population: 6,656**

**Input Area (sq. miles): 20.96**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 0 |

# EJSCREEN Report (Version 2019)

**Tract: 48061011400, TEXAS, EPA Region 6**

**Approximate Population: 6,656**

**Input Area (sq. miles): 20.96**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.83 | 8.43 | 20 | 8.37 | 21 | 8.3 | 34 |
| Ozone (ppb) | 26.3 | 38.4 | 0 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.14 | 0.429 | 8 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 21 | 35 | 3 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.24 | 0.43 | 1 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 120 | 470 | 40 | 400 | 45 | 750 | 38 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.12 | 0.15 | 65 | 0.17 | 60 | 0.28 | 41 |
| Superfund Proximity (site count/km distance) | 0.021 | 0.085 | 27 | 0.081 | 29 | 0.13 | 18 |
| RMP Proximity (facility count/km distance) | 1.5 | 0.91 | 82 | 0.82 | 83 | 0.74 | 85 |
| Hazardous Waste Proximity (facility count/km distance) | 0.29 | 0.83 | 47 | 0.75 | 52 | 4 | 43 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.83 | 0.19 | 97 | 9.8 | 97 | 14 | 94 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 62% | 47% | 70 | 44% | 74 | 36% | 83 |
| Minority Population | 87% | 57% | 77 | 51% | 82 | 39% | 88 |
| Low Income Population | 37% | 36% | 55 | 37% | 53 | 33% | 62 |
| Linguistically Isolated Population | 11% | 8% | 72 | 6% | 79 | 4% | 84 |
| Population With Less Than High School Education | 26% | 17% | 73 | 16% | 77 | 13% | 86 |
| Population Under 5 years of age | 4% | 7% | 24 | 7% | 25 | 6% | 32 |
| Population over 64 years of age | 17% | 12% | 80 | 13% | 76 | 15% | 68 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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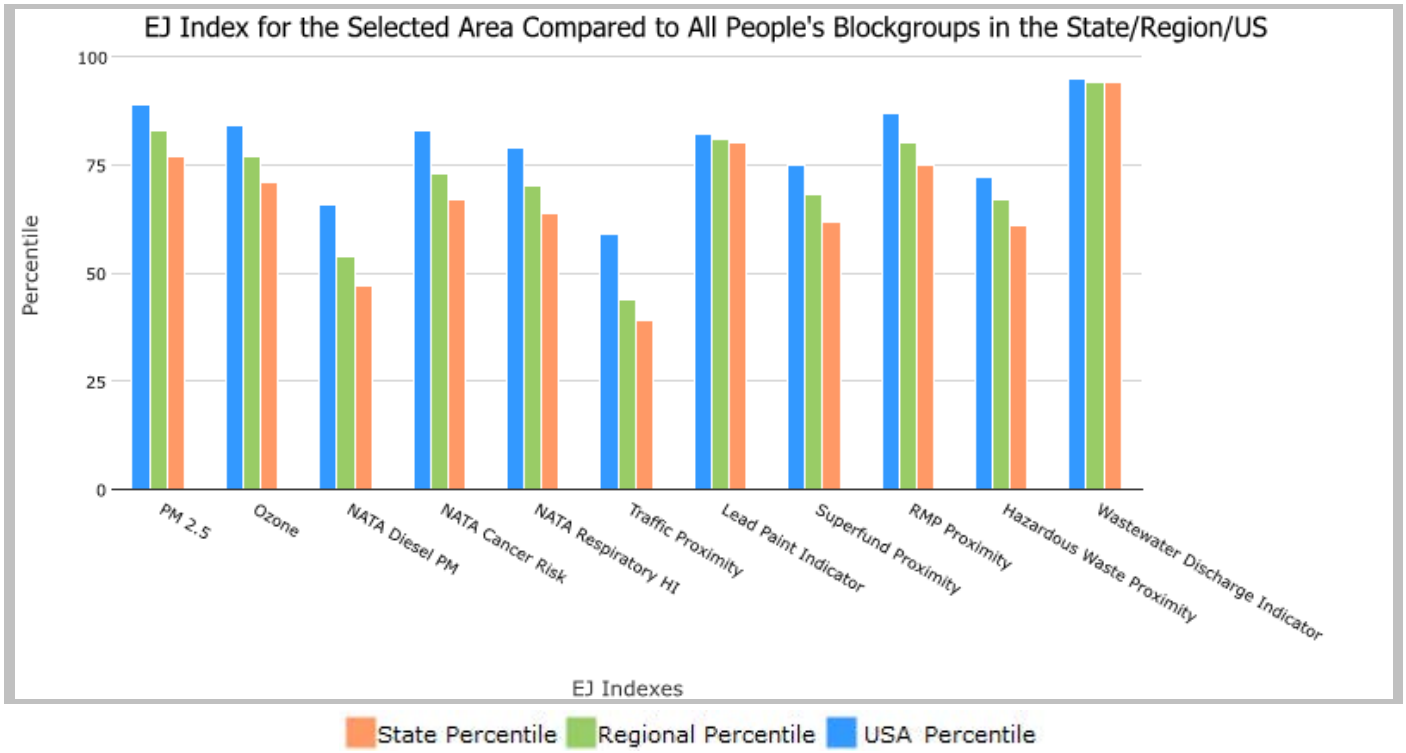
# EJSCREEN Report (Version 2019)

**Tract: 48061010100, TEXAS, EPA Region 6**

**Approximate Population: 9,052**

**Input Area (sq. miles): 184.75**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 77 | 83 | 89 |
| EJ Index for Ozone | 71 | 77 | 84 |
| EJ Index for NATA* Diesel PM | 47 | 54 | 66 |
| EJ Index for NATA* Air Toxics Cancer Risk | 67 | 73 | 83 |
| EJ Index for NATA* Respiratory Hazard Index | 64 | 70 | 79 |
| EJ Index for Traffic Proximity and Volume | 39 | 44 | 59 |
| EJ Index for Lead Paint Indicator | 80 | 81 | 82 |
| EJ Index for Superfund Proximity | 62 | 68 | 75 |
| EJ Index for RMP Proximity | 75 | 80 | 87 |
| EJ Index for Hazardous Waste Proximity | 61 | 67 | 72 |
| EJ Index for Wastewater Discharge Indicator | 94 | 94 | 95 |



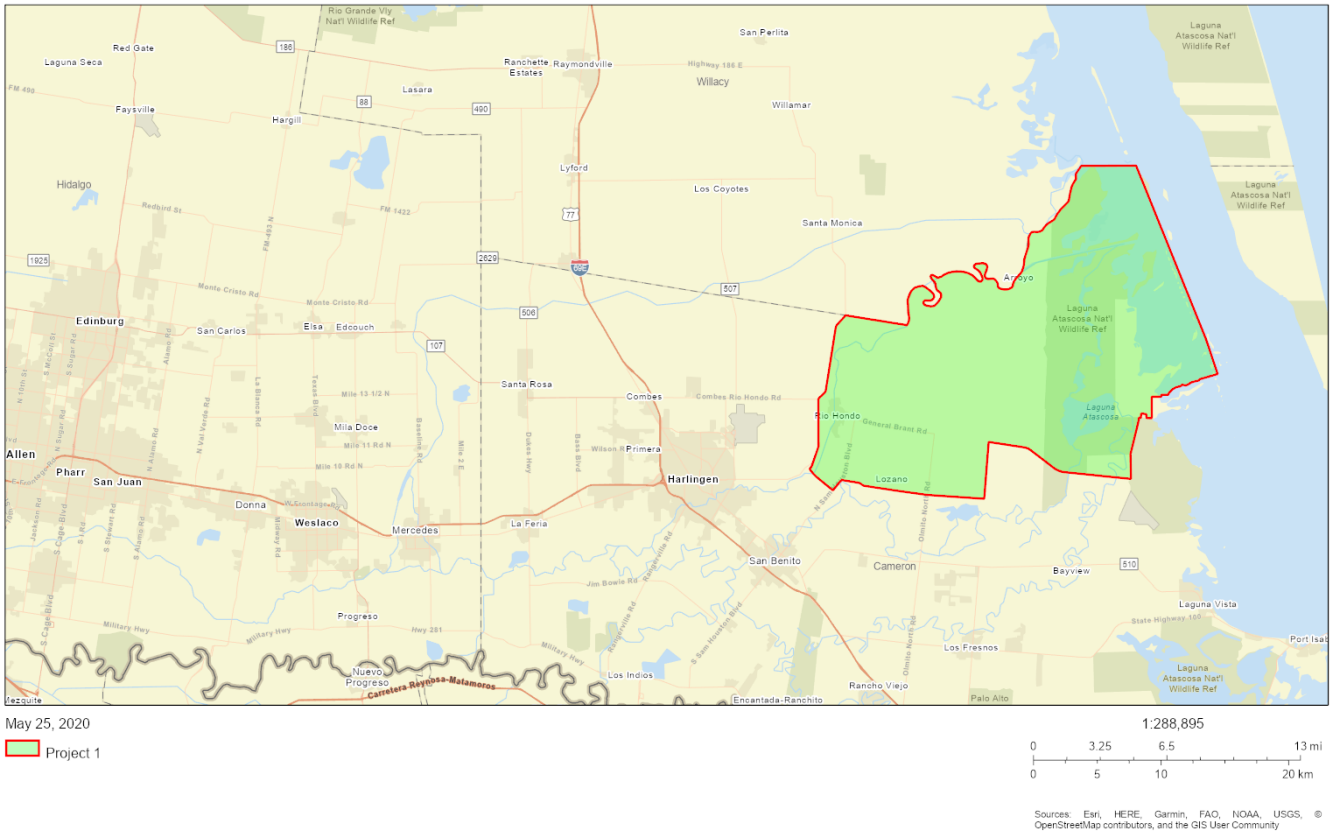

This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

# EJSCREEN Report (Version 2019)

**Tract: 48061010100, TEXAS, EPA Region 6**

**Approximate Population: 9,052**

**Input Area (sq. miles): 184.75**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 0 |

# EJSCREEN Report (Version 2019)

**Tract: 48061010100, TEXAS, EPA Region 6**

**Approximate Population: 9,052**

**Input Area (sq. miles): 184.75**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.35 | 8.43 | 11 | 8.37 | 13 | 8.3 | 23 |
| Ozone (ppb) | 26.1 | 38.4 | 0 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.0513 | 0.429 | 0 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 20 | 35 | 1 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.21 | 0.43 | 0 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 0.076 | 470 | 3 | 400 | 5 | 750 | 4 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.15 | 0.15 | 69 | 0.17 | 66 | 0.28 | 46 |
| Superfund Proximity (site count/km distance) | 0.018 | 0.085 | 22 | 0.081 | 23 | 0.13 | 15 |
| RMP Proximity (facility count/km distance) | 0.52 | 0.91 | 52 | 0.82 | 57 | 0.74 | 61 |
| Hazardous Waste Proximity (facility count/km distance) | 0.13 | 0.83 | 25 | 0.75 | 30 | 4 | 24 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.05 | 0.19 | 89 | 9.8 | 89 | 14 | 87 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 68% | 47% | 77 | 44% | 80 | 36% | 87 |
| Minority Population | 81% | 57% | 70 | 51% | 76 | 39% | 84 |
| Low Income Population | 55% | 36% | 77 | 37% | 76 | 33% | 83 |
| Linguistically Isolated Population | 15% | 8% | 80 | 6% | 85 | 4% | 89 |
| Population With Less Than High School Education | 30% | 17% | 78 | 16% | 82 | 13% | 89 |
| Population Under 5 years of age | 7% | 7% | 48 | 7% | 51 | 6% | 61 |
| Population over 64 years of age | 23% | 12% | 91 | 13% | 89 | 15% | 85 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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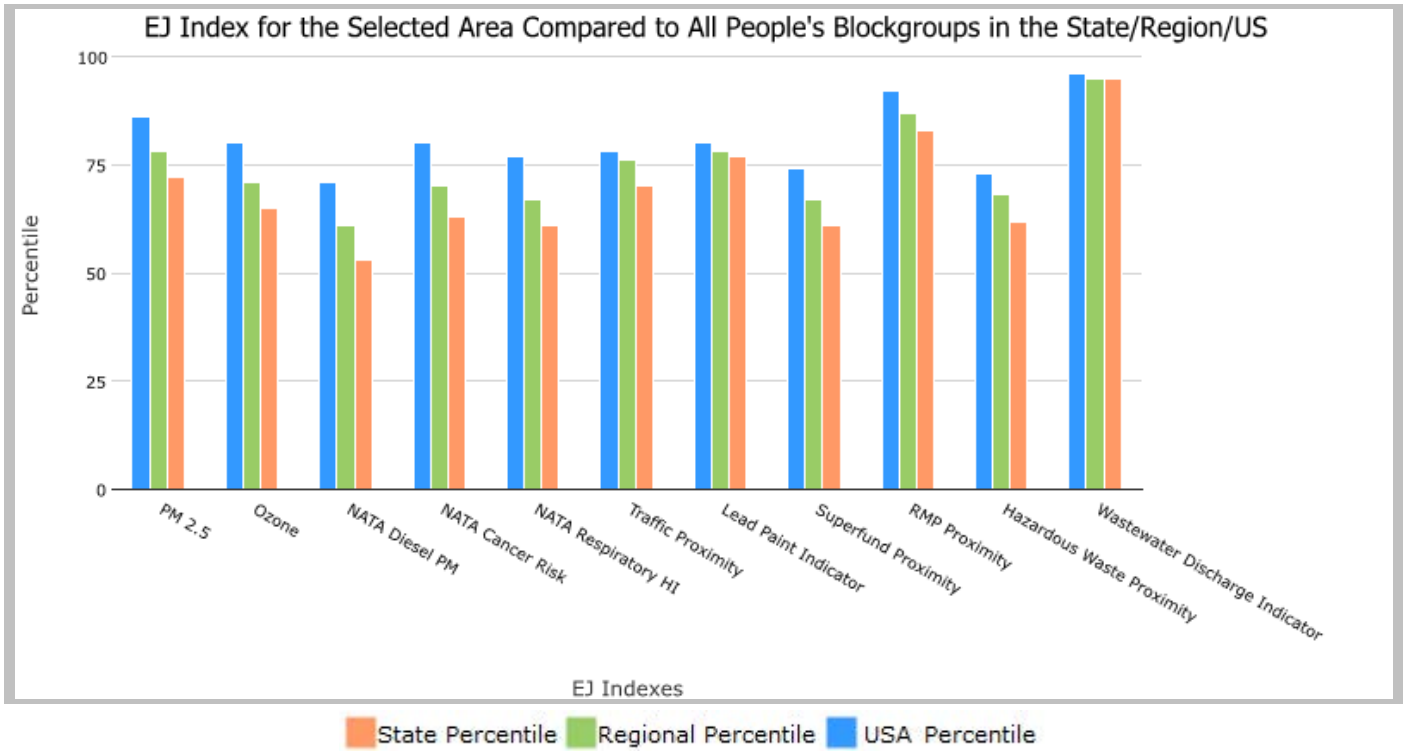
# EJSCREEN Report (Version 2019)

**Tract: 48061011301,48061010800,48061011302,48061011400,48061010100, TEXAS, EPA Region 6**

**Approximate Population: 29,128**

**Input Area (sq. miles): 216.95**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 72 | 78 | 86 |
| EJ Index for Ozone | 65 | 71 | 80 |
| EJ Index for NATA* Diesel PM | 53 | 61 | 71 |
| EJ Index for NATA* Air Toxics Cancer Risk | 63 | 70 | 80 |
| EJ Index for NATA* Respiratory Hazard Index | 61 | 67 | 77 |
| EJ Index for Traffic Proximity and Volume | 70 | 76 | 78 |
| EJ Index for Lead Paint Indicator | 77 | 78 | 80 |
| EJ Index for Superfund Proximity | 61 | 67 | 74 |
| EJ Index for RMP Proximity | 83 | 87 | 92 |
| EJ Index for Hazardous Waste Proximity | 62 | 68 | 73 |
| EJ Index for Wastewater Discharge Indicator | 95 | 95 | 96 |



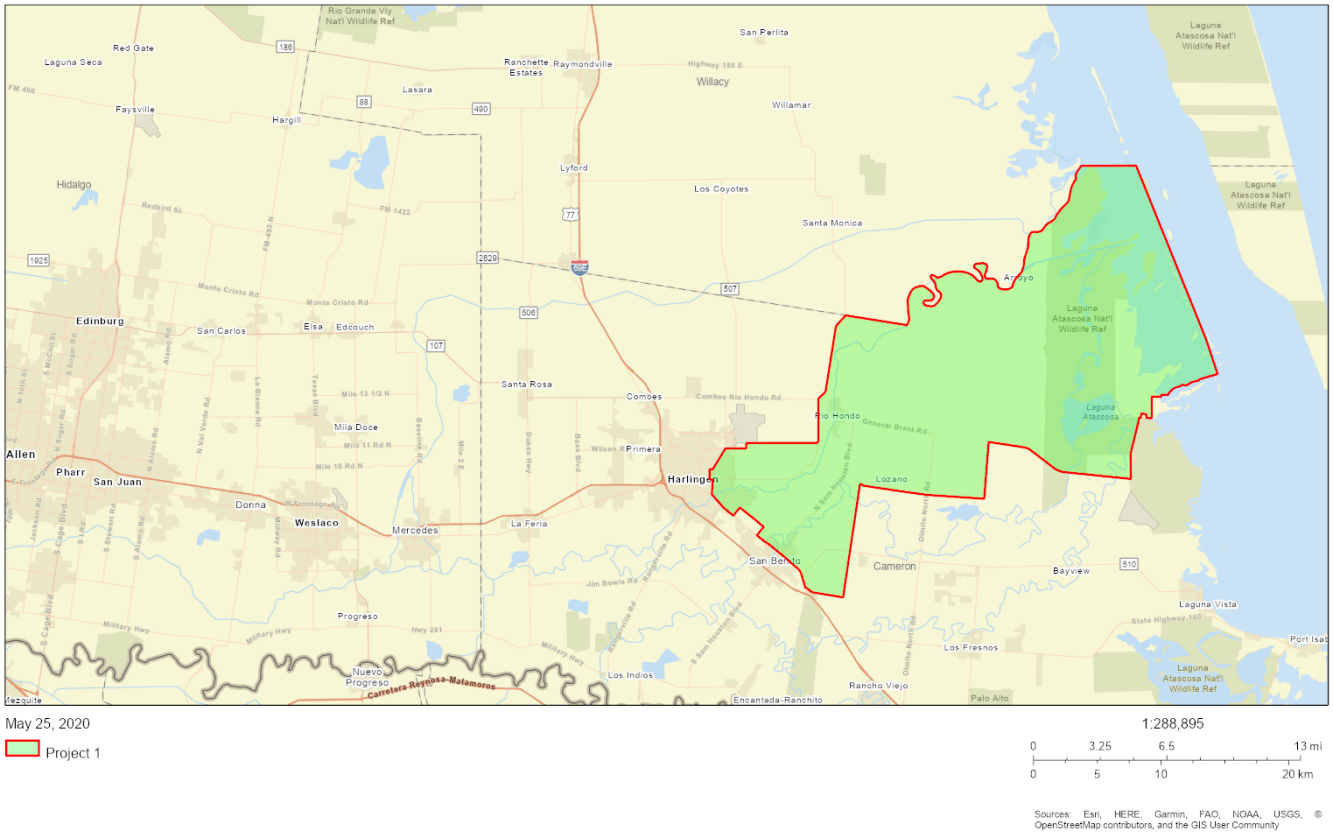

This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

# EJSCREEN Report (Version 2019)

**Tract: 48061011301,48061010800,48061011302,48061011400,48061010100, TEXAS, EPA Region 6**

**Approximate Population: 29,128**

**Input Area (sq. miles): 216.95**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 1 |

# EJSCREEN Report (Version 2019)

**Tract: 48061011301,48061010800,48061011302,48061011400,48061010100, TEXAS, EPA Region 6**

**Approximate Population: 29,128**

**Input Area (sq. miles): 216.95**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.71 | 8.43 | 17 | 8.37 | 18 | 8.3 | 32 |
| Ozone (ppb) | 26.3 | 38.4 | 1 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.143 | 0.429 | 8 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 21 | 35 | 2 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.24 | 0.43 | 2 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 230 | 470 | 56 | 400 | 61 | 750 | 51 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.14 | 0.15 | 68 | 0.17 | 63 | 0.28 | 43 |
| Superfund Proximity (site count/km distance) | 0.021 | 0.085 | 27 | 0.081 | 29 | 0.13 | 18 |
| RMP Proximity (facility count/km distance) | 1.6 | 0.91 | 83 | 0.82 | 85 | 0.74 | 86 |
| Hazardous Waste Proximity (facility count/km distance) | 0.2 | 0.83 | 39 | 0.75 | 43 | 4 | 35 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.22 | 0.19 | 94 | 9.8 | 94 | 14 | 92 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 63% | 47% | 71 | 44% | 75 | 36% | 84 |
| Minority Population | 79% | 57% | 69 | 51% | 75 | 39% | 83 |
| Low Income Population | 46% | 36% | 67 | 37% | 66 | 33% | 74 |
| Linguistically Isolated Population | 11% | 8% | 73 | 6% | 80 | 4% | 85 |
| Population With Less Than High School Education | 23% | 17% | 69 | 16% | 73 | 13% | 82 |
| Population Under 5 years of age | 9% | 7% | 65 | 7% | 67 | 6% | 76 |
| Population over 64 years of age | 17% | 12% | 79 | 13% | 75 | 15% | 67 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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# EJSCREEN Report (Version 2019)

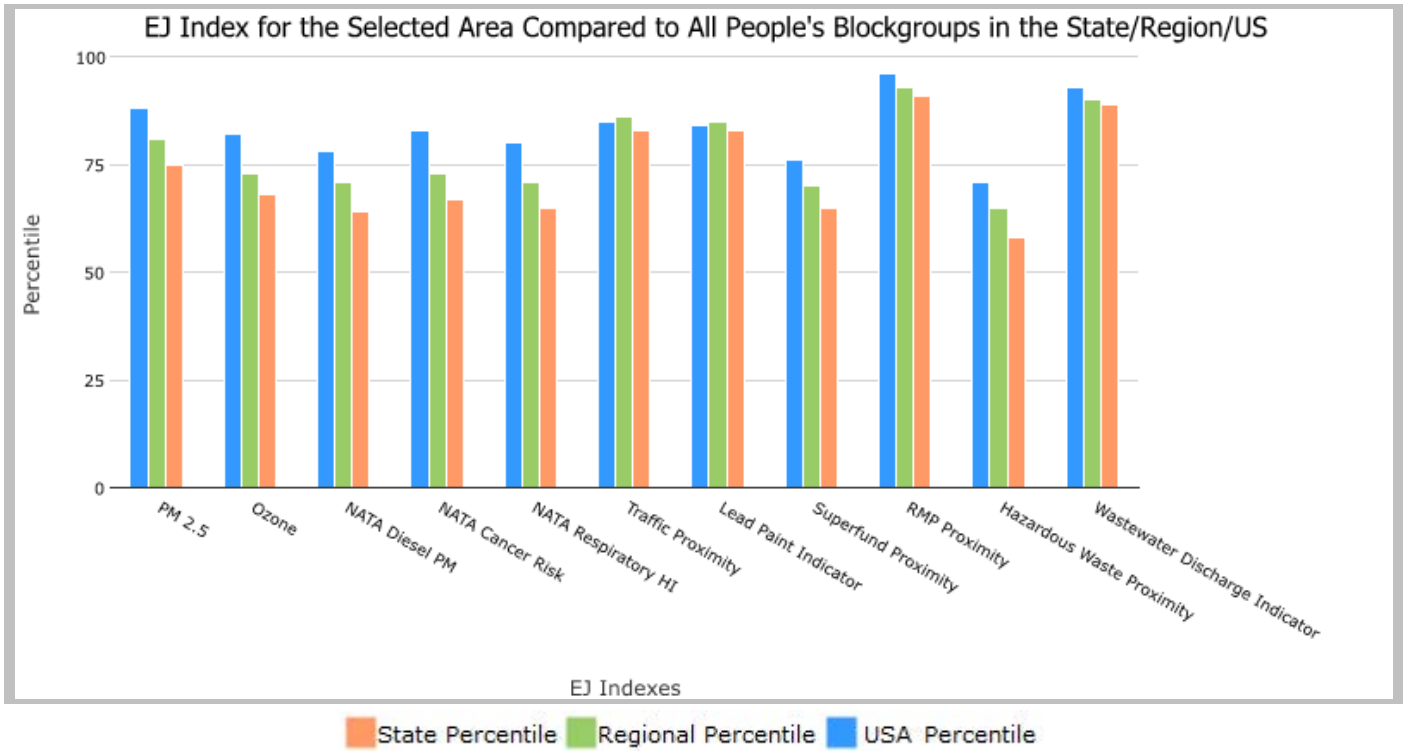
**City: Harlingen, TEXAS, EPA Region 6**

**Approximate Population: 65,371**

**Input Area (sq. miles): 40.41**

**Harlingen (The study area contains 1 blockgroup(s) with zero population.)**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 75 | 81 | 88 |
| EJ Index for Ozone | 68 | 73 | 82 |
| EJ Index for NATA* Diesel PM | 64 | 71 | 78 |
| EJ Index for NATA* Air Toxics Cancer Risk | 67 | 73 | 83 |
| EJ Index for NATA* Respiratory Hazard Index | 65 | 71 | 80 |
| EJ Index for Traffic Proximity and Volume | 83 | 86 | 85 |
| EJ Index for Lead Paint Indicator | 83 | 85 | 84 |
| EJ Index for Superfund Proximity | 65 | 70 | 76 |
| EJ Index for RMP Proximity | 91 | 93 | 96 |
| EJ Index for Hazardous Waste Proximity | 58 | 65 | 71 |
| EJ Index for Wastewater Discharge Indicator | 89 | 90 | 93 |

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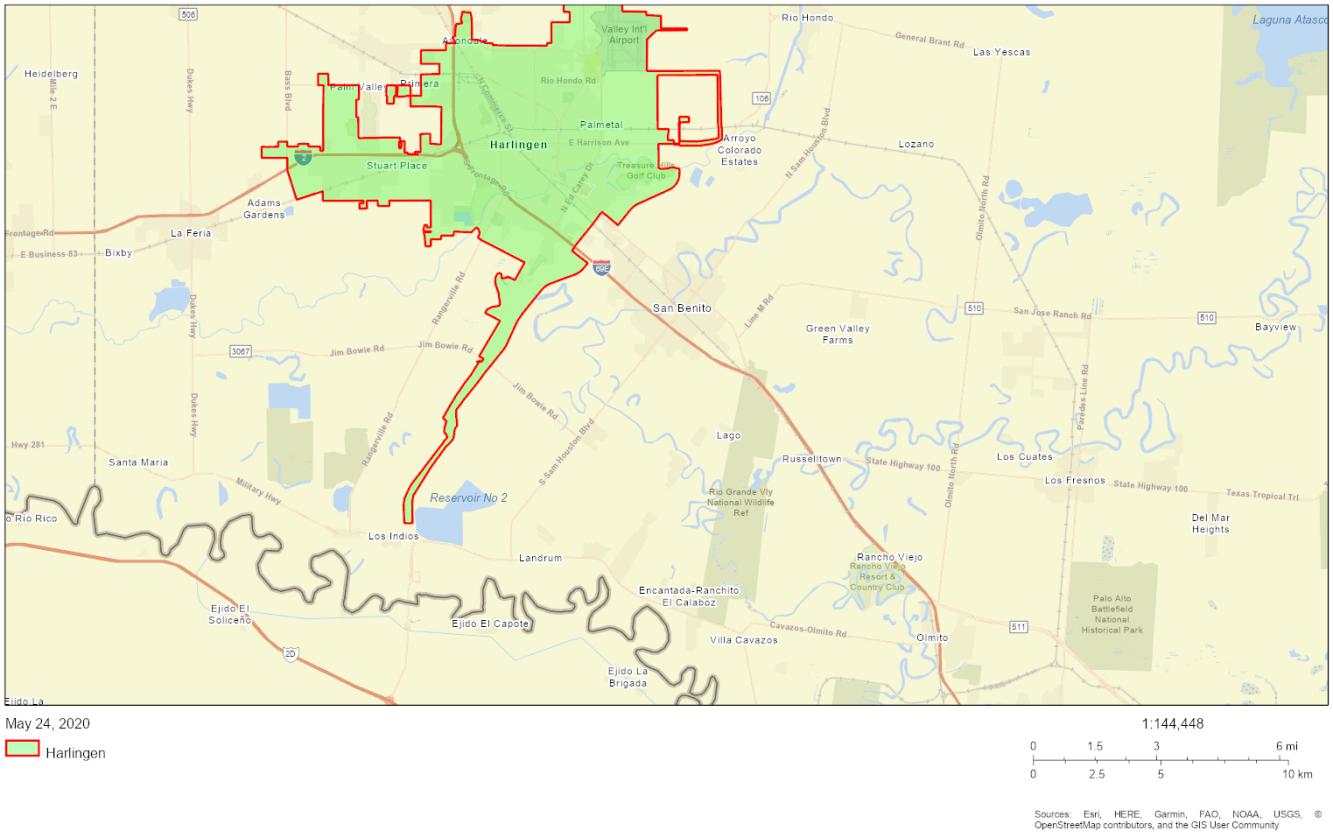
# EJSCREEN Report (Version 2019)

**City: Harlingen, TEXAS, EPA Region 6**

**Approximate Population: 65,371**

**Input Area (sq. miles): 40.41**

**Harlingen (The study area contains 1 blockgroup(s) with zero population.)**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 1 |

# EJSCREEN Report (Version 2019)

**City: Harlingen, TEXAS, EPA Region 6**

**Approximate Population: 65,371**

**Input Area (sq. miles): 40.41**

**Harlingen (The study area contains 1 blockgroup(s) with zero population.)**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.96 | 8.43 | 23 | 8.37 | 24 | 8.3 | 37 |
| Ozone (ppb) | 26.7 | 38.4 | 1 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.237 | 0.429 | 24 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 23 | 35 | 5 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.26 | 0.43 | 4 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 410 | 470 | 72 | 400 | 75 | 750 | 63 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.2 | 0.15 | 74 | 0.17 | 71 | 0.28 | 52 |
| Superfund Proximity (site count/km distance) | 0.025 | 0.085 | 33 | 0.081 | 35 | 0.13 | 23 |
| RMP Proximity (facility count/km distance) | 2.3 | 0.91 | 90 | 0.82 | 91 | 0.74 | 92 |
| Hazardous Waste Proximity (facility count/km distance) | 0.13 | 0.83 | 25 | 0.75 | 30 | 4 | 24 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.019 | 0.19 | 82 | 9.8 | 83 | 14 | 83 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 69% | 47% | 77 | 44% | 81 | 36% | 88 |
| Minority Population | 84% | 57% | 74 | 51% | 79 | 39% | 86 |
| Low Income Population | 54% | 36% | 75 | 37% | 75 | 33% | 82 |
| Linguistically Isolated Population | 13% | 8% | 77 | 6% | 83 | 4% | 87 |
| Population With Less Than High School Education | 28% | 17% | 75 | 16% | 79 | 13% | 87 |
| Population Under 5 years of age | 10% | 7% | 78 | 7% | 80 | 6% | 86 |
| Population over 64 years of age | 14% | 12% | 70 | 13% | 63 | 15% | 54 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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# EJSCREEN Report (Version 2019)

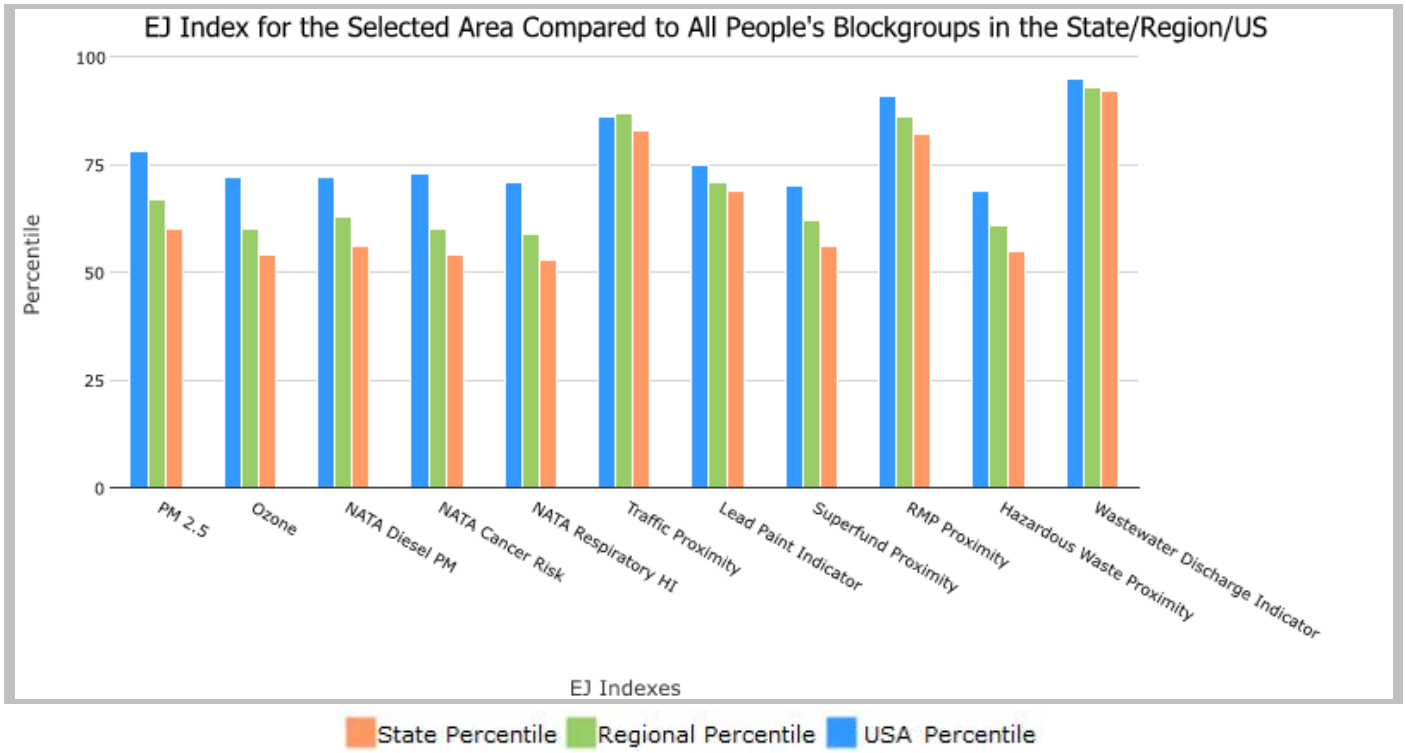
**.25 miles Ring around the Corridor, TEXAS, EPA Region 6**

**Approximate Population: 3,176**

**Input Area (sq. miles): 3.22**

**AC_0.25**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **EJ Indexes** | | | |
| EJ Index for PM2.5 | 60 | 67 | 78 |
| EJ Index for Ozone | 54 | 60 | 72 |
| EJ Index for NATA* Diesel PM | 56 | 63 | 72 |
| EJ Index for NATA* Air Toxics Cancer Risk | 54 | 60 | 73 |
| EJ Index for NATA* Respiratory Hazard Index | 53 | 59 | 71 |
| EJ Index for Traffic Proximity and Volume | 83 | 87 | 86 |
| EJ Index for Lead Paint Indicator | 69 | 71 | 75 |
| EJ Index for Superfund Proximity | 56 | 62 | 70 |
| EJ Index for RMP Proximity | 82 | 86 | 91 |
| EJ Index for Hazardous Waste Proximity | 55 | 61 | 69 |
| EJ Index for Wastewater Discharge Indicator | 92 | 93 | 95 |

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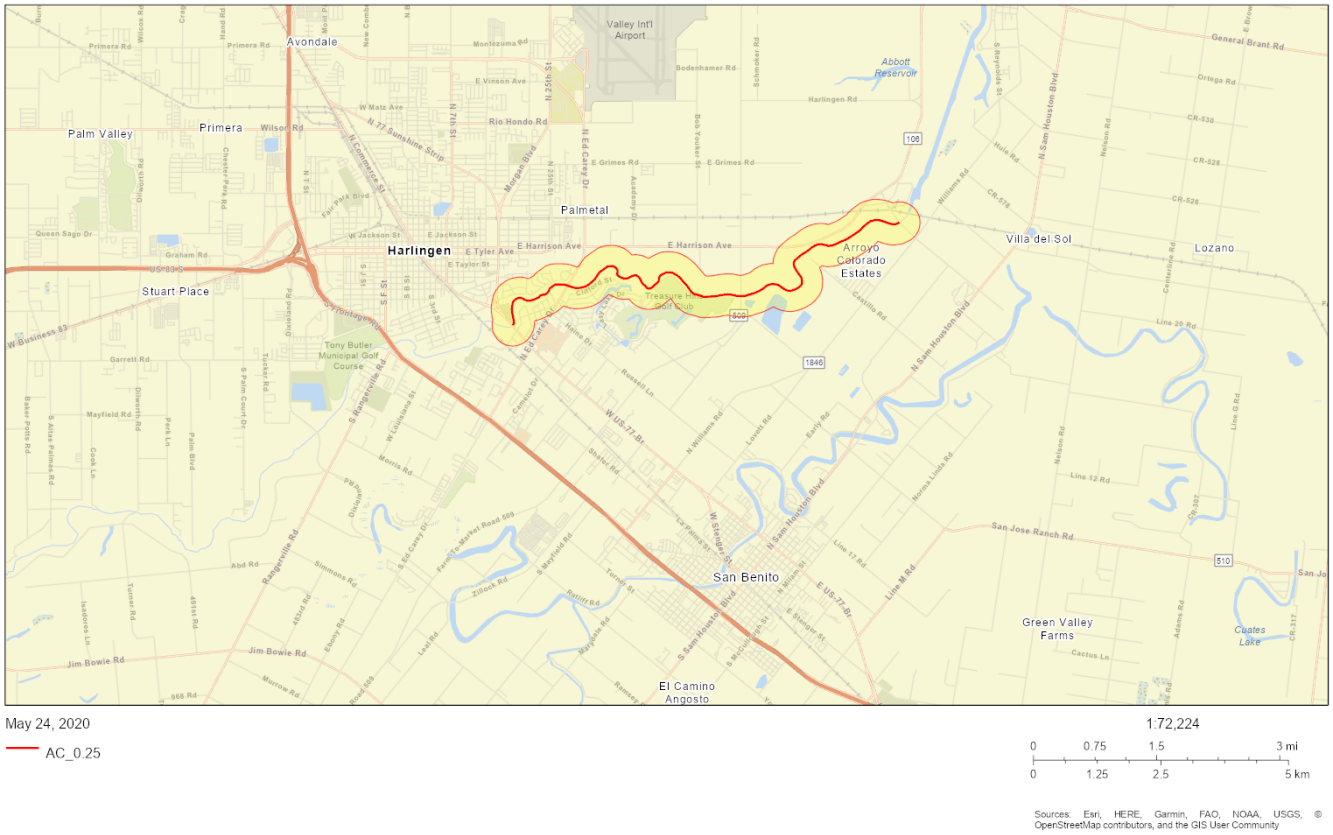
# EJSCREEN Report (Version 2019)

**.25 miles Ring around the Corridor, TEXAS, EPA Region 6**

**Approximate Population: 3,176**

**Input Area (sq. miles): 3.22**

**AC_0.25**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 1 |

# EJSCREEN Report (Version 2019)

**.25 miles Ring around the Corridor, TEXAS, EPA Region 6**

**Approximate Population: 3,176**

**Input Area (sq. miles): 3.22**

**AC_0.25**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Environmental Indicators** | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m$^3$) | 7.94 | 8.43 | 23 | 8.37 | 23 | 8.3 | 37 |
| Ozone (ppb) | 26.5 | 38.4 | 1 | 39.4 | 0 | 43 | 0 |
| NATA* Diesel PM (µg/m$^3$) | 0.254 | 0.429 | 25 | 0.401 | <50th | 0.479 | <50th |
| NATA* Cancer Risk (lifetime risk per million) | 23 | 35 | 4 | 36 | <50th | 32 | <50th |
| NATA* Respiratory Hazard Index | 0.26 | 0.43 | 4 | 0.45 | <50th | 0.44 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 750 | 470 | 84 | 400 | 87 | 750 | 76 |
| Lead Paint Indicator (% Pre-1960 Housing) | 0.17 | 0.15 | 72 | 0.17 | 68 | 0.28 | 49 |
| Superfund Proximity (site count/km distance) | 0.024 | 0.085 | 31 | 0.081 | 33 | 0.13 | 21 |
| RMP Proximity (facility count/km distance) | 2.5 | 0.91 | 92 | 0.82 | 92 | 0.74 | 93 |
| Hazardous Waste Proximity (facility count/km distance) | 0.21 | 0.83 | 40 | 0.75 | 45 | 4 | 37 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.12 | 0.19 | 92 | 9.8 | 92 | 14 | 90 |
| **Demographic Indicators** | | | | | | | |
| Demographic Index | 49% | 47% | 55 | 44% | 60 | 36% | 73 |
| Minority Population | 62% | 57% | 54 | 51% | 62 | 39% | 74 |
| Low Income Population | 36% | 36% | 54 | 37% | 51 | 33% | 61 |
| Linguistically Isolated Population | 7% | 8% | 61 | 6% | 70 | 4% | 77 |
| Population With Less Than High School Education | 15% | 17% | 54 | 16% | 55 | 13% | 68 |
| Population Under 5 years of age | 5% | 7% | 30 | 7% | 32 | 6% | 40 |
| Population over 64 years of age | 19% | 12% | 85 | 13% | 81 | 15% | 75 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

# APPENDIX D:

# Distribution and Coordination

**Federal**

Advisory Council on Historic Preservation

Federal Emergency Management Agency

National Park Service—Brownsville

Natural Resources Conservation Service

National Weather Service—Brownsville

U.S. Army Corps of Engineers

U.S. Border Patrol

U.S. Bureau of Reclamation

U.S. Customs and Border Protection

U.S. Department of Agriculture

U.S. Department of Interior

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

U.S. House of Representatives

U.S. Senate

**Tribes**

Alabama-Coushatta Tribe of Texas

Apache Tribe of Oklahoma

Comanche Nation

Kiowa Indian Tribe of Oklahoma

Mescalero Apache Tribe

**State**

Department of State Health Services

Museum of South Texas History

Texas Commission on Environmental Quality

Texas Department of Transportation—San Benito Office

Texas Emergency Management

Texas Forest Service

Texas Historical Commission

Texas House of Representatives

Texas Parks and Wildlife Department

Texas Senate

Texas State Soil and Water Conservation Board

Texas Water Development Board

University of Texas—Brownsville, Department of Chemistry and Environmental Science

University of Texas Rio Grande Valley

**County**

Cameron County

Harlingen Irrigation District

San Benito Irrigation District

**Municipal**

Harlingen, City of

**Individuals**

Adjacent property owners

**Organizations**

Arroyo Colorado Audubon Society

Arroyo Colorado Watershed Partnership

Citizens Advisory Board Frontera Audubon Society

Environmental Defense Fund

Frontera Audubon Society

Lower Rio Grande Water Committee

Native Plant Project (Harlingen)

Nature Conservancy

Rio Grande Watermaster

Sierra Club

Valley Proud Environmental Council

World Birding Center (Headquarters)

**News Media**

88.9 KJJF

CBS 4—KGBT

Harlingen TV, Print, Radio

Monitor, The

Valley Morning Star

# Coordination Correspondence

# (pending)

# APPENDIX E:

# Public Scoping Meeting Review Comments

| Commenter | Commenter Subject | IBWC Response |
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| Noela Nadine Sanchez, *Citizen* | Expanded vegetation and sediment removal alternative flood conveyance capacity would be fully restored through dredging and expanded vegetation management between US 77 and Cemetery Road. This alternative would provide properties in Harlingen with the greatest decrease in flood risk. | Thanks for your positive feedback in USIBWC's effort to restore the flow capacity of Arroyo Colorado to 21,000 cfs. |
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| Kimberly Salinas, *Citizen* | Option 4: Expanded Vegetation & Sediment Removal | |
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| David A. Garza, *Citizen* | Off channel alternative: The use of off-stream temporary runoff storage is viable idea. However, large regional detention facilities (RDF) would represent a challenge (land acquisition, etc.). The use of green infrastructure and low impact development techniques across the tributary areas of the Arroyo section can potentially be more effective in reducing and slowing down flow into the Arroyo and distribute the financial, compliance and operational burden compared to constructing large RDFs.<br>A combination of all three options should be considered: off channel storage, vegetation removal and sediment removal.<br>Proposed strategies not included in the description:<br>Watershed-based approach: the largest urbanized areas are located upstream of the Arroyo; a watershed wide approach should be conducted to slow down and reduce the amount of water that is discharged in the arroyo. A watershed-wide effort to reduce impermeable surfaces through low impact development and green infrastructure is needed.<br>Llano Grande Lake dredging project: The Arroyo Colorado Watershed Protection<br>Plan states for the "dredging of the Llano Grande Lake will provide more capacity to the Arroyo... The IBWC stopped dredging the Arroyo in the 1960's, and the lake began to silt". This option should be also considered to increase the capacity of the Arroyo upstream. | It is praiseworthy that other stakeholders are looking at watershed-wide approach. USIBWC is not authorized to look at interior drainage; our authorization by the Congress ends at the toe of the levee on landside. USIBWC's main mission is flood control through the floodways and building levees. Off-site storage was considered as an alternative approach, but it was found to be very expensive. |
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| Andy Vigstol, *Citizen* | I believe as part of the USIBWC's commitment to mitigating flood risks, the option of expanded vegetation removal and sediment removal is the only feasible option presented at tonight's public comment session.<br>This work is critical to reducing loss of life and property during extraordinary flood events, such as those seen in 2018 and 2019 (both estimated @ 500-year storm events). These events have changed local | Arroyo Colorado currently has 45% of its original flood flow carrying capacity, not 25%. It is part of USIBWC's floodway system and USIBWC is working to restore its capacity to provide flood protection for the lower Rio Grande Valley. WRRDA is more of an authorizing legislation; it does not include |

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| | perception of the extreme importance in maintaining our local flood ways.<br>The USBXLC may need to partner with the US Army Corps of Engineers who has identified this as a WRRDA 1001 Proposal, which may allow for greater funding of this urgent project. As I understand the Arroyo is currently at 25% of the original design capacity yet is causing water levels to crest at record levels. Please consider the most expansive option to increase flood capacity in our region. | funding. USACE has developed the implementation guidelines. |
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| Domingo J. Navarro,<br>*Citizen* | My choice after seeing the displays would be for the expanded vegetation and sediment removal.<br>Purchasing the needed land for sedimental disposal would be better than having the resources available. | Currently USIBWC is looking at vegetation and sediment removal for about 6 miles long reach between US 77 and Cemetery Road. Upstream reach of the arroyo will be looked at in the next phase. |
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| Carlos A Sanchez<br>*Assistant City Manager, City of Harlingen* | The Expanded Vegetation and Sediment Removal Alternative provides the most benefit towards a reaching a comprehensive floodway management plan for the Arroyo Colorado. The Fact Sheet distributed at last night's meeting, states that this alternative would fully restore the flood conveyance capacity of the Arroyo Colorado. I disagree with this statement. The cross-section of the Arroyo Colorado ranges from 250 to 350 feet and the proposed project will only address at most 100 feet of the cross-section. In other words, if the Arroyo is not being cleared to the extent to which it existed 50 years ago, how can it be expected to convey the original 21,000 cfs design flows? I believe that a ground survey needs to conduct after the dredging and vegetation clearing is completed to collect accurate data to update the hydraulic models. Only then can a determination be made as to the capacity of the Arroyo Colorado. | Hydraulic model for the arroyo was developed based on cross-section surveys of 2008, 2014 and 2018. LiDAR data for 2009 was used to model the floodplain terrain. Mitigation measures were developed based on hydraulic modeling. The contractor will provide the survey of the dredged cross-sections and the hydraulic model will be updated. |
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| Dan Cerna,<br>*City Manager, City of Harlingen* | Recent flood events have once again proven that the Arroyo Colorado no longer has the capability to convey 21,000 cfs of flood waters as originally designed by the USIBWC. Based on empirical data from recent flood events, the Arroyo begins to back-up into neighboring densely populated residential subdivisions at flows of less than 5,300 cfs, less than 25% of the original capacity. This coupled with the fact that the Arroyo is conveying flood waters from the entire region is contributing to ongoing flood control issues and concerns.<br>USIBWC in coordination with the USACoE needs to make a thorough assessment of the condition and capacity of the Lower Rio Grande Flood Control Project (LRGFCP). The USACoE would be a strategic partner with USIBWC in many ways as they | USIBWC appreciates cooperation and positive feedback from the City for this project. Our floodways and levees are built to provide flood protection for the design flow which is more than 100-year flow. The system is not adequate to reduce flooding during 500-year event. Our project is to restore the capacity of the arroyo to 21,000 cfs. We are also planning surveying and hydraulic modeling of the north floodway and the remaining portion of the arroyo in near future. We note your suggestion of increasing the flow diversion to north |

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| | can bring an added level of expertise to the project and may bolster funding to the project. The LRGFCP was built in 1932; since then vegetation and sedimentation loads within the floodways of the LRGFCP coupled with the population/development growth in the surrounding communities have significantly impacted the LRGFCP's ability to provide adequate flood protection. This is evident in the poor condition and ineffectiveness of the Arroyo Colorado's ability to convey flood waters to the original 21,000 CFS design.<br>Information gathered from such an assessment should result in a detailed plan of action to restore the floodways within the Rio Grande Valley including the North Floodway and Arroyo Colorado drainage systems to original capacity and increased ability to drain run-off from the region to a 500- year storm capacity. This plan should include conceptual and shovel ready flood mitigation projects for the floodways that the USIBWC manages. It should be noted that Cameron County has experienced two 500-year storm events recently in consecutive years, which caused widespread devastation and population displacement. Private property damage alone between these two events is estimated near $75 Million dollars not including damage to public infrastructure.<br>The resulting plan of action should result in actual, on-the-ground implementation and construction of designed improvements with the goal of improving drainage throughout the entire Lower Rio- Grande Valley region. I would stress that any resulting action should be coordinated with the Texas Water Development Board as they have recently published Flood Planning Region Boundaries which indicate that Cameron county is the ultimate downstream out fall for the entire Rio Grande system.<br>In the interim, and specifically to the projects that were offered during the December 12th, 2019 Public Comment meeting in Harlingen, Texas, we strongly urge IBWC to select the project that removes vegetation growth within the floodway and removes the sedimentation build-up along the Arroyo Colorado to restore the Arroyo to its originally designed capacity. Additional upstream improvements to the Arroyo outside of the scope of the public meeting should include construction and implementation of regional stormwater detention facility coupled with and in-line retention pond with a targeted goal of exceeding the original design capacity of 21,000 cfs while simultaneously lowering the BFE of a 500-year event.<br>The current condition of the North Flood Way and the Arroyo Colorado pose a serious risk not only to the City of Harlingen but the entire region that depend on the both drainage systems as means of discharging its | floodway, but it is not possible to implement increased flow diversion without agreement from all the stakeholders. |

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| | storm water. For this reason over the past several years the City of Harlingen has urged the leadership at USIBWC to update their comprehensive hydraulic study of both North Flood Way and Arroyo Colorado, identify and develop capital improvement projects that mitigate flows in both systems and reconfigure the LRGFCP to divert a larger amount of flow to the north Floodway and reduce the Arroyo's burden.<br>We believe it is imperative to gather the necessary data related to the Arroyo Colorado and North Main Drain to develop an action plan to protect life and property from future flooding disasters. A detailed survey of both the entire stretch of the Arroyo Colorado and the North Main Drain is a critical component in determining the current capacity of both waterways. We ask for the necessary funding to assist the IBWC in conducting the field survey of both. This will not only help to determine the current capacity of both waterways but will also provide critical information toward the goal of developing a long-term course of action to improve drainage in the Rio Grande Valley and reduce flooding risk.<br>We are willing to assist USIBWC and the USACoE in any way possible within the confines of our existing resources including coordination with local land owners and submitting grant applications to achieve the necessary improvements and providing data necessary to achieve the ultimate goal of improving storm water flood management and impact to life and property<br>USIBWC must be allocated the necessary resources that allow them to improve their ability to gather accurate and updated data regarding regional flood control. Once collected, this information should be disseminated to local jurisdictions in a timely manner for better coordination and partnership with the goal of improving and maintaining flood control systems within our region. Resources should include real time flood information gauges within the North Flood Way and Arroyo Colorado that are easily accessible to all jurisdictions within the LRGFC. | |
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| David Negrete, *IBWC—Mexico Section* | It is important to both nations that flood control structures conform to their original capacities. It is necessary to remove vegetation and sediment and, if possible, begin the work of removing concrete infrastructure in urban areas. | USIBWC agrees that floodways and flood control structures in both countries need to be restored to their original capacities for providing flood control benefits to the people living in the lower Rio Grande Valley on either side of the international boundary. |
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| Michael Mezmar, | Dig a deeper and wider channel with pools/ponding areas along the way. | Yes, removal of sediment and vegetation is to restore the arroyo |

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| *Citizen* | Stop flooding Cameron County and Harlingen. Digging will remove some brush, yes. P.S. stop Harlingen from flooding. | capacity which will facilitate drainage of neighboring cities. However, it will not eliminate flooding in the localities due to interior drainage. USIBWC is not authorize by the Congress to work on interior drainage issues behind USIBWC levees. |
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| Thomas P. Curtis, *Citizen* | My concern was that vegetation might be removed from the south side (high bank) of the Arroyo. All in all, my understanding after verifying with IBWC presentation that the plan to deepen the Arroyo should have no effect on the vegetation on the south side of the Arroyos. The vegetation on the south side should be left undisturbed since it presents erosion of the high bank during times of rising water. I could also from diverting more water storage the north floodway rather than adding water to the Arroyos. I don't believe adding more water to a drainage way through the City of Harlingen make sense, given the possibility of flooding any part of the City. | Vegetation from the steep bank will not be removed to prevent erosion. It is not possible to introduce higher flow along the north floodway without agreement from all the stakeholders. |
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| James Morand, *Citizen* | I find this entire event to be a farce. A political ploy and social excuse to make claims that they are involving the community in the decision-making process and that they are taking great strides to assure everything is being done.<br>I Say this with some reservation, as I and much of the community are still left with a certain level of animosity towards the actions or inactions of the previous year; however if the purpose was to in fact illicit a constructive or practical response from the general populous. I still feel that it seems rather illogical. Now if you were to call upon specific individuals that may have the necessary, engineering, agricultural, mechanical, or otherwise specific affiliation to the task at hand. The plea would seem more worthwhile, but I can assume you when presented at large the question you're asking will be answered with "There is something, wrong, fix it" as I would be one of the many saying it. Presented with the information made accessible tonight I suppose my questions are:<br>● If there is or has been a 50% decrease in the effectiveness of the Arroyo Colorado, why is it only now that we are seeking the publics approval to correct it. Did it happen relatively overnight? Was there any previous maintenance? Happen relatively overnight? Was there any previous maintenance?<br>● •If you already have a proposal to correct it why the hesitation, why not simply choose the course | The decrease in flood capacity has grown over time due to a combination deferred maintenance, funding constraints, increased interior drainage and storm events resulting in increased sedimentation.<br>Because this is a Federal action under the jurisdiction of the US Boundary and Water Commission (USIBWC), this process and resulting document are required under the National Environmental Policy Act to conduct a public evaluation of alternatives to the proposed action and the environmental consequences. Funding for this activity is at the discretion of the U.S Congress.<br>Urban development and the operation of urban drainage infrastructure, also known as interior drainage, is a factor in the performance of the Arroyo Colorado to transmit Rio Grande floodwaters as an element of the Lower Rio Grande Flood Control Project. Regulation, operation, and maintenance of interior drainage before entering Arroyo Colorado is the jurisdiction of adjacent |

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| | of action that produces the best results. Is this about funding will the project have an impact on resident's taxes and if so is that the only reason this was made into an open/public meeting to make it appear that the citizens have chosen therefore making an excuse if individuals question a tax increase.<br>● •Is the increase in sediment build up in any way related to the increase in infrastructure, housing, commerce, etc. and will the corrective action taken soon be affected or made defunct or ineffectual due to continued growth of infrastructure in our area.<br>● •On a side note at meetings conduct previously this on a side note at meetings conducted previously this year questions directed at this particular issue were brushed off by city officials as an "out of their hands issue" as those responsible for the Arroyo Colorado's maintenance were not in the employ, or under the scrutiny of the city. So why now is this a city headed issue. Is it simply an outside organization employing city resources or? | municipalities and is the subject of continuing dialogue between the USIBWC and the municipalities. |
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| Rodrigo Davila, *City of Harlingen Public Works Director* | The current condition of the Arroyo Colorado poses a serious risk not only to the City of Harlingen but the entire region that depends on this drainage system as a means of discharging its storm water. For this reason over the past several years the City of Harlingen has urged the leadership at USIBWC to update their hydraulic study of both North Flood Way and Arroyo Colorado, identify and develop capital improvement projects that mitigate flows in both systems and reconfigure the LRGFCP to divert a larger mound of flow to the north Floodway and reduce the Arroyo's flows.<br>We believe it is imperative to gather the necessary data related to the Arroyo Colorado and North Main Drain to develop an action plan to protect life and property from future flooding disasters. A detailed survey of both the entire stretch of the Arroyo Colorado and the North Main Drain is a critical component in determining the current capacity of both waterways. We ask for the necessary funding to assist the IBWC in conducting the field survey of both. This will not only help to determine the current capacity of both waterways but will also provide critical information toward the goal of developing a long-term course of action to improve drainage in the Rio Grande Valley and reducing flood risk.<br>There is a serious concern about the Arroyo Colorado being able to convey 21,000 cfs without causing devastating flood conditions to the City of Harlingen and surrounding communities. | |

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| | We are willing to assist USIBWC and the USACEoE in any way possible within the confines of our existing resources including coordination with local land owners and submitting grant applications to achieve necessary improvements and providing data necessary to achieve the ultimate goal of improving storm water flood management and impact to life and property. | |
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| Jaime Flores, *Texas Water Resources Institute, Program Coordinator for the Arroyo Colorado Watershed* | The Llano Grande Lake project were developed after Hurricane Dolly and the RGV Flood of 2010 when same of the same places flooded. This project was put together with the major stakeholders that were affected; City of Harlingen, City of La Feria & Cameron County and the ACWPP Habitat WG. This project has been modeled and shown to be effective and will result in flood mitigation and result in load reductions to the Arroyo Colorado during flood events and are approved by the EPA. We planned for this years ago. Please use the local, boots on the ground, knowledge of how to help in developing any future flood control/mitigation planning in the Rio Grande Valley.<br>Please review the Update to the Arroyo Colorado WPP P. 96-102 to read the projects below. All of these projects combined would have an impact on these areas. These projects were identified during Dolly and flushed out during the writing of the WPP to try and get funding for them.<br>The partnership supports stormwater detention projects, especially with enhanced water quality treatment. A few stormwater detention projects that have been specifically identified are summarized below.<br>Llano Grande Lake dredging project: The Llano Grande Lake is part of the Arroyo Colorado in the floodway between Mercedes and Weslaco. Originally, the lake was 8-10 ft. deep and there was an upwelling of water described as a natural spring feeding the lake. the Llano Grande Lake area was a military encampment throughout the 1930's and 1940's when the LRGV was starting to be settled. These camps were established at the Llano Grande Lake because of the access to the spring and fresh water in the lake. The groundwater in this area is very shallow, only five feet below the surface in some locations, and there are "perched" water tables throughout that provide baseflow to the Arroyo Colorado. This shallow groundwater and spring kept the lake full throughout the year. Later the lake became a huge outdoor recreation area with a boat ramp where people would launch small boats to fish and water ski.<br>The spring was silted over by Hurricanes Allen in 1980 and Gilbert in 1988. The lake acted as a natural | Watershed action plan for the Arroyo Colorado by various stakeholders once fully implemented will definitely help reduce flooding along the arroyo by decreasing inflow of water as well as sediments resulting from upstream detention in the watershed. USIBWC appreciate this effort; however, it is not authorized by the Congress to be involved in studying interior drainage issues. USIBWC staff can review project documents and provide suggestions if the stakeholders want such participation. |

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| | silt trap when the water slowed in the deep, wide channel. When the IBWC stopped dredging the Arroyo in the 1960's the lake began to silt in. This cut off the spring that had been feeding the lake, causing an associated decline in water quality. Now silt continues to the Port of Harlingen, where frequent dredging is necessary to maintain navigability.<br>The Arroyo Colorado Habitat Work Group concluded that dredging the lake to its original depth and restoring groundwater flow will improve Arroyo Colorado water quality. Dredging the lake will provide more capacity to the Arroyo, restore a native deep-water habitat and may restore access to a groundwater/underground spring. The extra capacity and spring water will create a diluting effect on existing stream pollutants. There have not been any project feasibility studies, so the first step is to determine whether dredging the lake will restore the spring flow and evaluate the potential benefits of the project. This project will preserve a historical lake and spring that provides habitat for birds, wildlife and native plant species. This project will also provide stormwater treatment, recreational areas and environmental education.<br>After a major flood event in 20I0, the international Boundary and Water Commission (IBWC) conducted a hydraulic analysis is for a vulnerable portion of the Arroyo Colorado in the City of Harlingen. The report made recommendations on ways to slow flooding and siltation, including upstream detention.<br>The Llano Grande Lake is a 4.2- miles stretch of the Arroyo Colorado that was the site of the former lake. This project builds upon the efforts and studies performed for the development of the Update to the Arroyo Colorado Watershed Protection Plan, accepted by the USEPA in December 2017. The project will help the watershed achieve water quality, flood protection, siltation abatement, economic development, habitat, and other goals.<br>Implement Management Measures and Restore Llano Grande Lake Spring Restoration of spring flow from Llano Grande Lake in conjunction with the implementation of watershed management measures described previously was also assessed. This consisted of restoring the lake's capacity along with 1,000 gallons per minute (GPM) in spring flow from the lake, adding 144 mgd (with zero sediment, N, P or E. coli) to the main channel in area of the project. There is a market for the fine silt/sand to be dredged from the project site after proper dewatering. Pipelines and other construction require this kind of materials. Proceeds from sales will help offset costs of implementation.<br><br>***Future Scenario Assessment*** | |

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| | A SWAT and CE-QUAL-W2 modeling systems were used to model future scenarios and determine the water quality results. The SWAT model was used by itself to evaluate bacteria in the Arroyo Colorado Above Tidal segment and to provide the loading of nutrients, sediment and bacteria to CE-QUAL-W2. The CE-QUAL-W2 model used the loading from the SWAT model to simulate DO dynamics and fate and transport of bacteria in the Arroyo Colorado Tidal segment.<br><br>***Impact of Spring Restoration and Management Measures***<br>Restoration of the Llano Grande Lake spring had a significant effect on E. coli, and nutrient concentrations in the non-tidal segment and Enterococci in the tidal segment and appears to be a critical measure for ultimately achieving bacteria water quality standards in these water bodies.<br><br>***Impact of Management Measure Implementation on Segment 2201***<br>CE-Qual-W2 is a two-dimensional, longitudinal/ vertical, hydrodynamic and water quality model developed by the USACE Waterways Experiment Station and Portland State University (Cole and Wells 2011). CE-QUAL-W2 (Version 3.7) was used because of its capabilities to predict longitudinal-vertical hydrodynamics and water quality of the tidally influenced portion of the Arroyo Colorado and to simulate the salt wedge that predominated in this portion of the Arroyo. CE-QUAL-W2 is strictly a hydrodynamic/water quality model, and nutrient, sediment and bacteria loadings are fed to it by SWAT. As such, the model does not provide an evaluation of watershed pollutant sources like SWAT and BST, but rather provides predictive capabilities to assess impacts of management measure implementation on DO and bacteria levels in the Arroyo Colorado Tidal.<br><br>While WAT e. coli results indicate non-impairment for future conditions in the non-tidal segment (2202), CE-QUAL-W2 results in the Arroyo Colorado Tidal show that Enterococci criterion (35 MPN/100 mL) are not met in Segment 2201 in the next 10 years with implementation of any of the scenarios modeled. This is due to the future growth expected to occur throughout the watershed and the high levels of wild-life present in the lower basin. Adaptive management is expected to be required to ultimately achieve water quality standards along with continued and expanded implementation of management measures. According to data, Llano Grande Lake Restoration followed by continued/expanded implementation of conservation practices is expected to achieve water quality | |

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| | standards in approximately 26 years in 2201_05, 20 years in 2201_04, less than 12 years in 2201_03, and less than 15 years in 2201_02.<br>Based on the CE-QUAL-W2 model outputs, this scenario results in water quality standards attainment for DO. | |