Draft

Environmental Assessment

Supporting the
Mechanical Control of Carrizo Cane in the Rio Grande Basin in Texas

Department of Homeland Security
U.S. Customs and Border Protection

July

2016

Abbreviations and Acronyms

BMP	best management practice
CBP	U.S. Customs and Border Protection
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
dBA	A-weighted decibel
DHS	Department of Homeland Security
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESP	Environmental Stewardship Plan
FEMA	Federal Emergency Management Agency
FM&E	Facilities Management and Engineering
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FR	Federal Register
HUC	hydrologic unit code
mph	miles per hour
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone
P.L.	Public Law
Pb	lead
percent g	percent of the force of gravity
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
RCRA	Resources Conservation and Recovery Act
ROW	right-of-way
SO_2	sulfur dioxide
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
tpy	tons per year
TXDOT	Texas Department of Transportation
USC	United States Code
USACE	U.S. Army Corps of Engineers
USBP	U.S. Border Patrol
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compounds

Cover Sheet

Draft Environmental Assessment
Supporting the Mechanical Control of Carrizo Cane
in the Rio Grande Basin in Texas

Responsible Agencies: Department of Homeland Security, U.S. Customs and Border Protection (CBP), U.S. Border Patrol.

Affected Location: Rio Grande Basin in Texas.

Report Designation: Draft Environmental Assessment (EA).

Abstract: Department of Homeland Security and CBP propose to conduct mechanical control of Carrizo cane (*Arundo donax*) in the Rio Grande basin in Texas. CBP would mechanically top (i.e., trim) the Carrizo cane to a height of approximately 3 feet (1 meter) using a mechanical cutter bar mounted on a four-wheel drive tractor. CBP may periodically determine that topping of Carrizo cane on the shoreline of the Rio Grande is necessary and conditions dictate that the activity would be conducted from a barge on the river. Carrizo cane is proposed to be topped in U.S. Border Patrol El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors.

The EA analyzes and documents potential environmental consequences associated with the Proposed Action. The analyses presented in the EA indicate that implementation of the Proposed Action would not result in significant environmental impacts, and a Finding of No Significant Impact is appropriate.

Status updates for the EA may be obtained via the CBP EA website at *http://www.cbp.gov/about/environmental-cultural-stewardship/cbp-environmental-documents* or by emailing joseph.zidron@cbp.dhs.gov. Comments on the EA or information requests may be submitted to Carrizo Cane Mechanical Control EA, c/o Mr. Joseph Zidron, U.S. Customs and Border Protection, 24000 Avila Road Suite 5020, Laguna Niguel, CA 92677; or by email at joseph.zidron@cbp.dhs.gov.

Privacy Advisory

Your comments on this document are requested. Letters or other written comments provided may be published in the EA. Comments will normally be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the private citizens making comments and specific comments will be disclosed; personal home addresses and telephone numbers will not be published in the EA.

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ENVIRONMENTAL ASSESSMENT

SUPPORTING THE MECHANICAL CONTROL OF CARRIZO CANE IN THE RIO GRANDE BASIN IN TEXAS

DEPARTMENT OF HOMELAND SECURITY
U.S. CUSTOMS AND BORDER PROTECTION
Border Patrol Facilities and Tactical Infrastructure
24000 Avila Road, Suite 5020
Laguna Niguel, CA 92677

JULY 2016

Executive Summary

Introduction

The Department of Homeland Security and U.S. Customs and Border Protection (CBP) propose to conduct mechanical control of Carrizo cane (*Arundo donax*) (hereafter referred to as cane) in the Rio Grande basin in Texas (i.e., Proposed Action, also referred to as cane control). This Environmental Assessment (EA) analyzes cane control within the cane control area, which is along the Rio Grande, and extends from 200 to 2,640 feet (0.5 mile) inland of the river. The cane control area is entirely within Texas and encompasses five U.S. Border Patrol (USBP) sectors: El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley. The Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors are entirely within Texas, while the majority of the El Paso Sector is in New Mexico.

The cane control area included in this EA crosses privately owned land parcels, tribal lands, and public lands managed by the National Park Service, U.S. Fish and Wildlife Service (USFWS), and Texas Parks and Wildlife Department. Tribal lands associated with the Kickapoo Tribe are present within the cane control area. CBP would secure permission from the relevant landowner or land manager prior to performing cane control.

This EA addresses topping of all cane within the cane control area, including on tribal lands in Texas. However, cane control associated with maintenance and repair of tactical infrastructure assets that are already covered in previous National Environmental Policy Act (NEPA) documents or are covered by a waiver issued by the Secretary of Homeland Security (the Secretary) are not included in the scope of this EA.

CBP prepared this EA through coordination with Federal, state, and local agencies and the public to identify and assess the potential impacts associated with the proposed cane control activities. This EA is being prepared to fulfill the requirements of the NEPA.

Purpose and Need

The purpose of the Proposed Action is to implement the mechanical cane control method to rapidly decrease cane height to ensure sufficient visibility of critical areas in the Rio Grande basin and provide access to these areas by USBP agents, when necessary. Large, dense stands of cane currently occupy the banks and floodplains of the Rio Grande, hindering law enforcement efforts along the U.S./Mexico international border, impeding and concealing the detection of criminal activity and illegal border crossers, and restricting USBP agents' access to riverbanks.

Because control of cane is difficult and complete eradication may be unrealistic, primary objectives for managing cane are often focused on suppression of existing infestations and reducing the spread of cane through control of healthy plant communities (USDA Forest Service 2014). CBP anticipates that mechanical cane topping would quickly improve visibility through height reduction, while also providing sufficient cover for the ocelot (*Leopardus pardalis*) and Gulf Coast jaguarundi (*Puma yagouaroundi cacomitli*). Likewise, cane control would reduce the need for post-control revegetation and restoration that complete cane removal may require.

The Proposed Action is needed to maintain border security within the Rio Grande basin. Increased visibility resulting from cane control is needed to minimize hazards and gain effective control of the nation's border, which would ensure USBP agent and public safety.

Public Involvement

CBP notified relevant Federal, state, and local agencies of the Proposed Action and requested input regarding any environmental concerns they might have. As part of the NEPA process, CBP coordinated with the U.S. Environmental Protection Agency; USFWS; Texas Historical Commission; and other Federal, state, and local agencies. Input from agency responses has been incorporated into the analysis of potential environmental impacts.

A Notice of Availability for this EA and draft Finding of No Significant Impact will be published in the following newspapers:

- *El Paso Times* (English and Spanish)
- *El Diario de El Paso* (Spanish)
- *Hudspeth County Herald* (English and Spanish)
- *Van Horn Advocate* (English and Spanish)
- *Alpine Avalanche* (English and Spanish)
- *Big Bend Sentinel* (English)
- *The International* (Spanish)
- *Del Rio News Herald* (English and Spanish)
- *The News Gram* (English and Spanish)
- *La Prensa* (Spanish)
- *San Antonio Express News* (English and Spanish)
- *Laredo Morning Times* (English and Spanish)
- *Starr County Town Crier* (English and Spanish)
- *The Monitor* (English)
- *Valley Morning Star* (English)
- *El Extra* (Spanish)
- *Brownsville Herald* (English)
- *El Nuevo Heraldo* (Spanish).

The Notice of Availability publications are intended to solicit comments on the Proposed Action and involve the local community in the decisionmaking process. Substantive comments from the public and other Federal, state, and local agencies will be incorporated into the Final EA.

During the 45-day public review and comment period for the Draft EA, CBP will consider comment submissions by email and mail from the public; Federal and state agencies; Federal, state, and local elected officials; stakeholder organizations; and businesses.

Description of the Proposed Action

The Department of Homeland Security and CBP propose to conduct mechanical control of cane. Cane would be mechanically topped (i.e., trimmed) to a height of approximately 3 feet (1 meter)

using a mechanical cutter bar mounted on a four-wheel drive tractor. A small amount of cane control could also occur with hand-held trimmers.

CBP will develop a comprehensive protocol for coordinating the necessary cane control activities within the different classes of landownership. The CBP Facilities Management and Engineering Sector Tactical Infrastructure Coordinator would work closely with the sectors for all cane control activities. Proposed activities would be managed by the Program Management Office's Maintenance and Repair Supervisor. CBP proposes to conduct mechanical topping of cane using the following process.

Two 2-person crews (four total personnel) would conduct the cane control activities in Texas. Equipment used for cane control activities would include two John Deere model 6140 140-horsepower four-wheel drive tractors or similar equivalents that have been retrofitted with a 22-foot Gillison cutter bar to trim the cane. The tractors would be transported from the local USBP sector equipment yard to the work site via trailer for an average daily round trip of 50 miles.

Access to each cane stand would be provided via existing USBP access roads and public roadways to the extent possible, but some off-roading may be necessary. If off-roading is necessary to access cane stands or to travel between specific cane patches at a work site, tractors would use the shortest path and would be limited to 0.25 mile between existing roads and cane stands. When working in a cane patch, travel outside of the patch would be minimized to the extent possible to avoid spread of cane to unaffected areas. Tractor operators would use the same ingress and egress points to access cane stands that require off-roading. After completion of topping, cane trimmings would be left in place.

From time to time, CBP may determine that topping of cane on the shoreline of the Rio Grande is necessary and conditions dictate that the activity would be conducted from a barge on the river. In these situations, CBP would top cane by maneuvering a tractor and cutting bar while positioned on an anchored flat decked barge. Upon topping as much cane within reach, the barge would be repositioned and reanchored. No cane would be topped from a barge on the Rio Grande in Big Bend National Park. Other than topping cane from a barge on the Rio Grande, no cane control equipment would enter wetlands, streams, or other waterbodies.

It is assumed that the proposed cane control activities would require both tractors to operate up to 40 hours per week for 52 weeks per year. Activities would occur one to two times a year in any given location. Cane control activities would be limited to daytime hours (7 a.m. to 5 p.m.).

Suitable best management practices (BMPs) would be implemented for all cane control activities. CBP would conduct advance surveys for nesting migratory birds and nests if mechanical control activities occurred during the nesting season (March 15 through September 15). Cane mechanical topping would not occur in suitable or critical habitat of threatened or endangered species. If CBP determined that cane control must be conducted within suitable habitat of threatened or endangered species, USFWS would be further consulted.

Alternatives Analysis

Alternative 1: Proposed Action. Under this alternative, cane control would be conducted as described in the previous section. A comprehensive set of BMPs would be incorporated as part

of the cane control activities to minimize potential impacts. All cane control activities would be implemented via a Work Plan based on anticipated conditions within each USBP sector and funding availability. Although centrally managed by CBP Facilities Management and Engineering, prioritization scheduling of cane control activities would be based on evolving need for such activities within each sector. Cane control requirements could change over time based on changes of density, location, and other conditions, but would not exceed the scope of this EA. If exceeded, new NEPA analysis would be required.

Alternative 2: No Action Alternative. Under the No Action Alternative, CBP would not conduct broadscale mechanical cane trimming in the cane control area. CBP would continue to control cane in local areas as needed on an ad hoc basis. The U.S./Mexico international border along the Rio Grande would continue to be afflicted by dense stands of cane that could leave CBP agents and the public vulnerable. The No Action Alternative would not meet CBP mission needs and does not address the Congressional mandates for gaining effective control of the U.S./Mexico international border in Texas. However, inclusion of the No Action Alternative is recommended by Council on Environmental Quality regulations and will be carried forward for analysis in the EA. The No Action Alternative also serves as a baseline against which to evaluate the impacts of the Proposed Action.

Summary of Environmental Impacts

Table ES-1 provides an overview of potential impacts anticipated under each alternative considered, broken down by resource area. **Section 3** of this EA addresses these impacts in more detail.

Table ES-1. Summary of Anticipated Environmental Impacts by Alternative

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Geology and Soils	Short-term, negligible, adverse effects on soils, primarily from soil compaction and erosion from off-road tractor use, would be expected. Prime farmland soils exist within the cane control area; however, no prime farmland soils would be removed or converted to nonagricultural uses. No impacts on regional geology and topography would be expected, and it is unlikely the Proposed Action would be affected by geologic hazards.	Short-term, negligible to minor, adverse effects on geology and soils would be expected.
Vegetation	Short- and long-term, direct and indirect, negligible to minor, adverse effects on vegetation could occur from crushing of non-target vegetation, soil compaction by tractors, accidental spills, and possible spread of the invasive cane. BMPs would be used to avoid or minimize these effects.	Short- and long-term, direct and indirect, minor, adverse effects on vegetation would be expected.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Terrestrial and Aquatic Wildlife Resources	Short- and long-term, direct and indirect, negligible to minor, adverse effects on terrestrial and aquatic wildlife could occur due to habitat degradation and a small amount of habitat loss from off-road vehicle travel. These activities would also result in temporary noise effects and displacement of terrestrial species. BMPs would be used to avoid or minimize these effects. Short-term, direct and indirect, minor, adverse effects on benthic species and habitat due to crushing of species and sediment disturbance from anchoring of the barge on the Rio Grande, and decreased water quality from sediment disturbance and leaving cane trimmings in the river.	Short- and long-term, direct and indirect, minor, adverse effects on terrestrial and aquatic wildlife would be expected.
Threatened and Endangered Species	Short- and long-term, direct and indirect, negligible, adverse effects on terrestrial and aquatic federally threatened and endangered species would be expected. Short- and long-term, direct and indirect, negligible to minor, adverse effects on state-listed species would be expected. Effects would be similar to those described for *Vegetation* and *Terrestrial and Aquatic Wildlife Resources*. Appropriate BMPs would be implemented and adverse effects from the cane control activities would be avoided or minimized.	Short- and long-term, direct and indirect, minor, adverse effects on terrestrial and aquatic threatened and endangered species would be expected.
Surface Waters and Waters of the United States	Short-term, direct and indirect, minor, adverse effects could occur on surface water resources decreased water quality from increased runoff, soil erosion, and sedimentation; possible spills or leaks; and decomposition of cane trimmings in water. BMPs would be implemented to minimize these effects.	Short-term, direct and indirect, minor, adverse effects on surface water resources would be expected.
Floodplains	Short-term, indirect, negligible, adverse effects could occur in floodplain areas, which could cause increased sedimentation into floodplains and drainage structures. The Proposed Action would not include development in the floodplain; therefore, it would not increase the flow of water through the channel or increase flooding downstream.	Short-term, indirect, negligible, adverse effects on floodplains would be expected.
Air Quality	Long-term, negligible, adverse effects on air quality would be anticipated. Air pollutant emissions would be generated as a result of operation of two diesel tractors and vehicles to transport the tractors. No significant effects on regional or local air quality would occur. A negligible contribution of annual greenhouse gas emissions would not likely contribute to global climate change to any discernible extent and are well below the level of significance.	Long-term, negligible, adverse effects on air quality would be expected.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Noise	Long-term, negligible, adverse effects on the ambient noise environment would occur due to operation of tractors. Noise-sensitive receptors in remote areas could be impacted to a greater degree from noise disturbances than those in urban environments; however, the noise from equipment would be localized and intermittent.	Long-term, negligible, adverse effects on noise would be expected.
Cultural Resources	There is the potential for adverse effects on known archaeological sites with surface components due to surface disturbance (e.g., soil compaction and tire rutting) from off-road tractor operations. Avoidance buffers surrounding cultural resources would minimize direct impacts.	Potential long-term, adverse effects on cultural resources.
Hazardous Materials and Waste Management	Long-term, negligible, adverse effects due to use and generation of hazardous substances, petroleum products, hazardous and petroleum wastes, and solid wastes would be expected. Handling or disposal of asbestos-containing materials, lead-based paint, and polychlorinated biphenyls would not occur and, therefore, no impacts on these resources would be expected.	Long-term, negligible, adverse effects on hazardous materials and waste management would be expected.
Land Use	No effects.	No effects.
Hydrology and Groundwater	No effects.	No effects.
Roadways and Traffic	No effects.	No effects.
Socioeconomic Resources, Environmental Justice, and Protection of Children	No effects.	No effects.
Sustainability and Greening	No effects.	No effects.
Aesthetics and Visual Resources	No effects.	No effects.
Climate Change	No effects.	No effects.
Human Health and Safety	No effects.	No effects.
Utilities and Infrastructure	No effects.	No effects.

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Appendices

Figures

Tables

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1. Introduction

The Department of Homeland Security (DHS) and U.S. Customs and Border Protection (CBP) propose to conduct mechanical control of Carrizo cane (*Arundo donax*) (hereafter referred to as cane) in the Rio Grande basin in Texas (i.e., Proposed Action, also referred to as cane control). The CBP Facilities Management and Engineering (FM&E) Office is responsible for maintenance and repair of tactical infrastructure, including vegetation control, to support CBP border security requirements. CBP FM&E would mechanically top (i.e., trim) the cane to a height of approximately 3 feet (1 meter) using a mechanical cutter bar mounted on a four-wheel drive tractor. A small amount of cane control could also occur with hand-held trimmers. Although this Environmental Assessment (EA) analyzes cane control within the entire geographic area, or cane control area, shown in **Figure 1-1**, the exact extent of cane within this area could change over time. The cane control area is entirely within Texas and encompasses five U.S. Border Patrol (USBP) sectors: El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley. The Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors are entirely within Texas, while the majority of the El Paso Sector is in New Mexico.

The cane control area included in this EA crosses privately owned land parcels, tribal lands, and public lands managed by the National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), and Texas Parks and Wildlife Department (TPWD). Tribal lands associated with the Kickapoo Tribe are present within the cane control area. CBP would secure permission from the relevant landowner or land manager prior to performing cane control.

The *Final Environmental Assessment Addressing Proposed Tactical Infrastructure Maintenance and Repair Along the U.S./Mexico International Border in Texas* (CBP 2014) addressed the maintenance and repair of existing tactical infrastructure, including control of vegetation in the vicinity of fences and gates, roads and bridges/crossovers, drainage structures, boat ramps, lighting and ancillary power system infrastructure, and tower components. While the Proposed Action is technically covered under the 2014 Final EA, some cane proposed for topping is not located near tactical infrastructure; therefore, additional National Environmental Policy Act (NEPA) analysis is required. This EA addresses topping of all cane within the Rio Grande basin in the cane control area, including on tribal lands in Texas. However, cane control associated with maintenance and repair of tactical infrastructure assets that are already covered in previous NEPA documents or are covered by a waiver issued by the Secretary of Homeland Security (the Secretary) are not included in the scope of this EA.

The Secretary's waiver authority is derived from Section 102 of the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) of 1996, as amended. Under Section 102 of the Illegal Immigration Reform and Immigrant Responsibility Act, the U.S. Congress gave the Secretary the authority to waive such legal requirements as the Secretary deems necessary to ensure the expeditious construction of tactical infrastructure. Since 2005, the Secretary has issued five separate waivers: San Diego Border Infrastructure System waiver (70 Federal Register [FR] 55622), the Barry M, Goldwater Range waiver (72 FR 2535), the San Pedro National Riparian Conservation Area (72 FR 60870) waiver, and the April 1, 2008

Figure 1-1. Cane Control Area in Texas

waivers for construction of pedestrian international border fence (73 FR 19077) and vehicular fence (73 FR 19078). Although the Secretary's waivers meant that CBP no longer had any specific legal obligation under the laws that were included in the waivers, both DHS and CBP remained committed to responsible environmental stewardship. For example, CBP prepared Environmental Stewardship Plans (ESPs) in lieu of NEPA documents for the tactical infrastructure constructed under the April 2008 waivers.

In preparing the ESPs, CBP coordinated with various stakeholder groups, including state and local governments, Federal and state land managers and resource agencies, and the interested public. The ESPs analyzed the potential environmental impacts associated with the construction and maintenance of tactical infrastructure, including vegetation control, and discussed mitigation measures that CBP would implement.

In furtherance of the Secretary's commitment to environmental stewardship, CBP continues to work in a collaborative manner with local government, state, and Federal land managers and the interested public to identify environmentally sensitive resources and develop appropriate best management practices (BMPs) to avoid or minimize adverse impacts resulting from vegetation control projects. This EA includes a comprehensive and integrated environmental impacts analysis of mechanical topping of cane within the cane control area that reflects CBP's environmental stewardship by better understanding the impacts and its commitments to minimize the potential negative impacts. This EA also discusses cane control activities and their attributes that will enhance positive environmental benefits.

This EA is organized into six sections plus appendices. **Section 1** provides background information on cane, identifies the purpose of and need for the Proposed Action, describes the area in which the Proposed Action would occur, and explains the public involvement process. **Section 2** provides a detailed description of the Proposed Action and alternatives including the No Action Alternative. **Section 3** describes existing environmental conditions in the area where the Proposed Action would occur, and identifies potential environmental impacts that could occur within each resource area. **Section 4** contains an analysis of the cumulative impacts that this project combined with other projects in the area may have on the environment. **Section 5** is a list of references used to develop the EA. **Section 6** is a list of preparers who helped develop the EA. Finally, the appendices include other information pertinent to the development of this EA.

1.1 Background

Carrizo cane (*Arundo donax*), also known as giant reed, is an invasive species and perennial bamboo-like grass that can grow to approximately 7 to 26 feet in height (Perdue 1958 and others as cited in Everitt et al. 2004). Cane is an exceptionally fast growing plant, growing approximately 4 inches per day and reaching a mature height of over 25 feet in approximately 12 months (TSSWCB 2015). It grows in many-stemmed cane-like clumps with rootstocks that form compact masses from which arise tough fibrous roots that penetrate deep into soil (Perdue 1958 and others as cited in Everitt et al. 2004).

Cane was intentionally introduced into California from the Mediterranean for erosion control and for use in thatching and basket weaving, and quickly spread throughout the southern half of the United States (Bell 1997 as cited in Yang et al. 2011). It has become an invasive weed in riparian habitats of the southwestern United States and Mexico. Cane is most invasive along muddy

banks of creeks and rivers in the southwestern United States with some of the densest stands along the U.S./Mexico international border portion of the Rio Grande in Texas (Everitt et al. 2004 and others as cited in Yang et al. 2011). **Figure 1-2** shows a dense stand of cane.

Source: Texas State Soil and Water Conservation Board (https://www.tsswcb.texas.gov/files/docs/contentimages/website%20pictures/Carizzo_Cane.jpg)

Figure 1-2. Typical Stand of Cane

Cane is particularly a major impediment to USBP activities along the U.S./Mexico international border between Laredo and Del Rio, Texas. Based on aerial photography and ground surveys, the portion of the Rio Grande from San Ygnacio, Texas (near Laredo) to Lajitas, Texas, which has a river length of 558 miles, was found to be infested with cane. The total area of cane in this stretch of the river was estimated to be 9,178 acres with 2,439 acres from Lajitas to Del Rio and 6,739 acres from Del Rio to San Ygnacio (Yang et al. 2011).

1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to implement the mechanical cane control method to rapidly decrease cane height to ensure sufficient visibility of critical areas in the Rio Grande basin and provide access to these areas by USBP agents, when necessary. Large, dense stands of cane currently occupy the banks and floodplains of the Rio Grande, hindering law enforcement

efforts along the U.S./Mexico international border, impeding and concealing the detection of criminal activity and illegal border crossers, and restricting USBP agents' access to riverbanks.

Because control of cane is difficult and complete eradication may be unrealistic, primary objectives for managing cane are often focused on suppression of existing infestations and reducing the spread of cane through control of healthy plant communities (USDA Forest Service 2014). CBP anticipates that mechanical cane topping would quickly improve visibility through height reduction, while also providing sufficient cover for the ocelot (*Leopardus pardalis*) and Gulf Coast jaguarundi (*Puma yagouaroundi cacomitli*). Likewise, cane control would reduce the need for post-control revegetation and restoration that complete cane removal may require.

The Proposed Action is needed to maintain border security within the Rio Grande basin. Increased visibility resulting from cane control is needed to minimize hazards and gain effective control of the nation's border, which would ensure USBP agent and public safety.

1.3 Framework for Analysis

NEPA is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. The Council on Environmental Quality (CEQ) is the principal Federal agency responsible for the administration of NEPA. CEQ regulations mandate that all Federal agencies use a systematic, interdisciplinary approach to environmental planning and the evaluation of actions that might affect the environment. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions.

The process for implementing NEPA is codified in 40 Code of Federal Regulations (CFR) §§ 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. CEQ was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations specify that an EA may be prepared for the following reasons:

- Briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS).
- Aid in an agency's compliance with NEPA when an EIS is unnecessary.
- Facilitate preparation of an EIS when one is necessary.

Within DHS and CBP, NEPA is implemented using DHS Directive 023-01, *Environmental Planning Program*, and CBP policies and procedures.

To comply with NEPA, the planning and decision-making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process does not, however, replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decision maker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review

procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

Within the framework of environmental impact analysis under NEPA, additional authorities that might be applicable include the Clean Air Act, Clean Water Act (CWA) (including a National Pollutant Discharge Elimination System storm water discharge permit or Section 404 permit), Noise Control Act, Endangered Species Act (ESA), Migratory Bird Treaty Act, National Historic Preservation Act (NHPA), Archaeological Resources Protection Act, Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act, and various Executive Orders (EOs). A summary of laws, regulations, and EOs that might be applicable to the Proposed Action is presented in **Appendix A**.

1.4 Public Involvement

Agency and public involvement in the NEPA process promotes open communication between the public and the government and enhances the decision-making process. All persons or organizations having a potential interest in the Proposed Action are encouraged to submit input into the decision-making process.

NEPA and implementing regulations from CEQ direct agencies to make their NEPA documents available to the public during the decision-making process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process.

Through the public involvement process, CBP will notify relevant Federal, state, and local agencies of the Proposed Action and the availability of the Draft EA, and request input on environmental concerns they might have regarding the Proposed Action. The public involvement process provides CBP with the opportunity to cooperate with and consider state and local views in its decision regarding implementing this Federal proposal.

CBP will coordinate with agencies such as the U.S. Environmental Protection Agency (USEPA) Region 6, USFWS Southwest Region, Texas Commission on Environmental Quality (TCEQ), Texas Department of Transportation (TXDOT), Texas Historical Commission, TPWD, appropriate Native American Tribes and Nations, and local agencies. The following is a sample list of Federal and state agencies and stakeholder groups that will be coordinated with during the NEPA process:

- **Federal Agencies**
    - USEPA Region 6
    - USFWS Southwest Region
    - U.S. Army Corps of Engineers (USACE) Fort Worth District
    - U.S. Section of the International Boundary and Water Commission
- **State Agencies**
    - TCEQ
    - TXDOT

  - Texas Historical Commission
  - TPWD
- **Stakeholders**
  - Federally Recognized Native American Tribes and Nations
  - Local Officials and Other Interested Parties.

A Notice of Availability for the EA and draft FONSI will be published in the following representative newspapers of regional distribution. This is done to solicit comments on the Proposed Action and alternatives and involve the local community in the decision-making process. Comments received from tribal, state, and Federal agencies will be incorporated into the Final EA. Comment letters will be included in **Appendix B**:

- *El Paso Times* (English and Spanish)
- *El Diario de El Paso* (Spanish)
- *Hudspeth County Herald* (English and Spanish)
- *Van Horn Advocate* (English and Spanish)
- *Alpine Avalanche* (English and Spanish)
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- *Brownsville Herald* (English)
- *El Nuevo Heraldo* (Spanish).

Hard copies of the Draft EA will be made available at the following libraries: El Paso Main Public Library, 501 N. Oregon Street, El Paso, TX 79901; Fort Hancock ISD/Public Library, 101 School Drive, Fort Hancock, TX 79839; Marfa Public Library, 115 E. Oak Street, Marfa, TX 79843; Alpine Public Library, 805 W. Avenue E, Alpine, TX 79830; City of Presidio Library, 1200 O'Reilly Street, Presidio, TX 79845; Val Verde County Library, 300 Spring Street, Del Rio, TX 78840; Eagle Pass Public Library, Roy P. Benavidez Center, 5091 Taft Street, Eagle Pass, TX 78852; Laredo Public Library, 1120 E. Calton Road, Laredo, TX 78041; Rio Grande City Public Library, 591 E. Canales Street, Rio Grande City, TX 78582; Speer Memorial Library, 801 E. 12th Street, Mission, TX 78572; McAllen Public Library, 4001 N. 23rd Street, McAllen, TX 78504; Mayor Joe V. Sanchez Public Library of Weslaco, 525 S. Kansas Ave., Weslaco, TX 78596; Dr. Hector P. Garcia Memorial Library, 434 S. Ohio Avenue, Mercedes, TX 78570; Harlingen Public Library, 410 76 Drive, Harlingen, TX 78550; San Benito Public Library, 101 W. Rose Street, San Benito, TX 78586; and Brownsville Public Library, Main Branch, 2600 Central Boulevard, Brownsville, TX 78520. Throughout the NEPA process, the

public can obtain information concerning the status and progress of the EA via the project website at *http://www.cbp.gov/about/environmental-cultural-stewardship/cbp-environmental-documents*.

2. Proposed Action and Alternatives

2.1 Introduction

This section describes the Proposed Action to conduct mechanical control of cane in the Rio Grande basin in Texas. As discussed in **Section 1.3**, the NEPA process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for a proposed action, which are defined for this action in **Section 1.2**. CEQ guidance advocates the inclusion of a No Action Alternative against which potential effects can be compared. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail as recommended by CEQ regulations.

2.2 Screening Criteria to Develop the Alternatives

Each alternative to the Proposed Action considered in the EA must be reasonable and meet CBP's purpose and need (as described in **Section 1.2**). Such alternatives must also meet essential technical, engineering, and economic threshold requirements to ensure that each is practical, environmentally sound, economically viable, and complies with governing standards and regulations. The following screening criteria were used to develop the Proposed Action and evaluate potential alternatives:

- ***Protecting Persistent Impedance Requirements.*** Proposed cane control activities must support USBP mission needs to hinder or delay individuals illegally crossing the U.S./Mexico international border into Texas or other illegal activities. The control of vegetation along the Rio Grande is imperative to the safe and rapid response capabilities of USBP agents.
- ***Maintain Remote Surveillance Capability.*** Proposed cane control activities must ensure continued visibility of certain areas of the U.S./Mexico international border to allow for effective use of surveillance towers.
- ***Minimize Potential Negative Environmental Impacts.*** Proposed cane control activities should be evaluated for their potential environmental impacts, and BMPs would be planned or implemented in consultation with the appropriate regulatory and resource agencies. Particular focus should be devoted to protecting the following sensitive environmental resources.
    - *Threatened or Endangered Species and Critical Habitat*. The proposed topping of cane should be conducted in such a manner as to have negligible to minor impacts on threatened or endangered species and their critical habitat. BMPs would be implemented so that a determination of No Effect, or at most, a determination of May Affect, but Not Likely to Adversely Affect, would be achieved. CBP has initiated ESA Section 7 consultation with the USFWS for the proposed cane topping activities within the cane control area in the five USBP sectors along the U.S./Mexico international border in Texas.
    - *Wetlands and Floodplains.* The proposed cane control activities should be conducted in such a manner as to have negligible to minor impacts on waters of the United States, including wetlands and floodplain resources, to the maximum

extent practicable. CBP would implement avoidance and minimization measures during the cane control activities to minimize impacts on wetlands and floodplains. During the planning process for such activities, appropriate coordination with USACE would occur and appropriate permits would be acquired, if necessary.

- *Cultural and Historic Resources.* The proposed cane control activities should be conducted in such a manner as to have negligible impacts on cultural and historic resources to the maximum extent practicable. CBP is required to comply with Section 106 of the NHPA, as amended, and its implementing regulations (36 CFR § 800) before conducting cane control activities. CBP is consulting with the Texas Historical Commission and conducting Section 106 review for the proposed activities.

Section 2.3 presents Alternative 1: Proposed Action, **Section 2.4** presents Alternative 2: No Action Alternative, and **Section 2.5** discusses alternatives considered but eliminated from further detailed analysis.

2.3 Alternative 1: Proposed Action

Under the Proposed Action, the scope of the cane control program would include topping of cane to a height of approximately 3 feet using a mechanical cutter bar mounted on a four-wheel drive tractor one to two times per year. A small amount of cane control could also occur with hand-held trimmers. All cane control activities would be implemented via a Work Plan based on anticipated conditions within each USBP sector and funding availability. Although centrally managed by FM&E, prioritization scheduling of cane control activities would be based on evolving need for such activities within each sector. Cane control requirements could change over time based on changes of density, location, and other conditions, but would not exceed the scope of this EA. Although this EA is analyzing control of cane within the cane control area, the exact extent, location, and amount of cane to be controlled within this area could change over time as program requirements evolve. If the scope is exceeded, new NEPA analysis would be required. Vegetation control covered by the Secretary's waiver or prior NEPA analyses is not within the scope of the Proposed Action.

The USBP sectors along the U.S./Mexico international border in Texas have identified a need for cane control to ensure continued visibility in the Rio Grande basin to secure the border. The CBP FM&E Sector Tactical Infrastructure Coordinator would work closely with the sectors for all cane control activities. Proposed activities would be managed by the Program Management Office's Maintenance and Repair Supervisor. CBP proposes to conduct mechanical topping of cane using the following process.

Two 2-person crews (four total personnel) would conduct the cane control activities in Texas. Equipment used for cane control activities would include two John Deere model 6140 140-horsepower four-wheel drive tractors or similar equivalents that have been retrofitted with a 22-foot Gillison cutter bar to trim the cane. The tractors would be transported from the local USBP sector equipment yard to the work site via trailer for an average daily round trip of 50 miles.

Access to each cane stand would be provided via existing USBP access roads and public roadways, to the extent possible, but some off-road travel may be necessary. If off-roading is

necessary to access cane stands or to travel between specific cane patches at a work site, tractors would use the shortest path and would be limited to 0.25 mile between existing roads and cane stands. When working in a cane patch, travel outside of the patch would be minimized to the extent possible to avoid spread of cane to unaffected areas (see **Appendix D** for more details). Tractor operators would use the same ingress and egress points to access cane stands that require off-roading. After completion of topping, cane trimmings would be left in place.

From time to time, CBP may determine that topping of cane on the shoreline of the Rio Grande is necessary and conditions dictate that the activity would be conducted from a barge on the river. In these situations, CBP would top cane by maneuvering a tractor and cutting bar while positioned on an anchored flat decked barge. Upon topping as much cane within reach, the barge would be repositioned and reanchored. No cane would be topped from a barge on the Rio Grande in Big Bend National Park. Other than topping cane from a barge on the Rio Grande, no cane control equipment would enter wetlands, streams, or other waterbodies.

It is assumed that the proposed cane control activities would require both tractors to operate up to 40 hours per week for 52 weeks per year. Activities would occur one to two times a year in any given location. Cane control activities would be limited to daytime hours (7 a.m. to 5 p.m.).

Suitable BMPs would be implemented for all cane control activities (see **Appendix D**). CBP would conduct advance surveys for nesting migratory birds and nests if mechanical control activities occurred during the nesting season (March 15 through September 15). Mechanical topping of cane would not occur in suitable or critical habitat of threatened or endangered species. If CBP determined that cane control must be conducted within suitable habitat of threatened or endangered species, USFWS would be further consulted.

2.3.1 Cane Control Area

The cane control area is the geographic area where CBP proposes to conduct mechanical topping of Carrizo cane (i.e., action area), and represents the limits of analysis for this EA. The cane control area is along the Rio Grande, and extends from 200 to 2,640 feet (0.5 mile) inland of the river covering approximately 120,300 acres (see **Figure 1-1**). Additional detailed maps of the action area in the Rio Grande basin in Texas are provided in **Appendix C**. The maps display ranges of threatened and endangered species within and near the cane control area. The maps depict additional activities occurring within threatened and endangered species ranges that would require use of species-specific BMPs, as agreed upon in consultation with USFWS.

The maps delineate species ranges, designated critical habitat, extent of suitable habitat, and documented sightings of the species in the area. Wilderness or other special-use designations and land management agency practices are considered in vegetation control planning. Coordination with land management agencies, Federal land managers, and USFWS, if necessary, would occur and appropriate BMPs would be implemented. The maps presented in **Appendix C** are not intended to be used as an implementation tool for cane topping activities, but instead represent the ranges of potential threatened and endangered species as related to the cane control area.

Depending on the number and nature of resources that could be impacted, a graduated series of BMPs would be identified to reduce impacts to less than significant levels. The BMPs categorized by the affected resources are presented in **Appendix D**. The combination of the

informative maps and the relevant BMPs provide CBP with a visual framework for conducting cane control activities in sensitive areas.

2.3.2 Cane Control

The Proposed Action would consist of mechanical topping of cane to approximately 3 feet within the Rio Grande basin in the cane control area. The location and frequency of topping employed as a part of the Proposed Action would vary by conditions and requirements within each USBP sector.

As part of the Proposed Action, conditions within each USBP sector would be inspected on regular basis to ensure cane height is at a level that allows for visibility of critical areas. Cane within the cane control area would be topped one to two times per year based on condition. Cane control would be scheduled to avoid migratory bird nesting seasons, or surveys would be conducted to determine if bird nests are present that must be avoided.

Under the Proposed Action, cane control planning would be conducted by CBP FM&E. Additionally, FM&E would have complete program management responsibility for implementing topping activities. For example, FM&E would formulate standard operating procedures for cane control, which consider BMPs and the environmental context of the area proposed to be topped.

As a part of FM&E's centralized cane control planning, CBP interdisciplinary technical staff, including environmental staff, would participate in reviewing and approving a cane control Work Plan. The process for developing the Work Plan would involve the following steps:

- ***Step 1.*** USBP Sectors and Border Patrol Facilities and Tactical Infrastructure field representatives identify areas that require cane to be topped.
- ***Step 2.*** CBP Program Management Office's interdisciplinary subject matter experts, including environmental staff, would decide on the best technical approach to top cane in the area and direct the implementation of applicable BMPs.
- ***Step 3.*** Cane control actions are prioritized in coordination with USBP Sector management.
- ***Step 4.*** Coordination with appropriate landowners and regulatory agencies would occur on an as-needed basis. Portions of this step might be accomplished informally before Step 3.
- ***Step 5.*** Work Plan cane control activities would be performed by fully trained and qualified personnel (both CBP in-house and contractor personnel) and their work progress would be monitored by trained and experienced CBP personnel.
- ***Step 6.*** CBP representatives would inspect areas where cane control is completed and ensure it was completed to the prescribed requirements and standards and the corresponding BMPs were followed.
- ***Step 7.*** CBP and contractor personnel would provide suggestions for future Work Plans based on the execution and outcomes of cane control and would support the interdisciplinary technical team in developing improved topping methods in the future.

Appropriate environmental training is a prerequisite for personnel actively engaged in cane control. These personnel would receive ongoing environmental training appropriate to their role in tactical infrastructure maintenance and repair. This approach fully incorporates efforts to integrate CBP's NEPA process with its Environmental Management System in accordance with CEQ guidance (CEQ 2007).

2.4 Alternative 2: No Action Alternative

Under the No Action Alternative, CBP would not conduct broadscale mechanical cane trimming in the cane control area. CBP would continue to control cane in local areas as needed on an ad hoc basis. The U.S./Mexico international border along the Rio Grande would continue to be afflicted by dense stands of cane that could leave CBP agents and the public vulnerable. The No Action Alternative would not meet CBP mission needs and does not address the Congressional mandates for gaining effective control of the U.S./Mexico international border in Texas. However, inclusion of the No Action Alternative is recommended by CEQ regulations and will be carried forward for analysis in the EA. The No Action Alternative also serves as a baseline against which to evaluate the impacts of the Proposed Action.

2.5 Alternatives Considered But Eliminated From Further Detailed Analysis

Cane control is an ongoing process with management methods that are continuously being evaluated. Various alternative methods of mechanical cane control are being implemented by other agencies based on their goals (see **Table 2-1**). Most of the alternative methods consist of removal of the entire cane plant. None of these methods are discussed because the focus of this EA is cane topping (i.e., trimming). This is currently the most effective method of cane control for purposes of CBP's mission (rapid decrease in cane height and visibility improvement) and, therefore, is the only alternative analyzed in this EA.

The other mechanical cane control methods identified in **Table 2-1** are viable for purposes of the agencies implementing them, but these methods do not meet the purpose and need for the Proposed Action as discussed in **Section 1.2**. CBP requires a mechanical cane control method that allows for rapid response to ensure border security. The other mechanical cane control methods identified in **Table 2-1** are time consuming, labor intensive, not financially viable, and less environmentally friendly than mechanical topping to approximately 3 feet. This EA does not preclude CBP from using additional or different cane control methods in the future. These methods would be addressed in separate NEPA documentation as appropriate in the future.

2.6 Identification of the Preferred Alternative

CBP has identified its Preferred Alternative as Alternative 1, the Proposed Action. Implementation of the Proposed Action would best meet CBP's purpose and need as described in **Section 1.2**. The Proposed Action is also preferred because it would be in line with the commitment to environmental stewardship covered by the Secretary's waiver and other NEPA documents.

Table 2-1. Other Mechanical Cane Control Methods

Method	Suitability	Description
Hand removal	Individual plants (<6 feet tall) and targeted control for protection of sensitive resources	Cut the canopy near the surface before pulling up the remaining portions of cane stems, rhizomes, and roots. The root mass and associated rhizomes must be entirely removed from the soil. Shovels, mattocks, or pick-ax are the most commonly used tools. Uprooted material should be removed or burned onsite to prevent rerooting. Anticipate resprouting and the need for follow-up herbicide spraying.
Excavating	Individual plant to broad stands (not recommended for streambed or edge because root material may be washed downstream)	Remove small, dense stands using a backhoe or excavator and grapple. Usually more effective when used in combination with chemical control and the planting of desired native species. Large-scale control can result in major ground disturbance, and possibly increase of other noxious weeds.
Mulching	Accessible, non-complex stands with <30 percent slope, and no sensitive habitat.	Cut top dormant growth with hammer-flail mower attached to a tractor or a rotary brush-cutter in late fall/winter. Follow-up with herbicide spraying of resprouts the next year, and again in summer of the third year.
Prescribed burning	None	Not recommended for primary cane control.

Source: USDA Forest Service 2014

3. Affected Environment and Environmental Consequences

This section provides a characterization of the affected environment and an analysis of the potential direct and indirect effects each alternative would have on the affected environment. Each alternative was evaluated for its potential to affect physical, biological, and socioeconomic resources. Cumulative and other effects are discussed in **Section 4**. All potentially relevant resource areas were considered in this EA. General descriptions of the eliminated resource areas and the basis for elimination are described in **Section 3.1**.

The following discussion elaborates on the characteristics that might relate to impacts on resources:

- *Short-term or long-term.* These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term effects are those that would occur only with respect to a particular activity or for a finite period or only during the time required for topping. Long-term effects are those that are more likely to be persistent and chronic.
- *Direct or indirect.* A direct effect is caused by and occurs contemporaneously at or near the location of the action. An indirect effect is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct effect of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect effect of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- *Negligible, minor, moderate, or major*. These relative terms are used to characterize the magnitude or intensity of an impact. Negligible effects are generally those that might be perceptible but are at a lower level of detection. A minor effect is slight but detectable. A moderate effect is readily apparent. A major effect is one that is severely adverse or exceptionally beneficial.
- *Adverse or beneficial.* An adverse effect is one having unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment. A single act might result in adverse effects on one environmental resource and beneficial effects on another resource.
- *Significance.* Significant effects are those that, in their context and due to their intensity (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR § 1508.27).
- *Context.* The context of an effect can be localized or more widespread (e.g., regional).
- *Intensity.* The intensity of an effect is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources or ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Intensity of effects are also considered in terms of their potential for violation of Federal,

state, or local environmental law; their controversial nature; the degree of uncertainty or unknown effects, or unique or unknown risks; if there are precedent-setting effects; and their cumulative effects (see **Section 4**).

3.1 Preliminary Impact Scoping

In accordance with NEPA, CEQ regulations, and DHS Directive 023-01, the following evaluation of environmental impacts focuses on those resources and conditions potentially subject to effects and potentially significant environmental issues deserving of study, and deemphasizes insignificant issues. Some environmental resources and issues that are often analyzed in an EA have been omitted from detailed analysis in this EA, specifically land use; hydrology and groundwater; roadways and traffic; socioeconomic resources, environmental justice, and protection of children; sustainability and greening; aesthetics and visual resources; climate change; human health and safety; and utilities and infrastructure. The following provides the basis for such exclusions.

3.1.1 Land Use

No impacts on land use plans or policies are anticipated from implementation of the Proposed Action. The Proposed Action would be compatible with existing land uses in the cane control area, and would not result in any changes in land use. The Proposed Action only consists of the trimming of cane; therefore, no construction or development would occur, no open space would be developed, and no land use designations would need to be changed. As a result, no impacts on land use would be expected.

3.1.2 Hydrology and Groundwater

The Proposed Action would only include topping (i.e., trimming) cane to approximately 3 feet, and would not include ground-disturbing activity. Although control of cane on the Rio Grande shoreline could periodically occur from a barge on the river, no equipment would otherwise enter wetlands, streams, or other waterbodies. Therefore, it is not anticipated the Proposed Action would result in changes to the hydrology of any waterbodies, including the Rio Grande, or to groundwater in the cane control area. Because the ground disturbance would not occur, it is expected that hydrology of the work sites, stormwater runoff and flow, percolation of precipitation into the ground, and groundwater recharge would not change from existing conditions. Additionally, the Proposed Action does not involve the use of chemicals, such as herbicides; therefore, no impacts on groundwater quality are anticipated.

3.1.3 Roadways and Traffic

The Proposed Action does not include any physical changes to roadways, and the cane control area is not accessible from most paved, primary public roadways. Cane topping activities would occur one or two times annually in any one location, amounting to approximately 4,100 total hours per year. The tractors with cutter bars would be transported on a trailer from the USBP sector equipment yard to each specific work location. While onsite, the tractor would use USBP access roads and other public roadways, to the extent possible, to travel between cane patches. Traffic resulting from cane topping equipment would be negligible.

3.1.4 Socioeconomic Resources, Environmental Justice, and Protection of Children

Socioeconomic Resources. The Proposed Action would have short-term, direct and indirect, negligible, beneficial impacts on the local economy and employment through the purchase of goods and services and increased employment. Workforce requirements and the procurement of material supplies would not overburden the available supply.

No personnel would be hired to the CBP workforce as a result of the Proposed Action. Two 2-person crews (four total personnel) would conduct the cane control activities. No changes in population are expected because it is assumed that all personnel needed for cane control activities would be drawn from the regional/local workforce and would not require permanent relocation of workers from outside the area. The short-term nature and scale of the topping activities (i.e., one to two times annually in any one location) would not induce indirect population growth in the region.

Direct beneficial impacts would result from increases to payroll earnings and taxes and the purchase of materials required. Indirect beneficial impacts would result from increases in expenditures on goods and services. No permanent or long-term impacts on population, employment, personal income, poverty levels, or other demographic or employment indicators would be expected from the Proposed Action.

Environmental Justice and Protection of Children. The Proposed Action would not have disproportionate impacts on low-income, minority, or child (under 18 years old) populations. Although the cane control area is within counties with high percentages of minority and low-income populations, areas requiring cane control are located away from most neighborhoods and residences. Any nearby property owners and residents might be affected by visual intrusion, noise, and temporary disruptions during cane topping activities. However, the activities would be temporary and intermittent (i.e., occur one or two times annually in any one location) to allow USBP agents to perform their mission. Contractors or USBP personnel would ensure that the area is cleared of people and would prevent entry to the work areas to eliminate hazards for any children in the area. The Proposed Action would help to deter cross-border violators in the immediate area, which in turn could prevent them from entering nearby neighborhoods, increasing the safety of children in these areas. Therefore, apart from beneficial impacts on child safety, the Proposed Action is not likely to impact minority and low-income populations or children. As a result, environmental justice and the protection of children are not discussed further.

3.1.5 Sustainability and Greening

NEPA identifies the need to "encourage [the] productive and enjoyable harmony between man and his environment" as a primary purpose (42 United States Code [USC] Section 4321). The traditional definition of sustainability calls for policies and strategies that meet society's present needs without compromising the ability of future generations to meet their own needs.

A number of policies, statutes, EOs, and supplemental agency policies and guidance exist to shape the Federal government's policies on sustainability. EO 13693 (March 2015), *Planning for Federal Sustainability in the Next Decade*, incrementally expands the sustainability goals outlined in each of its predecessor policies for production of renewable energy, energy-efficient purchasing, improved building performance, air emissions reductions, reduced water and energy

consumption, increases in zero emissions vehicle fleets, and improved stormwater management and water quality. In addition to this EO, DHS Directive 025-01, *Sustainable Practices for Environmental, Energy and Transportation Management*, establishes a policy to develop and implement sustainable practices and programs to help ensure that operations and actions are carried out in an environmentally, economically, and fiscally sound manner.

Implementation of the Proposed Action for cane control would use negligible amounts of resources. The adaptive management process would further the use of CBP's Environmental Management System in accordance with EO 13693 and DHS Directive 025-01. Therefore, beneficial effects on sustainability and greening would be expected; beyond that, sustainability and greening as a resource area is not discussed futher in this EA.

3.1.6 Aesthetics and Visual Resources

The Proposed Action would not have adverse impacts on aesthetics or visual resources. While some viewsheds would be changed due to the decreased height of cane and the clearing of previously obstructed views, the majority of natural space and aesthetics would remain unchanged. Most of the cane control area is not available for public access, and is used only by USBP personnel; therefore, there would be no adverse impact on appreciation of visual resources. Additionally, the creation of new viewsheds could result in beneficial impacts on aesthetics.

3.1.7 Human Health and Safety

Safety during vegetation control activities is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The Occupational Safety and Health Administration and USEPA issue standards that specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits with respect to workplace stressors.

Personnel are exposed to safety risks from the inherent dangers at any vegetation control site. Contractors would be required to establish and maintain safety programs that would be implemented during the mechanical topping process. The proposed mechanical cane control would not expose members of the general public to increased safety risks. Therefore, because the Proposed Action would not introduce new or unusual safety risks, and assuming appropriate protocols are followed and implemented, further detailed analysis of safety is not included in this EA.

Additionally, due to the remote location of the cane control area, the likelihood that the Proposed Action would impact the health and safety of the general public is extremely low. However, beneficial impacts on safety could occur from improved visibility of surveillance of critical areas of the U.S./Mexico internal border.

All occupational safety standards and BMPs, identified in **Appendix D** of this EA, would be implemented.

3.1.8 Utilities and Infrastructure

The cane control area in the Rio Grande basin in Texas would be in areas some distance from most utilities. CBP and its contractors would not use existing utilities and infrastructure to conduct cane control activities. The proposed mechanical topping process would not require ground disturbance and, therefore, would not affect underground utilities and infrastructure. If applicable, existing modern aboveground utility infrastructure would be located and marked before initiating any activities. No aboveground electric distribution or transmission lines would be affected. Due to the location of the cane control area and the aboveground nature of the mechanical topping process, impacts on utilities and infrastructure would not be expected. Therefore, impacts on utilities and infrastructure would not be expected and this resource area is not discussed further.

3.2 Geology and Soils

3.2.1 Definition of the Resource

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils and, where applicable, geologic hazards and paleontology. Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Geologic hazards include seismic activity such as earthquakes and landslides.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (i.e., the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Natural Resources Conservation Service is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (7 CFR § 658).

3.2.2 Affected Environment

Regional Geology. The U.S./Mexico international border in Texas is within the following physiographic provinces (from east to west): Gulf Coastal Plain, Edwards Plateau, and Basin and Range. The action area traverses three subprovinces of the Gulf Coastal Plain (Coastal Prairies, Interior Coastal Plains, and Blackland Prairies) and two subprovinces of the Edwards Plateau (Pecos Canyons and Stockton Plateau).

The Gulf Coastal Plain province and its Coastal Prairies subprovince occur within Hidalgo and Cameron counties and continue to the coastline of the Gulf of Mexico. This subprovince consists of young deltaic sands, silts, and clays that erode to nearly flat grasslands. Broad sand sheets with low dunes and blowouts dominate the landscape around Brownsville. The Blackland Prairies subprovince further to the west has a gently undulating surface with deep, black, fertile clay soils. These soils transition to the east to thin red and tan sandy and clay soils in the Interior Coastal Plains subprovince near Eagle Pass. This sandy region composes the vast majority of the central Gulf Coastal Plain within the cane control area.

The Edwards Plateau primarily occurs in central Texas and extends westward to include the border region of the Pecos River. This province includes the hill country and a broad plateau with entrenched streams, box canyons, and springs. The Edwards Plateau is capped by hard Cretaceous limestone that is susceptible to sinkholes and cavern formations. The Pecos Canyons divide the Edwards and Stockton plateaus and are formed by the Pecos River and its contributing streams that form blind canyons with nearly vertical walls. The Stockton Plateau is a mesa-like land formation in the far western extent of the Edwards Plateau province.

The Basin and Range province occurs in far west Texas and is characterized by intensely deformed and intruded strata within elevated and depressed land. The mountains of strongly folded and faulted sedimentary and volcanic or granite rocks within this province are generally flanked by plateaus in which the rocks are nearly horizontal and less deformed (University of Texas 1996).

Topography. The Gulf Coast Plains province ranges from 0 feet mean sea level (msl) at the coast to 1,000 feet above msl in the central portion of the cane control area, where rolling terrain is present. The Edwards Plateau ranges from 1,000 to 1,500 feet above msl within the cane control area and to the west contains mesas and steep-walled canyons; the Pecos River erodes the Pecos Canyon as deep as 1,000 feet. The Basin and Range province within the cane control area varies in elevation from 1,700 to 4,000 feet above msl, with north-south-trending mountains and basins (University of Texas 1996, USGS 2012).

Soils. The soils within and in the vicinity of the cane control area are level to undulating and are characterized as having a clayey to loamy texture. The majority of the soil associations within and in the vicinity of in the cane control area have a high clay content and, consequently, exhibit a slight to moderate susceptibility to erosion. However, an area primarily consisting of sandy soils occurs in Cameron County in the eastern coastal portion of the cane control area (USACE 1994a). The soils are primarily well-drained, and composed of gravelly to fine sandy loams. However, there are areas of clays and silts (e.g., Tigua-Harkey-Glendale-Gila) and rock land. Poorly drained clayey and loamy soils and deep sandy soils (e.g., Lomalta-Galveston-Sejita) are within the coastal area of Cameron County.

Loamy soils and cracking clayey soils of the Rio Grande plain (e.g., Rio Grande-Camargo-Matamoros soils) are mapped along the Rio Grande from Brownsville to the Falcon Reservoir, while the Harlingen-Laredo-Lagloria soil association forms the Rio Grande terraces in Cameron and parts of Hidalgo counties. The remainder of the Rio Grande terraces consists of the loamy McAllen-Brennan soils in the eastern part of Hidalgo County. Cracking and crumbling loamy clayey soils (e.g., Catarina-Montell-Jimenez) are shallow to moderately deep over indurated caliche from Falcon Reservoir to south of Eagle Pass (USACE 1994c, NRCS 2016a). These soils

dominate much of the area. From Eagle Pass to Del Rio, the same type of soil exists but is represented by the Uvalde-Montell-Zapata association (USACE 1994c). West of Del Rio through Terrell County and into the southern portion of Brewster County, soils are loamy and shallow to limestone (e.g., Lozier-Rock Outcrop). Very deep, loamy, calcareous Reagan soils also occur within this area on broad plateaus and in alluvial-fan and valley-fill sediments. West from Brewster County through El Paso County, the soil is predominantly a gravelly loam (e.g., Rock Outcrop-Lajitas-Delnorte) within the cane control area (University of Texas 2008, NRCS 2016b).

Prime Farmland. Within the cane control area, the Rio Grande-Camargo-Matamoros, Runn-Reynosa-Harlingen and Rio Grande-Reynosa-Lagloria soil associations are considered prime farmland. Runn, Reynosa, and Rio Grande soils are prime farmland soils, while Harlingen and Lagloria soils are prime farmland soils when irrigated. The Olmos-Coahuila-Acuna (specifically the Coahuila and Acuna soils) and Montell-Elindio soil associations are considered prime farmland when irrigated (NRCS 2016b).

Geologic Hazards. The 2014 Texas Seismic Hazard Map shows that the seismic hazard for the Texas portion of the U.S./Mexico international border ranges from 0 to 2 percent of the force of gravity (percent g) along the Gulf of Mexico coast to up to 30 percent g near El Paso. This indicates that, during a seismic event, little damage would occur towards the coast, but greater damage could occur towards El Paso (USGS 2014).

Approximately 10 faults have been identified within 30 miles of the Texas side of the U.S./Mexico international border. Each of the faults has an estimated slip rate of less than 0.008 inches per year, with the last major ruptures ranging from less than 130,000 years ago to less than 1.6 million years ago (USGS 2016a). Therefore, movement along faults in the vicinity of the cane control area is unlikely to occur.

3.2.3 Environmental Consequences

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

Effects on geology and soils would be significant if they would alter the lithology (i.e., the character of a rock formation), stratigraphy (i.e., the layering of sedimentary rocks), and geological structures that dictate groundwater systems; or change the soil composition, structure, or function within the environment.

3.2.3.1 PROPOSED ACTION

Regional Geology. No impacts on geology would be anticipated from implementing the Proposed Action. Cane control activities would not alter lithology, stratigraphy, or the geological structures that control the distribution of aquifers and confining beds.

Topography. No impacts on topography would be anticipated from implementing the Proposed Action. Cane control activities would not alter natural or human-made landforms.

Soils. Short-term, intermittent, negligible, adverse effects on soils would be anticipated from implementation of the Proposed Action due to use of tractors to top the cane and access cane stands. The use of tractors to access cane where no CBP access roads or public roads are present would result in soil compaction. Soil compaction could lead to increased rates of erosion and alter soil structure, which in turn would impact the soils' ability to conduct water, nutrients, and air that are essential to plant and soil organism survival (University of Minnesota 2001). However, this would also deter the regrowth of cane, and access for cane control activities would only occur once or twice a year.

In the event that USBP or public access roads are not present, the shortest paths or previously disturbed paths to work sites within the cane control area would be used to avoid further soil compaction. Additionally, all appropriate DHS and CBP environmental management regulations would be followed during the implementation of the Proposed Action. Therefore, impacts on soils would be negligible.

Prime Farmland. Prime farmland soils exist within the cane control area; however, no impacts on these soils would be expected to occur because most cane control activities would occur within cane patches, which are not currently used for agriculture. No prime farmland soils would be removed or converted to nonagricultural uses. In addition, the cane control activities would not significantly alter the properties of soil that determine its productivity (ability to conduct water, nutrients, and air) as discussed in *Soils*.

Geological Hazards. Geological hazards are prevalent throughout the U.S./Mexico international border region in the form of seismic events, landslides, debris flows, and rockfalls. Given the low probability of a geologic event occurring along the coast, that cane clearing would occur in areas where it grows in relatively level areas near the Rio Grande, and the unlikely movement along faults in the vicinity of the cane control area, it is unlikely that the Proposed Action would be affected by substantinal geological hazards. Although the area near El Paso could experience significant impacts from a seismic event, the Proposed Action would not result in noticeable surface soil disturbance and, therefore, would not increase the volume of debris moved during or after a geologic event.

3.2.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming would not occur in the cane control area. The No Action Alternative could result in localized short-term, negligible to minor, adverse impacts on soils due to soil compaction and erosion from the ad hoc operation of cane trimming tractors in off-road areas. The lack of coordinated environmental staff support and centralized planning for cane control would result in no specifications being established and no standardized BMPs (e.g., when off-road access is required, cane control equipment would use the same ingress and egress points, and would be limited to the minimum amount necessary but no more than 0.25 mile of off-road travel) being implemented. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action, as the potential for soil compaction and erosion would be greater due to a lack of centralized planning and BMP implementation.

3.3 Vegetation

3.3.1 Definition of the Resource

Vegetation resources include all terrestrial and aquatic plants that are found within the cane control area. This section describes the affected environment for native and nonnative vegetation to support discussion of environmental consequences for vegetation.

Bailey's multi-tiered classification of ecoregions contained in the *Descriptions of the Ecoregions of the United States* was used to provide general geographic descriptions of the ecology within the cane control area (Bailey 1995). An ecoregion contains geographically distinct environmental communities and conditions.

TPWD Texas Ecological Systems Data was used to provide detailed information about the vegetative communities within the cane control area (TPWD 2016). NatureServe (2016) defines ecological systems as representing recurring groups of biological communities found in similar physical environments and are influenced by similar ecological processes such as fire or flooding.

3.3.2 Affected Environment

The vegetation of west and south Texas has been broadly classified by Bailey's classification system as the Dry Domain. The key attribute of the Dry Domain is that annual losses of water through evaporation at the earth's surface exceed annual water gains from precipitation (Bailey 1995).

The cane control area encompasses the riparian and upland areas adjacent to the Rio Grande in Texas and ranges in width from 200 to 2,640 feet (0.5 mile). It straddles two divisions in Texas, the Tropical/Subtropical Desert Division in the west and the Tropical/Subtropical Steppe Division in the south. Both divisions are characterized by extremely arid conditions, along with high air and soil temperatures. Direct sun radiation is very strong, as is outgoing radiation at night, causing extreme variations between day and night temperatures. In Texas, the Tropical/Subtropical Desert Division is characterized by dry-desert vegetation, a class of xerophytic (drought-adapted) plants that are widely dispersed and provide negligible ground cover. In dry periods, visible vegetation is limited to small hard-leaved or spiny shrubs, cacti, or hard grasses. Many species of small annuals can be present, but they appear only after the rare but heavy rains have saturated the soil. The Tropical/Subtropical Steppe Division is typically located at high altitudes, generally on plateaus and high plains. This division contains grassland with short grasses and other herbs, and with locally developed shrubland and woodland. In Texas, the grasslands grade into savanna woodland or semideserts composed of xerophytic shrubs and trees, and the climate becomes semiarid subtropical (Bailey 1995).

Within the cane control area, Bailey's Tropical/Subtropical Desert Division contains the Chihuahuan Desert Province. The Chihuahuan Desert Province is commonly known as the Chihuahuan Desert and consists of numerous shrubs, most of them thorny. They frequently grow in open stands, but sometimes form low, closed thickets. In many places, they are associated with short grass, such as grama (*Bouteloua* ssp.) grasses. Extensive arid grasslands cover most of the high plains of this province (Bailey 1995).

The Tropical/Subtropical Steppe Division in the cane control area is composed of the Southwest Plateau and Plains Dry Steppe and Shrub Province. This is a region of flat to rolling plains and plateaus occasionally dissected by canyons. A mesa-and-butte landscape (i.e., landscape of sedimentary sandstone) is characteristic of certain parts of this province. This province is characterized by arid grasslands in which shrubs and low trees grow singly or in bunches. On the Edwards Plateau, oak and juniper are often mixed with grasses and mesquite (*Prosopis* sp.), and on steep rocky slopes these trees can form closed stands. Due to low rainfall, these trees rarely grow higher than 20 feet (Bailey 1995).

There are approximately 34 ecological systems in the cane control area. A table listing these ecological systems is presented in **Appendix C**. Within the cane control area, 13 of these systems account for more than 97 percent of the land cover. These are the ecological systems that generally define the landscape of the cane control area and are described as extracted from NatureServe Explorer in the following paragraphs (NatureServe 2016).

Tamaulipan Floodplain. Tamaulipan Floodplain accounts for approximately 34 percent of the cane control area, and is limited to riparian areas of the lower Rio Grande Valley in southern Texas. These woodlands, which occur on riverbanks, floodplains, and deltas, are a unique mix of species from southeastern North America and subtropical Central America and are often dominated by species that include sweet acacia (*Acacia farnesiana*), Texas persimmon (*Diospyros texana*), Texas ebony (*Ebenopsis ebano*), Anaqua (*Ehretia anacua*), Mexican ash (*Fraxinus berlandieriana*), or cedar elm (*Ulmus crassifolia*), among others. The highly variable understory is dependent on canopy density and can include dense shrub or herbaceous layers.

North American Warm Desert Riparian Woodland and Shrubland. This ecological system, which accounts for less than 11 percent of the cane control area, consists of low-elevation (i.e., less than approximately 4,000 feet) riparian corridors along medium to large perennial streams throughout canyons and desert valleys of the southwestern United States and adjacent Mexico. Rivers include the lower Colorado (into the Grand Canyon), Gila, Santa Cruz, Salt, lower Rio Grande, and the lower Pecos. The vegetation is a mix of riparian woodlands and shrublands. Dominant trees include boxelder (*Acer negundo*), velvet ash (*Fraxinus velutina*), Fremont cottonwood (*Populus fremontii*), Goodding's willow, arroyo willow (*Salix lasiolepis*), netleaf hackberry (*Celtis laevigata* var. *reticulata*), California sycamore (*Platanus racemosa*), and Arizona walnut (*Juglans major*). Dominant shrubs include Geyer willow (*Salix geyeriana*), silver buffaloberry (*Shepherdia argentea*), and narrowleaf willow (*Salix exigua*). Vegetation is dependent upon annual or periodic flooding and associated sediment scour and annual rise in the water table for growth and reproduction.

Tamaulipan Calcareous Thornscrub. This arid thornscrub is restricted to limestone and calcareous sandstone hills and caliche substrates in south Texas and accounts for approximately 11 percent of the cane control area. This system has an open shrub canopy that is usually less than 6.6 feet tall; however, shrub cover is generally greater than 70 percent and often greater than 85 percent of total vegetative cover. Dominant species include Texas barometer bush (*Leucophyllum frutescens*), guajillo (*Acacia berlandieri*), sweet acacia, and other shrub species that can be locally dominant including blackbrush acacia (*Acacia rigidula*), mountain torchwood (*Amyris madrensis*), Texas torchwood (Amyris texana), amargosa (*Castela erecta*), spiny hackberry (*Celtis pallida*), Texas kidneywood (*Eysenhardtia texana*), barreta (*Helietta parvifolia*), crown of thorns (*Koeberlinia spinosa*), Texas paloverde (*Parkinsonia texana*),

mescal bean (*Sophora secundiflora*), or yucca (*Yucca* spp.). The sparse to moderately dense herbaceous layer is dominated by perennial grasses.

Chihuahuan Mixed Desert and Thornscrub. This ecological system, which accounts for approximately 4 percent of the cane control area, is a widespread desert scrub that occurs on foothills, alluvial fans (i.e., fan-shaped sediments deposited by a river or stream), and bajadas (i.e., lower slopes of mountains characterized by loose alluvial sediments and poor soil development) in the Chihuahuan Desert of west Texas. It generally occurs above desert plains and extends up to the transition of dense shrubs and trees. Soils are typically well-drained, non-saline gravelly loams. Vegetation is characterized by the presence of creosote bush, typically mixed with thornscrub or other desert scrub such as lechuguilla (*Agave lechuguilla*), Wright's beebrush (*Aloysia wrightii*), yerba de pasmo (*Baccharis pteronioides*), amargosa, green sotol (*Dasylirion leiophyllum*), catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*), Rio Grande saddlebush (*Mortonia scabrella*), cactus apple (*Opuntia engelmannii*), and honey mesquite (*Prosopis galndulosa*), with littleleaf sumac (*Rhus microphylla*) occurring in or near drainages. Stands of acacia (*Acacia* spp.) or acacia-dominated thornscrub are included in this system. This system also includes upper piedmont deposits at the base of mountains derived from the weathering of the mountains and the transport and deposition of the weathered materials by streams. Stands of desert scrub within this system are strongly dominated by creosote bush. Grasses are common but generally have lower cover than shrubs.

Tamaulipan Mixed Deciduous Thornscrub. Tamaulipan Mixed Deciduous Thornscrub occurs in South Texas as a low elevation upland that consists of numerous shrub species and accounts for approximately 4 percent of the cane control area. This system generally occurs as a closed shrubland or low woodland, usually lacking a purely open herbaceous component. Honey mesquite is often the dominant component of the canopy, although huisache (*Vachellia farnesiana*), spiny hackberry, Texas ebony, and sugar hackberry (*Celtis laevigata*) may also be components of the canopy. Depending on the land use history, the shrub understory may be limited to Lindheimer pricklypear (*Opuntia engelmannii* var. *lindheimeri*), lotebush (*Ziziphus obtusifolia*), or spiny hackberry. On more mature sites, a diverse assemblage of species may occur such as blackbrush acacia, amargosa, Barbados cherry (*Malpighia emarginata*), Lindheimer pricklypear, tasajillo (*Cylindropuntia leptocaulis*), lotebush, spiny hackberry, Berlandier wolfberry (*Lycium berlandieri*), desert olive (*Forestiera neomexicana*), guayacan (*Guaiacum angustifolium*), Texas persimmon, Texas torchwood, coyotillo (*Karwinskia humboldtiana*), tenaza (*Havardia pallens*), snake-eyes (*Phaulothamnus spinescens*), desert yaupon (*Schaefferia cuneifolia*), brasil (*Condalia hookeri*), and colima (*Zanthoxylum fagara*). The herbaceous layer is usually sparse and may often be dominated by non-native grass species such as guineagrass (*Urochloa maxima*), buffelgrass (*Pennisetum ciliare*), Bermudagrass (*Cynodon dactylon*), King Ranch bluestem (*Bothriochloa ischaemum* var. *songarica*), and Kleberg bluestem (*Dichanthium annulatum*). Native grasses, such as silver bluestem (*Bothriochloa saccharoides*), false Rhodes grass (*Trichloris crinita*), and pink pappusgrass (*Pappophorum bicolor*), may be present.

Edwards Plateau Floodplain. Edwards Plateau Floodplain accounts for approximately 4 percent of the cane control area, and is found at valley floors of large rivers and perennial streams between the Trans-Pecos and South Texas ecological regions. This forested or woodland system has a canopy that is dominated or co-dominated by pecan (*Carya illinoinensis*), cedar elm, American elm (*Ulmus americana*), sugar hackberry, netleaf hackberry, and/or Texas live oak

(*Quercus fusiformis*). Chinaberry (*Melia azedarach*) is a common non-native tree encountered on these floodplains. Other species that may be present include Texas ash (*Fraxinus texensis*), green ash (*Fraxinus pennsylvanica*), Arizona walnut, bur oak (*Quercus macrocarpa*), Texas live oak, boxelder, western soapberry (*Sapindus saponaria* L. var. *drummondii*), Ashe juniper (*Juniperus ashei*), bald cypress (*Taxodium distichum*), mesquite, and American sycamore (*Platanus occidentalis*). The common vegetation types of this system within the cane control area include Deciduous Shrubland, Hardwood Forest, and Ashe Juniper Shrubland.

North American Warm Desert Wash. American warm desert wash accounts for 3 percent of the cane control area, and is restricted is restricted to intermittently flooded washes or arroyos that dissect various geologic features throughout the warm deserts of North America. Although often this system is often dry, it is defined by the riverine processes such as rapid sheet and gully flow. This system can occur as linear or braided strips within desert scrub-or desert grassland-dominated landscapes. The vegetation of desert washes is variable, ranging from sparse and patchy to moderately dense, and typically occurs along the banks, but may occur within the channel. The woody layer is typically intermittent to open and in Texas may be dominated by shrubs and small trees such as catsclaw acacia (*Acacia greggii*), split-leaf brickellia (*Brickellia laciniata*), mulefat (*Baccharis salicifolia*), netleaf hackberry, desert willow (*Chilopsis linearis*), green sotol, Apache plume (*Fallugia paradoxa*), Gregg's ash (*Fraxinus greggii*), little walnut (*Juglans microcarpa*), littleleaf leadtree (*Leucaena retusa*), honey mesquite (*Prosopis glandulosa*), littleleaf sumac, and Goodding's willow.

Chihuahuan Succulent Desert Scrub. Chihuahuan Succulent Desert Scrub accounts for approximately 3 percent of the cane control area, and is found in the Chihuahuan Desert of west Texas on colluvial slopes (loose gravity deposited slopes), upper bajadas, canyons, hills, and mesas. Sites are hot and dry, typically with southerly aspects. The vegetation is characterized by the relatively high cover of succulent species such as lechuguilla, candelilla (*Euphorbia antisyphilitica*), ocotillo (*Fouquieria splendens*), barrel cacti (*Ferocactus* spp.), prickly-pear cacti (*Opuntia* spp.), yucca, and many others. Perennial grass cover is generally low. The abundance of succulents is diagnostic of this desert scrub system, but desert shrubs are usually present.

Chihuahuan Creosotebush Desert Scrub. This ecological system, which accounts for approximately 2 percent of the cane control area, is a common lower elevation desert scrub that occurs throughout much of the Chihuahuan Desert of west Texas. Stands typically occur in flat to gently sloping desert basins and on alluvial plains, extending up into lower to mid positions of bajadas. Substrates range from coarse-textured loams on gravelly plains to finer-textured silt and clay soils in basins. Soils are alluvial (deposited by water), typically loamy and non-saline, and frequently calcareous (calcium-rich). The vegetation is characterized by a moderate to sparse shrub layer (less than 10 percent cover on extremely xeric [dry] sites) that is typically strongly dominated by creosote bush and American tarwort (*Flourensia cernua*). A few scattered shrubs or succulents can also be present, such as lechuguilla, mariola (*Parthenium incanum*), leatherstem (*Jatropha dioica*), crown of thorns, desert-thorn (*Lycium* spp.), and yucca. Additionally, American tarwort often strongly dominate in silty basins. In general, shrub diversity is low in this system. Herbaceous cover is usually low and composed of grasses.

North American Warm Desert Bedrock Cliff and Outcrop. North American Warm Desert Bedrock Cliff and Outcrop accounts for approximately 1 percent of the cane control area, and

occurs in the canyons of the Trans-Pecos ecological region. This sparsely vegetated system occupies the steep rock faces, with slopes greater than 80 percent, of the massive limestones and other substrates of this region. Some of these cliffs may be hundreds of feet tall. These landforms have very little to no soil development and vegetation is typically restricted to crevices, although crustose lichens may be well-represented.

Apacherian-Chihuahuan Semi-Desert Grassland and Steppe. Apacherian-Chihuahuan Semi-Desert Grassland and Steppe comprises approximately 1 percent of the cane control area, and is a broadly defined as desert grassland, mixed shrub-succulent, or xeromorphic (structurally adapted to store water and withstand drought) oak savanna. This system is typical of the borderlands of Arizona, New Mexico, and northern Mexico, but it also extends west to the Sonoran Desert and throughout much of the Chihuahuan Desert, including parts of west Texas. It is found on slopes up to 5,479 feet in elevation in the Chihuahuan Desert. It is characterized by typically diverse perennial grasses. Common species include various types of grama, plains lovegrass (*Eragrostis intermedia*), bullgrass (*Muhlenbergia emersleyi*), muhly grass (*Muhlenbergia* spp.), curlyleaf muhly (*Muhlenbergia setifolia*), and James' galleta (*Pleuraphis jamesii*); succulent species such as agave (*Agave* spp.) and yucca; short-shrub species of stickpea (*Calliandra* spp.), mimosa (*Mimosa* spp.), and feverfew (*Parthenium* spp.); and tall-shrub/short-tree species of acacia, mesquite, and various oaks (*Quercus* spp.).

Pasture/Hay and Cultivated Cropland. These are agricultural lands that typically have either a perennial herbaceous cover in the case of Pasture/Hay, or have seasonal fluctuations in annual or perennial plant cover in the case of Cultivated Croplands (NatureServe 2016). Together, land in these systems account for approximately 10 percent of the cane control area. Both systems typically do not contain significant cover from native plant species. In general, grading, fertilizer application, and irrigation have converted these areas to a completely different community type than what was originally present. Agriculture can also include ordinary pasture maintenance and renovation, and dry land farming operations consistent with rangeland management and soil disturbance activities. These lands occur at varying densities throughout the cane control area with the largest concentration occurring in the Rio Grande Valley of south Texas (Holland 1986).

Mainly Natural Azonal Mapped Types. Mainly Natural Azonal Mapped Types includes fallow fields or areas within cropland blocks that remained barren throughout one growing season, heavily grazed pastures where bare soil are dominant, and areas where exposed rock and bare soil on outcrops, river bars, or associated with development. These lands account for approximately 7 percent of the cane control area. The most prevalent vegetation in this ecological system within the cane control area is South Texas: Disturbance Grassland. This system is dominated by Bermudagrass, Kleberg bluestem, King Ranch bluestem, buffelgrass, kleingrass (*Panicum coloratum*), threeawns (*Aristida* spp.), and guineagrass.

Developed. Developed lands are comprised of areas of intensive use with much of the land constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported (Oberbauer et al. 2008). Developed land, which makes up approximately 4 percent of the cane control area, is highly modified and characterized by permanent or semi-permanent structures, pavement, or unvegetated areas. This land occurs throughout the cane control area with the highest concentrations occurring in the urban areas of El Paso, Del Rio, Eagle Pass, and

Laredo; and the metropolitan region of the Rio Grande Valley that includes McAllen and Brownsville.

3.3.3 Environmental Consequences

Effects on vegetation would be significant if the species or habitats are adversely affected over relatively large areas. Effects would also be considered significant if disturbances cause substantial or permanent reductions in population size or distribution of a plant species or sensitive ecological system.

The significance of effects on vegetation is based on the following:

- The portion of the resource that would be affected relative to its occurrence in the region
- The sensitivity of the resource to proposed activities
- The duration of ecological ramifications.

3.3.3.1 PROPOSED ACTION

Short- and long-term, direct and indirect, negligible to minor, adverse effects on vegetation would occur from the Proposed Action due to cane control, crushing of adjacent non-target vegetation and soil compaction by tractors during the process of accessing the cane stands, and accidental spills. Because the cane control area is predominantly riparian and prone to flooding, the Proposed Action could also result in the spread and establishment of the invasive cane downstream and downslope of the cane control area due to floodwaters transporting the cane trimmings downstream. Stems with no basal material (root material) are less likely to root (Cal-IPC undated); therefore, it is unlikely that the trimmings from the topped cane would establish a new plant. However, off-road tractor operation could result in the spread of cane to adjacent areas as result of unintentional root disturbance (DiTomaso et al. 2013). Adverse impacts on vegetation would be minimized through the use of appropriate BMPs (see **Appendix D**). For example, care would be taken to minimize the spread of cane by not allowing cane trimmings to be deposited into wetlands, streams, or waterbodies (with the exception of cane control occurring from a barge on the Rio Grande).

Cane control activities would occur within disturbed and undisturbed areas. Some cane stands might be accessible from adjacent existing roads, whereas other stands might not be accessible by roads and would require off-road travel, which could result in conversion or degradation of habitat. Off-road travel during cane control activities could also result in habitat disturbance resulting in the establishment of different plant communities, including invasive species, along the access routes to cane stands. For those activities conducted outside of disturbed areas, BMPs would be implemented to avoid directly harming non-target plants and to minimize other indirect effects on vegetation. For example, when off-road access is required, cane control equipment would use the same ingress and egress points to minimize impacts on plant communities. Furthermore, off-road access would be limited to the minimum amount necessary and would be limited to no more than 0.25 mile between existing roads and cane stands.

Degradation of plant communities would also occur if petroleum products or other hazardous materials are accidently released during operation or storage of cane control equipment. All regulatory requirements for handling and storage of fuels, oils, and other hazardous materials

would be implemented. All cane control contractors and personnel would review the CBP-approved spill prevention plan and implement it during cane control activities.

3.3.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming would not occur in the cane control area. The U.S./Mexico international border along the Rio Grande would continue to be afflicted by dense stands of cane, which would continue to become established in areas that are susceptible to invasive species establishment. The No Action Alternative could result in localized short- and long-term, direct and indirect, minor, adverse effects on vegetation from crushing of non-target vegetation, soil compaction by tractors, accidental spills, and possible spread of the invasive cane. The lack of coordinated environmental staff support and centralized planning for cane control would result in no specifications being established and no standardized BMPs (e.g., when off-road access is required, cane control equipment would use the same ingress and egress points, and would be limited to the minimum amount necessary but no more than 0.25 mile of off-road travel) being implemented. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action, as the potential for vegetation and habitat disturbance would be greater due to a lack of a centralized planning and BMP implementation.

3.4 Terrestrial and Aquatic Wildlife Resources

3.4.1 Definition of the Resource

This section provides a description of the wildlife and aquatic resources expected to occur within the cane control area. Terrestrial wildlife and aquatic resources include native or naturalized terrestrial and aquatic animals and the habitats in which they exist. Species addressed in this section include those that are not listed as threatened or endangered by the Federal government. Federal threatened and endangered species and other sensitive wildlife species are addressed in **Section 3.5**.

3.4.2 Affected Environment

An abundance of high-quality habitat for wildlife currently exists within the cane control area. This vast area is capable of supporting hundreds of wildlife species, including mammals, birds, reptiles, and amphibians. Many species occur throughout the entire cane control area; however, for the purpose of introducing wildlife and their habitats, the cane control area is separated into three regions: the "Trans-Pecos" in the far west Texas region (land west of the Pecos River), Edwards Plateau (land east of the Trans-Pecos), and South Texas (land southeast of the Edwards Plateau to the Gulf of Mexico).

Trans-Pecos. The Chihuahuan Desert covers the vast area of far west Texas known as the Trans-Pecos. The Trans-Pecos includes the following ecological regions and land cover types discussed in **Section 3.3.2**: North American Warm Desert Riparian Woodland and Shrubland; North American Warm Desert Wash; Chihuahuan Succulent Desert Scrub; Chihuahuan Creosote Desert Scrub; North American Warm Desert Bedrock Cliff and Outcrop; Apacherian-Chihuahuan Semi-Desert Grassland and Steppe; Pasture/Hay and Cultivated Cropland; Mainly Natural Azonal Mapped Types; and Developed.

Pronghorn antelope (*Antilocapra americana*) and southern mule deer (*Odocoileus hemionus*) are the most widely distributed large game animals within this area. The javelina (*Pecari tajacu*) is also a common species. The black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kangaroo rat (*Dipodomys* spp.), wood rat (*Neotoma floridana*), and numerous smaller rodents compete with domestic and wild herbivores. Mammalian predators include the coyote (*Canis latrans*) and bobcat (*Lynx rufus*).

The black-throated sparrow (*Amphispiza bilineata*) is one of the most abundant birds of the Trans-Pecos. Greater roadrunner (*Geococcyx californianus*), curve-billed thrasher (*Toxostoma curvirostre*), and Chihuahuan raven (*Corvus cryptoleucus*) are also common. Scaled quail (*Callipepla squamata*) and Gambel's quail (*Callipepla gambelii*) occupy most of the area, and northern bobwhite (*Colinus virginianus*) populations are also present. Raptors include the golden eagle (*Aquila chrysaetos*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), and the rare zone-tailed hawk (*Buteo albonotatus*). Migratory bird nesting generally occurs from March 15 through September 15 in the cane control area.

The Trans-Pecos is characterized by many reptiles, including the common chuckwalla (*Sauromalus ater*), Texas horned lizard (*Phrynosoma cornutum*), desert spiny lizard (*Sceloporus magister*), and various species of rattlesnakes (*Crotalus* spp.) (Bailey 1995). Common snakes include rat snakes (*Elaphe* spp.), water snakes (*Nerodia* spp.), western diamondback rattlesnakes (*Crotalus atrox*), and Texas coral snakes (*Micrurus fulvius tener*).

Edwards Plateau. The southwestern portion of the Edwards Plateau occurs as a small transition zone within the cane control area between the Trans-Pecos and South Texas. The Edwards Plateau includes the following ecological regions and land cover types discussed in **Section 3.3.2**: Edwards Plateau Floodplain; Pasture/Hay and Cultivated Cropland; Mainly Natural Azonal Mapped Types; and Developed.

Common mammals in the shrublands of the Edwards Plateau include nine-banded armadillo (*Dasypus novemcinctus*), fox squirrel (*Sciurus niger*), white-footed mouse (*Peromyscus leucopus*), black rat (*Rattus rattus*), house mouse (*Mus musculus*), raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), and cottontail (*Sylvilagus* spp.). Common avian species in the shrublands of the Edwards Plateau include mourning dove (*Zenaida macroura*), yellow-billed cuckoo (*Coccyzus americanus*), chimney swift (*Chaetura pelagica*), black-chinned hummingbird (*Archilochus alexandri*), red-bellied woodpecker (*Melanerpes carolinus*), purple martin (*Progne subis*), cliff swallow (*Petrochelidon pyrrhonota*), blue jay (*Cyanocitta cristata*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Parus bicolor*), Carolina wren (*Thryothorus ludovicianus*), Bewick's wren (*Thryomanes bewickii*), northern mockingbird (*Mimus polyglottos*), white-eyed vireo (*Vireo griseus*), black-and-white warbler (*Mniotilta varia*), northern cardinal (*Cardinalis cardinalis*), rufous-crowned sparrow (*Aimophila ruficeps*), lark sparrow (*Chondestes grammacus*), great-tailed grackle (*Quiscalus mexicanus*), and house sparrow (*Passer domesticus*) (Bailey 1995). Common species of amphibians in the Edwards Plateau include spadefoot toads (*Scaphiopus* spp.), chorus frogs (*Pseudacris* spp.), true toads (*Bufo* spp.), and true frogs (*Rana* spp.).

The cane control area follows the Rio Grande and includes the downstream reaches of some of its Texas tributaries (downstream of El Paso). Significant tributaries include the Pecos and

Devils rivers, which both flow into Amistad Reservoir, located just north of Del Rio. The Rio Grande also receives contributions from numerous spring-fed systems within the Trans-Pecos and Edward Plateau regions. Aquatic resources include native or naturalized fish, mollusks, and crustaceans within streams, rivers, reservoirs, and creeks. Common fish of the Rio Grande system include gars (*Lepisosteus* spp.), bass (*Micropterus* spp.), herrings (*Clupea* spp.), channel catfish (*Ictalurus punctatus*), darters (*Etheostoma* ssp.), bullhead (*Ictiobus* spp.), and shiners (*Notropis* spp.) (CBP 2008a).

South Texas. South Texas is part of the Southwest Plateau and Plains Dry Steppe and Shrub Province. South Texas includes the following ecological regions and land cover types discussed in **Section 3.3.2**: Tamualipan Floodplain; Tamualipan Calcareous Thornscrub; Tamualipan Mixed Deciduous Thornscrub; Pasture/Hay and Cultivated Cropland; Mainly Natural Azonal Mapped Types; and Developed.

Common mammals within this province include the whitetail deer, nine-banded armadillo, Mexican ground squirrel (*Spermophilus mexicanus*), fox squirrel, ringtail (*Bassariscus astutus*), raccoon, and gray fox (*Urocyon cinereoargenteus*) (Bailey 1995). Surveys from the region in 2008 noted additional mammals including coyote, bobcat, collared peccary (*Pecari tajacu*), striped skunk (*Mephitis mephitis*), nine-banded armadillo, eastern cottontail (*Sylvilagus floridanus*), desert cottontail, fulvous mouse (*Reithrodontomys fulvescens*), hispid cotton rat (*Sigmodon hispidus*), and Gulf Coast kangaroo rat (*Dipodomys compactus*) (CBP 2008a).

Bird species are especially abundant in this region as the Central and Mississippi flyways converge in south Texas. Additionally, south Texas is the northernmost range for many of the neotropical migrants of Central America. Approximately 500 avian species, including neotropical migrants, shorebirds, raptors, and waterfowl can occur in south Texas. Some of the birds that frequent south Texas include the least grebe (*Tachybaptus dominicus*), muscovy duck (*Anas platyrhynchos*), hook-billed kite (*Chondrohierax uncinatus*), gray hawk (*Buteo nitidus*), white-tailed hawk (*Buteo albicaudatus*), aplomado falcon, plain chachalaca (*Ortalis vetula*), red-billed pigeon (*Patagioenas flavirostris*), white-tipped dove (*Leptotila verreauxi*), green parakeet (*Aratinga holochlora*), red-crowned parrot (*Amazona viridigenalis*), groove-billed ani (*Crotophaga sulcirostris*), ferruginous pygmy-owl (*Glaucidium brasilianum*), common pauraque (*Nyctidromus albicollis*), buff-bellied hummingbird (*Amazilia yucatanensis*), ringed kingfisher (*Ceryle torquata*), green kingfisher (*Chloroceryle americana*), northern beardless-tyrannulet (*Camptostoma imberbe*), brown-crested flycatcher (*Myiarchus tyrannulus*), great kiskadee (*Pitangus sulphuratus*), tropical kingbird (*Tyrannus melancholicus*), Couch's kingbird (*Tyrannus couchii*), green jay (*Cyanocorax yncas*), brown jay (*Cyanocorax morio*), Tamaulipas crow (*Corvus imparatus*), Chihuahuan raven, cave swallow (*Petrochelidon fulva*), clay-colored robin (*Turdus grayi*), long-billed thrasher (*Toxostoma longirostre*), tropical parula (*Setophaga pitiayumi*), white-collared seedeater (*Sporophila torqueola*), olive sparrow (*Arremonops rufivirgatus*), Botteri's sparrow (*Aimophila botterii*), Altamira oriole (*Icterus gularis*), and Audubon's oriole (*Icterus graduacauda*) (CBP 2008a).

Reptiles and amphibians observed during the surveys in 2008 include the blue spiny lizard (*Sceloporus serrifer*), Laredo striped whiptail (*Cnemidophorus laredoensis*), prairie racerunner (*Cnemidophorus sexlineata viridis*), Texas horned lizard, Texas spiny softshell turtle (*Apalone spinifera emoryi*), Rio Grande cooter (*Pseudemys gorzugi*), Rio Grande leopard frog (*Lithobates berlandieri*), Rio Grande chirping frog (*Eleutherodactylus cystignathoides*), Mexican treefrog

(*Smilisca baudinii*), Gulf Coast toad (*Incilius valliceps*), and the giant (marine) toad (*Rhinella marina*) (CBP 2008a). Common turtles of southern Texas include eastern river cooter (*Pseudemys concinna*), ornate box turtle (*Terrapene ornata*), yellow mud turtle (*Kinosternon flavescens*), Texas tortoise (*Gopherus berlandieri*), smooth softshell (*Apalone mutica*), and spiny softshell (*Apalone spinifera*) (Bailey 1995).

Two fish species were also observed during these surveys: the Texas cichlid (*Herichthys cyanoguttatus*) and mosquito fish (*Gambusia affinis*). Other common fish of the Rio Grande system include gars, bass, herrings, channel catfish, darters, bullhead, and shiners (CBP 2008a).

3.4.3 Environmental Consequences

Effects on wildlife and aquatic resources would be significant if the species or habitats are adversely affected over relatively large areas. Effects would also be considered significant if disturbances cause substantial or permanent reductions in population size or distribution of a species.

The significance of effects on wildlife is based on the following:

- The importance (i.e., legal commercial, recreational, ecological, or scientific) of the resource
- The portion of the resource that would be affected relative to its occurrence in the region
- The sensitivity of the resource to proposed activities
- The duration of ecological ramifications.

3.4.3.1 PROPOSED ACTION

Short- and long-term, direct and indirect, negligible to minor adverse effects on wildlife would occur from the Proposed Action. The cane control area encompasses the riparian and upland areas adjacent to the Rio Grande in Texas. The extent of the cane control area from the Rio Grande ranges from 200 to 2,640 feet (0.5 mile). Cane control activities would result in temporary, minor degradation of wildlife habitat and a small amount of permanent habitat loss due to off-road travel by the tractors and transport vehicles.

Mechanical cane control would likely cause larger mammals, reptiles, and birds, including breeding migratory birds, to relocate temporarily due to noise and disturbance from the tractors. Individuals of smaller, less-mobile species could inadvertently be directly impacted by cane control activities through collision or crushing by tractors and transport vehicles. Some wildlife might be killed or injured during cane control activities or during transportation of equipment and personnel. In particular, burrowing animals, such as the rodents and reptiles, could be impacted. CBP would minimize animal collisions during cane control activities by not exceeding speed limits of 35 miles per hour (mph) on graded unpaved roads, 25 mph on all other unpaved roads, and 15 mph when off-road access is required. However, BMPs would be implemented to minimize these adverse effects (e.g., work would not occur at night and or during migratory bird nesting season [March 15 through September 15], unless migratory bird nest surveys are conducted to avoid unintentional take of active nests). CBP would minimize site disturbance and avoid attracting predators to the work sites by removing waste materials from the site. If waste

must remain on site more than 12 hours, it would be properly stored in closed containers until disposal.

Cane control activities conducted from a barge in the Rio Grande could result in short-term, direct and indirect, minor, adverse effects on benthic habitat and water quality. Anchoring of the barge could result in direct effects on invertebrate species such as mussels through crushing and dislodging and on habitat through sediment disturbance, and indirect effects on vertebrate and invertebrate species and habitat from an increase in sedimentation downstream of the barge. Although control of cane on the Rio Grande shoreline could periodically occur from a barge on the river, no other equipment would enter wetlands, streams, or other waterbodies. Potential water quality impacts associated with cane control activities are discussed in **Section 3.6.3**.

As described in **Section 3.3.3.1**, cane control equipment could damage and crush non-target vegetation, and compact soil in and promote the spread of cane to habitats adjacent to stands of cane, but measures would be put into place to minimize effects. Localized degradation of habitat would also occur if petroleum products or other hazardous materials are accidently released during operation or storage of cane control equipment. All regulatory requirements for handling and storage of fuels, oils, and other hazardous materials would be implemented. Thus, aquatic habitat degradation resulting from accidental releases of hazardous materials would be negligible.

A complete list of BMPs that CBP would implement to minimize impacts on wildlife are provided in **Appendix D**.

3.4.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming in the cane control area, including that conducted from a barge in the Rio Grande, would not occur. The U.S./Mexico international border along the Rio Grande would continue to be afflicted by dense stands of cane, which would continue to become established in areas that are susceptible to invasive species establishment. These cane stands offer very little habitat for wildlife species and once established prevent native habitats from becoming established. The No Action Alternative could result in localized, short- and long-term, direct and indirect, minor, adverse effects on terrestrial and aquatic wildlife from habitat degradation and loss and species displacement from off-road vehicle travel. The lack of coordinated environmental staff support and centralized planning for cane control would result in no specifications being established and no standardized BMPs (e.g., avoidance of cane control during important seasons) being implemented. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action, as the potential for habitat disturbance and loss, and species displacement would be greater due to a lack of a centralized planning and BMP implementation. However, the No Action Alternative would not conduct cane control from a barge in the Rio Grande, thereby avoiding impacts on benthic habitat that would occur under the Proposed Action.

3.5 Threatened and Endangered Species

3.5.1 Definition of the Resource

The ESA (16 USC § 1536) requires that Federal agencies consult with USFWS to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of

any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also prohibits any action that causes a "take" of any listed species. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." An "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. Species listed as threatened or endangered under the ESA (federally listed species) and designated critical habitat that have the potential to be affected by implementation of the Proposed Action are discussed in this section.

3.5.2 Affected Environment

USFWS and NatureServe occurrence data for species or natural communities with conservation value were used to determine presence within or near the cane control area. This section presents those federally listed species that are known to occur or have the potential to occur within the cane control area. State-listed species are described in **Appendix C**.

The agencies that have primary responsibility for the conservation of plant and animal species in Texas are USFWS and TPWD. These agencies maintain lists of plant and animal species that have been classified, or are potential candidates for classification, as threatened or endangered in the State of Texas. Federally listed species for El Paso, Hudspeth, Jeff Davis, Presidio, Brewster, Terrell, Val Verde, Kinney, Maverick, Webb, Zapata, Starr, Hidalgo, and Cameron counties were obtained through USFWS (USFWS 2016). Data on species' occurrences and distributions were obtained from NatureServe (NatureServe 2010b), The Center for Plant Conservation (CPC 2010), Texas Parks and Wildlife Endangered and Threatened Species database (TPWD 2007), Texas Natural Diversity Database (TPWD 2014), and Biological Resources Plan for Construction, Operation and Maintenance of Tactical Infrastructure for Rio Grande Valley Sector, Texas (CBP 2008b). Descriptions, including listing status, habitat, and range, of state-listed rare, threatened, and endangered species that could occur in the cane control area are presented in Table C-2 in **Appendix C**.

There are 22 species federally listed as threatened or endangered that are known to occur within or near the cane control area (see **Table 3-1**). An additional 29 threatened or endangered species occur within the counties along the U.S./Mexico international border in Texas.

The 29 species are Davis' green pitaya (*Echinocereus viridiflorus* var. *davisii*), little Aguja pondweed (*Potamogeton clystocarpus*), Nellie cory cactus (*Coryphantha minima*), Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*), Texas snowbells (*Styrax platanifolius* ssp. *texanus*), Texas wild-rice (*Zizania texana*), Peck's cave amphipod (*Stygobromus pecki*), Comal Springs drypoid beetle (*Stygoparnus comalensis*), Comal Springs riffle beetle (*Heterelmis comalensis*), Comanche Springs pupfish (*Cyprinodon elegans*), diminutive amphipod (*Gammarus hyalleloides*), fountain darter (*Etheostoma fonticola*), Pecos gambusia (*Gambusia nobilis*), Phantom springsnail (*Pyrgulopsis texana*), Phantom tyonia (*Tryonia cheatumi*), San Marcos salamander (*Eurycea nana*), Texas blind salamander (*Typhlomolge rathbuni*), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), golden cheeked warbler (*Dendroica chrysoparia*), interior least tern (*Sterna antillarum*), Mexican spotted owl (*Strix occidentalis lucida*), northern aplomado falcon (*Falco*

Table 3-1. Federally Listed Species and Critical Habitat Known to Occur within the Cane Control Area

Common Name	Scientific Name	Listing Status	Year Listed, Proposed, Designated
Birds			
Black-capped vireo	*Vireo atricapilla*	Endangered	1987
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	1995
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	2013
Yellow-billed cuckoo critical habitat	N/A	Designated	2014
Fishes			
Big Bend gambusia	*Gambusia gaigei*	Endangered	1967
Devils River minnow	*Dionda diabolic*	Threatened	1999
Devils River minnow critical habitat	N/A	Designated	2008
Rio Grande silvery minnow	*Hybognathus amarus*	Endangered	1994
Mammals			
Mexican long-nosed bat	*Leptonycteris nivalis*	Endangered	1988
Gulf Coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	Endangered	1976
Ocelot	*Leopardus pardalis*	Endangered	1982
Plants			
Ashy dogweed	*Thymophylla tephroleuca*	Endangered	1984
Bunched cory cactus	*Coryphantha ramillosa*	Threatened	1979
Chisos Mountain hedgehog cactus	*Echinocereus chisoensis var. chisoensis*	Threatened	1988
Hinckley’s oak	*Quercus hinckleyi*	Threatened	1988
Johnston's frankenia	*Frankenia johnstonii*	Endangered	1984
Lloyd’s Mariposa cactus	*Echinomastus mariposensis*	Threatened	1979
South Texas ambrosia	*Ambrosia cheiranthifolia*	Endangered	1994
Star cactus	*Astrophytum asterias*	Endangered	1993
Terlingua Creek cat's-eye	*Cryptantha crassipes*	Endangered	1991
Texas ayenia	*Ayenia limitaris*	Endangered	1994
Tobusch fishhook cactus	*Sclerocactus brevihamatus ssp. Tobuschii*	Endangered	1983
Walker's manioc	*Manihot walkerae*	Endangered	1991
Zapata bladderpod	*Lesquerella thamnophila*	Endangered	1999
Zapata bladderpod critical habitat	N/A	Designated	2000

femoralis septentrionalis), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), and west Indian manatee (*Trichechus manatus*). These species would not be affected by the Proposed Action because they do not occur or are very rare in areas where cane is located, or because no cane control activities would be conducted within or near habitat used by these species along or near the U.S./Mexico international border. Therefore, these 29 species are not discussed further.

The following paragraphs describe the 22 federally listed species known to occur within or near the cane control area. Suitable habitat for listed plant species and their applicable blooming seasons for these species are listed in **Table 3-2**.

Table 3-2. Threatened and Endangered Plant Species Habitat and Blooming Season

Common Name	Habitat	Blooming Season
Ashy dogweed	Open areas on fine sandy-loam soils on level or rolling grasslands.	March–May
Bunched cory cactus	Bouquillas and Santa Elena limestone formation within Chihuahuan desert scrubland.	April–August
Chisos Mountain hedgehog cactus	Alluvial flats at elevations of 1,950 to 2,250 feet in Chihuahuan desert vegetation.	March–July
Hinckley's oak	Dry limestone slopes at elevations of 3,500 to 4,500 feet in Chihuahuan desert vegetation.	March–April
Johnston's frankenia	Open or sparsely vegetated rocky gypseous hillsides and saline flats.	Year-round
Lloyd's Mariposa cactus	Very open area with few shrubs in the Chihuahuan desert scrubland at elevations of 2,500 to 3,500 feet.	July–August
Tobusch fishhook cactus	Eastern Edwards Plateau of Texas on high stream banks.	April–September
South Texas ambrosia	Subtropical woodland communities within coastal prairies and savannas with well-drained, heavy soils at low elevations from 23 to 66 feet.	Year-round
Star cactus	Sparse open thorn shrub and grasslands with gravelly clay and loam soils.	Late summer–early fall
Terlingua Creek cat's-eye	Open or sparsely vegetated areas with impure silty limestone soils (Fizzle Flat lentil) at elevations of 3,150 to 3,450 feet.	March–May
Texas ayenia	Open ground, on the edges of thickets, or within thickets, and on dry, alluvial clay soils.	Year-round
Walker's manioc	Endemic to the Tamaulipan biotic province. Grows among low shrubs, native grasses, and herbaceous plants, either in full sunlight or in the partial shade of shrubs.	April–September
Zapata bladderpod	Graveled to sandy-loam soils on upland terraces that are above the Rio Grande floodplain.	February–April

Ashy dogweed. This is a perennial herb growing up to 12 inches tall. This plant has a woody base and is covered with ashy-white wooly hairs (USFWS 1987a). The leaves are alternate and linear and exude a pungent odor when crushed. The flowers, which usually bloom from March to May, are golden yellow (NatureServe 2010b).

Ashy dogweed requires unique soils that exist in south Texas. Existing populations are on sandy pockets of Maverick-Catarina, Copita-Zapata, and Nueces Comita soils (TPWD 2009). These sandy or sandy-loam soils that occur on level or rolling grasslands are often shrub-invaded with Mesquite-Acacia thorn brush (NatureServe 2010a). Ashy dogweed is known to occur in the south Texas counties of Starr, Webb, and Zapata (TPWD 2009). However, this species has not been observed in Starr County since 1932. At the time the recovery plan was published, the total population occupied approximately 25 acres and was estimated at 1,300 individual plants on a right-of-way (ROW) owned by the Texas Department of Transportation and an adjacent private tract of land (USFWS 1987a).

Threats to the ashy dogweed population include ROW maintenance activities associated with the highway adjacent to known populations and adjacent ranching industry practices. These maintenance activities include mowing and blading along the ROW. Ranching industry practices that threaten the ashy dogweed include trampling of seedlings, clearing and grubbing, and the introduction of exotic grasses, such as buffel grass (*Cenchrus ciliaris*) (USFWS 1987a).

Bunched cory cactus. This is a small, multi-headed cactus with slender spines that radiate in all directions. Flowers, which bloom from April to August, are pale pink to deep rose, and fruits are green and juicy at maturity (CPC 2010). The stems of the bunched cory cactus are dark grayish green, solitary or rarely with a few branches that are 2.4 to 3.6 inches long and 2.4 to 3.7 inches in diameter (USFWS 1989a).

The bunched cory cactus is restricted to the Bouquillas and Santa Elena limestone formation and is distributed along cracks in rock ledges at edges of canyons and on hilltops in the lechuguilla shrublands of the Chihuahuan Desert (USFWS 1979). In the northern part of its range, this species is mostly confined to rocky, well-drained, and fully sunlit sites on steep canyon sides and hill summits along the canyons of the Rio Grande. The elevation range for bunched cory cactus is between 2,500 and 3,500 feet. This species is found in Texas near the Rio Grande in Brewster and southern Terrell counties, and south into the adjacent state of Coahuila, Mexico (NatureServe 2010b). It is known from approximately 25 sites, many within Big Bend National Park (TPWD 2007). It is found primarily as widely scattered populations or individuals occurring in canyons along the Rio Grande from Mariscal Canyon in Brewster County, downriver to Sanderson Canyon in Terrell County (USFWS 1989a). Five new sites recently accessed on privately owned land south of Sanderson, Texas, suggest that plant populations might extend even farther east than previously believed (CPC 2010).

Threats to the bunched cory cactus include collecting, small population numbers, patchy distribution, and restricted habitat (USFWS 1979).

Chisos Mountain hedgehog cactus. This is a short, cylindrical cactus, reddish-maroon in color that becomes greener in summer. The stems are often singular, though they occasionally form clumps. Spines are relatively sparse and do not completely obscure the stem. The flowers,

colored various shades of pink, are quite distinctive and appear from March to July (USFWS 1993a).

The Chisos Mountain hedgehog cactus can be found in low-elevation desert grasslands or sparsely vegetated shrublands within the Chihuahuan Desert on alluvial flats at elevations between 1,950 to 2,250 feet. It frequently grows on bare soil at the base of creosote bushes, and also among the stems of dog cholla (*Opuntia schotti*). There are 11 known occurrences of Chisos Mountain hedgehog cactus, consisting of fewer than 1,000 individuals (USFWS 1993a). The overall range of this plant is limited to a very small area on the southeastern side of Big Bend National Park in extreme southwestern Texas (NatureServe 2010b). Individual plants are widely scattered over the desert floor, sometimes hundreds of yards apart, and well hidden at the bases of creosote bushes and dog cholla (USFWS 1993a). The populations at Big Bend National Park are extremely scattered, both between and among groups.

Threats facing the Chisos Mountain hedgehog cactus include illegal collection by commercial and private collectors and herbivory by jackrabbits and rodents that eat the flowers and fruits during dry years.

Hinckley's oak. This is a dwarf, evergreen, multi-branched shrub which forms thickets approximately 4 feet tall (TPWD 2007). It is characterized by its small stature; thicket-forming, intricate, multiple-branched stems; and gray-green color. The leaf blades are thick, rounded with a spiny tip, and have 2 to 3 spiny teeth on each margin. Acorns are formed annually in late August and early September (USFWS 1992).

Hinckley's oak is found at middle elevations in Chihuahuan Desert scrub vegetation. It grows on dry limestone slopes between 3,500 to 4,500 feet in elevation, in habitat that receives an average of 10 inches of rain per year (CPC 2010). Hinckley's oak is found in desert shrublands in Brewster and Presidio counties. Currently only 10 populations are known; nine of these are in Big Bend Ranch State Park and the other is near Shafter, Texas (NatureServe 2010b, TPWD 2007). Most populations consist of less than 100 individuals and cover an area of less than 5 acres. The development of more arid climates is thought to have restricted the species to a few sites within its old range of distribution, resulting in a patchy distribution of a few populations with relatively few individuals (USFWS 1992).

Threats include reduction of suitable habitat, lack of genetic variety within individual stands, predation, and collection (USFWS 1992).

Johnston's frankenia. This is a low, somewhat sprawling, perennial shrub. Mature plants are rounded in appearance and approximately 12 to 18 inches high and 12 to 24 inches wide. The entire plant may be grayish-green or bluish-green most of the year, turning rusty brown in late fall, when it is easily detected. The gray-green leaf surfaces are haired, with salt crystals frequently visible on the underside of the leaves. Flowers are small, with five slightly fringed or toothed white petals and a distinct yellow center. Flowering occurs from April to November and is heavily dependent on precipitation (CBP 2008b).

Johnston's frankenia generally grows on open or sparsely vegetated, rocky, gypseous hillsides or saline flats. In Texas, this species is endemic to Webb, Zapata, and Starr counties, which are all in the cane control area. Johnston's frankenia populations have a clumped distribution, occurring

in openings of the Tamaulipan thorn scrub where the plant thrives in a setting of high light intensity. Threats include a severely restricted distribution, low numbers of individual plants, road construction, residential development, and oil- and natural gas-related activities. This species also has a very low reproductive potential (CBP 2008b).

Lloyd's Mariposa cactus. This is a small succulent with rounded, blue-green stems, partially covered by pinkish to chalky-blue spines. It produces pinkish flowers from February to March that are as large as the stem. Light green spherical fruits are formed in April and May beneath the topmost spines, and do not dry at maturity (CPC 2010).

Lloyd's Mariposa cactus can be found in arid, gravelly, limestone-derived soils on gentle slopes, primarily on the Boquillas Formation in the Chihuahua Desert between 2,500 to 3,500 feet (NatureServe 2010b). Lloyd's Mariposa cactus occurs as scattered individuals or occasionally as dense concentrations on hills and ridges in three parts of the Big Bend Region of Texas. One area occupies the southeastern corner of Brewster County, another area occupies the northeastern portion of Big Bend National Park, and a third area occupies the eastern portion of Brewster County north of Black Gap WMA (USFWS 1989b). Threats to documented sites are related primarily to illegal collection, and several sites have been extirpated by collectors (CPC 2010, NatureServe 2010b). Because coal and petroleum are also found within its range, mining and drilling activities for such resources remain potential threats (USFWS 1989b).

South Texas Ambrosia. This is a perennial herb belonging to the sunflower family that ranges from 1 to 24 inches tall. The leaves are usually opposite at the base, and alternate above. South Texas ambrosia is distinguished from related species within its geographical range by its simple leaves and the ashy blue-gray color; however, this species is easily obscured by taller native and introduced grasses (USFWS 1994a).

South Texas ambrosia grows at low elevations from 23 to 66 feet in open prairies and savannas of south Texas, on soils varying from clay-loams to sandy-loams. It inhabits the grasslands of the Gulf Coastal Plains in clay soils derived primarily from the Beaumont clay series. This soil is typically clay-loam to sandy-loam, usually deep clay soils and occasionally on wind-blown clay dunes along streams. The species is considered rare or infrequent in the coastal prairies of the Rio Grande Plains. South Texas ambrosia was known from 30 locations in Cameron, Jim Wells, Kleberg, and Nueces counties, Texas; and one location in Tamaulipas, Mexico. Three of these locations are historical occurrences that have not been relocated: one each in Jim Wells and Cameron counties, and Tamaulipas, Mexico. Currently, South Texas ambrosia occurs in 27 sites within Kleberg and Nueces counties. Of these 27 sites, 3 are on state land, 13 on Federal land (Kingsville Naval Air Station), and 11 on private land or in local jurisdictions in and around the communities of Bishop (Nueces County), Kingsville (Kleberg County), and Robstown (Nueces County), Texas. The species occurs primarily on private ranch lands that have not been subjected to continuous mowing, plowing, or herbicide use. Suitable habitat for the south Texas ambrosia probably exists in Kenedy and Willacy counties, based on the historical and presence of the plants in Cameron and Nueces counties (USFWS 2010a).

Major threats to south Texas ambrosia include destruction or modification of range through agricultural practices, highway construction, urbanization, invasive exotic grasses, and decreased genetic variability and viability through the loss or modification of habitat and fragmentation (CBP 2010).

Star cactus. This is a spineless, dome or disk-shaped cactus up to 6 inches in diameter and divided into eight symmetrical triangular segments. When soil moisture is available to the plants, the stems expand up to 2 inches above the ground, and the star cactus is usually a dull green color. During dry weather, the stems shrink into flat disks, the cacti turn dull brown, and often become concealed under gravel. Flowers of the star cactus, appearing from March to May and are yellow with orange centers. Fruits are green to grayish red and can be hidden by tufts of hairs (USFWS 2003).

The star cactus occurs among sparse, low shrubs, grasses, and halophytic (salt-tolerant) plants on dry upland sites. Soils are usually gravelly clays or loams, and typically contain high levels of gypsum, salt, or other alkaline minerals. The star cactus can occur in full sun, or beneath the partial shade of low grasses and sub-shrubs, such as red grama (*Bouteloua trifida*), saladillo (*Varilla texana*), and calderona (*Krameria ramosissima*). However, it does not tolerate the dense shade of taller shrubs and trees. In the United States, 13 small populations are currently known in Starr County, Texas, on Catahoula and Frio soils. Reliable historic records include similar habitat types in Zapata and Jim Hogg counties. Other reports of star cactus from Hidalgo and Cameron counties can be misleading; these anecdotal accounts do not indicate specific locations, nor were voucher specimens deposited in any herbaria. Threats include collection, land clearing, introduced invasive species, habitat fragmentation, and potential chemical contamination (USFWS 2003).

Terlingua Creek cat's eye. This is a silvery perennial that is 6 to 10 inches tall. It has a dense mound of silvery, hairy leaves that develop on top of a woody base. The erect stems are hairy, bristly, and as tall as the plant. White flower clusters up to 1 inch in diameter appear at the tips of the unbranched stems from March to May (USFWS 1993b).

Terlingua Creek cat's-eye grows in an arid, subtropical climate with cool, dry winters and hot, dry summers. All known sites occur on the Fizzle Flat (i.e., a limestone formation within the Badlands-Vieja association, characterized by hard, creamy yellow, platy, impure silty limestone that breaks down into small, angular, uniform fragments). This species occurs on rounded, low hills and gentle slopes at no particular aspect. Site elevations vary from 3,150 to 3,450 feet. Vegetation cover is less than 10 percent. Most of the species present are shrubs and woody perennials, and several have a low, rounded growth form (USFWS 1993b).

Plants are limited to an area of slightly greater than 100 square miles in the drainage of upper Terlingua Creek in Brewster County. There are approximately 5,000 individuals in 10 unprotected populations on privately owned land. All of these populations are within a 100 square-mile area near Big Bend National Park, but not on park land. Populations occupy sites from 5 to 500 acres (averaging approximately 100 acres), and numbers of individuals within populations vary from 50 to approximately 2,000 (with an average of 450 individuals). Threats to Terlingua Creek cat's-eye include habitat fragmentation and destruction (USFWS 1993b).

Texas ayenia. This is a perennial herb/shrub that reaches 2 to 5 feet tall. The leaves are simple, alternate, and heart-shaped, and gradually narrow at the tip. The flowers, which can appear year-round, are usually greenish, cream-colored, or light rosy pink in color. The five-hooded petals have a slender claw that is more than 1 to 1.5 times as long as the expanded part of the petal. The fruit is a five-celled, rounded capsule with short, curved, sharply pointed prickles with very short hairs covering it (USFWS 1994a).

Texas ayenia occupies dense subtropical woodland communities at low elevations. The current population occupies a Texas Ebony-Anaqua (*Pithecellobium ebano-Ehretia anacua*) plant community. This plant community occurs on well-drained riparian terraces with canopy cover close to 95 percent. Species found in this community include la coma (*Bumelia celastrina*), brasil (*Condalia hookeri*), granjeno (*Celtis pallida*), and snake-eyes (*Phaulothamnus spinescens*). This plant is an endemic species of southern Texas and northern Mexico whose historical range included Cameron and Hidalgo counties, Texas, and the states of Coahuila, Nuevo Leon, and Tamaulipas in Mexico. The only known populations of Texas ayenia in the United States are within Cameron, Hidalgo, and Willacy counties (USFWS 1994a). Habitat loss and degradation from agriculture or urban development have reduced the Texas Ebony-Anaqua vegetation community by greater than 95 percent. Texas ayenia has been reduced to one known population of 20 individuals that is extremely vulnerable to extinction (USFWS 2010b).

Tobusch fishhook cactus. This is a spiny succulent that typically grows as a single stem as tall as 5.1 inches and as thick as 3.5 inches. Within each cluster of spines, one is distinctively hooked (NatureServe 2010a). The flowers, which last approximately one week in mid-February to mid-March, are yellow and appear on the tips of the current year's tubercles (USFWS 1987b). The Tobusch fishhook cactus is found along stream banks and loose gravel bars resulting from flooding and stream bank erosion. The species can also be found in limestone uplands upon shallow, gravelly soil on top of limestone in seral shortgrass grasslands (NatureServe 2010b). Associated vegetation communities include live oak-juniper woodlands (USFWS 2010c).

At the time of listing, there were fewer than 200 individual documented Tobusch fishhook cacti in Bandera and Kerr counties. By 1985, new populations were discovered in Real, Kimble and Uvalde counties. By 1999, the total known number of individual Tobusch fishhook cactus had grown to 3,395 within Bandera, Edwards, Kerr, Kimble, Kinney, Real Uvalde and Val Verde counties. Threats to the Tobusch fishhook cactus include real estate development, which limits the possibility of prescribed burns and alters natural habitat (USFWS 2010c).

Walker's manioc. This is a vine-like perennial herb that can reach up to 6 feet tall. The leaves of this species have up to five lobes. It is found in semi-arid subtropical brush in extreme south Texas and neighboring Tamaulipas, Mexico. Flowering occurs from April to September. Male flowers are approximately 0.5 inch long, white with light purple streaks, and are almost tubular in shape (USFWS 1993c).

Walker's manioc usually grows among low shrubs, native grasses, and herbaceous plants, either in full sunlight or in the partial shade of shrubs. Currently, 10 populations (five in Starr County and five in Hidalgo County) of Walker's manioc exist in Texas. These populations occur on private and public lands. More than 95 percent of Walker's manioc native brush habitat has been cleared in the United States for agriculture, urban development, and recreation. The United States population has been reduced to a few scattered plants, making the species vulnerable to extinction (USFWS 1993c).

Zapata bladderpod. This is a silvery-green, herbaceous perennial of the *Brassicaceae* (Mustard) family. The flower, which appears from February to April, is a loose raceme of yellow petals that appear after sufficient rainfall. The fruit is small, round, and inflated like a tiny bladder, and measures approximately 0.08 to 0.3 inch in diameter (USFWS 2004).

The Zapata bladderpod occurs on graveled to sandy-loam upland terraces above the Rio Grande floodplain. It is associated with highly calcareous sandstones and clays. The bladderpod is a component of an open Texas sage–guajillo (*Leucophyllum frutescens – Acacia berlandieri*) shrubland alliance. The shrublands are sparsely vegetated and include the following species: blackbrush acacia (*Acacia rigidula*), mesquite (*Prosopis* sp.), desert hackberry (*Celtis pallida*), Spanish dagger (*Yucca treculeana*), lotebush (*Ziziphus obtusifolia*), and Texas lignum-vitae (*Guaiacum angustifolium*). This plant is endemic to southern Texas and possibly northern Mexico. Four populations are known in Starr County: two populations are found on the Lower Rio Grande Valley National Wildlife Refuge and two occur on private land. Three populations are known from Zapata County: two are on highway ROWs between the towns of Zapata and Falcon, and another lies near Falcon Lake (USFWS 2004). Critical habitat has been designated for Zapata bladderpod (65 FR 81181–81212) and occurs within the cane control area. Habitat modification and destruction from increased road and highway construction and urban development; increased oil and gas exploration and development; and conversion of plant communities to improve pastures, overgrazing, and vulnerability due to low population numbers are all threats to the Zapata bladderpod (USFWS 2004).

Big Bend gambusia. This is a relatively small, live-bearing fish from the *Poeciliidae* family. It is approximately 2 inches long at maturity. This species is yellowish with a faint lateral stripe, a bar beneath the eye, and a faint chin bar. Currently, the only wild population exists in a protected pond in Big Bend National Park. Although this population exists in open water with depths in excess of 3 feet, the Big Bend gambusia was most abundant among vegetation near the shore (USFWS 1984). All present populations of Big Bend gambusia are descendants of three fish (two males and one female) taken from the declining Rio Grande Village population in 1956. The Big Bend gambusia is threatened by runoff and flooding of the Rio Grande after heavy rains, which increases sediment deposition in the habitat and increases the likelihood that competitors would invade. Water diversions and decreased groundwater levels have decreased the flow from the springs. In addition, the Big Bend gamubsia is also susceptible to cold winters (USFWS 1984).

Devils River minnow. This is a small fish within the minnow family that reaches sizes of 1.0 to 2.1 inches. The species has a narrow head and prominent dark markings on the scale pockets of the body above the lateral line, producing a cross-hatched appearance when viewed from above (USFWS 1995).

The Devils River minnow is generally associated with channels of fast-flowing, spring-fed waters over gravel substrates. This species is most often found where spring flow enters a stream, as opposed to the spring outflow itself. The Devils River minnow is native to tributary streams of the Rio Grande within Val Verde and Kinney counties, Texas, and Coahuila, Mexico. Historically the species occupied the Devils River, San Felipe Creek, Sycamore Creek, Las Moras Creek, and two bodies of water in Mexico (Rio San Carlos and Rio Salado drainage). The Devils River minnow was first discovered in the late 1950s within Las Moras Creek in Bracketville, Texas. Today, the species is believed to have been extirpated from Las Moras Creek, Rio San Carlos, and lower portions of the Devils River. A new population of Devils River minnow was discovered in 2001 in the headwaters of Pinto Creek in Kinney County (USFWS 1995). Currently the Devils River minnow occurs in only three streams in Kinney and Val Verde counties: Devils River, San Felipe Creek, and Pinto Creek (USFWS 2008a). Critical habitat has been designated for Devils River minnow (73 FR 46987–47026); and occurs within the cane

control area. Threats to the Devils River minnow include range reduction due to the loss of habitat, the decline of spring flows, water quality degradation, stream channel modifications, and habitat degradation in Mexico (USFWS 1995).

Rio Grande silvery minnow. This is a small, heavy-bodied minnow with small eyes and a small, oblique mouth. Currently the only naturally occurring population is located in New Mexico. The Rio Grande silvery minnow was introduced into the Rio Grande in Presidio, Brewster, and Terrell counties as a nonessential, experimental population in December 2008 (USFWS 2010d). The geographic boundaries of this population range from Little Box Canyon downstream of Fort Quitman (Hudspeth County) through Big Bend National Park and the Rio Grande Wild and Scenic River, to Amistad Dam (Val Verde County). In addition, this population was reintroduced on the Pecos River from the river's confluence with Independence Creek to its confluence with the Rio Grande. Due to the fact that this species occurs within a national park, this species would be treated as a threatened species, and Section 7 (a)(1) and the consultation requirements of Section 7(a)(2) of the ESA apply (USFWS 2008b). Threats to the Rio Grande silvery minnow include destruction and modification of habitat due to diversion and dewatering, water impoundment, and channelization within the Rio Grande basin. In addition, competition and predation by introduced nonnative species and water pollution contribute to the decline of this species (USFWS 2010d).

Black-capped vireo. This is a small, insectivorous songbird with conspicuous white rings about the eyes. Adults have olive upperparts, a white breast and belly with yellowish flanks, and yellowish wing bars. The head is black in adult males and gray in adult females (USFWS 1987c).

Nests are constructed in twig forks of small trees or shrubs usually 17.7 to 36.2 inches above ground. Foliage that extends to ground level is considered to be an important aspect for nesting success (USFWS 1987c). Males tend to return to their former breeding territory each year (NatureServe 2010b). This species generally prefers habitats that have scattered, early successional, woody vegetation separated by bare ground, rocks, and scattered forbs. Many black-capped vireo territories are on steep slopes, such as the heads of ravines or along the sides of arroyos (USFWS 1987c).

The black-capped vireo migrates between western coastal Mexico in the winter, and central to northern Texas into Oklahoma in the spring. It usually arrives in the Texas nesting range from late March to mid-April (USFWS 1987c). The black-capped vireo is known to breed across 38 counties in Texas between March and July and migrate back to Mexico wintering grounds by September (USFWS 2007). Metapopulations have been identified in canyons traversing from the upper bend of the Rio Grande and include canyons of the Devils River. Counties along the Rio Grande where breeding populations have been identified include Brewster, Kinney, Terrell, and Val Verde. Localities have recently been documented within these four counties. In Brewster County, black-capped vireos have been identified in the Chisos Mountains, Big Brushy Canyon, Glass Mountains, and Big Bend National Park. In Kinney County, the species has been found at Kickapoo Caverns State Park. Terrell County sightings include the mouth of Independence Creek and Sanderson Canyon 5 miles west of Sanderson, Texas. In Val Verde County, the species has been identified at Howard Draw North of Pandale, Texas; the Highway 163 crossing of Devils River south of Juno; and the Devils River State Natural Area (USFWS 1991). Currently, the known population size is more than 6,200 pairs, and total population size could be much larger (NatureServe 2010b).

Black-capped vireos are susceptible to nest parasitism by brown-headed cowbirds (*Molothrus ater*), which could reduce nesting success by 80 to 100 percent in some areas. Other threats to this species include habitat loss, habitat degradation resulting from fire suppression, and overbrowsing by domestic livestock (NatureServe 2010b).

Southwestern willow flycatcher. The southwestern willow flycatcher is a small neotropical migratory bird that nests in dense areas of trees and shrubs in riparian habitats. This species arrives at its breeding grounds in early May and can stay as late as September. Nesting occurs from June through late July (USFWS 2002).

Southwestern willow flycatchers breed in patchy and dense riparian habitat adjacent to streams or other wetlands, near surface water, or in areas underlain by saturated soil. Tree and shrub species that are common in nesting habitat include willow (*Salix* spp.), seepwillow (*Baccharis* spp.), boxelder (*Acer negundo*), stinging nettle (*Urtica* spp.), blackberry (*Rubus* spp.), cottonwood (*Populus* spp.), arrowweed (*Tessaria sericea*), tamarisk (*Tamarix* spp.), and Russian olive (*Elaeagnus angustifolia*). Historically, the southwestern willow flycatcher was known to breed in southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and northwestern Mexico. Historically in Texas, this species is known to occur and breed within the Trans-Pecos region of western Texas. Breeding flycatchers have been reported from Fort Hancock on the Rio Grande, Davis Mountains, Big Bend National Park, and Guadalupe Mountains, Texas. Currently in Texas, the status of this species is unknown and no recent surveys have been conducted (USFWS 2002).

Southwestern willow flycatcher populations are threatened by destruction, modification, curtailment of its habitat or range, or disease and predation. However, the primary cause of decline is loss and modification of habitat from dams and reservoirs, diversions and groundwater pumping, livestock grazing, recreation, fire, agricultural development, urbanization, and introduction of exotic species. In addition, brown-headed cowbird populations have increased due to agricultural practices and livestock grazing (USFWS 2002).

Yellow-billed cuckoo. This is a medium-sized, neotropical migrant bird that winters in South America and breeds in North America. Adults are approximately 12 inches long, and weigh approximately 2 ounces. This bird has a fairly stout and slightly down curved bill, a somewhat elongated body, a long-tailed profile, and a narrow yellow ring of colored bare skin around the eye. The plumage is grayish-brown above and white below, with reddish primary flight feathers. The tail feathers are boldly patterned with black and white below. The western yellow-billed cuckoo generally nests from mid-June to late August (USFWS 2013a).

The western yellow-billed cuckoo nests in low to moderate elevation riparian woodlands that cover 50 acres or more in arid or semiarid landscapes. These woodlands often consist of willows, cottonwoods, mesquite, and tamarisk. Nests are generally placed in willows, alder (*Alnus* spp.), cottonwood, mesquite, walnut (*Juglans* spp.), box elder, sycamore (*Platanus* spp.), and tamarisk. Most nests are placed on well-foliaged horizontal branches at sites with dense canopy cover above the nest. Migratory habitat can consist of a variety of vegetation types including coastal scrub, secondary growth woodlands, hedgerows, humid lowland forests, forest edges, and riparian patches that are smaller, an approximate minimum of 5 acres, than those required for nesting (USFWS 2013a).

The western population segment is a distinct population segment of the yellow-billed cuckoo and was listed as threatened on October 3, 2014 (USFWS 2014). The geographical breeding range of the yellow-billed cuckoo in western North America includes suitable habitat within low- to moderate-elevation areas west of the crest of the Rocky Mountains in Canada and the United States. This breeding range includes the upper and middle Rio Grande, the Colorado River Basin, the Sacramento and San Joaquin River systems, the Columbia River system, and the Fraser River. The separation of the western population segment of the yellow-billed cuckoo is considered the Continental Divide, south through Montana, Wyoming, and Colorado, and the watershed divide between the Pecos and Rio Grande rivers in New Mexico and Texas, south to Big Bend in southwestern Texas, and extending to the states of the west coast. This separation in Texas follows isolated mountain ranges that emerge from the high desert plateau of western Texas. These mountain ranges include the Guadalupe and Delaware mountains on the Texas-New Mexico border; the Davis, Del Norte, and Santiago Mountains in western Texas; and the Chisos Mountains in Big Bend National Park. The distance of separation between the yellow-billed cuckoos in the eastern and western United States varies from 160 miles to more than 400 miles, and consists of areas of unoccupied, unsuitable habitat for the breeding yellow-billed cuckoo. The one exception to this distance occurs in southwestern Texas in Brewster County. Here, eastern yellow-billed cuckoos breed as far west as Rio Grande Village in Big Bend National Park, whereas western yellow-billed cuckoos are found approximately 50 miles west, upstream along the Rio Grande. The current population of the western yellow-billed cuckoo in western Texas is likely fewer than 10 pairs (USFWS 2013a).

Threats to the western population of the yellow-billed cuckoo include the destruction, modification, and curtailment of its habitat or range; the overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; and other natural or man-made factors affecting its continued existence (i.e., small and widely separated habitat patches and pesticides). The alteration (through dams, channelization, water extraction) of rivers and streams of western North America has created or contributed to almost all of these known threats to the yellow-billed cuckoo (USFWS 2013a).

Mexican long-nosed bat. This is a medium-sized bat, approximately 3 to 4 inches long, having a moderately long snout with a small triangular nose leaf at the tip. Mexican long-nosed bats occupy mid- to high-elevation desert scrub, open conifer-oak woodlands, and pine forest habitats in the Upper Sonoran Desert. They are one of the most arid adapted members of the Glossophaginae subfamily. Colonies roost in caves, mines, tunnels, and sometimes in culverts, hollow trees, or unused buildings (NatureServe 2010b). The only colonial roost in the United States is a cave at Mount Emory Peak, at an elevation of 7,500 feet, in Big Bend National Park. The Mount Emory Peak cave is a shallow fault block cave with a small crumbling entrance in which roosting occurs in an upper level on a high ceiling. It is also described as having considerably cooler air inside than outside during the summer and a breeze blowing through at all times (USFWS 1994b).

The Mexican long-nosed bat is known to occur from mid to high elevations between 1,500 to 9,300 feet throughout its range, which includes northern and central Mexico, southwestern Texas, and southwestern New Mexico. In Texas, the Mexican long-nosed bat is known from Big Bend National Park and from the Chinati Mountains area (USFWS 1994b).

The migratory path and nature of this species is not well-known. There are no references in the literature of roosts that are occupied year round, or whether seasonally occupied roosts are occupied by the same colony when they return. A particular colony might use one or more winter roosts, several migratory roosts, and still other summer roosts. Food resource availability probably drives this bat's migratory nature. It is speculated that Mexican long-nosed bats are nomadic, taking advantage of peaking food sources as they travel to traditional sites. The sporadic use of Mount Emory Peak cave in Big Bend National Park could reflect use in years when flower production is low in Mexico. Conversely, bats might not move into Big Bend National Park if flower production in northern Mexico is abundant (USFWS 1994b).

Modification or destruction of roost sites and foraging habitat are probably the major threats. Other threats include pesticides, competition for roosts and nectar, natural catastrophes, disease, and predation (USFWS 1994b).

Gulf Coast jaguarundi. This is a small, slender-bodied, long tailed, unspotted, weasel-like cat that hunts during the early morning and evening. It has a long, flat head with short and rounded ears, and is one of the few cat species that does not have a contrasting color on the backs of the ears. Its eyes are small and set closely together. The jaguarundi has two distinct color phases, red and gray, although the latter phase has also been called blue. A third color phase, black, has also been reported, but apparently does not occur in Texas (USFWS 2013b).

The habitat of the jaguarundi is similar to the ocelot and is found within the Tamaulipan Biotic Province, which includes several variations of subtropical thornscrub brush. Typical habitat consists of mixed thornscrub species which include the following: brasil, desert yaupon (*Schaefferia cuneifolia*), wolfberry (*Lycium berlandieri*), lotebush, amargosa (*Castela erecta*), white-brush (*Aloysia gratissima*), catclaw acacia, blackbrush acacia, lantana (*Lantana achyranthifolia*), guayacan (*Guajacum angustifolium*), cenizo (*Leucophyllum frutescens*), elbowbush (*Forestiera angustifolia*), and Texas persimmon (*Diospyros texana*). Trees that might be included within the thornscrub include mesquite, live oak (*Quercus* sp.), Texas ebony (*Ebenopsis ebano*), and hackberry (*Celtis laevigata*). Riparian areas and bunchgrass pastures with intermixed thornbrush are also used by the jaguarundi. The historical range of the Gulf Coast jaguarundi is from the Lower Rio Grande Valley in southern Texas into the eastern portion of Mexico in the states of Coahuila, Nuevo Leon, Tamaulipas, San Luis Potosi, and Veracruz. In Texas, jaguarundis historically were limited to Cameron, Hidalgo, Willacy, and Starr counties. No historical records of jaguarundis have been documented north of the Rio Grande Valley of Texas. The last confirmed sighting of this subspecies within the United States was in April 1986, when a road-killed specimen was collected 2 miles east of Brownsville (USFWS 2013b).

Ocelot. This is a medium-sized nocturnal cat, measuring up to 3 feet long and weighing twice as much as a large domestic cat. It is slender and covered with attractive, irregular-shaped rosettes and spots that run the length of its body. The ocelot's background color can range from light yellow to reddish-gray, to gold, and to a grayish-gold (USFWS 2010e).

The ocelot uses a wide range of habitat throughout its range in the Western Hemisphere, although they do not appear to be a habitat generalist. The ocelot is found within the Tamaulipan biotic province, which includes several variations of subtropical thornscrub brush. Ocelots prefer dense thornscrub habitats with greater than 95 percent canopy cover (USFWS 2010e). The historical range of the ocelot in the United States was much more extensive than the cats

currently known range. In Texas, the ocelot once inhabited southern and eastern Texas, north to Hedley, Texas and west to Marfa, Texas. Currently, the ocelot ranges from extreme southern Texas and southern Arizona through the coastal lowlands of Mexico to Central America, Ecuador and northern Argentina. The Texas ocelot is isolated from the Arizona ocelot by the Sierra Madre highlands and the Mexican Plateau. The two Texas populations occur on private ranches in Willacy and Kenedy counties and on the Laguna Atascosa National Wildlife Refuge in eastern Cameron County. These populations are isolated from each other by approximately 19 miles and occupy remnant habitat fragments outside of the cane control area (USFWS 2010e).

Threats to ocelot include the destruction, modification, and curtailment of suitable habitat or range and illegal hunting. Habitat loss and degradation have been contributed to deforestation, agriculture, and ranching. Habitat loss and fragmentation, especially along the Rio Grande, pose a critical threat to the long-term survival of the ocelot. Efforts are underway to preserve key habitat and biological corridors necessary for ocelot survival (USFWS 2010e).

3.5.3 Environmental Consequences

Effects on threatened and endangered species would be significant if the species or habitats are adversely affected over relatively large areas. The significance of effects on threatened and endangered species is based on the following:

- Permanent loss of occupied, critical, or other suitable habitat
- Temporary loss of critical habitat that adversely affects recolonization by threatened or endangered benthic resources
- Take (as defined under ESA) of a threatened or endangered species.

3.5.3.1 PROPOSED ACTION

In general, short- and long-term, direct and indirect, negligible effects on terrestrial and aquatic threatened and endangered species would occur from the Proposed Action. The cane control area encompasses the riparian and upland areas adjacent to the Rio Grande in Texas. The distance from the Rio Grande within the cane control area ranges from 200 to 2,640 feet (0.5 mile). Impacts would be similar to those described for vegetation and terrestrial and aquatic wildlife resources (see **Sections 3.3.3** and **3.4.3**). Adverse impacts on threatened and endangered species would be avoided and minimized by using appropriate BMPs (see **Appendix D**). When appropriate, species-specific surveys would be conducted prior to commencement of cane control activities within critical habitat, occupied habitat, or other suitable habitat. If surveys determine the presence of protected species, CBP would seek approval or additional consultation from USFWS for the activities that have the potential to harm protected species or adversely modify their critical habitat. Therefore, it has been determined that the Proposed Action may affect, but is not likely to adversely affect the 22 species federally listed as threatened or endangered and designated critical habitat for three species that are known to occur within or near the cane control area (see **Table 3-1**). CBP is informally consulting with USFWS under Section 7 of the ESA regarding potential effects on listed species and designated critical habitat. Analysis of state-listed rare, threatened, and endangered species that could occur in the cane control area are presented in Table C-2 in **Appendix C**. The Proposed Action, including the implementation of BMPs, is assessed within each of the following paragraphs.

Plant Species. Short-term, indirect, negligible adverse effects on ashy dogweed, bunched cory cactus, Chisos Mountain hedgehog cactus, Hinckley's oak, Johnston's frankenia, Lloyd's Mariposa cactus, Tobusch fishhook cactus, South Texas ambrosia, star cactus, Terlingua Creek cat's eye, Texas ayenia, Walker's manioc, and Zapata bladderpod would be expected as a result of the Proposed Action. These species and suitable habitat for each species is known to occur within the cane control area. Accessing cane stands by traveling off-road could result in conversion or degradation of habitat and ultimately the establishment of different plant communities, including invasive species, due to the surface disturbance and compaction of soils. Cane control activities would be conducted from existing roads, when possible. When off-road access is required cane control equipment would use the same ingress and egress points to minimize impacts to plant communities. Furthermore, off-road access would be limited to the minimum amount necessary and to no more than 0.25 mile between existing roads and cane stands.

For those activities conducted outside of disturbed areas or within disturbed areas where threatened and endangered plant species could occur, surveys would be conducted and other BMPs would be implemented to avoid and minimize direct and indirect effects on these species. All cane control activities would avoid areas of known threatened and endangered plant species, suitable habitat (see **Table 3-2**), and critical habitat, unless a survey is conducted. CBP would coordinate with the environmental subject matter expert to determine which threatened and endangered species or critical habitat could occur in the vicinity of cane control activities. If cane control activities in areas of known occurrences of these species, suitable habitat, and critical habitat are unavoidable, then a qualified biologist would conduct a survey during the appropriate blooming season (see **Table 3-2**). Individuals would be flagged and vegetation control would avoid flagged individuals. Pre-activity surveys would not be required in areas that have been previously surveyed, where no listed species were found, and that have been regularly maintained such that there is no reason to expect establishment of listed plant species.

Fish Species. Short-term, direct and indirect, negligible adverse effects on Big Bend gambusia, Devils River minnow, and Rio Grande silvery minnow could occur due to cane control activities. Localized degradation of habitat could occur if petroleum products or other hazardous materials are accidently released in or near water during operation or storage of cane control equipment. However, BMPs would be implemented to minimize or avoid direct and indirect effects. For example, no cane control equipment would enter wetlands, streams, or other waterbodies except for the periodic control of cane on the Rio Grande shoreline from a barge on the river. Additionally, cane would not be topped from a barge on the Rio Grande in Big Bend National Park to avoid impacts on the Rio Grande silvery minnow in this location, where it is regulated as a threatened species. No impacts on Devils River minnow, which within the cane control area is limited to San Felipe Creek upstream from the Rio Grande, are expected from cane control activities in the Rio Grande.

If cane in standing water outside of the Rio Grande needs to be topped, it would be done from an adjacent bank. Cane control activities would avoid riparian vegetation within 100 feet of known occurrences or suitable habitat for Big Bend gambusia (i.e., spring habitats in the vicinity of Boquillas Crossing and Rio Grande Village [Big Bend National Park]), Devils River minnow (i.e., channels of fast-flowing, spring-fed waters over gravel substrates in Val Verde and Kinney counties, Texas), and Rio Grande silvery minnow (i.e., areas of low to moderate water velocity in Big Bend National Park), or critical habitat, to provide a buffer area to protect the habitat from

sedimentation. Additionally, care would be taken during land-based cane control activities to avoid water quality impacts and indirect downstream impacts by not allowing cane trimmings to be deposited into moving streams or rivers.

Black-capped vireo. Short-term, direct and indirect, negligible adverse effects on the black-capped vireos would be expected. Direct effects such as habitat conversion or degradation from off-road access and disruption or modification of behavior (including nesting) resulting from noise or other disturbances would occur during cane control activities. Indirect effects include habitat degradation from establishment of nonnative plant species from off-road access and from erosion and sedimentation. BMPs including the following would be implemented to avoid and minimize these direct and indirect effects to a level that is not measurable.

Activities would occur within or adjacent to disturbed areas, when possible, in order to avoid black-capped vireo habitat. All cane control adjacent to (within 500 feet) defined black-capped vireo habitat would be avoided from March 15 to September 15. Black-capped vireo habitat is defined as areas of known occurrence or suitable habitat (i.e., low deciduous shrubland areas with 30 to 60 percent cover in the Edwards Plateau and eastern Trans-Pecos). If cane control is required near or adjacent to defined black-capped vireo habitat, qualified personnel with experience identifying black-capped vireo habitat would delineate and clearly mark the habitat to be avoided. Cane control activities adjacent to defined black-capped vireo habitat should be conducted from October through February, outside the nesting season, to the extent possible. If it is not possible to avoid cane control activities within the breeding season, USFWS-permitted biologist would conduct a survey for black-capped vireo. If black-capped vireos are present, a USFWS-permitted biologist would survey for nests approximately once per week within 500 feet of the cane control area for the duration of the activity. If an active nest is located, a 300-foot, no-activity buffer would be established around the nest until the young have fledged.

Southwestern willow flycatcher and yellow-billed cuckoo. Short-term, direct and indirect, negligible adverse effects on the southwestern willow flycatcher and yellow-billed cuckoo would be expected to be the same as those described for the black-capped vireo. BMPs would be implemented to avoid and minimize these direct and indirect effects to a level that is not measurable.

If cane control is required near or adjacent to (within 500 feet) occupied southwestern willow flycatcher and yellow-billed cuckoo habitat, critical habitat, and suitable habitat (i.e., dense riparian habitats along streams, rivers, lakesides, and other wetlands), qualified personnel with experience identifying southwestern willow flycatcher and yellow-billed cuckoo habitat would delineate and clearly mark the habitat to be avoided. In addition, cane control would be conducted from September 16 through March 14, outside the southwestern willow flycatcher and yellow-billed cuckoo breeding season. If it is not possible to avoid cane control activities within the breeding season, an USFWS-permitted biologist would conduct a survey for southwestern willow flycatchers and yellow-billed cuckoos prior to initiating cane control activities. If these birds are present, a USFWS-permitted biologist would survey for nests approximately once per week within 500 feet of the cane control area for the duration of the activity. If an active nest is found, a 300-foot, no-activity buffer would be established around the nest until the young have fledged.

Mexican long-nosed bat. Short-term, direct, negligible adverse effects on the Mexicanlong-nosed bat are anticipated from the Proposed Action. Direct effects on Mexican long-nosed bats would be caused by damage to non-targeted forage plants (agaves) adjacent to stands of cane, by off-road access to cane stands. However, cane control activities would occur within or adjacent to disturbed areas, when possible, and BMPs designed to avoid impacts on Mexican long-nosed bat would be implemented. For example, forage plants (agaves) would be protected, as all cane control activities would avoid accessing cane stands in known areas containing agaves. Additionally, when off-road access is required cane control equipment would use the same ingress and egress points to minimize impacts to plant communities. Furthermore, off-road access would be limited to the minimum amount necessary and would be limited to no more than 0.25 mile between existing roads and cane stands. In addition, no cane control activities would occur between June and August within 0.5 mile of any known roost (e.g., Emory Peak Cave in Big Bend National Park) and no cane control activities would occur at night.

Gulf Coast jaguarundi and ocelot. Short-term, direct, negligible adverse effects on the Gulf Coast jaguarundi and ocelot could occur due to cane control activities within Gulf Coast jaguarundi and ocelot habitat. Direct effects, such as habitat conversion or degradation from off-road access and disruption or modification of behavior from noise or other disturbances, would occur during cane control activities. However, BMPs would be implemented to avoid impacts on ocelot and jaguarundi and their habitats. For example, activities would occur within or adjacent to disturbed areas, when possible. Additionally, cane control activities would be conducted during daytime hours (7 a.m. to 5 p.m.) only to avoid nighttime noise and lighting impacts. Additionally, cane trimming would take place no less than approximately 3 feet from the ground to maintain adequate canopy cover for the Gulf Coast jaguarundi and ocelot.

3.5.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming in the cane control area, including that conducted from a barge in the Rio Grande, would not occur. The U.S./Mexico international border along the Rio Grande would continue to be afflicted by dense stands of cane, which would continue to become established in areas that are susceptible to invasive species establishment. These cane stands offer very little habitat for threatened and endangered wildlife species and once established prevent native habitats from growing. There would be no coordinated environmental staff support and centralized planning for cane control under the No Action Alternative. Localized, short- and long-term, direct and indirect, minor, adverse adverse effects on threatened and endangered species could occur from habitat degradation and loss, species displacement, soil compaction, accidental spills, and possible spread of the invasive cane.

3.6 Surface Waters and Waters of the United States

3.6.1 Definition of the Resource

Surface Waters. Surface water includes natural, modified, and constructed water confinement and conveyance features that may or may not have a defined channel and discernable water flows. These features are generally classified as streams, springs, wetlands, natural and artificial impoundments (ponds and lakes), and constructed drainage canals and ditches.

The CWA (33 USC § 1251 et. seq., as amended) establishes Federal limits on the amounts of specific pollutants that are discharged to surface waters to restore and maintain the chemical, physical, and biological integrity of the water.

The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands (discussed in the following paragraph). Jurisdiction over the waters of the United States is addressed by USEPA and USACE. These agencies assert jurisdiction over traditional navigable waters and their relatively permanent tributaries, and the wetlands that are adjacent to these waters (USEPA 2010).

Wetlands. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR § 328). The USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions.

Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill materials into the waters of the United States, including wetlands. In addition, Section 404 of the CWA also grants states with sufficient resources the right to assume these responsibilities. Section 401 of the CWA gives the state board and regional boards the authority to regulate through water quality certification any proposed federally permitted activity that could result in a discharge to water bodies, including wetlands. The state may issue certification, with or without conditions, or deny certification for activities that might result in a discharge to water bodies.

EO 11990, *Protection of Wetlands*, requires that Federal agencies provide leadership and take actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland.

3.6.2 Affected Environment

Surface Waters. The Rio Grande (hydrologic unit code [HUC] 13) and the Texas-Gulf (HUC 12) hydrologic regions are present within the cane control area. The Rio Grande and Texas-Gulf hydrologic regions are further divided into five subregions and one subregion, respectively, which overlap the cane control area (USGS 2016b). Descriptions of the drainage areas and impaired stream segments, as determined by the USEPA 303(d) list, are included in the following paragraphs (TCEQ 2014).

Rio Grande Region

The majority of the cane control area occurs within the Rio Grande region and includes the following subregions: the Rio Grande-Mimbres (HUC 1303), Rio Grande-Amistad (HUC 1304), Lower Pecos (HUC 1307), Rio Grande-Falcon (HUC 1308), and Lower Rio Grande (HUC 1309).

The Rio Grande drains an area of more than 330,000 square miles in Colorado, New Mexico, and Texas in the United States and Chihuahua, Durango, Coahuila, Nuevo Leon, and Tamaulipas in Mexico. Within Texas, the Rio Grande drains an area of 86,720 square miles. The Texas portion of the Rio Grande forms the international border with Mexico for 1,254 miles. Major impoundments in the Rio Grande watershed within Texas include Amistad and Falcon dams.

Rio Grande-Mimbres. The Rio Grande-Mimbres subregion consists of approximately 11,100 square miles where Mexico, New Mexico, and Texas converge. It includes the drainage within the United States portion of the Rio Grande basin from Elephant Butte Reservoir to the junction of the U.S./Mexico international boundary with the southernmost point of the New Mexico/Texas state boundary line, including the Jornada Draw, Mimbres River, and other closed basins west of the Rio Grande. One segment of the Rio Grande within this subregion is on the USEPA 303(d) list as an impaired stream. This segment occurs from the International Dam in El Paso County, Texas west to the New Mexico state boundary (TCEQ 2014).

Rio Grande-Amistad. The Rio Grande-Amistad subregion consists of approximately 18,700 square miles in west Texas and northern Mexico. It includes the drainage within the United States portion of the Rio Grande basin from the junction of the U.S./Mexico international boundary with the southernmost point of the New Mexico/Texas state boundary line to and including Amistad Reservoir, but excluding the Pecos River basin.

Three segments of the Rio Grande within this subregion are on the USEPA 303(d) list as impaired streams. The segment from a point 1.1 miles downstream of the confluence of Ramsey Canyon in Val Verde County to the confluence of the Rio Conchos (Mexico) in Presidio County is listed as impaired. Another segment occurs from the confluence of the Rio Conchos (Mexico) in Presidio County to Riverside Diversion Dam in El Paso County. The other impaired stream segment is from the Riverside Diversion Dam in El Paso County to International Dam in El Paso County (TCEQ 2014).

Lower Pecos Watershed. The Lower Pecos subregion consists of approximately 20,800 square miles in west Texas that contribute to the Pecos River (USGS 2016b). It includes the Pecos River basin from and including the Delaware River basin to the confluence with the Rio Grande. No stream segments within this subregion are on the USEPA 303(d) impaired waters list (TCEQ 2014).

Rio Grande-Falcon. The Rio Grande-Falcon subregion consists of approximately 5,170 square miles in southern Texas and northern Mexico (USGS 2016b). It includes the drainage of the Rio Grande basin in Texas from Amistad Reservoir to and including Falcon Reservoir. One segment of the Rio Grande within this subregion is on the USEPA 303(d) list as an impaired stream. The segment from the confluence of the Arroyo Salado (Mexico) in Zapata County to Amistad Dam in Val Verde County is listed as impaired (TCEQ 2014).

Lower Rio Grande Watershed. The Lower Rio Grande subregion consists of approximately 1,260 square miles in southern Texas and northern Mexico (USGS 2016b). It includes the drainage within the United States portion of the Rio Grande basin in Texas from Falcon Reservoir to the Gulf of Mexico. Two stream segments within this watershed are on the USEPA 303(d) list as impaired. One of these segments is the Rio Grande from a point 6.7 miles downstream of the International Bridge in Cameron County to Falcon Dam in Starr County. The

other impaired stream segment is from Rio Grande confluence at Rio Grande City to El Sauz in Starr County (TCEQ 2014).

Texas-Gulf Region

The Texas-Gulf region drains the vast majority of Texas to the Gulf of Mexico. A portion of the cane control area occurs within the Nueces-Southwestern Texas Coastal (HUC 1211) subregion (USGS 2016b).

Nueces-Southwestern Texas Coastal. The Nueces-Southwestern Texas Coastal subregion consists of approximately 29,000 square miles. It includes the coastal drainage and associated waters from Aransas Pass, including the Corpus Christi Bay and Nueces River drainages, to the Rio Grande Basin boundary. No stream segments within this subregion are on USEPA 303(d) impaired waters list (TCEQ 2014).

Wetlands. Riparian systems, coastal wetlands, and coastal pothole wetlands are the most common categories of wetlands in the cane control area. Palustrine emergent, palustrine forested, and palustrine scrub-shrub riparian systems occur along rivers and streams, such as the Rio Grande and the Nueces rivers, in the cane control area. Coastal wetlands include salt- and freshwater marshes, deltas, coastal bays, and estuaries. The predominant marsh types are the freshwater emergent and scrub-shrub marshes in river deltas and rice fields and the intertidal nonvegetated, emergent, and scrub-shrub emergent marshes found along the periphery of the coastal estuaries. Coastal pothole wetlands are shallow, circular depressions and basins that range in size from a tenth of an acre to greater than 5 acres.

Potholes occurring in the Lower Rio Grande Valley consist of high clay-content soil and are classified as palustrine wetlands. Resacas, old abandoned river channels, are also within the cane control area. They are generally shallow and measure 30 to 150 feet wide. Resacas are semi-permanent and often form ponds or oxbow lakes (USACE 1994b).

3.6.3 Environmental Consequences

A proposed action would be considered to have significant adverse impacts if it were to substantially affect water quality; substantially reduce water availability or supply to existing users; threaten or damage hydrologic characteristics; or violate established Federal, state, or local laws and regulations.

Determination of the significance of wetland impacts is based on (1) the function and value of the wetland, (2) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (3) the sensitivity of the wetland to proposed activities, and (4) the duration of ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected.

3.6.3.1 PROPOSED ACTION

Short-term, direct and indirect, minor, adverse impacts on surface waters and waters of the United States would occur from the Proposed Action. Cane control activities would increase runoff, erosion, and sedimentation and decreased water quality within the stream segments in the cane control area, some of which are already impaired. However, these adverse impacts, related

to erosion of soil, would be minimized through the use of appropriate BMPs (see **Appendix D**). For example, erosion would be reduced through minimization of off-road travel.

Periodic cane control activities conducted from a barge in the Rio Grande could result in short-term, direct and indirect, minor, adverse effects on surface water resources. Anchoring of the barge could result in sediment disturbance and an increase in sedimentation downstream of the barge. Cane control activities would not occur from a barge on the Rio Grande in Big Bend National Park. No other cane control equipment would enter wetlands, streams, or other waterbodies.

Degradation of water quality would also occur if petroleum products or other hazardous materials are accidently released during operation or storage of cane control equipment. All regulatory requirements for handling and storage of fuels, oils, and other hazardous materials, such as the development of spill prevention plans, would be implemented. All non-barge equipment maintenance, staging, laydown, and dispensing hazardous liquids (e.g., fuel and oil) would be limited to designated upland areas, thereby avoiding direct contamination to surface water and wetland systems. Barges conducting cane control activities on the Rio Grande would be refueled at existing marine fuel facilities. All regulatory requirements for handling and storage of fuels, oils, and other hazardous materials at the marine facility would be implemented.

Cane trimmings left in the Rio Grande could result in an indirect decrease in water quality. The decomposition and reduced cane canopy structure along stream banks may result in warmer stream temperatures and increased pH (a measure of how acidic/basic water is) (Bell 1993), which facilitates the conversion of ammonium to ammonia.

No long-term, direct impacts on surface waters and waters of the United States are anticipated with the implementation of the Proposed Action. Although control of cane on the Rio Grande shoreline could periodically occur from a barge on the river, no other equipment would enter wetlands, streams, or other waterbodies. Pertinent local, state, and Federal permits would be obtained for all work, including, if necessary, any work that could occur in jurisdictional drainages, waterways, or wetlands. CBP would consult with USACE as appropriate and where applicable to minimize wetland impacts if any and identify potential avoidance, minimization, and conservation measures.

3.6.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming in the cane control area, including that conducted from a barge in the Rio Grande, would not occur. The No Action Alternative could result in localized, short-term, direct and indirect, minor, adverse effects on surface water resources from deposition of fill materials (e.g., soil erosion), increased sedimentation, and decreased water quality caused by soil compaction that increases runoff. Due to the lack of coordinated environmental staff support and centralized planning including implementation of standardized BMPs (e.g., no cane control equipment would enter wetlands, streams, and waterbodies, other than the cane control activities conducted from a barge in the Rio Grande), it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action. However, the No Action Alternative would not conduct cane control from a barge in the Rio Grande, thereby avoiding impacts on water quality from cane trimmings falling into the Rio Grande, which would occur under the Proposed Action.

3.7 Floodplains

3.7.1 Definition of the Resource

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters that are periodically inundated. Floodplain ecosystem functions include natural moderation of floods through flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and support of a diversity of plants and animals. Floodplains provide a broad area to spread out and temporarily store floodwaters. This reduces flood peaks and velocities and the potential for erosion. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main waterbody (FEMA 1994).

Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year (FEMA 1994). Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps, which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific step-by-step process must be followed to comply with EO 11988 outlined in the FEMA document, *Further Advice on EO 11988 Floodplain Management*.

EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, amended EO 11988 and established the Federal Flood Risk Management Standard. The Federal Flood Risk Management Standard requires Federal agencies to use a higher flood elevation and expanded flood hazard area than the base flood to ensure climate change and other future changes are adequately considered in decisionmaking. The standard identifies three approaches for determining the expanded floodplain. Additionally, Federal agencies are required to consider whether the action is a critical action when establishing the floodplain, and are encouraged to use of natural and nature-based approaches when developing alternatives.

3.7.2 Affected Environment

The Rio Grande is the major surface waterbody in the cane control area associated with a 100-year floodplain. Other waters within the cane control area include the Amistad and Falcon reservoirs; Cow Creek; Chacon Creek; Salado Creek; and other arroyos, streams, and resacas (FEMA 2010).

3.7.3 Environmental Consequences

Evaluation of impacts on floodplains is based on existence of floodplains and associated regulations. The potential impact of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

3.7.3.1 PROPOSED ACTION

Short-term, indirect, negligible impacts could occur on floodplain areas from cane control activities, which could cause increased sedimentation into floodplains and drainage structures due to driving equipment off-road. No development is proposed in the floodplain under the Proposed Action. Additionally, the mechanical cane control being proposed would not increase the flow of water through the channel or increase flooding downstream. Cane control activities within the 100-year floodplain would be conducted in a manner consistent with EOs 11988 and 13690 and other applicable regulations. All necessary erosion control BMPs (see **Appendix D**) would be adopted to ensure stabilization of the work sites. Pertinent local, state, and Federal permits would be obtained for any work, including work that occurs in floodplains.

3.7.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming in the cane control area, including that conducted from a barge in the Rio Grande, would not occur. The No Action Alternative could result in localized, short-term, indirect, negligible, adverse effects on floodplains from slightly increased sedimentation; however, the flow of water through the channel and flooding downstream would not increase.

3.8 Air Quality

3.8.1 Definition of the Resource

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Regulatory Setting. The six principal pollutants defining air quality, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), suspended particulate matter (measured less than or equal to 10 microns in diameter [PM_{10}] and less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). CO, SO_2, Pb, and some particulates are emitted directly into the atmosphere from emissions sources. O_3, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile organic compounds (VOC) and nitrogen oxide (NO_x) emissions are used to represent O_3 generation because they are precursors of O_3.

Under the Clean Air Act, USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR § 50) for the criteria pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have short-term and long-term standards. Short-term standards are designed to

protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a Federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

General Conformity. The USEPA General Conformity Rule applies to Federal actions occurring in nonattainment and maintenance areas when the total direct and indirect emissions of nonattainment and maintenance pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity determination are called *de minimis* levels. *De minimis* levels (in tons per year [tpy]) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question. *De minimis* thresholds are presented in **Table 3-3**.

Table 3-3. General Conformity *De Minimis* Levels

Pollutant	Area Type	tpy
O_3 (VOC or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an O_3 transport region	100
O_3 (NO_x)	Marginal and moderate nonattainment inside an O_3 transport region	100
	Maintenance	100
O_3 (VOC)	Marginal and moderate nonattainment inside an O3 transport region	50
	Maintenance within an O3 transport region	50
	Maintenance outside an O3 transport region	100
CO, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
PM2.5 Direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors)	All nonattainment and maintenance	100
Pb	All nonattainment and maintenance	25

Greenhouse Gases and Climate Change Impacts. Greenhouse gases are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to

an increase in greenhouse gas emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

Revised draft guidance from CEQ, dated December 18, 2014, recommends that agencies consider both the potential effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the implications of climate change for the environmental effects of a proposed action. The guidance also emphasizes that agency analyses should be commensurate with projected greenhouse gas emissions and climate impacts, and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public and the decision-making process in distinguishing between alternatives and mitigations. It recommends that agencies consider 27,563 tpy (25,000 metric tpy) of carbon dioxide equivalent emissions as a reference point below which a quantitative analysis of greenhouse gas is not necessary unless it is easily accomplished based on available tools and data.

3.8.2 Affected Environment

The Proposed Action would occur in Brewster, Cameron, El Paso, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata counties in Texas. With the exception of El Paso County, all of these counties have been designated by the USEPA as unclassified/attainment for all criteria pollutants. The USEPA has designated portions of El Paso County as maintenance for CO and nonattainment (moderate classification) for PM_{10} (USEPA 2015).

3.8.3 Environmental Consequences

Impacts on air quality are based on estimated direct and indirect emissions associated with the Proposed Action. Impacts would be considered significant if the Proposed Action were to exceed the applicable General Conformity Rule *de minimis* thresholds, exceed the greenhouse gas reference point in the draft CEQ guidance, or contribute to a violation of any Federal, state, or local air regulations. Based on compliance with the NAAQS, the General Conformity Rule is only applicable in El Paso County to emissions of CO and PM_{10}, and as shown in **Table 3-3**, the applicable *de minimi*s thresholds for CO and PM_{10} are 100 tpy. While the General Conformity Rule is not applicable to the emissions of the other criteria pollutants in El Paso County or to any criteria pollutants in the other counties where the Proposed Action would occur, 100 tpy of statewide air emissions for any criteria pollutant has been applied as the threshold of significant impacts in this EA.

3.8.3.1 PROPOSED ACTION

Long-term, negligible, adverse impacts on air quality would result from the Proposed Action. These impacts would occur from the annual generation of criteria pollutant and greenhouse gas emissions from the operation of two diesel tractors for trimming cane during cane control activities throughout the year, and the transportation of these tractors to and from the work sites in the cane control area using heavy duty diesel vehicles. Although a barge might be used periodically to top cane on the shoreline of the Rio Grande, barge operation would be so infrequent that it is not considered in this analysis. The tractors are assumed to be John Deere 6140S models or similar equivalents that would operate up to 40 hours per week for 52 weeks per year. Transportation of these tractors from the local USBP equipment yards where they

would be stored to the work sites in the cane control area is assumed to require the heavy duty diesel vehicles to travel approximately 26,000 miles per year.

The statewide estimated annual air emissions from the Proposed Action are summarized in **Table 3-4**, and applicable significance criteria are also provided. Air emissions estimation documentation and a summary of the methods used in this air quality analysis are included in **Appendix E**. In summary, the annual air emissions from the Proposed Action would be well below all applicable significance criteria.

Table 3-4. Statewide Annual Air Emissions from the Proposed Action

	Annual Air Emissions (tpy)						
	NOx	**SOx**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**GHG**
Tractor Operation	2.29	0.14	1.24	0.24	0.23	0.22	209.46
Tractor Transportation	0.19	<0.01	0.07	0.02	0.01	0.01	44.93
Total	**2.48**	**0.14**	**1.31**	**0.26**	**0.24**	**0.23**	**254.38**
Significance Threshold	**100**	**100**	**100**	**100**	**100**	**100**	**27,563**

Key: GHG = greenhouse gas

General Conformity. As noted, the General Conformity Rule is applicable in El Paso County to emissions of CO and PM_{10}. As shown in **Table 3-4**, statewide emissions of CO and PM_{10} would be well below the applicable *de minimis* thresholds and spread along the Rio Grande. Therefore, even if all proposed cane trimming in Texas in a given year occurred in El Paso County, a conformity determination would not be required.

Greenhouse Gases and Climate Change Impacts. As noted above, the Proposed Action would contribute directly to emissions of greenhouse gases from the combustion of fossil fuels. Total greenhouse gas emissions from the Proposed Action would be approximately 0.92 percent of the CEQ reference point of 27,563 tpy (25,000 metric tpy). These limited annual emissions of greenhouse gases would not likely contribute to global climate change to any discernible extent and are well below the level of significance.

Ongoing global climate change has the potential to increase average temperatures, create more intense heavy precipitation events, and increase the frequency of droughts in Texas (Shafer et al. 2014). These potential changes to local climate patterns could slightly increase the rate at which cane grows and increase its geographic footprint, especially during non-drought periods. As a result, CBP might need to increase the number of tractors used or hours spent conducting cane control activities beyond the two tractors proposed under the Proposed Action. Air emissions from the Proposed Action would be negligible, and any increase in criteria pollutant and greenhouse gas emissions due to additional tractors or hours of operation would remain well below the level of significance. Impacts from ongoing changes to local climate patterns would not affect the ability to implement the Proposed Action.

3.8.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming would not occur in the cane control area. Impacts on air quality from the No Action Alternative would be similar to, but less than, those described for the Proposed Action because it can be reasonably anticipated that cane control would occur less frequently and in fewer locations. No significant effects on regional or local air quality would occur. A negligible contribution of annual greenhouse gas emissions would occur, and is not likely contribute to global climate change to any discernible extent and are well below the level of significance.

3.9 Noise

3.9.1 Definition of the Resource

Noise is defined as any undesirable sound that interferes with communication, poses a threat to human health, or is irritating. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad areas (e.g., residential areas, nature preserves, or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

Noise Metrics and Regulations. Although human response to noise varies, measurements can be calculated with instruments that record instantaneous sound levels in decibels. The A-weighted decibel (dBA) is used to characterize sound levels that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at the upper boundary of audibility, which is normally in the region of 135 dBA (USEPA 1981a). **Table 3-5** compares common sounds and shows how they rank in terms of the effects on hearing. As shown in the table, a whisper is normally 30 dBA and considered to be very quiet while an air conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10-dBA increase seems twice as loud (USEPA 1981b).

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit for instantaneous exposure, such as impact noise, is 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that would reduce sound levels to acceptable limits. Noise control laws and regulations in Texas vary between counties and municipalities.

Table 3-5. Sound Levels and Human Response

Noise Level (dBA)	Common Sounds	Effect
10	Just audible	Negligible*
30	Soft whisper (15 feet)	Very quiet
50	Light auto traffic (100 feet)	Quiet
60	Air conditioning unit (20 feet)	Intrusive
70	Noisy restaurant or freeway traffic	Telephone use difficult
80	Alarm clock (2 feet)	Annoying
90	Heavy truck (50 feet) or city traffic	Very annoying; Hearing damage (8 hours)
100	Garbage truck	Very annoying*
110	Pile drivers	Strained vocal effort*
120	Jet takeoff (200 feet) or auto horn (3 feet)	Maximum vocal effort
140	Carrier deck jet operation	Painfully loud

Sources: USEPA 1981b, *HDR extrapolation

3.9.2 Affected Environment

The majority of areas along the U.S./Mexico international border in Texas are characterized by floodplain areas to the east and mountain and desert landscapes to the west. Property uses along the border include public and tribal lands, and privately owned parcels such as residential/commercial areas and farm/ranch land. The cane control area is adjacent to both urban/mixed use areas and rural/undeveloped areas, but is generally located away from most neighborhoods and residences. Prominent sources of noise in these areas are most likely from vehicle traffic, aircraft, and agricultural equipment.

The closest populations to the cane control area in the USBP Rio Grande Valley Sector in the east are located in Sullivan City, and the cities of McAllen, Los Ebanos, Granjeno, Hidalgo, Santa Maria, Los Indios, La Paloma, Ranchito, El Calaboz, San Pedro, and Brownsville, among others. In the Laredo Sector, the closest populations are located in the cities of Laredo and Rio Bravo. In the Big Bend Sector, the closest populations are located in the City of Presidio. In the Del Rio Sector, the closest populations are located in the cities of Del Rio, Eagle Pass, and El Indio. Lastly, in the El Paso Sector to the west, the closest populations include those in the cities of El Paso, Socorro, San Elizario, Tornillo, and Fort Hancock.

A variety of sounds are emitted from equipment such as the tractors and trucks that would be used for cane control activities. The noise level typically associated with tractors is 85 dBA at a distance of 50 feet. The trucks that would be utilized to transport the tractors are considered light vehicles that produce an estimated noise level of 55 dBA at a distance of 50 feet (FHWA 2015).

3.9.3 Environmental Consequences

The impacts associated with noise are evaluated based on the changes to the ambient noise environment caused by the implementation of the Proposed Action. An action could have a significant impact with respect to noise if it were to substantially impact sensitive receptors over

the long-term, create appreciable areas of incompatible land use outside of the cane control area due to noise, or result in noncompliance with any applicable laws or regulations. Projected noise effects were evaluated qualitatively for the alternatives considered.

3.9.3.1 PROPOSED ACTION

The proposed control of cane would occur one to two times a year at any one location along the U.S./Mexico international border. Cane control activities could cause an increase in sound that is above the ambient level. Therefore, long-term, intermittent, negligible adverse impacts on noise receptors and the ambient noise environment of the cane control area would occur as a result of the Proposed Action. The specific noise levels and effects would vary based on the location and quantity of cane being trimmed, and the distance of the cane control activities (i.e., source of noise) to sensitive populations.

To predict how cane control activities would impact populations, noise resulting from the operation of tractors was estimated at various distances. The nearest populations vary depending on location of cane stands; however, the majority of the cane control area is sparsely populated or uninhabited. Examples of expected tractor noise during daytime hours at specified distances are shown in **Table 3-6**. These sound levels were predicted at 50, 300, 500, 1,000, and 3,000 feet from the source of the noise.

Table 3-6. Predicted Additive Noise Levels from Tractor Operation During Cane Control Activities

Distance from Noise Source	Predicted Noise Level
50 feet	85 dBA
300 feet	70 dBA
500 feet	65 dBA
1,000 feet	60 dBA
3,000 feet	50 dBA

Source: Sengpielaudio undated

Noise-sensitive receptors in remote areas could be impacted to a greater degree from noise disturbances than those in urban environments; however, the noise from equipment used during the implementation of the Proposed Action would be localized, short-term, and intermittent. Noise levels of up to 85 dBA would occur in the areas where cane control activities were occurring for the duration of those activities within normal working hours (i.e., approximately 7 a.m. to 5 p.m.). Tractors would operate within any given location one or two times per year.

Noise produced by the trucks that would transport the tractors and personnel to the work sites would have no impact on nearby populations because trucks are currently operating on area roadways and contributing to the existing ambient noise environments of the cane control area. Noise receptors within 50 feet of an operating truck would experience noise levels of 55 dBA; however, this would occur within the noise environment of an existing roadway. Additionally, noise associated with truck operation under the Proposed Action would be short-term and intermittent. BMPs such as ensuring mufflers on cane cutting equipment are maintained in proper working order would also help minimize noise impacts (see **Appendix D**).

Due to the existing ambient noise environments of the cane control area, intermittent tractor operation, the restriction of cane control activities to normal working hours, and adherence to all applicable laws and regulations, impacts on noise would be negligible.

3.9.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming would not occur in the cane control area. Impacts on noise from the No Action Alternative would be similar to those described for the Proposed Action; however, it can be reasonably anticipated that cane control would occur less frequently and in fewer locations along the Rio Grande. Therefore, populations within 1,000 feet of the ad hoc cane control activities would have the potential to experience less of a long-term, adverse effect on noise than that described for the Proposed Action.

3.10 Cultural Resources

3.10.1 Definition of the Resource

"Cultural resources" is an umbrella term for many heritage-related resources defined in several Federal laws and EOs, including the NHPA, Archeological and Historic Preservation Act, American Indian Religious Freedom Act, Archaeological Resources Protection Act, and Native American Graves Protection and Repatriation Act (NAGPRA). The NHPA focuses on cultural resources such as prehistoric and historic sites, buildings and structures, districts, or other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Such resources might provide insight into the cultural practices of previous civilizations or retain cultural and religious significance to modern groups. Resources judged important under criteria established in the NHPA are considered eligible for listing in the National Register of Historic Places (NRHP). These resources are termed "historic properties" and are protected under the NHPA.

NAGPRA requires consultation with culturally affiliated Native American tribes for the disposition of Native American human remains, burial goods, and cultural items recovered from federally owned or controlled lands. Typically, cultural resources are subdivided into archaeological sites (prehistoric or historic sites containing physical evidence of human activity but no standing structures); architectural sites (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); and sites of traditional, religious, or cultural significance to Native American tribes.

Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (i.e., artifacts). Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to warrant consideration for the NRHP. More recent structures, such as Cold War-era resources, might warrant protection if they are of exceptional importance or have the potential to gain significance in the future. Resources of traditional, religious, or cultural significance to Native American tribes can include archaeological resources, sacred sites, structures, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans consider essential for the preservation of their traditional culture.

3.10.2 Affected Environment

Regional Prehistory. The earliest well-established occupations in North America are associated with fluted projectile points and date to around 10,000 B.C. The time when the New World was first inhabited by humans is known as the Paleoindian Period. In the western United States, Paleoindians are believed to have been highly mobile big game hunters. The Paleoindian Period is followed by the Archaic Period in southern Texas (c. 6500 B.C.–A.D. 900) (Cordell 1984, Fagan 2005). This period is characterized by a shift to broad-spectrum hunting and gathering, including the exploitation of wild plants and small mammals. The Archaic Period is also characterized by the introduction of ground stone tools to process plants and the spread of the atlatl, or spearthrower, which extended the distance and velocity that a spear could be thrown.

The Mogollon tradition (250 B.C.–A.D. 1450) extends into the westernmost portion of Texas. It is characterized by red and brown scraped-and-polished pottery, equal dependence on hunting and agriculture, round pithouse and then rectangular dwellings, large ceremonial structures formally similar to houses, and inhumation. In southern Texas, horticulture was never widely adopted by indigenous groups, who continued a hunting and gathering way of life into historic times (Fagan 2005). The late prehistoric period (after A.D. 900), however, is marked by the adoption of the bow and arrow, and, in some locations, ceramic production.

Regional History. The Gulf Coast of Texas was first mapped in 1519 by the Spanish explorer Alonso Álvarez de Pineda. The first expedition into the Texas interior was led by Álvar Núñez Cabeza de Vaca in 1528. Spanish missions were established in Texas as early as 1685, and San Antonio became the first Spanish civilian settlement in 1718.

On September 27, 1821, Spain recognized the independence of Mexico. This new country included what is today California, Arizona, New Mexico, and Texas. On March 2, 1836, Mexico recognized the independence of the Republic of Texas. Texas later voted to join the United States and became the 28th state on December 29, 1845. However, the international border between Texas and Mexico was not established until after the Mexican-American War of 1846–1848. The Treaty of Guadalupe Hidalgo, which was signed on February 2, 1848, ended the war and formalized the border.

Known Cultural Resources. According to the Texas Historical Commission's Texas Archeological Sites Atlas, 569 archaeological sites (including 67 sites that contain historic standing structures), 40 NRHP structures or NRHP districts, 22 historical markers, and 12 cemeteries are located within the cane control area. Of the archaeological sites, 15 sites are listed in the NRHP, 30 sites are eligible for the NRHP, 45 sites are potentially eligible for the NRHP, and the remaining 479 sites have unknown or undetermined NRHP statuses.

3.10.3 Environmental Consequences

Adverse effects on cultural resources can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or that alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of Federal agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

Surface ground-disturbing activities associated with off-road tractor operations, possibly resulting in soil compaction and tire rutting, constitute the most relevant potential impact on cultural resources.

3.10.3.1 PROPOSED ACTION

Under the Proposed Action, surface disturbance from off-road tractor operations has the potential to have an adverse impact on known archaeological sites with surface components. The Proposed Action would focus only in areas where cane is present. Because rockshelters and cave sites are not conducive to the growth of cane, these sites were removed from the pool of sites with potential of being impacted. As a result, a total of 135 rockshelters and 7 cave sites were removed. Of the 434 remaining previously-recorded archaeological sites within the cane control area, 200 sites were identified as at risk to be impacted by the Proposed Action (see **Appendix F**). In an effort to minimize direct impacts to the 200 previously-recorded archaeological sites that could potentially be impacted by the Proposed Action, an avoidance buffer of 50 feet is recommended around the sites.

To minimize impacts on historic properties—including districts—with standing structures (resources listed in the NRHP, previously determined eligible for NRHP listing, or potentially eligible for NRHP listing), an avoidance buffer of 100 feet is recommended around the historic properties. These properties include the 40 NRHP structures or NRHP districts and the 43 previously-recorded archaeological sites containing historic standing structures (see **Appendix F**). Additionally, an avoidance buffer of 100 feet is recommended around the 12 cemeteries identified during the site records search.

If avoidance of these cultural resources is not possible, consultation with the Texas State Historic Preservation Officer would be necessary prior to topping cane within the avoidance buffers to determine the appropriate action required to mitigate potential impacts.

The potential also exists for the unanticipated discovery of cultural resources or human remains during the Proposed Action. Consequently, CBP would develop appropriate measures that detail crewmember responsibilities for reporting in the event of a discovery during the proposed cane control activities. These measures would also include mitigation procedures to be implemented in the event of a substantial unanticipated find. If human remains are discovered, CBP would adhere to the stipulations of Title 13, Part 2, Chapter 22 of the Texas Administrative Code and the Health and Safety Code Section 711.011(a)–(b) and stop work within 50 feet of the discovery. CBP would then contact the county coroner and a professional archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in archaeology or history to determine the significance of the discovery. If appropriate, CBP would also adhere to NAGPRA and its implementing regulations (43 CFR § 19). Depending on the recommendations of the coroner or the archaeologist, CBP would consult with the county to establish additional mitigation procedures. Potential mitigation procedures for unanticipated discoveries include avoidance, documentation, excavation, and curation.

CBP has complied with Section 106 of the NHPA by coordinating with the Texas Historical Commission and receiving concurrence on the Proposed Action (see **Appendix B**).

3.10.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming would not occur in the cane control area. The potential for impacts on previously unknown archaeological sites from off-road tractor operation under the No Action Alternative would be similar to, but less than, those described for the Proposed Action because it can be reasonably anticipated that cane control would occur less frequently and in fewer locations. However, the lack of coordinated environmental staff support and centralized planning for cane control would result in no specifications being established and no standardized BMPs (e.g., avoidance buffers surrounding cultural resources) being implemented. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action.

3.11 Hazardous Materials and Waste Management

3.11.1 Definition of the Resource

Hazardous materials are defined by 49 CFR § 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR § 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR §§ 105–180.

A hazardous substance, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC § 9601(14)), is defined as "(A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33; (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title; (C) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the RCRA , as amended, (42 USC § 6921); (D) any toxic pollutant listed under section 1317(a) of Title 33; (E) any hazardous air pollutants listed under section 112 of the Clean Air Act (42 USC § 7412); and (F) any imminently hazardous chemical substance or mixture which the Administrator of USEPA has taken action pursuant to section 2606 of Title 15." The term hazardous substance does not include petroleum products.

Hazardous wastes are defined by RCRA at 42 USC § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." The term hazardous waste does not include petroleum wastes.

EO 12088, *Federal Compliance with Pollution Control Standards*, as amended, directs Federal agencies to (1) comply with "applicable pollution control standards," in the prevention, control, and abatement of environmental pollution; and (2) consult with USEPA, state, interstate, and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution.

For the purposes of this EA, the evaluation of hazardous materials focuses on the storage, transport, handling, and use of petroleum products, fuels, solvents, and other hazardous

substances. Evaluation also extends to generation, storage, transportation, and disposal of hazardous and petroleum wastes when such activity occurs at or near the cane control area. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well-being of wildlife, vegetation, soil systems, and water resources. In the event of release of hazardous materials or wastes, the extent of contamination varies based on the type of soil, topography, and water resources.

Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs.

3.11.2 Affected Environment

The management of hazardous substances, petroleum products, hazardous and petroleum wastes, and solid waste, are regulated by Federal and state agencies. Each state has its own regulatory agency and associated regulations. The state agencies either adopt the Federal regulations or have their own regulations that are more restrictive than the Federal regulations. The following sections address the regulatory agencies and existing conditions of these materials.

Likewise, the Federal government and state agencies also have regulations for the handling, disposal, and remediation of special hazards such as asbestos, lead-based paint or polychlorinated biphenyls; however, the handling or disposal of these materials would not occur under the Proposed Action.

Hazardous Substances, Petroleum Products, and Hazardous and Petroleum Wastes. TCEQ regulates the management, permitting, handling, and disposal of hazardous substances, petroleum products, and hazardous and petroleum wastes in Texas. The Waste Reduction Policy Act of 1991 was adopted by the Texas Legislature to prevent pollution in Texas. TCEQ adopted the corresponding rule.

USBP and its contractors currently transport, handle, use, generate, and dispose of various types and quantities of hazardous substances, petroleum products, and hazardous and petroleum wastes as a result of conducting activities, such as tactical infrastructure maintenance and repair, in the area. The primary hazardous substances, petroleum products, and hazardous and petroleum wastes are used for or generated by vehicles and equipment associated with these activities. Some of these materials include motor oil, antifreeze, hydraulic oils, lubricants, and liquid fuels (diesel and gasoline).

Additionally, the cane control area crosses through portions of privately owned land parcels, tribal lands, and public lands on which hazardous substances, petroleum products, and hazardous and petroleum wastes could be transported, handled, used, or generated from the miscellaneous activities that take place on these lands. Hazardous substances and petroleum products that could be present within the cane control area due to general everyday use by various operators or occupants include pesticides, herbicides, petroleum products and hazardous substances associated with fuels, solvents, and cleaning products. There are no National Priority Sites or TCEQ Superfund sites within the cane control area (TCEQ 2015).

All hazardous substances, petroleum products, and hazardous and petroleum wastes associated with CBP activities are stored at various USBP or contractor maintenance shops and are managed in accordance with each group's respective hazardous materials standard operating

procedures. The hazardous and petroleum wastes are recycled or disposed of offsite in accordance with Federal, state, and local regulations.

Solid Wastes. The TCEQ is the state agency responsible for the oversight of any person that processes, stores, or disposes of, or arranges for transport of solid waste.

USBP and its contractors currently generate, store, transport, and dispose of various quantities of solid wastes that result from conducting activities, such as tactical infrastructure maintenance and repair, in the cane control area. The solid waste associated with these activities generally consists of construction materials (e.g., damaged infrastructure) and vegetation (e.g., tree trimmings). The waste is temporarily stored at various USBP or contractor maintenance shops prior to off-site disposal in accordance with Federal, state, and local regulations. Vegetation waste might be left at the work site. There are a number of public and private storage areas, facilities, maintenance areas, and other operations that generate, store, transport, and dispose of solid wastes within and near the cane control area.

3.11.3 Environmental Consequences

Impacts on hazardous materials management would be considered significant if a proposed action resulted in worker, resident, or visitor exposure to these materials above established limits. Impacts on hazardous materials management would be considered significant if a Federal action resulted in noncompliance with applicable Federal and respective state regulations, or increased the amounts generated or procured beyond current CBP hazardous materials management procedures and capacities.

An impact on solid waste management would be considered significant if a proposed action exceeded existing capacity at a disposal site or resulted in a long-term interruption of waste management, a violation of a permit condition, or a violation of an approved plan for that utility.

3.11.3.1 PROPOSED ACTION

Hazardous Substances, Petroleum Products, and Hazardous and Petroleum Wastes. Long-term, negligible, adverse impacts from use of hazardous substances and petroleum products would be expected from implementation of the Proposed Action. Four-wheel drive tractors containing hazardous substances and petroleum products would enter the cane control area in any given location one to two times per year. Hazardous materials and petroleum products in the cane control area would be limited to that contained within the tractors. Therefore, in the event of a spill or leak, negligible quantities of hazardous substances or petroleum products would be released. The accumulation of these hazardous materials in soil systems, water resources, vegetation, and wildlife would be unlikely because the location of cane control activities would vary over time, and would occur infrequently. The Proposed Action would not impact the storage, transportation, or disposal of hazardous substances or petroleum products.

All appropriate procedures required by Federal and state regulations for the handling, storage, disposal, and potential accidental release of hazardous substances and petroleum products would be implemented. All equipment would be maintained according to manufacturer's standards and inspected for leaks prior to the start of cane control activities. Therefore, impacts would be expected to be negligible.

No impacts associated with hazardous or petroleum wastes would be expected because apart from small quantities of engine lubricants, cane control activities would not generate these wastes.

Solid Wastes. Short-term, negligible, adverse impacts on solid waste management would be expected from the implementation of the Proposed Action. Impacts would result from the sizeable quantity of cane trimmings generated during cane control activities. These cane trimmings would be left on-site. All TCEQ regulations would be followed during the processing, storage, and disposal of solid waste associated with the Proposed Action.

3.11.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, CBP would continue to control cane in local areas as needed on an ad hoc basis, but broadscale mechanical cane trimming in the cane control area would not occur. Impacts from hazardous materials and wastes from the No Action Alternative would be similar to, but less than, those described for the Proposed Action because it can be reasonably anticipated that cane control would occur less frequently and in fewer locations along the Rio Grande.

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4. Cumulative and Other Adverse Effects

Cumulative impacts can result from individually minor but collectively significant past, present, and foreseeable future actions. For the purposes of the analysis in this section, consideration was given to cumulative impacts of cane control projects in the Rio Grande basin and CBP maintenance and repair of tactical infrastructure activities, including vegetation control, in the cane control area. The tactical infrastructure maintenance and repair activities include those addressed in previous NEPA documents and activities that were covered by a DHS Secretary's waiver. The maintenance and repair of tactical infrastructure is unique to CBP; therefore, these activities are unlikely to be subjected to the compounding activity of other entities, particularly because such activities commonly occur in isolated areas and on an infrequent basis. The geographic scope of the analysis varies by resource area.

4.1 Past, Present and Foreseeable Future Actions

Past and present actions are those cane control activities and CBP maintenance and repair actions that occurred within the geographic scope of cumulative effects prior to the development of this EA or are concurrently being undertaken by way of a DHS Secretary's waiver or separate NEPA. Past actions have shaped the current environmental conditions in close proximity (i.e., within several miles) to the Rio Grande basin. Therefore, the effects of identified past actions are now part of the existing environment, and are generally included in the affected environment described in **Section 3**. Present actions consist of ongoing cane control activities in the immediate vicinity of existing tactical infrastructure performed by CBP as well as activities performed by other agencies, and the current ad hoc, as-needed approach to the maintenance and repair of the infrastructure. Future actions consist of reasonably foreseeable future cane control activities identified in this EA and the maintenance and repair of current tactical infrastructure and future additional tactical infrastructure that could be required along the U.S./Mexico international border to address future border security needs.

4.1.1 Cane Control in Texas

Several Federal and Texas agencies and private entities conduct programs to control cane and other invasive plants across the state. Chemical control and other methods of mechanical control, including total removal of the cane plant, are commonly used. There have also been limited trials of use of biological control. Following is a general description of cane control methods and specific projects/programs in Texas.

Chemical Control. Chemical control via herbicide application is effective for controlling cane, but 3 to 5 years of repeated applications is likely necessary for complete, long-lasting control. The primary herbicides used on cane are imazapyr and glyphosate. Herbicides can be applied using a cut-stump method or by foliar application. The cut-stump method consists of cutting cane stems 2 to 4 inches above the ground surface, and then applying a concentrated herbicide solution. The foliar application consists of spraying herbicides over the entire cane canopy. The spraying method is selected based on site and growing conditions; hand-held spraying is best for shorter cane plants (<6 feet in height) and aerial spraying is most useful for areas with dense cane (USDA Forest Service 2014). Chemical control methods are less feasible for large-scale

cane infestations, and care must be taken so broad herbicide applications do not have adverse impacts on nontarget vegetation.

Mechanical Control. Common mechanical control methods were identified in **Table 2-1**. These methods include hand removal, excavating, mulching, and prescribed burning. Typically, mechanical control methods are combined with chemical control methods, such as cutting cane early in the growing season, waiting 3 to 6 weeks for regrowth, and then spraying herbicide, or mulching cane in the fall followed by excavation of roots and cane debris and spraying herbicide (USDA Forest Service 2014).

Biological Control. Two biological control agents, the Arundo wasp (*Tetramesa romana*) and the Arundo scale (*Rhizaspidiotus donacis*), have been evaluated, released, and established in the United States and Mexico. The Arundo wasp and the Arundo scale have been released at selected sites along the Rio Grande since 2009 and 2010, respectively. These biological control agents were found to be specific to cane and unlikely to harm native or cultivated plants in the Americas, and quarantine greenhouse studies have shown that both agents have the potential to significantly damage cane by suppressing leaf and stem growth (USDA APHIS 2009, USDA APHIS 2010). Release of a third biological control agent, the Arundo leafminer (*Lasioptera donacis*), is planned for 2016 (Goolsby 2014, Thomas and Goolsby 2015).

Specific Projects/Programs. Following are brief descriptions of specific cane control projects and programs in the Rio Grande basin in Texas.

- CBP proposed to remove cane along a 16-mile corridor (595 acres) along the Rio Grande using mechanical removal and cut stem and herbicide application (CBP 2008c). To date, only a pilot project of 1.1 miles (27 acres) of removal has been completed.
- In 2015, the Texas State Soil and Water Conservation Board (TSSWCB) was directed by the 84th Texas Legislature through Senate Bill 1734 to develop and implement a program to eradicate cane along the Rio Grande. TSSWCB envisions long-term management of cane through an ecosystem-based approach that will integrate the use of biological, chemical, mechanical, and cultural controls, as appropriate, to manage cane along the entire Rio Grande. Such an approach should promote the establishment of beneficial native plants, and will necessitate a long-term maintenance program to ensure eradication is successful. Participation in the program would be voluntary for landowners (TSSWCB 2015). To date, funding for this program has not been appropriated.
- The International Boundary and Water Commission conducts mowing maintenance annually along the Rio Grande to help convey high flow during rainy seasons and manage access to the river.
- The National Park Service uses a combination to fire and herbicides to manage cane at Big Bend National Park, Texas.
- The Texas Department of Parks and Wildlife uses herbicides to control cane (and common reed, *Phragmites)* growing in the alternate river channels of Bentsen State Park in Mission, Texas.

- Irrigation and drainage districts in the Lower Rio Grande Valley in Texas (Brownsville, Harlingen, Mercedes, McAllen, and La Hoya) use mechanical control, shredders, and backhoes for control of cane along irrigation canals and drainage ditches.
- The Maverick Irrigation District in Eagle Pass, Texas uses mechanical and chemical control to manage cane along irrigation canals and drainage ditches.
- TXDOT uses mechanical and chemical control to maintain cane populations along roadsides. The problem is most severe in south-central Texas near College Station (USDA APHIS 2010).

4.1.2 Cumulative Tactical Infrastructure in Texas

A substantial amount of tactical infrastructure has been constructed by CBP along the U.S./Mexico international border. Some of this tactical infrastructure was covered under the DHS Secretary's waiver, and CBP prepared ESPs to analyze the potential environmental impacts associated with construction and maintenance of this tactical infrastructure covered by the waiver. Other tactical infrastructure not covered under the waiver was analyzed in other NEPA documents. This cumulative effects analysis focuses on all assets associated with the maintenance and repair of CBP tactical infrastructure in the cane control area. **Table 4-1** summarizes the total tactical infrastructure to be maintained and repaired by CBP within the cane control area. It is reasonable to assume that CBP will continue to construct and install tactical infrastructure assets, thereby adding to the totals in the table.

Table 4-1. Summary of Existing Tactical Infrastructure Assets in the Cane Control Area

Asset (units)	Approximate Total
Fences and Gates (miles)	130
Roads and Integrated Bridges/Crossovers (miles)	710
Drainage Management Structures (number)	17
Linear Vegetation Control Areas (miles)	340
Vegetation Control Areas (acres)	3,025
Bridges	7
Lighting and Ancillary Power Systems	285
Boat Ramps	32
Towers (number)	63
Equipment Storage Areas (acres)	8

Note: Table 4-1 is based on GIS data dated September 26, 2014. Totals provided should be considered approximate as asset data are refined and added.

4.2 Cumulative Impacts Analysis

Effects of the Proposed Action combined with other past, present, and reasonably foreseeable actions identified in **Section 4.1** would not be expected to result in significant adverse cumulative effects. This section discusses the resource-specific cumulative effects.

Geology and Soils. The potential for effects on geology and soils is limited to areas where off-road tractor operation would occur within the cane control area. Short-term, intermittent, negligible, adverse effects on soils would be anticipated due to off-road tractor use that could result in soil compaction. This could lead to increased rates of erosion and alter soil structure, which in turn would impact the soils' ability to conduct water, nutrients, and air that are essential to plant and soil organism survival. Implementation of appropriate BMPs, including using existing roads and previously disturbed areas to access cane stands, where possible, and accessing remote cane stands via the shortest route, would minimize impacts on soils. The maintenance and repair of past, present, and foreseeable future tactical infrastructure would be expected to result in short-term, minor, cumulative adverse effects that are localized to the areas where ground disturbance has occurred. The adoption of appropriate BMPs and proposed schedule for maintenance for the maintenance and repair and construction projects would ensure that erosion would be minimized and erosion-creating activities well dispersed throughout the region avoiding any pockets of intense activity. Use of herbicides in other ongoing vegetation control projects could also result in localized short-term and long-term, adverse effects due to increased erosion and sedimentation from a decrease in vegetative cover. In the event that cane control activities and activities that result in ground disturbance occur simultaneously and in proximity, short-term, intermittent, negligible adverse cumulative effects could occur.

Vegetation. Minor to moderate cumulative effects on native species vegetation and habitat and introductions of nonnative species are observable from past and present development and land use. In addition, indirect, adverse impacts and loss of habitat occurred during construction of pedestrian and vehicle fence and other tactical infrastructure along the international border. The Proposed Action does not involve new development activities, but could result in short- and long-term, negligible to minor, direct and indirect, adverse effects on vegetation from crushing of non-target vegetation, soil compaction by tractors, accidental spills, and possible spread of the invasive cane. Other cane control projects would be expected to result in similar, but greater, impacts on vegetation when compared with the Proposed Action because most of these projects involve complete removal of cane, which creates ground disturbance and impacts on non-target vegetation. Removal of invasive cane through implementation of other cane control projects in combination with the proposed mechanical cane topping would result in cumulative beneficial effects on vegetation by allowing for the colonization of native vegetation. Maintenance and repair of tactical infrastructure would be expected to result in generally negligible to minor adverse effects on terrestrial and aquatic vegetation. BMPs would ensure impacts on vegetation including the introduction of nonnative species would be minimized for these projects, and consequently the cumulative effects on vegetation resources would be considered negligible to minor.

Terrestrial and Aquatic Wildlife Resources. Minor to moderate, adverse effects on wildlife species have occurred from the additive effects of past and present actions through the establishment of invasive species (e.g., cane and tamarisk), although there is quality habitat in the cane control area to support wildlife. The Proposed Action does not involve new development activities, and effects on wildlife and aquatic species are limited generally to the cane control area. Cane control activities would be expected to result in generally negligible to minor, adverse effects on wildlife and aquatic species. Operation of tractors would generate temporary noise and could displace wildlife species, and smaller, less-mobile species could inadvertently be directly impacted by cane control activities through collision or crushing by equipment. Periodic operation of a barge could have direct and indirect effects on benthic aquatic

species and habitat. Under the CBP cane control Work Plan, which would cover all CBP cane control activities in the region of analyses, BMPs would ensure impacts on terrestrial and aquatic wildlife resources would be minimized and, therefore, the cumulative impacts on terrestrial and aquatic wildlife resources would also be considered to be negligible to minor.

Threatened and Endangered Species. As discussed in **Section 3.5**, CBP is informally consulting with USFWS under Section 7 of the ESA regarding potential effects on listed species and designated critical habitat. A separate impact analysis has been developed under NEPA and presented in this EA, and parallels effects determinations made for the Section 7 consultation process.

The designation of threatened or endangered species by USFWS implies that past activities have had major adverse effects on these species. Threatened and endangered species are commonly protected because the number of individuals for a species and their historic range and habitat have been decimated and will only support a small number of individuals. Some species have declined for natural reasons, but declines are commonly exacerbated or accelerated by anthropogenic influences, such as agriculture, livestock grazing, urban development and road construction, overcollection of individuals, trampling and off-road vehicle use, hydrologic modifications, and altered fire regimes. Once native vegetation and habitat are disturbed, introduced species can colonize more readily and out-compete native species. Some species occupy specific niches, so even minor alterations are not tolerated well.

There are 22 species federally listed as threatened or endangered that are known to occur within or near the cane control area. **Section 3.5** presents detailed descriptions for each of these species. Cumulatively, present and future activities are likely to continue to affect threatened and endangered species. Potential threats include habitat loss from urbanization and road construction, trampling of protected plants, corridor fragmentation, and noise from increasingly urban areas. The ESA is intended to continue to protect threatened and endangered species with the goal of recovery.

The Proposed Action would generally be expected to have negligible to minor effects on threatened or endangered species that have been identified as potentially occurring in the cane control area. Effects include temporary noise for operation of machinery and causing species to flee with a potential for inadvertendly injuring or killing species. Vegetation control and the construction and maintenance and repair of tactical infrastructure that was included under the waiver or previous NEPA documentation (see projects identified in **Table 4-1**) was constructed under the supervision of biological monitors to ensure that BMPs and approved mitigation measures were followed for the protection of threatened and endangered species. No direct, adverse effects on threatened and endangered species or takes were identified in the Environmental Stewardship Summary Reports during construction of pedestrian and vehicle fence along the U.S./Mexico international border in Texas (CBP 2011, CBP 2012a, CBP 2012b, CBP 2012c). Under the CBP cane control Work Plan, BMPs and conservation measures identified in this EA would be implemented to ensure any impacts on threatened and endangered species would be minimized. Therefore, Proposed Action would result in no or very minor habitat degradation and other direct and indirect impacts on threatened and endangered species, and any contribution to cumulative adverse effects would be negligible to minor and not significant.

Surface Waters and Waters of the United States. Surface water quality of subwatersheds within the cane control area has historically been significantly affected by various inputs, including urban, agricultural, and livestock runoff and septic, wastewater, and industrial discharges. Some surface water bodies are consequently on USEPA's 303(d) list of impaired waters, as discussed in **Section 3.6**. Historically significant wetland losses have resulted from draining, dredging, filling, leveling, and flooding for agricultural and urban development.

The Proposed Action does not involve new development activities, but indirect, minor, adverse effects, such as deposition of fill materials (e.g., soil erosion and cane trimmings), increased sedimentation, and decreased water quality within the stream segments, could occur on surface waters from increased runoff from soil compaction caused by off-road tractor operation. Under the CBP cane control Work Plan, BMPs would ensure impacts on surface water and wetlands are minimized. Cumulatively, effects on surface waters and waters of the United States from cane control would be minor in the short term. No long-term cumulative effects would occur.

Floodplains. Floodplain resources can be adversely impacted by development, increases in impervious areas, loss of vegetation, hydrological changes, and soil compaction. Historically, natural floodplains have been permanently altered by development activities and the construction of canals and reservoirs. The Proposed Action does not involve new development activities and would have no direct effects on floodplains. Cane control could result in increased sedimentation into floodplains and drainage structures, but this would be an indirect, negligible effect. Ongoing maintenance of CBP tactical infrastructure would be expected to have similar effects. Cumulatively, effects on floodplains from cane control activities would therefore be negligible.

Air Quality. Counties within the cane control area have been designated unclassified/attainment for all criteria pollutants, except for El Paso County, which has been designated as maintenance for CO and nonattainment (moderate classification) for PM_{10}. The Proposed Action would have long-term, negligible, adverse effects on air quality during cane control activities. The annual air emissions from the Proposed Action would be well below all applicable significance criteria. Ground-disturbing activities, such as vegetation control projects and tactical infrastructure maintenance and repair, could result in cumulative, adverse effects particularly if there are multiple projects occurring at the same time and in the same vicinity. The adoption of appropriate BMPs for these projects and proposed schedule for tactical infrastructure maintenance and repair would ensure that dust creation would be minimized, and dust-creating activities would be well dispersed throughout the region avoiding any pockets of intense activity. Consequently, cumulative effects on local and regional air quality from the cane control activities would be negligible.

Noise. Cumulative effects on the noise environment occur when a project has noise emissions that are noticeably loud or that raise ambient noise levels. New noise sources are generally more noticeable in areas that have lower ambient noise levels. Cumulative effects on noise could occur where multiple projects are occurring at the same time and in the same vicinity because noise attenuates over distance.

The Proposed Action would have short-term, localized, negligible adverse effects as a result of the operation of tractors to trim cane. Cane control would be distant from most other substantial noise-generating activities, so there is little potential for cumulative effects from noise. Increased noise from the operation of the tractors could nonetheless combine with existing noise sources to

produce a temporary cumulative effect on noise-sensitive receptors. The combined noise of several projects occurring simultaneously in proximity might be heard over a greater distance, but effects would be short-term and localized. Under the Work Plan, the adoption of appropriate BMPs such as maintaining mufflers on motorized equipment and operation of equipment only one or two times a year in any given location would minimize noise impacts, and noise-creating activities would be well dispersed throughout the region avoiding any pockets of intense activity. Consequently, existing noise sources would continue to dominate the noise environment and, cumulatively, effects on the noise environment would be negligible.

Cultural Resources. Historically, long-term, major, adverse effects on cultural resources have likely occurred from the destruction or alteration of resources before their significance was realized. To avoid or minimize adverse effects from the Proposed Action, avoidance buffers are recommended around archaeological sites within the cane control area to minimize direct impacts on the sites. Tactical infrastructure construction for those projects identified in **Table 4-1** was performed under the supervision of cultural resources specialists to ensure known cultural resources would be protected and that any unanticipated discoveries would be identified and coordinated with the appropriate Federal, state, or tribal parties. CBP prepared detailed cultural resources reports and surveyed areas prior to construction, and groundbreaking activities were subsequently monitored. Cumulatively, effects on cultural resources from cane control when combined with other actions would be negligible.

Hazardous Materials and Waste Management. Past development and land uses have resulted in hazardous waste sites requiring remediation in the cane control area. As discussed in **Section 3.11**, Federal and state regulations govern the storage, transportation, handling, use, generation, and disposal of hazardous substances, petroleum products, and hazardous and petroleum wastes. Portions of the cane control area is agricultural, so herbicides and pesticides are likely used and stored. Pesticide sale and use are also regulated.

The Proposed Action and maintenance and repair of CBP tactical infrastructure in the cane control area would use small amounts of hazardous materials. Quantities of hazardous materials required for equipment used for cane control activities would be relatively small, contained to work sites, and handled in accordance with all Federal and Texas laws and regulations. Localized, adverse effects could occur in the event of a spill, but the potential for cumulative, adverse effects is minimal. Cumulatively, effects on hazardous materials and waste management from cane control activities whe combined with other actions would be negligible.

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6. List of Preparers

This EA has been prepared under the direction of CBP. The individuals that assisted in resolving and providing agency guidance for this document are listed as follows:

Joseph Zidron (CBP)
Environmental Protection Specialist
Border Patrol Facilities and Tactical Infrastructure
Program Management Office
Facilities Management and Engineering

This EA has been prepared by HDR under the direction of CBP. The individual contractor personnel that contributed to the preparation of this document are listed as follows:

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A

Applicable Laws, Regulations, Policies, and Planning Criteria

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APPENDIX A: APPLICABLE LAWS AND EXECUTIVE ORDERS

Table A-1. Applicable Laws and Executive Orders[1]

Title, Citation	Summary
Archaeological and Historical Preservation Act, 16 United States Code (USC) 469	Protects and preserves historical and archaeological data. Requires Federal agencies to identify and recover data from archaeological sites threatened by a proposed action(s).
Clean Air Act, 42 USC 7401–7671q, as amended	Establishes Federal standards for air pollutants. Prevents significant deterioration in areas of the country where air quality fails to meet Federal standards.
Clean Water Act, 33 USC 1251–1387 (also known as the Federal Water Pollution Control Act)	Comprehensively restores and maintains the chemical, physical, and biological integrity of the nation's waters. Implemented and enforced by the U.S. Environmental Protection Agency (USEPA).
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601–9675 (also known as "Superfund")	Provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and cleanup of inactive hazardous substance disposal sites. Establishes a fund financed by hazardous waste generators to support cleanup and response actions.
Endangered Species Act of 1973, 16 USC 1531–1543, as amended	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Prohibits Federal action that jeopardizes the continued existence of endangered or threatened species. Requires consultation with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration Fisheries and a biological assessment when such species are present in an area affected by Federal government activities.
Fish and Wildlife Coordination Act, 16 USC 661–667e, as amended	Authorizes the Secretaries of the Interior and Commerce to provide assistance to and cooperate with Federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. The 1946 amendments require consultation with USFWS and the state fish and wildlife agencies involving any waterbodies that are proposed or authorized, permitted, or licensed to be impounded, diverted, or otherwise controlled or modified by any agency under a Federal permit or license.
Migratory Bird Treaty Act, 16 USC 703–712	Implements various treaties for protecting migratory birds; the taking, killing, or possession of migratory birds is unlawful.
National Environmental Policy Act of 1969, 42 USC 4321–4370e, as amended	Requires Federal agencies to use a systematic approach when assessing environmental impacts of government activities. Proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts to the environment.

Title, Citation	Summary
National Historic Preservation Act, 54 USC § 300101 et seq	Requires Federal agencies to consider the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object eligible for inclusion, or listed in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through NRHP listing), and protection of significant historical and cultural properties.
Noise Control Act of 1972, 42 USC 4901–4918	Establishes a national policy to promote an environment free from noise that jeopardizes health and welfare. Authorizes the establishment of Federal noise emissions standards and provides relevant information to the public.
Occupational Safety and Health Act of 1970, 29 USC 651–678	Establishes standards to protect workers, including standards on industrial safety, noise, and health standards.
Resource Conservation and Recovery Act, 42 USC 6901–6992k	Establishes requirements for safely managing and disposing of solid and hazardous waste and underground storage tanks.
Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, July 14, 1982, 47 Federal Register (FR) 30959 (6/16/82), as supplemented	Requires Federal agencies to consult with state and local governments when proposed Federal financial assistance or direct Federal development impacts interstate metropolitan urban centers or other interstate areas.
EO 12898, *Environmental Justice*, February 11, 1994, 59 FR 7629 (2/16/94), as amended	Requires certain Federal agencies, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13693, *Planning for Federal Sustainability in the Next Decade*	Directs Federal agencies to reduce direct greenhouse gas emissions by at least 40 percent over the next decade while at the same time fostering innovation, reducing spending, and strengthening the communities in which Federal facilities operate. It is also designed to promote building energy conservation, efficiency, and management; ensure that percentages of building electrical energy and thermal energy will be clean (renewable and alternative) energy; ensure that the total building energy consumed by the agency incorporates renewable energy; and to incorporate renewable energy guidelines where feasible.
EO 13175, *Consultation and Coordination with Indian Tribal Governments*, November 6, 2000, 65 FR 67249 (11/09/00)	Requires Federal agencies to establish an accountable process that ensures meaningful and timely input from tribal officials in developing policies that have tribal implications.

Title, Citation	Summary
EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds,* January 10, 2001, 66 FR 3853 (1/17/01)	Requires each agency to ensure that environmental analyses of Federal actions (required by the National Environmental Policy Act or other established environmental review processes) evaluate the effects of actions and agency plans on migratory birds, emphasizing species of concern. Agencies must support the conservation intent of migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities, and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.
EO 11593, *Protection and Enhancement of the Cultural Environment,* May 13, 1971, 36 FR 8921 (5/15/71)	Requires all Federal agencies to locate, identify, and record all cultural resources, including significant archeological, historical, or architectural sites.

Note:

1. This table only reflects those laws and EOs that might reasonably be expected to apply to the Proposed Action and alternatives addressed in this EA.

Other laws and EOs evaluated for this EA include, but are not limited to, the following:

- American Indian Religious Freedom Act, 42 USC 1996, et seq.
- Antiquities Act, 16 USC 433, et seq.; Archeological Resources Protection Act, 16 USC 470 aa-ll, et seq.
- Architectural Barriers Act, 42 USC 4151, et seq.
- Community Environmental Response Facilitation Act, 42 USC 9620, et seq.
- Department of Transportation Act, Public Law (P.L.) 89-670, 49 USC 303, Section 4(f), et seq.
- Emergency Planning and Community Right-to-Know Act, 42 USC 11001–11050, et seq.
- Environmental Quality Improvement Act, P.L. 98-581, 42 USC 4371, et seq.
- Farmlands Protection Policy Act, P.L. 97-98, 7 USC 4201, et seq.
- Federal Insecticide, Fungicide, and Rodenticide Act, P.L. 86-139, 7 USC 135, et seq.
- Federal Records Act, 44 USC 2101-3324, et seq.
- Fish and Wildlife Act of 1956, P.L. 85-888, 16 USC 742, et seq.
- Native American Graves Protection and Repatriation Act, 25 USC 3001, et seq.
- Pollution Prevention Act of 1990, 42 USC 13101-13109, et seq.
- Safe Drinking Water Act, P.L. 93-523, 42, USC 201, et seq.
- Toxic Substances Control Act, 7 USC 136, et seq.
- Wild and Scenic Rivers Act, P.L. 90-542, 16 USC 1271, et seq.
- EO 12114, dated January 9, 1979, *Environmental Effects Abroad of Major Federal Actions*, 44 FR 1957

- EO 12088, dated October 13, 1978, *Federal Compliance with Pollution Control Standards*, 43 FR 47707, as amended by EO 12580, dated January 23, 1987, and revoked (in part) by EO 13148, dated April 21, 2000
- EO 13132, dated August 4, 1999, *Federalism*, 64 FR 43255
- EO 13007, dated May 24, 1996, *Historic Sites Act*, 16 USC 46, et seq.; Indian Sacred Sites, 61 FR 26771
- EO 13112, dated February 3, 1999, *Invasive Species*, 64 FR 6183, as amended by EO 13286, February 28, 2003, 68 FR 10619
- EO 11514, dated March 5, 1970, *Protection and Enhancement of Environmental Quality*, 35 FR 4247, as amended by EO 11541, July 1, 1970, 35 FR 10737 and EO 11991, May 24, 1977, 42 FR 26967
- EO 13045, dated April 21, 1997, *Protection of Children from Environmental Health and Safety Risks*, 62 FR 19885, as amended by EO 13229, October 9, 2001, 66 FR 52013 and EO 13296, April 18, 2003, 68 FR 19931
- EO 11990, dated May 24, 1977, *Protection of Wetlands*, 42 FR 26961, as amended by EO 12608, September 9, 1987, 52 FR 34617.

B

Public Involvement and Agency Coordination

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APPENDIX B: PUBLIC INVOLVEMENT AND AGENCY COORDINATION

Interested Party List

Copies of the Coordination Letter with instructions for accessing the Draft EA were sent to the following agencies and interested parties during the Draft EA public review period:

FEDERAL AGENCY CONTACTS

Mr. John Blevins
Division Director
U.S. EPA Region 6

Mr. David Larson
Chief of Resource Management
Big Bend National Park

Mr. Tom Bruechert
Texas Environmental Team Leader
U.S. Department of Transportation

Commissioner Edward Drusina
Commissioner
International Boundary and Water Commission

Ms. Sue Masica
Regional Director, Intermountain Region
National Park Service

Ms. Mary Orms
U.S. Fish and Wildlife Service

Ms. Ofelia Parra Amaro
International Boundary and Water Commission

Ms. Andrée DuVarney
National Environmental Coordinator
U.S. Department of Agriculture

Mr. Robert Houston
Chief of Office of Planning and Coordination
U.S. Environmental Protection Agency, Region 6

Mr. Ron Curry
Administrator
U.S. Environmental Protection Agency

Mr. Adam Zerrenner
Field Supervisor
U.S. Fish and Wildlife Service

Mr. Robert Jolley
Field Office Manager
BLM Amarillo Field Office

Mr. Ernesto Reyes
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Texas Coastal Ecological Services Field Office

STATE AGENCY CONTACTS

Mr. Clayton Wolf
Director of Wildlife
Texas Parks and Wildlife, Wildlife Diversity Program

Ms. Jody Henneke
Deputy Commissioner
Texas General Land Office

Mr. John Howard
Environmental Policy Director
Governor's Policy Office

Ms. Patty Reeh
Regional Director
Texas Commission on Environmental Quality

Mr. Carter Smith
Executive Director
Texas Parks and Wildlife

Mr. James M. Bass
Executive Director
Texas Dept. of Transportation

Mr. Stephen J. Benn
Area Manager
Texas Parks and Wildlife

Ms. Julie Wicker
Texas Parks and Wildlife

Mr. Archie Clouse
Regional Director
Texas Commission on Environmental Quality

Ms. Lorinda Gardner
Regional Director
Texas Commission on Environmental Quality

Mr. Mark Lockwood
Regional Director
Texas Parks and Wildlife

Environmental Policy Director
Governor's Policy Office

Mr. Carlos Rubinstein
Area Director
Texas Commission on Environmental Quality

Mr. David A. Ramirez
Area Director
Texas Commission on Environmental Quality

Mr. Jaime A. Garza
Regional Director
Texas Commission on Environmental Quality

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission

LOCAL CONTACTS

The Honorable Oscar Leeser
Mayor
City of El Paso, Mayor's Office

Mr. Tommy Gonzalez
City Manager
City of El Paso

The Honorable Veronica Escobar
County Judge
El Paso County, Commissioners Court

The Honorable Mike Doyal
County Judge
Hudspeth County, Commissioners Court

The Honorable Carlos G. Urias
County Judge
Culberson County, Commissioners Court

The Honorable Jeannette Duer
County Judge
Jeff Davis County, Commissioners Court

The Honorable Dan Dunlap
Mayor
City of Marfa

Mr. James R. Mustard
City Administrator
City of Marfa

Mr. Jim White
County Commissioner
Presidio County

The Honorable John Ferguson
Mayor
City of Presidio

Mr. Marco Baeza
City Administrator
City of Presidio

The Honorable Avinash Rangra
Mayor
City of Alpine

Mr. Erik Zimmer
City Manager
City of Alpine

The Honorable Eleazar R. Cano
County Judge
Brewster County

The Honorable Joe Shuster
County Judge
Pecos County, Commissioners Court

The Honorable Santiago Flores
County Judge
Terrell County, Commissioners Court

The Honorable Robert Garza
Mayor
City of Del Rio

Mr. Henry Arredondo
City Manager
City of Del Rio

The Honorable Efrain V. Valdez
County Judge
Val Verde County, Commissioners Court

The Honorable Souli A. Shanklin
County Judge
Edwards County, Commissioners Court

The Honorable Tully Shahan
County Judge
Kinney County, Commissioners Court

The Honorable Ramsey English Cantu
Mayor
City of Eagle Pass

Mr. Roberto Gonzalez
City Manager
City of Eagle Pass

The Honorable David Saucedo
County Judge
Maverick County, Commissioners Court

The Honorable William R. Mitchell
County Judge
Uvalde County, Commissioners Court

The Honorable Joe Luna, Esq.
County Judge
Zavala County, Commissioners Court

The Honorable Francisco G. Ponce
County Judge
Dimmit County, Commissioners Court

The Honorable Pete Saenz
Mayor
City of Laredo

Mr. Jesus Olivares
City Manager
City of Laredo

The Honorable Tano E. Tijerina
County Judge
Webb County, Commissioners Court

The Honorable Joe Rathmell
County Judge
Zapata County, Commissioners Court

The Honorable Joel Villarreal
Mayor
Rio Grande City

Ms. Elisa Y. Beas
Deputy City Manager
Rio Grande City

The Honorable Eloy Vera
County Judge
Starr County, Commissioners Court

The Honorable Roberto Salinas
Mayor
City of Roma

Mr. Crisanto Salinas
City Manager
City of Roma

The Honorable Jim Darling
Mayor
City of McAllen

Mr. Roy Rodriguez
City Manager
City of McAllen

The Honorable Ramon Garcia
County Judge
Hidalgo County, Commissioners Court

The Honorable Tony Martinez
Mayor
City of Brownsville

Mr. Charlie Cabler
City Manager
City of Brownsville

The Honorable Chris Boswell
Mayor
City of Harlingen

Mr. Dan Serna
City Manager
City of Harlingen

The Honorable Pete Sepulveda, Jr.
County Judge
Cameron County, Commissioners Court

Israel M. Reyna
Barrio de Colores

Mr. Gabriel Perez
Environmental Manager
Union Pacific Railroad

TRIBAL CONTACTS

The Honorable Javier Loera
War Captain/Tribal Historic Preservation Officer
Ysleta del Sur Pueblo

The Honorable Wallace Coffey
Chairman
Comanche Nation

The Honorable Juan Garza Jr.
Chairman
Kickapoo Traditional Tribe of Texas

The Honorable Billy Evans Horse
Chairman
Kiowa Tribe of Oklahoma

The Honorable Carlos Hisa
Governor
Ysleta del Sur Pueblo

The Honorable Danny Breuninger, Sr.
President
Mescalero Apache Tribe of the Mescalero Reservation

The Honorable Amber Toppah
Chairwoman
Kiowa Tribe of Oklahoma

The Honorable Michael Burgess
Chairman
Comanche Nation of Oklahoma

Mrs. Augustine Asbury
Alabama-Quassarte Tribal Town

Mr. Jimmy Arterberry
Comanche Nation of Oklahoma

Ms. Linda Langley
Coushatta Tribe of Louisiana

Ms. Nekole Alligood
Cultural Preservation Director
The Delaware Nation

Mr. Charles Coleman
Thlopthloco Tribal Town

Ms. Miranda “Nax’ce” Myer
Tonkawa Tribe of Oklahoma

Ms. Jean Ann Lambert
Quawpaw Tribe of Oklahoma

The Honorable Terri Parton
President
Wichita and Affiliated Tribes

The Honorable Lyman Guy
Chairman
Apache Tribe of Oklahoma

Letter from Texas State Historic Preservation Officer

1300 Pennsylvania Avenue NW
Washington, DC 20229

U.S. Customs and Border Protection

APR 29 2016

RECEIVED
MAY 02 2016

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
1511 Colorado Street
Austin, TX 78701

REFERENCE: Section 106 Consultation for U.S. Customs and Border Protection, U.S. Border Patrol, Mechanical Topping of Carrizo Cane along the Rio Grande River in Texas

Dear Mr. Wolfe:

U.S. Customs and Border Protection (CBP) is informing your office that it plans to assume maintenance activities in the form of vegetation control of Carrizo cane (*Arundo donax*) along the Rio Grande River Basin in Texas (See Enclosed Figure). CBP would mechanically top (i.e., trim) the cane to a height of 1 meter (3.3 feet) using a mechanical cutter bar mounted on a four-wheel-drive tractor. No ground disturbance would occur as result of the proposed action.

The purpose of the Project is to implement mechanical control of cane via topping to ensure sufficient visibility of critical areas along the Rio Grande basin for U.S. Border Patrol (USBP) agents, when necessary. Large, dense stands of cane currently occupy the banks and floodplains of the Rio Grande, hindering law enforcement efforts along the U.S./Mexico international border, impeding and concealing the detection of criminal activity and illegal border crossers, restricting USBP agents' access to riverbanks, and damaging the ecological function and biodiversity of the Rio Grande. The action to be cleared does not entail any excavation or subsurface disturbance, and has been undertaken in the past by various local crews.

The Area of Potential Effect (APE) is defined as the cane control area. The cane control area occurs along the Rio Grande and extends up to 0.5 mile (2,640 feet) inland of the river and covers approximately 120,400 acres (See Enclosed Figure).

Pursuant to Section 800.4(d), CBP has determined that no historic properties will be affected. CBP respectfully requests your concurrence with our determination at this time.

CBP will also invite the following tribes to consult concerning this undertaking pursuant to § 800.2(c)(1)(i) and § 800.2(c)(2):

Tonkawa Tribe of Oklahoma
Comanche Nation of Oklahoma
Ysleta del Sur Pueblo

CONCUR
by Justin Kockrita
for Mark Wolfe
Executive Director, THC
Date 5/9/2016
Track# 201606891

Mescalero Apache Tribe of the Mescalero Reservation
Kickapoo Traditional Tribe of Texas

If you have any questions or concerns, please feel free to contact Joseph Zidron at (949) 643-6392 - Office; (949) 307-2982 - Mobile; or joseph.zidron@DHS.gov.

Sincerely,

Paul Enriquez
Environmental Branch Chief
Border Patrol Facilities and Tactical Infrastructure
Program Management Office
24000 Avila Road, Suite 5020
Laguna Niguel, CA 92677

Enclosure

Letter to U.S. Fish and Wildlife Service

1300 Pennsylvania Avenue NW
Washington, DC 20229

U.S. Customs and Border Protection

JUN 14 2016

Mr. Ernesto Reyes
Fish and Wildlife Biologist
Texas Coastal Ecological Services Field Office
Alamo Sub-Office
Route 2, Box 202A
Alamo, TX 76516

Subject: Request for Concurrence with the Not Likely to Adversely Affect Determinations for Control of Carrizo Cane (*Arundo donax*) within the Rio Grande Basin, Texas

Dear Mr. Reyes:

The Department of Homeland Security, U.S. Customs and Border Protection (CBP) proposes to conduct mechanical control of Carrizo cane (*Arundo donax*) in the Rio Grande basin in Texas (i.e., the Proposed Action, also referred to as cane control). The CBP Facilities Management and Engineering (FM&E) Office is responsible for maintenance and repair of tactical infrastructure, including vegetation control, to support CBP border security requirements. CBP FM&E would mechanically top (i.e., trim) the cane to a height of approximately 3 feet using a mechanical cutter bar mounted on a four-wheel-drive tractor. For this Proposed Action, CBP is preparing an environmental assessment in accordance with the requirements of the National Environmental Policy Act.

To comply with Section 7(a)(2) of the Endangered Species Act, CBP has analyzed effects of the Proposed Action on species classified as threatened or endangered. CBP has determined through that analysis that the planned cane control may affect, but is not likely to adversely affect the 22 species federally listed as threatened or endangered and designated critical habitat for three species that are known to occur within or near the action area (see **Enclosure A**). Additionally CBP has developed maps that display the ranges and critical habitats in and near the action area for these 22 species that are federally listed as threatened or endangered (see **Enclosure B**).

In accordance with 50 Code of Federal Regulations 402.13, CBP requests concurrence from the U.S. Fish and Wildlife Service that the planned cane control may affect, but is not likely to adversely affect listed species and designated critical habitat.

We appreciate your assistance with this project. If you have any questions or concerns, please contact me by telephone at (949) 643-6392, or via email at Joseph.Zidron@cbp.dhs.gov.

Sincerely,

Joseph Zidron
Environmental Branch Chief (A)
Border Patrol Facilities and Tactical Infrastructure
Program Management Office

Enclosures

Sample Interested Party Letter

1300 Pennsylvania Avenue NW
Washington, DC 20229

U.S. Customs and
Border Protection

Mr. John Blevins
Division Director
U.S. EPA Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Subject: Notice of Availability for the Draft Environmental Assessment (EA) Supporting the Mechanical Control of Carrizo Cane in the Rio Grande Basin in Texas

Dear Mr. Blevins:

U.S. Customs and Border Protection (CBP), a component within the Department of Homeland Security (DHS), proposes to conduct mechanical control of Carrizo cane (*Arundo donax*) in the Rio Grande basin in Texas. Pursuant to the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (USC) 4321 et seq., CBP has prepared a Draft EA to identify and assess the potential impacts of mechanically topping (i.e., trimming) the cane to a height of approximately 3 feet (1 meter) using a mechanical cutter bar mounted on a four-wheel drive tractor. CBP may periodically determine that topping of cane on the shoreline of the Rio Grande is necessary and conditions dictate that the activity would be conducted from a barge on the river. Additionally, a small amount of cane could also be topped with hand-held trimmers.

The vegetation control actions that are part of maintenance and repair of tactical infrastructure assets that have already been addressed in previous NEPA documents or tactical infrastructure assets that are covered by a waiver issued by the Secretary of the DHS under the authority of the Illegal Immigration Reform and Immigrant Responsibility Act of 1966 are not within the scope of the Proposed Action. The analysis in the Draft EA considers two alternatives, the Proposed Action and the No Action Alternative.

The EA complies with NEPA, the Council on Environmental Quality regulations in 40 Code of Federal Regulations (CFR) Parts 1500–1508, and DHS Directive 023-01, *Environmental Planning Program*.

CBP invites public participation in the NEPA process through its solicitation of comments on the enclosed Draft EA and its associated Finding of No Significant Impact (FONSI). In order to be considered for inclusion in the Final EA, comments on the Draft EA and FONSI must be received by September 6, 2016. Please provide comments using only one of the following methods:

(a) By email to *joseph.zidron@cbp.dhs.gov*

(b) By mail to Carrizo Cane Mechanical Control EA, c/o Joseph Zidron, U.S. Customs and Border Protection, 24000 Avila Road – Suite 5020, Laguna Niguel, CA 92677

When submitting comments, please include your name and address, and identify your comments as for the Carrizo Cane Mechanical Control EA. Your comments, along with your identifying information, will be made available to the public.

Electronic copies of the Draft EA and FONSI are also available on the internet at http://www.cbp.gov/about/environmental-cultural-stewardship/cbp-environmental-documents. Hard copies of the Draft EA and FONSI can also be reviewed at the El Paso Main Public Library, Fort Hancock ISD/Public Library, Marfa Public Library, Alpine Public Library, City of Presidio Library, Val Verde County Library, Eagle Pass Public Library, Laredo Public Library, Rio Grande City Public Library, Speer Memorial Library (Mission), McAllen Public Library; Mayor Joe V. Sanchez Public Library of Weslaco, Dr. Hector P. Garcia Memorial Library (Mercedes), Harlingen Public Library, San Benito Public Library, and Brownsville Public Library, Main Branch.

If you have any technical questions, please contact Mr. Joseph Zidron by mail at Border Patrol Facilities and Tactical Infrastructure, 24000 Avila Road - Suite 5020, Laguna Niguel, CA 92677; or by telephone at (949) 643-6392.

Sincerely,

Joseph Zidron
Environmental Branch Chief (A)
Border Patrol Facilities and Tactical Infrastructure
Program Management Office

Enclosure: Draft EA and FONSI

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Detailed Maps of the Cane Control Area

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APPENDIX C: DETAILED MAPS OF THE CANE CONTROL AREA

There are approximately 34 ecological systems in the cane control area (see **Table C-1**). The ecological systems that generally define and compose more than 97 percent of the landscape within the cane control area are described below. These ecological systems were extracted from NatureServe Explorer (NatureServe 2016).

Table C-1. Ecological Systems within the Cane Control Area

Ecological Systems
Tamualipan Floodplain
North American Warm Desert Riparian Woodland and Shrubland
Tamualipan Calcareous Thornscrub
Developed
Mainly Natural
Chihuahuan Mixed Desert and Thornscrub
Pasture/Hay and Cultivated Cropland
Tamualipan Mixed Deciduous Thornscrub
Edwards Plateau Floodplain
North American Warm Desert Wash
Chihuahuan Succulent Desert Scrub
Chihuahuan Creosote Desert Scrub
North American Warm Desert Bedrock Cliff and Outcrop
Apacherian-Chihuahuan Semi-Desert Grassland and Steppe
Tamualipan Ramadero
Tamualipan Saline Thornscrub
Rio Grande Delta Thorn Woodland and Shrubland
Edwards Plateau Limestone Shrubland
Edwards Plateau Riparian
Tamualipan Savanna Grassland
North American Warm Desert Lower Montane Riparian Woodland
Edwards Plateau Liestone Savanna and Woodland
Tamualipan Palm Grove Riparian Forest
North American Warm Desert Pavement
Texas Saline Coastal Prairie
North American Warm Desert Volcanic Rockland
Edwards Plateau Dry-Mesic Slope Forest and Woodland
Chihuahuan Mixed Salty Desert Scrub
Chihuahuan Sandy Plains Semi-Desert Grassland
Edwards Plateau Cliff
Edwards Plateau Limestone Savanna and Woodland
Tamualipan Lomas
Texas Coast Salt and Brackish Tidal Marsh
Chihuahuan Loamy Plains Desert Grassland

Additionally, links are provided here for supplementary detailed maps of the ranges of federally threatened and endangered species that would require use of species-specific BMPs. The maps delineate ranges (including designated critical habitat), extent of suitable habitat, and documented sightings of the species in the area. Wilderness or other special-use designations and land management agency practices are considered in maintenance and repair planning. Coordination with land management agencies, Federal land managers, and the USFWS, if necessary, would occur and appropriate BMPs would be implemented. The maps presented are not intended to be used as an implementation tool for cane control activities, but instead represent a method to show the range of potential threatened and endangered species.

Depending on the number and nature of resources that could be impacted, a graduated series of BMPs would be identified to reduce impacts to less than significant levels. The BMPs are presented in **Appendix D** along with the affected resources. The combination of the informative maps and the relevant BMPs are intended to provide CBP with a visual framework to assist in applying appropriate cane control solutions in sensitive areas. Descriptions of state-listed rare, threatened, and endangered species, their habitat, and impact determinations are outlined in **Table C-2**.

Map Index for Texas Federally Threatened and Endangered Species

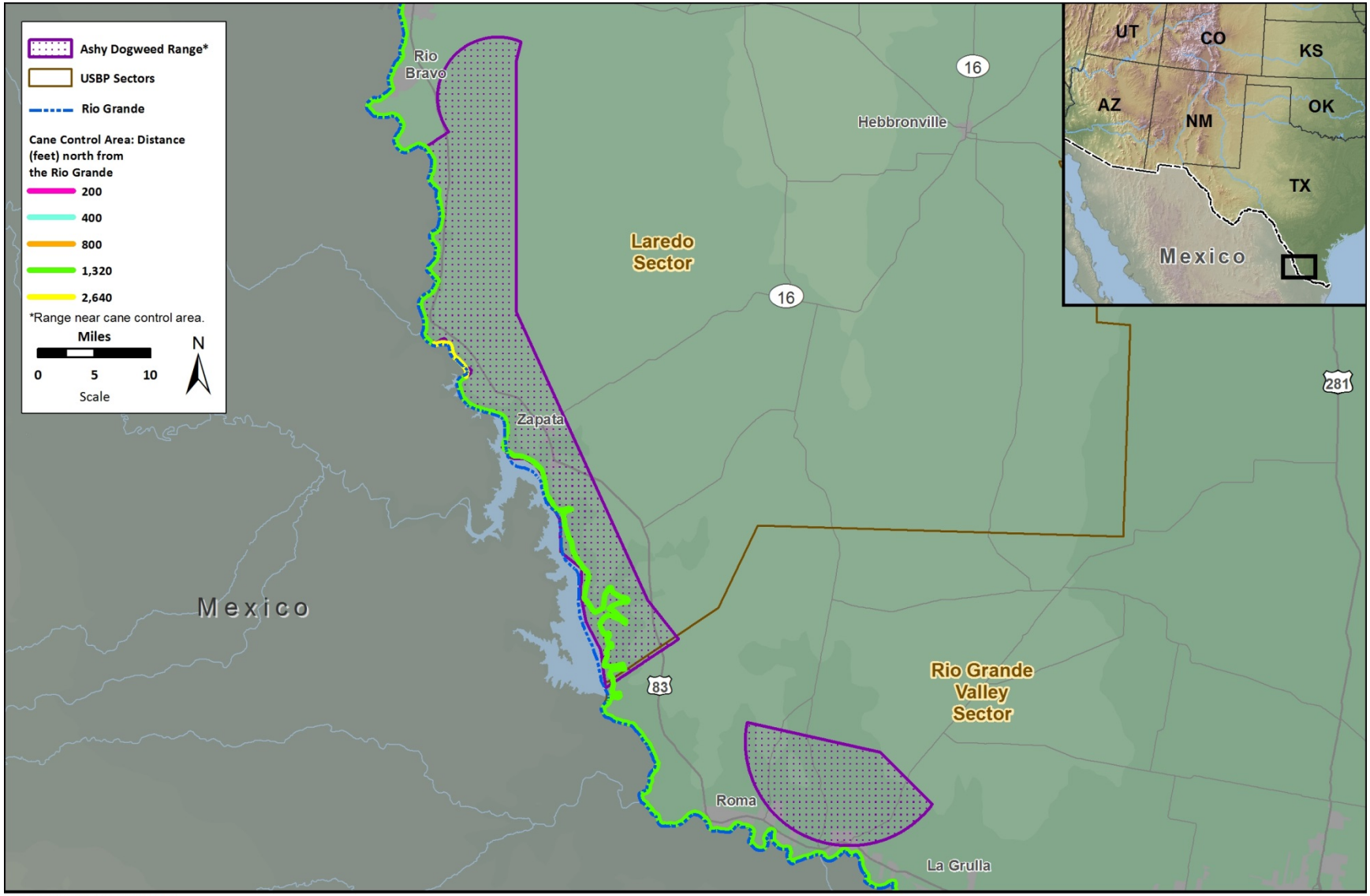
Twenty-two federally listed threatened and endangered species have the potential to occur in the can control area and could be affected by the Proposed Action. The ranges of federally listed threatened and endangered species within the cane control area are detailed in the maps linked below. Click on the species names provided below to view the range map for that species.

Threatened and Endangered Plant Species:

- Click here to view the species range map for **Ashy dogweed**.
- Click here to view the species range map for **Bunched cory cactus**.
- Click here to view the species range map for **Chisos Mountain hedgehog cactus**.
- Click here to view the species range map for **Hinckley's oak**.
- Click here to view the species range map for **Johnston's frankenia**.
- Click here to view the species range map for **Lloyd's Mariposa cactus**.
- Click here to view the species range map for **South Texas ambrosia**.
- Click here to view the species range map for **Star cactus**.
- Click here to view the species range map for **Terlingua Creek cat's-eye**.
- Click here to view the species range map for **Texas ayenia**.
- Click here to view the species range map for **Tobusch fishhook cactus**.
- Click here to view the species range map for **Walker's manioc**.
- Click here to view the species range map for **Zapata bladderpod**.

Threatened and Endangered Fish, Bird, and Mammal Species:

- Click here to view the species range map for **Big Bend gambusia**.
- Click here to view the species range map for **Devils River minnow**.
- Click here to view the species range map for **Rio Grande silvery minnow**.
- Click here to view the species range map for **Black-capped vireo**.
- Click here to view the species range map for **Southwestern willow flycatcher**.
- Click here to view the species range map for **Yellow-billed cuckoo**.
- Click here to view the species range map for **Mexican long-nosed bat**.
- Click here to view the species range map for **Gulf Coast jaguarundi**.
- Click here to view the species range map for **Ocelot**.



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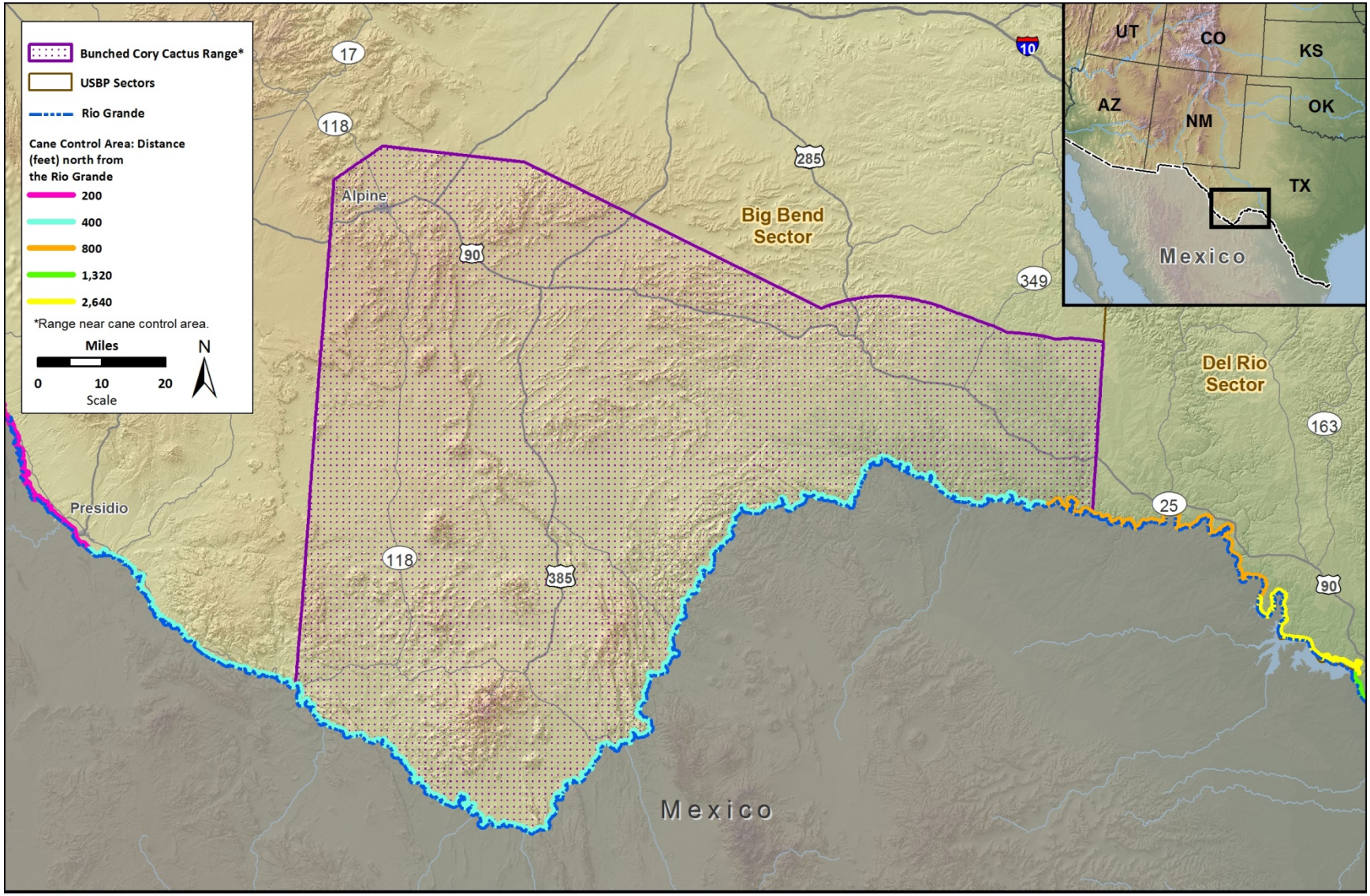

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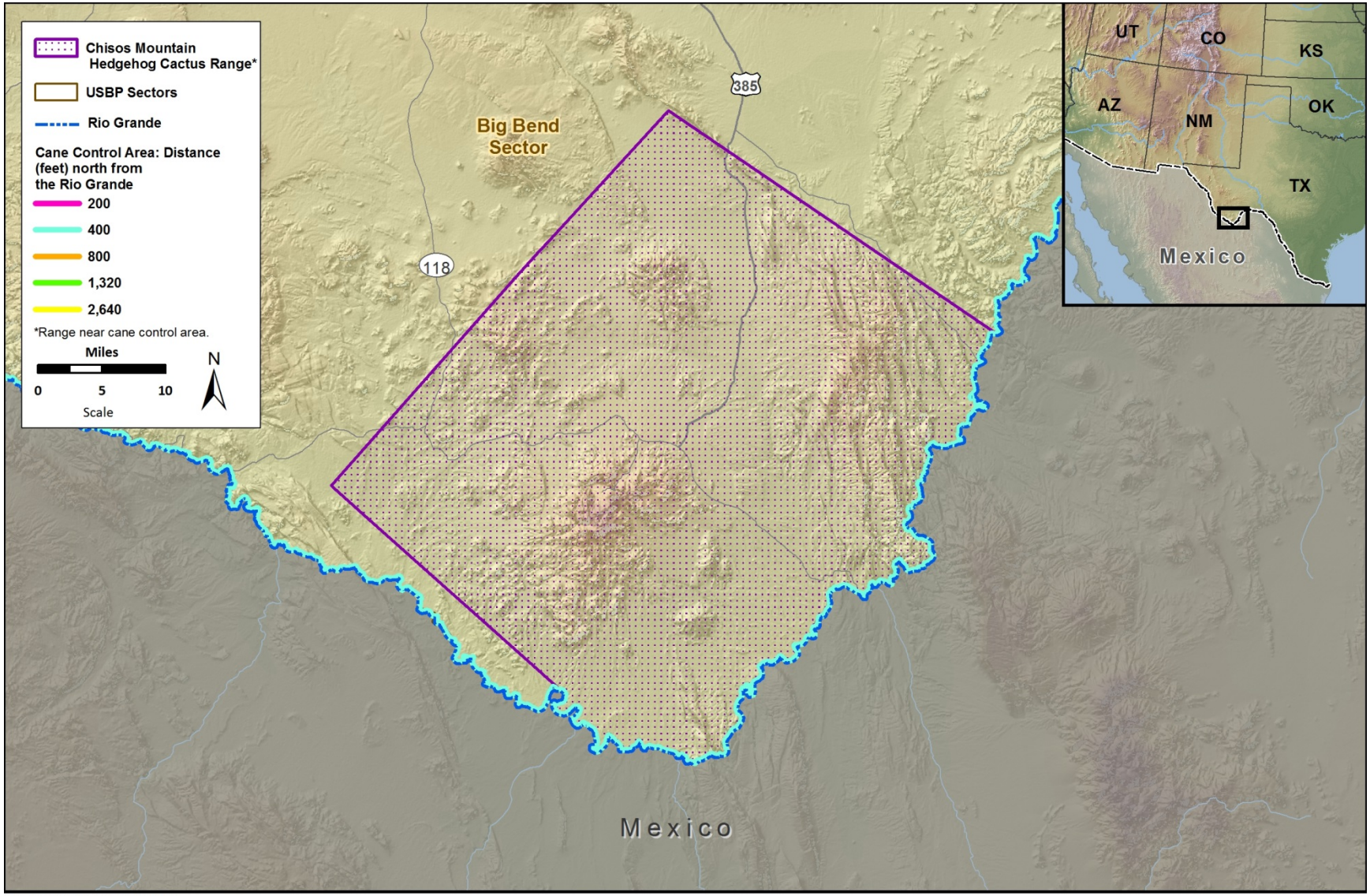

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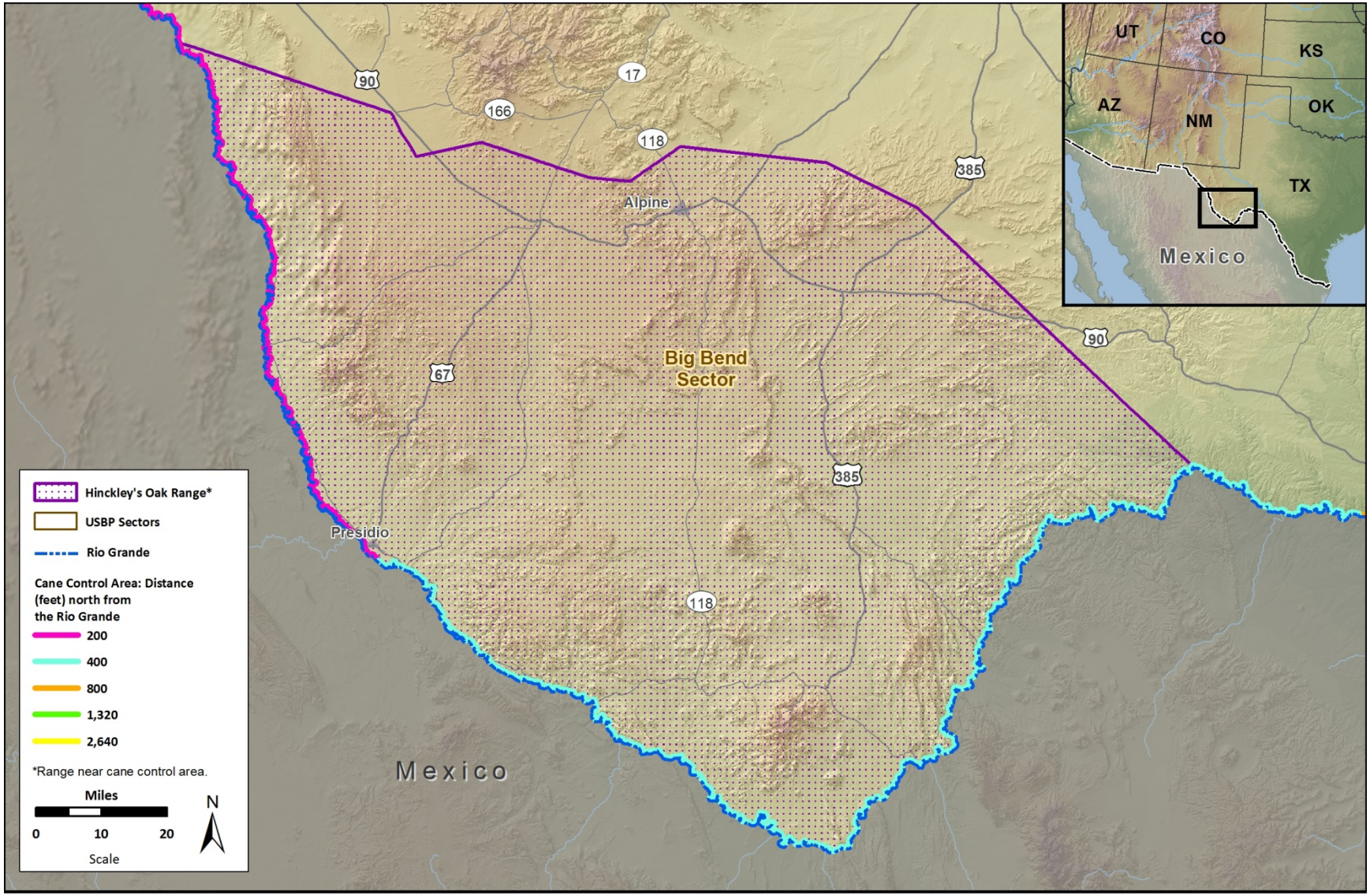

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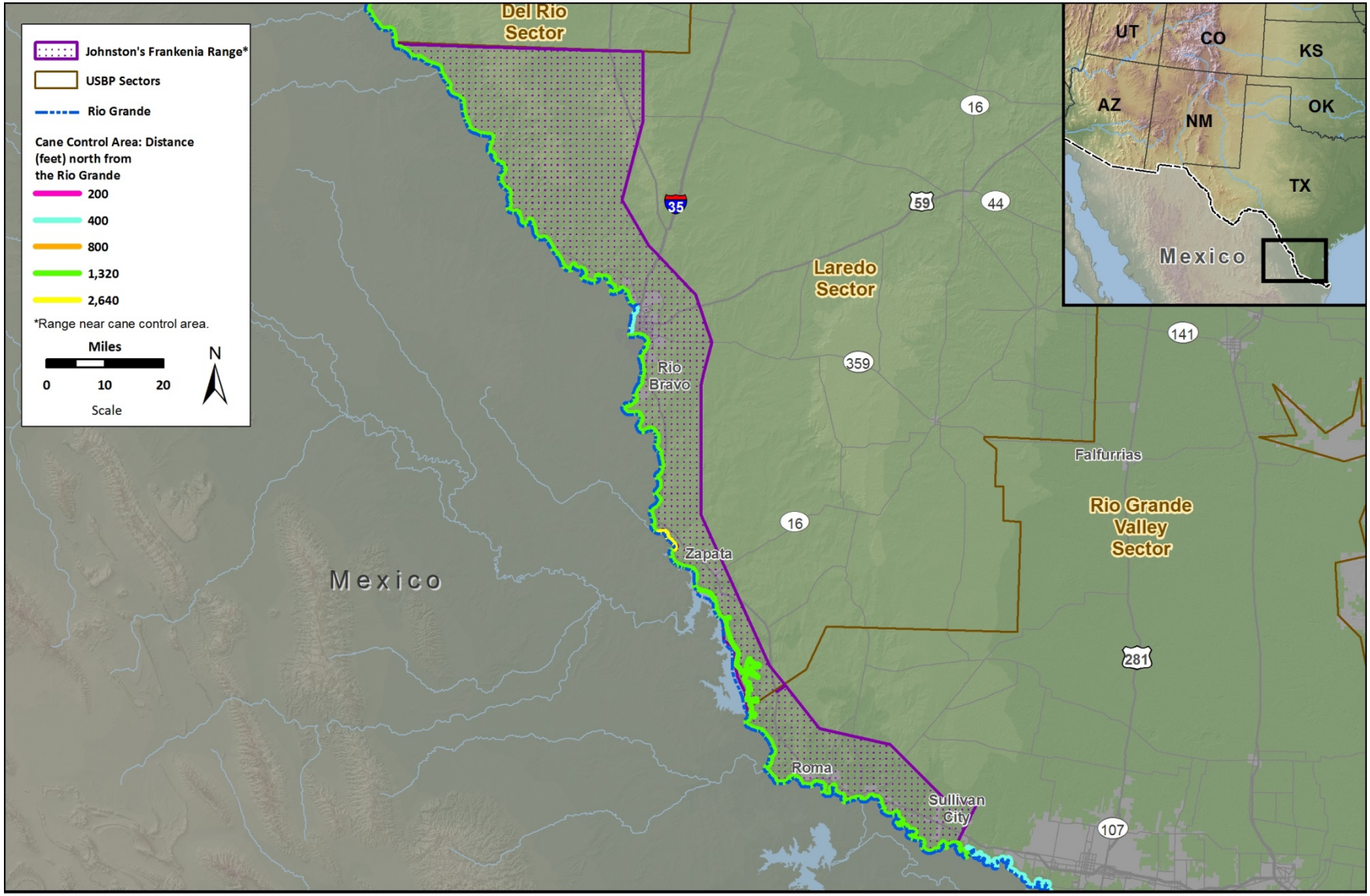

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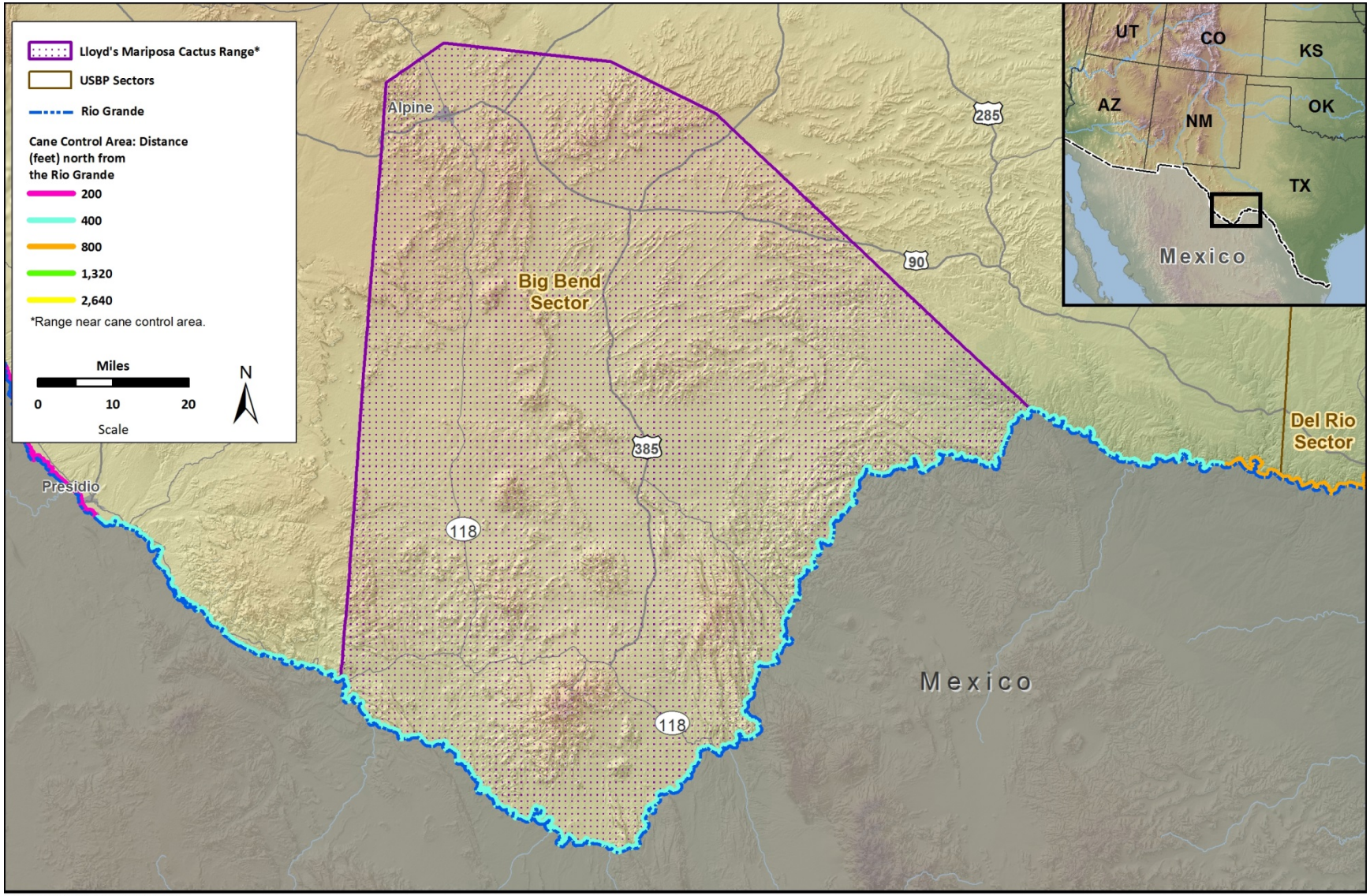

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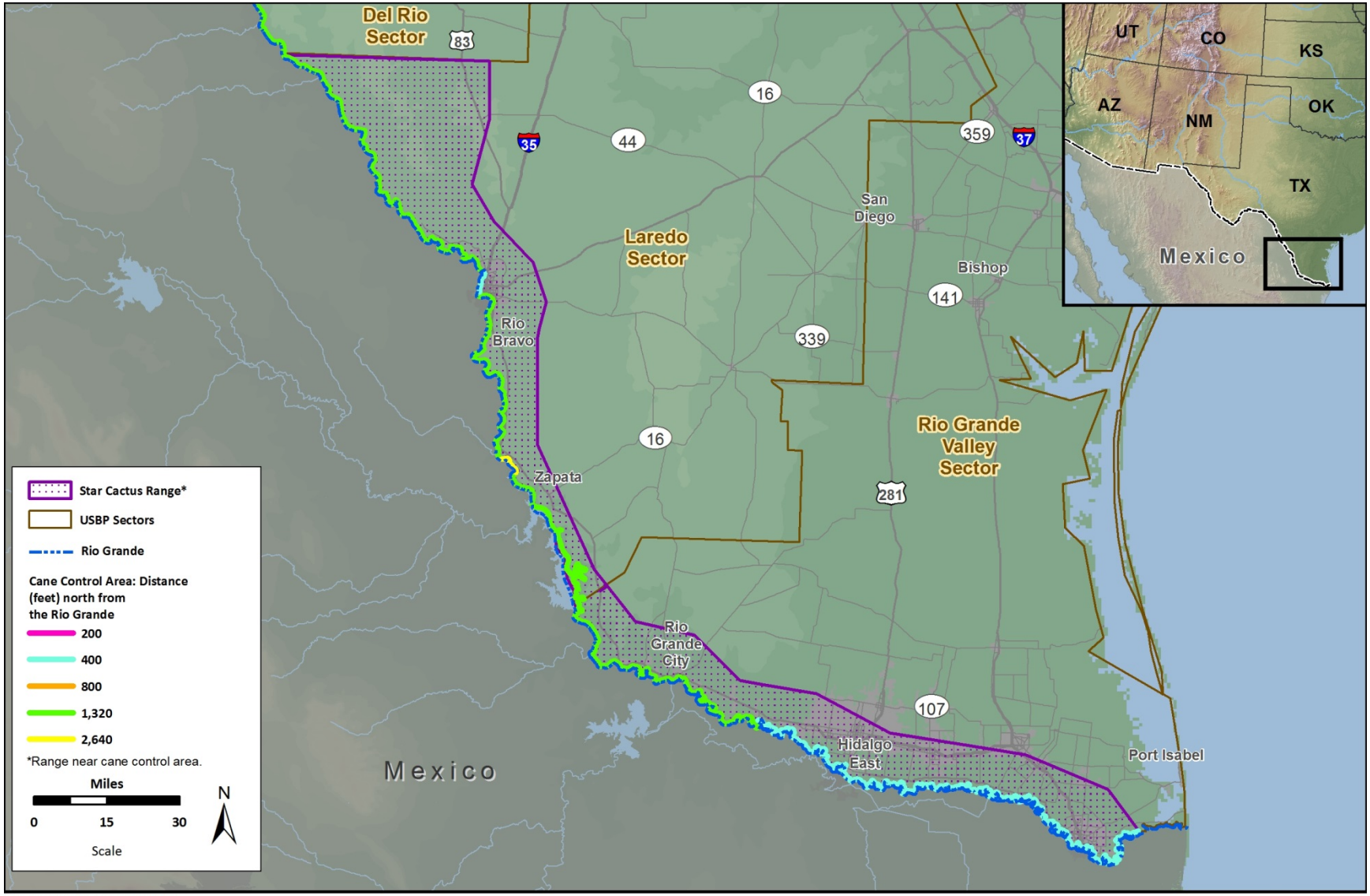

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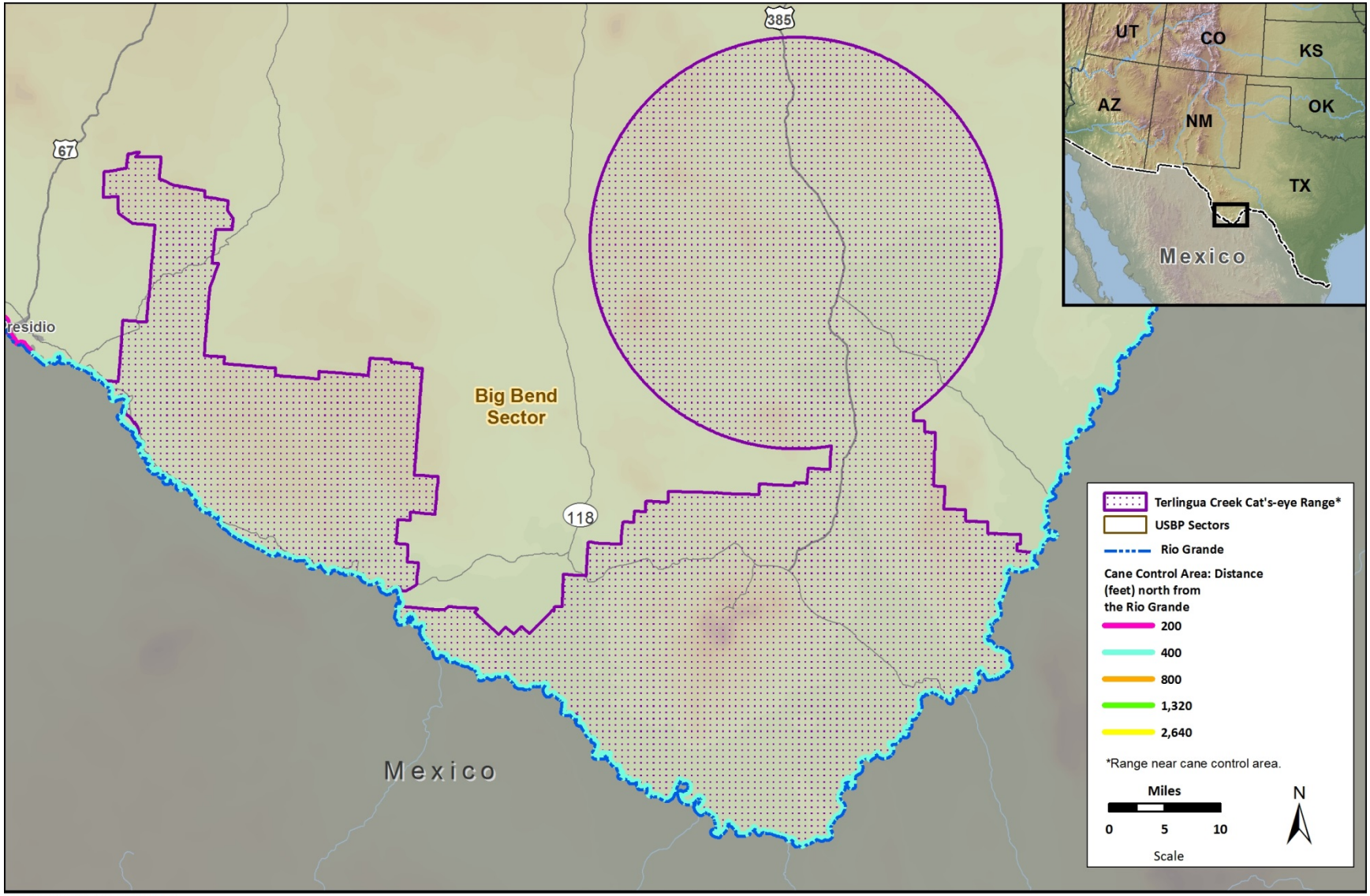

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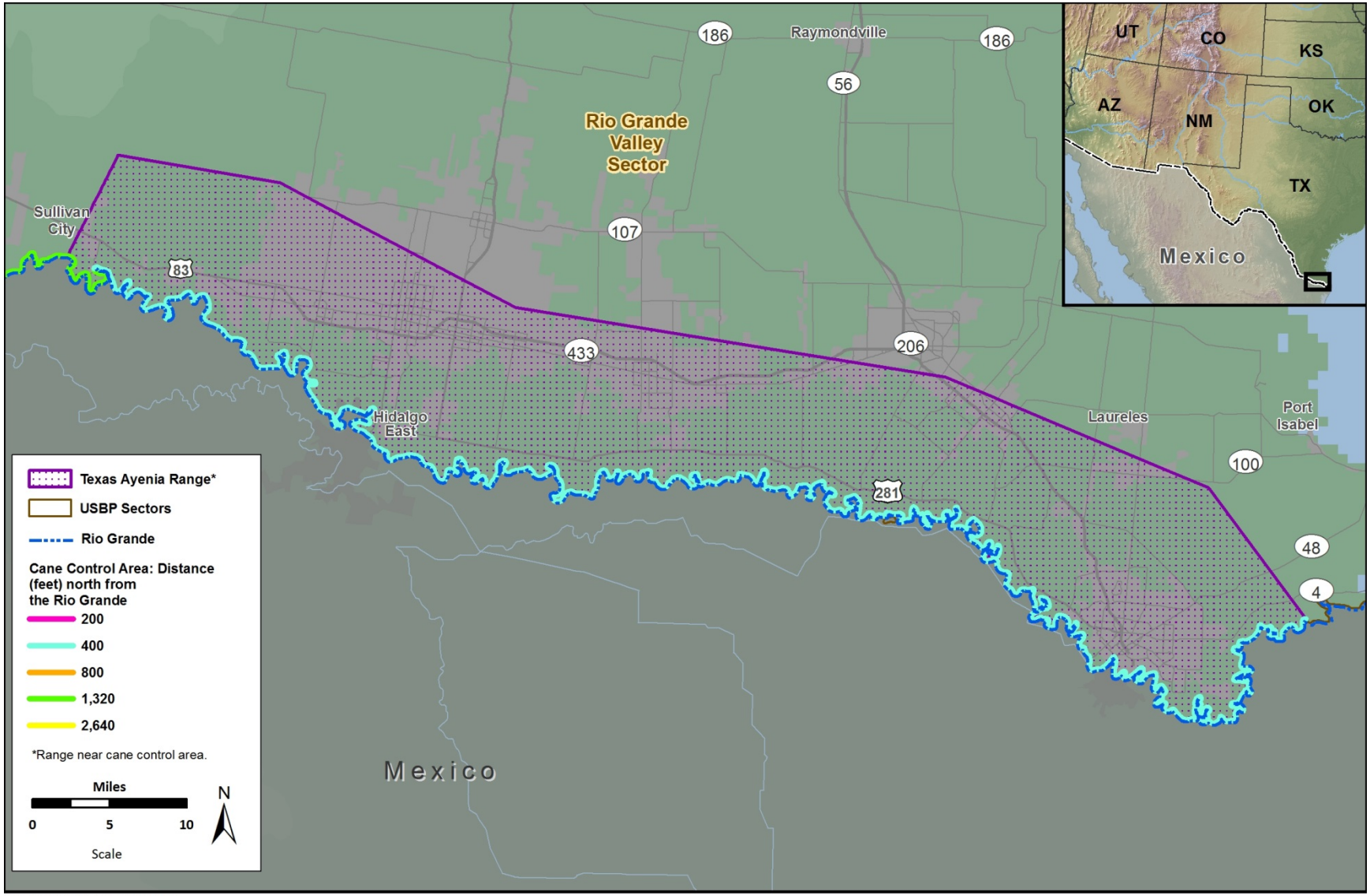

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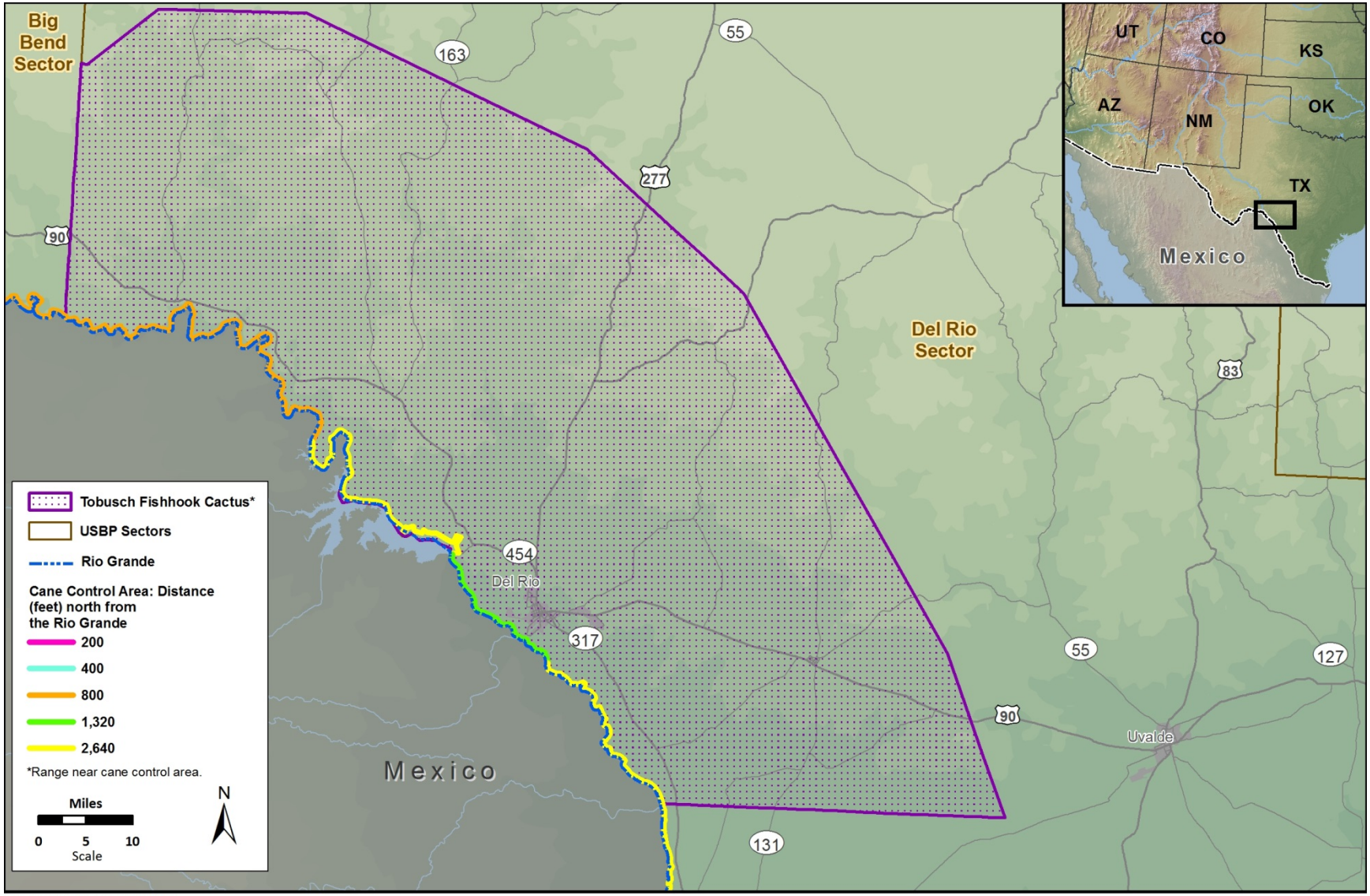

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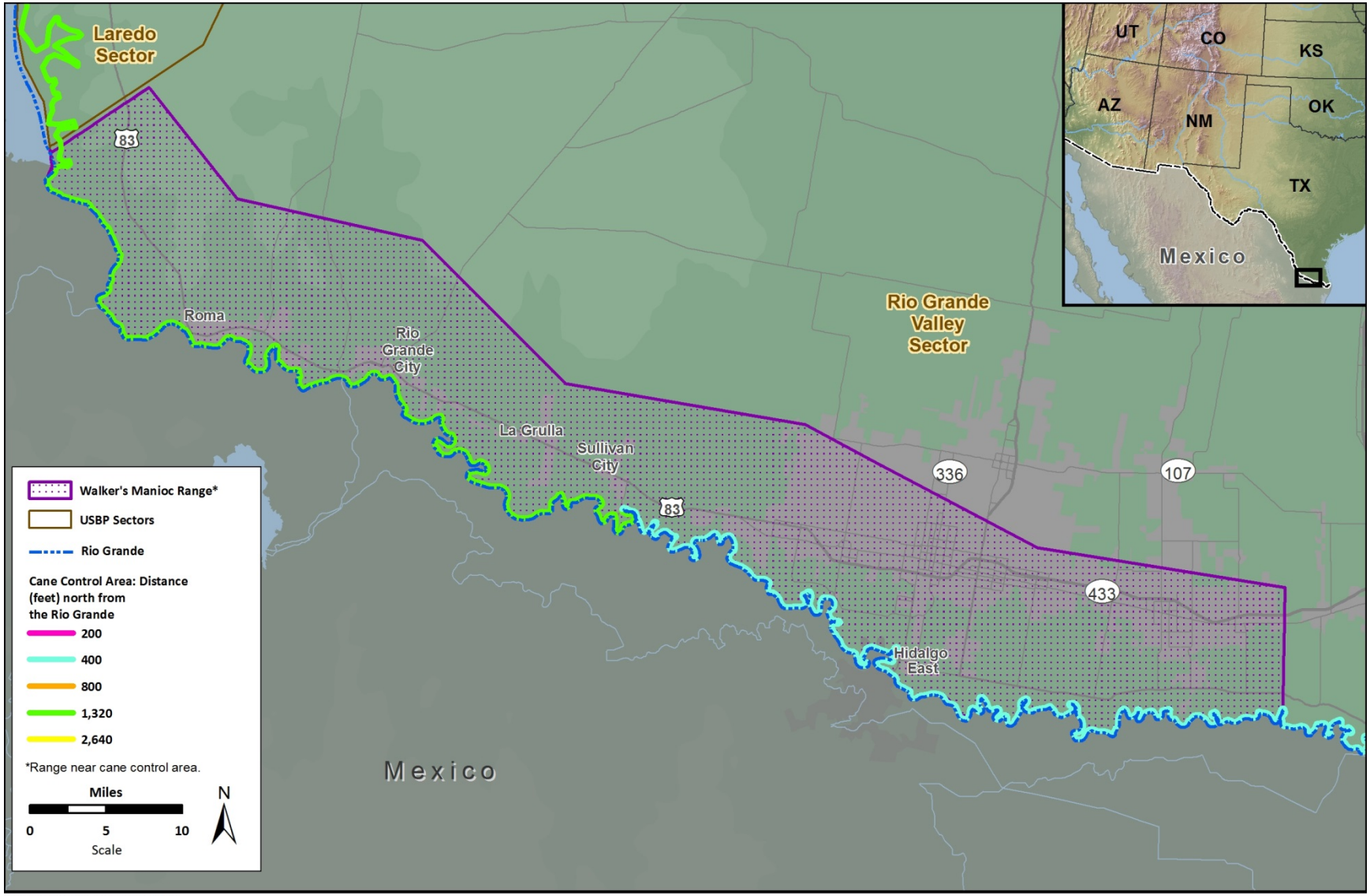

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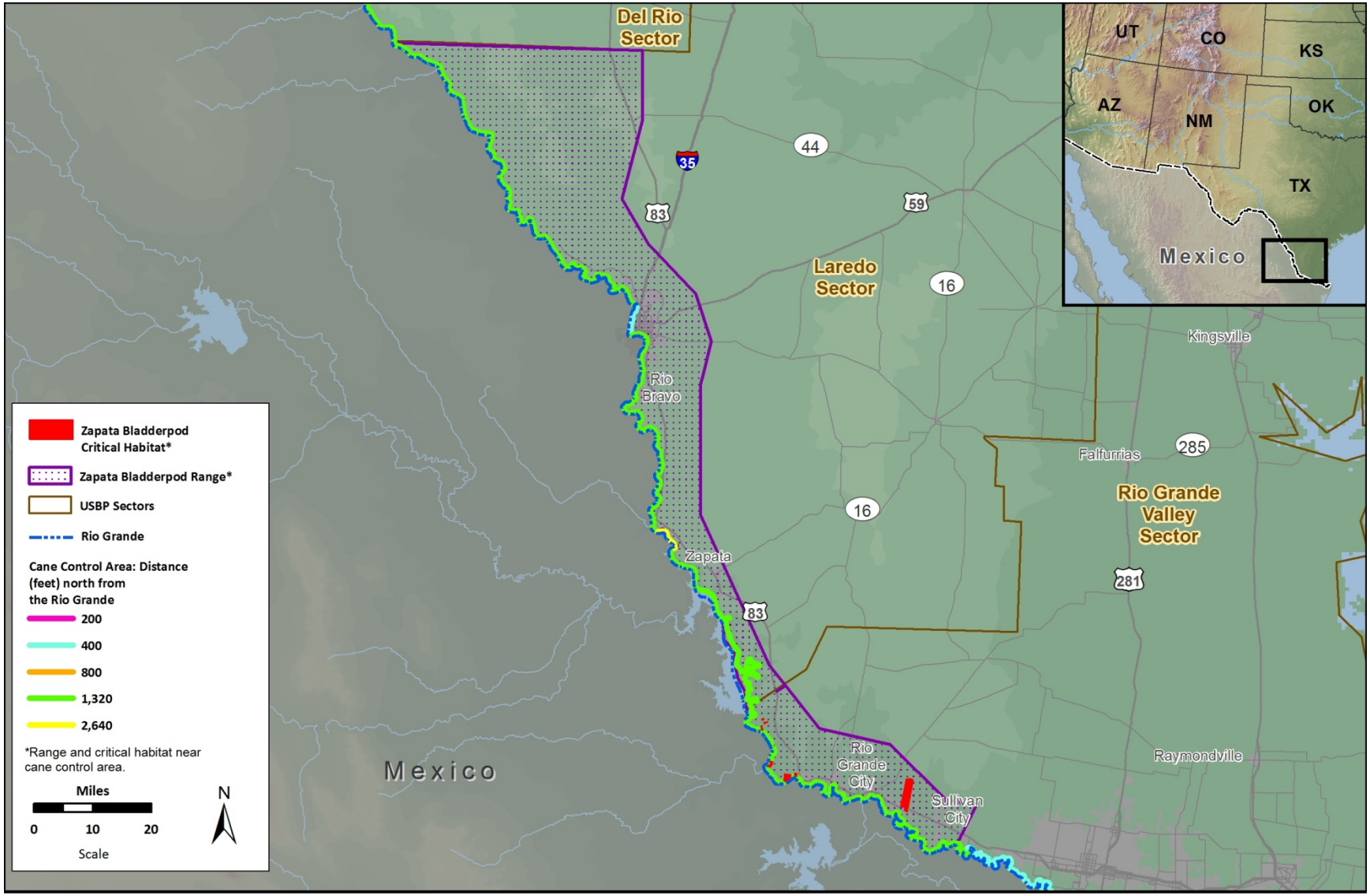

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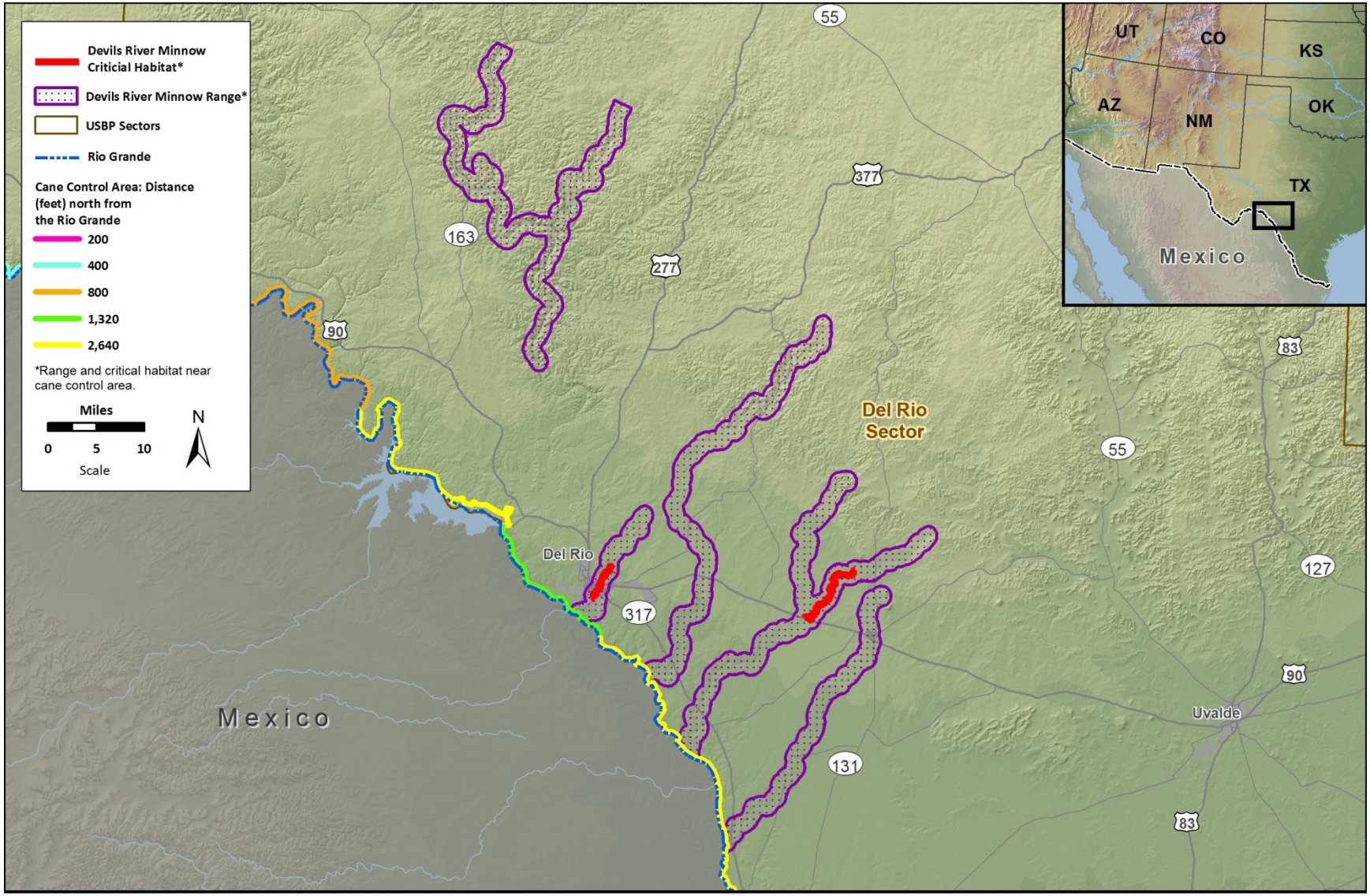

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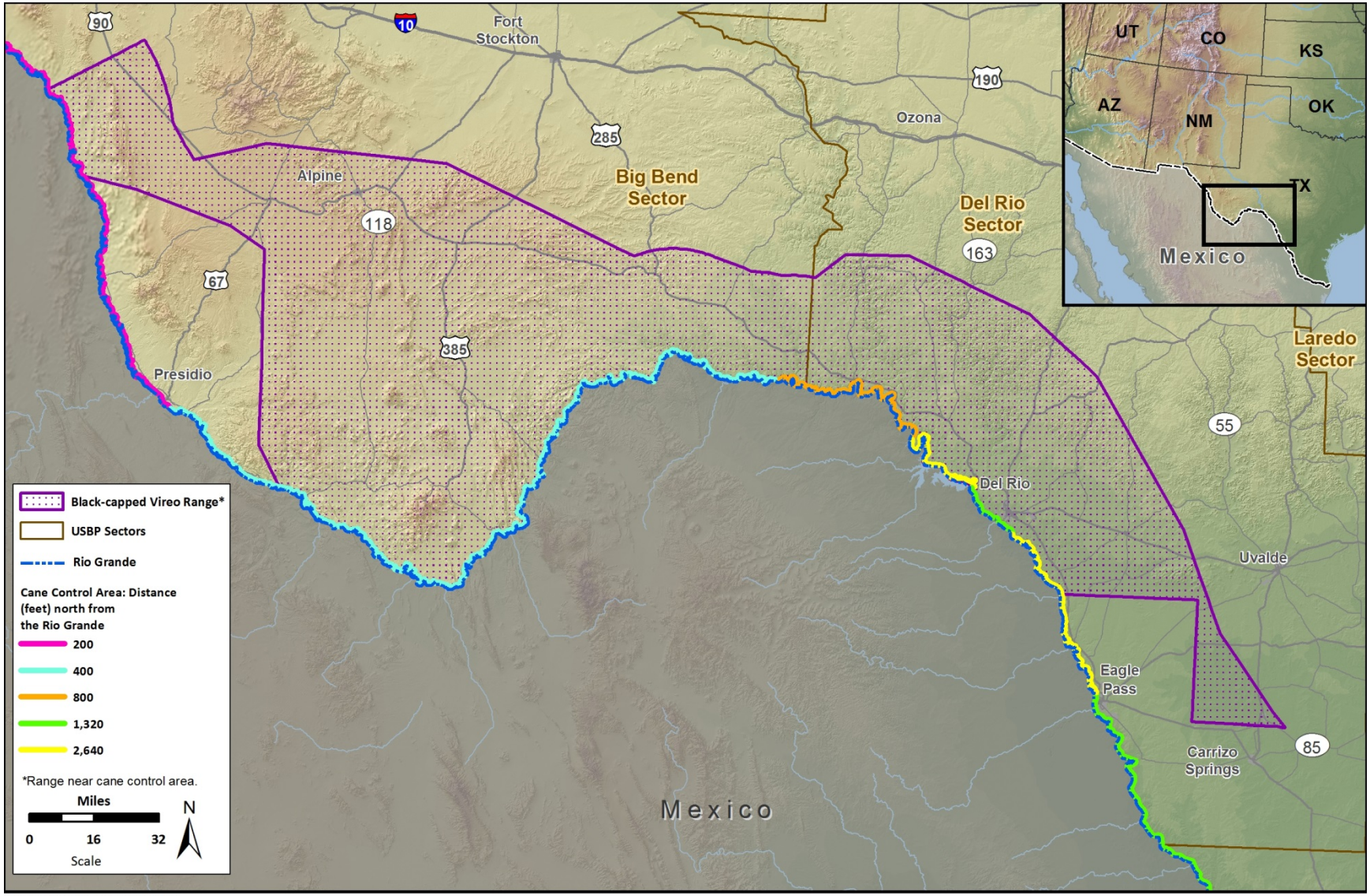
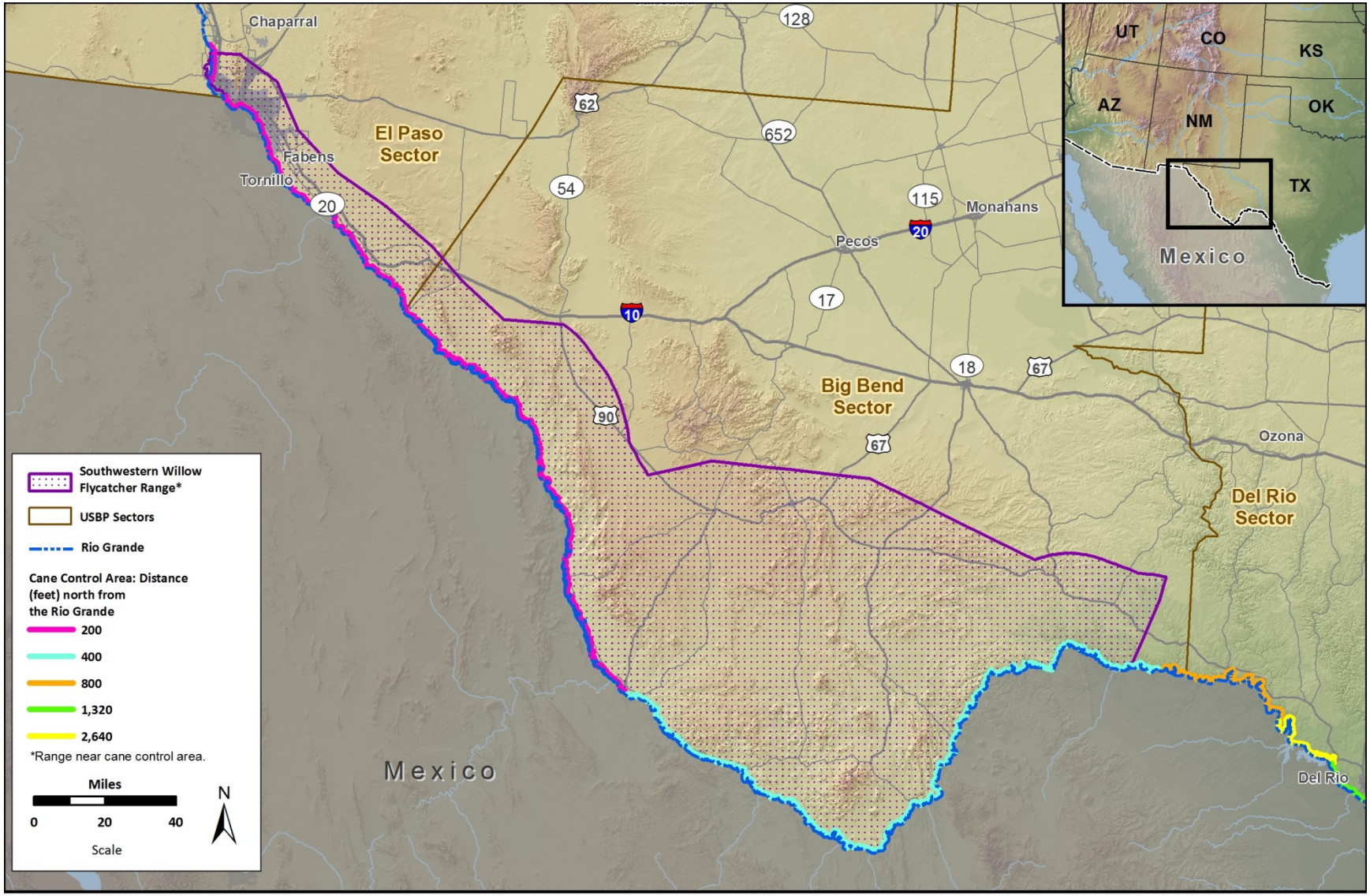

Fort Stockton
Ozona
Alpine
Big Bend Sector
Del Rio Sector
Laredo Sector
Presidio
Del Rio
Uvalde
Eagle Pass
Carrizo Springs
Mexico
UT
CO
KS
AZ
NM
OK
TX
Mexico
Black-capped Vireo Range*
USBP Sectors
Rio Grande
Cane Control Area: Distance (feet) north from the Rio Grande
200
400
800
1,320
2,640
*Range near cane control area.
Miles
0
16
32
Scale
N
Source: ESRI StreetMap USA 2010



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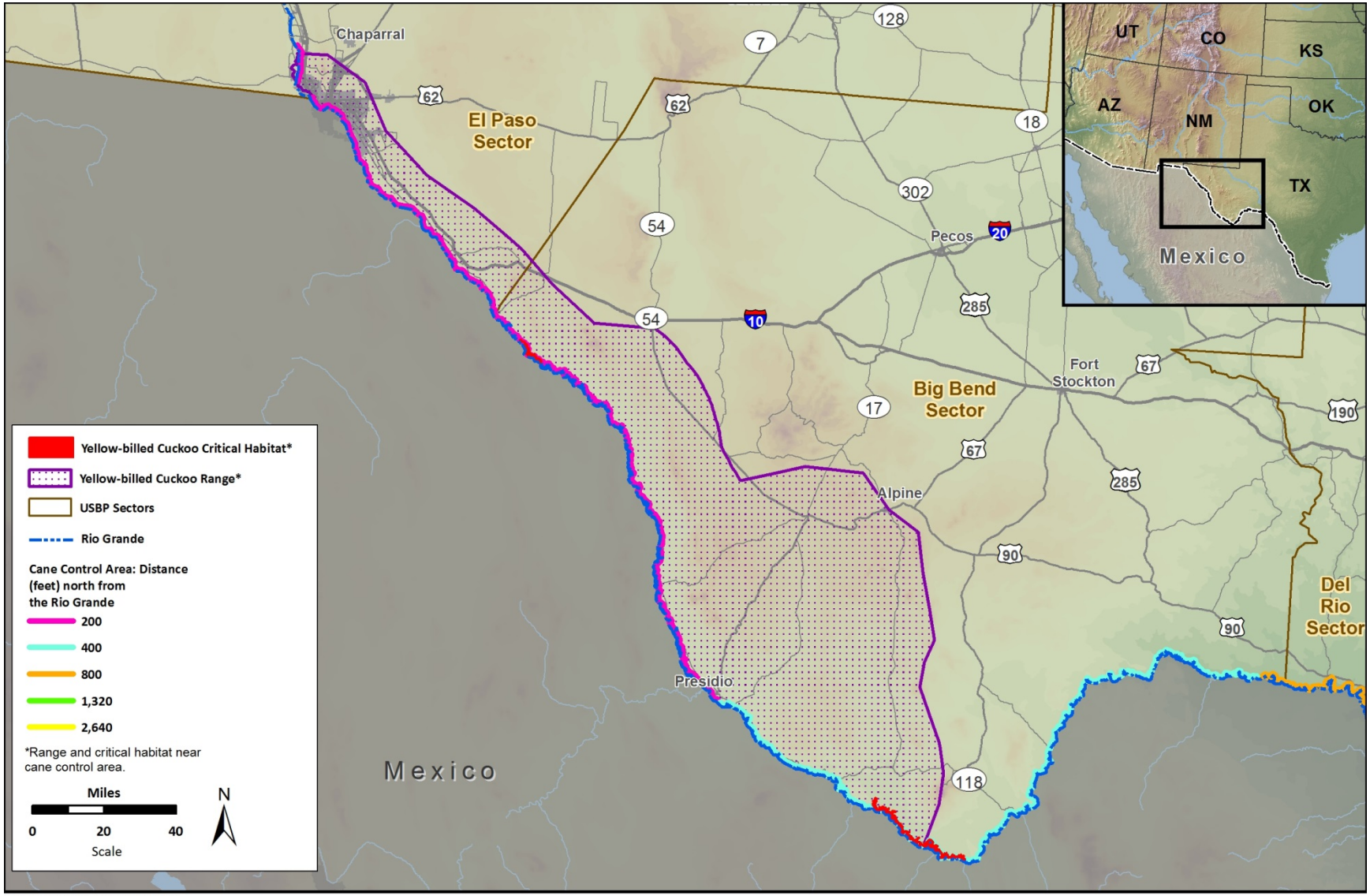

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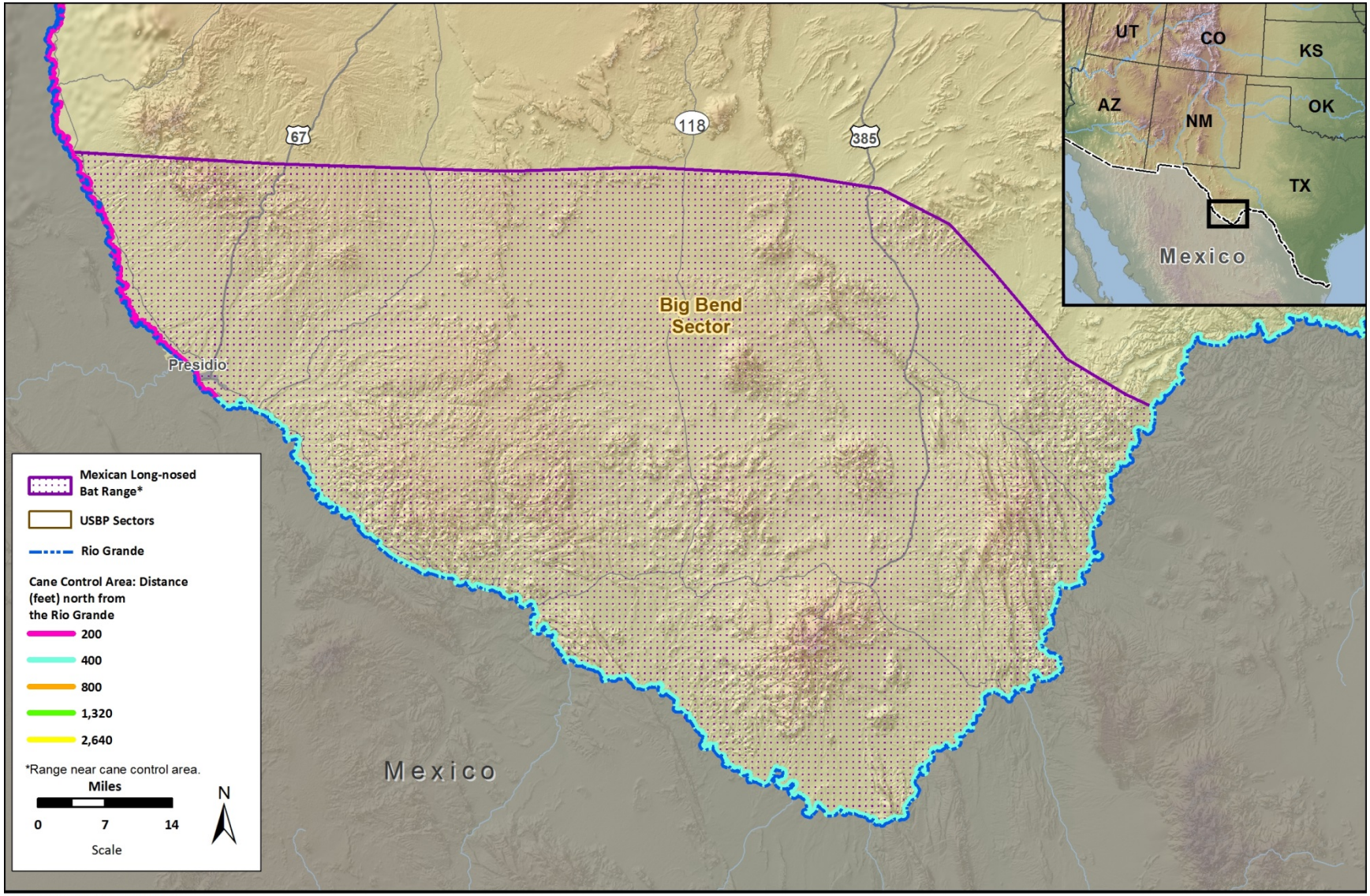

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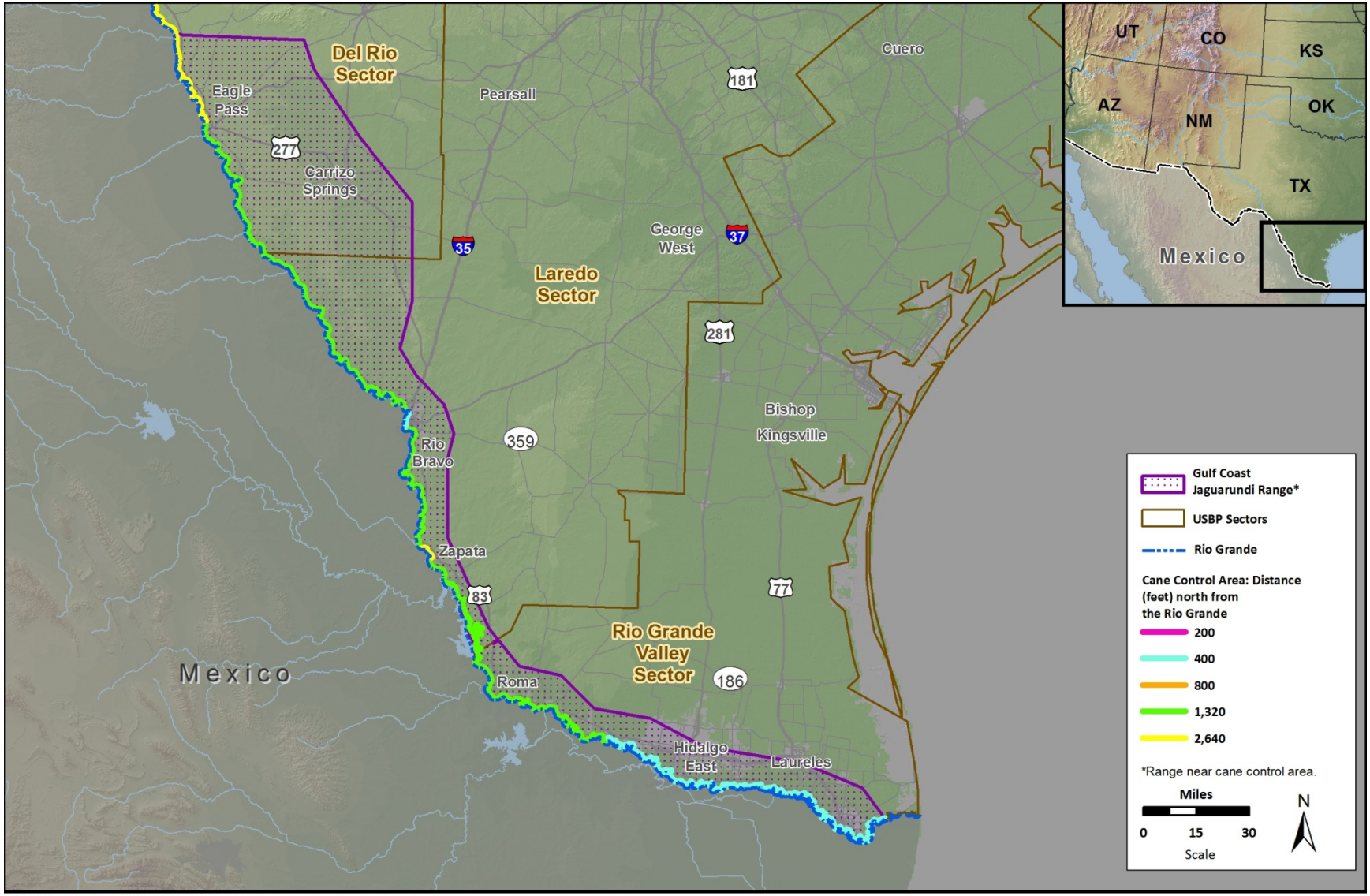

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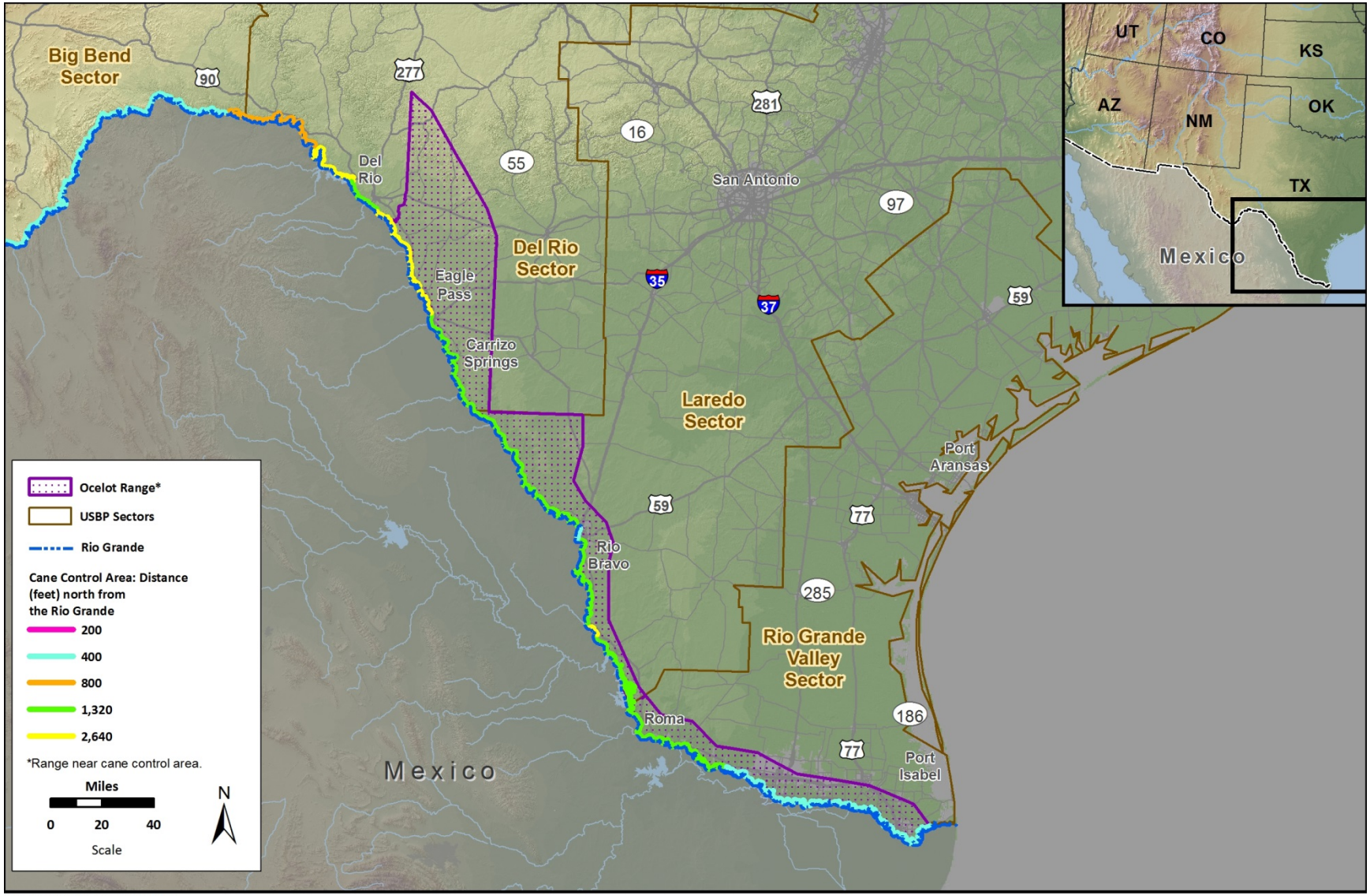

Source: ESRI StreetMap USA 2010

Table C-2. Determination of Impacts for Various State Listed Rare, Threatened and Endangered Species That Could Occur Within the Cane Control Area in Texas

Species	Listing Status	Habitat	Range (County)	Determination
AMPHIBIANS				
Black-spotted newt *Notophthalmus meridionalis*	T	Wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods.	Cameron and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Dolan Falls salamander *Eurycea sp 10*	R	Springs and waters.	Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Edwards Plateau spring salamanders *Eurycea sp 7*	R	Springs and waters of some caves of this region.	Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Mexican burrowing toad *Rhinophrynus dorsalis*	T	Roadside ditches, temporary ponds, arroyos, or wherever loose friable soils are present in which to burrow; generally underground emerging only to breed or during rainy periods.	Starr and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mexican treefrog *Smilisca baudinii*	T	Sub-humid regions near streams and in resacas.	Hidalgo and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Northern leopard frog *Rana pipiens*	R	Streams, ponds, lakes, wet prairies, and other bodies of water; will range into grassy, herbaceous areas some distance from water; eggs laid March-May and tadpoles transform late June-August; may have disappeared from El Paso County due to habitat alteration.	El Paso	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Sheep frog *Hypopachus variolosus*	T	Predominantly grassland and savanna; moist sites in arid areas.	Hidalgo and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
South Texas siren (large form) *Siren sp 1*	T	Wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods, but does require some moisture to remain.	Hidalgo, Maverick, and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Valdina Farms sinkhole salamander *Eurycea troglodytes complex*	R	Isolated, intermittent pools of a subterranean streams and sinkholes.	Kinney and Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
AMPHIBIANS (continued)				
White-lipped frog *Leptodactylus fragilis*	T	Grasslands, cultivated fields, roadside ditches, and a wide variety of other habitats; often hides under rocks or in burrows under clumps of grass; species requirements incompatible with widespread habitat alteration and pesticide use in south Texas.	Hidalgo, Starr, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
BIRDS				
Audobon's oriole *Icterus graduacauda audubonii*	R	Scrub, mesquite; nests in dense trees, or thickets, usually along water courses.	Cameron, Hidalgo, Maverick, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Baird's sparrow *Ammodramus bairdii*	R	Short-grass prairie with scattered shrubs.	Brewster, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Terrell, Val Verde, Webb, Zapata, and Zavala	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Brown jay *Cyanocorax morio*	R	Woodlands and mesquite along the Rio Grande; dense brushy woods, open woods, forest edge, second-growth woodland, clearings, plantation; nests in tree or shrub often far out on limb, usually 23-69 feet above ground.	Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Brownsville common yellowthroat *Geothlypis trichas insperata*	R	Tall grasses and bushes near ponds, marshes, and swamps.	Brewster, Hidalgo, and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Cactus ferruginous pygmy-owl *Glaucidium brasilianum cactorum*	T	Riparian trees, brush, palm, and mesquite thickets; during day also roosts in small caves and recesses on slopes of low hills; breeding April to June.	Cameron, Hidalgo, Starr, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Common black-hawk *Buteogallus anthracinus*	T	In cottonwoods (*Populus* spp.) or willows (*Salix* spp.) within riparian areas.	Brewster, Cameron, Hidalgo, Jeff Davis, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (continued)				
Ferruginous hawk *Buteo regalis*	R	Open areas, especially prairies, plains, and badlands.	Brewster, El Paso, Hudspeth, Jeff Davis, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Gray hawk *Asturina nitida*	T	Riparian woodlands and adjacent scrub grasslands.	Brewster, Cameron, Hidalgo, Presidio, Starr, Terrell, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Hook-billed kite *Chondrohierax uncinatus*	R	Dense tropical and subtropical forests, but does occur in open woodlands.	Hidalgo, Starr, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mexican hooded oriole *Icterus cucullatus*	R	Thick riparian vegetation.	Kinney, Maverick, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Montezuma quail *Cyrtonyx montezumae*	R	Grassy openings in pine-oak or oak-juniper	Brewster, El Paso, Hudspeth, Jeff Davis, Maverick, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mountain plover *Charadrius montanus*	R	Short-grass prairie, but occasionally in cropland or barren ground.	Brewster, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Uvalde, Webb, and Zavala	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Northern beardless-tyrannulet *Camptostoma imberbe*	T	Mesquite woodlands; near Rio Grande frequents cottonwood, willow, elm, and great leadtree; breeding April to July.	Cameron, Hidalgo, Starr, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Prairie falcon *Falco mexicanus*	R	Open, mountainous areas, plains and prairie. Nests on cliffs.	Brewster, El Paso, Hudspeth, Jeff Davis, Presidio, and Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Reddish egret *Egretta rufescens*	T	Brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (continued)				
Rose-throated becard *Pachyramphus aglaiae*	T	Riparian trees, woodlands, open forest, scrub, and mangroves; breeding April to July.	Cameron, Hidalgo, and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Sennett's hooded oriole *Icterus cucullatus sennetti*	R	Builds nests in Spanish moss (*Tillandsia usneoides*). Breeding March to August.	Brewster, Cameron, Hidalgo, Kinney, Maverick, Starr, Terrell, Uvalde, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Snowy plover *Charadrius alexandrinus*	T	Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast.	Cameron, El Paso, Hudspeth, and Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Sooty tern *Sterna fuscata*	R	Predominately 'on the wing'; does not dive, but snatches small fish and squid with bill as it flies or hovers over water; breeding April-July.	Cameron	Short- and long-term, direct and indirect, negligible, adverse impacts.
Southeastern snowy plover *Charadrius alexandrinus tenuirostris*	R	Wintering migrant along beaches and bayside mud or salt flats.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible, adverse impacts.
Texas Botteri's sparrow *Aimophila botterii texana*	T	Grassland and short-grass plains with scattered bushes or shrubs, sagebrush, mesquite, or yucca; nests on ground of low clump of grasses.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Tropical parula *Parula pitiayumi*	T	Dense or open woods, undergrowth, brush, and trees along edges of rivers and resacas; breeding April to July.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (continued)				
Western burrowing owl *Athene cunicularia hypugaea*	R	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows.	Brewster, Cameron, El Paso, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Western snowy plover *Charadrius alexandrinus nivosus*	R	Breeds in open areas of shortgrass prairie.	Cameron, El Paso, Hidalgo, Hudspeth, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
White-faced ibis *Plegadis chihi*	T	Freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
White-tailed hawk *Buteo albicaudatus*	T	Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May.	Cameron, Hidalgo, Hudspeth, and Kinney	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Wood stork *Mycteria americana*	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds; formerly nested in Texas, but no breeding records since 1960.	Cameron, Hidalgo, Webb, and Zapata	Short- and long-term, direct and indirect, negligible, adverse impacts.
Zone-tailed hawk *Buteo albonotatus*	T	Riparian areas near arid open areas, including open pine-oak woodlands, and mesa or mountain country.	Brewster, Cameron, Hidalgo, Jeff Davis, Presidio, Starr, Terrell, Uvalde, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
CRUSTACEANS				
Ezell's cave amphipod *Stygobromus flagellatus*	R	Known only from artesian wells.	Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH				
American eel *Anguilla rostrata*	R	Most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Blotched gambusia *Gambusia senilis*	T	Formerly known from springs and vegetated, quiet pools; probably extirpated.	Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Blue sucker *Cycleptus elongatus*	T	Typically found in channels and flowing pools with a moderate current. Substrate type usually exposed bedrock, sometimes in combination with sand and gravel. Adults winter in deep pools and spawn on riffles upstream in spring.	Brewster, Kinney, Maverick, Presidio, Terrell, Val Verde, and Webb	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Bluntnose shiner *Notropis simus simus*	T	Pecos River; main river channel.	El Paso, Hudspeth, Presidio, and Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Chihuahua catfish *Ictalurus sp.*	R	Rio Grande, main river channel.	Brewster, Jeff Davis, Kinney, Maverick, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Chihuahua shiner *Notropis chihuahua*	T	Clear cool water typically associated with springs; often in pools with slight current with a gravel or sand substrate.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Conchos pupfish *Cyprinodon eximius*	T	Sloughs, backwaters, and margins of larger streams and mouths of creek tributaries to larger rivers.	Brewster, Presidio, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Headwater catfish *Ictalurus lupus*	R	Clear streams and rivers with moderate gradients.	Brewster, Jeff Davis, Kinney, Maverick, Presidio, Terrell, Val Verde, and Webb	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Manantial roundnose minnow *Dionda argentosa*	R	Creeks, medium rivers, streams and springs.	Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Maravillas red shiner *Cyprinella lutrensis blairi*	R	Maravillas Creek.	Brewster	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (continued)				
Mexican goby *Ctenogobius claytonii*	T	Brackish and freshwater coastal streams.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mexican redhorse *Moxostoma austrinum*	R	Near rocks and boulders in rapids of small to large streams.	Brewster, Hudspeth, Kinney, Maverick, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mexican stoneroller *Campostoma ornatum*	T	Riffles, chutes, and pools of creeks and rivers with a substrate consisting of sand, pebbles, gravel, or bedrock.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Opossum pipefish *Microphis brachyurus*	T	Brooding adults found in fresh or low salinity waters and young move or are carried into more saline waters after birth.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Pecos pupfish *Cyprinodon pecosensis*	T	Shallow margins of clear, vegetated spring waters high in calcium carbonate, as well as in sinkhole habitats.	Terrell and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Proserpine shiner *Cyprinella proserpina*	T	Rocky runs and pools of creeks and small rivers.	Kinney, Maverick, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Rio Grande chub *Gila pandora*	T	Pools of small to moderate-sized tributaries, often near inflow of riffles and in association with cover such as undercut banks and plant debris.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Rio Grande darter *Etheostoma grahami*	T	Gravel and rubble riffles of creeks and small rivers; spawns in the winter.	Kinney, Maverick, Terrell, Val Verde, and Webb	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Rio Grande shiner *Notropis jemezanus*	R	Riffles of large rivers or creeks with a substrate of rubble, gravel and sand, often overlain with silt.	Brewster, Cameron, Hidalgo, Kinney, Maverick, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (continued)				
River goby *Awaous banana*	T	Clear water with slow to moderate current, sandy or hard bottom, and little or no vegetation; also enters brackish and ocean waters.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
INSECTS				
A mayfly *Caenis arwini*	R	Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
A mayfly *Campsurus decoloratus*	R	Clay substrates; mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
A mayfly *Neochoroterpes kossi*	R	Small streams and adjacent shoreline vegetation.	Culberson	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
A Royal moth *Sphingicampa blanchardi*	R	Woodland - hardwood; Tamaulipan thornscrub with caterpillar's host plant, Texas Ebony (*Pitheocellobium flexicaule*) an important element.	Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
A Royal moth *Sphingicampa raspa*	R	Wooded areas with oaks, junipers, legumes and other woody trees and shrubs	Brewster, El Paso, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
A tiger beetle *Tetracha affinis angustata*	R	Open sandy areas, beaches, open paths or lanes, or on mudflats; larvae in hard-packed ground in vertical burrows	Hidalgo and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
A tiger beetle *Cicindela hornii*	R	Dry areas on hillsides or mesas where soil is rocky or loamy and covered with grasses.	Brewster, El Paso, Hudspeth, and Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Arroyo darner *Aeshna dugesi*	R	Creek, high - moderate gradient; eggs laid in aquatic plants, larvae cling to bottom of pools of streams, adults forage widely in pools in streams, from desert up to pine-oak zone.	Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Barbara Ann's tiger beetle *Cicindela politula barbarannae*	R	Limestone outcrops in arid treeless environments or in openings within less arid pine-juniper-oak communities; open limestone substrate itself is almost certainly an essential feature; roads and trails.	El Paso and Hudspeth	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (continued)				
Blanchard's sphinx moth *Adhemarius blanchardorum*	R	Deciduous forest.	Brewster	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Bonita diving beetle *Deronectes neomexicana*	R	Streams and creeks.	Brewster	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Cazier's tiger beetle *Cicindela cazieri*	R	Found in open, sunny areas; larvae of tiger beetles are also predaceous and live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Chisos metalmark *Apodemia chisosensis*	R	Agave scrub communities.	Brewster and Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Chisos skipperling *Piruna haferniki*	R	Openings in oak-pine woodlands with an understory of broad-leaved grasses.	Brewster	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Coahuila giant skipper *Agathymus remingtoni valverdiensis*	R	Associated with the foodplant Lechuguilla (*Agave lechuguilla*) in desert hills and thorn forest.	Kinney and Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Flint's net-spinning caddisfly *Cheumatopsyche flinti*	R	Found in springs.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Freeman's metalmark *Calephelis rawsoni freemani*	R	Wet areas including stream edges, gulches, subtropical woodland, and shaded limestone outcrops.	Brewster and Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (continued)				
Guadalupe Mountains tiger beetle *Cicindela politula petrophila*	R	Open, sunny areas; larva lives in vertical burrows in soil of dry paths, fields, or sandy beaches.	Hudspeth	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Hungerford's naucorid *Ambrysus hungerfordi hungerfordi*	R	Known from one location; riparian, cottonwoods and willows, only associated aquatic plant was alga in low density, plunge pool at the base of waterfall; flow present year-round.	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Leonora's dancer damselfly *Argia leonorae*	R	Small streams and seepages.	Hudspeth, Kinney, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Los Olmos tiger beetle *Cicindela nevadica olmosa*	R	Found in open, sunny areas; larvae live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Manfreda giant-skipper *Stallingsia maculosus*	R	Subtropical thorn and pine forests. The larval hostplant is Texas tuberose (*Manfreda maculosa*).	Cameron, Hidalgo, and Kinney	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Neojuvenile tiger beetle *Cicindela obsoleta neojuvenilis*	R	Bare or sparsely vegetated, dry, hard-packed soil; typically in previously disturbed areas.	Hidalgo, Maverick, and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Poling's hairstreak *Fixsenia polingi*	R	Oak woodlands.	Brewster, El Paso, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Rawson's metalmark *Calephelis rawsoni*	R	Desert scrub or oak woodlands in foothills.	Brewster, Hidalgo, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Sage sphinx *Sphinx eremitoides*	R	Desert, grassland; sandy prairie or desert with sage; caterpillars feed on leaves of sage; adults emerge late spring or summer.	Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (continued)				
Smyth's tiger beetle *Cicindela chlorocephala smythi*	R	Live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Subtropical blue-black tiger beetle *Cicindela nigrocoerulea subtropica*	R	Live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Tamaulipan agapema *Agapema galbina*	R	Tamaulipan thornscrub with adequate densities of the caterpillar foodplant *Condalia hookeri hookeri*.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Tawny giant skipper *Agathymus neumoegeni chisosensis*	R	Grasslands, shrublands, and woodlands.	Brewster	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas austrotinodes caddisfly *Austrotinodes texensis*	R	Karst springs and spring runs; flow in type locality swift but may drop significantly during periods of little drought; substrate coarse and ranges from cobble and gravel to limestone bedrock; many limestone outcroppings also found along the streams.	Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas minute moss beetle *Limnebius texanus*	R	Adult moss beetles of this genus are aquatic and herbivorous; larvae are semiaquatic and carnivorous; found in vegetation along margins of streams.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
MAMMALS				
Big free-tailed bat *Nyctinomops macrotis*	R	Roosts in cracks and crevices in cliff faces and canyon walls	Brewster, El Paso, Hudspeth, Jeff Davis Presidio, and Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Black bear *Ursus americanus*	T	Large tracts of bottomland hardwood forests.	Brewster, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Terrell, Uvalde, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (continued)				
Black-tailed prairie dog *Cynomys ludovicianus*	R	Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups.	El Paso, Hudspeth, Jeff Davis, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Carrizo Springs pocket gopher *Geomys personatus streckeri*	R	Underground burrows of deep, sandy soils; feed mostly on vegetation	Dimmit and Maverick	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Cave Myotis *Myotis velifer*	R	Roosts in caves and tunnels.	Brewster, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Uvalde, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Coues' rice rat *Oryzomys couesi*	T	Cattail-bulrush marsh with shallower zone of aquatic grasses near the shoreline; shade trees around the shoreline are important features; prefers salt and freshwater, as well as grassy areas near water.	Cameron, Hidalgo, and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Davis pocket gopher *Geomys personatus davisi*	R	Burrows in sandy soils	Webb and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Davis Mountains cottontail *Sylvilagus floridanus robustus*	R	Brushy pastures, edges of cultivated fields, and well-drained streamsides.	Brewster, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Desert bighorn sheep *Ovis canadensis mexicana*	R	Rocky mountainous terrain including bluffs and steep slopes with sparse vegetation.	Brewster, Hudspeth, and Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Desert pocket gopher *Geomys arenarius*	R	Cottonwood-willow association; live underground, but build large and conspicuous mounds.	El Paso and Hudspeth	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (continued)				
Fringed Myotis *Myotis thysanodes*	R	Ranges from desert scrub to mountain pine communities. Roosts in caves and mines.	Brewster, El Paso, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Ghost-faced bat *Mormoops megalophylla*	R	Occupies caves and mines	Brewster, Cameron, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Terrell, Uvalde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Gray-footed chipmunk *Tamias canipes*	R	Forest-dwelling; favorite habitat is downed logs near edges of clearings; also occur in dense stands of mixed timber (oaks, pines, firs) and on brushy hillsides, especially with rock crevices.	Hudspeth	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Greater western mastiff bat *Eumops perotis californicus*	R	Roosts in crevices and cracks in cliffs faces.	Brewster, Jeff Davis, Kinney, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Guadalupe southern pocket gopher *Thomomys bottae guadalupensis*	R	Ranges from loose sands and silts to tight clays; dry deserts to montane meadows.	Brewster, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Limpia Creek pocket gopher *Thomomys bottae texensis*	R	Ranges from loose sands and silts to tight clays in lower canyons to higher coniferous woodlands	Brewster, Hudspeth, Jeff Davis and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Limpia southern pocket gopher *Thomomys bottae limpiae*	R	Ranges from loose sands and silts to tight clays	Brewster, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Long-legged bat *Myotis volans*	R	Open woods and mountainous areas. Roosts in buildings, crevices, and hollow trees; may use caves as night roosts.	Brewster, El Paso, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (continued)				
Mexican long-tongued bat *Choeronycteris mexicana*	R	Deep canyons where uses caves and mine tunnels as day roosts.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	R	Ranges from desert scrub to pinyon-juniper woodlands. Roosts in caves or mines.	Brewster, El Paso, Hudspeth, Jeff Davis, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Pecos River muskrat *Ondatra zibethicus ripensis*	R	Creeks, rivers, lakes, drainage ditches, and canals; prefer shallow, fresh water with clumps of marshy vegetation, such as cattails, bulrushes, and sedges.	El Paso, Hudspeth, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Plains spotted skunk *Spilogale putorius interrupta*	R	Open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Cameron, Hidalgo, Starr, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	R	Desert areas with rugged canyons, rock outcrops, and high cliffs. Roosts in caves and rock crevices.	Brewster and Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Presidio mole *Scalopus aquaticus texanus*	R	Occurs in moist (not wet), sandy soils; live underground in excavated or usurped burrows.	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Southern yellow bat *Lasiurus ega*	R	Tree roosting species that commonly roosts in the dead fronds of palm trees (*Sabal mexicana*).	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas pocket gopher *Geomys personatus fuscus*	R	Underground burrows of deep, sandy soils.	Kinney and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (continued)				
Spotted bat *Euderma maculatum*	T	Ranges from desert scrub to pine forests at high elevations.	Brewster	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Western red bat *Lasiurus blossevillii*	R	Riparian areas. Roosts in deciduous trees along riparian courses.	Brewster, El Paso, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Western small-footed bat *Myotis ciliolabrum*	R	Ranges from desert scrub to wooded areas. Roosts beneath rocks, underneath exfoliating bark, and in buildings.	Brewster, El Paso, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Western yellow bat *Lasiurus xanthinus*	R	Riparian areas. Roosts in deciduous trees along riparian courses. Also has been found using giant dagger yucca (*Yucca carnerosana*).	Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
White-nosed coati *Nasua narica*	T	Woodlands, riparian corridors and canyons.	Brewster, Cameron, Hidalgo, Kinney, Maverick, Starr, Terrell, Uvalde, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Yellow-nosed cotton rat *Sigmodon ochrognathus*	R	Rocky slopes with scattered shrubs and bunch grasses. Nests located at base of shrubs.	Brewster, Hudspeth, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Yuma myotis *Myotis yumanensis*	R	Lowland habitats near open water.	Brewster, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
MOLLUSKS				
Chisos Mountains threeband *Humboldtiana chisosensis*	R	Xeric rockslides along the lower margin of pine woodlands.	Brewster	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS (continued)				
Brune's tryonia *Tryonia brunei*	R	Benthic; abundant on firm substratum and in soft mud before modification.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Davis Mountains threeband *Humboldtiana cheatumi*	R	Terrestrial snail; deciduous leaf litter in cool, moist upper reaches of canyons.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Davis spring snail *Fontelicella davisi*	R	Freshwater; in and on mud and rocks among patches of watercress in spring-fed rivulets.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
False spike mussel *Quadrula mitchelli*	T	Medium to large rivers with substrate from mud through mixtures of sand, gravel, and cobble.	Brewster, Cameron, Hidalgo, Kinney, Maverick, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Franklin Mountain talus snail *Sonorella metcalfi*	R	Terrestrial; bare rock, talus, scree; inhabits igneous talus most commonly of rhyolitic origin.	El Paso	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Franklin Mountain wood snail *Ashmunella pasonis*	R	Terrestrial; bare rock, talus, scree; talus slopes, usually of limestone, but also of rhyolite, sandstone, and siltstone, in arid mountain ranges.	El Paso and Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mexican fawnsfoot mussel *Truncilla cognata*	T	Largely unknown; possibly intolerant of impoundment; possibly needs flowing streams and rivers with sand or gravel bottoms based on related species needs.	Kinney, Maverick, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mitre Peak threeband *Humboldtiana ferrissiana*	R	Terrestrial snail; in leaf litter, under rocks.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mount Livermore threeband *Humboldtiana palmeri*	R	Terrestrial snail; highest parts (most mesic) of igneous intrusive mountains; in leaf litter; among boulders.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS (continued)				
Northern threeband *Humboldtiana ultima*	R	Leaf litter in mesic canyons of limestone mountains; in soil, under rocks.	Hudspeth	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Presidio County spring snail *Fontelicella metcalfi*	R	Found in the outflows of springs (24 degrees Celsius) in fine mud and dense watercress.	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Rio Grande monkeyface *Quadrula couchiana*	R	Habitat largely undescribed, but probably small to moderate size streams and moderate size rivers with flowing waters and substrates ranging from mud to gravel.	Kinney	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Salina mucket *Potamilus metnecktayi*	T	Lotic waters with a substrate of clay and silt along river banks.	Brewster, Cameron, Hidalgo, Kinney, Maverick, Presidio, Starr, Terrell, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
San Carlos threeband *Humboldtiana hoegiana praesidii*	R	Leaf litter and in soil under rocks in higher elevations of desert mountain ranges.	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
REPTILES				
Big Bend slider *Trachemys gaigeae*	R	Quiet bodies of fresh water with muddy substrates and abundant aquatic vegetation.	Brewster, El Paso, Hudspeth, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Black-striped snake *Coniophanes imperialis*	R	Semi-arid coastal plain, warm, moist micro-habitats and sandy soils.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Chihuahuan Desert lyre snake *Trimorphodon vilkinsonii*	T	Rocky hillsides and mountain slopes.	Brewster, El Paso, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (continued)				
Chihuahuan mud turtle *Kinosternon hirtipes murrayi*	T	Fresh water with abundant aquatic vegetation; semi-aquatic.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Keeled earless lizard *Holbrookia propinqua*	R	Coastal dunes, barrier islands, and other sandy areas.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Mountain short-horned lizard *Phrynosoma hernandesi*	T	Usually in open, shrubby, or openly wooded areas with sparse vegetation at ground level; soil may vary from rocky to sandy; burrows into soil or occupies rodent burrow when inactive; inactive during cold weather.	El Paso, Hudspeth, and Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
New Mexico garter snake *Thamnophis sirtalis dorsalis*	R	Wet or moist habitat; irrigation ditches, and riparian-corridor farmlands, less often in running water; home range approximately 2 acres.	El Paso	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Northern cat-eyed snake *Leptodeira septentrionalis septentrionalis*	R	Thorn scrub woodland; dense thickets bordering ponds and streams; semi-arboreal.	Cameron, Hidalgo, and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Reticulate collared lizard *Crotaphytus reticulatus*	T	Open brush-grasslands; thorn-scrub vegetation, usually on well-drained rolling terrain of shallow gravel, caliche, or sandy soils; often on scattered flat rocks below escarpments or isolated rock outcrops among scattered clumps of prickly pear and mesquite.	Hidalgo, Kinney, Maverick, Starr, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Reticulated gecko *Coleonyx reticulatus*	T	Rocky canyons and crevices in arid habitats.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Spot-tailed earless lizard *Holbrookia lacerata*	R	Moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas.	Hidalgo, Kinney, Maverick, Starr, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (continued)				
Speckled racer *Drymobius margaritiferus*	T	Dense thickets near water, Texas palm groves, riparian woodlands; often in areas with much vegetation litter on ground.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas horned lizard *Phrynosoma cornutum*	T	Arid and semi-arid regions with sparse vegetation, including shrubs, grasses, and cacti.	Brewster, Cameron, El Paso, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas indigo snake *Drymarchon melanurus erebennus*	T	Thornbush-chaparral woodlands of south Texas, in particular dense riparian corridors; requires moist microhabitats, such as rodent burrows, for shelter.	Cameron, Hidalgo, Kinney, Maverick, Starr, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas scarlet snake *Cemophora coccinea lineri*	T	Mixed hardwood scrub on sandy soils.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas tortoise *Gopherus berlandieri*	T	Scrub and brushlands with sandy, well draining soils.	Brewster, Cameron, , Hidalgo, Kinney, Maverick, Starr, Terrell, Val Verde, Webb, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Trans-Pecos black-headed snake *Tantilla cucullata*	T	Mesquite-creosote and pinyon-juniper-oak in the limestone hills.	Brewster, Jeff Davis, Presidio, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
PLANTS				
Amelia's abronia *Abronia ameliae*	R	Occurs on deep, well-drained sandy soils of the South Texas Sand Sheet in grassy and/or herbaceous dominated openings within coastal live oak woodlands or mesquite-coastal live oak woodlands.	Hidalgo and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Appressed two-bristle rock daisy *Perityle bisetosa var appressa*	R	Rock outcrops and crevices in limestone exposures on cliffs.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Bailey's ballmoss *Tillandsia baileyi*	R	Epiphytic on various trees and tall shrubs, perhaps most common in mottes of Live oak on vegtated dunes and flats.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Bearded mock-orange *Philadelphus crinitus*	R	Talus slopes (igneous); flowering July-August.	Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.
Big Bend hop-hornbeam *Ostrya chisosensis*	R	Mixed woodlands on mesic, rocky, igneous slopes at high elevations.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Bigpod bonamis *Bonamia ovalifolia*	R	Slopes and drainages with sandy and/or gravelly soils.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Black-corona milkvine *Matelea atrostellata*	R	Rocky soils in mountain canyons and oak-pinyon-juniper woodlands.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Blumberg's centaury *Centaurium blumbergianum*	R	Known from perennial seeps and associated drainages in limestone, sandstone, or gypseous canyons.	Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Broadpod rushpea *Pomaria brachycarpa*	R	Grasslands, live oak savannas, and open mesquite woodlands on shallow, stony, clay soils over limestone; most specimens are from ungrazed roadsides, often in shallowest soils on landscape where competition from taller perennial grasses is minimal; flowering April-July.	Kinney	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Brush-pea *Genistidium dumosum*	R	Desert scrub on rocky limestone hills at lower elevations.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Buckley's spiderwort *Tradescantia buckleyi*	R	Occurs on sandy loam or clay soils in grasslands or shrublands.	Cameron and Webb	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Bushy wild buckwheat *Eriogonum suffruticosum*	R	Open areas on limestone slopes, low hills, and clay flats.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Chaffey's cory cactus *Escobaria dasyacantha var chaffeyi*	R	Pine-oak-juniper woodlands on rocky igneous and limestone soils at 4,675-7,300 feet.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Chihuahua balloon-vine *Cardiospermum dissectum*	R	Thorn shrublands or low woodlands on well to excessively well drained, calcareous, sandy to gravelly soils in drier uplands of the Lower Rio Grande Valley, in areas underlain by the Goliad formation, Catahoula and Frio formations undivided, Jackson Group, and other Eocene formations; flowering (April-) July-September, probably throughout the growing season in response to rainfall. excessively well drained, calcareous, sandy to gravelly soils	Hidalgo, Starr, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Chihuahua scurfpea *Pediomelum pentaphyllum*	R	Texas habitat unknown; in Arizona, found in highly degraded desert grasslands or mixed desert scrub; soils are described as deep sandy loams, sometimes with sparse to moderate amounts of small-sized gravel (0.2-0.4 inches diameter), some soils display minor eolian coppicing; flowering April-May.	Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Chisos agave *Agave glomeruliflora*	R	Gravelly or rocky soils in oak-juniper woodlands and mesquite-creosote bush-invaded grasslands at elevations of 1,950-5,900 feet; flowering mid-spring to early fall.	Brewster, Hudspeth, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Chisos coral-root *Hexalectris revoluta*	R	In humus in oak groves along rocky creekbeds at mid- to high elevations; in the Glass Mountains, it has been found among lechuguilla and shinnery oak on the sunny slopes and ridges; usually flowering May-August.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Chisos oak *Quercus graciliformis*	R	Oak woodlands in dry rocky canyons, usually associated with a high water table; above elevations of 5,400 feet; flowering in the spring, fruiting July-early September.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Chisos pinweed *Lechea mensalis*	R	Open oak-pinyon-juniper woodlands over igneous or sandstone rock outcrops at high elevations.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Cliff bedstraw *Galium correllii*	R	Dry, steep or vertical limestone cliff faces at elevations of 1,150-1,650 feet; flowering April-November, fruiting May-December.	Brewster and Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Comal snakewood *Colubrina stricta*	R	In El Paso County, found in a patch of thorny shrubs in colluvial deposits and sandy soils at the base of an igneous rock outcrop; flowering late spring or early summer.	El Paso	Short- and long-term, direct and indirect, negligible, adverse impacts.
Correll's bluet *Houstonia correllii*	R	Sandy soils in grasslands with scattered shrubs or in mesquite savannas; does not occur in disturbed sandy areas or in 'improved' pastures; flowering March.	Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Correll's false dragon-head *Physostegia correllii*	R	Wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May-September.	Maverick, Val Verde, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Correll's green pitaya *Echinocereus viridiflorus var correllii*	R	Among grasses on rock crevices on low hills in desert or semi-desert grassland on novaculite or limestone; flowering March-May.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Cox's dalea *Dalea bartonii*	R	Semi-desert shortgrass grasslands with scattered pinyon pine and juniper in gravelly soils on limestone hills; probably flowering in late spring, fruiting in late summer-early fall.	Brewster and Terrell	Short- and long-term, direct and indirect, negligible, adverse impacts.
Cutler's twistflower *Streptanthus cutleri*	R	Open shrublands or grasslands on calcareous gravel of talus slopes, rocky hillsides, and gravelly streambeds, at moderate elevations in the Chihuahuan Desert; flowering mostly February-March, sometimes into May.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Desert night-blooming cereus *Peniocereus greggii var greggii*	R	Chihuahuan Desert shrublands or shrub invaded grasslands in alluvial or gravelly soils at lower elevations, 3,900-4,900 feet, on slopes, benches, arroyos, flats, and washes; flowering synchronized over a few nights in early May to late June when almost all mature plants bloom, flowers last only one day and open just after dark, may flower as early as April.	Brewster, El Paso, Hudspeth, Jeff Davis, Presidio, and Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Duncan's cory cactus *Escobaria dasyacantha var duncanii*	R	Chihuahuan Desert scrub at low to moderate elevations 2,150-6,000 feet on hills, ledges, and benches in cracks and crevices of limestone outcrops; flowering February-March (-May, or July in New Mexico), fruiting mostly May-June.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Durango yellow-cress *Rorippa ramosa*	R	Moist, fine-textured, alluvial soils on floodplains and in beds of intermittent streams; flowering March-May.	Brewster and Terrell	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Dwarf broomspurge *Chamaesyce jejuna*	R	Found on grama-grass prairie on caliche uplands, also dry caliche slopes, and limestone hills; flowering late March through July.	Brewster, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Falfurrias milkvine *Matelea radiata*	R	Only two known specimens; one from clay soil on dry gravel hills at altitude of approximately 150 feet; other from Falfurrias, no habitat description; probably flowering May-June.	Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Glass Mountains rock-daisy *Perityle vitreomontana*	R	Crevices and solution pockets in Capitan Limestone exposures on cliffs and rock outcrops.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Graybeard cactus *Echinocereus viridiflorus var canus*	R	Steep rubble of black Maravillas chert, near top of ridge.	Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Grayleaf rock-daisy *Perityle cinerea*	R	Crevices in dry limestone caprock of mesas; flowering spring-fall.	Terrell	Short- and long-term, direct and indirect, negligible, adverse impacts.
Green Island echeandia *Echeandia texensis*	R	Found in areas with saline clays of lomas dominated by herbaceous species with scattered brush and stunted trees, or in grassy openings in subtropical thorn shrublands; flowers April, June, and November	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Green spikemoss *Selaginella viridissima*	R	Shaded or sheltered igneous, limestone, or sandstone rock ledges, boulders and cliffs in woodlands and shrublands.	Brewster and Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Gregg's wild-buckwheat *Eriogonum greggii*	R	Sparingly vegetated openings in thorn shrublands in shallow soils on xeric ridges; also on excessively drained, sandy soil over caliche and calcareous sandstone of the Goliad Formation and over sandstone or fossiliferous layers of the Jackson Group; flowering February-July.	Hidalgo and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Golden-spine hedgehog cactus *Echinocereus chloranthus var neocapillus*	R	Sparsely vegetated desert grasslands over novaculite outcrops; flowering late March-early May.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Golden-spine prickly-pear *Opuntia aureispina*	R	Desert flats and low hills on slabs of fractured Boquillas limestone at 1,576-2,800 feet elevation; flowering March-May.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Guadalupe Mountains columbine *Aquilegia chrysantha var chaplinei*	R	Perennially moist to wet limestone canyon walls; moist leaf litter and humus among boulders in wooded mesic canyons; flowering April-November (most reliably June-July).	Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Gyp locoweed *Astragalus gypsodes*	R	Gypsum or stiff gypseous clay soils on low rolling hills, mostly low elevations; many of the known locations are on the Castile Formation (Permian); flowering March-June.	Hudspeth	Short- and long-term, direct and indirect, negligible, adverse impacts.
Gypsum hotspring aster *Arida blepharophylla*	R	Perennial springs, seeps, and their drainages in sandstone, calcareous, or gypseous canyons; flowering summer and fall.	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Gypsum scalebroom *Lepidospartum burgessii*	R	Gypsum dune system in the salt basin west of the Guadalupe Mountains, east of Dell City; sparsely vegetated areas; some plants on and around shifting, unstabilized dunes; others in stabilized gypseous soils with a well-developed microbiotic crust; flowering late April-early October.	Hudspeth	Short- and long-term, direct and indirect, negligible, adverse impacts.
Havard's machaeranthera *Xanthisma viscidum*	R	Occurs on calcareous or sandy soils in desert shrublands or mesquite grasslands.	Hudspeth	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Havard's stonecrop *Sedum havardii*	R	Crevices in igneous rock outcrops at mid-to-high elevations, sometimes loose igneous talus, in oak-pinyon woodlands and chaparral; flowering May-September.	Brewster and Terrell	Short- and long-term, direct and indirect, negligible, adverse impacts.
Heather leaf-flower *Phyllanthus ericoides*	R	Crevices in limestone on dry canyon walls and other rock outcrops; flowering October, and presumably in other months, given sufficient moisture.	Terrell	Short- and long-term, direct and indirect, negligible, adverse impacts.
Hester's cory cactus *Escobaria hesteri*	R	Grasslands on novaculite hills or limestone hills and alluvial fans, also in pine-oak-juniper woodlands on igneous substrates; flowering April-early June.	Terrell	Short- and long-term, direct and indirect, negligible, adverse impacts.
Hinckley's brickellbush *Brickellia hinckleyi var hinckleyi*	R	Mixed woodlands or forests on rocky slopes in higher elevation mountain canyons; flowering July-October.	Brewster and Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.
Hinckley's columbine *Aquilegia chrysantha var hinckleyana*	R	Wet areas near waterfalls, perennial seeps, springs, etc., in canyons of desert mountains; flowering March-November.	Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Hinckley's Jacob's-ladder *Polemonium pauciflorum ssp hinckleyi*	R	Mesic canyons and shaded talus boulder field on igneous slopes, elevation 6,900-7,550 feet, often in the shade of a pine-oak-juniper forest; flowering July-October.	Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.
Hueco rock-daisy *Polemonium pauciflorum ssp hinckleyi*	R	North-facing or otherwise mostly shaded limestone cliff faces within relatively mesic canyon system; flowering spring-fall.	El Paso	Short- and long-term, direct and indirect, negligible, adverse impacts.
Irion County wild-buckwheat *Eriogonum nealleyi*	R	Grasslands and shallow stony soils over limestone and indurated caliche, often collected from ungrazed but sparsely vegetated roadsides, particularly where limestone or caliche is exposed on hilltops; flowering June-September.	Pecos	Short- and long-term, direct and indirect, negligible, adverse impacts.
Jackie's bluet *Stenaria mullerae var pooleana*	R	North- to east-facing vertical limestone cliff faces in mid-elevation canyons; flowering May, perhaps to September.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Kay's grama *Bouteloua kayi*	R	Gravelly soils on desert flats and on limestone ledges along bluffs; flowering May-November.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Kleberg saltbush *Atriplex klebergorum*	R	Occurs in sparsely vegetated saline areas, including flats and draws; in light sandy or clayey loam soils with other halophytes; occasionally observed on scraped oil pad sites; observed flowering in late August-early September.	Starr, Webb, and Zapata	Short- and long-term, direct and indirect, negligible, adverse impacts.
Lateleaf oak *Quercus tardifolia*	R	Mixed evergreen-deciduous woodlands in moist canyon bottoms at elevation ca. 7,050 feet; flowering in the spring.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Leatherweed croton *Croton pottsii var thermophilus*	R	Sparsely vegetated desert grasslands on extremely xeric sites at low elevations (1,650-2,640 feet), on substrates ranging from sand to limestone and basalt; flowering spring-fall.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Leoncita false foxglove *Agalinis calycina*	R	Grasslands on perennially moist heavy, alkaline/saline, calcareous silty clays and loams in and around desert springs and seeps; flowering September-October.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Lila de los llanos *Echeandia chandleri*	R	Among shrubs or in grassy openings in subtropical thorn shrublands on somewhat saline clays of lomas also observed in a few upland coastal prairie remnants on clay soils over the Beaumont Formation at inland sites well to the north and along railroad right-of-ways and cemeteries; flowering (May-) September-December, fruiting October-December.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Little-leaf brongniartia *Brongniartia minutifolia*	R	Desert shrublands at lower elevations 1,950-5,000 feet, in blackish sand, gravel, volcanic ash and other substrates, often in or along arroyos or shallow drainages; flowering May-August.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Livermore sandwort *Arenaria livermorensis*	R	Sparsely vegetated igneous rock outcrops at higher elevations, 7,600-8,200 feet.	Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Livermore sweet-cicely *Osmorhiza bipatriata*	R	Moist igneous-derived soils of shaded rocky slopes around springs in high mountain canyons; occurs in shade of a mesic canyon forest; flowering June-August.	Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.
Longstalk heimia *Nesaea longipes*	R	Moist or subirrigated alkaline or gypsiferous clayey soils along unshaded margins of cienegas and other wetlands; also occurs common in moderately alkaline clay along perennial stream and in subirrigated wetlands atop poorly-defined spring system; also occurs in low, wetland area along highway right-of-way; flowering May-September.	Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Many-flowered unicorn-plant *Proboscidea spicata*	R	Dry sandy alluvial and/or Eolian soils on terraces or in other disturbed sandy habitats; flowering May-June.	Brewster, Jeff Davis and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Manystem spiderflower *Cleome multicaulis*	R	Wet, saline or alkaline sandy soils around alkali sinks or flats, saline playas, springs, or meadows.	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Maravillas milkwort *Polygala maravillasensis*	R	Crevices of limestone exposed on canyons walls, and in low desert mountains at 1,450-3,100 feet elevation; flowering May-October.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Mary's bluet *Stenaria butterwickiae*	R	Shallow pockets or crevices in limestone bedrock on ridgetops; flowering or fruiting at least May-August.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Matt Turner's aster *Arida matterneri*	R	In gypseous or sandy soils along shallow, perennial seeps and streams within canyons in the Chihuahuan Desert; flowering summer-early fall (July-September).	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
McCart's whitlow-wort *Paronychia maccartii*	R	Substrate for type location described as 'very hard-packed red sand', possibly the Cuevita-Randado Complex, probably occurring in thorn shrubland plant community; based on type specimen's presence of flowers and collection date, flowers in March.	Webb	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Mexican mud-plantain *Heteranthera mexicana*	R	Wet clayey soils of resacas and ephemeral wetlands; flowering June-December.	Cameron, Hidalgo, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Nickel's cory cactus *Coryphantha nickelsiae*	R	Limestone outcrops and nearby alluvial or gravelly soils on hills or plains in grasslands or shrublands at low elevations; flowering August through September.	Webb	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Ojinaga ringstem *Anulocaulis reflexus*	R	Primarily on shaley gypseous clays at 2,600-4,000 feet; flowering mid-May-mid-October.	Jeff Davis and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Old blue pennyroyal *Hedeoma pilosum*	R	Single historic record from open exposed limestone; flowering period unknown.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Orcutt's senna *Senna orcuttii*	R	Gravelly or rocky soil on limestone slopes and in beds of intermittent streams, within various mid- to lower elevation Chihuahuan Desert communities; at least one site is on east- to north-facing slopes; flowering July-August.	Brewster and Terrell	Short- and long-term, direct and indirect, negligible, adverse impacts.
Perennial caltrop *Kallstroemia perennans*	R	Somewhat barren gypseous clays or limestone soils at low elevations in the Chihuahuan Desert; flowering late spring-early fall.	Brewster, Presidio, and Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Plains gumweed *Grindelia oolepis*	R	Heavy clay (blackland) soils, often in depressional areas, sometimes persisting in areas where mowing may maintain or mimic natural prairie disturbance regimes; roadsides, railroad rights-of-ways, vacant lots in urban areas, cemeteries; flowering April-December.	Cameron	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Powell's Mormon tea *Ephedra torreyana var powelliorum*	R	Desert scrub on gravelly to fine grained gypseous soils; 2,789-3,609 feet.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Prostrate milkweed *Asclepias prostrata*	R	Grasslands or openings in shrublands on loamy fine sands and fine sandy loams of the Copita, Hebbronville, and possibly other soil series occurring over the Laredo, Yegua, and other Eocene formations; flowering April-October.	Starr and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Purple gay-mallow *Batesimalva violacea*	R	Among boulders in seasonally moist igneous rock canyons, often under small trees and large shrubs; flowering/fruiting at least October-November in Big Bend National Park.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Ripley's senna *Senna ripleyana*	R	Gravelly hilltops in arid grasslands and creosote flats in Chihuahuan Desert; elevation ranges 3,900-4,900 feet; flowering/fruiting July-October.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Robust oak *Quercus robusta*	R	Mixed evergreen-deciduous woodlands in moist canyon bottoms at elevations ca. 4,200 feet flowering in the spring.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Royal red penstemon *Penstemon cardinalis ssp regalis*	R	Pine-oak woodlands in canyons at higher elevations; flowering May-June (-August).	Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.
Runyon's cory cactus *Coryphantha macromeris var runyonii*	R	Gravelly to sandy or clayey, calcareous, sometimes gypsiferous or saline soils, often over the Catahoula and Frio formations, on gentle hills and slopes to the flats between, at elevations ranging from 30 to 500 feet; late spring or early summer, November, fruit has been collected in August.	Cameron, Hidalgo, and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Runyon's water-willow *Justicia runyonii*	R	Margins of and openings within subtropical woodlands or thorn shrublands on calcareous, alluvial, silty or clayey soils derived from Holocene silt and sand floodplain deposits of the Rio Grande Delta; can be common in narrow openings such as those provided by trails through dense ebony woodlands and is sometimes restricted to microdepressions; flowering (July-) September-November.	Cameron and Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Rydberg's scurfpea *Pediomelum humile*	R	Shortgrass grasslands or cenizo-guajillo shrublands on shallow, stony to gravelly clay soils on dry, open limestone or yellowish, eroding caliche hills; flowering March-May.	Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Sabinal prairie-clover *Dalea sabinalis*	R	Rocky soils or on limestone outcrops in sparse grassland openings in juniper-oak woodlands; flowering April-May or May-June.	Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Sand prickly-pear *Opuntia arenaria*	R	Deep, loose or semi-stabilized sands in sparsely vegetated dune or sandhill areas, or sandy floodplains in arroyos; flowering May-June.	El Paso and Hudspeth	Short- and long-term, direct and indirect, negligible, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Sand sacahuista *Nolina arenicola*	R	Mesquite-sand sage shrublands on windblown Quarternary reddish sand in dune areas; flowering time uncertain May-June, June-September.	Edwards and Hudspeth	Short- and long-term, direct and indirect, negligible, adverse impacts.
Shinners' rocket *Thelypodiopsis shinnersii*	R	Mostly along margins of Tamaulipan thornscrub on clay soils of the Rio Grande Delta, including lomas near the mouth of the river; flowering March-April.	Cameron and Starr	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Shinners' tickle-tongue *Zanthoxylum parvum*	R	Understory of maple-oak woodlands or evergreen oak shinnery on rocky, often shallow, well-drained, neutral, non-calcareous loams underlain by rhyolite, tuff trachyandesite, or other igneous rock, at elevations between approximately 4,400 and 5,750 feet; flowering late March-early April, before the leaves have fully expanded.	Brewster and Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.
Sierra del Carmen oak *Quercus carmenensis*	R	Shrublands and woodlands on talus slopes at 7,200-8,200 feet elevation; immature fruit collected in July.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Silvery wild-mercury *Argythamnia argyraea*	R	Among shortgrasses in grasslands or open shrublands on which whitish clay soils, particularly those derived from the Yegua Formation; flowering April-June; fruit may persist until fall.	Kinney and Maverick	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Silver cholla *Opuntia imbricata var argentea*	R	Rocky limestone slopes, rarely in alluvial soils in mesquite thickets, flowering April-July; fruit ripening two-three months after flowering.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Slimlobe rock-daisy *Perityle dissecta*	R	Limestone cliff faces in desert canyons; flowering/fruiting spring-fall.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Small-leaved yellow velvet-leaf *Wissadula parvifolia*	R	Occurs on sandy loams or clays in shrublands or woodlands on gently undulating terrain of the Holocene sand sheet over the Goliad Formation.	Hidalgo	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Smooth-stem skullcap *Scutellaria laevis*	R	Mountain slopes and in arroyos along dry streambeds; flowering April-September.	Hudspeth	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Spiny kidney-wood *Eysenhardtia spinosa*	R	Grasslands or sparse shrublands on igneous outcrops or limestone hills; on rocky hills and gravelly drainages of mixed igneous origin; flowering July–October.	Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Springrun whitehead *Shinnersia rivularis*	R	In shallow, slow-moving water in small, usually spring-fed streams and rivers arising from calcareous outcrops; rooted in a mucky to gravelly bottom; flowering throughout the year, most reliably March-May.	Val Verde and Zavala	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Stairstep two-bristle rock-daisy *Perityle bisetosa var scalaris*	R	Crevices in limestone exposures on bluffs and other rock outcrops; flowering May-October.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Stalk-leaf phacelia *Phacelia petiolata*	R	On gypsum soils at low elevations; flowering May-August.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Standley's draba *Draba standleyi*	R	Crevices in sparsely vegetated igneous boulders and rock outcrops at high elevations in pine-oak-juniper woodlands; flowering June-October.	Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.
Straw-spine glory-of-Texas *Thelocactus bicolor var flavidispinus*	R	Rocky hills in desert grasslands or shrublands below approximately 5,000 feet; flowering late March-May.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
St. Joseph's staff *Manfreda longiflora*	R	Thorn shrublands on clays and loams with various concentrations of salt, caliche, sand, and gravel; rossettes are often obscured by low shrubs; flowering September-October.	Hidalgo, Starr, and Zapata	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Swallow spurge *Chamaesyce golondrina*	R	Alluvial or eolian sand along Rio Grande, occasionally on adjacent shale or limestone slopes; flowering June-November.	Hudspeth and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Terlingua brickellbush *Brickellia hinckleyi var terlinguensis*	R	Chihuahuan Desert; perhaps at lower elevations than var. hinckleyi; found on slope in the Chisos Mountains and along creek bottom; flowering July-October.	Brewster and Hudspeth	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Texas false saltgrass *Allolepis texana*	R	Sandy to silty soils of valley bottoms and river floodplains, not generally on alkaline or saline sites; flowering (May-) July-October depending on rainfall.	Brewster, El Paso, Jeff Davis, and Presidio	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas greasebush *Glossopetalon texense*	R	Dry limestone ledges, chalk bluffs, and limestone outcrops; one population is on an extremely steep slope, inaccessible to most herbivores; flowering period uncertain, including at least June-December.	Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Texas golden prince's plume *Stanleya pinnata var. texana*	R	Occurs on clay or silty soils on sparsely vegetated limestone and/or gypseous hills, draws, washes, and flats.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Texas largeseed bittercress *Cardamine macrocarpa var texana*	R	Seasonally moist, loamy soils in pine-oak woodlands; flowering in early spring and usually withering by the beginning of summer.	Brewster, Hudspeth, Kinney, and Uvalde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Texas milkvine *Matelea texensis*	R	Desert grasslands or woodlands over igneous substrate, at elevations between 3,900-5,000 feet; flowering/fruiting May-October.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Texas mock-orange *Philadelphus texensis*	R	Limestone outcrops on cliffs and rocky slopes, on boulders in mesic canyon bottoms, usually in shade of mixed evergreen-deciduous slope woodland forest; flowering April-May, but readily recognizable throughout the growing season.	Uvalde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Texas trumpets *Acleisanthes crassifolia*	R	Shallow, well-drained, calcareous, gravelly loams over caliche on gentle to moderate slopes, often in sparsely vegetated openings in cenizo (*Leucophyllum frutescens*) shrublands; known populations occur on Austin Chalk (Cretaceous) or Uvalde Gravel (Pleistocene); flowering March-November, fruiting April-December.	Kinney, Maverick, and Val Verde	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.
Texas windmill-grass *Chloris texensis*	R	Sandy to sandy loam soils in relatively bare areas in coastal prairie grassland remnants, often on roadsides where regular mowing may mimic natural prairie fire regimes; flowering in fall.	Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Texas wolf-berry *Lycium texanum*	R	Semi-desert grasslands and thorn shrublands on sandy, gravelly, and/or loamy soils, on very gently sloping terrain as well as in rocky areas of canyons, often over limestone at moderate elevations; flowering March-October.	Brewster and Hudspeth	Short- and long-term, direct and indirect, negligible, adverse impacts.
Three-tongue spurge *Chamaesyce chaetocalyx var triligulata*	R	In crevices in steep limestone cliffs and on scree and colluvium below; flowering/fruiting July-October.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Trans-Pecos maidenbush *Andrachne arida*	R	Crevices in calcareous bedrock exposures on arid mountain slopes, usually with succulents, Texas sites are on Cretaceous limestone; flowering July-October.	Brewster and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Turner's horseweed *Laennecia turnerorum*	R	Occurs on silty limestone-derived soils in Chihuahuan Desert shrubland in basins surrounded by desert mountains.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Two-bristle rock-daisy *Perityle bisetosa var bisetosa*	R	Crevices in limestone exposures on bluffs and other rock outcrops; flowering late summer-fall.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Vasey's bitterweed *Hymenoxys vaseyi*	R	Occurs on xeric limestone cliffs and slopes at mid- to high elevations in desert shrublands.	El Paso	Short- and long-term, direct and indirect, negligible, adverse impacts.
Warnock's coral-root *Hexalectris warnockii*	R	In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons.	Brewster, Jeff Davis, Presidio, and Terrell	Short- and long-term, direct and indirect, negligible, adverse impacts.
Warnock's rock-daisy *Perityle warnockii*	R	Crevices and solution pits in steep, dry, inaccessible limestone bluffs; flowering spring-fall.	Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Watson's false clappia-bush *Pseudoclappia watsonii*	R	Chihuahuan Desert shrublands on dry, rocky, gypseous clay hills and arroyos; flowering May-August.	Brewster, Hudspeth, and Jeff Davis	Short- and long-term, direct and indirect, negligible to minor, adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (continued)				
Wendt's malaxis *Malaxis wendtii*	R	Oak-juniper-pinyon woodlands; flowering July-September.	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Wheeler's spurge *Chamaesyce geyeri var wheeleriana*	R	Sparingly vegetated, loose eolian quartz sand on reddish sand dunes or coppice mounds; flowering and fruiting at least August-September.	El Paso and Hudspeth	Short- and long-term, direct and indirect, negligible, adverse impacts.
White column cactus *Escobaria albicolumnaria*	R	Creosote bush or lechuguilla canyon shrublands primarily on nearly level terrain to rolling hills on thin, gravelly soils or limestone bedrock of the Santa Elena, Glen Rose, Boquillas, and Telephone Canyon formations; at lower elevations 1,800-5,000 feet in the Chihuahuan Desert; flowering early March-May.	Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Wilkinson's whitlow-wort *Paronychia wilkinsonii*	R	Shallow rocky soils in crevices on novaculite hills or outcrops at low to moderate elevations in the Chihuahuan Desert; flowering April-October	Brewster	Short- and long-term, direct and indirect, negligible, adverse impacts.
Withered woolly loco *Astragalus mollissimus var marcidus*	R	Short to midgrass grasslands and occasionally shrublands on gravelly and sometimes clayey soils in basins, flats, and slopes at mid to higher elevations, usually on conglomerate or igneous substates; flowering April-July.	Jeff Davis and Presidio	Short- and long-term, direct and indirect, negligible, adverse impacts.
Wright's trumpets *Acleisanthes wrightii*	R	Open semi-desert grasslands and shrublands on shallow stony soils over limestone on low hills and flats; flowering spring-fall.	Brewster, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Wright's water-willow *Justicia wrightii*	R	Shortgrass grasslands and/or shrublands; dry gravelly clay soils over limestone on flats and low hills at elevations of 2,950-4,900 feet; flowering April-August.	Brewster, Terrell, and Val Verde	Short- and long-term, direct and indirect, negligible, adverse impacts.
Young's snowbells *Styrax platanifolius ssp youngiae*	R	In relatively mesic montane limestone canyons; flowering Apr-May, fruiting July-September.	Brewster and Jeff Davis	Short- and long-term, direct and indirect, negligible, adverse impacts.

Sources:
TPWD, Rare Threatened and Endangered Species of Texas by County: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/index.phtml;
TPWD, A List of the Rare Plants of Texas (December 2010 Edition): https://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_rp_w7000_1142.pdf;
Herps of Texas: http://www.herpsoftexas.org/;
Texas Freshwater Fishes, Texas State University: http://www.bio.txstate.edu/~tbonner/txfishes/index.htm;
The Mammals of Texas by David J. Schmidly; Revised edition 2004; Bats of Texas by Loren K. Ammerman 2012; and Texas Natural Diversity Database http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/txndd (14 March 2014).

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Best Management Practices

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APPENDIX D: BEST MANAGEMENT PRACTICES

Land Use

1. CBP will notify all landowners and land managers at least 5 days in advance of any scheduled cane control activities on their lands.

Vegetation

1. Care will be taken to avoid damage or harm to native plant species en route to and during cane control activities.
2. Cane control activities will be developed and scheduled in a manner that minimizes the potential spread of cane (e.g., cane control would not entail excavation or subsurface disturbance).

Wildlife

1. Minimize animal collisions during cane control activities by not exceeding speed limits of 35 miles per hour (mph) on major unpaved roads (i.e., graded with ditches on both sides) and 25 mph on all other unpaved roads. During periods of decreased visibility (e.g., night, dusk, dawn, poor weather, curves), do not exceed speeds of 25 mph.

Non-Threatened and Endangered Migratory Birds

1. Mechanical cane control should be timed to avoid the migration, breeding, and nesting timeframe of migratory birds (March 15 through September 15). When initial mechanical cane control must be implemented during March 15 through September 15, a survey for nesting migratory birds will be conducted immediately prior to the start of activities. If an active nest is found, a buffer zone (35 feet) will be established around the nest and no activities will occur within that zone until nestlings have fledged and abandoned the nesting area.
2. If mechanical cane control is scheduled during the migratory bird-nesting season, steps would be taken to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and use of various excluders (e.g., noise). Birds can be harassed to prevent them from nesting on the site. Once a nest is established, they cannot be harassed until all young have fledged and left the nest site. If nesting birds are found during the supplemental survey, defer vegetation control activities until the birds have left the nest. Confirmation that all young have fledged should be made by qualified personnel.

Threatened and Endangered Species

General BMPs

1. Coordinate with the environmental Subject Matter Expert to determine which threatened and endangered species could occur in the vicinity of cane control activities. In areas where there are no threatened and endangered or other species of concern, the personnel performing the cane control activities are responsible for monitoring implementation of general BMPs to avoid impacts on the environment.
2. To protect individuals of listed species within the work site, suspend work in the

immediate vicinity of the individual until it moves out of harm's way on its own, or enlist a qualified specialist (individuals or agency personnel with a permit to handle the species) to relocate the animal to a nearby safe location in accordance with accepted species-handling protocols.

3. Develop and implement a training program to inform cane control personnel of the listed species that occur within the work site, penalties for violation of state or Federal laws, implementation of included BMPs, and reporting.
4. Check visible space underneath all vehicles and heavy equipment for listed species and other wildlife prior to moving vehicles and equipment at the beginning of each workday and after vehicles have idled for more than 15 minutes.
5. Equipment staging areas will be located at previously used staging areas or disturbed areas or at least 0.3 mile away from known, occupied sites of listed aquatic species.

Species-Specific BMPs

Plants: Ashy dogweed (*Thymophylla tephroleuca*), bunched cory cactus (*Coryphantha ramillosa*), Chisos Mountain hedgehog cactus (*Echinocereus chisoensis* var. *chisoensis*), Hinckley's oak (*Quercus hinckleyi*), Johnston's frankenia (*Frankenia johnstonii*), Lloyd's Mariposa cactus (Echinomastus mariposensis), Tobusch fishhook cactus (*Sclerocactus brevihamatus* ssp. *tobuschii*), South Texas ambrosia (Ambrosia cheiranthifolia), star cactus (*Astrophytum asterias*), Terlingua Creek cat's-eye (*Cryptantha crassipes*), Texas ayenia (*Ayenia limitaris*), Walker's manioc (*Manihot walkerae*), Zapata bladderpod (*Lesquerella thamnophila*). **Table D-1** presents the suitable habitat and blooming seasons for these plant species.

1. Off-road driving or other surface ground-disturbing activities in suitable habitat or critical habitat of threatened or endangered plant species would be avoided unless a survey is conducted by a qualified biologist. If cane control activities occur in areas of known occurrences of these species, critical habitat, and suitable habitat and are unavoidable, then a qualified biologist would conduct a survey during the appropriate blooming season (see **Table D-1**). An area of sufficient size would be flagged to create a buffer large enough to ensure that threatened or endangered plant species are not directly or indirectly affected.

Fish: Big Bend gambusia *(Gambusia gaigei),* Devils River minnow *(Dionda diaboli),* and Rio Grande silvery minnow (*Hybognathus amarus*). **Table D-2** presents the suitable habitat for these fish species.

1. Except for cane control conducted from a barge in the Rio Grande, no cane control equipment would enter a wetland, stream, or other waterbody. Additionally, cane control activities conducted from a barge would be avoided in the Rio Grande in Big Bend National Park, in order to avoid impacts on the Rio Grande silvery minnow, which is regulated as a threatened species in this location. If cane in standing water outside of the Rio Grande needs to be topped, it should be done from an adjacent bank. Contact the environmental Subject Matter Experts to coordinate separate environmental clearances if cane control is required within a wetland, waterbody, or stream.

Table D-1. Threatened and Endangered Plant Species That Could Occur Within the Cane Control Area

Common Name	Suitable Habitat	Blooming Season
Ashy dogweed	Open areas on fine sandy-loam soils on level or rolling grasslands.	March–May
Bunched cory cactus	Bouquillas and Santa Elena limestone formation within Chihuahuan desert scrubland.	April–August
Chisos Mountain hedgehog cactus	Alluvial flats at elevations of 1,950 to 2,250 feet in Chihuahuan desert vegetation.	March–July
Hinckley's oak	Dry limestone slopes at elevations of 3,500 to 4,500 feet in Chihuahuan desert vegetation.	March–April
Johnston's frankenia	Open or sparsely vegetated rocky gypseous hillsides and saline flats.	Year-round
Lloyd's Mariposa cactus	Very open area with few shrubs in the Chihuahuan desert scrubland at elevations of 2,500 to 3,500 feet.	July–August
Tobusch fishhook cactus	Eastern Edwards Plateau of Texas on high stream banks.	April– September
South Texas ambrosia	Subtropical woodland communities within coastal prairies and savannas with well-drained, heavy soils at low elevations from 23 to 66 feet.	Year-round
Star cactus	Sparse open thorn shrub and grasslands with gravelly clay and loam soils.	Late summer– early fall
Terlingua Creek cat's-eye	Open or sparsely vegetated areas with impure silty limestone soils (Fizzle Flat lentil) at elevations 3,150 to 3,450 feet.	March–May
Texas ayenia	Open ground, on the edges of thickets, or within thickets, and on dry, alluvial clay soils.	Year-round
Walker's manioc	Endemic to the Tamaulipan biotic province. Grows among low shrubs, native grasses, and herbaceous plants, either in full sunlight or in the partial shade of shrubs.	April– September
Zapata bladderpod	Graveled to sandy-loam soils on upland terraces that are above the Rio Grande floodplain.	February– April

Table D-2. Threatened and Endangered Fish Species That Could Occur Within the Cane Control Area

Common Name	Suitable Habitat
Big Bend gambusia	Spring habitats in the vicinity of Boquillas Crossing and Rio Grande Village (Big Bend National Park).
Devils River minnow	Channels of fast-flowing spring-fed waters over gravel substrates in Val Verde and Kinney counties, Texas.
Rio Grande silvery minnow	Areas of low to moderate water velocity in Big Bend National Park.

2. Cane control activities would avoid riparian vegetation within 100 feet of known occurrences or suitable habitat for Big Bend gambusia, Devils River minnow, and Rio Grande silvery minnow, or critical habitat, to provide a buffer area to protect the habitat from sedimentation (see **Table D-2**).

Birds: Black-capped vireo *(Vireo atricapilla)*, southwestern willow flycatcher *(Empidonax trailli extimus)*, and yellow-billed cuckoo (*Coccyzus americanus*). **Table D-3** presents the suitable habitat and nesting seasons for these bird species.

1. Activities associated with cane control (including off-road vehicle operations) in suitable habitat of threatened or endangered bird species (see **Table D-3** for a description of suitable habitat and nesting season for each species) will be limited to the minimum necessary to maintain tactical visibility. With the following exception, this limited cane control will be conducted outside of the nesting season (see **Table D-3**). This restriction does not apply to areas where protocol surveys have been conducted and it has been determined that the area is not occupied and does not contain Primary Constituent Elements.
2. If mechanical cane control activities (including off-road vehicle operations) must be conducted near (within 500 feet) suitable habitat of a threatened or endangered bird species during the nesting season (see **Table D-3**), the following avoidance measures will apply. A qualified biologist will conduct a survey for threatened and endangered birds prior to initiating cane control activities. If a threatened or endangered bird is present, a qualified biologist will survey for nests approximately once per week within 500 feet of the cane control area for the duration of the activity. If an active nest is found, no cane control will be conducted within 300 feet of the nest until the young have fledged.

Table D-3. Threatened and Endangered Bird Species That Could Occur Within the Cane Control Area

Common Name	Suitable Habitat	Nesting Season
Black-capped vireo	Deciduous shrubland areas with 30 to 60 percent cover in the Edwards Plateau and eastern Trans-Pecos.	late-March–mid-September
Southwestern willow flycatcher	Dense riparian habitats along streams, rivers, lakesides, and other wetlands.	March 15–September 15
Yellow-billed cuckoo	Low to moderate elevation riparian woodlands greater than or equal to 50 acres in size.	June 15–August 31

Mammals: Mexican long-nosed bat (*Leptonycteris nivalis*), Gulf Coast jaguarundi (*Herpailurus yagouaroundi cacomitli*), ocelot (*Leopardus pardalis*)

1. No cane control activities will be conducted between June and August within 0.5 mile of any known roost (e.g., Emory Peak Cave in Big Bend National Park) identified and agreed upon by United States Fish and Wildlife Service and CBP.
2. All agave species (*Agav*e ssp.) will be avoided when off-roading is required in order to access cane stands within the range of the Mexican long-nosed bat.
3. No cane control activities will occur at night.

Water Resources

1. Mechanical cane control activities within the 100-year floodplain will be conducted in a manner consistent with Executive Order 11988 and other applicable regulations.
2. All cane control contractors and personnel will review the CBP-approved spill prevention plan and implement it during cane control activities.
3. Except for cane control conducted from a barge in the Rio Grande, no cane control equipment would enter a wetland, stream, or other waterbody). Cane control by barge in the Rio Grande would not be conducted in Big Bend National Park. If cane in standing water outside of the Rio Grande needs to be topped, it will be done from an adjacent bank. Contact the environmental Subject Matter Experts to coordinate separate environmental clearances if cane control is required within a wetland, waterbody, or stream.
4. Avoid contaminating natural aquatic and wetland systems with runoff by limiting all equipment maintenance, staging, laydown, and dispensing hazardous liquids (e.g., fuel and oil) to designated upland areas.
5. Cease work during heavy rains, and do not resume work until conditions are suitable for the movement of equipment and materials, as well as for limiting the spread of cane and other invasive species.
6. Care will be taken during land-based cane control activities to avoid water quality impacts and indirect downstream impacts by not allowing cane trimmings to be deposited into moving streams or rivers.

Noise

1. All Occupational Safety and Health Administration requirements will be followed with respect to cane control noise impacts. Ensure all motorized equipment possess properly working mufflers and are kept properly tuned to reduce backfires. For activities involving heavy equipment, seasonal restrictions might be required to avoid impacts on threatened or endangered species in areas where these species or their potential habitat occur. See *Species-Specific BMPs*.

Roadways and Access

1. Cane stands will be accessed using existing roads to the extent possible. Off-roading will be limited to no more than 0.25 mile between existing roads and cane stands. Operators will use the same ingress and egress points to access cane stands that require off-roading. Off-roading may require a survey from a qualified biologist within

the range and habitat of some threatened or endangered species. See *Species-Specific BMPs*.

Hazardous Materials and Waste Management

1. Implement proper and routine maintenance of all tractors, vehicles, and other cane control equipment such that emissions are within the design standards of all equipment.
2. Minimize site disturbance and avoid attracting predators by promptly removing waste materials, wrappers, and debris from the site. Any waste that must remain on site more than 12 hours should be properly stored in closed containers until disposal.

E

Air Quality Calculations

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APPENDIX E: AIR QUALITY CALCULATIONS

Tractor Operation Air Emissions

Primary reference is: Air Force Civil Engineer Center (AFCEC). 2015. *Air Emissions Guide for Air Force Mobile Sources. Methods for Estimating Emissions of Air Pollutants for Mobile Sources at U.S. Air Force Installations.* October 2014. Includes December 2015 Addendum.

Emission Factors for a Diesel Agricultural Tractor							
Unit	**NO_x**	**SO2**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**GHG**
lb. per 1000 hp-hr.	13.30	0.84	7.23	1.39	1.32	1.30	1,219.13

Hours of use per year: 2,080
Number of tractors: 2

Annual Air Emissions							
Unit	**NO_x**	**SO2**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**GHG**
lb./yr.	4,570.09	288.64	2,484.34	477.63	453.57	446.70	418,912.57
tons/yr.	**2.29**	**0.14**	**1.24**	**0.24**	**0.23**	**0.22**	**209.46**

Notes:
Assumes two John Deere 6140S model tractors would be used. This model has 140 horsepower and is diesel fueled.
Load factor is 59% per Table 4-1 of AFCEC 2015.
Emission factors are from Table 4-1 of AFCEC 2015.
Each tractor would be used for 40 hours per week for 52 weeks per year.

Tractor Transportation Air Emissions

Primary reference is: Air Force Civil Engineer Center (AFCEC). 2015. *Air Emissions Guide for Air Force Mobile Sources. Methods for Estimating Emissions of Air Pollutants for Mobile Sources at U.S. Air Force Installations.* October 2014. Includes December 2015 Addendum.

Total miles driven per year to transport both tractors: 26,000

Emission Factors for HDDVs in Texas in 2016							
Unit	**NO_x**	**SO_x**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
grams/mile	6.657	0.014	2.276	0.634	0.288	0.265	1,567.591

Annual Air Emissions							
Unit	**NO_x**	**SO_x**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
lb./yr.	381.581	0.802	130.461	36.341	16.508	15.190	89,854.684
tons/yr.	**0.191**	**0.000**	**0.065**	**0.018**	**0.008**	**0.008**	**44.927**

Notes:
Assumes the tractors would be transported on a trailer towed by a heavy duty diesel vehicle similar to a 1-ton pickup truck weighing around 8,500 pounds.
Emission factors are from Table 5-27 of AFCEC 2015.

Days worked per year:	260
Number of tractors:	2
Round-trip miles per day:	50

Summary of Air Emissions

Annual Air Emissions (tons/year)							
	NO_x	**SO_x**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**GHG**
Tractor Operation	2.29	0.14	1.24	0.24	0.23	0.22	209.46
Tractor Transportation	0.19	0.00	0.07	0.02	0.01	0.01	44.93
Total	**2.48**	**0.14**	**1.31**	**0.26**	**0.24**	**0.23**	**254.38**

Percent of CEQ threshold: 0.92%

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Previously Recorded Archaeological Sites Located in the Cane Control Area

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APPENDIX F: PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES LOCATED IN THE CANE CONTROL AREA

Table F-1. Previously-Recorded Archaeological Sites Located in the Cane Control Area

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41BS1615	Prehistoric (Early Archaic—Late Archaic)	Lithic workshop / open campsite	Unknown	No	No diagnostic but high research potential
41BS1627	Prehistoric (Late Archaic— Late Prehistoric)	Open campsite	Unknown	No	Hearths and the buried deposit may have research potential but continued erosion will eventually destroy the buried deposit
41BS1635	Prehistoric (Late Archaic— Late Prehistoric) and Historic	Open campsite	Unknown	No	Moderate to good research potential, despite extensive disturbance; surface site with an abundance of features and artifacts
41BS1656	Prehistoric and Historic	Open campsite	Unknown	Yes	Additional investigation of the structure
41BS1659	Prehistoric and Historic (ca. 1910s–1930s)	Open campsite and historic homesite	Unknown	Yes	Research value is considered good based on numbers of features and artifacts, despite impacts
41BS1868	Prehistoric (Early Archaic—Late Prehistoric) and Historic	Prehistoric open campsite and Pantera homestead / Community	Has potential	Yes	Strongly qualifies for further research including major excavations
41BS1895	Prehistoric (Late Archaic) and Historic	Open camp and “Medicine Wheel” with historic scatter	Unknown	No	High research potential
41BS1896	Prehistoric	Open campsite	Unknown	No	This site is relatively intact and more features may exist subsurface; excavation of this site to determine the nature and extent of the potentially buried deposits, and sample exposed deposits

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41BS360	Prehistoric	Open campsite	Not eligible	No	Site is threatened by floodplain, testing and excavation of the site should be undertaken
41BS402	Historic, Prehistoric use suggested	Historic habitation, 2 stone-walled structures, other features, and cemetery	Unknown	Yes	Historic occupation of this site has apparently obliterated most evidence of any prehistoric components, so further research or preservation should probably concentrate on the historic components
41BS430	Historic	Remains of adobe house and corral	Unknown	Yes	Additional investigation of site and surrounding area
41BS432	Prehistoric	Campsite	Unknown	No	Additional surface inspection and testing
41BS440	Historic (1909–1942)	Hot Springs reputed to have medicinal qualities	Listed	No	Operated as a resort from approximately 1909 to 1942; Hot Springs NRHP District
41BS448	Prehistoric	Extensive burned rock midden	Unknown	No	Further investigation recommended
41BS601	Historic	Ruins of an old wax factory and pumphouse	Unknown	Yes	No further work
41BS678	Historic	House: stone structure with wagon road	Not eligible	Yes	Avoidance recommended
41BS706	Prehistoric (Late Archaic) and Historic (Mexican-Anglo)	Prehistoric open campsite, historic farm	Unknown	No	Avoid disturbance of the site portion north of the irrigation ditch; any construction in the vicinity should be limited to the farmed area toward the river; future study of the site should involve testing in the narrow strip of undisturbed land between the irrigation ditch and gravel ridge

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41BS709	Prehistoric and Historic (Early 20th c.)	Lithic scatter and historic structure	Unknown	Yes	Determine origin of historic structure through verbal interviews with early residents of the area; conduct land deep record search; continue monitoring site for vandalism and unauthorized artifact collecting.
41BS866	Prehistoric (Late Archaic—Late Prehistoric) and Historic	Open campsite with mortar holes, hearths, and nearby small collapsed rock shelter and a stone walled historic structure	Has potential	Yes	This site should be definitely protected from further disturbance by construction, moving, and other impacts
41BS913	Historic (Early 20th c.)	Walled structure	Has potential	Yes	Further investigations recommended
41EP37	Historic (1850–1880)	Fort Bliss and Hart's Mill	Listed	Yes	Old Fort Bliss Historic District
41EP4679	Prehistoric and Historic	Prehistoric unknown site and historic earthen irrigation canal	Prehistoric: Not eligible; Historic: Has Potential	Yes	—
41EP7014	Historic	Linear canal structure with associated features	Eligible	Yes	Archival or documentary only
41HZ181	Late Prehistoric and Late Archaic	Open campsite; hearth stones, mano and metate fragments, flakes, and ceramics (similar to El Paso Plain)	Listed	No	Listed on NRHP on 1/11/1991; designated as an SAL on 3/19/1993; further investigations recommended; National Register District: Archeological and Historical Resources of the Indian Hot Springs Area
41HZ283	Late Prehistoric	Open campsite and lithic procurement; hearths, lithics, ceramics	Eligible	No	Listed on NRHP on 1/11/1991; designated as an SAL on 3/19/1993; further investigations recommended; National Register District: Archeological and Historical Resources of the Indian Hot Springs Area

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41HZ292	Late Prehistoric and Late Archaic	Open campsite; hearths, burned rock lithics, ceramics	Listed	No	Listed on NRHP on 1/11/1991; designated as an SAL on 3/19/1993; further investigations recommended; National Register District: Archeological and Historical Resources of the Indian Hot Springs Area
41HZ303	Late Prehistoric and Late Archaic	Open campsite; hearths, groundstone, lithics, ceramics	Listed	No	Listed on NRHP on 1/11/1991; designated as an SAL on 3/19/1993; further investigations recommended; National Register District: Archeological and Historical Resources of the Indian Hot Springs Area
41HZ329	Prehistoric unknown	Campsite/lithic processing locale; hearths, lithics	Unknown	No	Further investigations recommended
41HZ342	Neo-American	Burned rock midden; hearths, lithics, shell, shell ornaments, ceramics	Unknown	No	Further investigations recommended; SAL in progress
41HZ444	Historic unknown	Customs house/port of entry; broken concrete, glass, metal, iron sign post	Has potential	Yes	Archival research recommended; structure demolished in 1970s; within the Indian Hot Springs Health Resort Historic District
41HZ464	Prehistoric unknown; Historic recent	Prehistoric pen campsite; historic trash deposit; burned rock midden, debitage	Has Potential	No	Has Potential for NRHP and SAL listing; site included in a proposed Indian Hot Springs NRHP nomination (1990)
41MV1	Prehistoric unknown	Lithic scatter; 2 debitage flakes	Not Eligible within ROW	No	Monitoring recommended

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41MV103	Prehistoric unknown/ Historic ca. 1930	Prehistoric open campsite; mussel shell, burned rock/ Historic domestic; foundation of small hut residence built around 1930, likely an adobe structure	Unknown	Yes	Testing and/or monitoring recommended
41MV108	Prehistoric unknown	Open campsite; lithics, burned rock	Undetermined	No	Avoidance recommended. If avoidance is not possible, monitoring is recommended during future construction activities
41MV110	Prehistoric unknown	Open campsite/ plant gathering and processing locale; debitage, expedient tools, metate, burned sandstone scatter	Unknown	No	Avoidance recommended for areas within the site with intact colluvial-loess soils; otherwise, no further work recommended
41MV2	Historic; 19th and 20th centuries	—	Eligible; Not Eligible within ROW	Yes	— Site falls within the Fort Duncan National Register District, no indication if 41MV2 is a contributing element
41MV205	Prehistoric unknown	Lithic scatter; debitage, mussel shell	Has Potential	No	Avoidance recommended; additional testing is needed to determine NRHP eligibility
41MV208	Prehistoric unknown	Campsite/lithic scatter; debitage, burned rock (possible features), mussel shell	Has Potential	No	Avoidance recommended; additional testing is needed to determine NRHP eligibility
41MV209	Middle Archaic, Late Archaic	Lithic scatter; debitage, bifaces, two potential features indicated by mussel shell concentrations; two Pandora points and a Lange point	Has Potential	No	Avoidance recommended; additional testing is needed to determine NRHP eligibility

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41MV211	Prehistoric unknown	Campsite/lithic scatter; debitage, Lange projectile point; possible deflated hearth, burned rock	Has Potential	No	Avoidance recommended; additional testing is needed to determine NRHP eligibility
41MV222	Prehistoric unknown	Lithic scatter; two possible hearth features, burned rock with no artifacts associated	Has Potential	No	Avoidance recommended; additional testing is needed to determine NRHP eligibility
41MV223	Prehistoric unknown	Lithic scatter; debitage, biface	Has Potential	No	Avoidance recommended; additional testing is needed to determine NRHP eligibility
41MV236	Prehistoric unknown	Campsite/lithic scatter; debitage, cores, tested cobbles	Has Potential	No	Avoidance recommended; additional testing is needed to determine NRHP eligibility
41MV244	Prehistoric unknown	Lithic scatter; debitage, burned sandstone rocks, distal biface	Unknown	No	Surface collections and/or archaeological testing recommended
41MV255	Prehistoric unknown Historic; 1919	Prehistoric lithic scatter; debitage, bifaces, mussel shell / Historic; Graffiti on three bedrock panels at southernmost portion of the site	Historic component Eligible: Prehistoric component Not Eligible within ROW	No	Inscriptions are from four soldiers of Company K of the 3rd infantry of the U.S. Army in 1919; low research value, but archival research might provide additional background data on these individuals or their duties in the Eagle Pass area; preservation of inscriptions recommended
41MV268	Prehistoric unknown	Lithic scatter, late stage lithic reduction debitage, burned rock, preform, one Andice, Bell, or Calf Creek point	Undetermined; Not Eligible within ROW	No	Further work recommended to compare to adjacent sites larger habitation sites
41MV269	Prehistoric unknown	Lithic scatter; debitage, two points of Ensor, Fairland, Figuero, or Palmillas type suggest Late Archaic occupation	Undetermined	No	Further testing recommended to compare to adjacent sites that exhibit long-term re-visitation

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41MV270	Historic; Initial date 1920s, possibly used until the 1970s	Subterranean irrigation pumphouse with associated structural foundations, storage tanks, and acequia supports, 4 concrete foundations located directly to the east of pumphouse, extensive cable, insulator, and large bolt hardware debris suggests the presence of an electrical generation facility associated with the pumphouse.	Undetermined	Yes	Adjacent to the Rio Grande; pumphouse walls and some of the roof support elements are intact; may provide useful information about early-20th century irrigation practices
41MV277	Prehistoric unknown	Lithic surface scatter; debitage	Undetermined	No	Testing recommended with 3.3 × 3.3-feet and 6.6 × 6.6-feet units; backhoe trenching may also be useful
41MV279	Prehistoric unknown	Lithic scatter; debitage, burned stone, mussel shell	Undetermined	No	Testing recommended; deposits may extend to 3.3 to 6.6 feet deep
41MV283	Prehistoric unknown; Historic late 19th-mid 20th century	Prehistoric campsite; debitage, burned stone, mussel shell Historic farm and ranch headquarters; glass, ceramics, metal	Undetermined	No	Testing to determine nature, extent, significance
41MV308	Historic mid 19th-mid 20th century	Business/residence; limestone footers found in trench; ceramics, glass, nails	Undetermined	Yes	Testing of site to determine NRHP eligibility; Information potential on historical architecture and 19th century cultural artifacts
41MV373	Prehistoric unknown	Lithic scatter; debitage, cores, one informal tool	Unknown	No	Testing recommended
41MV374	Prehistoric unknown	Lithic scatter; debitage, cores	Unknown	No	Testing recommended

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41MV67	Prehistoric unknown	Occupation area; debitage, burned rock, bifaces, groundstone, mussel shell	Not Eligible	No	Avoidance of southwest portion of site
41MV68	Prehistoric unknown	Occupation area / lithic scatter; debitage, burned rock, bifaces, possible groundstone,	Not Eligible	No	Surface collection recommended and monitoring in advance of extensive disturbance
41MV76	Prehistoric unknown / Historic Anglo	Prehistoric lithic scatter; debitage, burned rock / Historic trash dump; whiteware, glass, round nails, no evidence of structure	Unknown	No	Testing recommended
41MV77	Prehistoric unknown	Campsite / lithic scatter; abundant debitage, burned rock, hearths, mussel shell, bone fragments	Unknown	No	Testing recommended
41MV79	Prehistoric unknown	Lithic scatter; debitage, burned rock	Unknown	No	Testing recommended
41MV80	Prehistoric unknown	Lithic scatter; debitage, cores, formal tools, two corner-notched points suggest a Late or Transitional occupation, and a leaf-shaped point indicates a Middle or Late Archaic occupation	Has Potential; recommended Eligible (2013)	No	Testing and monitoring recommended

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41PS10	Prehistoric (Late Prehistoric), Protohistoric, and Historic	Village/ lithic scatter/ burned rock midden	Not eligible	No	SAL potential; limited testing should be conducted immediately Southwest of the road easement to ascertain the presence of pithouse structures or other features; site should be periodically monitored after rains to evaluate materials eroding from site
41PS119	Prehistoric	Chipping-quarrying / lithic scatter / burned rock midden (including sotol pit)	Unknown	No	Surface collection, subsurface testing recommended
41PS120	Prehistoric	Chipping-quarrying / lithic scatter / burned rock midden	Unknown	No	surface collection and subsurface testing needed
41PS122	Prehistoric	Camp / chipping-quarrying / lithic scatter / burned rock midden	Unknown	No	Surface collection desirable and also subsurface testing
41PS124	Prehistoric and Historic	Small cluster of circular prehistoric masonry structures with artifact scatter and historic ranch and associated cemetery	Has potential	Yes	Test excavations should be conducted within the features to establish feature integrity, as well as for the presence of temporally/ culturally diagnostic artifacts
41PS125	Prehistoric	Camp / chipping-quarrying / lithic scatter / burned rock midden (including sotol pit) / stream terrace	Has potential	No	Surface collection and subsurface testing
41PS21	Prehistoric (Late Prehistoric) and Historic	Pithouse Village and Spanish Tapalcomes village	Listed	Yes	El Polvo Site; a concerted effort should be made to locate intact, buried deposits of cultural materials throughout the site and to conduct careful excavations of these areas; extensive archival and oral history research should be conducted to establish the history of this important area; Tapalcomes NRHP District

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41PS320	Prehistoric (Late Prehistoric)	Camp / chipping-quarrying / lithic scatter / midden / burned rock accumulation / stream terrace	Eligible	No	SAL; some midden areas are well preserved. Surface of site appears to have been collected by relic hunters; well preserved square-ish foundation of single stones in south part of Area C
41PS322	Neo-American, Historic	Camp / village / chipping / midden / lithic scatter / burned rock midden (including sotol pit) / stream terrace	Eligible	No	Further investigations warranted
41PS324	Prehistoric and Historic	Lithic scatter and 2 Historic adobe and basalt boulder house structures	Unknown	Yes	Controlled surface collection and mapping recommended
41PS329	Prehistoric and Historic	Lithic scatter with possible hearths and a Historic cemetery (~20 cairn graves with wood crosses)	Unknown	Yes	Testing if affected by construction
41PS349	Prehistoric (Late Prehistoric, ca. A.D. 1200–1400)	Occupation	Eligible	No	SAL
41PS353	Historic	Historic structure and graveyard	Unknown	No	Further work recommended
41PS355	Prehistoric (Archaic) and Neo-American	Camp and processing area	Unknown	No	Further work recommended
41PS356	Prehistoric and Historic (possibly pre-1920)	Prehistoric camp / midden / burned rock midden and Historic house / farm / ranch	Undetermined	Yes	Further work recommended
41PS381	Neo-American and Historic	Prehistoric and Historic camp and processing area	Unknown	No	Further work recommended
41PS392	Prehistoric (Archaic) and Neo-American	Camp and processing area	Unknown	No	Further work recommended

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41PS402	Prehistoric	Camp	Unknown	No	Further work recommended
41PS410	Neo-American and Historic	Charcoal stain and trash scatter	Unknown	No	Possible SAL; possible human skeletal remains; no further work
41PS425	Prehistoric and Historic (Late 19th c.)	Prehistoric habitation site and historic engineering site (irrigation ditch)	Has potential	Yes	Historic engineering site should be nominated to the National Register
41PS443	Prehistoric	Open campsite on river terrace	Eligible	No	SAL; fence site so that access can be controlled; signage pertaining to legal protection now afforded due to state acquisition; map and photo-document site; preserve and protect site as a cultural resource on TPWD property
41PS444	Prehistoric	Open campsite on river terrace	Eligible	No	SAL; control access to site by fencing boundaries; create transit map of surface features; photo-document features; signage to discourage further collecting; preserve and protect site as a cultural resource of TPWD property
41PS447	Prehistoric	Open campsite (hearth field)	Eligible	No	SAL; preserve and protect as a cultural resource on property owned and operated by TPWD-further document site
41PS448	Prehistoric	Open site on river terrace	Eligible	No	SAL; complete comprehensive documentation of site; preserve and protect as a cultural resource on property owned and operated by TPWD-further document site

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41PS449	Prehistoric	Open campsite on river terrace	Eligible	No	SAL; additional documentation and exploration of the site is warranted; preserve and protect as a cultural resource on property owned and operated by TPWD-further document site
41PS58	Prehistoric and Historic	Prehistoric agricultural village and historic Spanish Colonial mission	Eligible	Yes	Western edge of site intersects the La Junta de los Rios Archeological District
41PS762	Historic	Two parallel cobble walls	Undetermined	Yes	Preservation (avoidance) recommended
41PS776	Prehistoric (Late Prehistoric) and Historic	Hearth field / burned rock midden	Undetermined	No	Preservation (avoidance) recommended
41PS800	Prehistoric	Burned rock midden	Eligible	No	Subsurface testing on the eastern end of the site is recommended to determine its integrity and significance
41VV1215	Historic	Old Southern Pacific Railroad Grade	Not eligible within ROW	Yes	Within the West of Pecos Railroad Camps District; Southern Pacific Railroad Grade, NPS 88-15
41VV1362	Historic	Railroad structures and graffiti	Unknown	Yes	—
41VV1393	Historic	2 historic masonry ruins; Railroad structures	Unknown	Yes	Within the West of Pecos Railroad Camps District; NPS 92-43
41VV1398	Historic	Railroad structures and miscellaneous	Unknown	Yes	NPS 92-198

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41VV1491	Prehistoric unknown	Lithic scatter with hearths in various stages of erosion and four more concentrations that are possibly deflated mounds. Possible cairns noted as well	Unknown	No	NPS 92-141; More thorough survey might reveal areas of greater artifact concentration or small features such as hearths
41VV1505	Early Historic American	Railroad with six collapsed masonry structures (each 13.1 × 13.1 feet) associated with the construction of the nearby 1881 Southern Pacific Railroad grade (41VV1215); a circle of stones and a cairn, both 6.6 × 6.6 feet in area are on the northwest end of the site.	Unknown	Yes	NPS 92-213
41VV1542	Historic	Historic ranching residential structure and ranching trail. The structure consists of three dry-laid limestone building ruins of a ranch house with steel pipe fence post fragments and a livestock trail with poured concrete and stone reinforcements.	Unknown	Yes	NPS 92-192
41VV1723	Early Archaic, Middle Archaic, Late to Transitional Archaic, Late Archaic, Late Prehistoric	Open terrace campsite with at least seven burned rock middens, over 140 hearths (mainly on southeast side), lithic scatter, mortar hole, grinding facet, mano, metate, projectile points, and Plainware pottery	Unknown	No	NPS 96-2; water erosion and vandalism noted. This could be a very important site because of the possibility of good archaeological preservation of buried features on the west side of the drainage. Ranger monitoring is requested (1996).

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41VV1783	Transitional Archaic, Late Archaic	Open campsite with large burned rock scatter with at least 12 intact hearth features (best preserved in southwest quadrant), mano, lithic scatter with projectile points	Unknown	No	NPS 96-63; Because of this sites close proximity to Amistad Acres, Box Canyon, and boat ramps, collecting could be a problem. Ranger monitoring should be occasionally performed (1996).
41VV1792	Transitional Archaic	Open campsite with one fairly well-preserved burned rock midden, 10 hearths, lithic scatter with projectile points	Unknown	No	NPS 96-72; This site is "out of the way" along as the water remains low. Water erosion and livestock appear to be the only damaging impacts. Minimal ranger monitoring is requested until water reaches terrace area (1996).
41VV1837	Prehistoric unknown	Open campsite with several hearth features and lithic scatter	Unknown	No	NPS 97-4; Has been previously inundated; Further documentation (sketch maps) and shovel testing recommended
41VV1865	Prehistoric unknown	Burned rock scatter and lithic scatter	Unknown	No	Monitoring recommended
41VV1889	Prehistoric unknown	Campsite with 25+ hearths and teepee rings	Unknown	No	OP #3 ; Recommend site be surveyed with mapping and some test excavation of most deflated hearths for profile information
41VV1935	Prehistoric unknown	Lithic quarry with burned rock middens and mortars	Has Potential	No	Multi-component features make this a unique site worthy of lithic and other studies. Should produce radiocarbon dates and possibly perishables; Mapping and photography recommended, field school should be considered.

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41VV1976	Early Archaic, Late Archaic, Late Prehistoric / Neo-American	Lithic scatter with 85 burned rock middens, 100 mortar cups, projectile points	Has Potential	No	It should be protected by making the area of the site and surrounding area off limits to camping; Testing recommended
41VV1992	Prehistoric unknown	Lithic scatter	Unknown	No	Further testing recommended
41VV206	Archaic to Historic, 7000 BC - 1700 AD	Campsite with extensive burned rock midden, hearths, lithic scatter, projectile points, pictographs	Prehistoric Eligible; Historic Eligible (1990)	No	Jackson's Rattlesnake Canyon Site 4; SAL designated (1990), SAL Group: Rattlesnake Canyon Archeological Site; No recommended actions
41VV2145	Prehistoric unknown	Lithic scatter with projectile points consistent with Late or Transitional Archaic styles	Has Potential; Recommended Eligible under Criterion D	No	Surface collection and testing recommended; Monitoring as an alternative measure
41VV312	Prehistoric unknown	Open campsite with burned rock mounds, lithic scatter	Unknown	No	Testing recommended
41VV347	Prehistoric unknown	Open campsite with midden, burned rock, lithic scatter, mussel shell	Unknown	No	Testing recommended
41VV388	Historic 19th Century	Railroad camp with remains of several structures, many tent outlines and associated scatters of historic trash; oven and a stone-lined dugout	Unknown	Yes	HS 7; Within the West of Pecos Railroad Camps District; no recommended actions
41VV389	Historic 19th Century	Railroad camp with many tent outlines and associated scatters of historic trash; mule and wagon trails	Unknown	Yes	HS 8; Within the West of Pecos Railroad Camps District; no recommended actions
41VV390	Historic 19th Century	Railroad camp; may be the old town of Vinegaroon; contains several dry-laid masonry structures, two ovens and many tent outlines	Unknown	Yes	HS-9; Within the West of Pecos Railroad Camps District; no recommended actions

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41VV407	Middle Archaic II, Transitional Archaic, Archaic, Historic American, Post-archaic	Open campsite with rock alignment and lithic scatter; four cairns Historic ranching with fence and alignment	Prehistoric Eligible (1983)	No	Saddleback Site; Within the Seminole Canyon Archaeological District; SAL designated (1983); 75 percent destroyed; no recommended actions
41VV586	Prehistoric unknown, Historic 19th century	Prehistoric lithic scatter Historic railroad structures associated with 1880s Southern Pacific Railroad including 7 freestanding limestone masonry structures (also rectangular and roofless), associated tent-outlines and dugouts, two drainage ditches	Unknown	Yes	RR Tunnel Camp, Meyersville; No recommended actions
41VV627	Archaic to Historic, 7000 BC–1700 AD	Lithic quarry, burned rock scatter, lithic scatter, pictographs	Prehistoric Eligible; Historic Eligible (1990)	No	SAL designated (1990), SAL Group: Rattlesnake Canyon Archeological Sites; No recommended actions
41VV629	Historic, early 20th century	Historic dams; two dams built in early 1900's, upper is of limestone and concrete lower is piled rock approximately 3.3 feet high with a spillway on left bank.	Unknown	Yes	No further work recommended unless an unexpectedly early age is assigned by local informants
41VV662	Late Prehistoric	Open campsite with two buried hearths, lithic scatter, mussel shell, ceramics (may be modern)	Unknown	No	Charcoal in lense is sufficient for assay, buried hearths are intact; if ever to be affected by construction should be tested and dated

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41VV812	Prehistoric (Late Prehistoric)	Dense lithic scatter and two rock alignments	Has potential	No	This site type is emerging as possible square structure bases and should be investigated
41VV814	Prehistoric and Historic	Lithic and burned rock scatter and historic shed	Unknown	Yes	No recommended action
41SR142	Prehistoric and Historic	Lithic scatter and Fort Ringgold	Prehistoric: Not eligible; Historic: Listed	Yes	Site should be investigated to determine its historical and archaeological (remaining) values and as appropriate nominated as an SAL and/or to the NRHP; Fort Ringgold is a listed NRHP district
41SR208	Historic	Mill (Cotton gin) and Nestor Saenz Store- Blk. 12, Lot 8	Has potential	Yes	Contributing to the Roma National Register Historic District; this site should be extensively surveyed for its archaeological potential
41SR209	Historic	Rodriguez Store-Blk.7, Lot.5	Listed	Yes	Contributing to the Roma National Register Historic District; this site should be monitored as brush is cleared away
41SR210	Historic	Antonia Saenz Residence-Blk 8, Lot 3	Not eligible (individually)	Yes	Contributing to the Roma National Register Historic District
41SR211	Historic	Stone Cottage, Original Townsite, Blk.8, Lot 2	Not eligible (individually)	Yes	Contributing to the Roma National Register Historic District
41SR212	Historic	Garcia Ramirez Store and Residence	Not eligible (individually)	Yes	Contributing to the Roma National Register Historic District
41SR213	Historic	Noah Cox Residence	Listed	Yes	Contributing to the Roma National Register Historic District; OTHM # 6055; RTHL
41SR214	Historic	Manuel Guerra Store and Residence	Listed	Yes	Contributing to the Roma National Register Historic District; OTHM # 3200; RTHL

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41SR215	Historic	Ramirez Hospital	Not eligible (individually)	Yes	Contributing to the Roma National Register Historic District; RTHL
41SR390	Prehistoric and Historic (19th c.—modern)	Prehistoric: Open campsite; Historic: trash dumps	Eligible	No	Construction crews should avoid the northern 30 feet of the construction corridor to avoid damaging the site
41SR392	Prehistoric	Open campsite	Eligible	No	Site should be mitigated or avoided
41SR393	Prehistoric and Historic	Prehistoric: Open campsite with historic artifacts and modern dump	Eligible	No	The affected areas of the site should be mitigated through surface collection and excavation
41ZP1	Prehistoric and Historic	Rock house foundation and open camp	Undetermined	Yes	Deserves more thorough examination, testing of pottery and non-pottery areas, and a test at the deep exposure
41ZP11	Prehistoric	Open campsite	Not eligible	No	The diversity of projectile point types makes the research value of this site moderately high
41ZP144	Protohistoric	Burial	Eligible	No	Site is within the San Ygnacio Historic District
41ZP159	Historic	Structure (stone foundation)	Undetermined	Yes	Record property and archival research; inundated by Presa Falcon
41ZP188	Prehistoric	Open campsite	Undetermined	No	Better documentation of the surface materials is needed, along with shovel testing to seek and assess any buried cultural materials
41ZP215	Prehistoric	Open campsite	Undetermined	No	A detailed documentation of the surface materials is needed when the site is exposed and shovel testing should be performed to seek and assess any buried cultural materials

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41ZP253	Prehistoric	Open campsite	Undetermined	No	Detailed documentation of surface materials and shovel testing to seek and assess buried cultural deposits should be undertaken
41ZP254	Prehistoric and Historic	Open campsite with historic ruins	Undetermined	Yes	The structure is likely to be part of the San Bartolo Ranch complex (41ZP93); site is almost entirely inundated by Presa Falcon
41ZP33	Prehistoric (Early Archaic—Late Prehistoric)	Open campsite	Undetermined	No	A more detailed documentation of the surface materials is needed, along with limited shovel testing to seek and assess any buried cultural materials
41ZP377	Prehistoric and Historic	Open campsite with historic ceramic scatter	Undetermined	No	Detailed documentation of surface materials and shovel testing to seek and assess any buried cultural deposits should be undertaken
41ZP379	Historic	Five building ruins and artifact scatter	Undetermined	Yes	Detailed documentation of surface materials; shovel testing should be undertaken to seek and assess any buried cultural remains
41ZP4	Historic (Spanish Colonial)	Stone house ruins open camp	Not eligible within ROW	Yes	Some stone house ruins are located near gage station and should be investigated
41ZP427	Historic	Two probable 19th-century sandstone and concrete structures	Undetermined	Yes	Detailed documentation of surface materials, archival and oral research to determine the site's association with other sites nearby, and shovel testing to seeks and assess any buried cultural deposits
41ZP439	Prehistoric	Open camp and lithic scatter	Unknown	No	Formal National register testing is warranted if impacts are anticipated; site has SAL potential

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41ZP445	Prehistoric (Late Archaic—Late Prehistoric	1 Matamoros point and 2 core flakes	Undetermined	No	Subsurface investigation to determine the integrity of the site, and to help in determining how the IBWC should manage the site
41ZP446	Prehistoric	Lithic quarry	Undetermined	No	Investigation to determine integrity of the site, and help in determination of how the IBWC should manage the site
41ZP7	Prehistoric	Open campsite with burial	Eligible	No	Detailed documentation of the surface materials is needed, along with shovel testing to search for and allow evaluation of buried cultural materials
41ZP741	Prehistoric	Hearthfield / third terrace open camp	Undetermined	No	Shovel test the site for depth and extent
41ZP76	Prehistoric and Historic (1874)	Prehistoric campsite; Mexican colonial style houses and ranching complex (San Francisco Ranch)	Listed	Yes	Further investigations are warranted to assess the buried prehistoric and historic archaeological components based on the amount of cultural material encountered around the structures; Site is within the San Francisco Ranch National Register District
41ZP778	Prehistoric	Hearthfield / lithic procurement	Undetermined	No	Shovel test the site for depth and extent
41ZP81	Historic	Ranch structures (Ramireno Ranch)	Undetermined	Yes	Archival research recommended
41ZP812	Prehistoric	Lithic scatter	Undetermined	No	Shovel test the site for depth and to determined if features are present
41ZP82	Prehistoric and Historic	Lithic scatter and Rincon Rancho	Undetermined	No	If threatened by future impact agents, this site should be re-visited and tested/sampled

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41ZP823	Prehistoric	Open camp	Undetermined	No	Shovel test the site for depth and extent
41ZP827	Prehistoric	Lithic scatter	Undetermined	No	Shovel test the site for depth and extent and presence of features
41ZP85	Prehistoric and Historic	Town of Zapata Viejo (old Zapata), with five probable prehistoric open campsites	Undetermined	Yes	Detailed documentation of surface materials and shovel testing should be undertaken to search for and allow evaluation of buried, intact cultural remains
41ZP894	Prehistoric	Open camp and a lithic procurement area	Undetermined	No	Additional work in areas outside of previous ROW
41ZP924	Prehistoric	Lithic debitage, ceramic sherd, thin biface/projectile point, early stage bifaces, burned rock, mussel shell, bone	Undetermined	No	Survey level, subsurface testing should be conducted to determine the vertical and horizontal extents of the site
41ZP93	Historic	Structural remains and exhumed cemetery of the historic San Bartolo Ranch	Undetermined	Yes	Detailed documentation of surface features and shovel testing should be conducted to search for and allow evaluation of any buried, intact deposits and archival research
41ZP948	Prehistoric and Historic	Prehistoric camp and historic dump	Undetermined	No	Further investigation recommended
41ZP957	Prehistoric and Historic	Prehistoric occupation and historic dump	Eligible	No	Additional testing is recommended in order to assess the potential for buried intact deposits within the central portion of the site
41ZP97	Historic	Town of San Ygnacio	Listed	Yes	Site is within the San Ygnacio Historic District
41ZP98	Prehistoric (Early Archaic—Late Prehistoric)	Open terrace site	Undetermined	No	Should be tested if exposed

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41WB11	Prehistoric and Historic (19th c.)	Lithic scatter and military fort (Fort McIntosh)	Eligible	Yes	Further investigations and restoration recommended
41WB12	Prehistoric and Historic (19th–20th c.)	Open camp with historic artifacts	Eligible	No	Test and evaluate NRHP potential of the site
41WB13	Prehistoric and Historic (20th c.)	Open camp with 20th c. artifacts	Unknown	No	Test and evaluate NRHP potential of the site
41WB14	Prehistoric	Open camp	Unknown	No	Test and evaluate NRHP potential of the site
41WB17	Prehistoric and Historic (ca. 1860)	Open camp with historic artifacts	Not eligible within ROW	No	Test the site to determine if preserved remains in central area
41WB18	Prehistoric	Open terrace site	Not eligible within ROW	No	Possible burial; testing in burial area recommended
41WB20	Middle Archaic—Late Prehistoric	Burned sandstone, lithic debris, charcoal concentrations, and burials	Eligible	No	SAL
41WB235	Prehistoric (Probably Late Archaic)	Base camp	Not eligible	No	Significance testing recommended
41WB294	Historic (ca. 1910–1930)	Cemetery; Dolores Cemetery	Has Potential	Yes	Cemetery used by Dolores Ranch mining community, 291+ graves; cemetery should continue to be protected and preserved
41WB47	Prehistoric (Late Archaic)	Three Late Archaic dart points and two biface fragments	Unknown	No	Minor testing recommended; within the San Jose de Palafox Historic/Archeological District
41WB50	Historic (20th c.)	Spanish and Mexican settlement and cemetery	Unknown	Yes	Graves date to 1907, 1913, and 1934; additional surveys when vegetation is clear recommended; within the San Jose de Palafox Historic/Archeological District
41WB51	Prehistoric (Late Archaic) and Historic (ca. 1880s–1902)	Prehistoric habitation and Historic ranch	Listed	Yes	Continued monitoring at the site; within the San Jose de Palafox Historic/Archeological District

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41WB534	Prehistoric	Campsite	Undetermined	No	Site avoidance recommended, otherwise testing should be undertaken
41WB564	Prehistoric	Unifaces, debitage, fire cracked rock, and mussel shell, and a possible burned rock feature	Undetermined	No	Surface collection, testing, and mitigation if the site is to be impacted
41WB565	Middle–Late Archaic and Historic	Occupation with historic materials at far eastern end and a 'grave' marked on USGS topo.	Undetermined	No	Hand excavations on western end; grave should be found and correctly mapped
41WB58	Prehistoric and Historic (ca. 1900)	Occupation with possible cremation and historic house ruins	Unknown	Yes	—
41WB593	Prehistoric (Archaic)	Hearthfield and lithic scatter	Not eligible within ROW	No	Additional work should be conducted to determine the site's integrity near the terrace edge
41WB597	Prehistoric (Late Archaic—Late Prehistoric) and Historic	Prehistoric campsite and historic ranch house	Not eligible within ROW	Yes	Testing to determine National Register eligibility and devise a data recovery plan if necessary
41WB61	Prehistoric	Lithic scatter and camping area	Unknown	No	Test pits and examinations of margins for depositions of earlier materials
41WB62	Prehistoric	Lithic scatter and camping area	Unknown	No	Test pits and examinations of margins for depositions of earlier materials
41WB63	Prehistoric	Lithic scatter and camping area	Unknown	No	Test pits and examinations of margins for depositions of earlier materials
41WB634	Prehistoric	Lithic scatter	Unknown	No	Further testing if site will be impacted

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41WB635	Prehistoric	Surface and subsurface distribution of lithic debitage and lithic tools	Unknown	No	Further testing recommended
41WB646	Historic (17th–21st c.)	Ruins and deposits of historic structures	Unknown	Yes	Standing walls should be stabilized and preserved
41WB657	Prehistoric	Burned rock midden / open camp	Undetermined	No	The midden should be fenced in to avoid complete destruction
41WB673	Prehistoric and Historic	Lithic sheet litter intermixed with historic ceramics	Unknown	No	Further work recommended
41WB83	Prehistoric and Historic	Open occupation area	Undetermined	No	Avoid if possible, test leading edge of terrace to determine significance
41HG218	Middle Archaic	Lithic scatter and possible camp area	Not eligible within ROW (2010)	No	Should be mitigated or avoided by Border Fence project (2008)
41HG236	Prehistoric and Modern	Deeply buried lithic scatter and surficial modern debris scatter	Eligible	No	Further investigations would provide valuable insights into the prehistory of the Lower Rio Grande Valley
41CF169	Historic	Farmstead	Not eligible	No	Systematic surface collections and shovel testing recommended
41CF170	Historic	Farmstead	Has potential	No	Systematic surface collections and shovel testing recommended
41CF171	Historic	Farmstead	Has potential	No	Systematic surface collections and shovel testing recommended
41CF179	Late Prehistoric to Early Historic (AD 1490–1650)	Hearth feature	Unknown	No	Test excavations to better delineate site and determine NRHP status
41CF208	Historic	Old Military Road, Cameron County Section	Has potential	No	NRHP eligibility determinations recommended; potentially part of the Mexican American War Battlefield Sites National Register Archeological District; possibly completely paved over

Identifier	Affiliation	Features / Function	NRHP Eligibility	Historic Structures	Comments / Recommendations
41CF95	Historic	Neal Home (ca. 1850)	Unknown	Yes	One of the earliest homes in Brownsville
41CF96	Historic	Fort Brown; ruins and structure	Listed	Yes	Fort Brown is a listed NRHP district

Key: NRHP = National Register of Historic Places; SAL = State Antiquities Landmark; ROW = right-of-way; TPWD = Texas Parks and Wildlife Department; RTHL = Recorded Texas Historic Landmark; OTHM = Official Texas Historical Marker; IBWC = International Boundary and Water Commission

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