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ENVIRONMENTAL ASSESSMENT

ADDRESSING PROPOSED TACTICAL INFRASTRUCTURE MAINTENANCE AND REPAIR ALONG THE U.S./MEXICO INTERNATIONAL BORDER IN TEXAS

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

APRIL 2014

ABBREVIATIONS AND ACRONYMS

µg/m³	microgram per cubic meter
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing materials
AIRFA	American Indian Religious Freedom Act
ARHA	Archeological and Historic Preservation Act
AST	aboveground storage tank
AQCR	air quality control region
BMP	best management practice
CAA	Clean Air Act
CBP	U.S. Customs and Border Protection
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
dBA	a-weighted decibel
DHS	Department of Homeland Security
DOD	U.S. Department of Defense
DVD	digital video disc
EA	Environmental Assessment
EIA	Energy Information Agency
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESCP	Erosion-and-sediment-control plans
ESP	Environmental Stewardship Plan
ESSR	Environmental Stewardship Summary Report
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRM	Flood Insurance Rate Map
FM&E	Facilities Management and Engineering
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FR	Federal Register
FY	Fiscal Year
GHG	greenhouse gas
HAP	hazardous air pollutant
HUC	hydrologic unit code
I	Interstate
IIRIRA	Illegal Immigration Reform and Immigrant Responsibility Act
LBP	lead-based paint
mg/m3	milligrams per cubic meter
mm/year	millimeters per year
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

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NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOA	Notice of Availability
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	U.S. National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O_3	Ozone
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
Pb	lead
PCB	polychlorinated biphenyl
percent g	percent of the force of gravity
PM_{10}	particulate matter equal to or less than 10 microns in diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PMO	Project Management Office
POE	Port of Entry
ppm	part per million
ppb	part per billion
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
ROW	right-of-way
RVSS	Remote Video Surveillance System
SBInet	Secure Border Initiative
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SOP	standard operating procedures
SO_2	sulfur dioxide
SSPP	Strategic Sustainability Performance Plan
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
tpy	tons per year
TSCA	Toxic Substances Control Act
TX	Texas Highway
USACE	U.S. Army Corps of Engineers
USBP	U.S. Border Patrol
U.S.C	United States Code
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USIBWC	United States Section, International Boundary and Water Commission
UST	underground storage tank
VOC	volatile organic compound
WMA	Wildlife Management Area

COVER SHEET

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ENVIRONMENTAL ASSESSMENT ADDRESSING
PROPOSED TACTICAL INFRASTRUCTURE MAINTENANCE AND REPAIR
ALONG THE U.S./MEXICO INTERNATIONAL BORDER IN TEXAS

DEPARTMENT OF HOMELAND SECURITY,
U.S. CUSTOMS AND BORDER PROTECTION,
U.S. BORDER PATROL

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

Affected Location: U.S./Mexico international border in Texas.

Proposed Action: CBP proposes to maintain and repair existing tactical infrastructure along the U.S./Mexico international border in Texas. The existing tactical infrastructure along the U.S./Mexico international border in Texas is within USBP El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors.

Report Designation: Draft Environmental Assessment (EA).

Abstract: CBP proposes to maintain and repair existing tactical infrastructure along the U.S./Mexico international border in Texas. The existing tactical infrastructure includes fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and communications and surveillance tower components (including Remote Video Surveillance System [RVSS] or Secure Border Initiative [SBInet] towers [which are henceforth referred to as towers]). The existing tactical infrastructure occurs within the USBP El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors in Texas.

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 (FONSI) has been prepared.

Throughout the National Environmental Policy Act (NEPA) process, the public may obtain information concerning the status and progress of the Proposed Action and the EA via the project Web site at *http://www.cbp.gov/about/environmental-cultural-stewardship/nepa-documents/docs-review*; by emailing TX_TIMR_EA@cbp.dhs.gov; by written request to Texas TIMR EA, c/o Nicolas Frederick at HDR, 3733 National Drive, Suite 207, Raleigh, NC 27612; or by fax to (919) 785-1178.

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APIRL 2014

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EXECUTIVE SUMMARY

INTRODUCTION

The Department of Homeland Security (DHS) and U.S. Customs and Border Protection (CBP), propose to maintain and repair certain existing tactical infrastructure along the U.S./Mexico international border in the State of Texas. The tactical infrastructure proposed to be maintained and repaired consists of fences and gates, roads and bridges/crossovers, drainage structures and grates, lighting and ancillary power systems, and communications and surveillance tower components (including Remote Video Surveillance System [RVSS] or Secure Border Initiative [SBInet] towers [henceforth referred to as towers]). The existing tactical infrastructure occurs in the following U.S. Border Patrol (USBP) sectors: El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley.

The tactical infrastructure analyzed in this Environmental Assessment (EA) crosses multiple privately owned land parcels, tribal lands, and public lands managed by the National Park Service (NPS) U.S. Fish and Wildlife Service (USFWS), Texas Parks and Wildlife Department (TPWD), and U.S. Department of Defense (DOD). The CBP Facilities Management and Engineering (FM&E) Office is responsible for construction and maintenance and repair of tactical infrastructure (e.g., fences, roads, lights, towers, and drainage structures) to support CBP border security requirements.

This EA addresses the maintenance and repair of existing tactical infrastructure. Tactical infrastructure included in this EA is found in all five USBP sectors along the U.S./Mexico international border in Texas. This EA also addresses maintenance and repair of existing tactical infrastructure on tribal lands in Texas. However, the maintenance and repair of tactical infrastructure assets that are already addressed in previous National Environmental Policy Act (NEPA) documents is not included within the scope of this EA. In addition, tactical infrastructure assets that are covered by a waiver issued by the Secretary of Homeland Security (the Secretary) are also excluded from 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 maintenance and repair of tactical infrastructure. This EA is being prepared to fulfill the requirements of the NEPA.

PURPOSE AND NEED

The purpose of the Proposed Action is to ensure that the physical integrity of the existing tactical infrastructure and associated supporting elements continue to perform as intended and assist the USBP in securing the U.S./Mexico international border in Texas. In many areas, tactical infrastructure is a critical element of border security, which contributes as a force multiplier for controlling and preventing illegal border intrusion. To achieve effective control of our nation's borders, CBP is developing a combination of personnel, technology, and infrastructure; mobilizing and rapidly deploying highly trained USBP agents; placing tactical infrastructure strategically; and fostering partnerships with other law enforcement agencies.

The Proposed Action is needed to maintain the level of border security provided by the existing tactical infrastructure that could otherwise become compromised through acts of sabotage, acts of nature, or a concession in integrity due to a lack of maintenance and repair. CBP must ensure that tactical infrastructure functions as it is intended, which assists CBP with the following mission requirements:

- Establishing substantial probability of apprehending terrorists and their weapons as they attempt to enter illegally between the Ports of Entry (POEs)
- Deterring illegal entries through improved enforcement
- Detecting, apprehending, and deterring smugglers of humans, drugs, and other contraband.

Furthermore, well-maintained tactical infrastructure allows ready access to the U.S./Mexico international border for rapid response to detected threats and facilitates the ability to adjust quickly to changing threats.

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 (USEPA); 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 (NOA) for this EA and Draft Finding of No Significant Impact (FONSI) will be published in the following newspapers:

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

The 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 accept comment submissions by fax, 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

CBP proposes to maintain and repair existing tactical infrastructure consisting of fences and gates, roads and bridges/crossovers, drainage structures and grates, designated open observation zones, boat ramps, lighting and ancillary power systems, and communications and surveillance tower components not directly associated with the tactical infrastructure covered by the Secretary's waiver and prior NEPA documentation. The maintenance and repair activities are necessary to repair damages caused by natural disasters, normal deterioration due to wear and tear, and intentional destruction or sabotage. The existing tactical infrastructure is along the U.S./Mexico international border in Texas and cuts across multiple land ownership categories including lands under CBP ownership, lands managed by other Federal and state agencies, tribal lands, and private property. Most of the maintenance and repair activities associated with the Proposed Action would occur within 25 miles of the U.S./Mexico international border in Texas. CBP will develop a comprehensive protocol for coordinating the necessary maintenance and repair activities within the different classes of landownership. The maintenance and repair of tactical infrastructure assets that are already addressed in previous NEPA documents is not included in this EA. In addition, tactical infrastructure assets that are covered by a waiver issued by the Secretary are not included in this EA. Tribal land associated with the Kickapoo Tribe is present within the region of influence (ROI).

The USBP sectors along the U.S./Mexico international border in Texas have identified a need for tactical infrastructure maintenance and repair to ensure their continued utility in securing the border. The CBP FM&E Sector TI Coordinator would work closely with the sector for all maintenance and repair activities. Proposed activities would be managed by the Project Management Office's Maintenance and Repair Supervisor. CBP proposes to conduct the following forms of tactical infrastructure maintenance and repair.

Fences and Gates

Maintenance and repair of fences and gates would consist of welding of metal fence components, replacing damaged or structurally compromised members, reinforcing or bracing foundations, repairing burrowing activities under fences and gates, repairing weather-related damages, controlling vegetation, and removing accumulated debris. The Proposed Action would also include the repair or replacement of gate-operating equipment (e.g., locks, opening/closing devices, motors, and power supplies). There are approximately 135 miles of fence on non-tribal lands in Texas. The fencing consists of primary border fencing and a variety of perimeter security fencing to protect sensitive infrastructure. Approximately 5 percent of the fences and gates installed by CBP within the Texas action area are not covered by a Secretary's waiver or previously analyzed and are, therefore, evaluated in this EA. The exact number of miles of fence associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of miles of fence associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing fence, would require separate NEPA analysis.

Access Roads and Integrated Bridges/Crossovers

Maintenance and repair of access roads and bridges would consist of filling in potholes, regrading road surfaces, implementing improved water drainage measures (e.g., ensure road crowns shed water and establishing drainage ditches, culverts, or other water-control features, as needed to control runoff and prevent deterioration to existing infrastructure or surrounding land), applying soil stabilization agents, controlling vegetation and debris, and adding lost road surface material to reestablish intended surface elevation needed for adequate drainage.

Approximately 2,100 miles of the 2,500 miles of road within the action area that are used by CBP are not covered by a Secretary's waiver or previously analyzed and are, therefore, evaluated in this EA. Most of the 2,100 miles are within 25 miles of the U.S./Mexico international border in Texas. The exact number of miles of roads associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of miles of roads associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major changes to roadway networks and major upgrades to existing roadways, would require separate NEPA analysis.

Drainage Management Structures

Maintenance and repair of drainage systems would consist of cleaning blocked culverts and grates of trash and general debris and repairing or replacing nonfunctional or damaged drainages when necessary. Resizing and replacing or repairing culverts or flow structures would occur, as necessary, to maintain proper functionality; and riprap, gabions, and other erosion-control structures would be repaired, resized, or added to reduce erosion and improve water flow. In addition, maintenance and repair of riprap and low-water crossings would occur when necessary to maintain proper functionality. Maintenance and repair requirements would consist of restoring or replacing damaged or displaced riprap. All debris and trash removed from culverts and grates would be hauled away to an appropriate disposal facility. An estimated 90 such structures associated with the tactical infrastructure are proposed to be maintained and repaired in the action area; approximately 90 percent are considered in this EA. The exact number of drainage structures associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of drainage structures associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing drainage structures, would require separate NEPA analysis.

Vegetation Control to Maintain Road Visibility

Vegetation encroaching upon roads and bridges would be maintained to ensure visibility and to sustain safe driving conditions for USBP agents during travel. Control of vegetation would be achieved by trimming, mowing, and applying selective herbicides. In areas deemed too difficult to mow, such as under guardrails, within riprap, and immediately adjacent to bodies of water within the proposed setbacks, herbicides would be used if appropriate. Suitable best management practices (BMPs) would be implemented for all vegetation control activities (see **Appendix E**). Only herbicides approved by the USEPA and the relevant Federal and state land management agency would be used, where appropriate. Herbicide use would be part of an integrated approach that uses minimal quantities of herbicide applied by certified personnel in accordance with the label. Heavy equipment needed would include mowers, trimmers, and equipment necessary for mechanical grubbing. BMPs would be implemented to stabilize the work areas and avoid impacts on biological resources (see **Appendix E**).

CBP would conduct surveys for nesting migratory birds and nests if maintenance occurred during the nesting season (March 15 through September 15). Vegetation control would not occur in suitable or critical habitat of threatened or endangered species. If CBP determined that vegetation control must be conducted within suitable habitat of threatened or endangered species, they would consult further with the USFWS.

Boat Ramps

The maintenance and repair of boat ramps would include repairing and restoring boat ramp surfaces, conducting vegetation control to maintain unencumbered access, and implementation of erosion-control measures.

Lighting and Ancillary Power Systems

Maintenance and repair would consist of the replacement of burned-out light bulbs, restoration/replacement of damaged power lines or onsite power-generating systems (e.g., generators, fuel cells, wind turbine generators, and photovoltaic arrays), repair and replacement of associated electrical components, and, where necessary, vegetation control and debris removal. Heavy equipment potentially needed to maintain lighting and ancillary power systems includes lifts, track-hoes, backhoes, and flatbed trucks. Approximately 95 percent of the estimated 750 lighting and ancillary power systems within the action area is considered in this EA. The exact number of lighting and ancillary power systems associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of lighting and ancillary power systems associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing lighting and ancillary power systems, would require separate NEPA analysis.

Communications and Surveillance Towers

Communications and surveillance towers and their components are mounted on a combination of monopoles, water towers, radio towers, telephone poles, and buildings. The physical structures of the communications and surveillance tower components would be repaired and maintained (e.g., painting and welding to maintain existing metal towers), as necessary. Heavy equipment potentially needed to maintain lighting and ancillary power systems includes lifts, track-hoes, backhoes, and flatbed trucks. Maintenance and repair of secondary power-generation systems would consist of the replacement of burned-out light bulbs, restoration or replacement of damaged power lines, repair and replacement of associated electrical components and, where necessary, vegetation control and debris removal. Between 100 and 120 of the towers used by CBP in the action area are considered in this EA. The exact number of towers associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of towers associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing towers would require separate NEPA analysis.

Each of the towers has a small footprint; none exceeds 10,000 square feet. Access roads to the towers are included in the road mileage previously discussed.

Equipment Storage

The maintenance and repair of the existing tactical infrastructure as previously described requires the use of various types of equipment and support vehicles. Such equipment could include graders, backhoes, tractor mowers, dump trucks, flatbed trucks, and pick-up trucks. When assigned to an activity, the equipment would be stored within the existing footprint of the maintenance and repair location or at a staging area previously designated for such purposes by CBP. All the staging areas and, in turn, the activities occurring therein, that would be used by CBP as part of the Proposed Action have either already been analyzed in previous NEPA documents or are covered by the Secretary’s waiver. BMPs would be implemented to avoid impacts on wildlife and threatened and endangered species once equipment is moved (see **Appendix E**).

ALTERNATIVES ANALYSIS

Alternatives Considered

Alternative 1: Proposed Action. Under this alternative, maintenance and repair would be performed as described in **Section 2.2**. A comprehensive set of BMPs would be incorporated as part of the proposed maintenance and repair activities to minimize potential impacts (see **Appendix E**). Maintenance and repair would occur via a periodic work plan based on anticipated situations within each sector and funding availability. Although centrally managed by FM&E, prioritization of projects based upon evolving local requirements within each sector would determine maintenance and repair schedules. This alternative would accommodate changes in tactical infrastructure maintenance and repair requirements. Maintenance and repair requirements could change over time based on changes in usage or location, but would not exceed the scope of the EA. If the scope of the EA is exceeded, new NEPA analysis would be required. Using such an approach, FM&E and sector managers would still be committed to a preventative maintenance strategy and performing repairs to specified standards where necessary. FM&E and the sectors would ensure the sustainability of tactical infrastructure to support mission requirements.

Alternative 2: No Action Alternative. Under the No Action Alternative, the tactical infrastructure along the U.S./Mexico international border in Texas would be maintained on an as-needed basis and would be considered primarily reactive maintenance. This approach would lack centralized standardization of maintenance and repair activities, and BMPs intended to reduce impacts might not be implemented. Such ad hoc maintenance would not address the overall maintenance requirements for tactical infrastructure and would not be considered sustainable in quality, resulting in the gradual degradation of the tactical infrastructure. Maintenance and repair activities planned on an ad hoc basis without uniform application of centralized standards would likely lead to inconsistent outcomes and greater risk to environmental resources, CBP personnel, and CBP needs if no BMPs could be implemented. 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 prescribed by the Council on Environmental Quality (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.

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
Land Use	No new construction would occur; therefore, no effects on land use plans or policies would be expected.	The No Action Alternative would result in continuation of existing land uses. No effects on land use would be expected.
Geology and Soils	Short- and long-term, minor, adverse effects on soils, primarily from the control of vegetation and use of herbicides would be expected. Erosion-and-sediment-control plans (ESCPs) and BMPs would be implemented to reduce the potential for adverse effects associated with erosion and sedimentation. No prime farmland soils exist within the action area, therefore, no impacts on prime farmland soils would occur.	Short- and long-term, minor, direct and indirect, adverse effects on soils would be expected under this alternative. CBP would continue current maintenance and repair activities and tactical infrastructure would be maintained on an as-needed basis.
Vegetation	Short- and long-term, negligible to moderate, direct, adverse effects on terrestrial and aquatic vegetation would occur. BMPs would be used to avoid or minimize these effects. In-water maintenance and repair activities could result in direct and indirect impacts on aquatic plants and their habitat.	Short- and long-term, minor to moderate, direct, adverse effects on terrestrial and aquatic vegetation could occur from the No Action Alternative. In-water maintenance and repair activities could result in direct and indirect impacts on aquatic plants and their habitat.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Terrestrial and Aquatic Wildlife Resources	Short- and long-term, negligible to minor, direct and indirect, adverse effects on terrestrial and aquatic species could occur due to habitat degradation. These activities would result in temporary noise effects and displacement of terrestrial species. Near- and in-water maintenance activities could result in direct and indirect impacts on aquatic species and their habitat from increases in erosion, turbidity, and sedimentation.	Short- and long-term, minor to moderate, direct and indirect, adverse effects on terrestrial and aquatic species could occur from the No Action Alternative. Adverse effects on terrestrial species could occur due to habitat degradation associated with vegetation-control activities. Near- and in-water maintenance activities could result in direct and indirect impacts on aquatic species and their habitat from increases in erosion, turbidity, and sedimentation.
Threatened and Endangered Species	Short- and long-term, negligible to minor, direct and indirect, adverse effects on terrestrial and aquatic threatened and endangered species would be expected. Appropriate BMPs would be implemented and adverse effects from the maintenance activities would be avoided or minimized.	Short- and long-term, minor to moderate, direct and indirect, adverse effects on threatened and endangered species would be expected under this alternative. Tactical infrastructure would be maintained and repaired on an as-needed basis. There would be no centralized planning process for maintenance and repair. Therefore, maintenance and repair of tactical infrastructure would be performed only on resources in disrepair.
Hydrology and Groundwater	Short- to long-term, minor, adverse and beneficial impacts on groundwater and hydrology would be expected. Vegetation control within the road setback might cause short- to long-term, negligible to minor, adverse impacts on groundwater and hydrology by increasing erosion into wetlands, surface waters, and other groundwater recharge areas.	Short- and long-term, minor to moderate, direct and indirect, adverse impacts on hydrology and groundwater would be expected. Degrading infrastructure, particularly eroding roads, might lead to increased sediments, nutrients, and contaminants in wetlands, streams and other groundwater recharge areas, and blocked drainage structures could increase flood risk.
Surface Waters and Waters of the United States	Short- and long-term, negligible to minor, indirect, adverse impacts could occur on surface water resources from vegetation control and debris removal, and the grading of roadways, which could cause increased sedimentation into wetlands, arroyos, or other surface water or drainage features. BMPs would be implemented to minimize sedimentation.	Short- and long-term, minor to major, direct and indirect, adverse impacts on surface waters might occur. Degrading infrastructure, particularly eroding roads, could lead to increased sediments, nutrients, and contaminants in wetlands, streams, arroyos, and other water-related features, and blocked drainage structures could increase flood risk.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Floodplains	Short-term, negligible to minor, indirect, adverse impacts could occur on floodplain areas from vegetation control and debris removal, which could cause increased sedimentation into floodplains and drainage structures. Short-term, minor, adverse impacts would result from the introduction of fill material during grading. Long-term, minor, beneficial impacts on floodplains could occur by minimizing erosion of road material into floodplain areas.	Short- and long-term, minor to moderate, direct and indirect, adverse impacts could occur on floodplains. Degrading infrastructure, particularly eroding roads, might lead to increased sediments and other fill materials in the floodplain, and blocked drainage structures impair flow, which could increase flood risk.
Air Quality	Short-term, negligible to minor, adverse impacts on air quality would be anticipated. Air pollutant emissions would be generated as a result of grading, filling, compacting, trenching, and other maintenance and repair operations, but these emissions would be temporary and would not be expected to generate any offsite effects. No significant effects on regional or local air quality would occur, and a negligible contribution towards statewide greenhouse gas inventories would be anticipated.	No direct or indirect adverse impacts would be expected on local or regional air quality from implementation of the No Action Alternative. CBP would continue current maintenance and repair activities and tactical infrastructure would be maintained on an as-needed basis.
Noise	Long-term, periodic, negligible to minor, adverse effects on the ambient noise environment would occur. Populations within 1,000 feet of the proposed maintenance and repair activities would have the potential to be exposed to a greater adverse effect than that described for the No Action Alternative.	Long-term, periodic, negligible to minor, adverse effects on the ambient noise environment would occur. CBP would continue current maintenance and repair activities and tactical infrastructure would be maintained on an as-needed basis.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Cultural Resources	There is the potential for long-term, minor, adverse effects on archaeological sites from the grading of roads. All other activities would have negligible to no potential to impact on cultural resources.	Negligible or no potential to impacts on cultural resources would be expected. There would be no Programmatic Agreement under the No Action Alternative. As a result, undertakings with the potential to cause effects on historic properties would follow the review and mitigation procedures set forth in Section 106 of the National Historic Preservation Act (NHPA). Unanticipated find procedures would be identical to those of the Proposed Action. Less ground-disturbing activities would take place and unanticipated finds would therefore be less likely.
Roadways and Traffic	Short-term, negligible to minor, adverse effects on transportation would be expected from short-term roadway closures and detours while work is underway. Long-term, minor to moderate, beneficial effects on transportation would allow for faster, safer, and more efficient responses by the USBP to threats.	Most roadway repairs would be reactive to immediate issues affecting these roadways and would not address the long-term maintenance requirements. As-needed repairs would not be considered sustainable in quality because they would result in gradual degradation of these roadways.
Hazardous Materials and Waste Management	Long-term, negligible to minor, adverse impacts due to hazardous substances, petroleum products, hazardous and petroleum wastes, and pesticides would be expected. Due to the nature and age of the tactical infrastructure, it is not anticipated to contain asbestos-containing materials (ACMs), lead-based paint (LBPs), polychlorinated biphenyls (PCBs), or solid waste, and therefore no impacts on these resources would be expected.	Long-term, negligible to minor, adverse impacts on solid waste management would be expected due to the deterioration of tactical infrastructure over time. No impacts due to hazardous substances, petroleum products, hazardous and petroleum wastes, pesticides, ACMs, LBPs, and PCBs would be expected. Due to the nature and age of the tactical infrastructure it is not anticipated to contain ACMs, LBPs, PCBs, or solid waste.
Socioeconomic Resources, Environmental Justice, and Protection of Children	Short-term, minor, beneficial effects would result from increases to payroll earnings and taxes and the purchase of materials required for maintenance and repair. Short- to long-term, indirect, beneficial impacts on the protection of children in the areas along the U.S./Mexico international border would occur.	Under the No Action Alternative, there would be no change from the baseline conditions; therefore, no impacts would be expected.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
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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ADDRESSING PROPOSED TACTICAL INFRASTRUCTURE MAINTENANCE AND REPAIR ALONG THE U.S./MEXICO INTERNATIONAL BORDER

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1. INTRODUCTION

The Department of Homeland Security (DHS) and U.S. Customs and Border Protection (CBP), propose to maintain and repair certain existing tactical infrastructure along the U.S./Mexico international border in Texas. The tactical infrastructure proposed to be maintained and repaired consists of fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, communications and surveillance tower components (including Remote Video Surveillance System [RVSS] or Secure Border Initiative [SBInet] towers, henceforth referred to as towers). Although the majority of anticipated tactical infrastructure can be found within the geographic areas show in **Figure 1-1**, the exact extent could change over time to accommodate CBP needs. The existing tactical infrastructure in Texas occurs in 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 tactical infrastructure included in this analysis crosses multiple privately owned land parcels, tribal lands, and public lands managed by the National Park Service (NPS) U.S. Fish and Wildlife Service (USFWS), Texas Parks and Wildlife Department (TPWD), U.S. Department of Defense (DOD) and the Texas Department of Transportation (TXDOT). The CBP Facilities Management and Engineering (FM&E) Office is responsible for maintenance and repair of tactical infrastructure (e.g., fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and tower components) to support CBP border security requirements.

This Environmental Assessment (EA) addresses the maintenance and repair of existing tactical infrastructure. This EA also addresses maintenance and repair of any tactical infrastructure on tribal lands in Texas. However, the maintenance and repair of tactical infrastructure assets that are already covered in previous National Environmental Policy Act (NEPA) documents is not included within the scope of this EA. In addition, tactical infrastructure assets that are covered by a waiver issued by the Secretary of Homeland Security (the Secretary) are also excluded from the scope of this EA. Tribal land associated with the Kickapoo Tribe is present within the region of influence (ROI).

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 IIRIRA, 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, waivers for construction of Pedestrian 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 that was constructed under the April 2008 waivers.

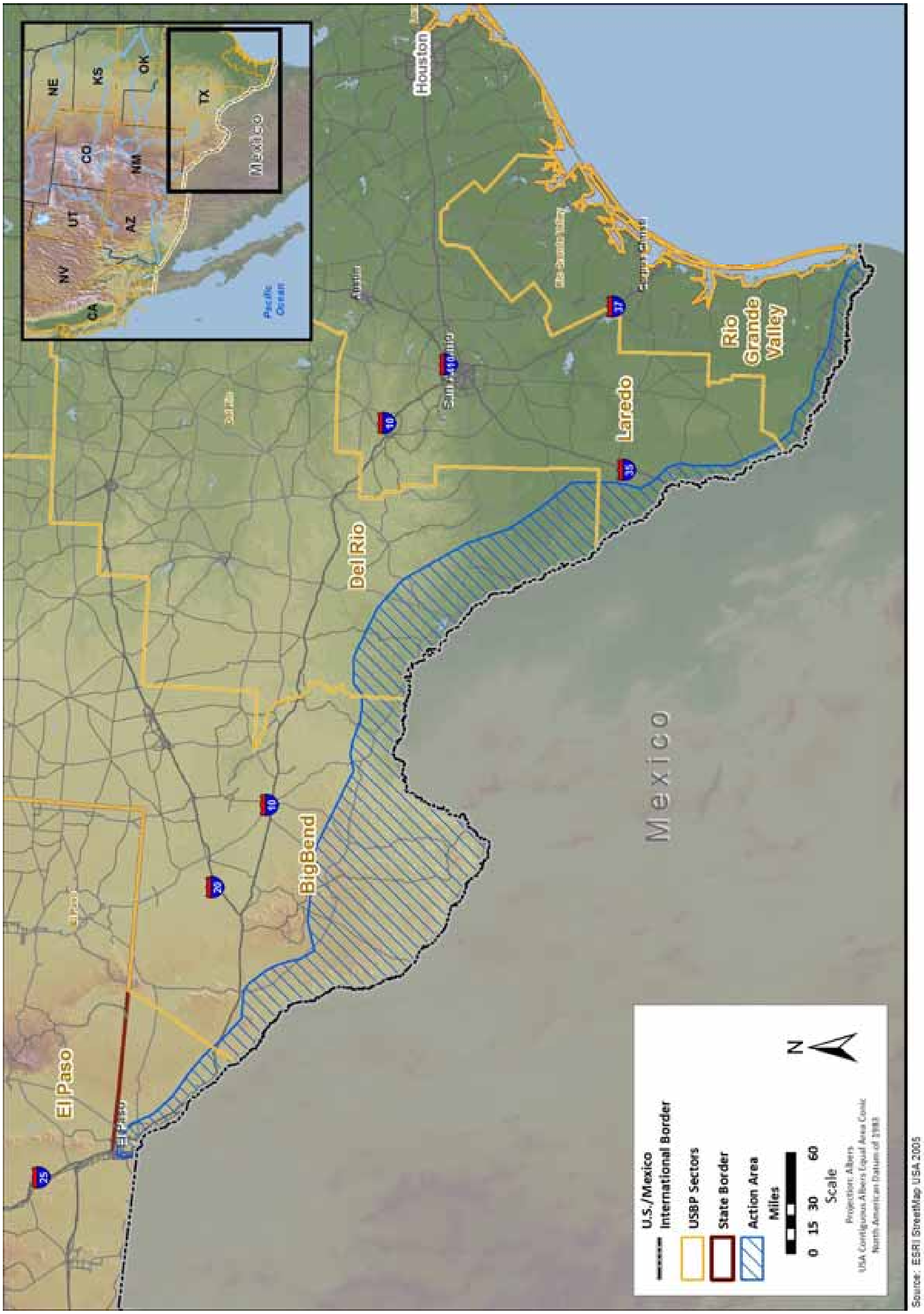

Figure 1-1. Action Area for Proposed Tactical Infrastructure Maintenance and Repair Activities in Texas

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 such tactical infrastructure 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 tactical infrastructure projects. This EA addresses the cumulative impacts of all CBP maintenance and repair activities within the action area including the tactical infrastructure analyzed in previous NEPA documents or ESPs. This comprehensive and integrated environmental impacts analysis of all tactical infrastructure assets within the action area reflects CBP's environmental stewardship by better understanding the cumulative impacts and its commitments to minimize the potential negative impacts. This EA also discusses tactical infrastructure maintenance and repair 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 USBP missions, 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, alternatives considered, and the No Action Alternative. **Section 3** describes existing environmental conditions in the areas where the Proposed Action would occur, and identifies potential environmental impacts that could occur within each resource area under the alternatives evaluated in detail. **Section 4** discusses potential cumulative impacts and other impacts that might result from implementation of the Proposed Action, combined with foreseeable future actions. **Sections 5** and **6** provide lists of references and preparers for the EA.

1.1 USBP BACKGROUND

USBP has multiple, complementary missions (CBP 2010a), including the following:

- Apprehend terrorists and terrorist weapons illegally entering the United States
- Deter illegal entries through improved enforcement
- Detect, apprehend, and deter smugglers of humans, drugs, and other contraband.

USBP has nine administrative sectors along the U.S./Mexico international border within the states of California, Arizona, New Mexico, and Texas. The sectors are San Diego, El Centro, Yuma, Tucson, El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley.

This EA examines the maintenance and repair of tactical infrastructure along the U.S./Mexico international border in Texas in the El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors.

1.2 PURPOSE AND NEED

The purpose of the Proposed Action is to ensure that the physical integrity of the existing tactical infrastructure and associated supporting elements continue to perform as intended and assist the USBP in securing the U.S./Mexico international border in Texas. In many areas, tactical infrastructure is a critical element of border security, which acts as a force multiplier for controlling and preventing illegal border intrusion. To achieve effective control of our nation's borders, CBP is developing the right combination of personnel, technology, and infrastructure; mobilizing and rapidly deploying highly trained USBP agents; placing tactical infrastructure strategically; and fostering partnerships with other law enforcement agencies.

The Proposed Action is needed to maintain the level of border security provided by the existing tactical infrastructure that could otherwise become compromised through acts of sabotage, acts of nature, or a concession in integrity due to a lack of maintenance and repair. Tactical infrastructure would be maintained to ensure USBP agent safety by preventing potential vehicular accidents resulting from minimizing and eliminating hazardous driving conditions. CBP must ensure that tactical infrastructure functions as it is intended, which assists CBP with mission requirements identified in **Section 1.1**.

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*, and DHS Directive 023-01 *Environmental Planning Program*, and CBP policies and procedures. The CEQ was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations specify that an EA may be prepared to:

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

To comply with NEPA, the planning and decisionmaking process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not 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 decisionmaker 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 (CAA), Clean Water Act (CWA) (including a National Pollutant Discharge Elimination System [NPDES] storm water discharge permit and Section 404 permit), Section 10 of the Rivers and Harbors Act of 1899, 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 (TSCA), 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 decisionmaking process. All persons or organizations having a potential interest in the Proposed Action are encouraged to submit input into the decisionmaking process.

NEPA and implementing regulations from the CEQ and DHS direct agencies to make their EAs and EISs available to the public during the decisionmaking 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 notified relevant Federal, state, and local agencies of the Proposed Action and requested 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. As part of the EA process, CBP hosted eight open house scoping meetings in February 2014: one each in El Paso, Big Bend, and Laredo sectors; two in Del Rio Sector; and three in Rio Grande Valley Sector. The purpose of the open houses was to foster open communication between the interested parties, including members of the public, and the project representatives. The open house scoping meetings also provided an idea of the range of individuals, organizations, and agencies interested in the project. Attendees to the open house meetings were provided with comment cards, fact sheets, and visual displays. Court reporters were available to individuals who wished to record a comment verbally rather than submit a written comment. Spanish language interpreters were available in the event that participants wishing to make a comment used Spanish as their primary language. Commnect received during the scoping process were incorporated into this EA.

CBP has coordinated 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, Texas Historical Commission, Texas Parks and Wildlife, appropriate Native American Tribes and Nations, and local agencies.

Agency responses will be incorporated into the analysis of potential environmental impacts. The following is a 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
  - USACE Fort Worth District
  - BLM Amarillo Field Office
  - United States Section, International Boundary and Water Commission (USIBWC)
- **State Agencies**
  - TCEQ
  - Texas Department of Transportation
  - Texas Historical Commission
  - Texas Parks and Wildlife
- **Stakeholders**
  - Federally Recognized Native American Tribes and Nations.

A Notice of Availability (NOA) for this EA and draft FONSI will be published in representative newspapers of regional distribution. This is done to solicit comments on the Proposed Action and alternatives and involve the local community in the decisionmaking process. During the 45-day public review and comment period for the Draft EA, CBP will accept comment submissions by fax, email, and mail from the public; Federal and state agencies; Federal, state, and local elected officials; stakeholder organizations; and businesses. Substantive comments from the public and other Federal, state, and local agencies will be incorporated into the Final EA and included in **Appendix B**. The following is a list of newspapers that will be used for publishing the NOA.

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

- *Brownsville Herald*
- *El Nuevo Heraldo* (Spanish).

Hard copies of the Draft EA can be reviewed at the following libraries: El Paso Main Public Library, 501 N. Oregon St., El Paso, TX 79901; Fort Hancock ISD/Public Library, 101 School Dr., Fort Hancock, TX 79839; Marfa City Municipal Library, 115 E. Oak St., Marfa, TX 79843; Alpine Public Library, 805 W. Avenue E, Alpine, TX 79830; City of Presidio Library, 1200 O'Rielly St., Presidio, TX 79845; Val Verde County Library, 300 Spring St., Del Rio, TX 78840; Eagle Pass Public Library, 589 E. Main St., Eagle Pass, TX 78852; Laredo Public Library, 1120 E. Calton Rd., Laredo, TX 78041; Rio Grande City Public Library, 591 E. Canales St., Rio Grande City, TX 78582; Speer Memorial Library, 801 E. 12th St., Mission, TX 78572; McAllen Public Library, 4001 N. 23rd St., McAllen, TX 78504; Weslaco Public Library, 525 S. Kansas Ave., Weslaco, TX 78596; Mercedes Memorial Library, 434 S. Ohio Ave., Mercedes, TX 78570; Harlingen Public Library, 410 76 Dr., Harlingen, TX 78550; San Benito Public Library, 101 W. Rose St., San Benito, TX 78586; and Brownsville Public Library, 2600 Central Blvd., Brownsville, TX 78520. Throughout the NEPA process, the public may obtain information concerning the status and progress of the EA via the project Web site at *http://www.cbp.gov/about/environmental-cultural-stewardship/nepa-documents/docs-review*.

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2. PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This section describes the Proposed Action and the alternatives considered. 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 in **Section 1.2**. CEQ regulations specify the inclusion of a No Action Alternative against which potential effects can be compared.

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. CBP uses an optimal mix of tactical infrastructure development, application of remote surveillance technologies, and deployment of USBP agents to achieve border security objectives. The following screening criteria were used to develop the Proposed Action and evaluate potential alternatives.

- ***Protecting Persistent Impedance Requirements.*** Tactical infrastructure must support CBP mission needs by its capability to hinder or delay individuals illegally crossing the U.S./Mexico international border in Texas, either on foot or by vehicle. The continuous maintenance and repair of the fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and communications and surveillance tower components are imperative to the safe and rapid response capabilities of USBP agents.
- ***Maintain Remote Surveillance Capability.*** Proposed maintenance and repair activities must ensure tower infrastructure sites are accessible on an as-needed basis and ensure continued functionality of the supporting components, foundation footers/pads, perimeter fencing, tower structures, and designated work/storage areas.
- ***Minimize Potential Negative Environmental Impacts.*** Proposed maintenance and repair activities should be evaluated for their potential environmental impacts and BMPs would be planned or implemented in proportion to the risk in consultation with the appropriate regulatory and resource agencies. Particular management focus should be devoted to protecting the following sensitive environmental resources.
    - *Threatened or Endangered Species and Critical Habitat*. The maintenance and repair of tactical infrastructure 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. Any maintenance and repair activities that could not be mitigated to a determination of May Affect, but Not Likely to Adversely Affect using BMPs

would undergo separate Section 7 consultation. CBP has initiated consultation with the USFWS and a Biological Assessment is being prepared for tactical infrastructure maintenance and repair activities within the action area in the five USBP sectors along the U.S./Mexico international border in Texas.

- *Wetlands and Floodplains*. The maintenance and repair of tactical infrastructure should be conducted in such a manner as to have negligible impacts on waters of the United States, including wetlands and floodplain resources to the maximum extent practical. CBP is consulting with the USACE to minimize wetland and floodplain impacts and identify potential avoidance, minimization, and conservation measures. During the planning process for such activities, appropriate coordination with the USACE would occur and appropriate permits would be acquired, if necessary.
- *Cultural and Historic Resources*. The maintenance and repair of tactical infrastructure should be conducted in such a manner as to have negligible impacts on cultural and historic resources to the maximum extent practical. CBP is consulting with the Texas Historical Commission to develop a Programmatic Agreement (PA). Under the Proposed Action, undertakings with the potential to cause effects on historic properties would be covered by a PA between CBP, the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Officers (SHPOs), Federal agencies, and tribes. If the undertaking is not covered under the PA, CBP would be required to conduct the applicable Section 106 review for those activities that are not covered. If the EA and FONSI are issued prior to approval of the PA, CBP would be required to conduct the standard Section 106 review process for these activities until they are covered by an executed PA. Therefore, CBP is required to comply with Section 106 of the NHPA, as amended, and its implementing regulations (36 CFR 800) before conducting maintenance and repair 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 tactical infrastructure maintenance and repair program would include reactive maintenance and repair activities (e.g., resolving damage from intentional sabotage or severe weather events) and preventive/scheduled maintenance and repair activities designed to ensure environmental sustainability (e.g., culvert replacement, drainage and grate cleaning, preventive soil erosion measures). All maintenance and repair would occur via a periodic work plan based on anticipated situations within each sector and funding availability. Although centrally managed by FM&E, prioritization of projects based upon evolving local requirements within each sector would determine maintenance and repair schedules. This alternative would allow for changes in tactical infrastructure maintenance and repair requirements. Maintenance and repair requirements could change over time based on changes in usage or location, but would not exceed the scope of this EA. If the scope of this EA is exceeded, new NEPA analysis would be required. Tactical infrastructure covered by the

Secretary's waiver or prior NEPA analyses (e.g., staging areas) 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 tactical infrastructure maintenance and repair to ensure their continued utility in securing the border. The CBP FM&E Sector TI Coordinator would work closely with the sector for all maintenance and repair activities. Proposed activities would be managed by the Project Management Office's (PMO) Maintenance and Repair Supervisor. CBP proposes to conduct the following forms of tactical infrastructure maintenance and repair. Although a majority of anticipated tactical infrastructure can be found within the geographic areas shown in **Figure 1-1**, the exact extent, location, and amount of tactical infrastructure to be maintained could change over time to accommodate CBP needs.

2.3.1 Tactical Infrastructure Assets

CBP proposes to maintain and repair existing tactical infrastructure consisting of fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and tower components not directly associated with the tactical infrastructure covered by the Secretary's waiver and prior NEPA documentation. Maintenance and repair standards are presented in **Appendix C**. The following paragraphs describe the types of tactical infrastructure CBP proposes to maintain and repair.

Fences and Gates. Maintenance and repair of fences and gates would consist of welding metal fence components, replacing damaged or structurally compromised members, reinforcing or bracing foundations, repairing burrowing activities under fences and gates, repairing weather-related damages, controlling vegetation, and removing accumulated debris. The Proposed Action would also include repairing or replacing gate-operating equipment (e.g., locks, opening/closing devices, motors, and power supplies). There are approximately 135 miles of fence and 120 gates on non-tribal lands within the action area in Texas. The fencing consists of primary border fencing and a variety of perimeter security fencing to protect sensitive infrastructure. Approximately 5 percent of the total fences and gates installed by CBP within the action is not covered by a Secretary's waiver or previously analyzed and are, therefore, considered in this EA. The exact number of miles of fence associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of miles of fence associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing fence, would require separate NEPA analysis.

Some earth moving could be necessary for fence and gate maintenance. To replace damaged or structurally compromised portions of fences and gates, heavy equipment might be needed for filling, compacting, and trenching. On-road haul trucks and cranes, or other such equipment could be required to replace heavy fence and gate parts. All necessary erosion-control BMPs (see **Appendix E**) would be adopted to ensure stabilization of the project areas.

Access Roads and Integrated Bridges/Crossovers. Maintenance and repair activities would consist of filling in potholes, regrading road surfaces, implementing improved water drainage measures (e.g., ensure road crowns shed water and runoff flows to established drainage ditches, culverts, or other water-control features as needed to control runoff and prevent deterioration to existing infrastructure or surrounding land), applying soil stabilization agents, controlling vegetation and debris, and adding lost road surface material to reestablish intended surface elevation needed for adequate drainage.

Maintenance of the existing roads would be in accordance with proven maintenance and repair standards. All of the standards CBP would follow are developed based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resource agencies. These maintenance and repair standards are described in **Appendix C**. Bridges would be inspected on a routine basis and their structural integrity maintained.

Earth moving could be necessary for access road maintenance. Heavy equipment would be needed for activities such as grading, filling, and compacting. The majority of proposed maintenance and repair would occur on graded earth roads and two-track roads (see **Appendix C**). Because of their lack of formal construction design, these two roadway types are subject to the greatest deterioration if left unmaintained. When subjected to heavier traffic, rutting occurs which, in turn, is exacerbated by runoff that further erodes roads. Unmanaged storm water flow also causes erosion to occur, washing out complete sections of road and, in many instances, makes roads impassable.

Commercial grading equipment would be used to restore an adequate surface to graded earth roads. USBP sector personnel and contract support personnel well-versed in grading techniques would be employed for such activity. A poorly regraded surface quite often results in rapid deterioration of the surface. The restored road would be slightly crowned and absent of windrows in the gutter line to avoid ponding and channeling within the road during rain events. Any associated roadside drainage would be maintained to ensure that runoff is relieved from the road surface quickly and effectively without creating further erosion issues. The addition of material to these roads would be kept to the minimum needed to achieve the proposed objective. All necessary erosion-control BMPs (see **Appendix E**) would be adopted to ensure stabilization of the project areas.

CBP currently uses approximately 2,500 miles of road within the action area. Approximately 2,100 miles (5 percent) of local roadways within 25 miles of the U.S./Mexico international border in Texas consequently have not been subject to analysis after deducting the roads analyzed in previous NEPA documents or covered by a Secretary's waiver. The exact number of miles of roads maintained and repaired by CBP within Texas could change over time to accommodate CBP needs. Therefore, the number of miles of roads associated with the Proposed Action is considered somewhat flexible and not constrained by a quantifiable number. Bridges would be inspected on a routine basis and their structural integrity maintained. Future actions, such as major changes to roadway networks and major upgrades to existing roadways, would require separate NEPA analysis.

Drainage Management Structures. Maintenance and repair of drainage systems would consist of cleaning blocked culverts and grates (e.g., cattle guards) of trash and general debris and repairing or replacing nonfunctional or damaged drainage structures when necessary. Resizing and replacing or repairing culverts or flow structures would occur, as necessary, to maintain proper functionality; and riprap, gabions, and other erosion-control structures would be repaired, resized or added to reduce erosion and improve water flow. In addition, maintenance and repair of riprap and low-water crossings would occur when necessary to maintain proposed functionality. Maintenance and repair requirements would consist of restoring or replacing damaged or displaced riprap. All debris and trash removed from culverts and grates would be taken to an appropriate disposal facility. During the planning process for such activities, appropriate coordination with the USACE would occur and appropriate permits would be acquired if necessary.

Low-water crossings consist of riprap or concrete at waterway edges and articulated matting or similar hardened material in the middle. The function of the riprap or concrete is to protect the articulated matting or similar hardened material from being washed away and enhances the stability and longevity of the materials. Maintenance and repair requirements would consist of restoring damaged or displaced ripraps. Articulated matting (or similar hardened material) would be restored, replaced, or strengthened to maintain its functionality. Built-up debris could also be removed to create a sustainable, efficient low-water crossing.

Heavy equipment such as on-road haul trucks and cranes would be required for replacing culverts, low-water crossings, and riprap for the maintenance and repair of drainage structures. For in-water work, all necessary BMPs would be adopted to ensure stabilization of the project areas. Most work would be conducted from existing roads and other disturbed areas; however, heavy equipment might be needed adjacent to those roads to repair or replace drainage and erosion-control structures.

There are an estimated 90 drainage management structures associated with the tactical infrastructure to be maintained and repaired in Texas; Approximately 90 percent are analyzed in this EA. The exact number of drainage structures associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of drainage structures associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing drainage structures, would require separate NEPA analysis.

Vegetation Control to Maintain Road Visibility. Vegetation encroaching upon roads and bridges would be maintained to ensure visibility and to sustain safe driving conditions for USBP agents during travel. Control of vegetation would be achieved by trimming, mowing, and applying selective herbicides. In areas deemed too difficult to mow, such as under guardrails, within riprap, and immediately adjacent to bodies of water within the proposed setbacks, herbicides would be used if appropriate. Suitable best management practices (BMPs) would be implemented for all vegetation control activities (see **Appendix E**). Only herbicides approved by the USEPA and the relevant Federal and state land management agency would be used, where appropriate. Herbicide use would be part of an integrated approach that uses minimal quantities of herbicide applied by certified personnel in accordance with the label. Equipment needed would include mowers, trimmers, and equipment necessary for mechanical grubbing. BMPs would be used to stabilize the work areas and avoid impacts on biological resources (see **Appendix E**).

CBP would conduct surveys for nesting migratory birds and nests if maintenance occurred during the nesting season (March 15 through September 15). Vegetation control would not occur in suitable or critical habitat of threatened or endangered species. If CBP determined that vegetation control must be conducted within suitable habitat of threatened or endangered species, USFWS would be further consulted..

Boat Ramps. The maintenance and repair of boat ramps would include repairing and restoring boat ramp surfaces, conducting vegetation control to maintain unencumbered access, and implementation of erosion-control measures.

Lighting and Ancillary Power Systems. The maintenance and repair of lighting and ancillary power systems would consist of replacing burned-out light bulbs, restoring or replacing damaged power lines or onsite power-generating systems (e.g., generators, fuel cells, wind turbine generators, and photovoltaic arrays), repairing and replacing associated electrical components and, where necessary, controlling vegetation and removing debris. Approximately 95 percent of CBP's approximately 750 lighting and ancillary power systems within the action area is analyzed in this EA. The exact number of lighting and ancillary power systems associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of lighting and ancillary power systems associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing lighting and ancillary power systems, would require separate NEPA analysis.

Communications and Surveillance Towers. Communications and surveillance towers and components are mounted on combination of monopoles, water towers, radio towers, telephone poles, and buildings. The physical structures of the tower components would be repaired and maintained (e.g., painting or welding to maintain existing metal towers), as necessary. Heavy equipment potentially needed to maintain lighting and ancillary power systems includes lifts, track-hoes, backhoes, and flatbed trucks. Maintenance and repair of secondary power-generation systems would consist of replacing burned-out light bulbs, restoring and replacing damaged power lines, repairing and replacing associated electrical components, and, where necessary, controlling vegetation and removing debris. Between 100 and 120 of the total towers used by CBP in Texas are analyzed in this EA under the Proposed Action. The exact number of towers associated with the Proposed Action within Texas could change over time to accommodate CBP needs. Therefore, the number of towers associated within the Proposed Action is considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions, such as major upgrades to existing towers would require separate NEPA analysis.

Each of the towers has a small footprint, and none exceeds 10,000 square feet. Roads to the towers are included in the road mileage previously discussed.

Equipment Storage. The maintenance and repair of the existing tactical infrastructure as previously described requires the use of various types of equipment and support vehicles. Such equipment could include graders, backhoes, tractor mowers, dump trucks, flatbed trucks, and pick-up trucks. When assigned to an activity, the equipment would be stored within the existing footprint of the maintenance and repair location or at a staging area previously designated for such purposes by CBP. All the staging areas and, in turn, the activities occurring therein, that would be used by CBP as a part of the Proposed Action have either already been analyzed in previous NEPA documents or are covered by the Secretary's waiver.

2.3.2 Location of Tactical Infrastructure to be Maintained and Repaired

The existing tactical infrastructure found along the U.S./Mexico international border in Texas cuts across multiple landownership categories including lands under CBP ownership, lands managed by other Federal agencies, tribal lands, and private property. CBP would develop a comprehensive protocol for coordinating the necessary maintenance and repair activities within the different classes of landownership.

CBP-Owned Tactical Infrastructure. CBP would undertake necessary maintenance and repair activities to ensure the continuity of the intended functionality of the tactical infrastructure and to protect invested resources as responsible stewards of Federal resources entrusted to CBP.

Tactical Infrastructure Assets on Land Managed by Other Federal and State Agencies. These tactical infrastructure assets are located on public lands managed by the NPS, USFWS, DOD and TPWD. CBP would establish mutually agreed upon processes for performing maintenance and repair activities on tactical infrastructure on lands owned by these agencies. CBP is committed to work through the appropriate permit-granting authority established within these agencies to ensure that CBP proposed maintenance and repair activities would be accomplished in a manner that is mutually beneficial to all agencies. As an example of this commitment, CBP actively participates in the Borderland Management Task Force working committee to coordinate these activities on a regular basis.

Tactical Infrastructure Assets on Tribal Land. As stated previously, the maintenance and repair of tactical infrastructure assets on tribal lands is analyzed in this EA. For maintenance and repair of tactical infrastructure assets on tribal land, CBP would formally seek consultations with the representatives of federally recognized Native American tribes to undertake the necessary maintenance and repair of tactical infrastructure assets on tribal land. CBP would seek the appropriate resolutions and abide by the internal governing rules and regulations for obtaining the necessary permits to perform the maintenance and repair.

Tactical Infrastructure Assets on Private Land. CBP would conduct maintenance and repair activities on privately held properties in voluntary cooperation with owners. No maintenance and repair would occur without an agreement in place between CBP and cooperating landowners.

2.3.2.1 Tactical Infrastructure Mapped within the Action Area in Texas

The blue hatched area depicted on **Figure 1-1** is the geographic area where CBP tactical infrastructure is located (i.e., action area), and represents the limits of analysis for this EA. Additional detailed maps of the tactical infrastructure addressed in this EA along the U.S./Mexico international border in Texas are provided in **Appendix D**, which accompanies this EA as a digital video disc (DVD). In addition to displaying existing tactical infrastructure, the maps display ranges of threatened and endangered species within the action 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 the USFWS, and that are discussed further in the Biological Assessment.

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 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 in **Appendix D** are not intended to be used as an implementation tool for maintenance and repair activities, but instead represent the ranges of potential threatened and endangered species as related to the action 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 are presented in **Appendix E** categorized by the affected resources. The combination of the informative maps and the relevant BMPs would provide CBP with a visual framework for applying appropriate maintenance and repair solutions in sensitive areas.

2.3.3 Maintenance and Repair Program

The Proposed Action would consist of both preventative and reactive maintenance. The types of maintenance employed as a part of the Proposed Action would vary by tactical infrastructure asset.

As part of the Proposed Action, fences and gates would be inspected on a routine basis to ensure gate mechanisms operate correctly and fence components are in good working condition. Maintenance and repair of fences and gates would occur as required. As part of preventative maintenance and repair of access roads, maintenance and repair activities would occur, as needed, based on quarterly inspections, and reactive maintenance and repair would occur upon discovery of damage due to intentional sabotages or weather events. During maintenance and repair of access roads, integrated bridges/crossovers would be inspected, maintained, and repaired as required. Drainage management structures would be inspected regularly during the rainy season and preventative maintenance and repair would occur to ensure operability. After storm events, reactive maintenance and repair would occur to ensure the structures are clear of debris and blockages. Preventative maintenance and repair of light systems would occur approximately every 2 to 3 years and all lights would be replaced. Maintenance and repair of towers would occur on an as-needed basis following regular inspections. Maintenance and repair of ancillary power systems would occur according to manufacturer specifications. Maintenance and repair 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, centralized maintenance and repair planning would be conducted by FM&E. In addition, FM&E would have complete program management responsibility for implementing maintenance and repair activities. For example, FM&E would formulate standard design specifications, which would consider BMPs and the environmental context of the tactical infrastructure to determine the priority and type of maintenance and repair needed.

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

- ***Step 1.*** USBP Sectors and Border Patrol Facilities and Tactical Infrastructure field maintenance and repair representatives identify maintenance and repair needs.
- ***Step 2.*** A team of CBP PMO interdisciplinary subject matter experts, including environmental staff, would decide on the best technical approach for ensuring desired specifications and standards and implementing applicable BMPs.
- ***Step 3.*** A cost estimate for the proposed maintenance and repair Work Plan would be prepared and submitted to the CBP chain-of-command for approval. Maintenance and repair 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 maintenance and repair 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 review the completed maintenance and repair work and ensure it was completed to the prescribed specifications 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 tactical infrastructure maintenance and repair and would support the interdisciplinary technical team in developing improved maintenance and repair solutions in the future.

Appropriate environmental training is a prerequisite for personnel actively engaged in tactical infrastructure maintenance and repair. 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

The No Action Alternative would maintain the status quo. It is not a proposal to eliminate maintenance and repair activities. Under the No Action Alternative, CBP would continue to perform the required maintenance and repair of tactical infrastructure; however, maintenance and repair would be conducted on an as-needed basis, using a largely reactive approach. There would be no centralized planning process for maintenance and repair. Rather, individual USBP sectors within Texas would request FM&E to conduct a particular maintenance and repair activity and FM&E would be responsible for executing the request. In addition, there would be no established design or performance specifications, which could mean that as-needed repairs are required more often and evaluation of potential environmental impacts would occur on a case-by-case basis.

Under the No Action Alternative, there would be no systematic approach to preventative maintenance. Thus, tactical infrastructure breakdowns that have already occurred or are imminent would likely be given the highest priority for maintenance and repair. Examples include the foundation of fencing eroding to the point of imminent failure, roads becoming impassable due to severe rutting, or uncontrolled vegetation growth impeding stormwater drainage flow. Preventative maintenance and repair would be limited to those situations where a USBP sector identifies a potential trouble spot and makes a specific request for some type of preventative maintenance and repair.

The No Action Alternative would continue to meet minimum CBP mission needs, but the lack of a centralized planning effort, established performance specifications, and a preventative maintenance plan would make it far more difficult for CBP to prevent the gradual degradation of tactical infrastructure. In addition, it is possible that not all BMPs would be implemented during emergency maintenance and repair scenarios. The lack of coordinated environmental staff support and formalized planning under this alternative increases the potential for unintended delays in complying with NEPA, the ESA, and other environmental requirements. The No Action Alternative serves as a baseline against which an evaluation of the impacts of the Proposed Action can be made. **Table 2-1** provides an overview of the alternatives analyzed in the EA.

Table 2-1. Summary of Alternatives Identified

Management Approaches	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Maintenance and Repair Activities	Preventative and reactive maintenance and repair activities to minimize environmental impacts.	Reactive maintenance and repair when infrastructure breaks down.
Design and Performance Specifications	Establish design specifications and a subsequent maintenance and repair approach.	None.
Maintenance and Repair Organizational Approach	Central maintenance and repair planning and decentralized execution. In-house environmental staff expertise used to minimize potential environmental impacts. Coordinated environmental planning to make most efficient use of staff resources and minimize delays in critical maintenance and repair actions.	Ad hoc and decentralized planning and execution without coordinated environmental staff support resulting in inefficiencies complying with NEPA and other environmental requirements.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER DETAILED ANALYSIS

2.5.1 Upgrade All Existing Unpaved Roads to FC-2 All-Weather Roads

Under this alternative, all existing roads would be upgraded to the FC-2 (all-weather roads) classification. Adopting this alternative would be cost-prohibitive and cause substantial environmental impacts. This alternative would greatly enhance CBP's capability to improve border security, but for the aforementioned reasons, this alternative was eliminated from further detailed study in the EA.

2.5.2 No Maintenance and Repair of Tactical Infrastructure

Under this alternative, tactical infrastructure would not be maintained or repaired. This alternative would result in tactical infrastructure degrading to the point that the initial functional intent would no longer exist. This alternative would lead to the deterioration of tactical infrastructure over time, creating safety hazards, uncontrolled erosion, and other associated environmental concerns, and the abandonment of foreign materials within an environmental setting. In addition, because this alternative would result in the degradation and disrepair of tactical infrastructure, it would not meet the purpose and need as stated in **Section 1.2** or comply with USBP mission objectives. For these reasons, this alternative was eliminated from further detailed analysis in the EA.

2.5.3 Maintenance and Repair Program Using Only Mandatory BMPs

Under this alternative, the scope of the tactical infrastructure maintenance and repair program would be same as the Proposed Action, but only mandatory BMPs would be implemented in the planning and execution of maintenance and repair (i.e., BMPs developed by CBP to promote environmental stewardship would not be used [see **Appendix E**]). Work Plans for scheduled and reactive maintenance and repair would be formulated by analyzing the lowest cost and the minimum acceptable design standards and specifications. FM&E would still have program management responsibility for implementing maintenance and repair to design specifications; however, only mandatory BMPs would be factored into the maintenance and repair Work Plan or the life-cycle costs of maintaining and repairing tactical infrastructure. In addition, environmental planning would be limited to compliance with applicable minimum requirements. This alternative would not meet CBP's commitment to environmental stewardship and would not minimize potential negative environmental effects; therefore, this alternative was eliminated from further detailed analysis in the EA.

2.6 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

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

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3. AFFECTED ENVIRONMENT AND 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 initially considered in this EA. General descriptions of the eliminated resources and the basis for elimination are described in **Section 3.1**.

The following discussion elaborates on the nature of 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 maintenance and repair activities. 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 the 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 Part 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, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. 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 effects 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. The following provides the basis for such exclusions.

Aesthetics and Visual Resources

The Proposed Action would not have a significant effect on aesthetics or visual resources, as existing infrastructure would be maintained or repaired and no additional infrastructure would be installed. Therefore, the appearance of tactical infrastructure would not change and no major effect on aesthetic and visual resources would be anticipated.

Human Health and Safety

Maintenance and repair site safety 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. Occupational Safety and Health Administration (OSHA) and the 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 maintenance and repair site. Contractors would be required to establish and maintain safety programs at the maintenance and repair site. The proposed maintenance and repair 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, detailed examination of safety is not included in this EA.

Additionally, due to the remote location of the tactical infrastructure, the likelihood that the Proposed Action would impact the health and safety of humans other than USBP agents and contractors or USBP personnel performing the road improvements is extremely low. However, minor, beneficial impacts on safety could occur from use of improved roads.

All occupational safety standards and BMPs, as outlined in **Appendix E** of this document, would be implemented.

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 [U.S.C.] 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 13423 (January 24, 2007), *Strengthening Federal Environmental, Energy, and Transportation Management*, promotes environmental practices, including acquisition of bio-based, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and maintenance of cost-effective waste prevention and recycling programs at Federal facilities. EO 13514 (October 5, 2009), *Federal Leadership in Environmental, Energy, and Economic Performance*, sets sustainability goals for Federal agencies and focuses on making improvements in agency environmental, energy, and economic performance. EO 13514 does not rescind or eliminate the requirements of EO 13423. Instead, it expands on the energy reduction and environmental performance requirements for Federal agencies identified in EO 13423 (FedCenter 2010). In addition to these EOs, 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 the maintenance and repair of tactical infrastructure would use negligible amounts of resources. The adaptive management process would further the use of CBP's Environmental Management System in accordance with EO 13423, EO 13514, and DHS Directive 025-01. Therefore, beneficial effects on sustainability and greening would be expected.

Utilities and Infrastructure

The majority of proposed maintenance and repair of tactical infrastructure along the U.S./Mexico international border in Texas would occur in remote areas distanced from utilities. USBP and its contractors would not use existing utilities and infrastructure to complete maintenance and repair activities. Due to the remote location of the action area, impacts on utilities and infrastructure would not be expected. Therefore, analysis of this resource area has been omitted from further detailed analysis.

3.2 LAND USE

3.2.1 Definition of the Resource

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel of land. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meaning of various land use descriptions, "labels," and definitions varies among jurisdictions. For example, natural conditions of property can be described or categorized as unimproved, undeveloped, a conservation or preservation area, and a natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the location and extent of an action needs to be evaluated for its potential effects on the project area and adjacent land uses. The foremost factor affecting an action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use in the project area, the types of land uses on adjacent properties and their proximity to an action, the duration of an action, and its permanence.

3.2.2 Affected Environment

Land use classifications along the U.S./Mexico international border in Texas include agriculture, rangeland, and urban, with extensive areas of recreation and wildlife management activities. Developed land, which makes up approximately 3 percent of the Texas action area, is highly modified and characterized by permanent or semi-permanent structures, pavement, or unvegetated areas. This land occurs throughout the action 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.

Specific land uses within the agriculture classification include highly developed croplands (e.g., small grains, forage crops, hay production), pasture, and orchards. The land can be irrigated or non-irrigated (USACE 1994a).

Land uses within the rangeland classification include the grazing of cattle, horses, sheep, goats, and other domestic animals. This is based on the presence of naturally occurring grasses, grass-like plants and forbs, or shrubs suitable for grazing and browsing. This classification would include the following types of ecosystems: natural grasslands, savannas, wetlands, and other areas with the potential to support certain forb and shrub communities under prudent and normally accepted land management practices.

The urban land use classification includes residential, industrial, transportation, commercial, educational, medical, recreational, open space for environmental protection (i.e., floodways, utility easements, and rights-of-way), and underdeveloped land (USEPA 2001a).

There are also numerous recreational/special land use areas. Most of these special land use areas are outside of highly urbanized centers. These land uses have been established for various recreational activities but also for flood control; and scenic, historic, and wildlife management uses as described in the following paragraphs.

Wildlife Management Areas. Wildlife Management Areas (WMAs) in the project area are operated by the Wildlife Division of the TPWD. The TPWD has 51 WMAs, encompassing 756,464 acres of land throughout the state. WMAs are established to represent habitats and wildlife populations typical of each ecological region of Texas; permit research on wildlife populations and habitat; conduct education on resource management; and provide opportunities for hunting, hiking, camping, bird watching, and a host of other outdoor recreational opportunities, all of which are compatible with the conservation of this valuable resource. The Las Palomas WMA Lower Rio Grande Valley Units, Black Gap WMA, and Elephant Mountain WMA are within the action area (TPWD 2010, TPWD 2005).

National Wildlife Refuges. Part of the Lower Rio Grande Valley National Wildlife Refuge (NWR) is in the action area. The Lower Rio Grande Valley NWR is composed of 100 tracts connecting natural brush lands that remain along the lower stretches of the Rio Grande and contains more than 90,000 acres. The Lower Rio Grande Valley NWR system is still in the acquisition phase and the purchasing of properties and conservation easements could eventually lead to the Lower Rio Grande Valley NWR encompassing 132,500 acres. The tracts complement existing wildlife corridors (TPWD 2005, USFWS 1997).

The Santa Ana NWR in southern Hidalgo County is also within the action area. The 2,088-acre refuge is positioned along an east-west and north-south juncture of two major migratory routes for birds and serves as the northernmost range for various Central and South American species (USFWS 2014a).

National Parks and National Recreation Areas. NPS land occurs within the action area. Big Bend National Park is a major recreational area in southern Brewster County. At approximately 800,000 acres, Big Bend National Park features more species of birds, bats, and cacti than any other national park in the United States. Amistad National Recreational Area is an approximately 57,300-acre park in southern Val Verde County and acts as a transition zone between three major plant communities: the Tamaulipan shrubland, Chihuahuan Desert, and the Edwards Plateau. Chamizal National Memorial is also within the action area and memorializes the Chamizal Treaty of 1963 peacefully settling a boundary dispute between the United States and Mexico (NPS 2014).

3.2.3 Environmental Consequences

An analysis of the effects of a proposed action on land use addresses the potential for impacts to occur on areas affected. Land use can remain compatible, become compatible, or become incompatible. Projected compatibility issues were measured both qualitatively and quantitatively. The level of potential land use effects is based on the degree of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use effect would be significant if it met any of the following criteria:

- Was inconsistent or in noncompliance with existing land use plans or policies
- Precluded the viability of existing land use
- Precluded continued use or occupation of an area
- Was incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflicted with planning criteria established to ensure the safety and protection of human life and property.

3.2.3.1 Alternative 1: Proposed Action

No new construction or change in land use would occur under the Proposed Action; therefore, no effects on land use plans or policies would be expected. The Proposed Action would result in the continuation of the existing land uses as only maintenance and repair of tactical infrastructure would occur within the action area. This alternative would be compatible with the existing land uses in the action area and, therefore, would not result in any changes in land use.

3.2.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, tactical infrastructure maintenance and repair activities along the U.S./Mexico international border in Texas would continue and current tactical infrastructure would be maintained on an as-needed basis. The No Action Alternative would result in continuation of existing land uses. No effects on land use would be expected as a result of the No Action Alternative.

3.3 GEOLOGY AND SOILS

3.3.1 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.

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 (NRCS) is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (see 7 CFR Part 658, 5 July 1984).

3.3.2 Affected Environment

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

Plateau and Pecos Canyons) and three subprovinces of the Gulf Coastal Plains (Blackland Prairies, Interior Coastal Plains, and the Coastal Prairies).

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 within this province are generally flanked by plateaus in which the rocks are nearly horizontal and less deformed. The interior of these mountain ranges is composed of strongly folded and faulted sedimentary and volcanic or granite rocks. Many of the mountain peaks within this province are formed by volcanic rocks and have slopes flanked by large flows of volcanic ash and thick deposits of volcanic debris. Eroded craters, which are formed as a result of the collapse and subsidence of volcanic cores, are abundant within the Basin and Range province of Texas (University of Texas 1996).

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 Stockton Plateau is a mesa-like land formation in the far western extent of the Edwards Plateau province. 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 (University of Texas 1996).

The Gulf Coastal Plain includes three subprovinces from west to east along the border region: the Blackland Prairies, the Interior Coastal Plains, and the Coastal Prairies. The Blackland Prairies have a gently undulating surface with deep, black, fertile clay soils. These soils transition 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 Gulf Coastal Plain within the action area. The Coastal Prairies of the Gulf Coastal Plains 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 (University of Texas 1996). Rivers in this area are mature with broad low relief valleys. Remnant sand dunes from previous shorelines, now superseded by progressively younger shorelines, locally form small rounded hills (USACE 1994c).

Topography. The Basin and Range province within the action area varies in elevation from 1,700 to 8,750 feet above mean sea level (msl), with north-south-trending mountains and basins. The Edwards Plateau ranges from 1,200 to 4,200 feet above msl in the west, with mesas and steep-walled canyons; the Pecos River erodes the Pecos Canyon as deep as 1,000 feet. The Gulf Coast Plains province ranges from 1,000 feet above msl in the west, where rolling terrain is present, to 0 feet above msl at the coast (University of Texas 1996).

Soils. Twenty-four soil associations are mapped within the tactical infrastructure and maintenance action area (see **Appendix F**). The soils are level to undulating and are characterized as having a clayey to loamy texture. An area mapped as sandy soils occurs from Baffin Bay to Brownsville and on Padre Island. The majority of the soil associations mapped have a high clay content and, consequently, exhibit a slight to moderate susceptibility to erosion and a low to high potential to shrink-swell (USACE 1994b).

Soils along the eastern portion of the action area 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 mapped within the coastal area from Brownsville to Baffin Bay. 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. 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).

The interior of the action area consists of loamy soils of the Hidalgo-Willacy-Delfina association and the McAllen-Brennen association in Hidalgo County. The remainder of the interior portion of the action area is intermixed with defined areas of deep soils with loamy surface layers (USACE 1994c).

Prime Farmland. Of the 24 soils, 2 are considered prime farmland (Rio Grande-Camargo-Matamoros and Hidalgo-Willacy-Delfina) and 2 are considered prime farmland if irrigated (Harlingen-Laredo-Lagloria and McAllen-Hidalgo-Brennan) (NRCS 2011a).

Geologic Hazards. The 2008 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 along the western boundary with Mexico, south of El Paso. This indicates that, during a seismic event, little damage would occur towards the coast, but major damage could occur south of El Paso (USEPA 2011c).

Approximately 10 faults have been identified within 30 miles of the Texas portion of the U.S./Mexico international border. Each of the faults has an estimated slip rate of less than 0.2 millimeters per year (mm/year), with the last major ruptures ranging from less than 130,000 years to less than 1.6 million years ago (USGS 2009). Therefore, movement along faults within the action area is unlikely to occur.

3.3.3 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 control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function within the environment.

3.3.3.1 Alternative 1: Proposed Action

Regional Geology. No impacts on geology would be anticipated from implementing the Proposed Action.

Topography. Long-term, negligible, adverse impacts on topography would be anticipated from grading activities that would locally alter existing topography. Areas proposed for grading have been previously graded and, therefore, impacts would be negligible.

Soils. Tactical infrastructure maintenance and repair activities along the U.S./Mexico international border in Texas would be expected to result in short- and long-term, minor, adverse effects on soils, primarily from the control of vegetation and use of herbicides. Control of vegetation would increase erosion and sedimentation potential. Erosion-and-sediment-control plans (ESCPs) would be developed and implemented both during and following maintenance and repair activities to contain soil and runoff on site, and reduce potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff.

Roads classified as FC-3 (graded earth), FC-4 (two-track roads), and FC-5 (sand) would have the greatest potential for erosion. Grading activities, particularly those associated primarily with FC-3 and FC-5 roads, would result in short-term, minor, adverse impacts on soil resulting from erosion and sedimentation. Grading activities in more rugged terrain and within boat ramp areas could result in greater potential for soil erosion and sedimentation than in flat terrain. However, maintenance of roads would reduce the effects incurred from negligence, such as rutting, washout, and long-term soil erosion. Grading and maintenance activities within the boat ramp areas could result in increased erosion and sedimentation due to the proximity to nearby water bodies. This potential for erosion and sedimentation would be greatest during storm events prior to the completion of grading activities. Once grading activities have subsided and soils have once again compacted under vehicle weight, soil erosion and sedimentation into nearby water bodies would be much less likely to occur. Proper crowning of roads and installation of ditches to manage storm water runoff on FC-3 and FC-5 roads would also reduce the potential for soil erosion and sedimentation. Therefore, maintenance of roads would result in long-term, beneficial impacts on soils.

Maintenance and repair of FC-4 roads would result in short- and long-term, minor, adverse impacts on soils from vegetation control and removal of rock, which could result in increased erosion and sedimentation. Installation of culverts and low-water crossings for FC-4 roads would occur where erosion is problematic. This would also result in short-term, minor, adverse and long-term, minor, beneficial impacts on soils due to a decrease in erosion potential. Grading is anticipated to be performed infrequently on FC-4 roads.

Maintenance to towers would be anticipated to result in a short-term, negligible, adverse impact from erosion of soils due to potential ground disturbance from repairs or replacement of equipment. This would be a localized impact. A short- to long-term, beneficial impact on soils could occur due to clearing blockages from drainage structures and low water crossings if these blockages have caused water to back up onto normally dry soils resulting in soil erosion and sedimentation. In addition, erosion and downstream sedimentation could occur from rerouting of drainage channels to avoid blockages or during flow back-up.

Herbicides could impact soils depending on the type of herbicide used and the timing of herbicide application. Application of herbicides to soil could result in runoff and leaching of chemicals. Timing of application contributes to the effectiveness of an herbicide on target plants and on non-target plants and features such as soil. Therefore, application of a highly soluble herbicide during a dry period presents a far different hazard to soil than during a rainy season. The same contrast occurs between clear versus rainy days, and calm versus windy days (Neary and Michael undated).

It is anticipated that short-term, minor, direct, adverse impacts on soil would occur from herbicide applications during which some chemicals would adsorb strongly to soil, thereby temporarily altering the soil chemistry until the chemicals have adequately degraded from microbial action. Short-term, negligible impacts could occur after weedy vegetation has died but before other vegetation has become established. Soil could locally be more susceptible to erosion and sedimentation before vegetation is established.

Prime Farmland. Prime farmland soils exist within the action area; however, no impacts on these soils would be expected to occur because the maintenance and repair of tactical infrastructure would be confined to the existing footprints.

Geological Hazards. Geologic hazards are prevalent throughout the U.S./Mexico international border in the form of seismic events, landslides, debris flows, and rock falls. Continued maintenance and repair of the tactical infrastructure would be beneficial because it would result in repairs to infrastructure that reduces the potential for erosion and sedimentation, and remove debris from a geological event. BMPs would be implemented to minimize soil erosion and sedimentation. BMPs could include installing silt fencing and sediment traps, applying water to disturbed soil to control dust, and revegetating disturbed areas as soon as possible after disturbance, as appropriate (see **Appendix E**). Soil erosion- and sediment-control measures, such as silt fencing or curtains, would be implemented in areas where erosion and sedimentation are anticipated to result from maintenance and repair activities. Erosion- and sediment-control measures would be included in site plans to minimize long-term erosion and sediment production at each site. Use of storm water-control measures that favor reinfiltration would minimize the potential for erosion and sediment production as a result of future storm events (see **Sections 3.7** and **3.8** for an evaluation of impacts on water resources). However, much of the area along the U.S./Mexico international border in Texas is only sparsely vegetated; therefore, it would be expected that control of vegetation would have a long-term, minor impact on soil erosion and sedimentation, specifically during storm events.

3.3.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, tactical infrastructure maintenance and repair activities along the U.S./Mexico international border would continue and current tactical infrastructure would be maintained on an as-needed basis. There would be a potential for short- and long-term, minor, direct and indirect, adverse impacts on soils due to soil disturbance from grading and other ground-disturbing maintenance activities. By completing maintenance and repair work on an as-needed basis and not periodically as described in the Proposed Action, the potential exists for an increased impact on soils from emergency repair activities, such as repair of a road after washout. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action because the potential for erosion and sedimentation would be greater since a proactive approach to maintenance and repair would not occur.

3.4 VEGETATION

3.4.1 Definition of the Resource

Vegetation resources include all terrestrial and aquatic plants that are found within the action 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 descriptions of the ecology within the action area (Bailey 1995). An ecoregion contains geographically distinct environmental communities and conditions. Because ecoregions are defined by their shared biotic and abiotic characteristics, they represent practical units on which to base conservation planning. Domains are defined by climate and split into divisions, which are defined according to climate and vegetation. Divisions are subsequently split into provinces that are typically defined by their major plant formations (USFS 2010).

The U.S. Geological Survey's (USGS) Gap Analysis Program mapping of the United States was used to achieve a finer resolution of the vegetative communities within the action area (USGS 2007). NatureServe (2010a) defines ecological systems as representing recurring groups of biological communities that are found in similar physical environments and are influenced by similar ecological processes such as fire or flooding. Ecological systems represent classification units that are readily identifiable by conservation and resource managers in the field. Ecological systems describe groups that are "taxonomically" broader than alliances and associations.

3.4.2 Affected Environment

The vegetation of west and south Texas has been broadly classified under the Dry Domain of Bailey's classification system (Bailey 1995). 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 action area 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 (drought-adapted) shrubs and trees, and the climate becomes semiarid-subtropical (Bailey 1995).

Within the action 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 grasses. Extensive arid grasslands cover most of the high plains of this province (Bailey 1995).

The Tropical/Subtropical Steppe Division in the action 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, 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 75 ecological systems in the action area (NatureServe 2010a). A table listing these ecological systems is presented in **Appendix D**. Within the action area, 18 of these systems account for more than 95 percent of the land cover. These are the ecological systems that generally define the landscape of the action area and are described in the following paragraphs. These descriptions were extracted from NatureServe Explorer (NatureServe 2010a).

Chihuahuan Mixed Desert and Thornscrub. This ecological system, which makes up approximately 18 percent of the action 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, 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, 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 (NatureServe 2010a).

Tamaulipan Mesquite Upland Scrub. This ecological system, which makes up approximately 12 percent of the action area, occurs throughout much of the lower Rio Grande plains and plateaus of northeastern Mexico and southern Texas. It has become widespread in the past 100 to 150 years as the result of disturbance to adjacent mesquite savanna grasslands. The vegetation is characterized by an open to dense tall-shrub layer dominated by honey mesquite. Other species that can also be dominant include guajillo, sweet acacia (*Acacia farnesiana*), blackbrush acacia, Texas torchwood (*Amyris texana*), mountain torchwood (*Amyris madrensis*), spiny hackberry (*Celtis pallida*), Texas barometer bush (*Leucophyllum frutescens*), prickly-pear cacti (*Opuntia* spp.), Texas paloverde (*Parkinsonia texana*), yucca (*Yucca* spp.) and lime prickly-ash (*Zanthoxylum fagara*). The herbaceous layer is generally sparse, but dense grasses can dominate stands with open shrub canopies or remnant patches of savanna (NatureServe 2010a).

Apacherian-Chihuahuan Mesquite Upland Scrub. This ecological system, which makes up approximately 12 percent of the action area, often occurs as invasive upland shrubland within the Chihuahuan Desert of west Texas. This shrubland is concentrated in historically extensive desert grasslands within foothills and piedmont deposits at the base of mountains. Substrates are typically derived from gravelly alluvium with the ability for infiltration and storage of winter precipitation in deeper soil layers. This system is dominated by honey or velvet mesquite (*Prosopis velutina*) and other deep-rooted shrubs and succulents because deep-soil moisture is unavailable to grasses and cacti. Other desert scrub species that also dominate this system include acacia (*Acacia* spp.) and juniper (*Juniperus* spp.). Creosote bush is typically absent or has low cover. Grass cover is typically low and composed of desert grasses such as low woollygrass (*Dasyochloa pulchella*), muhly grasses (*Muhlenbergia* spp.), curlyleaf muhly (*Muhlenbergia setifolia*), and tobosa grass (*Pleuraphis mutica*) (NatureServe 2010a).

Chihuahuan Creosotebush Desert Scrub. This ecological system, which makes up approximately 11 percent of the action 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 (*Koeberlinia spinosa*), 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 (NatureServe 2010a).

Chihuahuan Succulent Desert Scrub. This ecological system, which makes up approximately 8 percent of the action area, 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, 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 (NatureServe 2010a).

Apacherian-Chihuahuan Semi-Desert Grassland and Steppe. This ecological system, which makes up approximately 8 percent of the action area, is a broadly defined desert grassland, mixed shrub-succulent, or xeromorphic 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 (*Bouteloua* spp.), plains lovegrass (*Eragrostis intermedia*), bullgrass (*Muhlenbergia emersleyi*), muhly, curlyleaf muhly, 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.) (NatureServe 2010a).

Tamaulipan Calcareous Thornscrub. This arid thornscrub ecological system, which makes up approximately 6 percent of the action area, is restricted to limestone and calcareous sandstone hills and caliche substrates in south Texas. 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, guajillo, sweet acacia, and other shrub species that can be locally dominant including blackbrush acacia, mountain torchwood, Texas torchwood, amargosa, spiny hackberry, Texas kidneywood (*Eysenhardtia texana*), barreta (*Helietta parvifolia*), crown of thorns, Texas paloverde, mescal bean (*Sophora secundiflora*), or yucca. The sparse to moderately dense herbaceous layer is dominated by perennial grasses (NatureServe 2010a).

Tamaulipan Savanna Grassland. This Tamaulipan ecological system of south Texas makes up approximately 3 percent of the action area. This system is dominated by the perennial Bermuda grass (*Cynodon* spp.) with sparse overstory of mesquite or oak trees and thornscrub. This system was once a common matrix system, but has largely been converted to desert scrub and exists as remnant patches (NatureServe 2010a).

Edwards Plateau Limestone Shrubland. This ecological system, which makes up approximately 3 percent of the action area, occurs on relatively thin-soiled surfaces of limestone plateaus of south-central Texas. These short to tall shrublands are variable in density depending on the relative amount of, and depth to, bedrock. Bastard oak (*Quercus sinuata* var. *breviloba*) is an important component of the system with some areas dominated by Texas live oak (*Quercus fusiformis*). Ashe juniper (*Juniperus ashei*) is often found in this system. Other shrub species can include sumac (*Rhus* spp.), Texas redbud (*Cercis canadensis* var. *texensis*), stretchberry (*Forestiera pubescens*), netleaf swampprivet (*Forestiera reticulata*), Texas ash (*Fraxinus texensis*), Mexican buckeye (*Ungnadia speciosa*), mescal bean, Texas persimmon, shrubby blue sage (*Salvia ballotiflora*), fragrant mimosa (*Mimosa borealis*), brasil, and cactus apple. This system also includes Mohr's oak (*Quercus mohriana*) or sandpaper oak (*Quercus vaseyana*)-dominated shrublands that are more common to the west, often sharing dominance with Pinchot's juniper (*Juniperus pinchotii*). Herbaceous cover can be patchy and generally consists of perennial grass species (NatureServe 2010a).

Chihuahuan Loamy Plains Desert Grassland. This ecological system, which makes up approximately 2 percent of the action area, occurs in the northern Chihuahuan Desert of west Texas. These sites are typically flat or gently sloping so precipitation does not run off and can be somewhat mesic (i.e., regularly moist), but are not considered wetlands. Soils are non-saline, finer textured loams or clay loam. Vegetation is characterized by perennial grasses and is typically dominated by tobosa grass, and black grama (*Bouteloua eriopoda*) or blue grama (*Bouteloua gracilis*). In degraded stands, burro grass (*Scleropogon brevifolius*), low woollygrass, or threeawn (*Aristida* spp.) can also dominate. If present, mesic grasses such as western wheatgrass (*Pascopyrum smithii*), vine mesquite (*Panicum obtusum*), alkali sacaton (*Sporobolus airoides*), and big sacaton (*Sporobolus wrightii*) typically have low cover and are restricted to drainages and moist depressions. Scattered shrubs such as Torrey's jointfir (*Ephedra torreyana* var. *torreyana*), American tarwort, broom snakeweed (*Gutierrezia sarothrae*), creosote bush, tree cholla (*Opuntia imbricata*), honey mesquite, and yucca can be present, especially on degraded sites (NatureServe 2010a).

Edwards Plateau Limestone Savanna and Woodland. This upland system, which makes up approximately 2 percent of the action area, occurs on limestone soils in the Edwards Plateau of south-central Texas. This system is typified by a mosaic of evergreen oak forests, woodlands and savannas over shallow soils of rolling uplands and upper slopes within the Edwards Plateau. Texas live oak or Ashe juniper typically dominate the canopy of this system. Other species can include Buckley oak (*Quercus buckleyi*), Lacey oak (*Quercus laceyi*), post oak (*Quercus stellata*), cedar elm (*Ulmus crassifolia*), Texas ash, bastard oak, sandpaper oak, and Texas persimmon. This system varies from dense patches of forest where canopy cover approaches 100 percent with interspersed grasslands, to open savanna-like woodlands with scattered individual or small groups of trees. Understories can contain various shrubs and grasses including Texas redbud, stretchberry, skunkbush sumac (*Rhus trilobata*), grama, little bluestem (*Schizachyrium scoparium*), Texas wintergrass (*Nassella leucotricha*), cedar sedge (*Carex planostachys*), purple threeawn (*Aristida purpurea*), and Texas sage (*Salvia texana*). Grasslands dominated by little bluestem occur in small patches. Grasslands in this system tend to grade from shortgrass communities in the west to mixed grass communities to the east (NatureServe 2010a).

Chihuahuan Mixed Salt Desert Scrub. This ecological system, which makes up approximately 2 percent of the action area, includes extensive open-canopied shrublands of typically saline basins in the Chihuahuan Desert of west Texas. Stands often occur on alluvial flats and around playas (i.e., dry lake basins), or flat-bottomed depressions, and in floodplains along the Rio Grande and Pecos rivers. Substrates are generally fine-textured, saline soils. Vegetation is typically composed of one or more saltbush (*Atriplex* spp.) species such as fourwing saltbush (*Atriplex canescens* var. *canescens*) or mound saltbush (*Atriplex obovata*) along with species of tarwort (*Flourensia* spp.), pickleweed (*Salicornia* spp.), seepweed (*Suaeda* spp.), or other plants that thrive in saline soil. Grass species can include alkali sacaton, tobosa grass, or saltgrass (*Distichlis spicata*) at varying densities (NatureServe 2010a).

Madrean Encinal. Madrean Encinal, which makes up approximately 1 percent of the action area, occurs on foothills, canyons, bajadas, and plateaus in western Texas. These woodlands are dominated by Madrean evergreen oaks such as Arizona white oak (*Quercus arizonica*), Emory oak (*Quercus emoryi*), dwarf oak (*Quercus intricata*), gray oak (*Quercus grisea*), Mexican blue oak (*Quercus oblongifolia*) and Toumey oak (*Quercus toumeyi*). Arizona cypress (*Cupressus arizonica*), pinyon (*Pinus* spp.) and juniper trees can be present but not dominant. Chaparral species such as pointleaf manzanita (*Arctostaphylos pungens*), mountain mahogany (*Cercocarpus montanus*), cliffrose (*Purshia* spp.), silktassel (*Garrya* spp.), Sonoran scrub oak (*Quercus turbinella*), frangula (*Frangula* spp.), and sumac can also be present. The grass layer is usually prominent between trees and is dominated by warm-season grasses (NatureServe 2010a).

Tamaulipan Floodplain. This ecological system, which makes up approximately 1 percent of the action area, is limited to riparian areas of the lower Rio Grande Valley in southern Texas. Stands occur on riverbanks, floodplains, and deltas. These woodlands are a unique mix of species from southeastern North America and subtropical Central America and are often dominated by species that include sweet acacia, Texas persimmon, Texas ebony, Anaqua, Mexican ash (*Fraxinus berlandieriana*), or cedar elm, among others. The highly variable understory is dependent on canopy density and can include dense shrub or herbaceous layers (NatureServe 2010a).

North American Warm Desert Riparian Woodland and Shrubland. This ecological system, which makes up less than 1 percent of the action area, consists of low-elevation (i.e., less than 3,937 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, velvet ash (*Fraxinus velutina*), Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), 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 (NatureServe 2010a).

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 2010a). Together these lands make up approximately 3 percent of the action 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 action area with the largest concentration occurring in the Rio Grande Valley of south Texas (Holland 1986).

Developed. This is a system composed 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 3 percent of the action area, is highly modified and characterized by permanent or semi-permanent structures, pavement, or unvegetated areas. This land occurs throughout the action 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.

3.4.3 Environmental Consequences

Effects on vegetation 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 vegetation 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 Alternative 1: Proposed Action

Short- and long-term, negligible to minor, direct and indirect, adverse effects on vegetation would occur from the Proposed Action due to vegetation control, crushing, accidental spills, and temporary increases in turbidity and sedimentation. Vegetation control would occur within existing footprints where vegetation is being maintained, and outside of the existing footprints for road setbacks. Vegetation control could include the selective removal of woody vegetation and could result in conversion or degradation of habitat. Vegetation control could also result in habitat disturbance resulting in the establishment of different plant communities, including invasive species, in the controlled area.

Negligible to minor, direct, adverse effects on vegetation, such as crushing, might occur when required vehicles and equipment access, park at, and maneuver around areas requiring maintenance. All maintenance activities are expected to occur within or adjacent to existing footprints of tactical infrastructure; as such, these impacts would be negligible.

Degradation of plant communities would also occur if petroleum products or other hazardous materials are accidently released during operation or storage of maintenance and repair vehicles and other 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.

Near- and in-water maintenance, such as that for bridges, boat ramps, and roads, and repair of damaged riprap, culverts, and other drainage structures and crossings, could result in direct and indirect impacts on aquatic plants and their habitats from increases in erosion, sedimentation, and turbidity. Impacts would include direct smothering of aquatic plants, degradation of habitat, and a decrease in sunlight. In addition, hazardous materials could be inadvertently released into aquatic habitat during maintenance and repair activities. These actions would temporarily degrade aquatic habitat, and directly and indirectly affect aquatic plant species. However, maintenance of roadways and repair of damaged riprap, culverts, and other drainage structures and crossings would reduce erosion, improve stream flow, and result in beneficial impacts on aquatic habitat and species.

Under this alternative, a long-term, beneficial impact on vegetation would occur from the reduced potential for erosion and sedimentation from the periodic, scheduled inspections and maintenance of crossings and structures. Adverse impacts on vegetation would be minimized through the use of appropriate BMPs (see **Appendix E**). Examples of BMPs that would be implemented with the Proposed Action to reduce impacts as necessary are listed as follows:

- If vegetation must be cut back, allow natural regeneration of native plants by cutting vegetation with hand tools, mowing, trimming, or other vegetation-control methods that allow root systems to remain intact.
- Vegetation targeted for retention would be flagged to reduce the likelihood of being treated.
- Vegetation control would be timed to avoid the migration, breeding, and nesting timeframe of migratory birds (March 15 through September 15). Herbicide retreatments could occur throughout the year. If initial mechanical and chemical vegetation control or subsequent mechanical vegetation control needs to be implemented during March 15 through September 15, a survey for nesting migratory birds would be conducted immediately prior to the start of activities. Cutting of riparian vegetation would be avoided within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.
- The method of vegetation control used on a levee would ensure that the integrity of the levee is maintained.
- A fire prevention and suppression plan would be developed and implemented for all maintenance and repair activities that require welding or otherwise have a risk of starting a wildfire.
- Fill material, sandbags, hay bales, and mulch brought in from outside the project area by its source location would be identified and sources that are sterile or weed-free would be used.
- Project operations including both initial treatment and subsequent maintenance and repair would be timed to avoid the migration, breeding, and nesting timeframe of special status species. In general, mechanical vegetation treatment and retreatment would occur between October 1 and March 31. Herbicide retreatments would occur throughout the year.
- Control of riparian vegetation within 100 feet of aquatic habitats would be avoided to provide a buffer area to protect the habitat from sedimentation.

- For all in-water work in streams, sediment barriers would be used to avoid downstream effects of turbidity and sedimentation.

3.4.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, short- and long-term, minor to moderate, direct and indirect, adverse effects on vegetation would occur. Under the No Action Alternative, CBP would continue current maintenance and repair activities, and tactical infrastructure would be maintained and repaired on an as-needed basis. There would be no centralized planning process for maintenance and repair, and consequently, maintenance and repair usually would be performed on tactical infrastructure that is in disrepair. Under this alternative, the lack of coordinated environmental staff support and centralized planning would result in inefficiencies that would lead to the eventual degradation of tactical infrastructure, resulting in impacts on vegetation. Maintenance and repair under this alternative would result in impacts on vegetation, such as conversion and degradation of habitat and plant communities from vegetation control, establishment of different plant communities including invasive species, and accidental release of petroleum products or other hazardous materials; trampling and crushing vegetation while accessing the sites; and increased erosion, turbidity, and sedimentation including the burial of aquatic plants. By completing maintenance and repair work on an as-needed basis, the potential exists for increased impacts on vegetation. Without a centralized planning process, maintenance and repair specifications would not be established and standardized BMPs would not be implemented. For example, without a standardized BMP requiring that the footprint of the maintenance area be flagged or marked, vegetation immediately adjacent to the maintenance footprint could be impacted if maintenance activities went beyond that footprint. Thus, some vegetation adjacent to tactical infrastructure could be degraded or destroyed. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action, as the potential for habitat disturbances would be greater due to a lack of a proactive approach to maintenance and repair.

3.5 TERRESTRIAL AND AQUATIC WILDLIFE RESOURCES

3.5.1 Definition of the Resource

This section provides a description of the wildlife and aquatic resources expected to occur within the action area. Terrestrial wildlife resources include native or naturalized terrestrial animals and the habitats in which they exist. Aquatic wildlife resources include native or naturalized 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, other sensitive wildlife species, and migratory birds are addressed in **Section 3.6.**

3.5.2 Affected Environment

An abundance of high-quality habitat for wildlife currently exists within the action area. This vast area is capable of supporting hundreds of wildlife species, including mammals, birds, reptiles, and amphibians. Many species occur throughout the entire action area; however, for the purpose of introducing wildlife and their habitats, the action area is separated into two sections divided by the Pecos River: the "Trans-Pecos" in the far west Texas region, which includes the land west of the Pecos River; and south Texas, which includes the land south and east of the Pecos River.

Trans-Pecos. The Chihuahuan Desert covers the vast area of far west Texas known as the Trans-Pecos. 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*). Common mammals in the shrublands east of the Trans-Pecos 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*), coyote, white-tailed deer (*Odocoileus virginianus*), and cottontail (*Sylvilagus* spp.).

The black-throated sparrow 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*). Common avian species in the shrublands east of the Trans-Pecos include mourning dove, 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). Migratory bird nesting occurs from March 15 through September 15 in the action area

The Trans-Pecos is characterized by many reptiles, including the common chuckwalla, Texas horned lizard (*Phrynosoma cornutum*), desert spiny lizard (*Sceloporus magister*), and various species of rattlesnakes (*Crotalus* spp.) (Bailey 1995). Common species of amphibians east of the Trans-Pecos include spadefoot toads (*Scaphiopus* spp.), chorus frogs (*Pseudacris* spp.), true toads (*Bufo* spp.), and true frogs (*Rana* spp.). Common snakes include rat snakes (*Elaphe* spp.), water snakes (*Nerodia* spp.), western diamondback rattlesnakes (*Crotalus atrox*), and Texas coral snakes (*Micrurus fulvius tener*). 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 (*A. spinifera*) (Bailey 1995).

The action area follows the Rio Grande and includes all of its 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 gracile*), 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. 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 cottontails (*Sylvilagus floridanus*), desert cottontails (*Sylvilagus audubonii*), 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).

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).

3.5.3 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.

3.5.3.1 Alternative 1: Proposed Action

Short- and long-term, negligible to minor, direct and indirect, adverse effects on wildlife would occur from the Proposed Action. All maintenance and repair activities would occur within or adjacent to the existing footprints of tactical infrastructure. As such, maintenance and repair of tactical infrastructure would result in temporary, minor degradation of wildlife habitat and a small amount of permanent habitat loss.

Mechanical vegetation-control methods, such as mowing and trimming, would likely cause larger mammals, reptiles, and birds, including breeding migratory birds, to relocate temporarily. Individuals of smaller, less-mobile species could inadvertently be directly impacted by maintenance and repair activities. Vegetation control would occur within existing footprints where vegetation is being maintained. As such, impacts from vegetation control would be temporary. Vegetation control could include the selective removal of woody vegetation and could result in conversion or degradation of habitat. In addition to the direct disturbance of habitat associated with vegetation control, including the selective removal of woody plants, this activity could result in the establishment of invasive plant species in the controlled area resulting in the conversion of habitat.

Localized degradation of habitat would also occur if petroleum products or other hazardous materials are accidently released during operation or storage of maintenance vehicles and other 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. Thus, habitat degradation resulting from accidental releases of hazardous materials would be negligible.

Some wildlife might be killed or injured during ground-disturbing activities or during transportation of equipment and personnel. Most ground-disturbing activities would occur within and adjacent to previously disturbed sites; therefore, the number of animals killed or injured during proposed activities would be less than what would occur when new areas are disturbed. However, burrowing animals, such as the rodents and reptiles, could be impacted.

Near- and in-water bridge, boat ramp, road, and drainage structure maintenance and repair activities could result in direct and indirect impacts on aquatic species and their habitats from increases in erosion, sedimentation, and turbidity. Sedimentation can reduce the quantity and quality of spawning areas and influence stream productivity and food supply (e.g., aquatic insects) for both aquatic and terrestrial species. In addition, hazardous materials could be inadvertently released into aquatic habitats during maintenance and repair activities. These actions would temporarily degrade aquatic habitat and directly and indirectly affect aquatic species. BMPs would be implemented to minimize sedimentation and reduce the risk of the release of hazardous materials into aquatic systems (e.g., control of riparian vegetation would be avoided when possible to provide a buffer area to protect aquatic habitat from sedimentation). As a result of implementing these control measures, sedimentation and associated adverse effects on aquatic species would be minor. In addition, road maintenance, and repair of damaged riprap, culverts, and other drainage structures and crossings would reduce erosion, improve stream flow, and result in beneficial impacts on aquatic habitat and species. Under this alternative, a long-term, beneficial impact on wildlife and their habitats would occur due to reduced potential for erosion and sedimentation from the periodic, scheduled inspections and maintenance of crossings and structures.

Temporary displacement of mobile wildlife from noise, night lighting, and other disturbances associated with the Proposed Action could occur more often than existing maintenance and repair activities because maintenance would be scheduled at regular intervals. However, BMPs would be implemented to minimize these adverse effects (e.g., if lights must be used at night, they would be limited to a maximum of 1.5 foot-candles and downshielded to avoid affecting bat species, such as the cave myotis).

Adverse impacts would be minimized by using appropriate BMPs (see **Appendix E**). The following are examples of BMPs that could be implemented with the Proposed Action to reduce impacts:

- Vegetation control including both initial treatment and subsequent maintenance would be timed to avoid the migration, breeding, and nesting timeframe of special status species. In general, mechanical vegetation treatment and retreatment would occur between October 1 and March 31. Herbicide retreatments would occur throughout the year.
- Ensure temporary light poles and other pole-like structures used for maintenance activities have anti-perch devices to discourage roosting by birds.
- Minimize animal collisions during maintenance and repair 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, poor weather, curves), do not exceed speeds of 25 mph.

- To prevent entrapment of wildlife species, ensure excavated, steep-walled holes or trenches are either completely covered by plywood or metal caps at the close of each work day or provided with one or more escape ramps (at no greater than 1,000-foot intervals and sloped less than 45 degrees) constructed of earth fill or wooden planks.
- Each morning before the start of maintenance activities and before such holes or trenches are filled, ensure they are thoroughly inspected for trapped animals. Ensure that any animals discovered are allowed to escape voluntarily (by escape ramps or temporary structures), without harassment, before maintenance activities resume; or are removed from the trench or hole by a qualified person and allowed to escape unimpeded.

3.5.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, CBP would continue current maintenance activities and short- and long-term, minor to moderate, direct and indirect, adverse effects on terrestrial and aquatic wildlife would occur. Tactical infrastructure would be maintained and repaired on an as-needed basis. There would be no centralized planning process for maintenance and repair, and, as a consequence, maintenance and repair usually would be performed only on tactical infrastructure that is in disrepair. Under this alternative, the lack of coordinated environmental staff support and centralized planning would result in inefficiencies that would lead to the eventual degradation of tactical infrastructure. The No Action Alterative would result in greater impacts on wildlife than the Proposed Action because maintenance and repair would be reactionary. Under this alternative, impacts on wildlife, such as displacement of wildlife, habitat conversion, and degradation from vegetation control and the accidental release of petroleum products; crushing of smaller, less-mobile species resulting in death or injury; and disturbance from noise effects, night lighting, and temporary displacement of terrestrial species, would be expected.

By completing maintenance and repair work on an as-needed basis, the potential exists for increased impacts on wildlife species. Without a centralized planning process, maintenance and repair specifications would not be established and standardized BMPs might not be implemented (e.g., without a standardized BMP requiring that the footprint of the maintenance area be flagged or marked, wildlife habitat immediately adjacent to the maintenance footprint could be impacted if maintenance activities went beyond the footprint). In addition, maintenance and repair activities planned on an ad hoc basis without uniform application of centralized standards would likely lead to inconsistent outcomes and greater risk to environmental resources such as wildlife. For example, it might not allow the implementation of BMPs that require scheduling preventative maintenance around important seasons, such as the growing or active season when sensitive species might be vulnerable. Thus, some wildlife species and their habitat adjacent to tactical infrastructure could be degraded or destroyed. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action, as the potential for habitat disturbances would be greater due to the lack of a proactive approach to maintenance and repair.

3.6 THREATENED AND ENDANGERED SPECIES

3.6.1 Definition of the Resource

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. Information from the USFWS and NatureServe elemental occurrence data were used to determine the presence of species within the action area. An elemental occurrence is defined by NatureServe as an area of land or water where a species or natural community is or was present and has conservation value (NatureServe 2010b). These occurrence data require that a species is in appropriate habitat, at the appropriate time of the year, and is naturally occurring (NatureServe 2010b). This section presents those federally listed species that are known to occur or have the potential to occur within the action area. State-listed species are described in **Appendix D**.

3.6.2 Affected Environment

The agencies that have primary responsibility for the conservation of plant and animal species in Texas are the 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. Listed species for El Paso, Hudspeth, Culberson, Jeff Davis, Presidio, Brewster, Pecos, Terrell, Val Verde, Edwards, Kinney, Maverick, Dimmit, Zavala, Uvalde, Webb, Zapata, Starr, Hidalgo, and Cameron counties were obtained through USFWS (USFWS 2014b). Data on species' occurrences and distributions were obtained from NatureServe (NatureServe 2010a), The Center for Plant Conservation (CPC 2010), Texas Parks and Wildlife Endangered and Threatened Species database (TPWD 2007), and Biological Resources Plan for Construction, Operation and Maintenance of Tactical Infrastructure For Rio Grande Valley Sector, Texas (CBP 2008b). There are 24 species federally listed as threatened or endangered that are known to occur within or near the action area, see **Table 3-1**. Suitable habitat and their applicable blooming seasons for these species are listed in **Table 3-2**. Analysis of state-listed rare, threatened, and endangered species is outlined in **Appendix D**.

An additional 34 threatened or endangered species occur within the counties along the U.S./Mexico international border in Texas. These species would not be affected by the Proposed Action because they do not occur or are very rare in areas where tactical infrastructure is located, or because no activities would be conducted within or near habitat used by these species along or near the U.S./Mexico international border. Therefore, these 34 species are not discussed further. The species are Davis' green pitaya (Echinocereus viridiflorus var. davisii), little Aguja pondweed (*Potamogeton clystocarpus*), Nellie cory cactus (*Coryphantha minima*), Pecos sunflower (*Helianthus paradoxus*), Texas wild-rice (*Zizania texana*), Peck's cave amphipod (*Stygobromus pecki*), Pecos assiminea (*Assiminea pecos*), Comal Springs drypoid beetle (*Stygoparnus comalensis*), Comal Springs riffle beetle (*Heterelmis comalensis*), Comanche Springs pupfish (*Cyprinodon elegans*), Diamond tryonia (*Pseudotryonia adamantine*), diminutive amphipod (*Gammarus hyalleloides*), fountain darter (*Etheostoma fonticola*), Gonzales tryonia (*Tryonia circumstriata*), Leon Springs pupfish (*Cyprinodon bovinus*), Pecos amphipod (*Gammarus pecos*), Pecos gambusia (*Gambusia nobilis*), Phantom springsnail (*Pyrgulopsis texana*), Phantom tyonia (*Tryonia cheatumi*), San Marcos salamander

Table 3-1. Federally Listed Species Known to Occur within the Action Area

Common Name	Scientific Name	Listing Status
PLANTS		
Ashy dogweed	*Thymophylla tephroleuca*	Endangered
Bunched cory cactus	*Coryphantha ramillosa*	Threatened
Chisos Mountain hedgehog cactus	*Echinocereus chisoensis* var. *chisoensis*	Threatened
Hinckley's oak	*Quercus hinckleyi*	Threatened
Johnston’s frankenia	*Frankenia johnstonii*	Endangered
Lloyd’s mariposa cactus	*Echinomastus mariposensis*	Threatened
Tobusch fishhook cactus	*Sclerocactus brevihamatus tobuschii*	Endangered
Sneed pincushion cactus	*Coryphantha sneedii sneedii*	Threatened
South Texas ambrosia	*Ambrosia cheiranthifolia*	Endangered
Star cactus	*Astrophytum asterias*	Endangered
Terlingua Creek cat’s-eye	*Cryptantha crassipes*	Endangered
Texas ayenia	*Ayenia limitaris*	Endangered
Texas snowbells	*Styrax platanifolius texanus*	Endangered
Walker’s manioc	*Manihot walkerae*	Endangered
Zapata bladderpod	*Lesquerella thamnophila*	Endangered, critical habitat
FISHES		
Big Bend gambusia	*Gambusia gaigei*	Endangered
Devils River minnow	*Dionda diaboli*	Threatened, critical habitat
Rio Grande silvery minnow	*Hybognathus amarus*	Endangered, critical habitat
BIRDS		
Black-capped vireo	*Vireo atricapilla*	Endangered
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered, critical habitat
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened (Proposed)
MAMMALS		
Gulf Coast jaguarundi	*Puma yagouaroundi cacomitli*	Endangered
Mexican long-nosed bat	*Leptonycteris nivalis*	Endangered
Ocelot	*Leopardus pardalis*	Endangered

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 between 3,500 and 4,500 feet in Chihuahuan desert vegetation.	March–April
Johnston’s frankenia	Open or sparsely vegetated rocky gypsies hillsides, and saline flats.	year-round
Lloyd’s Mariposa cactus	Very open area with few shrubs in the Chihuahuan desert scrubland at elevations between 2,500 and 3,500 feet.	July–August
Tobusch fishhook cactus	Eastern Edwards Plateau of Texas on high stream banks.	April–September
Sneed pincushion cactus	Cracks on vertical limestone cliffs and ledges within semi-desert grasslands at elevations of 3,900 to 7,700 feet.	March–May
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 between 3,150 and 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
Texas snowbells	Edwards Plateau Vegetation Area. Lightly wooded areas with vertical limestone and dolomite cliffs.	March–May
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

(*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 femoralis* *septentrionalis*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*, Proposed), west Indian manatee (*Trichechus manatus*), and whooping crane (*Grus americana*).

3.6.2.1 Terrestrial Threatened and Endangered Species

The following paragraphs describe the 24 federally listed species known to occur within or near the action area.

Ashy dogweed (*Thymophylla tephroleuca*). 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 2010a).

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 2010b). 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 (USFWS 1987a), 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). NatureServe data indicate one elemental occurrence of approximately 1,000 ashy dogweed plants within Zapata County and USGS topographic quadrangle maps O'Keefe Lake and Arroyo Salado West within the action area (NatureServe 2010b).

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 *(Coryphantha ramillosa)*. 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 2010a). It is known from about 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). NatureServe data indicate that there are 23 records of elemental occurrence of bunched cory cactus within Brewster and Terrell counties, Texas, and USGS topographic quadrangle maps Solis, San Vincente, Boquillas, Stillwell Crossing, Bourland Canyon, Black Gap, Cupola Mountain, Las Vegas De Los Ladrones, Yellow House Peak, Dove Mountain, Taylor Canyon, McCain Canyon, and Sanderson within the action area (NatureServe 2010b).

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

Chisos Mountain hedgehog cactus (*Echinocereus chisoensis* var. *chisoensis*). 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 2010a). 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. Within the action area, NatureServe provides records of 12 elemental occurrences of Chisos Mountain hedgehog cactus within Brewster County and USGS topographic quadrangle maps San Vicente, Boquillas, Glen Springs, Roy's Peak, and Panther Junction (NatureServe 2010b).

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 (*Quercus hinckleyi*). This is a dwarf, evergreen, multi-branched shrub which forms thickets about 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 2010a, 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). Within the action area, NatureServe provides a record for 10 elemental occurrences of Hinckley's oak within USGS topographic quadrangle maps of Ernst Valley, Sue Peaks, McKinney Springs, Dagger Flat, Boquillas, The Solitairio and Shafter. Nine of the occurrences are within Presidio County, and one is in Brewster County (NatureServe 2010b).

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

Johnston's frankenia (*Frankenia johnstonii*). 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 all occur within the action 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 (CBP 2008b). NatureServe provides a record for eight elemental occurrences of Johnston's frankenia within USGS topographic quadrangle maps Roma-Los Saenz West, Roma-Los Saenz East, Saline no, Arroyo Clarion, Beckwith Arm, Arroyo Salad West, Blanca's Creek North, and Laredo South (NatureServe 2010b).

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 (*Echinomastus mariposensis*). 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 2010a). 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). Within the action area, NatureServe provides a record for 23 elemental occurrences of Lloyd's Mariposa cactus within Brewster

County and USGS topographic quadrangle maps Ernst Valley, Boquillas, Roy's Peak, Amarilla Mountain, McKinney Springs, Black Gap, Bourland Canyon, Dagger Flat, Bone Spring NE, Las Vegas De Los Landrones, Stillwell Mountain, Dove Mountain, Yellow House Peak, and Pine Mountain West (NatureServe 2010b).

Threats to documented sites are related primarily to illegal collection, and several sites have been extirpated by collectors (CPC 2010, NatureServe 2010a). Because coal and petroleum are also found within its range, mining and drilling activities for such resources remain potential threats (USFWS 1989b).

Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*). These are cacti that form tight clumps, sometimes with as many as 100 stems. The individual stems range from 1 to 3 inches long and 0.5 to 1 inches in diameter and are often hidden by dense spines. The spines are typically white and appear darker at the tips. The flowers, which bloom from April to September, are 0.5 inches in diameter (USFWS 1986).

Sneed pincushion cactus habitat typically consists of dry limestone outcrops on rocky, steep, slopes in semi-desert grasslands at elevations of 3,900 to 7,700 feet. Associated vegetation consists of low-lying shrubs, rosette-forming perennials, cacti, and annual and perennial herbs. Common soil characteristics between Sneed pincushion cactus locations are unknown. This cactus is often found growing in cracks on vertical cliffs or ledges in Chihuahuan desert scrub (USFWS 1986). Sneed pincushion cactus is presently known from the Franklin Mountains of El Paso County, Texas, and Dona Aña and Eddy counties, New Mexico. Additional locations include the southern edge of the Organ Mountains of New Mexico and the Guadalupe Mountains of Texas and New Mexico (USFWS 1986). Within the action area, NatureServe provides a record for five elemental occurrences of Sneed pincushion cactus within El Paso County, Texas, and within USGS topographic quadrangle maps of El Paso, Smeltertown, Canutillo, and North Franklin Mountain (NatureServe 2010b).

Threats to Sneed's pincushion cactus include habitat modification or destruction and collection pressures. In addition, this species has a very restricted range.

South Texas Ambrosia (*Ambrosia cheiranthifolia*). 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 Gulf Coastal grasslands 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 2010b). Within the action area, NatureServe provides a record for one elemental occurrence of South Texas ambrosia within Cameron County and USGS topographic quadrangle map Olmito (NatureServe 2010b).

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 2010c).

Star cactus (*Astrophytum cheiranthifolia*). 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 (USFWS 2003). Within the action area, NatureServe provides a record for two elemental occurrences of star cactus within Starr County and USGS topographic quadrangle maps Rio Grande City North and El Suaz (NatureServe 2010b).

Threats include collection, land clearing, introduced invasive species, habitat fragmentation, and potential chemical contamination (USFWS 2003).

Terlingua Creek cat's eye (*Cryptantha crassipes*). 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 about 100 acres), and numbers of individuals within populations vary from 50 to approximately 2,000 (with an average of 450 individuals) (USFWS 1993b). Within the action area, NatureServe provides a record for eight elemental occurrences of Terlingua Creek cat's-eye within Brewster County and USGS topographic quadrangle maps Packsaddle Mountain and Agua Fria Mountain (NatureServe 2010b).

Threats to Terlingua Creek cat's-eye include habitat fragmentation and destruction (USFWS 1993b).

Texas ayenia (*Ayenia limitaris*). 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). Within the action area, NatureServe provides a record for six elemental occurrences of Texas ayenia within Cameron County and USGS topographic quadrangle maps East Brownsville, West Brownsville, Olmito, along with Hidalgo County and within quadrangle maps Progreso and Mercedes (NatureServe 2010b).

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 2010c).

Texas snowbells (*Styrax platanifolius* ssp. *texanus*). This is deciduous, multi-stemmed, woody shrub that averages approximately 10 feet in height. In the spring, pendulous racemes of long white flowers are produced. This species prefers moist habitats including river drainages, canyons, and draws on the Edwards Plateau. These habitats do not necessarily require surface water to support the species, as many of these sites have sub-surface water or collect runoff. Most of these populations have been observed in areas where the plants receive partial shade during the day. The plant is known to occur on both vertical cliffs and level terrain (USFWS 2008a).

Texas snowbells are presently known to exist within Edwards, Real, and Val Verde counties in 22 natural populations with one to several hundred individuals per population. It is believed that the total number of individuals is less than 1,000 (USFWS 2008a). Within the region of analysis, NatureServe provides a record for four elemental occurrences of Texas snowbells within Val Verde County and USGS topographic quadrangle maps Dolan Springs and Telephone Canyon (NatureServe 2010b). Some of the main threats include habitat alteration as a result of overgrazing, fire suppression, and brush clearing (USFWS 2008a).

Tobusch fishhook cactus (*Sclerocactus brevihamatus* ssp. *tobuschii*). 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 2010b). 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 2010a). Associated vegetation communities include live-oak-juniper woodlands (USFWS 2010a).

At the time of listing, there were less 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 (USFWS 2010a). Within the action area, NatureServe provides a record for seven elemental occurrences of Tobusch fishhook cactus within USGS topographic quadrangle maps Anacacho, Odlaw, Clark Waterhole, Dolan Springs, and Telephone Canyon (NatureServe 2010a). Threats to the Tobusch fishhook cactus include real estate development, which limits the possibility of prescribed burns and alters natural habitat (USFWS 2010a).

Walker's manioc (*Manihot walkerae*). 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 about 0.5 inches 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. Within the action area, NatureServe provides a historical record of five elemental occurrences of Walker's manioc occurring within Starr and Hidalgo counties. Two occurrences exist in Starr County within USGS topographic quadrangle maps La Grula and Rio

Grande City North. Three occurrences exist in Hidalgo County within USGS topographic quadrangle map Mission (NatureServe 2010b).

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 (*Lesquerella thamnophila*). 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 inches 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 pallid)*, 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 NWR 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 action area. Within the action area, NatureServe provides a record for five elemental occurrences of Zapata bladderpod within Starr County and USGS topographic quadrangle maps Roma-Los Saenz West and Falcon Village. NatureServe also provides one record of Zapata bladderpod within Zapata County and USGS topographic quadrangle Zapata SE (NatureServe 2010b).

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 (*Gambusia gaigei*). This is a relatively small, live-bearing fish from the Poeciliidae. 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 3.3 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. Within the action area, NatureServe provides a record of one elemental occurrence in Brewster County and USGS topographic quadrangle map Boquillas (NatureServe 2010b).

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 will 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 (*Dionda diaboli*). 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 2008b). Critical habitat has been designated for Devils River minnow (73 FR 46987–47026); and occurs within the action area. Within the action area, NatureServe provides a record for four elemental occurrences of Devil's River minnow within Kinney County and USGS topographic quadrangle maps Del Rio SE and Bracketville. Records of occurrences also exist in Val Verde County, Texas, and within USGS topographic quadrangle maps Del Rio SW, Del Rio, NE Del Rio NW Counties, Bakers Crossing, Sycamore Canyon, Telephone Canyon, Dolan Springs, and Clark Waterhole (NatureServe 2010b).

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 (*Hybognathus amarus*). 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 2008c). NatureServe data indicate that there are no records of elemental occurrence of Rio Grande silvery minnow in the action area (NatureServe 2010b).

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 2010a).

Black-capped vireo (*Vireo atricapilla*). 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 2010a). 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 Devil's 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 Devil's River South of Juno; and the Devil's 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 than this (NatureServe 2010a).

NatureServe data indicate there are 20 records of elemental occurrence of the black-capped vireo in the action area. These occurred within the boundaries of the Baker's Crossing, Black Gap, Clark Waterhole, Dagger Flat, Dolan Springs, Emory Peak, Sanderson, Satan Canyon, Sycamore Canyon, Telephone Canyon, and the Basin USGS topographic quadrangle maps. The most recent record of an elemental occurrence in the action area was in 2003 (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 2010a).

Southwestern willow flycatcher (*Empidonax traillii extimus*). 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).

NatureServe data do not indicate that there are any records of elemental occurrence of southwestern willow flycatcher in the action area (NatureServe 2010b). However, portions of the defined Recovery Unit for the southwestern willow flycatcher are within the action area. The Rio Grande Recovery Unit encompasses the Rio Grande watershed from its headwaters in southwestern Colorado to the Pecos River in southwestern Texas. This unit includes the Pecos River watershed and one site at Coyote Creek, in the upper Canadian River watershed (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 (*Coccyzus americanus*). 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, white below, and 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 yellow-billed cuckoo breeds in both the eastern and western United States. The proposed rule to designate the distinct population segment of the yellow-billed cuckoo as a threatened species under the ESA only covers the western population. 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. Under the current proposed rule 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). Texas Natural Resource Diversity Database indicates that there are no records of elemental occurrence of yellow-billed cuckoo in the action area (TPWD 2014).

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 (*Leptonycteris nivalis*). 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 2010a). 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). NatureServe data indicate there are two records of elemental occurrence of Mexican long-nosed bats within the Emory Peak and Center Peak USGS topographic quadrangle map (NatureServe 2010b).

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 (*Puma yagouaroundi cacomitli*). 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 (*Acacia greggii*), 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 jaguarondi. 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).

NatureServe data indicate there are 17 records of elemental occurrence of jaguarundi in the action area. These occurred within the boundaries of the Southmost, East Brownsville, West Brownsville, San Juan SE, Las Milpas, Santa Maria, La Paloma, Mission, La Joya, Sullivan City, Falcon Village, Carrizo Springs East, Carrizo Springs West, El Indio and Deadman's Hill USGS topographic quadrangle maps. The most recent record of an elemental occurrence in the action area was in 1993 (NatureServe 2010b). The greatest threat to jaguarundi populations in the United States is habitat loss and fragmentation (USFWS 2013b).

Ocelot (*Leopardus pardalis*). 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 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 NWR in eastern Cameron County. These populations and are isolated from each other by approximately 19 miles and occupy remnant habitat fragments outside of the action area (USFWS 2010e). NatureServe data indicate there are nine records of elemental occurrence of ocelot in the action area. These occurred within the boundaries of the Southmost, East Brownsville, Las Milpas, La Joya, Eagle Pass NE, Deadman's Hill, Quemado SE, and Brackettville USGS topographic quadrangle maps. The most recent record of an elemental occurrence in the action area was in 1993 (NatureServe 2010b).

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).

3.6.3 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.

3.6.3.1 Alternative 1: Proposed Action

In general, short- and long-term, negligible to minor, direct and indirect, adverse effects on terrestrial and aquatic threatened and endangered species would occur from the Proposed Action. Impacts would be similar to those described for vegetation and terrestrial and aquatic wildlife resources, which includes their habitats (see **Sections 3.4** and **3.5**). Adverse impacts on threatened and endangered species would be avoided and minimized by using appropriate BMPs (see **Appendix E**).

Impact determinations were based on the following factors.

- The Proposed Action involves the maintenance and repair of existing tactical infrastructure. Those activities would be conducted within and adjacent to the footprint of that infrastructure.
- CBP would use a centralized maintenance and repair planning process to ensure that program activities are appropriately planned and implemented.
- CBP would implement design standards and BMPs to avoid harming or harassing protected species and to minimize other direct and indirect effects.
- When appropriate, surveys would be conducted prior to implementing maintenance and repair activities such as vegetation control within critical habitat, occupied habitat, or other suitable habitat.
- The program would result in no or very minor habitat degradation and other direct and indirect impacts on threatened and endangered species; therefore, any contribution to the cumulative adverse effects of future non-Federal activities in the region would be negligible.
- CBP would seek approval or additional consultation from the USFWS for activities that have the potential to harm protected species or adversely modify their critical habitat.

Terrestrial Threatened and Endangered Species

Plant Species. Short-term, negligible, indirect, adverse effects on ashy dogweed, bunched cory cactus, Chisos Mountain hedgehog cactus, Lloyd's Mariposa cactus, Johnston's frankenia, Tobusch fishhook cactus, Sneed pincushion cactus, star cactus, Hinckley's oak, South Texas ambrosia, Terlingua Creek cat's eye, Texas ayenia, Texas snowbells, 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 action area. Vegetation control could result in conversion or degradation of habitat because of the establishment of different plant communities (including invasive species) and erosion and sedimentation. However, maintenance and repair activities would be conducted within and adjacent to the footprint of existing tactical infrastructure. 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 directly harming plants and to minimize sedimentation and other indirect effects on these species. For example, all vegetation-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. If vegetation-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, negligible, direct and indirect, adverse effects on Big Bend gambusia, Devils River minnow, and Rio Grande silvery minnow would be anticipated due to maintenance and repair activities. Direct effects such as disturbance or habitat degradation would be associated with in-water maintenance activities, and activities designed to maintain drainage structures and low-water crossings (e.g., cleaning blocked drainages, resizing and replacement of culverts, repairing or adding riprap, removing debris and trash, and repairing grates). Indirect effects, such as erosion and sedimentation, would be associated with the vegetation control and near-water activities. However, maintenance and repair activities would be conducted within and immediately adjacent to existing disturbances and BMPs would be implemented to minimize or avoid direct and indirect effects. For example, all vegetation-control activities would avoid riparian vegetation within 100 feet of known occurrences, 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, herbicides would not be used within 100 feet of areas of known occurrences, suitable habitat, and critical habitat for the Big Bend gambusia, Devils River minnow, and Rio Grande silvery minnow unless approved by the USFWS.

Black-capped vireo. Short-term, negligible, direct and indirect, adverse effects on the black-capped vireos would be expected. Direct effects include habitat conversion or degradation from road maintenance and vegetation control, and disruption or modification of behavior (including nesting) resulting from noise or other disturbances during maintenance and repair activities. Indirect effects include habitat degradation from establishment of nonnative plant species and from erosion and sedimentation. However, activities would occur within or adjacent to existing footprints of tactical infrastructure. Additionally, BMPs would be implemented to minimize or avoid impacts on black-capped vireo and its habitat. For example, all vegetation control in 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 vegetation 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. High-impact maintenance and repair activities that require heavy equipment within 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 maintenance and repair 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 maintenance or repair 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, negligible, direct and indirect, adverse effects on the southwestern willow flycatcher and yellow-billed cuckoo would be expected. Direct effects include habitat conversion or degradation from road maintenance and vegetation control, and disruption or modification of behavior (including nesting) resulting from noise or other disturbances during maintenance and repair activities. Indirect effects include habitat degradation from establishment of nonnative plant species and from erosion and sedimentation. However, activities would occur within or adjacent to existing footprints of tactical infrastructure. Additionally, BMPs would be implemented to minimize or avoid impacts on southwestern willow flycatcher and yellow-billed cuckoo and their habitat. If vegetation control is required near or adjacent to 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, vegetation control would be conducted from September 16 through March 14, outside the southwestern willow flycatcher and yellow-billed cuckoo breeding season. All other maintenance activities would be avoided within occupied southwestern willow flycatcher and yellow-billed cuckoo habitat, critical habitat, and suitable habitat during the southwestern willow flycatcher breeding season (March 15 through September 15), if possible. If it is not possible to avoid maintenance activities within the breeding season, an USFWS-permitted biologist would conduct a survey for southwestern willow flycatchers and yellow-billed cuckoos prior to initiating maintenance or repair activities. If these birds are present, a USFWS-permitted biologist would survey for nests approximately once per week within 500 feet of the maintenance or repair 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, negligible, direct, adverse effects on lesser long-nosed bat are anticipated from the Proposed Action. Direct effects on Mexican long-nosed bats would be caused by vegetation control of forage plants (agaves) or potential disturbance caused by maintenance activities in close proximity to occupied roosts. However, maintenance and repair activities would occur within or adjacent to existing tactical infrastructure, and BMPs designed to minimize or avoid impacts on Mexican long-nosed bat would be implemented. For example, forage plants (agaves) would be protected, as all vegetation-control activities would avoid known areas containing agaves. If vegetation-control activities in areas where agaves occur are unavoidable then a qualified biologist would conduct a survey within the maintenance area. Individual plants would be flagged and vegetation-control activities would not disturb the demarcated individuals. In addition, no maintenance and repair activities, including vegetation control, noise, and night lighting within 5 miles of any potential Mexican long-nosed bat roost sites (i.e., Peloncillo Mountains and Animas Mountains) would be conducted between July and September. If maintenance and repair activities cannot be avoided during this season, noise and lighting impacts would be avoided during the night by conducting activities during daylight hours only. If night lighting is unavoidable, light would shine directly onto the work area to ensure worker safety and efficiency, and light would not exceed 1.5 foot-candles in Mexican long-nosed bat habitat.

Gulf coast jaguarundi and ocelot. Short-term, negligible, direct, adverse effects on Gulf Coast jaguarundi and ocelot could occur due to road maintenance and vegetation-control activities within Gulf Coast jaguarundi and ocelot habitat. However, activities would occur within or adjacent to existing footprints of tactical infrastructure. Additionally, BMPs would be implemented to minimize or avoid impacts on ocelot and jaguarundi and their habitats. For example, maintenance activities would be conducted during daylight hours only to avoid nighttime noise and lighting impacts. If night lighting is unavoidable, light would shine directly onto the work area to ensure worker safety and efficiency, and light would not exceed 1.5 foot-candles in ocelot or jaguarundi habitat.

3.6.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, CBP would continue current maintenance and repair activities and short- and long-term, minor to moderate, direct and indirect, adverse effects on threatened and endangered species would occur. Tactical infrastructure would be maintained and repaired on an as-needed basis. There would be no centralized planning process for maintenance and repair, and, consequently, maintenance and repair of tactical infrastructure usually would be performed only on resources that are in disrepair. The lack of coordinated environmental staff support and formalized planning under this alternative would result in inefficiencies that would lead to the eventual degradation of tactical infrastructure. Implementation of this alternative would result in impacts on threatened and endangered species, including conversion and degradation of habitat from vegetation control, displacement of wildlife, including threatened and endangered wildlife, accidental release of petroleum products or other hazardous materials; incidental trampling and crushing while accessing the sites; and increased erosion, turbidity, and sedimentation.

3.7 HYDROLOGY AND GROUNDWATER

3.7.1 Definition of the Resource

Evaluation of hydrology requires a study of the occurrence, distribution, and movement of water, and its relationship with the environment. Many factors affect the hydrology of a region, including natural precipitation and evaporation rates and outside influences such as groundwater withdrawals. Groundwater is a subsurface hydrologic resource. It functions to recharge surface water and is used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations.

3.7.2 Affected Environment

Climate and hydrology. Four major ecoregions are found in the action area: the Chihuahuan Desert, Edwards Plateau, Southern Texas Plains, and Western Gulf Coastal Plains. The Chihuahua Desert differs from other hot deserts, such as the Sonoran, because it has higher elevations and summer-dominated rainfall as opposed to a biannual precipitation regime. It has broad basins and valleys, with isolated mesas and mountains (USGS 2010a). Some areas of the Chihuahuan Desert are the hottest and most arid regions in the state, with low available moisture and high evapotranspiration rates, while at higher elevations there is somewhat higher annual precipitation (Griffith et al. 2004). The Chihuahuan Desert can have 0 to 20 inches of rainfall yearly, but averages 10 inches, primarily from summer rains, with 0 to 1 inches of runoff and 80 to 110 inches of evaporation annually (USGS 1996a, USGS 2010b).

The Edwards Plateau Ecoregion consists of a limestone plateau with karst topography and, although it is considered semiarid, it contains springs and intermittent streams (Griffith et al. 2004). The region is known for summer rainfall deficiencies and occasional severe droughts, punctuated by periodic high-intensity rainfall associated with tropical events. Flooding and erosion caused by these storms are major factors in the local environment.

The Southern Texas Plains Ecoregion is also considered an arid to semiarid region. It contains springs and streams that show some similarities to those of the Edwards Plateau, as they likely originate from the same cool water aquifers (Griffith et al. 2004). There is a biannual precipitation regime, with peak rainfall occurring in spring and fall. Precipitation tends to vary with extreme year-to-year moisture variation. Spring rains are typically the result of frontal activity, and fall precipitation is usually tropical in origin. Transpiration and evaporation rates are generally much greater than precipitation rates. Droughts are common and frequently severe (Griffith et al. 2004).

The Western Gulf Coastal Plains Ecoregion is characterized by a convergence of subtropical, temperate, desert, and coastal influences, with hot, humid summers and mild winters because of its southern latitude and close proximity to the Gulf of Mexico. Droughts are uncommon, and precipitation primarily falls in the spring and summer months because of convective thunderstorms; however, precipitation can occur in the summer and fall from tropical storms (TNC 2003).

Overall, rainfall ranges from 0 to 28 inches per year, with the least precipitation occurring in the Chihuahuan Desert region, and increasing eastward to the Gulf of Mexico (USGS 1996a). Average runoff for the entire action area typically ranges from 0 to 2 inches annually, with the extreme easternmost area along the Gulf reaching as high as 8 inches annually (USGS 1996a).

Groundwater. There are several aquifer systems within the action area, including the Rio Grande, the Edwards-Trinity, the Texas Coastal Uplands, and the Coastal Lowlands aquifer systems (USGS 1996a). These systems are composed of numerous individual aquifers.

In western Texas, the Hueco-Mesillas Bolsons aquifer is a major component of the Rio Grande aquifer system. It is composed of basin fill deposits of silt, clay, sand, and gravel. The water is fresh to slightly saline, with salinity increasing to the south. Water quality deterioration and land subsidence has resulted from excessive withdrawals, with nearly 90 percent of the water pumped from the aquifer for public use (TSWB 2007, Ashworth and Hopkins 1995).

The major aquifer of the Edwards-Trinity aquifer system is the Edwards-Trinity (Plateau) aquifer. Limestone in this system generally sits above sand and sandstone. Irrigation is the most important use of water withdrawn from the Edwards-Trinity aquifer system and is concentrated in the northwestern part of the region, where soil conditions are particularly favorable for farming. Withdrawals for public, mining, and thermoelectric power uses also occur. The aquifer is recharged by direct precipitation on the land surface. Much of the natural discharge from the aquifer occurs as spring flows along the southeastern edge of the Edwards Plateau where erosion has cut the rocks down to the water table; however, excessive withdrawal of groundwater in portions of the region has caused some springs to stop flowing (USGS 1996a). Water quality from the Edwards Trinity system ranges from fresh to slightly saline, with salinity increasing towards the west. Certain areas have unacceptable levels of fluoride that exceed drinking water standards (Ashworth and Hopkins 1995).

The Texas Coastal Uplands aquifer system provides large quantities of water for public, agriculture, and industrial uses. The principal aquifer of this system is the Carrizo-Wilcox, which is composed primarily of sand, with gravel, silt, clay, and interspersed lignite. The water is typically hard but fresh, although in areas of low recharge and excessive withdrawals, it can be more saline. High iron and manganese levels occur in deeper portions of the aquifer. Irrigation withdrawals account for almost half of the groundwater use, but municipal withdrawals constitute another 40 percent. Natural discharge occurs from evapotranspiration and loss to streams, while recharge is generally from infiltration of precipitation (USGS 1996a, TSWB 2007).

The Coastal Lowlands aquifer system is composed of continental and marine deposits of sand, silt, and clay. The system is recharged by the infiltration of precipitation, and natural discharges occur through evapotranspiration, loss of water to streams as base flow, and upward leakage to shallower aquifers in low-lying coastal areas or the Gulf of Mexico (USGS 1996a). The major aquifer of the Coastal Lowlands system is the Gulf Coast aquifer. Water is used for municipal, irrigation, and industrial purposes. Water quality varies with depth and location, with lower-quality water occurring in the southern portions in the form of higher salinity and alkalinity. Excessive pumping in some areas has led to ground subsidence, ranging from 0.5 to 9 feet (TSWB 2007, Ashworth and Hopkins 1995).

3.7.3 Environmental Consequences

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

3.7.3.1 Alternative 1: Proposed Action

Climate and hydrology. No impacts on climate and hydrology with respect to the ecoregions or precipitation regime would be anticipated. Climate and hydrologic cycles are large-scale processes that affect local areas; however, a significant contribution of greenhouse gas (GHG) emissions or alteration to the existing topography, vegetation, or precipitation regime would be required to modify climate or hydrology.

Groundwater. Short-term, negligible to minor, indirect, adverse impacts could occur on groundwater from vegetation control and debris removal, which could cause the deposition of fill materials or increased erosion into groundwater recharge areas. Long-term, negligible to minor, indirect, beneficial impacts on groundwater could occur from a decrease in erosion because roadways would be properly maintained, which would reduce the effects incurred from negligence, such as washout and long-term sedimentation. No adverse impacts on groundwater would be expected from the use of existing approved equipment storage areas.

No impacts on groundwater would be expected from maintenance and repair of existing FC-1 (paved) and FC-2 (all-weather) roads if standard BMPs, such as spill prevention measures, erosion and sediment controls, and proper equipment maintenance are implemented (see **Appendix E**). Maintenance and repair of FC-3 (graded earth) and FC-4 (two-track) roads could lead to short-term, minor, adverse impacts on groundwater during maintenance and repair activities because grading and other ground-disturbing activities would result in erosion and sedimentation. In addition, maintenance and repair of FC-4 roads could require the control of vegetation and rock, which could alter the flow of water and percolation of precipitation into the ground, resulting in a long-term, negligible to minor, adverse impact on groundwater recharge.

Long-term, minor, beneficial impacts on groundwater would occur by properly maintaining roads, which would reduce the effects incurred from neglected maintenance, such as washout and long-term sedimentation.

Rutting could occur along graded earth and sand roads and would be exacerbated by rain events that further erode the surface. Unmanaged storm water flow also causes general erosion to occur, washing out complete sections of road and in many instances making roads impassable. Maintenance and repair of existing roads would have short- and long-term, minor to moderate, beneficial impacts on groundwater by minimizing erosion of potentially contaminated (e.g., oils, metals) road material into groundwater recharge areas. Improper maintenance could result in short-term, negligible to minor, direct and indirect, adverse impacts on groundwater by increasing erosion or introducing fill material into groundwater recharge areas. A poorly regraded surface often results in rapid deterioration of the surface. The graded earthen roads should be slightly crowned and absent of windrows in the gutter line to avoid ponding and channeling within the road during rain events. Grading with the use of commercial grading equipment is proposed to restore an adequate surface to FC-3 (graded earth) roads. USBP sector personnel and contract support personnel well-versed in grading techniques would be employed for such activity. The addition of material to these roads to achieve the proposed objective would be kept to a minimum. Any associated roadside drainage would be maintained to ensure that runoff is relieved from the road surface quickly and effectively without creating further erosion issues. Maintenance and repair of the existing roads would be in accordance with proven maintenance and repair standards. All necessary erosion-control BMPs would be adopted to ensure stabilization of the project areas. All of the standards CBP is adopting are developed based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resource agencies.

Mowing and control of vegetation within the road setback could result in short- to long-term, negligible to minor, adverse impacts on groundwater by increasing erosion into groundwater recharge areas. In areas deemed too difficult to mow (e.g., under guardrails, within riprap, and immediately adjacent to bodies of water within the proposed setbacks) the use of herbicides might occur. It is proposed that terrestrial and aquatic herbicide applications would occur with products approved by the USEPA and relevant Federal land management agency, where appropriate. The use of herbicides has the potential for long-term, minor, direct, adverse effects on groundwater if spills were to occur. All use of herbicides would be performed in accordance with label requirements by certified USBP sector or contract support personnel. Herbicide use would follow an integrated approach that uses the least-intense approach first and only progresses in intensity if necessary

3.7.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, short- and long-term, minor to moderate, direct and indirect, adverse impacts on hydrology and groundwater would be anticipated because preventative measures would not be implemented to manage maintenance and repair prior to these activities becoming dire. Therefore, degrading infrastructure, particularly eroding roads, could lead to increased sediments, nutrients, and contaminants in wetlands, streams, and other groundwater recharge areas, and blocked drainage structures could increase flood risk. Impacts on hydrology and groundwater under the No Action Alternative would be anticipated to be greater than impacts for the Proposed Action. The potential for the introduction of contaminants in groundwater recharge areas could be greater under the No Action Alternative if BMPs cannot be implemented during ad hoc/emergency repair activities. Changes in hydrology from clogged drainage structures could occur, which could reduce the potential for groundwater recharge in the area.

3.8 SURFACE WATERS AND WATERS OF THE UNITED STATES

3.8.1 Definition of the Resource

Surface water resources generally consist of wetlands, lakes, rivers, and streams. All of these surface water components contribute to the economic, ecological, recreational, and human health of a community.

Waters of the United States are defined within the CWA, and jurisdiction is addressed by the USEPA and the USACE. These agencies assert jurisdiction over traditional navigable waters and their relatively permanent tributaries, and the wetlands that are adjacent to these waters (USEPA 2010a).

The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States (USEPA 2010b), with the objective of restoration and maintenance of chemical, physical, and biological integrity of the Nation's waters (USEPA 2010a). To achieve this objective, several goals were identified, including (1) eliminate discharge of pollutants into navigable waters by 1985; (2) achieve water quality that provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water by 1983; (3) prohibit the discharge of toxic pollutants in toxic amounts; (4) provide Federal financial assistance to construct publicly owned waste treatment works; (5) develop and implement the national policy that area-wide waste treatment management planning processes to ensure adequate control of sources of pollutants in each state; (6) enforce the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into navigable waters, waters of the contiguous zone, and the oceans; and (7) establish the national policy that programs be developed and implemented in an expeditious manner to enable the goals to be met through the control of both point and nonpoint sources of pollution.

The USACE regulates the discharge of dredged and fill material (e.g., concrete, riprap, soil, cement block, gravel, sand) into waters of the United States including adjacent wetlands under Section 404 of the CWA (USEPA 2010b) and work on structures in or affecting navigable waters of the United States under Section 10 of the Rivers and Harbors Act of 1899 (USEPA 2010b).

Wetlands and riparian habitats are ecologically important communities that provide many benefits for people, and fish and wildlife. They provide key habitat for a wide array of plant and animal species, including resident and migrating birds, amphibian and fish species, mammals, and insects. Vegetation production and diversity are usually very high in and around these sites, with many plant species adapted only to these unique environments. In addition, wetlands and riparian zones provide a variety of hydrologic functions vital to ecosystem integrity. They protect and improve water quality by storing floodwaters, recharging groundwater, and filtering out nutrients and chemicals (USEPA 2001b). Development and conversion of wetlands and riparian zones affects wildlife diversity, carrying capacity, and hydrologic regime. More than 220 million acres of wetlands are estimated to have existed in the lower 48 states in the 1600s. More than half of those wetland acres have been drained or converted to other uses, with the most impacts occurring in the 1950s to 1970s. Approximately 60,000 acres of wetlands are still lost annually, primarily from conversion for agriculture and other development purposes (USEPA 2001c).

Wetlands are a protected resource under EO 11990, *Protection of Wetlands*, issued in 1977 "to avoid to the extent possible the short- and long-term, adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative." Wetlands have been defined by agencies responsible for their management. The term "wetlands" used herein, is defined using USACE conventions. The USACE has jurisdiction to protect wetlands under Section 404 of the CWA using the following definition:

> . . . areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3[b]).

Three diagnostic characteristics must be met to classify an area a wetland: (1) more than 50 percent of the dominant vegetation species present must be classified as obligate (species that are found greater than 99 percent of the time in wetlands), facultative wetland (species that are found 67 to 99 percent of the time in wetlands), or facultative (species that are found 34 to 66 percent of the time in wetlands); (2) the soils must be classified as hydric; and (3) the area is either permanently or seasonally inundated, or saturated to the surface at some time during the growing season of the prevalent vegetation (USACE 1987).

Wetlands are protected as a subset of "the waters of the United States" under Section 404 of the CWA. 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. 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 (USEPA 2010b).

3.8.2 Affected Environment

3.8.2.1 Surface Waters

3.8.2.2 Rio Grande Watershed

The Rio Grande watershed (hydrologic unit code [HUC] 13) and the Texas-Gulf watershed (HUC 12) are present within the action area. The majority of the action area occurs within the Rio Grande watershed and includes the following subwatersheds: the Rio Grande-Mimbres (HUC 1303), Rio Grande-Amistad (HUC 1304), Rio Grande closed basins (HUC 1305), Lower Pecos (HUC 1307), Rio Grande-Falcon (HUC 1308), and Lower Rio Grande (HUC 1309). The action area also includes one subwatershed of the Texas-Gulf watershed, the Nueces-Southwestern Texas Coastal (HUC 1211) watershed (USGS 2014).

3.8.2.3 Rio Grande Watershed

The Rio Grande basin 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. A total of seven pairs of sister cities are found along the Texas-Mexico border, which result in dense urban land use. The majority of the land within the Rio Grande basin in Texas is privately owned and used for agriculture and grazing activities. Some land parcels are owned by the Federal and state government and include Big Bend National Park in west Texas and a network of refuges owned by the USFWS and TPWD in south Texas (USIBWC 2013). Major impoundments in the Rio Grande watershed within Texas include Amistad and Falcon dams.

Major tributaries to the Rio Grande basin within the United States include Independence Creek, in the Lower Pecos subwatershed; the Devils River, which forms an arm of the International Amistad Reservoir, in the upper Rio Grande-Amistad subwatershed; and San Felipe Creek, which flows through Del Rio, Texas, in the Rio Grande-Falcon subwatershed. Major tributaries to the Rio Grande basin within Mexico include the Rio Conchos, which flows into the Rio Grande near Presidio, Texas, in the Rio Grande-Amistad subwatershed; the Rio Salado, which forms an arm of the International Falcon Reservoir, in the Rio Grande-Falcon subwatershed; and the Rio San Juan, which flows into the Rio Grande upstream of McAllen, Texas, in the Lower Rio Grande subwatershed (USIBWC 2013).

The TCEQ currently lists seven stream segments of the Rio Grande basin as being impaired on the USEPA 303(d) list, of which six occur within the action area. These segments are impaired due to the following parameters: bacteria, chloride, sulfate, and total dissolved solids (TCEQ 2012). Specific impairment parameters and stream segments are listed by subwatershed in the following paragraphs.

Rio Grande-Mimbres Watershed. The Rio Grande-Mimbres watershed is divided into several smaller subwatersheds, of which only one, the El Paso-Las Cruces watershed, occurs within the action area. This subwatershed consists of 3,530,617 acres where Mexico, New Mexico, and Texas converge. The major surface water for this watershed is the Rio Grande (USGS 2014). A portion of the Rio Grande within this subwatershed, from the Anthony Drain to International Dam, is on the USEPA 303(d) list as impaired for bacteria (TCEQ 2012).

Rio Grande-Amistad Watershed. The Rio Grande-Amistad watershed is divided into 16 smaller subwatersheds, all of which occur within the action area. This watershed consists of 18,866,981 acres in west Texas and northern Mexico. Within Texas, this watershed occurs from El Paso to the dam at Amistad Reservoir, and includes much of the Trans-Pecos region and the Devils River (USGS 2014). The Devils River joins the Rio Grande at the Amistad Reservoir, forming a significant arm on the Texas side of the reservoir. This river drains 271,742 acres of relatively undisturbed land in Texas. The land conditions of this drainage area and the spring contributions within the Devils River define this high-quality stream (USIBWC 2013). Two segments of the Rio Grande within this subwatershed are on the USEPA 303(d) list as impaired streams. One segment, which occurs from the Riverside Diversion Dam in El Paso County to the confluence of the Rio Conchos (Mexico) in Presidio County, is impaired due to bacteria, chloride, and total dissolved solids. The other segment, which occurs from the confluence with the Rio Conchos to a point 1.1 miles downstream of the confluence of Ramsey Canyon in Val Verde County, is impaired due to chloride, sulfate, and total dissolved solids (TCEQ 2012).

Rio Grande Closed Basins Watershed. The Rio Grande closed basins watershed is divided into three subwatersheds, of which only one, the Salt Basin watershed, occurs within the action area. This subwatershed consists of 5,069,695 acres in far west Texas and southern New Mexico (USGS 2014). The Salt Basin historically contained a significant amount of surface water until the commencement of water pumping for agriculture in the 1920s. Today it is generally an area of dry lakes and extensive salt deposits (TSHA 2011a). There are no major surface waters in this area and no documented water quality issues (TCEQ 2012).

Lower Pecos Watershed. The Lower Pecos watershed is divided into 11 subwatersheds, of which five occur within the action area. These subwatersheds consists of 6,790,749 acres in west Texas that contribute to the Pecos River (USGS 2014). The Pecos River is a major tributary to the Rio Grande. It originates in New Mexico and flows southeast for approximately 900 miles until it enters the Rio Grande at the Amistad Reservoir. In total, the Pecos River drainage area is about 44,000 square miles. Irrigation and impoundments for power generation have significantly reduced its historical flow (TSHA 2011b). The Lower Pecos watershed is not on the USEPA 303(d) impaired waters list; however, the Upper Pecos, which is outside of the action area, is impaired due to depressed dissolved oxygen (TCEQ 2012)

Rio Grande-Falcon Watershed. The Rio Grande-Falcon watershed is divided into three subwatersheds, all of which occur within the action area. This watershed consists of 8,122,032 acres in southern Texas and northern Mexico (USGS 2014). One of the major tributaries to the Rio Grande in Texas, San Felipe Creek occurs within this watershed. San Felipe Creek is a spring-fed stream in Del Rio, Texas. This stream enters the Rio Grande downstream of the Amistad Dam in Val Verde County (USIBWC 2013). One segment of the Rio Grande within this watershed is on the USEPA 303(d) list as an impaired stream. From Amistad Dam to the confluence of the Arroyo Salado (Mexico), which occurs adjacent to Zapata County, is listed as impaired due to bacteria (TCEQ 2012). The Rio Grande-Falcon watershed is not on the USEPA 303(d) impaired waters list.

Lower Rio Grande Watershed. The Lower Rio Grande watershed is divided into two subwatersheds, both of which occur in the action area. This watershed consists of 2,255,850 acres in southern Texas and northern Mexico (USGS 2014). Two stream segments within this watershed are on the USEPA 303(d) list as impaired streams due to bacteria. One of these segments is the Rio Grande from Falcon Dam to a point 6.7 miles downstream of the International Bridge in Cameron County. The other impaired stream segment is the Arroyo Los Olmos, in Starr County. This stream is impaired for 24.5 miles from a point near the historical settlement of El Sauz, Texas, to the confluence with the Rio Grande, near Rio Grande City (TCEQ 2012).

3.8.2.4 Texas Gulf Watershed

The Texas Gulf watershed drains the vast majority of Texas to the Gulf of Mexico. This watershed is subdivided into numerous watersheds of which one, the Nueces-Southwestern Texas Coastal watershed, occurs within the action area. This watershed is further divided by the Nueces River and Southwestern Texas Coastal watersheds.

Nueces River. The Nueces River begins in central Texas, arising from springs on the Edwards Plateau, and flows south-southeast for approximately 315 miles to its mouth on Nueces Bay. It drains an area of 16,800 square miles and carries an annual runoff of some 620,000 acre-feet. The river and its drainage basin are in a predominantly rural area. Major impoundments in the Nueces watershed include Choke Canyon Reservoir and Lake Corpus Christi, which provide water for municipal, industrial, mining, and recreational uses, and provide flood control and electrical power generation (TSHA 2011c).

The Nueces watershed is divided into 11 subwatersheds, four of which occur within the action area. These subwatersheds consists of 4,923,992 acres in south Texas. Within the entire Nueces watershed, 10 stream segments are on the USEPA 303(d) list. One of the stream segments is the Nueces River from Holland Dam in LaSalle County to a point 328 feet upstream of Farm to Market Road 1025 in Zavala County (TCEQ 2012). Approximately 30 miles of this stream segment occur within the action area, in Dimmit and Zavala counties.

Southwestern Texas Coastal Watershed. The Southwestern Texas Coastal watershed is divided into eight subwatersheds, of which only one, the South Laguna Madre watershed, occurs within the action area. The South Laguna Madre watershed consists of 1,808,561 acres in far south Texas. The Arroyo Colorado is the main surface water within this watershed outside of the bays and estuaries of the coast. Other surface waters include resacas, floodways, and irrigation canals (USGS 2014).

The Arroyo Colorado is approximately 52 miles long and is in the Rio Grande Delta. It was a former outlet to the Rio Grande, and still carries excess waters from that river to Laguna Madre during flood events. Portions of the arroyo have been dredged to allow for barge traffic. The drainage area surrounding it is primarily agricultural land, including citrus orchards (TSHA 2011d). A portion of the Arroyo Colorado within the action area is listed as impaired on the USEPA 303(d) list for bacteria, and mercury and polychlorinated biphenyls (PCBs) in fish tissue. This impaired stream segment occurs from Farm to Market Road 2062 in Hidalgo County to a point 328 feet downstream of Cemetery Road, south of Port Harlingen in Cameron County (TCEQ 2012).

3.8.2.5 Wetlands

There are approximately 7.6 million acres of wetlands in Texas covering approximately 4.4 percent of the state. Texas has lost about half of its original wetlands, primarily because of agricultural conversions, overgrazing, urbanization, channelization, water table declines, and construction of navigation canals (USGS 1996b).

Riparian systems, coastal wetlands, and coastal pothole wetlands are the most common categories of wetlands in the action area. Palustrine emergent, palustrine forested, and palustrine scrub-shrub riparian systems occur along rivers and streams in the area, such as the Rio Grande and the Nueces rivers. 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 action area. They are generally shallow and measure 30 to 150 feet wide. Resacas are semipermanent and often form ponds or oxbow lakes (USACE 1994a)

3.8.3 Environmental Consequences

3.8.3.1 Alternative 1: Proposed Action

Short-term, negligible to moderate, indirect, adverse impacts could occur from vegetation control and debris removal, bridge repair, and boat ramp maintenance, which could cause the deposition of fill materials or increased sedimentation into wetlands, arroyos, or other surface water or drainage features. However, maintenance and repair of tactical infrastructure would be conducted in such a manner as to have negligible impacts on wetlands, and floodplain resources to the maximum extent practical. Erosion-control BMPs would be adopted to maintain runoff on site and would minimize the potential for adverse effects on downstream water quality. Pertinent local, state, and Federal permits would be obtained for any work, including work that could occur in jurisdictional drainages, waterways, or wetlands. CBP would consult with USACE as appropriate and where applicable to minimize wetland impacts and identify potential avoidance, minimization, and conservation measures.

Maintenance and repair of the existing road tactical infrastructure would be in accordance with proven maintenance and repair standards. All of the standards CBP would adopt are developed based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resource agencies. No impacts on surface water resources would be expected from maintenance and repair of lighting and electrical systems, or towers.

Maintenance of FC-3 (graded earth), FC-4 (two-track), and FC-5 (sand) roads would minimize erosion and deposition of potentially contaminated (e.g., oils, metals) road material into wetlands, surface waters, arroyos, and other drainage features. When subjected to heavier traffic, rutting occurs, which in turn is exacerbated by rain events that further erode the surface. Unmanaged storm water flow also causes general erosion to occur, washing out complete sections of road and in many instances making roads impassable. The road should be slightly crowned and absent of windrows in the gutter line to avoid ponding and channeling within the road during rain events. Grading associated with FC-3 and FC-5 roads with the use of commercial grading equipment is proposed to restore an adequate surface. USBP sector personnel and contract support personnel well-versed in grading techniques would be employed for such activity. The addition of material to these roads to achieve the proposed objective would be kept to a minimum. Any associated roadside drainage would be maintained to ensure that runoff is relieved from the road surface quickly and effectively without creating further erosion issues.

Installation of culverts and low-water crossings associated with FC-4 roads would result in short-term, minor, adverse impacts on water quality due to an increase in turbidity from a disturbance in sediments and potential for contaminants to enter into water bodies during maintenance and repair activities, such as through leaks or spills from equipment. Long-term, beneficial impacts would occur after activities have ceased and storm water flow is properly managed.

In addition, bridges would be inspected on a routine basis and their structural integrity maintained. Short-term, minor to moderate, adverse impacts would occur on surface water resources from bridge maintenance and repair, depending on the extent of required work.

Mowing and vegetation control within the road setback could result in increased erosion into wetlands, surface waters, arroyos, and other drainage areas. In areas deemed too difficult to mow, such as under guardrails, within riprap, and immediately adjacent to bodies of water within the proposed setbacks, the use of herbicides might occur. It is proposed that terrestrial and aquatic herbicide applications would be made with products approved by the USEPA and relevant Federal land management agency (where appropriate). The use of herbicides would result in long-term, minor, direct, adverse effects on surface water resources, if spills were to occur. All use of herbicides would be performed in accordance with label requirements by certified USBP sector or contract support personnel. Herbicide use would follow an integrated approach that uses the least intensive approach first and only progresses in intensity if necessary.

3.8.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, there is a potential for short- and long-term, minor to major, direct and indirect, adverse impacts on surface waters. The No Action Alternative would result in greater impacts on surface waters than the Proposed Action because a proactive approach to maintenance and repair would not occur; therefore, reactive maintenance and repair activities would occur when a problem has arisen. For example, degrading infrastructure, particularly eroding roads, could lead to increased sediments, nutrients, and contaminants in wetlands, streams, arroyos, and other water-related features, and blocked drainage structures could increase flood risk. In addition, it is likely that not all BMPs would be implemented during emergency repair activities, which could result in adverse impacts on surface waters.

3.9 FLOODPLAINS

3.9.1 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 water body (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 (FIRMs), 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*.

3.9.2 Affected Environment

The Rio Grande is the major surface water in the action area associated with a 100-year floodplain. Other waters include Big Canyon Creek; the Amistad and Falcon reservoirs; Cow Creek; the Nueces River; Arroyo Colorado; Chacon Creek; Salado Creek; Resaca de la Palma; and numerous other arroyos, streams, and resacas (FEMA 2010).

3.9.3 Environmental Consequences

3.9.3.1 Alternative 1: Proposed Action

Short-term, negligible to minor, indirect, adverse impacts and short- and long-term, minor, direct, beneficial impacts on floodplains would be anticipated from implementing the Proposed Action. Short-term, negligible to minor, indirect impacts could occur on floodplain areas from vegetation control and debris removal, which could cause increased sedimentation into floodplains and drainage structures. However, clearing blocked drainage structures of debris and fill materials would result in short- and long-term, direct and indirect, beneficial impacts on floodplains by improving conveyance of floodwaters. BMPs would be implemented to minimize impacts on floodplains to negligible. No adverse impacts on floodplains from maintenance of bridges, lighting and electrical systems, towers, or boat ramps would be expected. The addition of fill material to these ramps to achieve the proposed objective would be kept to a minimum. The use of soil stabilization agents could be required on some ramps. It is proposed that any applications would be made with soil stabilization products approved by the USEPA and relevant Federal land management agency (where appropriate), and would be performed in accordance with label requirements by qualified USBP sector or contract-support personnel.

No impacts on floodplains would be expected from routine repair and maintenance of existing FC-1 (paved) and FC-2 (all-weather) roads if standard BMPs are implemented and any necessary local, state, or Federal permitting requirements are met. The majority of proposed maintenance and repair is planned for FC-3 (graded earth) and FC-4 (two-track) roads. Because of their lack of formal construction design, FC-3 (graded earth) and FC-4 (two-track) roadways are subject to the greatest deterioration if left unmaintained. Maintenance and repair of FC-3 (graded earth) and FC-4 (two-track) roads could lead to short- and long-term, minor, adverse and beneficial impacts on floodplains.

Proper maintenance of existing FC-3 (graded earth) and FC-5 (sand) roads would have short- and long-term, minor to moderate, beneficial impacts on floodplains by minimizing erosion of road material into floodplain areas. When subjected to heavier traffic, rutting occurs, which is exacerbated by rain events that further erode the surface. Unmanaged storm water flow also causes general erosion to occur, washing out complete sections of road and in many instances making roads impassable. The road should be slightly crowned and absent of windrows in the gutter line to avoid ponding and channeling within the road during rain events. Grading with the use of commercial grading equipment is proposed to restore an adequate surface to FC-3 (graded earth) roads. USBP sector personnel and contract support personnel well-versed in grading techniques would be employed for such activity. The addition of material to these roads to achieve the proposed objective would be kept to a minimum. Any associated roadside drainage would be maintained to ensure that runoff is relieved from the road surface quickly and effectively without creating further erosion issues.

Proper maintenance of existing FC-4 (two-track) roads would have short- and long-term, minor, direct, beneficial impacts on floodplains by minimizing erosion of road material into floodplain areas. Installation of culverts could cause long-term, minor, direct, adverse impacts on floodplains by creating restrictions to water flow and potentially increasing flood risk. Proper sizing of culverts would reduce this potential impact. Two-track roads have no crown, and generally do not have any improved drainage features or ditches, although culverts and low water crossings could be installed where continuous erosion issues occur. Installation of properly sized culverts and cleaning blocked drainage structures could have short- and long-term, direct and indirect, beneficial impacts by decreasing restrictions and improving conveyance of floodwaters.

Mowing and control of vegetation within the road setback could result in short- to long-term, negligible to minor, adverse impacts on floodplains by increasing erosion into floodplain areas. In areas deemed too difficult to mow, such as under guardrails, within riprap, and immediately adjacent to bodies of water within the proposed setbacks, the use of herbicides might occur. Short-term, negligible to minor, adverse impacts on floodplains would be expected from the use of herbicides, as the decrease in vegetation in the floodplain could allow for easier conveyance of floodwaters within the floodplain and increase the velocity and volume of storm water flow until native vegetation has been reestablished. Impacts from herbicides on water quality are discussed in **Section 3.8**.

All necessary erosion-control BMPs (see **Appendix E**) would be adopted to ensure stabilization of the project areas. Pertinent local, state, and Federal permits would be obtained for any work, including work that occurs in floodplains. The maintenance and repair of tactical infrastructure would be conducted in such a manner as to have minimal impacts on floodplains to the maximum extent practical. CBP is consulting with the USACE to minimize floodplain impacts and identify potential avoidance, minimization, and conservation measures. Maintenance and repair of the existing road tactical infrastructure would be in accordance with proven maintenance and repair standards. All of the standards CBP is adopting are developed based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resource agencies.

3.9.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, there is a potential for short- and long-term, minor to moderate, direct and indirect, adverse impacts on floodplains. Degrading infrastructure, particularly eroding roads, could lead to increased sediments and other fill materials in the floodplain, and blocked drainage structures impair flow, which could increase flood risk. This approach would result in greater impacts on floodplains than the Proposed Action because a proactive approach to maintenance and repair would not occur. Reactive maintenance and repair activities would be coordinated once an issue arises. For example, instead of clearing blocked drainage structures periodically of debris, the drainage structures could be cleared when flooding occurs and it becomes a necessity to maintain the structure. Thus, structures generally not impacted by floodwaters could be affected under the No Action Alternative if the blockage of the drainage structure is not detected or attended to in a timely manner. The No Action Alternative does not guarantee that all BMPs would be implemented during emergency repair activities.

3.10 AIR QUALITY

3.10.1 Definition of the Resource

In accordance with Federal CAA requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

Ambient Air Quality Standards. Under the CAA, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for ozone (O_3), which is measured as volatile organic compounds (VOCs) and nitrogen oxides (NO_x); carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}] and particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb) (40 CFR Part 50). The CAA also gives the authority to states to establish air quality rules and regulations. The State of Texas has adopted the NAAQS for criteria pollutants. **Table 3-3** presents the USEPA NAAQS.

Attainment Versus Nonattainment and General Conformity. The USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by USEPA means that there is not enough information to classify an AQCR appropriately, so the area is considered attainment. The USEPA has delegated the authority for ensuring compliance with the NAAQS in Texas to the TCEQ. In accordance with the CAA, each state must develop a State Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS.

The General Conformity Rule applies only to significant Federal actions in nonattainment or maintenance areas. This rule requires that any Federal action meet the requirements of a SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

Table 3-3. National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard	Secondary Standard
		Federal	
CO	8-hour (1)	9 ppm (10 mg/m^3)	None
	1-hour (1)	35 ppm (40 mg/m^3)	None
Pb	Rolling 3-Month Average (2)	0.15 µg/m^3 (3)	Same as Primary
NO_2	Annual (4)	53 ppb (5)	Same as Primary
	1-hour (6)	100 ppb	None
PM_{10}	24-hour (7)	150 µg/m^3	Same as Primary
$PM_{2.5}$	Annual (8)	12 µg/m^3	15 µg/m^3
	24-hour (6)	35 µg/m^3	Same as Primary
O_3	8-hour (9)	0.075 ppm (10)	Same as Primary
SO_2	1-hour (11)	75 ppb (12)	None
	3-hour (1)	None	0.5 ppm (3-hour)

Source: ; USEPA 2012

Notes: Parenthetical values are approximate equivalent concentrations.

1. Not to be exceeded more than once per year.
2. Not to be exceeded.
3. Final rule signed 15 October 2008. The 1978 standard for Pb (1.5 µg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved. The USEPA designated areas for the new 2008 standard on 8 November 2011.
4. Annual mean.
5. The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
6. 98th percentile, averaged over 3 years.
7. Not to be exceeded more than once per year on average over 3 years.
8. Annual mean, averaged over 3 years.
9. Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
10. Final rule signed 12 March 2008. The 1997 O_3 standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour O_3 standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour O_3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
11. 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
12. Final rule signed on 2 June 2010. The 1971 annual (0.3 ppm) and 24-hour (0.14 ppm) SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until 1 year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved..

Key: ppm = parts per million; ppb = parts per billion; mg/m3 = milligrams per cubic meter; µg/m3 = micrograms per cubic meter

Federal Prevention of Significant Deterioration. Federal Prevention of Significant Deterioration (PSD) regulations apply in attainment areas to major stationary sources (e.g., sources with the potential to emit 250 tons per year [tpy] of any regulated pollutant) and significant modifications to major stationary sources (e.g., change that adds 10 to 40 tpy to the major stationary source's potential to emit depending on the pollutant). Additional PSD major source and significant modification thresholds apply for GHGs, as discussed in the *Greenhouse Gas Emissions* subsection. PSD permitting can also apply to a proposed project if all three of the following conditions exist: (1) the proposed project is a modification with a net emissions increase to an existing PSD major source, (2) the proposed project is within 10 kilometers of national parks or wilderness areas (i.e., Class I Areas) , and (3) regulated stationary source pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 microgram per cubic meter ($\mu g/m^3$) or more (40 CFR 52.21[b][23][iii]). A Class I area includes national parks larger than 6,000 acres, national wilderness areas and national memorial parks larger than 5,000 acres, and international parks. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's class designation (40 CFR 52.21[c]).

Title V and Other CAA Requirements. Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A Title V major stationary source has the potential to emit regulated air pollutants and hazardous air pollutants (HAPs) at levels equal to or greater than Major Source Thresholds. Major Source Thresholds vary depending on the attainment status of an ACQR. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Section 112 of the CAA lists HAPs and identifies stationary source categories that are subject to emissions control or work practice requirements. Section 111 of the CAA lists stationary source categories that are subject to new source performance standards if the applicable equipment is constructed, reconstructed, or modified after specified dates.

Greenhouse Gas Emissions. GHGs are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide (CO_2), methane, and nitrous oxide. GHGs are mainly produced by the burning of fossil fuels and through industrial and biological processes. On 22 September 2009, the USEPA issued a final rule for mandatory GHG reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on CO_2 and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO_2 equivalent emissions per year but excludes mobile source emissions. The regulation of GHG emissions under the PSD and Title V permitting programs was initiated by a USEPA rulemaking issued on 3 June 2010 known as the GHG Tailoring Rule (75 FR 31514). GHG emissions thresholds for the permitting of stationary sources are an increase of 75,000 tpy of CO_2 at existing major sources and facility-wide emissions of 100,000 tpy of CO_2 for a new source or a modification of an existing minor source. The 100,000 tpy of CO_2 threshold defines a major GHG source for both construction (PSD) and operating (Title V) permitting, respectively.

EO 13514 was signed in October 2009 and requires agencies to set goals for reducing GHG emissions. One requirement within EO 13514 is the development and implementation of an agency Strategic Sustainability Performance Plan (SSPP) that prioritizes agency actions based on lifecycle return on investment. Each SSPP is required to identify, among other things, "agency activities, policies, plans, procedures, and practices" and "specific agency goals, a schedule, milestones, and approaches for achieving results, and quantifiable metrics" relevant to the implementation of EO 13514. The DHS's SSPP was originally released to the public in June 2010 and has been updated annually since. This implementation plan describes specific actions that the DHS will take to achieve its individual GHG reduction targets, reduce long-term costs, and meet the full range of goals of the EO. All SSPPs segregate GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the agency. Scope 2 emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 emissions are other indirect GHG emissions that result from agency activities but from sources that are not owned or directly controlled by the agency. The GHG goals in the DHS SSPP include reducing Scope 1 and Scope 2 GHG emissions by 25.3 percent by 2020, relative to fiscal year (FY) 2008 emissions, and reducing Scope 3 GHG emissions by 7.2 percent by 2020, relative to FY 2008 emissions.

3.10.2 Affected Environment

The tactical infrastructure along the U.S./Mexico international border in Texas is within three AQCRs. El Paso and Big Bend Sectors are within the El Paso-Las Cruces-Alamogordo Interstate AQCR (40 CFR 81.82), the Del Rio Sector is within the Metropolitan San Antonio Intrastate AQCR, and the Laredo and Rio Grande Valley sectors are within the Brownsville-Laredo Intrastate AQCR. **Table 3-4** shows the county, state, AQCR, and attainment status for the action area.

Table 3-4. Air Quality Control Regions and Attainment Status by Sector

County	Sector	AQCR	Attainment Status
El Paso Hudspeth	El Paso Big Bend	El Paso-Las Cruces-Alamogordo Interstate	Maintenance for CO (P) Moderate Nonattainment for PM_{10} Attainment/unclassified for all other criteria pollutants
Val Verde Maverick	Del Rio	Metropolitan San Antonio Intrastate	Attainment/unclassified for all criteria pollutants
Webb Hidalgo Cameron	Laredo Rio Grande Valley	Brownsville-Laredo Intrastate	Attainment/unclassified for all criteria pollutants

Sources: USEPA 2010g, USEPA 2010e, USEPA 2010f, USEPA 2010c

Note: P = partial; part of El Paso County is a maintenance area for CO.

El Paso and Hudspeth counties are within the El Paso-Las Cruces-Alamogordo Interstate AQCR (40 CFR 81.82). The TCEQ oversees the implementation of the Federal CAA in the State of Texas. Therefore, all counties are subject to rules and regulations developed by the TCEQ. El Paso County has been characterized by the USEPA as a Federal moderate nonattainment area for PM_{10} and Federal moderate maintenance area for CO (for part of the county). The El Paso-Las

Cruces-Alamogordo Interstate AQCR has been designated by the USEPA as unclassified/attainment for all other criteria pollutants (USEPA 2010e, USEPA 2010f).

Maverick and Val Verde counties are within the Metropolitan San Antonio Intrastate AQCR (40 CFR 81.40). The air quality in the Metropolitan San Antonio Intrastate AQCR has been designated by the USEPA as unclassified/attainment for all other criteria pollutants (USEPA 2010f).

Webb, Hidalgo, and Cameron counties are within the Brownsville-Laredo Intrastate AQCR (40 CFR 81.135). The air quality in the Brownsville-Laredo Intrastate AQCR has been designated by the USEPA as unclassified/attainment for all other criteria pollutants (USEPA 2010f).

3.10.3 Environmental Consequences

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP or permit limitations/requirements
- Emissions representing an increase of 100 tpy for any attainment criteria pollutant (NO_x, VOCs, CO, PM_{10}, $PM_{2.5}$, SO_2), unless the proposed activity qualifies for an exemption under the Federal General Conformity Rule.

Although the 100-tpy threshold is not a regulatory-driven threshold, it is being applied as a conservative measure of significance in attainment areas. The rationale for this conservative threshold is that it is consistent with the highest General Conformity *de minimis* levels for nonattainment areas and maintenance areas. In addition, it is consistent with Federal stationary source major source thresholds for Title V permitting which formed the basis for the nonattainment *de minimis* levels.

Effects on air quality in NAAQS "nonattainment" areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP or permit limitations.

The Federal *de minimis* threshold emissions rates were established by USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to affect air quality substantially. **Table 3-5** presents these thresholds, by regulated pollutant. As shown in **Table 3-5**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

Table 3-5. Conformity *de minimis* Emissions Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
O_3 (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
CO	Nonattainment/ maintenance	All	100
PM_{10}	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not Applicable	100
$PM_{2.5}$ (measured directly, as SO_2, or as NO_x)	Nonattainment/ maintenance	All	100
SO_2	Nonattainment/ maintenance	All	100
NO_x	Nonattainment/ maintenance	All	100

Source: 40 CFR 93.153

With respect to the General Conformity Rule, effects on air quality would be considered significant if the proposed Federal action would result in an increase of a nonattainment or maintenance area's emissions inventory above the *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area. 40 CFR 93.153(c) exempts certain Federal actions from a general conformity determination.

In addition to the *de minimis* emissions thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Class I area, and stationary source emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more (40 CFR 52.21[b][23][iii]).

3.10.3.1 Alternative 1: Proposed Action

Short-term, negligible to minor, adverse impacts on air quality would be anticipated from implementing the Proposed Action. The Proposed Action would only generate temporary air pollutant emissions. The maintenance and repair activities associated with the Proposed Action would generate air pollutant emissions because of grading, filling, compacting, trenching, and other maintenance and repair activities, but these emissions would be temporary and would not be expected to generate any offsite effects. The Proposed Action would not result in a net increase in personnel or commuter vehicles. Therefore, the emissions associated with the Proposed Action from existing personnel and commuter vehicles would not result in an adverse impact on local or regional air quality.

Maintenance and repair activities would result in short-term emissions of criteria pollutants as combustion products from construction equipment. Emissions of all criteria pollutants would result from maintenance and repair activities including combustion of fuels from on-road haul trucks transporting materials and personnel commuter emissions.

Fugitive dust emissions would be greatest during initial site-preparation activities and would vary from day to day depending on the type of maintenance and repair, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from maintenance and repair activities is proportional to the area of land being worked and the level of activity.

Appropriate BMPs and mitigation measures would be adopted to reduce fugitive dust and other emissions to the greatest extent possible (see **Appendix E**). All of the standards developed are based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resource agencies.

Texas has extensive laws requiring BMPs to reduce fugitive dust and other emissions from maintenance and repair projects. These BMPs are displayed in **Appendix E**. No additional BMPs above what is required by regulation were deemed needed for the Proposed Action.

For the purpose of analysis in this EA, the total mileage of roadways currently used by CBP was obtained to estimate air emissions associated with the Proposed Action. The exact road mileage maintained and repaired by CBP within Texas could change over time to accommodate CBP needs (e.g., illegal border activity shifted to another area requiring USBP agents to use different roadways). Therefore, the miles of roads associated with the Proposed Action should be considered somewhat flexible and not constrained by a quantifiable number. It is estimated that every 3 months, approximately 5 percent of roadways analyzed in this EA would be graded, for a total of 20 percent of roadways graded annually. All other portions of the tactical infrastructure would require other routine maintenance and repair activities such as filling potholes, vegetative management, soil stabilization measures, and minor repairs. **Table 3-6** describes the approximate mileage and acreage that would be graded annually by sector. **Appendix G** contains air quality emissions calculations for the Proposed Action.

Under the General Conformity rule, a number of different Federal activities are exempt. The exemption under 40 CFR 93.153(c)(iv) of the General Conformity rules states, "routine maintenance and repair activities, including repair and maintenance of administrative sites, roads, trails, and facilities" are exempt from General Conformity. All proposed activities associated with the Proposed Action would include routine maintenance and repair activities and are considered to be exempt under the General Conformity rule. If any future actions would require constructing new road networks, significant upgrades to existing roadways, expanding roads or drainages, or installing new mission-support equipment, separate NEPA analysis would be required.

Table 3-6. Approximate Tactical Infrastructure Maintenance and Repair Area Proposed to be Graded, by Sector in Texas

Sector	Approximate Mileage of Tactical Infrastructure without Prior NEPA Documentation	Mileage Included in Air Quality Analysis	Area Included in Air Quality Analysis (acres)
El Paso	55	11	27
Del Rio	1,030	206	499
Laredo	30	6	15
Big Bend	90	18	44
Rio Grande Valley	560	112	272
Total	**1,765**	**353**	**857**

Assumptions for mileage included in air quality analysis:

1. Every 3 months approximately 5 percent of roadways considered in this EA would be graded annually for a total of 20 percent. The remaining portions would only include other routine maintenance and repair activities.
2. Area of land disturbance assumes a width of 20 feet multiplied by the length.

Note: El Paso Sector example: 11 miles x 5,280 feet/mile x 20 feet wide / 43,560 ft^2/acre = 27 acres

El Paso-Las Cruces-Alamogordo Interstate AQCR

El Paso County has been characterized by the USEPA as a Federal moderate nonattainment area for PM_{10} and Federal moderate maintenance area for CO (partial), and the El Paso-Las Cruces-Alamogordo Interstate AQCR has been designated by the USEPA as unclassified/attainment for all other criteria pollutants (USEPA 2010g, USEPA 2010e). The Proposed Action would generate emissions well below *de minimis* levels for all criteria pollutants. All emissions would be short-term. In addition, activities planned within El Paso County qualify for exemption under the General Conformity Rule. Therefore, the maintenance and repair activities associated with the Proposed Action would not have significant effects on regional or local air quality.

San Antonio Intrastate AQCR and Brownsville-Laredo Intrastate AQCR

The Metropolitan San Antonio Intrastate AQCR and the Brownsville-Laredo Intrastate AQCR have been designated by the USEPA as unclassified/attainment for all criteria pollutants (USEPA 2010f). The Proposed Action would generate emissions well below *de minimis* levels with the exception of fugitive dust (PM_{10}). Although PM_{10} emissions would be above 100 tpy, all emissions would be short-term. In addition, activities planned within the Del Rio Sector would have qualified for exemption under the General Conformity Rule if the Del Rio Sector was in a nonattainment or maintenance area. Therefore, the maintenance and repair activities associated with the Proposed Action in the San Antonio Intrastate AQCR and the Brownsville-Laredo Intrastate AQCR would not have significant effects on regional or local air quality.

Greenhouse Gas Emissions. The Proposed Action would contribute directly to emissions of GHG from the combustion of fossil fuels from maintenance and repair activities and commuting of support personnel. CO_2 accounts for 92 percent of all GHG emissions; electric utilities are the primary source of anthropogenic CO_2, followed by transportation (EIA 2013).

The Energy Information Agency (EIA) estimates that in 2008, gross CO_2 emissions in the State of Texas were 622.7 million metric tons of CO_2 equivalents (EIA 2010). Annual activities associated with the maintenance and repair of tactical infrastructure in Texas would emit approximately 1,800 metric tons of CO_2. Total annual CO_2 emissions from the Proposed Action in the State of Texas would be 0.0003 percent of the state CO_2 emissions and, therefore, would represent a negligible contribution towards statewide GHG inventories.

Class I Areas. According to 40 CFR Part 81, Big Bend National Park, a Federal Class I area, is within the action area (see **Figure 3-1**). Because all emissions associated with the Proposed Action within the Big Bend National Park Class I area are not from stationary sources, PSD requirements do not apply, including the PSD trigger for impact on Class I areas. There are no other Class I areas in the vicinity of the action area (USEPA 2011a).

3.10.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, tactical infrastructure maintenance and repair activities along the U.S./Mexico international border in Texas would continue. Tactical infrastructure would be maintained and repaired on an as-needed basis, and short- and long-term, negligible to minor, adverse impacts on air quality would be anticipated from emissions associated with combustion of fossil fuels, particulate matter, and fugitive dust emissions. The No Action Alternative would be expected to result in greater impacts on air quality than the Proposed Action because a proactive approach to maintenance and repair would not occur, and reactive maintenance could entail a more spatially and temporally concentrated use of construction equipment. In addition, the No Action Alternative does not guarantee that all BMPs would be implemented during emergency repair activities, such as the wetting of soil to minimize fugitive dust emissions.

3.11 NOISE

3.11.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. 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. How an individual responds to the sound source will determine if the sound is viewed as music to one's ears or as annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad areas (e.g., nature preserves or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

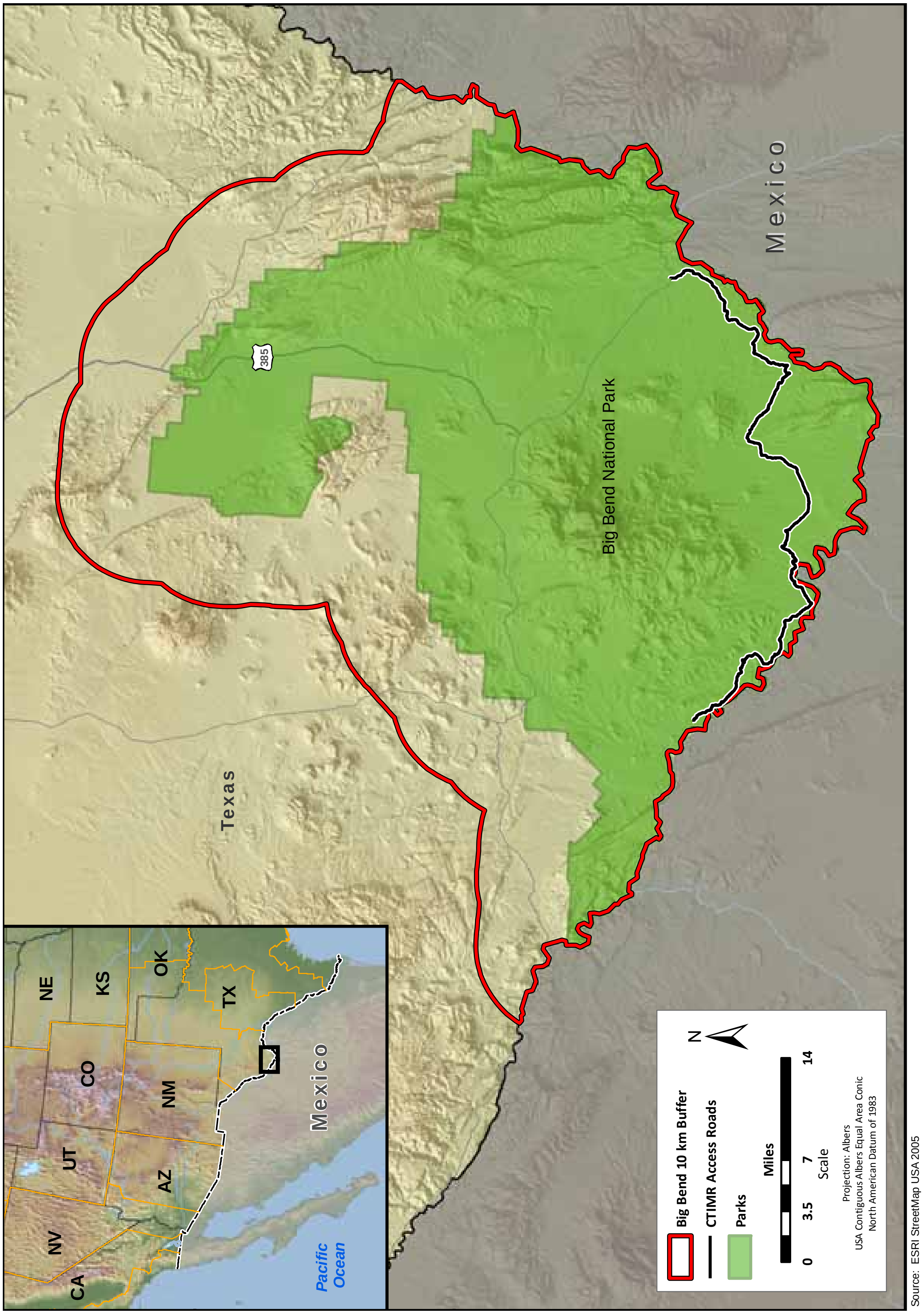


Figure 3-1. Big Bend National Park Class I Area

Noise Metrics and Regulations. Although human response to noise varies, measurements can be calculated with instruments that record instantaneous sound levels in decibels. 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 3-7** compares common sounds and shows how they rank in terms of the effects on hearing. As shown, 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).

Table 3-7. 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

Source: USEPA 1981b, *HDR extrapolation

Under the Noise Control Act of 1972, OSHA 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 to is 115 dBA and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that would reduce sound levels to acceptable limits.

Construction Sound Levels. Maintenance and repair work can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from loaders, trucks, saws, and other work equipment. **Table 3-8** lists noise levels associated with common types of construction equipment.

Table 3-8. Predicted Noise Levels for Maintenance and Repair Equipment

Equipment	Predicted Noise Level at 50 feet (dBA)
Bulldozer	80
Grader	80–93
Truck	83–94
Roller	73–75
Backhoe	72–93
Jackhammer	81–98
Concrete mixer	74–88
Welding generator	71–82
Paver	86–88

Source: USEPA 1971

3.11.2 Affected Environment

The majority of areas along the U.S./Mexico international border in Texas are characterized by mountain and desert landscapes to the west, and floodplain areas to the east. Property uses along the border include public lands, national park, wildlife refuge, military reservation, residential/commercial, and farm/ranch land. The proposed maintenance and repair of tactical infrastructure is adjacent to both urban/mixed use areas and rural/undeveloped areas. The areas immediately to the north of the U.S./Mexico international border are largely rural/undeveloped areas. Prominent sources of noise in these areas are most likely from vehicle traffic, aircraft, and agricultural equipment. The closest populations in the El Paso sector include those in the cities of El Paso, Socorro, San Elizario, Tornillo, and Fort Hancock. In the Big Bend Sector, the City of Presidio is within the action area. Civilian populations in proximity to tactical infrastructure in the Del Rio Sector are within the cities of Del Rio, Spofford, Eagle Pass, El Indio, and Catarina. Civilian populations in proximity to tactical infrastructure in the Laredo Sector are within the cities of Laredo and Rio Bravo. Finally, civilian populations in proximity to the action area in the Rio Grande Valley Sector include those 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.

The areas south of the action area in Mexico include the cities of Juarez, Ojinaga, Ciudad Acuna, Piedras Negras, Nuevo Laredo, Ciudad Miguel Aleman, Reynosa, Nuevo Progreso, and Heroica Matamoros, which are urban/mixed use areas. Prominent sources of noise in these areas are most likely from vehicle traffic and local industry. The closest populations in Mexico are approximately 50 feet from the action area. Areas outside of the urban centers in Mexico are largely rural/undeveloped. Prominent sources of noise in these areas are most likely from vehicle traffic and agricultural equipment.

3.11.3 Environmental Consequences

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., if the total number of sensitive receptors exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise effects were evaluated qualitatively for the alternatives considered.

3.11.3.1 Alternative 1: Proposed Action

Maintenance and repair of tactical infrastructure would occur sporadically along the U.S./Mexico international border. Long-term, periodic, negligible to minor, adverse effects on the ambient noise environment would occur.

The specific noise levels and effects would vary depending on the location, type, and quantity of maintenance or repair being performed, and the distance from the source of the noise to sensitive populations. Maintenance and repair activities usually involve the use of more than one piece of equipment simultaneously (e.g., paver and haul truck). To predict how maintenance and repair activities would impact populations, noise from probable maintenance and repair activities was estimated. The cumulative noise from a paver and haul truck was estimated to determine the total impact of noise from maintenance and repair activities at a given distance. As stated in **Section 3.11.2**, the nearest populations vary depending on location; however, the majority of area considered in this EA is sparsely populated or uninhabited. Examples of expected cumulative maintenance and repair noise during daytime hours at specified distances are shown in **Table 3-9**. These sound levels were predicted at 50, 300, 500, 1,000, and 3,000 feet from the source of the noise.

Table 3-9. Predicted Noise Levels from Maintenance and Repair Activities

Distance from Noise Source	Predicted Noise Level
50 feet	92 dBA
300 feet	76 dBA
500 feet	72 dBA
1,000 feet	66 dBA
3,000 feet	56 dBA

Noise-sensitive receptors in remote areas could be more sensitive to noise disturbances than those in urban environments; however, the noise from equipment used for maintenance and repair activities would be localized, short-term, and intermittent during machinery operations. The proposed maintenance and repair activities would be expected to result in noise levels comparable to those indicated in **Table 3-9**. Noise levels of up to 92 dBA would occur in the areas where maintenance and repair activities were occurring for the duration of those activities during normal working hours (i.e., approximately 7:00 a.m. to 5:00 p.m., depending on local ordinances).

3.11.3.2 Alternative 2: No Action Alternative

Impacts on noise from the No Action Alternative would be similar to those described for the Proposed Action (see **Section 3.11.3.1**); however, it can be reasonably anticipated that the maintenance and repair activities would occur less frequently, in fewer locations along the U.S./Mexico international border in Texas. For this reason, populations within 1,000 feet of the proposed maintenance and repair activities would have the potential to experience less of a long-term, adverse effect than that described for the Proposed Action. However, short-term impacts on noise from implementing the No Action Alternative could be greater than the Proposed Action because it is possible that the reactive activities would occur on a larger scale.

3.12 CULTURAL RESOURCES

3.12.1 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, the Archeological and Historic Preservation Act (ARHA), the American Indian Religious Freedom Act (AIRFA), the Archaeological Resources Protection Act, and the 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, a subculture, or a 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.

3.12.2 Affected Environment

3.12.2.1 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.

3.12.2.2 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. The international border between Texas and Mexico, however, was not established until 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. The treaty also ceded California and much of modern-day Arizona and New Mexico to the United States.

3.12.2.3 Known Cultural Resources

In May 2010, HDR prepared a *Summary of Cultural Resources Management Reports from the Construction of Tactical Infrastructure, U.S.-Mexico International Border, California, Arizona, New Mexico, and Texas* (Church and Hokanson 2010). According to this study, 979.1 miles have been surveyed for cultural resources along the U.S./Mexico international border. A total of

458 archaeological sites, 164 historic structures, and one historic district were identified during these surveys.

Approximately 159 miles of project area were surveyed for cultural resources along the U.S./Mexico international border in Texas as part of the VF300 and PF225 programs. This total consists of 56.7 miles of fence in the El Paso Sector, 11 miles of fence in the Big Bend Sector, 3.1 miles of fence in the Del Rio Sector, and 70.5 miles of fence (65 miles surveyed) and 18 miles of access roads in the Rio Grande Valley Sector. These surveys identified 28 archaeological sites, and 164 historic structures and one historic district. These resources are either listed or eligible for listing in the NRHP. Data recovery or extensive subsurface testing was conducted at four sites.

3.12.3 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 agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

Ground-disturbing activities associated with the implementation of the proposed action constitute the most relevant potential impact on cultural resources.

3.12.3.1 Alternative 1: Proposed Action

Under the Proposed Action, ground-disturbing activities would be confined to the existing footprint of the tactical infrastructure. As a result, these activities have negligible or no potential to impact cultural resources. The exception is the grading of roads that have not been previously graded. This activity has the potential to have long-term, minor, adverse impacts on archaeological sites that intersect the roads. Consultation with the Texas SHPO would take place prior to the grading of roads that have not been previously graded. Archaeological surveys of these roads might be required prior to ground-disturbing activities. If previously documented or newly discovered archaeological sites intersect the roads, mitigation measures (including avoidance of the sites) would be implemented. The Proposed Action would therefore have minor, adverse effects on cultural resources.

Maintenance and repair activities under the Proposed Action would be covered by a PA between CBP, the ACHP, and SHPO, and Federal agencies or federally recognized tribes that own or manage land along the U.S./Mexico international border. The specific activities covered by the agreement would be defined in the PA. According to a draft of the PA, which is being developed in consultation with the potential signatories listed, CBP is required to determine if all of the actions within the scope of an activity or project are included in the terms and conditions set forth in the PA. If so, CBP is required to document this determination in the project file. CBP can then proceed with the activity or project without further Section 106 review. If the activity or project is not composed entirely of the actions listed in the PA, CBP would be required to follow the standard Section 106 review process for the activities that are not listed. In other words, CBP is required to comply with Section 106 of the NHPA of 1966, as amended, and its implementing regulations (36 CFR 800) before conducting maintenance and repair activities. The standard Section 106 review process also would be followed prior to execution of the PA. After the PA has been executed, standard Section 106 review would be followed prior to any maintenance and repair activities occurring on the land of agencies that are not signatories to the PA.

The potential exists for the unanticipated discovery of cultural resources or human remains during the maintenance and repair of tactical infrastructure. Consequently, CBP would develop appropriate measures that detail crewmember responsibilities for reporting in the event of a discovery during maintenance and repair activities. These measures would also include mitigation procedures to be implemented in the event of a significant unanticipated find. If human remains are discovered, CBP would adhere to the stipulations of Public Resources Code Section 5097.98 and Health and Safety Code 7050 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. As a result, potential impacts on cultural resources discovered during the maintenance and repair of tactical infrastructure would be minor.

3.12.3.2 Alternative 2: No Action Alternative

The No Action Alternative has the potential to impact historic properties and have an adverse effect on cultural resources. Under the No Action Alternative, maintenance and repair would take place on an ad hoc basis. There would be no systematic program to maintain and repair tactical infrastructure. As a result, tactical infrastructure could degrade to the point that emergency repairs would be required, which could result in ground-disturbing activities outside the existing footprint of the tactical infrastructure. Ground-disturbing activities outside of the existing footprint could disturb previously unidentified cultural resources. The No Action Alternative does not guarantee that BMPs would be implemented during emergency repair activities.

Under the No Action Alternative, maintenance and repair activities would be covered by a PA as described in **Section 3.12.3.1**. Unanticipated find procedures under the No Action Alternative would be identical to those of the Proposed Action.

3.13 ROADWAYS AND TRAFFIC

3.13.1 Definition of the Resource

The transportation resource is defined as the system of roadways and highways that is within or near to the action area and could reasonably be affected by the Proposed Action. Traffic relates to changes in the number of vehicles on roadways and highways because of the Proposed Action.

3.13.2 Affected Environment

Interstate (I) 10 and the smaller Texas Highway (TX) 20 are the primary roadways in the far western portion of the region of the analysis. Both roadways roughly parallel the U.S./Mexico international border from the New Mexico/Texas state line to Fort Hancock. Numerous primary, secondary, and tertiary roadways intersect I-10 and TX-20 including the extensive roadway network within the City of El Paso. US-90 is the primary road through much of the west-central part of the action area. US-90 extends from the cities of Van Horn to Del Rio. US-67 and US-385, which extend to the north from the U.S./Mexico international border, intersect US-90 in Marfa and Marathon, respectively. The two primary highways in the east-central and far eastern portions of the action area are US-277, which extends from Del Rio through Eagle Pass before ending in Carrizo Springs, and US-83, which extends from Carrizo Springs to Brownsville. Major intersecting roadways include US-57 at Eagle Pass, I-35 and US-59 at Laredo, US-281 at McAllen, US-77 at Harlingen, and TX-48 at Brownsville. Numerous paved and unpaved tertiary roadways are present throughout much of the region.

The majority of access roads proposed for maintenance and repair are classified as FC-3 and FC-4 access roads (see **Appendix** C for more detailed definitions). These access roads are primarily used by the USBP to limit illegal border intrusion and very little public traffic is present due to the remoteness of the region. Additionally, many of the access roads are owned by private landowners and are not accessible to the public. Features such as bridges, low water crossings, security gates, and storm water drainage culverts are present along many of the FC-3 and some FC-4 roads of the region.

Common issues with the roadways proposed for maintenance and repair include flooding, erosion, and the overgrowth of vegetation. Improper management of storm water can cause water to pond at low points and create flooding deep enough to obstruct vehicles. Improper management of storm water can also cause erosion that leads to potholes and washouts. Over long periods, erosion can wash out entire sections of roadway and in many instances make roads impassable. Vegetative growth can encroach into the roadways creating obstructions and visual impairments.

3.13.3 Environmental Consequences

Impacts on transportation are evaluated by how well existing roadways can accommodate changes in traffic. Adverse effects would occur if drivers experience high delays because the Proposed Action altered traffic patterns beyond existing lane capacity or resulted in the closures or detours of roadways.

3.13.3.1 Alternative 1: Proposed Action

Short-term, negligible to minor, adverse effects on transportation would be expected from the Proposed Action due to short-term, local increases in traffic from the vehicles conducting maintenance and repair activities. Long-term, minor to moderate, beneficial effects on transportation would be expected by improving the conditions of the roadways. Traffic impacts would be most notable closer to the location of a given maintenance and repair activity and less noticeable farther away. Larger highways such as US-90, I-10, and other Texas highways would experience no noticeable change in traffic volume. A slight increase in traffic volume on the smaller, single-lane roadways might be noticeable but would affect very few people due to the remoteness of the region. Due to the limited number of vehicles anticipated to be needed for the proposed maintenance and repair activities, impacts on traffic volume would be negligible to minor.

The tactical infrastructure maintenance and repair activities focusing on the roadways themselves would likely cause short-term roadway closures and detours while work is underway. Because most of the roadways proposed for maintenance and repair are used solely by USBP, the public would not be impacted by these roadway closures or detours. The roadway closures and detours would be temporary, so USBP personnel accessing the tactical infrastructure would experience only minor disruptions. In addition, maintenance and repair activities would be spread over time and scattered across the entire action area. As such, all short-term effects on transportation would be expected to be limited.

Long-term, minor to moderate, beneficial effects on transportation would be expected. Roadway maintenance and repair would be prioritized and this would lessen the potential for the gradual degradation of the roadways by conducting thoughtful regional-scale, preventative maintenance rather than only making small-scale, reactionary repairs as is currently done. The Proposed Action would prevent the roadways from falling into disrepair and improve the condition of those roadways that have already fallen into disrepair.

It is possible that the Proposed Action would result in increased public use of access roads. For areas already authorized for unrestricted public access, improving road maintenance would result in a long-term, beneficial effect. For protected areas, road maintenance would be coordinated with the land management agency to ensure that any potential for increased public use would be consistent with the agency's policies. Improvements to the quality of roads used by USBP would allow for faster, safer, and more efficient responses by the USBP to threats. Better quality roads would lessen the wear and tear on USBP vehicles and minimize the potential for blown tires, damaged vehicle components, and stuck vehicles. Improvements to these roadways would not increase the amount of long-term traffic because patrols by USBP would not increase in frequency, and most of the roads proposed for repair and maintenance are not used by the public.

3.13.3.2 Alternative 2: No Action Alternative

The No Action Alternative would result in greater short-term, and fewer long-term impacts on roadways and traffic when compared to the Proposed Action. Existing CBP roadway maintenance and repair procedures would continue as described in **Section 3.13.3.1**. The roadways proposed by CBP for maintenance and repair under the No Action Alternative would continue to be repaired on an as-needed basis. As such, most roadway repairs would be reactive to immediate issues affecting these roadways and would not address the long-term preventative maintenance requirements. Repairs performed on an as-needed basis would not be considered sustainable in quality because they would result in gradual degradation of these roadways. The No Action Alternative would result in greater impacts on roadways and traffic than the Proposed Action. The No Action Alternative could entail larger and longer disruptions in the flow of traffic due to reactionary maintenance and repair activities that potentially require greater attention than those associated with a preventative maintenance plan. Conversely, the periodic maintenance and repair activities as discussed under the Proposed Action would result in more occurrences of minor roadwork and fewer occurrences of major roadwork, which would be anticipated to result in a shorter disruption to the flow of traffic.

3.14 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

3.14.1 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 Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR Parts 105–180.

A hazardous substance, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. §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 RCRA , as amended, (42 U.S.C. §6921); (D) any toxic pollutant listed under section 1317(a) of Title 33; (E) any HAPs listed under section 112 of the CAA (42 U.S.C. §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 U.S.C. §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." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), PCBs, and lead-based paint (LBP). The USEPA is given authority to regulate these special hazard substances by the TSCA Title 15 U.S.C. Chapter 53. USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR Part 763 with additional regulation concerning emissions (40 CFR Part 61). Whether from lead abatement or other activities, depending on the quantity or concentration, the disposal of the LBP waste is potentially regulated by the RCRA at 40 CFR 260. The disposal of PCBs is addressed in 40 CFR Parts 750 and 761.

Pesticides are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947 (40 CFR Parts 150–189). In 1972, Congress enacted the Federal Environmental Pesticide Control Act, which amended FIFRA by specifying methods and standards of control in greater detail. Subsequent amendments have clarified the duties and responsibilities of the USEPA. These regulations stipulate the USEPA must regulate all pesticides that are sold and distributed in the United States. The term "pesticides" includes pesticides, herbicides, rodenticides, antimicrobial products, biopesticides, and other substances used to control a wide variety of pests.

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 the USEPA, state, interstate, and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution.

Evaluation of hazardous materials and wastes focuses on the storage, transport, handling, and use of pesticides, herbicides, petroleum products, fuels, solvents, and other hazardous substances. Evaluation also extends to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site. 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 species, botanical habitats, 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. Alternative means of waste disposal include waste-to-energy programs and incineration. In some localities, landfills are designed specifically for, and limited to, disposal of construction and demolition debris. Recycling programs for various waste categories (e.g., glass, metals, papers, asphalt, and concrete) reduce reliance on landfills for disposal.

3.14.2 Affected Environment

The management of hazardous substances, petroleum products, hazardous and petroleum wastes, pesticides, solid waste, ACMs, LBP, and PCBs 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; however, the nature and age of the tactical infrastructure is such that the handling or disposal of these materials is unlikely for the activities associated with the Proposed Action.

Hazardous Substances, Petroleum Products, and Hazardous and Petroleum Wastes. The TCEQ regulates the management of hazardous substances, petroleum products, and hazardous and petroleum wastes in Texas. The Texas Petroleum Storage Tank Program is a comprehensive regulatory program for underground storage tanks (USTs), and to a lesser extent, aboveground storage tanks (ASTs). Regulated USTs are subject to extensive administrative and technical standards, including requirements for registration, installation, upgrades, repairs, removals, release reporting, corrective action, financial assurance, fees, contractor registration, reporting, and record keeping. The TCEQ also regulates the permitting, handling, and disposal of hazardous and petroleum wastes.

The Waste Reduction Policy Act of 1991 was adopted by the Texas Legislature to prevent pollution in Texas. The TCEQ adopted the corresponding rule. This act requires that certain facilities handling hazardous materials and waste prepare a five-year Pollution Prevention Plan.

USBP or its contractors currently store, 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 tactical infrastructure maintenance and repair activities on an as-needed basis. These materials are used for or generated directly from the maintenance and repair activities, and the operation and maintenance of the equipment necessary for maintaining and repairing the tactical infrastructure. The primary hazardous substances and petroleum products likely include materials such as lead-acid batteries, motor oil, antifreeze, paint and paint thinners, cleaners, hydraulic oils, lubricants, and liquid fuels (diesel and gasoline). The hazardous substances, petroleum products, and hazardous and petroleum wastes are stored at various USBP or contractor maintenance shops and managed in accordance with each group's respective hazardous materials standard operating procedures (SOPs). The hazardous and petroleum wastes are recycled or disposed of offsite in accordance with Federal, state, and local regulations.

There are several public and private storage areas, facilities, maintenance areas, and other operations that store, transport, handle, use, generate, and dispose of various types and quantities of hazardous substances, petroleum products, and hazardous and petroleum wastes within and near the action area (CBP 2007b, CBP 2008c, CBP 2008d, CBP 2008f).

USBP stations within the action area that are listed in the USEPA RCRAInfo database are McAllen, Fabens, Del Rio, and El Paso Headquarters. McAllen, Del Rio, and El Paso Headquarters are listed as inactive RCRA hazardous waste handlers with no current permit. Additionally, the McAllen, Fabens, and El Paso Headquarters stations maintain current UST permits, and the McAllen station maintains an NPDES permit (USEPA 2011b).

There are two National Priorities List sites (Crystal City Airport, Crystal City, USEPA ID: TXD980864763; Donna Reservoir and Canal System, Donna, USEPA ID: TX0000605363) within the action area (USEPA 2011c).

Pesticides. The Texas Department of Agriculture is designated as the state's lead agency in the regulation of pesticide use and application through the Pesticide Division. The division is responsible for licensing and training pesticide applicators, overseeing worker protection, registering pesticides for sale in the state, and working to minimize unnecessary impacts on agriculture while enhancing protection of endangered and threatened species as mandated by Federal law. Additionally, the Structural Pest Control Service, part of the Pesticide Division, licenses applicators that make pesticide applications in and around structures.

USBP or its contractors currently use small quantities of herbicides for vegetation control in the Texas tactical infrastructure area. The herbicides are stored at various USBP or contractor maintenance shops and applied by certified personnel in accordance with label requirements.

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 to process, store, or dispose of; solid waste owned or possessed by the person or by any other person or entity.

USBP or its contractors currently generate, store, transport, and dispose of various types and quantities of solid wastes due to performing tactical infrastructure maintenance and repair activities on an as-needed basis. The solid waste generally consists of vegetation (e.g., tree trimmings) and construction materials (e.g., damaged infrastructure). They are temporarily stored at various USBP or contractor maintenance shops prior to off-site recycling or disposal in accordance with Federal, state, and local regulations.

There are several public and private storage areas, facilities, maintenance areas, and other operations that generate, store, transport, and dispose of solid wastes within and near the Texas tactical infrastructure area.

Asbestos-Containing Materials. Asbestos is regulated by the USEPA under the CAA, TSCA, and CERCLA. USEPA has established that any material containing more than 1 percent asbestos by weight is considered an ACM. Friable ACM is any material containing more than 1 percent asbestos, and that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is any ACM that does not meet the criteria for friable ACM.

Based on the nature and age of the tactical infrastructure proposed for maintenance and repair, it is not anticipated to contain asbestos. Additionally, the equipment used to maintain and repair the tactical infrastructure is not likely to contain asbestos.

Lead-Based Paint. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X) regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards. The use of most LBP was banned in 1978.

The tactical infrastructure proposed for maintenance and repair was constructed after 1978 and therefore is not anticipated to contain LBP. Additionally, the equipment used to maintain and repair the tactical infrastructure is not likely to contain LBP.

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment such as transformers and fluorescent light ballasts. Federal regulations govern items containing 50 to 499 ppm PCBs. Chemicals classified as PCBs were widely manufactured and used in the United States throughout the 1950s and 1960s. PCB-containing oil is typically found in older electrical transformers and light fixtures (ballasts).

Based on the nature and age of the tactical infrastructure, it is not anticipated to contain PCBs. Additionally, the equipment used to maintain and repair the tactical infrastructure is not likely to contain PCBs. PCBs might be found in the electrical transformers within the action area, but maintenance and repair activities are not expected to disturb electrical transformers.

3.14.3 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 the 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 effect on solid waste management would be significant if the proposed action exceeded existing capacity 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.

3.14.3.1 Alternative 1: Proposed Action

Long-term, negligible to minor, adverse impacts due to hazardous substances, petroleum products, hazardous and petroleum wastes, and pesticides would be expected from implementation of the Proposed Action. Maintenance vehicles containing hazardous substances and petroleum products would be deployed more frequently, than the No Action Alternative, increasing the probability of a spill or release. Prior to pesticide application, TCEQ would be consulted for the appropriate permits or instruction on the quantity and approved application techniques.

No impacts due to ACMs, LBP, or PCBs would be expected from implementation of the Proposed Action as the tactical infrastructure it is not anticipated to contain ACMs, LBP, or PCBs. As stated in **Section 3.14.2**, none of these substances would be expected to be present due to the nature and age of the tactical infrastructure. If maintenance and repair activities require disturbance of a known or encountered solid waste landfill, TCEQ would be consulted prior to disturbance to significantly reduce or eliminate any potential exposure to ACMs, LBP, or PCBs that might be in the landfill.

No impacts on solid waste management would be expected from the implementation of the Proposed Action. The volumes of solid waste produced during the repair and maintenance activities would be minimal and are not anticipated to increase.

3.14.3.2 Alternative 2: No Action Alternative

Long-term, negligible to minor, adverse impacts on solid waste management would be expected due to potentially greater generation. The No Action Alternative is reactive in nature and could eventually result in greater deterioration of tactical infrastructure over time due to lack of preventative maintenance, which could result in more frequent maintenance and repair of tactical infrastructure. This could create greater volumes of solid waste.

No impacts due to hazardous substances, petroleum products, hazardous and petroleum wastes, or pesticides would be expected from the implementation of the No Action Alternative. The No Action Alternative would result in the continuation of the existing storage, transport, handling, use, generation, and disposal of hazardous substances, petroleum products, hazardous and petroleum wastes, and pesticides as described in **Section 3.14.2**. The tactical infrastructure would continue to be maintained and repaired on an as-needed basis. There would be no new chemicals or toxic substances used or stored. Prior to pesticide application, the respective state agency should be consulted for the appropriate permits or instruction on the quantity and approved application techniques.

No impacts due to ACMs, LBP, or PCBs would be expected from implementation of the No Action Alternative. As stated in **Section 3.14.2**, due to the nature and age of the tactical infrastructure it is not anticipated to contain ACMs, LBP, or PCBs. If maintenance and repair activities require disturbance of a known or encountered solid waste landfill, the respective state regulatory agency would be consulted prior to disturbance to reduce significantly or eliminate any potential exposure to ACMs, LBP, or PCBs that might be in the landfill. The No Action Alternative does not guarantee that all BMPs would be implemented during emergency repair activities. Therefore, the No Action Alternative would result in greater impacts associated with hazardous materials and wastes than the Proposed Action.

3.15 SOCIOECONOMIC RESOURCES, ENVIRONMENTAL JUSTICE, AND PROTECTION OF CHILDREN

3.15.1 Definition of the Resource

Socioeconomic Resources. Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Factors that describe the socioeconomic environment represent a composite of several interrelated and nonrelated factors. There are several factors that can be used as indicators of economic conditions for a geographic area, such as median household income, employment and unemployment rates, percentage of residents living below the poverty level, and employment by business sector. Data on employment can identify gross numbers of employees, employment by industry or trade and unemployment trends. Data on household income in a region can be used to compare the before and after effects of any jobs created or lost as a result of a proposed action. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. After the project, the same data can be gathered again to analyze any impacts from the proposed action to the economic health of the region.

Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued on February 11, 1994, by President Clinton, and pertains to environmental justice issues and relates to various socioeconomic groups and the health effects that could be imposed on them. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was created to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

Protection of Children. EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each Federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

3.15.2 Affected Environment

The geographical area in which a majority of the socioeconomic, environmental justice, and protection of children effects for the alternatives might occur is defined as the ROI. The ROI is considered a primary impact area because it could receive direct and indirect socioeconomic impacts from the proposed maintenance and repair of tactical infrastructure. The ROI for this EA is composed of the counties along the U.S./Mexico international border in Texas. Data and analysis pertaining to housing, schools, and community services within the ROI is excluded from the socioeconomic analysis as the alternatives would not likely result in drastic increases or decreases in demographics or employment characteristics. Subsequently, impacts on the housing market, schools, or community services would not be expected under the proposed alternatives. Therefore, analysis of the housing market, schools, or community services is omitted further from this section.

Socioeconomics

Demographic Characteristics. The southwestern region of the United States has been characterized by robust population growth over the past 20 years. During the period from 1990 to 2010, the population of Texas increased from 17 million people in 1990 to 25 million people in 2010, a 48 percent increase. Growth in the United States from 1990 to 2010 occurred at rate of 24 percent. Complete population data for Texas and the United States are displayed in **Table 3-10** (U.S. Census Bureau 1990, U.S. Census Bureau 2010).

Table 3-10. Population for Texas and the United States, 1990, 2000, and 2010

Geographic Area	1990	2000	2010	Percent Change		
				1990 to 2000	2000 to 2010	1990 to 2010
Texas	16,986,510	20,851,820	25,145,561	23%	21%	48%
United States	248,709,873	281,421,906	308,745,712	13%	10%	24%

Source: U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2010

The largest portion of the U.S./Mexico international border is located in Texas, accounting for 1,241 miles of the border, and 21 counties are along the Texas portion of the border. Six counties, Hidalgo, Webb, Starr, Cameron, Zapata, and Maverick, experienced population growth from 1990 to 2010 at a rate greater than the State of Texas. The population of 10 counties increased at a rate less than Texas but did not incur negative growth from 1990 to 2010. These 10 counties are El Paso, Val Verde, Angelina, Presidio, Uvalde, Jeff Davis, Hudspeth, Pecos, Brewster, and Kinney. Five counties experienced a decrease in population from 1990 to 2010: Zavala, Dimmit, Edwards, Culberson, and Terrell. Of the 21 border counties, the total population of Hidalgo County increased the most from 1990 to 2010 (102 percent or 391,224 people) with the total population in 2010 at approximately 775,000. Culberson County experienced the largest quantitative decrease in population with approximately 1,000 fewer persons (30 percent) reported between 1990 and 2010 (U.S. Census Bureau 1990, U.S. Census Bureau 2010). Complete population data for the 21 border counties in Texas and Texas are displayed in **Table 3-11**.

Table 3-11. Population for Border Counties in Texas, 1990, 2000, and 2010

Geographic Area	1990	2000	2010	Percent Change		
				1990 to 2000	2000 to 2010	1990 to 2010
Angelina County	69,884	80,130	86,771	15%	8%	24%
Brewster County	8,681	8,866	9,232	2%	4%	6%
Cameron County	260,120	335,227	406,220	29%	21%	56%
Culberson County	3,407	2,975	2,398	-13%	-19%	-30%
Dimmit County	10,433	10,248	9,996	-2%	-2%	-4%
Edwards County	2,266	2,162	2,002	-5%	-7%	-12%
El Paso County	591,610	679,622	800,647	15%	18%	35%
Hidalgo County	383,545	569,463	774,769	48%	36%	102%
Hudspeth County	2,915	3,344	3,476	15%	4%	19%
Jeff Davis County	1,946	2,207	2,342	13%	6%	20%
Kinney County	3,119	3,379	3,598	8%	6%	15%
Maverick County	36,378	47,297	54,258	30%	15%	49%
Pecos County	14,675	16,809	15,507	15%	-8%	6%
Presidio County	6,637	7,304	7,818	10%	7%	18%
Starr County	40,518	53,597	60,968	32%	14%	50%
Terrell County	1,410	1,081	984	-23%	-9%	-30%
Uvalde County	23,340	25,926	26,405	11%	2%	13%
Val Verde County	38,721	44,856	48,879	16%	9%	26%
Webb County	133,239	193,117	250,304	45%	30%	88%
Zapata County	9,279	12,182	14,018	31%	15%	51%
Zavala County	12,162	11,600	11,677	-5%	1%	-4%
Texas	16,986,510	20,851,820	25,145,561	23%	21%	48%

Source: U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2010

Employment Characteristics. The largest percentage of people employed by industry in Texas and the United States is the educational services, and health care and social assistance industry, composing 21 and 22 percent, respectively. The second largest employment industry is the retail trade industry accounting for 12 percent in Texas and the United States. The agriculture, forestry, fishing and hunting, and mining industry is the smallest industry by percentage of those employed in the United States at 2 percent. The smallest industry by percentage of those in Texas (2 percent) is the information industry (U.S. Census Bureau 2010). **Table 3-12** contains data for Texas and the United States for all 13 industries as defined by the U.S. Census Bureau.

Table 3-12. Employment Estimates by Industry in Texas and the United States by Percentage, 2010

Industry	Texas	United States
Population 16 years and over in labor force	12,065,652	155,163,977
Population of employed persons in the civilian labor force	11,125,616	141,833,331
Agriculture, forestry, fishing and hunting, and mining	2.9	1.9
Construction	8.6	7.1
Manufacturing	9.7	11.0
Wholesale trade	3.3	3.1
Retail trade	11.5	11.5
Transportation and warehousing, and utilities	5.7	5.1
Information	2.2	2.4
Finance and insurance, and real estate and rental and leasing	6.9	7.0
Professional, scientific, and management, and administrative and waste management services	10.5	10.4
Educational services, and health care and social assistance	20.8	22.1
Arts, entertainment, and recreation, and accommodation and food services	8.2	8.9
Other services, except public administration	5.2	4.9
Public administration	4.4	4.8

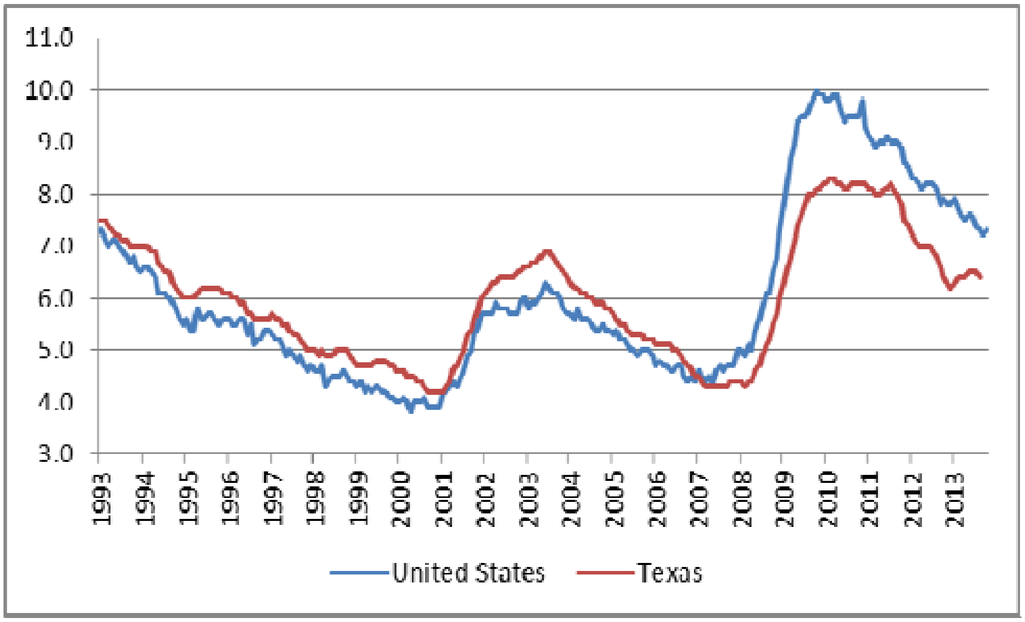
Source: U.S. Census Bureau 2010

The largest percentage of workers are employed in the educational services, and health care and social assistance industry in 20 of 21 border counties in Texas. The 20 counties and the percentage of persons working in this industry are listed as follows.

- Angelina County (26.0)
- Brewster County (21.6)
- Cameron County (29.4)
- Culberson County (21.5)
- Dimmit County (25.1)
- Edwards County (21.6)
- El Paso County (23.8)
- Hidalgo County (29.6)
- Jeff Davis County (21.5)
- Kinney County (17.1)
- Maverick County (28.6)
- Pecos County (19.8)
- Presidio County (28.4)
- Starr County (42.5)
- Terrell County (19.2)
- Uvalde County (24.8)
- Val Verde County (22.8)
- Webb County (24.5)
- Zapata County (30.5)
- Zavala County (29.3)

The county where the educational services, and health care and social assistance industry is not the largest is Hudspeth County. The largest industry in Hudspeth County is the agriculture, forestry, fishing and hunting, and mining industry, which employs approximately 20 percent of workers (U.S. Census Bureau 2010).

Figure 3-2 displays unemployment data for Texas and the United States. From 2007 through 2013, the unemployment rate in Texas has been lower than the unemployment rate for the United States. The highest unemployment rate in Texas occurred in February and March 2010 (8.3 percent), while the national unemployment rate was highest in October 2009 (10.0 percent). As of August 2013, the unemployment rate in Texas was 6.4 percent and the national unemployment rate was 7.3 percent (BLS 2013).



Source: BLS 2013

Figure 3-2. Unemployment Rates for Texas and the United States, 1993–2013

Environmental Justice and Protection of Children

Racial, Ethnic, and Youth Population Characteristics. The southwestern United States contains a large Hispanic or Latino population. Approximately 55 percent of the population of Texas and 36 percent of the United States population is considered a minority population (i.e., Hispanic or Latino, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and multi-race that includes one of the aforementioned races). The Hispanic or Latino population in Texas (38 percent) is much larger as compared to the United States (16 percent). The percentage of Black or African American population within Texas was less than that of the United States. The percentage of the population younger than 18 years of age in the United States was 24 percent. In Texas, the percentage of the population younger than 18 years of age was 27 percent (U.S. Census Bureau 2010). **Table 3-13** presents the racial and ethnic characteristics of the populations in the Texas border region and the United States.

Table 3-13. Racial and Ethnic Characteristics of the Populations in Texas and the United States, 2010

Race and Ethnicity	Texas	United States
Total Population	25,145,561	308,745,538
Percent younger than 18	27.3	24.0
Percent White	45.3	63.7
Percent Black or African American	11.5	12.2
Percent American Indian and Alaska Native	0.3	0.7
Percent Asian	3.8	4.7
Percent Native Hawaiian and Other Pacific Islander	0.1	0.2
Percent Some Other Race	0.1	0.2
Percent Two or More Races	1.3	1.9
Percent Hispanic or Latino	37.6	16.3

Source: U.S. Census Bureau 2010

In Texas, 19 of the 21 counties examined contained Hispanic or Latino populations that were greater than the 38 percent Hispanic or Latino population reported for Texas. The largest percentage of the population reported as Hispanic or Latino was in Maverick, Starr, and Webb counties with 96 percent. Angelina and Jeff Davis counties were the only counties where the percent of Hispanic or Latino residents (20 percent and 34 percent, respectively) did not exceed that of Texas. Angelina County did have a slightly larger African-American population by percentage at 15 percent, compared to 12 percent for Texas overall. **Table 3-14** provides complete racial and ethnic population data for Texas border counties.

Seven Texas border counties had youth populations that are smaller by percentage (ranging from 20 to 27 percent) when compared with Texas. The percentage of youth in the total population of the remaining 14 border counties ranged from 28 percent to 35 percent (U.S. Census Bureau 2010).

Low-income and Poverty Characteristics. In Texas, the percent of individuals and families whose income was below the poverty level (17 percent and 13 percent, respectively) is elevated in comparison to the United States (14 percent and 10 percent, respectively). Median household incomes follow a similar trend. Texas' median household income is $49,646 compared to $51,914 for the United States (U.S. Census Bureau 2010).

Within the 21 counties along the U.S./Mexico international border in Texas, the percent of families whose income was below the poverty level ranged from 9 percent in Terrell County to 40 percent in Hudspeth County, while the percent of individuals whose income was below the poverty level ranged from 15 percent in Jeff Davis County to 43 percent in Zavala County. Of the 21 counties, only Terrell County had a lower percent of families below the poverty level

Table 3-14. Racial and Ethnic Characteristics for Border Counties in Texas, 2010

Race and Ethnicity	Angelina County	Brewster County	Cameron County	Culberson County	Dimmit County	Edwards County	El Paso County	Hidalgo County	Hudspeth County	Jeff Davis County	Kinney County
Total Population	86,771	9,232	406,220	2,398	9,996	2,002	800,647	774,769	3,476	2,342	3,598
Percent of population younger than 18	26.7	20.3	33.0	27.8	30.0	20.8	30.1	34.7	30.1	19.8	20.1
White	63.3	54.3	10.7	21	12.2	47.3	13.1	7.8	18.1	63.6	41.6
Black or African American	14.8	0.9	0.3	0.3	0.8	0.5	2.6	0.4	0.9	0.4	1.1
American Indian & Alaska Native	0.3	0.4	0.1	0.5	0.1	0.5	0.3	0.1	0.3	0.3	0.5
Asian	0.9	0.6	0.6	0.9	0.5	0.1	0.9	0.9	0.4	0.3	0.3
Native Pacific Islander	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Some Other Race	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.2
Two or More Races	0.9	1.2	0.2	1.0	0.1	0.2	0.7	0.2	0.7	1.5	0.7
Hispanic or Latino	19.8	42.4	88.1	76.2	86.2	51.3	82.2	90.6	79.6	33.7	55.7
Race and Ethnicity	**Maverick County**	**Pecos County**	**Presidio County**	**Starr County**	**Terrell County**	**Uvalde County**	**Val Verde County**	**Webb County**	**Zapata County**	**Zavala County**	**State of Texas**
Total Population	54,258	15,507	7,818	60,968	984	26,405	48,879	250,304	14,018	11,677	25,145,561
Percent of population younger than 18	33.8	24.6	29.0	33.9	22.2	28.9	29.8	35.2	34.3	31.3	27.3
White	2.9	27.9	14.5	4.0	50.3	29.0	17.5	3.3	6.1	5.5	45.3
Black or African American	0.1	3.4	0.3	0.0	0.6	0.4	1.2	0.2	0.1	0.3	11.5
American Indian & Alaska Native	0.9	0.4	0.3	0.0	0.7	0.2	0.2	0.0	0.1	0.1	0.3
Asian	0.3	0.5	1.0	0.2	0.4	0.4	0.4	0.5	0.2	0.0	3.8
Native Pacific Islander	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Some Other Race	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1
Two or More Races	0.1	0.5	0.4	0.0	0.5	0.4	0.4	0.1	0.1	0.1	1.3
Hispanic or Latino	95.7	67.3	83.4	95.7	47.5	69.3	80.2	95.7	93.3	93.9	37.6

Source: U.S. Census Bureau 2010

(9 percent) than Texas (13 percent). Brewster, Jeff Davis, and Terrell counties are the only counties in which the percent of individuals below the poverty level was lower than the 17 percent for Texas. Median household income in these 21 counties ranged from a low of $21,707 to a high of $43,750, and no border county contained a median household income greater than the $49,646 reported for Texas. See **Table 3-15** for the percent of population below the poverty level for Texas and the 21 Texas border counties (U.S. Census Bureau 2010).

Table 3-15. Percent of Individual and Families Below the Poverty Level and Median Household Income for Border Counties in Texas

Geographic Area	Individual Poverty Rate	Family Poverty Rate	Median Household Income
Angelina County	17.8	13.3	$39,148
Brewster County	16.5	10.5	$35,799
Cameron County	34.7	30.0	$31,264
Culberson County	28.8	19.6	$35,500
Dimmit County	36.4	31.5	$25,882
Edwards County	24.7	16.9	$40,163
El Paso County	25.6	22.5	$36,333
Hidalgo County	34.4	30.5	$31,879
Hudspeth County	46.0	39.6	$22,647
Jeff Davis County	14.7	14.0	$43,750
Kinney County	32.2	20.8	$24,388
Maverick County	33.6	30.7	$28,813
Pecos County	19.9	17.1	$38,125
Presidio County	24.1	22.1	$29,513
Starr County	38.0	35.1	$24,441
Terrell County	16.5	9.2	$35,403
Uvalde County	26.7	21.4	$35,087
Val Verde County	24.0	19.3	$36,993
Webb County	29.8	25.4	$36,684
Zapata County	37.6	33.5	$24,496
Zavala County	43.0	34.6	$21,707
Texas	16.8	13.0	$49,646

Source: U.S. Census Bureau 2010

3.15.3 Environmental Consequences

Socioeconomic Resources. Project-related expenditures are assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates ten employment positions might go unnoticed in an urban area, but could have considerable impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or a decrease in regional spending or earning patterns, those effects would be considered adverse. A proposed action could have a significant effect with respect to the socioeconomic conditions in the surrounding ROI if the following were to occur:

- Change the local business volume, employment, personal income, or population that exceeds the ROI's historical annual change
- Disproportionately impact minority populations or low-income populations.

Environmental Justice and Protection of Children. Ethnicity and poverty data are examined for the counties along the U.S./Mexico international border in Texas to determine if a low-income or minority population could be disproportionately affected by a proposed action.

3.15.3.1 Alternative 1: Proposed Action

Socioeconomic Resources. Maintenance and repair of tactical infrastructure under the Proposed Action would have short-term, minor, direct and indirect, beneficial impacts on socioeconomics, demographics, and employment through increased employment and the purchase of goods and services. Direct impacts on employment and the procurement of material supplies would be minor and short-term and would not overburden the available supply. No permanent changes to the CBP workforce would be expected as a result of this alternative.

Short-term, minor increases in population might occur during times of maintenance and repair. It is assumed that many of the workers needed for this alternative would be drawn from the regional workforce and would not require the permanent relocation of workers from outside the area. The construction industry would adequately be able to meet the demand for workers. The short-term nature and scale of the maintenance and repair projects would not induce indirect population growth in the region.

It is assumed that materials for maintenance and repair would be sourced locally. In addition, many of the workers needed for the maintenance and repair would likely be employed within the regional construction industry. Incremental gains to the construction industry might occur to fulfill an increased demand for workers. Each job created by implementation of the Proposed Action would generate additional revenue and could create additional jobs within companies that supply goods and services. The project would not likely create any long-term employment 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 employment, population, personal income, poverty levels, or other demographic or employment indicators would be expected from the Proposed Action.

Environmental Justice and the Protection of Children. The proposed maintenance and repair of tactical infrastructure would have short-term, indirect, adverse, and long-term indirect, beneficial impacts on low-income and minority populations and the protection of children in the areas along the U.S./Mexico international border. Much of the tactical infrastructure that would be maintained and repaired as a part of the Proposed Action runs through or adjacent to many rural settlements, small towns, and neighborhoods within larger cities that have minority and low income populations. Property owners and residents might be affected by visual intrusion, noise, and temporary disruptions during maintenance activities. However, the maintenance and repair of tactical infrastructure would be temporary and intermittent and allow USBP agents to perform their mission. As a result, the Proposed Action would indirectly help to deter cross-border violators in the immediate area, which in turn could prevent drug smugglers, terrorists, and terrorist weapons from entering the surrounding area.

3.15.3.2 Alternative 2: No Action Alternative

Under the No Action Alternative, there would be no change from the baseline conditions. Overall maintenance requirements for tactical infrastructure along the U.S./Mexico international border would not be addressed and the tactical infrastructure would not be considered sustainable in quality, resulting in gradual degradation. If the No Action Alternative is implemented, short-term local employment benefits from the purchase of maintenance and repair materials and a temporary increase in maintenance jobs would not occur. Furthermore, money from maintenance and repair payrolls that would circulate throughout the local economies would not occur. The Proposed Action would result in greater benefits to socioeconomics than the No Action Alternative because maintenance and repair work would occur on a periodic basis, providing a more stable source of income for workers and the local economy.

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 all CBP maintenance and repair of tactical infrastructure activities including maintenance and repair activities addressed under this EA, under previous NEPA documents, and activities which were covered by a Secretary's waiver. In this instance, the type of activity that is at issue in this EA—the maintenance and repair of tactical infrastructure—is unique to CBP. Thus, these activities are unlikely to be subjected to the compounding activity of other entities, particularly when they take place, as they often do, in isolated areas and on an infrequent basis. To that same end, where maintenance of roads occurs, it is complementary to, or in lieu of, maintenance performed by others. The geographic scope of the analysis varies by resource area.

4.1 CUMULATIVE IMPACTS OF THE CBP MAINTENANCE AND REPAIR PROGRAM

Past, Present, and Foreseeable Future Actions

Past and present actions are those 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 Secretary's waiver or separate NEPA. Past actions have shaped the current environmental conditions in close proximity (i.e., within several miles) to existing tactical infrastructure. 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 the current ad hoc, as-needed approach to the maintenance and repair of existing tactical infrastructure and future actions would consist of the maintenance and repair of all current tactical infrastructure including tactical infrastructure analyzed in this EA.

Additionally, it is reasonable to assume consideration of the maintenance and repair activities for future additional tactical infrastructure, including pedestrian and vehicle fence, roads, bridges, lighting, and other types of infrastructure mentioned in this EA, will be required in the El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley Sectors along the U.S./Mexico international border to address future border security needs.

Cumulative Tactical Infrastructure in Texas

As discussed in **Section 1** of this EA, CBP constructed a substantial amount of tactical infrastructure along the U.S./Mexico international border under the Secretary's waiver. CBP prepared ESPs to analyze the potential environmental impacts associated with construction and maintenance of tactical infrastructure covered by the waiver. Tactical infrastructure has also been constructed that was not covered under the waiver but was analyzed in other NEPA documents. **Table 4-1** summarizes recent tactical infrastructure projects within the USBP El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors. The USBP Laredo Sector has no primary or vehicle fence, but there is an ongoing pilot project for vegetation removal that is discussed further.

Table 4-1. Descriptions of Other Recent Tactical Infrastructure Projects Included in the Cumulative Effects Analysis

USBP Sector	Description of Tactical Infrastructure Projects Covered under Recent Waiver or NEPA Documentation
El Paso	Total of approximately 85 miles of primary pedestrian and vehicle fence, 75 miles of roads, and permanent lights: • *HV-1, HV-2, HV-3.* 16.3 miles of vehicle fence and 19.8 miles of access roads, within the Roosevelt Reservation west of Antelope Wells Port of Entry (POE) in Hidalgo County, New Mexico [a] • *HV-4.* 6 miles of vehicle fence within the Roosevelt Reservation east and west of Antelope Wells POE in Hidalgo County, New Mexico [b] • *JV-1, JV-2, JV-3.* 40 miles of vehicle fence and 8 miles of access roads, within the Roosevelt Reservation west of the Santa Teresa POE in Luna and Doña Ana counties, New Mexico [a] • *Other.* 6 miles of pedestrian fence, 16.5 miles of vehicle fence (Segments IV-2/IV-4B), 12 miles of lights, 2 miles of patrol road, 44 miles of drag road, and other ancillary infrastructure along the southern boundary of Luna County, New Mexico [a, b, c] • *K-2A.* 9.6 miles of primary pedestrian fence along the flood control levee and irrigation canals near Modesto-Gomez Park in El Paso, Texas [d] • *K-2B.* 2.4 miles of primary pedestrian fence between the flood control levee and the Rio Grande near Rio Bosque Park in El Paso County, Texas [d] • *K-2C.* 6.9 miles of primary pedestrian fence and permanent lights on the south side of the canal in El Paso County, Texas [d] • *K-2D.* 9.4 miles of primary pedestrian fence between the canal and the levee with two bridge locations, and permanent lights in El Paso County, Texas [d] • *K-3.* 9.1 miles of primary pedestrian fence and permanent lights between the canal and the levee extending east of the Fabens POE in El Paso County, Texas [d] • *K-4.* 13.5 miles of primary pedestrian fence are planned near the Fabens POE in El Paso and Hudspeth counties, Texas [e *] • *K-5.* 5.1 miles of primary pedestrian fence extending from west of the Fort Hancock POE to the Diablo Arroyo east of the Fort Hancock POE in Hudspeth County, Texas [d]
Big Bend [1]	Total of 11 miles of primary pedestrian fence, access and patrol roads, and lights: • *L-1.* 4.7 miles of primary pedestrian fence (Bollard floating fence style) and road atop the USIBWC levee and 0.12 miles of concrete trench at the southern fence terminus, southwest of Sierra Blanca in Hudspeth County, Texas [f] • *L-1A & L-1B.* 6.2 miles of primary pedestrian fence and a retaining wall are planned near the Rio Grande POE in Presidio County, Texas [g 1]
Del Rio	Total of 4 miles of primary pedestrian fence, concrete retaining walls, access and patrol roads, and lights: [h] • *M-1.* 2.3 miles of primary pedestrian fence, patrol and access roads, and lights near the International Bridge (TX-239-Spur) in Del Rio, Texas • *M-2A.* 0.8 miles of primary pedestrian fence, patrol and access roads, and lights in Eagle Pass, Texas

USBP Sector	Description of Tactical Infrastructure Projects Covered under Recent Waiver or NEPA Documentation
Laredo	Removal of the introduced, invasive species Carrizo cane (*Arundo donax*) along a 16-mile corridor (595 acres) using mechanical removal, cut stem and herbicide application, aerial spraying of herbicide, or burn and herbicide treatment. To date, only 1.1 miles (27 acres) of removal has been completed. [i]
Rio Grande Valley [2]	Total of 70 miles of primary pedestrian fence, concrete flood control structures, access and patrol roads, and lights: [j] • *O-1.* 3.8 miles of primary pedestrian fence near Roma POE in Rio Grande City, Texas • *O-2.* 8.7 miles of primary pedestrian fence near Rio Grande City POE in Rio Grande City, Texas • *O-3.* 1.9 miles of primary pedestrian fence near Los Ebanos POE in McAllen, Texas • *O-4 through O-10.* 20.3 miles of concrete flood control structures in noncontiguous segments between McAllen and Weslaco, Texas • *O-11.* 2.3 miles of primary pedestrian fence in Harlingen, Texas • *O-12.* 0.9 miles of primary pedestrian fence at Weaver's Mountain in Harlingen, Texas • *O-13.* 1.6 miles of primary pedestrian fence near the West Los Indios POE, Harlingen, Texas • *O-14.* 3.6 miles of primary pedestrian fence near the East Los Indios POE, Harlingen, Texas • *O-15.* 1.9 miles of primary pedestrian fence near Triangle and La Paloma in Harlingen, Texas • *O-16.* 3.0 miles of primary pedestrian fence near Ho Chi Minh and Estero in Harlingen, Texas • *O-17.* 1.6 miles of primary pedestrian fence near the proposed Carmen Road Freight Train Bridge in Brownsville, Texas • *O-18.* 3.6 miles of primary pedestrian fence near the proposed Flor De Mayo POE in Brownsville, Texas • *O-19.* 3.4 miles of primary pedestrian fence near the Brownsville/Matamoros POE in Brownsville, Texas • *O-20.* 0.9 miles of primary pedestrian fence near the Veterans International Bridge in Brownsville, Texas • *O-21.* 13.0 miles of primary pedestrian fence from Veterans International Bridge to Sea Shell Inn in Fort Brown, Texas

Sources: a. CBP 2010c; b. CBP 2007a; c. CBP 2007b; d. CBP 2010d; e. CBP 2008e; f. CBP 2010e; g. CBP 2008f; h. CBP 2008c; i. CBP 2008g; j. CBP 2008d; CBP 2010b

Notes:

1. Segments L-1A and L-1B in the USBP Big Bend Sector have not yet been constructed, but they are included in the project total and considered in this cumulative effects analysis because they are reasonably foreseeable future projects.
2. An Environmental Stewardship Summary Report (ESSR) has not been finalized for the USBP Rio Grande Valley Sector tactical infrastructure, so the information presented in the ESP is analyzed in this cumulative effects analysis.

This cumulative effects analysis focuses on all assets associated with the maintenance and repair of tactical infrastructure, because they are most relevant to the Proposed Action and are, therefore, the type of activities that are most likely to lead to additive or cumulative effects. Cumulative, long-term effects that would be expected because of maintenance and repair of the tactical infrastructure along the U.S./Mexico international border in Texas are identified and discussed in detail in this section. Segments HV-1, HV-2, HV-3, HV-4, JV-1, JV-2, JV-3, IV-2, and IV-4B are within New Mexico but included in this cumulative effects analysis because they are within the USBP El Paso Sector area of operation. Most construction activities have already occurred, so adverse effects identified as a result of construction activities are not discussed unless some unique aspect of that project segment warrants further discussion. As noted in **Table 4-1**, Segments L-1A and L-1B in the USBP Big Bend Sector have not yet been constructed (approximately 6 miles of pedestrian fence). **Table 4-2** summarizes total tactical infrastructure, including assets analyzed in this Proposed Action, to be maintained cumulatively by CBP. It is reasonable to assume that CBP will continue to construct and install tactical infrastructure assets similar to those described in **Table 4-1**, adding to the totals in **Table 4-2**. Future proposals for construction of tactical infrastructure would require a separate NEPA analysis.

Table 4-2. Summary of Existing Tactical Infrastructure Assets in Texas

Asset (units)	Approximate Total
Fences and Gates (miles)	130
Roads and Integrated Bridges/Crossovers (miles)	2500
Drainage Management Structures (number)	35
Linear Vegetation Control Areas (miles)	550
Vegetation Control Areas (acres)	3800
Bridges	15
Lighting and Ancillary Power Systems	670
Boat Ramps	7
Towers (number)	130
Equipment Storage Areas (acres)	225

Note: Table is based on GIS data from Baker dated March 3, 2014. Totals provided should be considered approximate as asset data are refined and added.

The maintenance and repair activities analyzed in this cumulative impacts analysis would be the same as those described in **Section 2.3** of this EA.

4.2 CUMULATIVE ANALYSIS BY RESOURCE AREA

This section presents the resource-specific impacts related to the past, present, and reasonably foreseeable actions previously discussed in **Section 4.1**.

4.2.1 Alternative 1: Proposed Action

Implementation of the Proposed Action (Alternative 1) is CBP's Preferred Alternative, which would result in maintenance and repair activities occurring via a periodic work plan. Maintenance and repair activities would be implemented based on prioritization and funding within the sector. For the purpose of this analysis, it is assumed that all CBP tactical infrastructure—that is, tactical infrastructure within the scope of Proposed Action, tactical infrastructure covered by the Secretary's waiver and previous NEPA analysis, and future CBP tactical infrastructure—would be maintained via a periodic work plan. Implementation of the Proposed Action would not be expected to contribute to significant adverse cumulative effects.

4.2.2 Land Use

Most areas along the U.S./Mexico international border are remote and contain agricultural and open space land uses, many of which are managed or protected by the Federal government. The maintenance and repair of tactical infrastructure would have no effect on land use plans or policies. Maintenance and repair activities involve work on existing infrastructure, so there would be no change in long-term land uses. Cumulatively, the Proposed Action and other tactical infrastructure maintenance and repair activities would not contribute to adverse effects on land use.

4.2.3 Geology and Soils

The potential for effects on geology and soils is limited to areas where ground disturbance would occur within the action area. As noted, all CBP tactical infrastructure would be subjected to centralized maintenance and repair planning. As a part of the centralized maintenance and repair planning, CBP's interdisciplinary maintenance and repair technical staff, including environmental staff, would participate in reviewing and approving a maintenance and repair work plan for all tactical infrastructure. The adoption of appropriate BMPs and proposed schedule for maintenance would ensure that erosion would be minimized and erosion-creating activities well dispersed throughout the region avoiding any pockets of intense activity. Cumulatively, this approach reduces the impacts of any ad hoc approach applied to past maintenance and repair activities and ensures future potential erosion is well managed. Consequently, the maintenance and repair of past, present, and foreseeable future construction activity would be expected to result in short-term, minor, adverse effects that are localized to the areas where ground disturbance has occurred. Use of herbicides could also result in localized short-term and long-term, adverse effects due to increased erosion and sedimentation from a decrease in vegetative cover but would be minor in nature due to adherence to the work plan. Long-term, beneficial effects would be expected from stabilization of roadways and drainage structures throughout the action area. In the event that multiple maintenance and repair activities or any ground-disturbing activities were occurring simultaneously and in proximity, minor, short-term and negligible long-term, adverse, cumulative effects could occur.

4.2.4 Vegetation

Minor to moderate 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 direct take of habitat occurred during construction of pedestrian and vehicle fence. The Proposed Action does not involve new development activities, and effects on vegetation are generally limited to the existing footprint of tactical infrastructure. Selective maintenance and repair activities would be expected to result in generally negligible to minor adverse effects on terrestrial and aquatic vegetation. Under the work plan, BMPs would ensure impacts on vegetation including the introduction of nonnative species would be minimized, and consequently the cumulative effects on vegetation resources would be considered negligible to minor.

4.2.5 Terrestrial and Aquatic Wildlife Resources

Minor to moderate effects on wildlife species have occurred from the additive effects of past and present actions, though there is quality habitat in the action area to support wildlife. The Proposed Action does not involve new development activities, and effects on wildlife and aquatic species are limited to the existing footprint and immediately surrounding areas. Maintenance and repair activities would be expected to result in generally negligible to minor, adverse effects on wildlife and aquatic species. Operation of heavy equipment would generate temporary noise and could displace wildlife species. Under the work plan, which would cover all CBP tactical infrastructure 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 in effect.

4.2.6 Threatened and Endangered Species

As discussed in **Section 3.6**, CBP will consult with USFWS under Section 7 of the ESA regarding potential effects on listed species and designated critical habitat. Potential direct and indirect effects on federally listed species presented in this EA are based on currently available data. A separate effects analysis is developed under NEPA, but parallels impact determinations made for the Section 7 consultation process.

The designation of threatened or endangered implies that past activities have had major adverse effects on these species. Threatened and endangered species are commonly protected because their historic range and habitat have been reduced 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. Anthropogenic influences that have contributed to reduced range and habitat availability and reduced populations include agriculture, livestock grazing, urban development and road construction, overcollection, trampling and off-road vehicle use, hydrologic modifications, and altered fire regimes. Once natural 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 well tolerated.

There are 24 federally listed threatened or endangered species that are known to occur within the action area. **Section 3.6** presents detailed discussions 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 will continue to protect threatened and endangered species with the goal of recovery.

The Proposed Action would generally be expected to have negligible effects on threatened or endangered species that have been identified as potentially occurring in the action area. 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 (ESSRs) during construction of pedestrian and vehicle fence along the U.S./Mexico international border. Under the work plan, which would cover all CBP tactical infrastructure in the region of analyses, BMPs and conservation measures identified in both the Biological Assessment and this EA would ensure any impacts on threatened and endangered species would be minimized and, therefore, the cumulative impacts on species would not be significant.

4.2.7 Hydrology and Groundwater

Water quality and quantity of aquifers in the geographic action area have historically been affected adversely by surrounding land uses and water withdrawals. The Proposed Action does not involve new development activities; negligible to minor, indirect, adverse effects could occur on hydrology and groundwater systems from the maintenance and repair of roadways and drainage management structures. Maintenance of other existing tactical infrastructure (see projects identified in **Table 4-1**) would be expected to have similar effects on hydrology and groundwater as those described in this EA (see **Section 3.7.3**). Cumulatively, effects on hydrology and groundwater from the maintenance and repair of tactical infrastructure would be negligible.

4.2.8 Surface Waters and Waters of the United States

Surface water quality of subwatersheds within the action 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 3.8** (USEPA 2010d). Historically significant wetland losses have resulted from draining, dredging, filling, leveling, and flooding for agricultural and urban development. Texas has lost approximately half of its original wetlands (USGS 1996a).

The Proposed Action does not involve new development activities, but negligible to minor, indirect, adverse effects could occur on surface waters from the maintenance and repair of roadways and drainage management structures. Under the work plan, which as noted will include all CBP tactical infrastructure, BMPs would ensure impacts on surface water and wetlands are minimized. Cumulatively, effects on surface waters and waters of the United States from the maintenance and repair of tactical infrastructure would be negligible to minor in the short term but with the consistent observance of the work plan could result in long-term, minor beneficial impacts on surface water quality.

4.2.9 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. Vegetation control and debris removal could result in increased sedimentation into floodplains and drainage structures, but this would be a negligible, indirect effect. Maintenance of other existing tactical infrastructure would be expected to have similar effects on floodplains as those described in this EA (see **Section 3.9.3**). Cumulatively, effects on floodplains from the maintenance and repair of tactical infrastructure would be negligible.

4.2.10 Air Quality

USBP El Paso and Big Bend sectors operate within an AQCR that is in nonattainment for CO and PM_{10}. USBP Del Rio, Laredo, and Rio Grande Valley sectors operate within ACQRs that are in attainment for all criteria pollutants. The Proposed Action would have short-term, minor, localized, adverse effects on air quality during maintenance and repair activities. In USBP Del Rio, Laredo, and Rio Grande Valley sectors (i.e., Metropolitan San Antonio Intrastate and Brownsville-Laredo Intrastate AQCRs), emissions of PM_{10} would be greater than 100 tpy (see **Section 3.10.3**). Other construction and ground-disturbing activities could result in cumulative, adverse effects if there are multiple projects occurring at the same time and in the same vicinity. The adoption of appropriate BMPs and proposed schedule for maintenance under a centralized work plan 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. Moreover, because all CBP tactical infrastructure would be maintained via the work plan, it would be more likely, relative to the no action alternative, that BMPs will be incorporated into maintenance activities. Consequently cumulative effects on local and regional air quality from the maintenance and repair of tactical infrastructure would be minor.

4.2.11 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, negligible to minor, localized, adverse effects as a result of the operation of heavy machinery to maintain and repair tactical infrastructure. Maintenance and repair of tactical infrastructure in remote areas would be distant from most other substantial noise-generating activities, so there is little potential for cumulative effects. Increased noise from the operation of machinery could combine with existing noise sources or other construction-type activities 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 centralized work plan, the adoption of appropriate BMPs and proposed schedule for maintenance would ensure that noise would be minimized 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 from the maintenance and repair of all tactical infrastructure would be negligible to minor.

4.2.12 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. The Proposed Action involves maintenance and repair of tactical infrastructure along existing corridors and roadways. 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. No effects on cultural resources were identified in the ESSRs for construction of pedestrian and vehicle fence along the U.S./Mexico international border because cultural resources were appropriately identified and mitigated prior to construction. Cumulatively, effects on cultural resources from the maintenance and repair of tactical infrastructure would be negligible.

4.2.13 Roadways and Traffic

Most of the action area is remote; there are fewer and smaller roadways servicing remote areas. States and localities continuously maintain or improve roadways as needed to service the population, which occurs more frequently and intensely in populated areas than in remote areas. The roadways affected by the Proposed Action are primarily unpaved roadways classified as FC-3 or FC-4 (see **Appendix C**) that are not commonly used by the general public. Maintenance of other existing tactical infrastructure would be expected to have similar effects on roadways and traffic as those described in this EA (see **Section 3.13.3**). Cumulatively, effects on roadways and traffic from the maintenance and repair of tactical infrastructure would be negligible.

4.2.14 Hazardous Materials and Waste Management

Past development activities and land uses have resulted in multiple hazardous waste sites in the action area. As discussed in **Section 3.14**, Federal and state regulations govern the storage, transportation, handling, use, generation, and disposal of hazardous substances, petroleum products, and hazardous and petroleum wastes. Some of the action area is heavily agricultural, so herbicides and pesticides are used and stored. Pesticide sale and use are also regulated.

The Proposed Action and other tactical infrastructure maintenance and repair activities would use small amounts of hazardous materials. Quantities of hazardous materials for individual projects would be relatively small, contained to areas associated with work areas, 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 the maintenance and repair of tactical infrastructure would be negligible.

4.2.15 Socioeconomic Resources, Environmental Justice, and Protection of Children

The southwestern region of the United States, particularly Hidalgo, Webb, Starr, Cameron, Zapata, and Maverick counties, has experienced robust population growth over the past two decades. The Proposed Action would provide only minor, short-term, beneficial effects while maintenance and repair activities are occurring and would have little potential for cumulative effects on socioeconomic resources. Maintenance and repair activities of tactical infrastructure, including the Proposed Action and other projects identified in **Table 4-1**, would result in long-term, beneficial cumulative effects by allowing USBP agents to patrol border areas effectively. This would be considered cumulatively beneficial for the safety of all residents, including children, in the southern border area.

4.2.16 Alternative 2: No Action Alternative

The No Action Alternative (Alternative 2) would result in reactive maintenance and repair of tactical infrastructure within 25 miles of the U.S./Mexico international border in Texas. As discussed in **Section 3**, generally, the No Action Alternative would be expected to have a greater potential for adverse effects than the Proposed Action on soils, vegetation, terrestrial and aquatic wildlife, threatened and endangered species, groundwater, surface water and waters of the United States, floodplains, air quality, noise, cultural resources, roadways and traffic, hazardous materials and waste management, and socioeconomic resources. Under the No Action Alternative, maintenance and repair work would be completed on an as-needed basis without a centralized planning process that establishes maintenance and repair specifications and standardizes BMPs. The lack of a centralized planning effort would make it far more difficult for CBP to prevent the gradual degradation of all tactical infrastructure. This gradual degradation of past, present, and foreseeable future tactical infrastructure projects when considered in conjunction with the No Action Alternative could result in adverse impacts on resources well beyond the intended footprint of proposed maintenance and repair. Degraded roads and associated drainage features could lead to more adverse offsite erosion and sedimentation with an unintended increase in impacts on associated water quality and species habitat. There is a greater potential for emergency repairs when BMPs might not be implemented. Under such conditions, there is also a greater likelihood of repair activities occurring beyond the proposed footprint with a corresponding potential to affect adversely cultural resources and species habitat that have not been previously surveyed. Maintenance and repair activities could also be more sporadic under the No Action Alternative, which would be more adverse on socioeconomic resources than the Proposed Action. Effects on land use under the No Action Alternative would be the same as effects under the Proposed Action.

Cumulative effects on soils, vegetation, terrestrial and aquatic wildlife, threatened and endangered species, groundwater, surface water and waters of the United States, floodplains, air quality, noise, cultural resources, roadways and traffic, hazardous materials and waste management, and socioeconomics under the No Action Alternative would be expected to be more adverse than those discussed under the Proposed Action. Cumulative effects on land use would be essentially the same as those discussed under the Proposed Action. Implementation of the No Action Alternative would not, however, be expected to contribute to significant adverse, cumulative effects when considered with other recently completed or planned future projects in the action area.

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APPENDIX A

Applicable Laws and Executive Orders

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 U.S.C. 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 U.S.C. 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 U.S.C. 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 U.S.C. 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 U.S.C. 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 U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries and a biological assessment when such species are present in an area affected by Federal government activities.
Fish and Wildlife Coordination Act, 16 U.S.C. 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 the 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 U.S.C. 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 U.S.C. 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 decisionmaking process designed to identify unacceptable or unnecessary impacts to the environment.

Title, Citation	Summary
National Historic Preservation Act, 16 U.S.C. 470–470x-6	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 U.S.C. 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 U.S.C. 651–678	Establishes standards to protect workers, including standards on industrial safety, noise, and health standards.
Resource Conservation and Recovery Act, 42 U.S.C. 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 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 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, January 24, 2007, 72 FR 3919 (January 26, 2007)	Requires the head of each Federal agency to implement sustainable practices for energy efficiency, greenhouse gas emissions avoidance or reduction, and petroleum products use reduction; renewable energy, including bioenergy; water conservation; acquisition; pollution and waste prevention and recycling; reduction or elimination of acquisition and use of toxic or hazardous chemicals; high performance construction, lease, operation, and maintenance of buildings; vehicle fleet management; and electronic equipment. Requires more widespread use of Environmental Management Systems as the framework with which to manage and continually improve these sustainable practices.

Title, Citation	Summary
EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, October 5, 2009, 74 FR 52117 (October 8, 2009)	Directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation, and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas (GHG) emissions, water use, pollution prevention, regional development and transportation planning, and sustainable building design; and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings.
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.
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 Executive Orders (EOs) potentially relevant to this EA include, but are not limited to, the following:

- American Indian Religious Freedom Act, 42 U.S.C. 1996, et seq.
- Antiquities Act, 16 U.S.C. 433, et seq.; Archeological Resources Protection Act, 16 U.S.C. 470 aa-ll, et seq.
- Architectural Barriers Act, 42 U.S.C. 4151, et seq.
- Community Environmental Response Facilitation Act, 42 U.S.C. 9620, et seq.
- Department of Transportation Act, Public Law (P.L.) 89-670, 49 U.S.C. 303, Section 4(f), et seq.

- Emergency Planning and Community Right-to-Know Act, 42 U.S.C. 11001–11050, et seq.
- Environmental Quality Improvement Act, P.L. 98-581, 42 U.S.C. 4371, et seq.
- Farmlands Protection Policy Act, P.L. 97-98, 7 U.S.C. 4201, et seq.
- Federal Insecticide, Fungicide, and Rodenticide Act, P.L. 86-139, 7 U.S.C. 135, et seq.
- Federal Records Act, 44 U.S.C. 2101-3324, et seq.
- Fish and Wildlife Act of 1956, P.L. 85-888, 16 U.S.C. 742, et seq.
- Flood Disaster Protection Act, 42 U.S.C. 4001, et seq.
- Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001, et seq.
- Pollution Prevention Act of 1990, 42 U.S.C. 13101-13109, et seq.
- Safe Drinking Water Act, P.L. 93-523, 42, U.S.C. 201, et seq.
- Toxic Substances Control Act, 7 U.S.C. 136, et seq.
- Wild and Scenic Rivers Act, P.L. 90-542, 16 U.S.C. 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 11988, dated May 24, 1977, *Floodplain Management and Protection*, 42 FR 26951, as amended by EO 12148, dated July 20, 1979, 44 FR 43239
- EO 13007, dated May 24, 1996, *Historic Sites Act*, 16 U.S.C. 46, et seq.; Indian Sacred Sites, 61 FR 26771
- EO 12372, dated July 14, 1982, *Intergovernmental Review of Federal Programs*, 47 FR 30959, as amended by EO 12416, April 8, 1983, 48 FR 15587; supplemented by EO 13132, August 4, 1999, 64 FR 43255
- 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.

APPENDIX B

Public Involvement and Agency Coordination

APPENDIX B

Public Involvement and Agency Coordination

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The Honorable Laura Allen
County Judge
Val Verde County, Commissioners Court

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

The Honorable Tim Ward
County Judge
Kinney County, Commissioners Court

The Honorable Ramsey English Cantu
Mayor
City of Eagle Pass

Gloria Barrientos
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 Raul G. Salinas
Mayor
City of Laredo

Carlos R. Villarreal
City Manager
City of Laredo

The Honorable Danny Valdez
County Judge
Webb County, Commissioners Court

The Honorable Joe Rathmell
County Judge
Zapata County, Commissioners Court

The Honorable Ruben O. Villarreal
Mayor
Rio Grande City

Matt Z. Ruszczak
City Manager
Rio Grande City

The Honorable Eloy Vera
County Judge
Starr County, Commissioners Court

The Honorable Alfredo Guerra, Jr.
Mayor
City of Roma

Crisanto Salinas
City Manager
City of Roma

The Honorable Jim Darling
Mayor
City of McAllen

Roy Rodriguez
Interim City Manager
City of McAllen

The Honorable Ramon Garcia
County Judge
Hidalgo County, Commissioners Court

The Honorable Tony Martinez
Mayor
City of Brownsville

Charlie Cabler
City Manager
City of Brownsville

The Honorable Chris Boswell
Mayor
City of Harlingen

Carlos R. Yerena
City Manager
City of Harlingen

The Honorable Carlos H. Cascos, CPA
County Judge
Cameron County, Commissioners Court

Israel M Reyna
Barrio de Colores

Mr. Gabriel Perez
Environmental Manager
Union Pacific Railroad

Sample Interested Party Letter

April 24, 2014

Mr. John Blevans
«Division Directo»
«U.S. EPA »
«Region 6»
«1445 Ross Avenue »
«Suite 1200»
«Dallas, TX 75020»

Subject: Notice of Availability for the Draft Environmental Assessment (EA) Addressing Proposed Tactical Infrastructure Maintenance and Repair Along the U.S./Mexico International Border in Texas

Dear Mr. Blevens:

U.S. Customs and Border Protection (CBP), a component within the Department of Homeland Security (DHS), proposes to maintain and repair existing tactical infrastructure along the U.S./Mexico international border in Texas. Pursuant to the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (U.S.C.) 4321 et seq., CBP has prepared a Draft EA to identify and assess the potential impacts of maintenance and repair of existing tactical infrastructure consisting of fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and communications and surveillance tower components.

The 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 June 9, 2014. Please provide comments using only <u>one</u> of the following methods:

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

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

(c) By fax to (919) 785-1118.

When submitting comments, please include your name and address, and identify your comments as for the TX TIMR 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/nepa-documents/docs-review. 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 City Municipal 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, McAllen Public Library, Weslaco Public Library, Mercedes Memorial Library, Harlingen Public Library, San Benito Public Library, and Brownsville Public Library.

If you have any technical questions, please contact Mr. Paul Enriquez by mail at Border Patrol Facilities and Tactical Infrastructure, 24000 Avila Road - Suite 5020, Laguna Niguel, CA 92677; or by telephone at (949) 643-6365; or contact Mr. Joseph Zidron by telephone at (949) 643-6392.

Sincerely,

Paul Enriquez
Environmental Branch Chief
Border Patrol Facilities and Tactical Infrastructure
Program Management Office

Enclosure: Draft EA and FONSI

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APPENDIX C

Tactical Infrastructure Classifications and Maintenance and Repair Standards

APPENDIX C

Tactical Infrastructure Classifications and Maintenance and Repair Standards

Introduction

The tactical infrastructure will be maintained in accordance with proven maintenance and repair standards. All of the standards CBP is adopting are developed based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resources agencies. Below is a description of tactical infrastructure classifications and maintenance and repair standards.

Road Classification

CBP has developed a road classification system whereby roads are maintained to specific standards dependent upon their classification. Under the CBP classification system, five standards for roads have been developed:

- *FC-1 Paved Road* – Paved, all-weather road constructed of any material. Road is two lane with a total road width of 24 feet (see **Figures C-1** and **C-2**).
- *FC-2 All-Weather Road* – Unpaved, all-weather road consisting of a surface of imported aggregate material such as milled bituminous material or processed stone and gravel. Road is two-lane with a total road width of 24 feet (see **Figures C-3** and **C-4**).
- *FC-3 Graded Earth Road* – Unpaved road constructed of graded, native material. Road is two-lane with a total road width of 20 feet (see **Figures C-5** and **C-6**).
- *FC-4 Two-Track Road* – Unpaved road on natural ground consisting of a single lane with an overall road width of 10 feet (see **Figures C-7** and **C-8**).
- *FC-5 Sand Road* – Unpaved, sand road consisting of natural ground conditions, two lanes, and an overall road width of 16 to 18 feet (see **Figures C-9** and **C-10**).

Road Maintenance and Repair

The maintenance and repair of FC-1 and FC-2 roads within state, county, or municipal government's purview is completed by their transportation departments. Maintenance and repair of FC-1 and FC-2 roads located on Federal land are maintained in coordination and performed where necessary by agreement with the appropriate Federal agency. In general, CBP would adhere to U.S. Forest Service (USFS) standards for road maintenance, which have been tried and proven over many years and in a variety of environmental conditions.

Some of the tactical infrastructure on Federal lands is covered by the Secretary's waiver and is the responsibility of CBP to maintain and repair. In the few instances where CBP is required to maintain FC-1 and FC-2 roads, maintenance and repair would be restricted to minor resurfacing to address potholes in paved surfaces and rutting and raveling in all-weather roads. Minor work to shoulder areas of these roads would also be required to maintain the integrity of the road surfaces and roadbeds.

Figure C-1. FC-1 Paved Road (Photograph)

FC 1 – Paved Roads

The proposed paved road facility consists of two (2) 3.6 m (12 ft) travel lanes with 0.6 m (2 ft) shoulders at a 2% cross slope. The proposed pavement design for this section consists of 200 mm (8 in) of compacted aggregate base with a two (2) coarse surface treatment. Parallel ditches with a 1V:3H front slope and a 1V:4H back slope are proposed to provide proper drainage. Existing FC 1 roadways may vary from proposed roadway specifications.

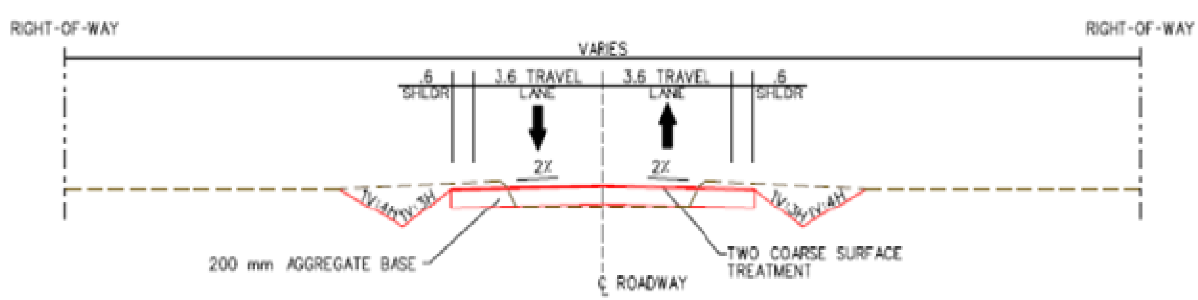

Figure C-2. FC-1 Paved Road (Diagram)

Figure C-3. FC-2 All-Weather Road (Photograph)

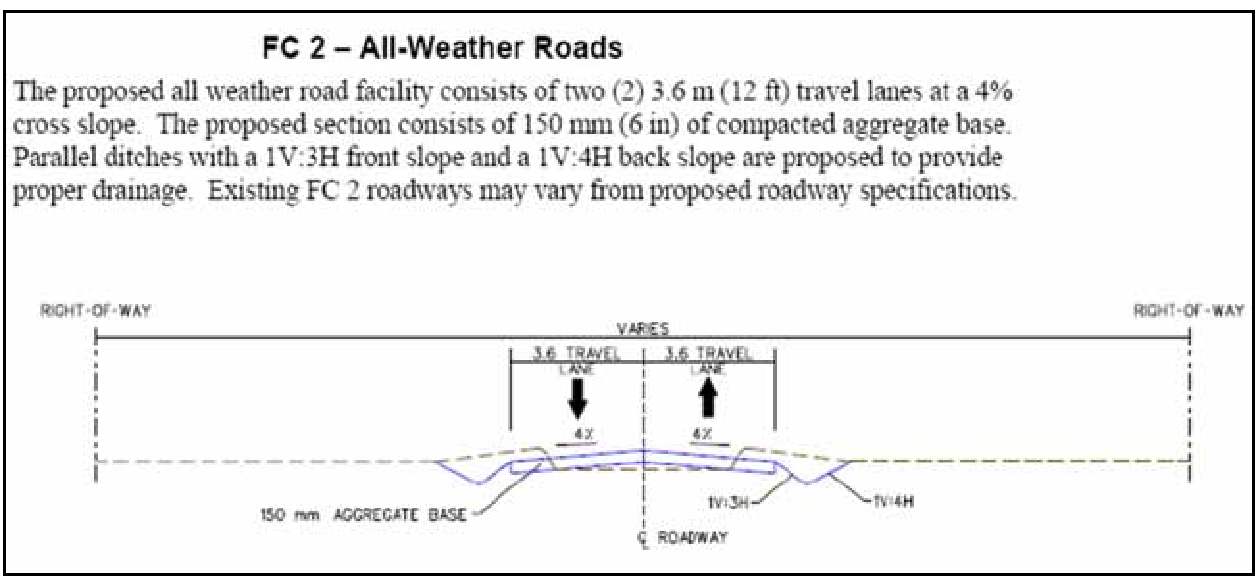

Figure C-4. FC-2 All-Weather Road (Diagram)

Figure C-5. FC-3 Graded Earth Road (Photograph)

FC 3 – Graded Earth Roads

The proposed graded earth road facility consists of two (2) 3.0 m (10 ft) travel lanes at a 4% cross slope. The proposed section consists of natural ground. Parallel ditches with a 1V:3H front slope and a 1V:4H back slope are proposed to provide proper drainage. Existing FC 3 roadways may vary from proposed roadway specifications.

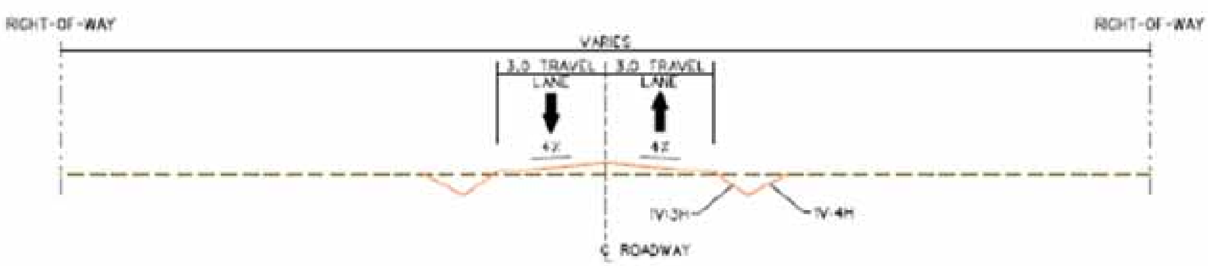

Figure C-6. FC-3 Graded Road (Diagram)

Figure C-7. FC-4 Two-Track Road (Photograph)

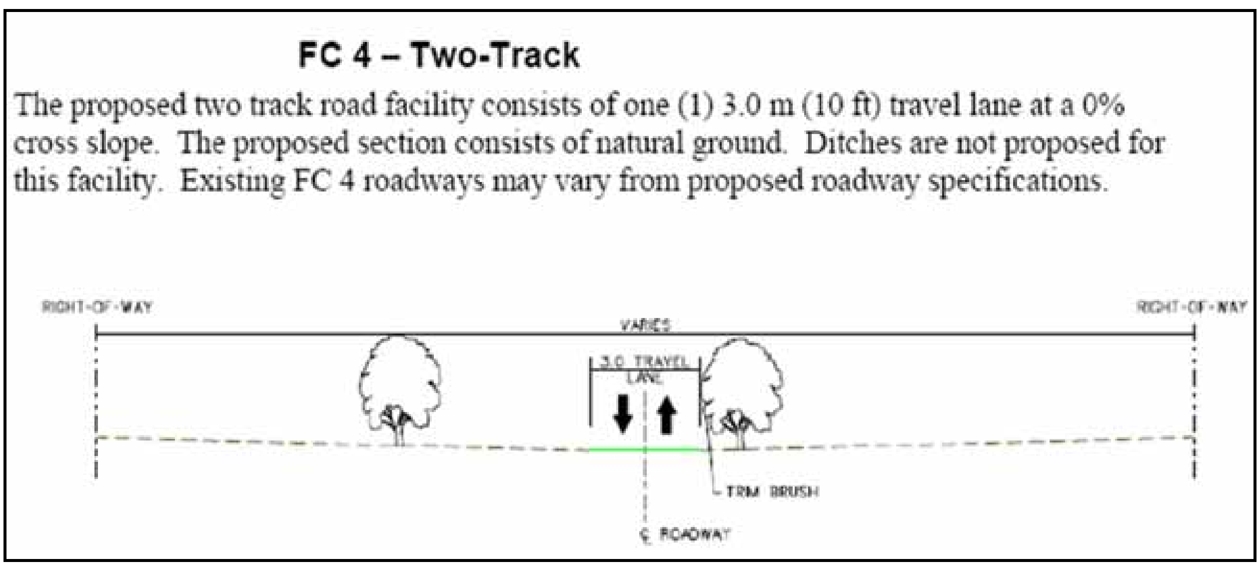

Figure C-8. FC-4 Two-Track Road (Diagram)

Figure C-9. FC-5 Sand Road (Photograph)

FC5 – Sand Road

The proposed sand road consists of 16-18 feet travel lane at a 0% cross slope. The proposed section consist of natural ground – no foundation base. Drainage ditches are not proposed for this type road. Existing FC-5 roadways may vary from proposed roadway specifications,

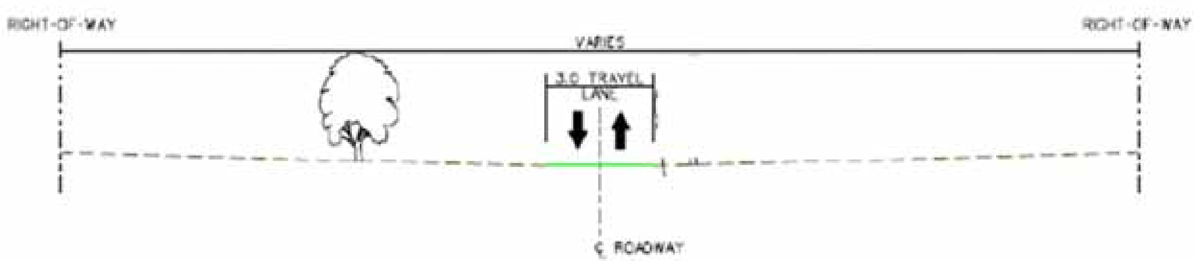

Figure C-10. FC-5 Sand Road (Diagram)

The majority of proposed maintenance and repair is planned for FC-3 and FC-4 roads. Because of their lack of formal construction design, FC-3 and FC-4 roadways are subject to the greatest deterioration if left unmaintained. When subjected to heavier traffic, rutting occurs, which in turn is exacerbated by rain events that further erode the surface. Unmanaged storm water flow also causes general erosion to occur, washing out complete sections of road and in many instances making roads impassable. The characteristics of the FC-4 road will remain unchanged from maintenance and repair.

Grading with the use of commercial grading equipment (see **Figure C-11**) is proposed to restore an adequate surface to FC-3 roads. USBP sector personnel and contract support personnel well-versed in grading techniques would be employed for such activity. A poorly regraded surface quite often results in rapid deterioration of the surface. The restored road should be slightly crowned and absent of windrows in the gutter line to avoid ponding and channeling within the road during rain events. Any associated roadside drainage would be maintained to ensure that runoff is relieved from the road surface quickly and effectively without creating further erosion issues. The addition of material to these roads to achieve the proposed objective would be kept to a minimum. All necessary erosion-control BMPs would be adopted to ensure stabilization of the project areas.

Figure C-11. Standard Grading Equipment

The frequency of maintenance would depend on usage and weather conditions (e.g., heavy rain seasons could require an increase in maintenance and repair). Maintenance and repair activities would include inspections to determine surface irregularities (e.g., potholes, washout), then grading, compacting, and reshaping of the road would occur generally using onsite soils as necessary. The addition of material to these roads to achieve the proposed objective would be kept to a minimum, but may be necessary to fill depressions or to grade the surface of the road back up to match shoulder grades. Roads could occasionally need to be scarified, have aggregate added, and the surface recompacted. It is recommended that these roads be inspected and, if necessary, maintained every six months and after major storm events. Debris and sedimentation removal from low water crossings, culverts, and ditches to minimize flooding, water diversion, and erosion would also occur every six months and after major storm events. All necessary erosion-control BMPs would be adopted to ensure stabilization of the project areas (see **Appendix E**).

As the two track name implies, FC-4 roads consist of two parallel tracks created by the loss of vegetation where the tires contact and compact the earth; between which may lay a strip of low-growth vegetation. These roads receive very little maintenance consisting primarily of occasional brush and boulder clearing, and possibly but much less frequently grading with small tractor mounted box blades. Two-track roads have no crown, and generally do not have any improved drainage features or ditches, although culverts and low water crossings may be installed where continuous erosion issues occur. Any maintenance and repair done to FC-4 roads would not change the character of the roadway.

Most FC-5 roads are associated with fence infrastructure that has been covered by the Secretary's waiver or previous NEPA documentation and therefore dismissed from further discussion. There are, however, some FC-5 roads that provide access to infrastructure that are not covered by the Secretary's waiver or previous NEPA documentation and will be examined throughout this EA. Activities to maintain FC-5 roads would be similar to those described above for FC-3 roads.

APPENDIX D

Detailed Maps of the Tactical Infrastructure Maintenance and Repair Action Area

APPENDIX D

Detailed Maps of the Tactical Infrastructure Maintenance and Repair Region of Analysis

There are approximately 74 ecological systems in the region of analysis (see **Table D-1**). The ecological systems that generally define and compose 95 percent of the landscape within the action area are described below. These ecological systems were extracted from NatureServe Explorer (NatureServe 2010).

Additionally, links are provided here for supplementary detailed maps of the tactical infrastructure along the U.S./Mexico international border in Texas (see Map Index on page **D-4**). In addition to displaying existing tactical infrastructure, the maps display the ranges of federally threatened and endangered species that would require use of species-specific BMPs, as formally agreed upon during consultation with the USFWS and further discussed in the Biological Assessment.

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 maintenance and repair 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 E** 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 maintenance and repair solutions in sensitive areas. Descriptions of state-listed rare, threatened, and endangered species, their habitat, and impact determinations are outlined in **Table D-2**.

Table D-1. Ecological Systems within the Region of Analysis

Ecological Systems
Chihuahuan Mixed Desert and Thorn Scrub
Tamaulipan Mesquite Upland Scrub
Apacherian-Chihuahuan Mesquite Upland Scrub
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub
Chihuahuan Succulent Desert Scrub
Apacherian-Chihuahuan Semi-Desert Grassland and Steppe
Tamaulipan Calcareous Thornscrub
Tamaulipan Savanna Grassland
Edwards Plateau Limestone Shrubland
Cultivated Cropland
Chihuahuan Loamy Plains Desert Grassland
Edwards Plateau Limestone Savanna and Woodland
Chihuahuan Mixed Salt Desert Scrub
Developed, Low Intensity
Developed, Open Space
Disturbed, Non-specific
Madrean Encinal
Tamaulipan Floodplain
Developed, Medium Intensity
Pasture/Hay
North American Warm Desert Riparian Systems
Western Great Plains Shortgrass Prairie
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub
Tamaulipan Riparian Systems
Western Great Plains Mesquite Woodland and Shrubland
Open Water (Fresh)
Chihuahuan-Sonoran Desert Bottomland and Swale Grassland
Edwards Plateau Riparian
Rocky Mountain Montane Riparian Systems
Developed, High Intensity
North American Warm Desert Riparian Woodland and Shrubland
South Texas Sand Sheet Grassland
Texas Coastal Bend Beach
Gulf and Atlantic Coastal Plain Tidal Marsh Systems
North American Warm Desert Pavement
Disturbed/Successional - Shrub Regeneration
North American Warm Desert Lower Montane Riparian Woodland and Shrubland
North American Warm Desert Badland
Madrean Pinyon-Juniper Woodland
Modified/Managed Southern Tall Grassland
Madrean Juniper Savanna
Texas Saline Coastal Prairie
South Texas Dune and Coastal Grassland
Tamaulipan Mixed Deciduous Thornscrub
South Texas Lomas

Ecological Systems
Central and South Texas Coastal Fringe Forest and Woodland
North American Warm Desert Bedrock Cliff and Outcrop
Mogollon Chaparral
Western Great Plains Sandhill Steppe
Southern Rocky Mountain Juniper Woodland and Savanna
Texas-Louisiana Coastal Prairie
Western Great Plains Floodplain Systems
Southwestern Great Plains Canyon
Western Great Plains Cliff and Outcrop
Sonora-Mojave Mixed Salt Desert Scrub
Edwards Plateau Dry-Mesic Slope Forest and Woodland
North American Warm Desert Playa
Open Water (Brackish/Salt)
East-Central Texas Plains Riparian Forest
Introduced Riparian and Wetland Vegetation
Inter-Mountain Basins Semi-Desert Shrub Steppe
Chihuahuan Sandy Plains Semi-Desert Grassland
Harvested forest-Shrub Regeneration
Sonoran Paloverde-Mixed Cacti Desert Scrub
Introduced Upland Vegetation - Annual Grassland
Chihuahuan Gypsophilous Grassland and Steppe
North American Warm Desert Wash
Inter-Mountain Basins Semi-Desert Grassland
Madrean Oriental Chaparral
Rocky Mountain Gambel Oak-Mixed Montane Shrubland
Edwards Plateau Mesic Canyon
Rocky Mountain Lower Montane-Foothill Shrubland
Inter-Mountain Basins Big Sagebrush Shrubland
Southern Rocky Mountain Ponderosa Pine Woodland

Map Index for Texas Federally Threatened and Endangered Species

Twenty-four federally listed threatened and endangered species have the potential to occur in the region of analysis and could be affected by the Proposed Action. The ranges of federally listed threatened and endangered species within the region of analysis 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 **Sneed pincushion cactus.**
- Click here to view the species range map for **South Texas ambrosia ragweed.**
- 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 **Texas snowbells.**
- 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.**

Table D-2. Determination of Impacts For State Listed Rare, Threatened and Endangered Species That Occur Within El Paso, Hudspeth, Culberson, Jeff Davis, Presidio, Brewster, Pecos, Terrell, Val Verde, Edwards, Kinney, Uvalde, Zavala, Maverick, Dimmit, Webb, Zapata, Starr, Hidalgo, and Cameron Counties, Texas

Species	Listing Status	Habitat	Range (County)	Determination
ARACHNIDS				
Guadalupe Cave pseudoscorpion *Archeolarca guadalupensis*	R	Lives in leaf mold or decaying vegetation, in soils, beneath bark and stones, and in some mammals' nests.	Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Dolan Falls salamander *Eurycea sp 10*	R	Springs and waters.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Edwards Plateau spring salamanders *Eurycea sp 7*	R	Springs and waters of some caves of this region.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
AMPHIBIANS (CONTINUED)				
Mexican treefrog *Smilisca baudinii*	T	Sub-humid regions near streams and in resacas.	Hidalgo and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Sheep frog *Hypopachus variolosus*	T	Predominantly grassland and savanna; moist sites in arid areas.	Hidalgo and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Valdina Farms sinkhole salamander *Eurycea troglodytes complex*	R	Isolated, intermittent pools of a subterranean streams and sinkholes.	Edwards, Kinney, Uvalde, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
BIRDS				
Audobon's oriole *Icterus graduacauda audubonii*	R	Scrub, mesquite; nests in dense trees, or thickets, usually along water courses.	Cameron, Dimmit, Hidalgo, Maverick, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Baird's sparrow *Ammodramus bairdii*	R	Short-grass prairie with scattered shrubs.	Brewster, Culberson, Dimmit, Edwards, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Terrell, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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 7-21 meters above ground.	Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
Brownsville common yellowthroat *Geothlypis trichas insperata*	R	Tall grasses and bushes near ponds, marshes, and swamps.	Brewster, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Common black-hawk *Buteogallus anthracinus*	T	In cottonwoods (*Populus* spp.) or willows (*Salix* spp.) within riparian areas.	Brewster, Cameron, Culberson, Hidalgo, Jeff Davis, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Ferruginous hawk *Buteo regalis*	R	Open areas, especially prairies, plains, and badlands.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Gray hawk *Asturina nitida*	T	Riparian woodlands and adjacent scrub grasslands.	Brewster, Cameron, Hidalgo, Presidio, Starr, Terrell, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Hook-billed kite *Chondrohierax uncinatus*	R	Dense tropical and subtropical forests, but does occur in open woodlands.	Hidalgo, Starr, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
Mexican hooded oriole *Icterus cucullatus cucullatus*	R	Thick riparian vegetation.	Dimmit, Kinney, Maverick, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Montezuma quail *Cyrtonyx montezumae*	R	Grassy openings in pine-oak or oak-juniper	Brewster, Culberson, Edwards, El Paso, Hudspeth, Jeff Davis, Maverick, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mountain plover *Charadrius montanus*	R	Short-grass prairie, but occasionally in cropland or barren ground.	Brewster, Culberson, Dimmit, Edwards, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Uvalde, Webb, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Prairie falcon *Falco mexicanus*	R	Open, mountainous areas, plains and prairie. Nests on cliffs.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
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, Hidalgo, and Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Rose-throated becard *Pachyramphus aglaiae*	T	Riparian trees, woodlands, open forest, scrub, and mangroves; breeding April to July.	Cameron, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Sennett's hooded oriole *Icterus cucullatus sennetti*	R	Builds nests in Spanish moss (*Tillandsia usneoides*). Breeding March to August.	Brewster, Cameron, Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Snowy plover *Charadrius alexandrinus*	T	Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast.	Cameron, Culberson, El Paso, Hudspeth, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Southeastern snowy plover *Charadrius alexandrinus tenuirostris*	R	Wintering migrant along beaches and bayside mud or salt flats.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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, Culberson, Dimmit, Edwards, El Paso, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Starr, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Western snowy plover *Charadrius alexandrinus nivosus*	R	Breeds in open areas of shortgrass prairie.	Cameron, Culberson, El Paso, Hidalgo, Hudspeth, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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, Culberson, Edwards, Hidalgo, Jeff Davis, Pecos, Presidio, Starr, Terrell, Uvalde, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
CRUSTACEANS				
Devil's Sinkhole amphipod *Stygobromus hadenoecus*	R	Subaquatic; subterranean obligate crustacean; in cave pools.	Edwards	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Ezell's cave amphipod *Stygobromus flagellatus*	R	Known only from artesian wells.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Blotched gambusia *Gambusia senilis*	T	Formerly known from springs and vegetated, quiet pools; probably extirpated.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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, Uvalde, Val Verde, and Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bluntnose shiner *Notropis simus simus*	T	Pecos River; main river channel.	El Paso, Hudspeth, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Chihuahua catfish *Ictalurus sp.*	R	Rio Grande, main river channel.	Brewster, Jeff Davis, Kinney, Maverick, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Guadalupe bass *Micropterus treculii*	R	Perennial streams.	Edwards and Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Headwater catfish *Ictalurus lupus*	R	Clear streams and rivers with moderate gradients.	Brewster, Jeff Davis, Kinney, Maverick, Presidio, Terrell, Uvalde, Val Verde, and Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Manantial roundnose minnow *Dionda argentosa*	R	Creeks, medium rivers, streams and springs.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Maravillas red shiner *Cyprinella lutrensis blairi*	R	Maravillas Creek.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican goby *Ctenogobius claytonii*	T	Brackish and freshwater coastal streams.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Pecos pupfish *Cyprinodon pecosensis*	T	Shallow margins of clear, vegetated spring waters high in calcium carbonate, as well as in sinkhole habitats.	Culberson, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Proserpine shiner *Cyprinella proserpina*	T	Rocky runs and pools of creeks and small rivers.	Kinney, Maverick, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
INSECTS				
A mayfly *Allenhyphes michaeli*	R	Texas Hill country. Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A mayfly *Caenis arwini*	R	Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A mayfly *Campsurus decoloratus*	R	Clay substrates; mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A mayfly *Neochoroterpes kossi*	R	Small streams and adjacent shoreline vegetation.	Culberson	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
A Royal moth *Sphingicampa blanchardi*	R	Woodland - hardwood; Tamaulipan thornscrub with caterpillar's host plant, Texas Ebony (*Pitheocellobium flexicaule*) an important element.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A Royal moth *Sphingicampa raspa*	R	Wooded areas with oaks, junipers, legumes and other woody trees and shrubs	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Culberson, El Paso, Hudspeth, Jeff Davis, and Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A tiger beetle *Amblycheila picolominii*	R	Bare rock/talus/scree, desert, grassland/herbaceous; burrowing in or using soil.	Culberson	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
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.	Culberson, El Paso, and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Blanchard's sphinx moth *Adhemarius blanchardorum*	R	Deciduous forest.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bleached skimmer *Libellula composita*	R	Dragonfly; alkaline spring-fed streams and marshes, adults can oviposit directly into hot water in hot springs, larvae live in cooler spring runs, adults forage in brushlands; invertivore, diurnal, larvae overwinter, flight season mid June to late August.	Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bonita diving beetle *Deronectes neomexicana*	R	Streams and creeks.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	**Listing Status**	**Habitat**	**Range (County)**	**Determination**
INSECTS (CONTINUED)				
Chisos metalmark *Apodemia chisosensis*	R	Agave scrub communities.	Brewster and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Chisos skipperling *Piruna haferniki*	R	Openings in oak-pine woodlands with an understory of broad-leaved grasses.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Coahuila giant skipper *Agathymus remingtoni valverdiensis*	R	Associated with the foodplant Lechuguilla (*Agave lechuguilla*) in desert hills and thorn forest.	Edwards, Kinney, Terrell, and Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Leonora's dancer damselfly *Argia leonorae*	R	Small streams and seepages.	Hudspeth, Kinney, Presidio, Terrell, Uvalde, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Neojuvenile tiger beetle *Cicindela obsoleta neojuvenilis*	R	Bare or sparsely vegetated, dry, hard-packed soil; typically in previously disturbed areas.	Dimmit, Hidalgo, Maverick, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Poling's hairstreak *Fixsenia polingi*	R	Oak woodlands.	Brewster, Culberson, El Paso, Jeff Davis, Pecos, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Rawson's metalmark *Calephelis rawsoni*	R	Desert scrub or oak woodlands in foothills.	Brewster, Hidalgo, Jeff Davis, Pecos, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
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 and Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Smyth's tiger beetle *Cicindela chlorocephala smythi*	R	Live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Tamaulipan agapema *Agapema galbina*	R	Tamaulipan thornscrub with adequate densities of the caterpillar foodplant *Condalia hookeri hookeri*.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Tawny giant skipper *Agathymus neumoegeni chisosensis*	R	Grasslands, shrublands, and woodlands.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
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.	Culberson and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
MAMMALS				
Big free-tailed bat *Nyctinomops macrotis*	R	Roosts in cracks and crevices in cliff faces and canyon walls	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis Pecos, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Black bear *Ursus americanus*	T	Large tracts of bottomland hardwood forests.	Brewster, Culberson, Dimmit, Edwards, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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.	Culberson, Edwards, El Paso, Hudspeth, Jeff Davis, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Carrizo Springs pocket gopher *Geomys personatus streckeri*	R	Underground burrows of deep, sandy soils; feed mostly on vegetation	Dimmit, Maverick, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
Cave Myotis *Myotis velifer*	R	Roosts in caves and tunnels.	Brewster, Culberson, Dimmit, Edwards, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Davis pocket gopher *Geomys personatus davisi*	R	Burrows in sandy soils	Dimmit, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Davis Mountains cottontail *Sylvilagus floridanus robustus*	R	Brushy pastures, edges of cultivated fields, and well-drained streamsides.	Brewster, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Desert bighorn sheep *Ovis canadensis mexicana*	R	Rocky mountainous terrain including bluffs and steep slopes with sparse vegetation.	Brewster, Culberson, Hudspeth, and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
Desert pocket gopher *Geomys arenarius*	R	Cottonwood-willow association; live underground, but build large and conspicuous mounds.	El Paso and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Ghost-faced bat *Mormoops megalophylla*	R	Occupies caves and mines	Brewster, Cameron, Dimmit, Edwards, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Terrell, Uvalde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
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, Culberson, Hudspeth, Jeff Davis and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Limpia southern pocket gopher *Thomomys bottae limpiae*	R	Ranges from loose sands and silts to tight clays	Brewster, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican long-tongued bat *Choeronycteris mexicana*	R	Deep canyons where uses caves and mine tunnels as day roosts.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Culberson, Edwards, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
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, Jeff Davis, and Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Presidio mole *Scalopus aquaticus texanus*	R	Occurs in moist (not wet), sandy soils; live underground in excavated or usurped burrows.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas pocket gopher *Geomys personatus fuscus*	R	Underground burrows of deep, sandy soils.	Kinney and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Spotted bat *Euderma maculatum*	T	Ranges from desert scrub to pine forests at high elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Western red bat *Lasiurus blossevillii*	R	Riparian areas. Roosts in deciduous trees along riparian courses.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
Western small-footed bat *Myotis ciliolabrum*	R	Ranges from desert scrub to wooded areas. Roosts beneath rocks, underneath exfoliating bark, and in buildings.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
White-nosed coati *Nasua narica*	T	Woodlands, riparian corridors and canyons.	Brewster, Cameron, Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Terrell, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Yellow-nosed cotton rat *Sigmodon ochrognathus*	R	Rocky slopes with scattered shrubs and bunch grasses. Nests located at base of shrubs.	Brewster, Culberson, Hudspeth, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Yuma myotis *Myotis yumanensis*	R	Lowland habitats near open water.	Brewster, Culberson, Dimmit, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS				
Chisos Mountains threeband *Humboldtiana chisosensis*	R	Xeric rockslides along the lower margin of pine woodlands.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Brune's tryonia *Tryonia brunei*	R	Benthic; abundant on firm substratum and in soft mud before modification.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Davis Mountains threeband *Humboldtiana cheatumi*	R	Terrestrial snail; deciduous leaf litter in cool, moist upper reaches of canyons.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Pecos, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Franklin Mountain talus snail *Sonorella metcalfi*	R	Terrestrial; bare rock, talus, scree; inhabits igneous talus most commonly of rhyolitic origin.	El Paso	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mitre Peak threeband *Humboldtiana ferrissiana*	R	Terrestrial snail; in leaf litter, under rocks.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Northern threeband *Humboldtiana ultima*	R	Leaf litter in mesic canyons of limestone mountains; in soil, under rocks.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Presidio County spring snail *Fontelicella metcalfi*	R	Found in the outflows of springs (24 degrees C) in fine mud and dense watercress.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
San Carlos threeband *Humboldtiana hoegiana praesidii*	R	Leaf litter and in soil under rocks in higher elevations of desert mountain ranges.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Stockton Plateau threeband *Humboldtiana texana*	R	Rocky hillsides with a mixture of dwarf oaks and bunch grasses. Elevation from 1,200-1,500 m (3,900-5,000 ft)	Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Black-striped snake *Coniophanes imperialis*	R	Semi-arid coastal plain, warm, moist micro-habitats and sandy soils.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
Chihuahuan Desert lyre snake *Trimorphodon vilkinsonii*	T	Rocky hillsides and mountain slopes.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Chihuahuan mud turtle *Kinosternon hirtipes murrayi*	T	Fresh water with abundant aquatic vegetation; semi-aquatic.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Keeled earless lizard *Holbrookia propinqua*	R	Coastal dunes, barrier islands, and other sandy areas.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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.	Culberson, El Paso, Hudspeth, and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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 about 2 acres.	El Paso	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
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.	Dimmit, Hidalgo, Kinney, Maverick, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Reticulated gecko *Coleonyx reticulatus*	T	Rocky canyons and crevices in arid habitats.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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.	Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
Texas horned lizard *Phrynosoma cornutum*	T	Arid and semi-arid regions with sparse vegetation, including shrubs, grasses, and cacti.	Brewster, Cameron, Culberson, Dimmit, Edwards, El Paso, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Starr, Terrell, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas scarlet snake *Cemophora coccinea lineri*	T	Mixed hardwood scrub on sandy soils.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas tortoise *Gopherus berlandieri*	T	Scrub and brushlands with sandy, well draining soils.	Brewster, Cameron, Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts. .

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
Trans-Pecos black-headed snake *Tantilla cucullata*	T	Mesquite-creosote and pinyon-juniper-oak in the limestone hills.	Brewster, Jeff Davis, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
PLANTS				
Alkali spurge *Chamaesyce astyla*	R	In nearly bare areas within alkali sacaton (*Sporobolus airoides*) grasslands on alkaline and/or saline silt loam on alluvial flats along a spring-fed desert stream; flowering and fruiting at least March-June and August-September.	Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Appressed two-bristle rock daisy *Perityle bisetosa var appressa*	R	Rock outcrops and crevices in limestone exposures on cliffs.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Bearded mock-orange *Philadelphus crinitus*	R	Talus slopes (igneous); flowering July-August.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Big Bend hop-hornbeam *Ostrya chisosensis*	R	Mixed woodlands on mesic, rocky, igneous slopes at high elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Bigpod bonamis *Bonamia ovalifolia*	R	Slopes and drainages with sandy and/or gravelly soils.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Black-corona milkvine *Matelea atrostellata*	R	Rocky soils in mountain canyons and oak-pinyon-juniper woodlands.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Blumberg's centaury *Centaurium blumbergianum*	R	Known from perennial seeps and associated drainages in limestone, sandstone, or gypseous canyons.	Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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.	Edwards and Kinney	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Brush-pea *Genistidium dumosum*	R	Desert scrub on rocky limestone hills at lower elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Buckley's spiderwort *Tradescantia buckleyi*	R	Occurs on sandy loam or clay soils in grasslands or shrublands.	Cameron and Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bushy wild buckwheat *Eriogonum suffruticosum*	R	Open areas on limestone slopes, low hills, and clay flats.	Brewster, Pecos, and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chaffey's cory cactus *Escobaria dasyacantha var chaffeyi*	R	Pine-oak-juniper woodlands on rocky igneous and limestone soils at 1425-2225 m (4675-7300 ft).	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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 (0.5-1 cm diameter), some soils display minor eolian coppicing; flowering April-May.	Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chisos agave *Agave glomeruliflora*	R	Gravelly or rocky soils in oak-juniper woodlands and mesquite-creosote bush-invaded grasslands at elevations of about 600-1800 m (1950-5900 ft); flowering mid-spring to early fall.	Brewster, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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 and Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chisos oak *Quercus graciliformis*	R	Oak woodlands in dry rocky canyons, usually associated with a high water table; above elevations of 1650 m (5400 ft); flowering in the spring, fruiting July-early September.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Chisos pinweed *Lechea mensalis*	R	Open oak-pinyon-juniper woodlands over igneous or sandstone rock outcrops at high elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Cliff bedstraw *Galium correllii*	R	Dry, steep or vertical limestone cliff faces at elevations of 350-500 m (1150-1650 ft); flowering April-November, fruiting May-December.	Brewster and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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.	Kinney, Maverick, Val Verde, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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 and Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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 County	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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, 1200-1500 m (3900-4900 ft), 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, Pecos, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Dimmit sunflower *Helianthus praecox ssp hirtus*	R	Bluestem midgrass grasslands on loose, well-drained, slightly acid, deep, sandy soils, mostly of Antosa-Bobilla Association and Poteet Series; underlain by Carrizo Sand Formation; flowering late summer-fall.	Dimmit	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Don Richard's spring moss *Donrichardsia macroneuron*	R	Shaded limestone rocks partially submerged in rapidly flowing relatively thermally constant water at a spring complex in a short 10 m (30 ft) run between the spring source and the river.	Edwards	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Duncan's cory cactus *Escobaria dasyacantha var duncanii*	R	Chihuahuan Desert scrub at low to moderate elevations 650-1825 m (2150-6000 ft) 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Falfurrias milkvine *Matelea radiata*	R	Only two known specimens; one from clay soil on dry gravel hills at altitude of approximately 45 m (150 ft); other from Falfurrias, no habitat description; probably flowering May-June.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Glass Mountains rock-daisy *Perityle vitreomontana*	R	Crevices and solution pockets in Capitan Limestone exposures on cliffs and rock outcrops.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Graybeard cactus *Echinocereus viridiflorus var canus*	R	Steep rubble of black Maravillas chert, near top of ridge.	Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Grayleaf rock-daisy *Perityle cinerea*	R	Crevices in dry limestone caprock of mesas; flowering spring-fall.	Pecos and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Golden-spine hedgehog cactus *Echinocereus chloranthus var neocapillus*	R	Sparsely vegetated desert grasslands over novaculite outcrops; flowering late March-early May.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Golden-spine prickly-pear *Opuntia aureispina*	R	Desert flats and low hills on slabs of fractured Boquillas limestone at 480-850 m (1576-2800 ft) elevation; flowering March-May.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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).	Culberson and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Guadalupe Mountains mescal bean *Sophora gypsophila var guadalupensis*	R	One-seeded juniper (*Juniperus monosperma*) shrublands on dry slopes above 1,500 m (4,900 ft) elevation in Guadalupe Mountains on slightly gypseous pink sandstone that occurs as lenses within the pervasive limestone of the region; flowering late March-late April or May.	Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Guadalupe Mountains pincushion cactus *Escobaria guadalupensis*	R	On exposed slabs and fractured limestone rock on steep, mostly south-facing slopes in pine-oak-juniper woodlands at (1370-) 1825-2650 m ([4500-] 6000-8700 ft) in the Guadalupe Mountains; flowering April-May; fruiting October-November.	Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Guadalupe Mountains rabbitbrush *Ericameria nauseosa ssp texensis*	R	Crevices and solution pits in limestone ledges and boulders, less often in open gravel alluvium of streambeds at elevations between 1490 and 2150 m (4900 and 7050 ft); flowering September-November.	Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Guadalupe Mountains violet *Viola guadalupensis*	R	Bullet' hole openings in dolomitized limestone rock faces, in the shade of an open Douglas-fir (*Pseudotsuga menziesii)* woodland at about 2,450 m (8,000 ft) elevation in the Guadalupe Mountains; flowering March-May.	Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Havard's machaeranthera *Xanthisma viscidum*	R	Occurs on calcareous or sandy soils in desert shrublands or mesquite grasslands.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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.	Pecos and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Hinckley's Jacob's-ladder *Polemonium pauciflorum ssp hinckleyi*	R	Mesic canyons and shaded talus boulder field on igneous slopes, elevation 2,100-2,300 m (6,900-7,550 ft), often in the shade of a pine-oak-juniper forest; flowering July-October.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Kay's grama *Bouteloua kayi*	R	Gravelly soils on desert flats and on limestone ledges along bluffs; flowering May-November.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Lateleaf oak *Quercus tardifolia*	R	Mixed evergreen-deciduous woodlands in moist canyon bottoms at elevation ca. 2,150 m (7,050 ft); flowering in the spring.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Leatherweed croton *Croton pottsii var thermophilus*	R	Sparsely vegetated desert grasslands on extremely xeric sites at low elevations (500-800 m [1650-2640 ft), on substrates ranging from sand to limestone and basalt; flowering spring-fall.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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 and Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Little-leaf brongniartia *Brongniartia minutifolia*	R	Desert shrublands at lower elevations 600-1400 m (1950-5000 ft), in blackish sand, gravel, volcanic ash and other substrates, often in or along arroyos or shallow drainages; flowering May-August.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Livermore sandwort *Arenaria livermorensis*	R	Sparsely vegetated igneous rock outcrops at higher elevations, 2300-2500 m (7600-8200 ft).	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
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 Jun	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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.	Pecos and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Manystem spiderflower *Cleome multicaulis*	R	Wet, saline or alkaline sandy soils around alkali sinks or flats, saline playas, springs, or meadows.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Maravillas milkwort *Polygala maravillasensis*	R	Crevices of limestone exposed on canyons walls, and in low desert mountains at 450-950 m (1,450-3,100 ft) elevation; flowering May-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican mud-plantain *Heteranthera mexicana*	R	Wet clayey soils of resacas and ephemeral wetlands; flowering June-December.	Cameron, Dimmit, Hidalgo, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Ojinaga ringstem *Anulocaulis reflexus*	R	Primarily on shaley gypseous clays at 800 - 1200 m (2600-4000 ft); flowering mid-May - mid-October.	Jeff Davis and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Old blue pennyroyal *Hedeoma pilosum*	R	Single historic record from open exposed limestone; flowering period unknown.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Powell's Mormon tea *Ephedra torreyana var powelliorum*	R	Desert scrub on gravelly to fine grained gypseous soils; 850-1100 m (2789-3609 ft).	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Ripley's senna *Senna ripleyana*	R	Gravelly hilltops in arid grasslands and creosote flats in Chihuahuan Desert; elevation ranges 1,200-1,500 m (3,900-4,900 ft); flowering/fruiting July-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Robust oak *Quercus robusta*	R	Mixed evergreen-deciduous woodlands in moist canyon bottoms at elevations ca. 1,280 m (4,200 ft) flowering in the spring.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Royal red penstemon *Penstemon cardinalis ssp regalis*	R	Pine-oak woodlands in canyons at higher elevations; flowering May-June (-August).	Culberson and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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 10 to 150 m (30 to 500 ft); late spring or early summer, November, fruit has been collected in August.	Cameron, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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.	Uvalde and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Sand sacahuista *Nolina arenicola*	R	Mesquite-sand sage shrublands on windblown Quarternary reddish sand in dune areas; flowering time uncertain May-June, June-September.	Culberson, Edwards, and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Shinner's sunflower *Helianthus occidentalis ssp plantagineus*	R	Mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country.	Dimmit	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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 about 1,350-1,750 m (4,400-5,750 ft); flowering late March-early April, before the leaves have fully expanded.	Brewster and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Sierra del Carmen oak *Quercus carmenensis*	R	Shrublands and woodlands on talus slopes at 2,200-2,500 m (7,200-8,200 ft) elevation; immature fruit collected in July.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Slimlobe rock-daisy *Perityle dissecta*	R	Limestone cliff faces in desert canyons; flowering/fruiting spring-fall.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Smooth-stem skullcap *Scutellaria laevis*	R	Mountain slopes and in arroyos along dry streambeds; flowering April-September.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Sparsely-flowered jewelflower *Streptanthus sparsiflorus*	R	Shaded areas in gravelly limestone canyons and arroyos, often in dry creek beds at elevations ranging 1,200-1,800 m (3,900-5,900 ft); flowering May-June.	Culberson	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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.	Uvalde, Val Verde, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Stalk-leaf phacelia *Phacelia petiolata*	R	On gypsum soils at low elevations; flowering May-August.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Straw-spine glory-of-Texas *Thelocactus bicolor var flavidispinus*	R	Rocky hills in desert grasslands or shrublands below about 1,500 m (5000 ft); flowering late March-May.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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.	Uvalde and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Texas milkvine *Matelea texensis*	R	Desert grasslands or woodlands over igneous substrate, at elevations between 1200-1500 m (3900-5000 ft); flowering/fruiting May-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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.	Edwards and Uvalde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
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, Culberson, and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Tharp's blue-star *Amsonia tharpii*	R	Open areas in midgrass grasslands or shrublands in shallow clay soils over limestone.	Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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 and Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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, Culberson, Jeff Davis, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Warnock's rock-daisy *Perityle warnockii*	R	Crevices and solution pits in steep, dry, inaccessible limestone bluffs; flowering spring-fall.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Wendt's malaxis *Malaxis wendtii*	R	Oak-juniper-pinyon woodlands ; flowering July-September.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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 550-1370 m (1800-5000 ft) in the Chihuahuan Desert; flowering early March-May.	Pecos and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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 900-1500 m (2950-4900 ft); flowering April-August.	Brewster, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect 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; and Bats of Texas by Loren K. Ammerman 2012

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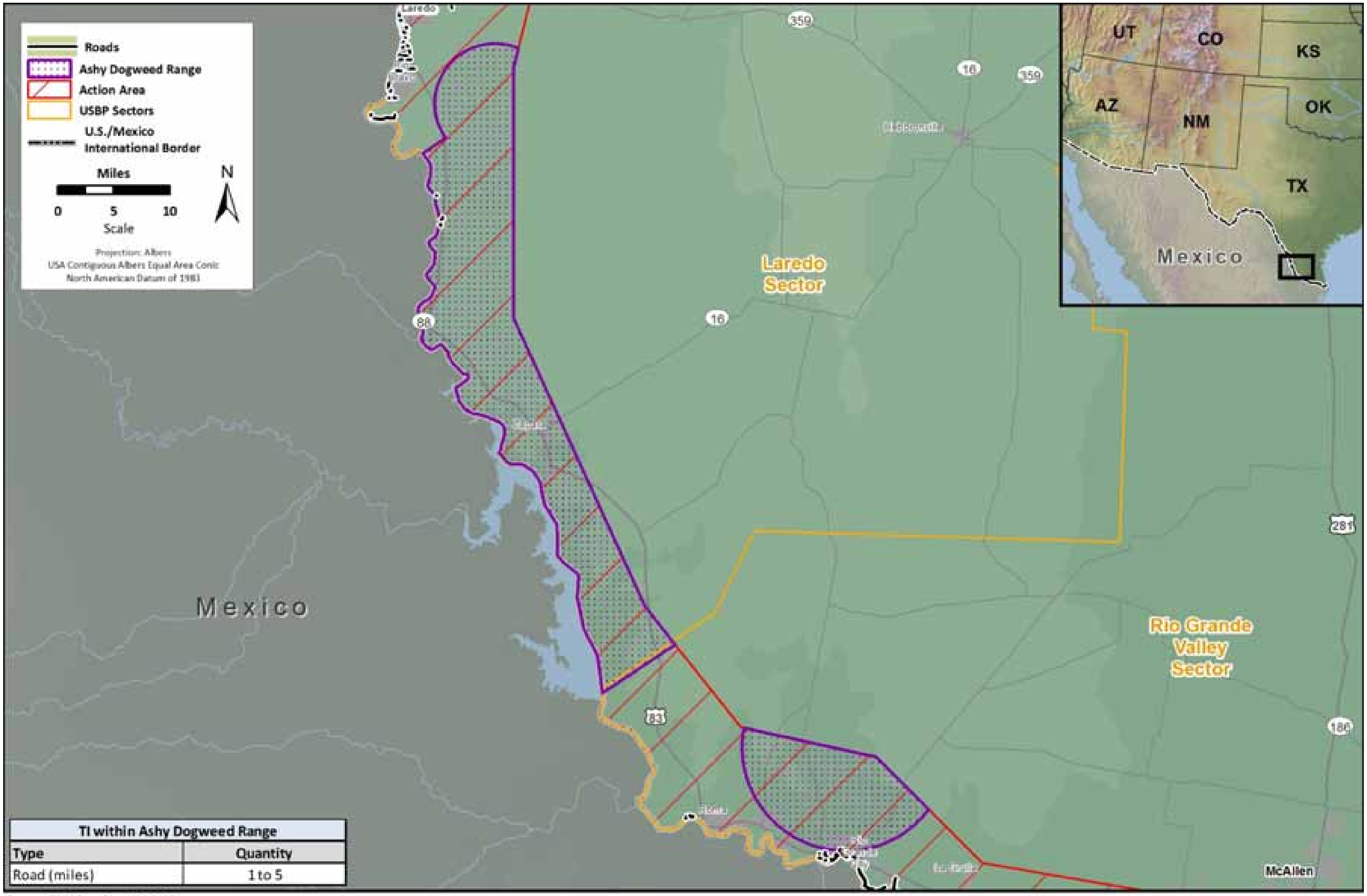
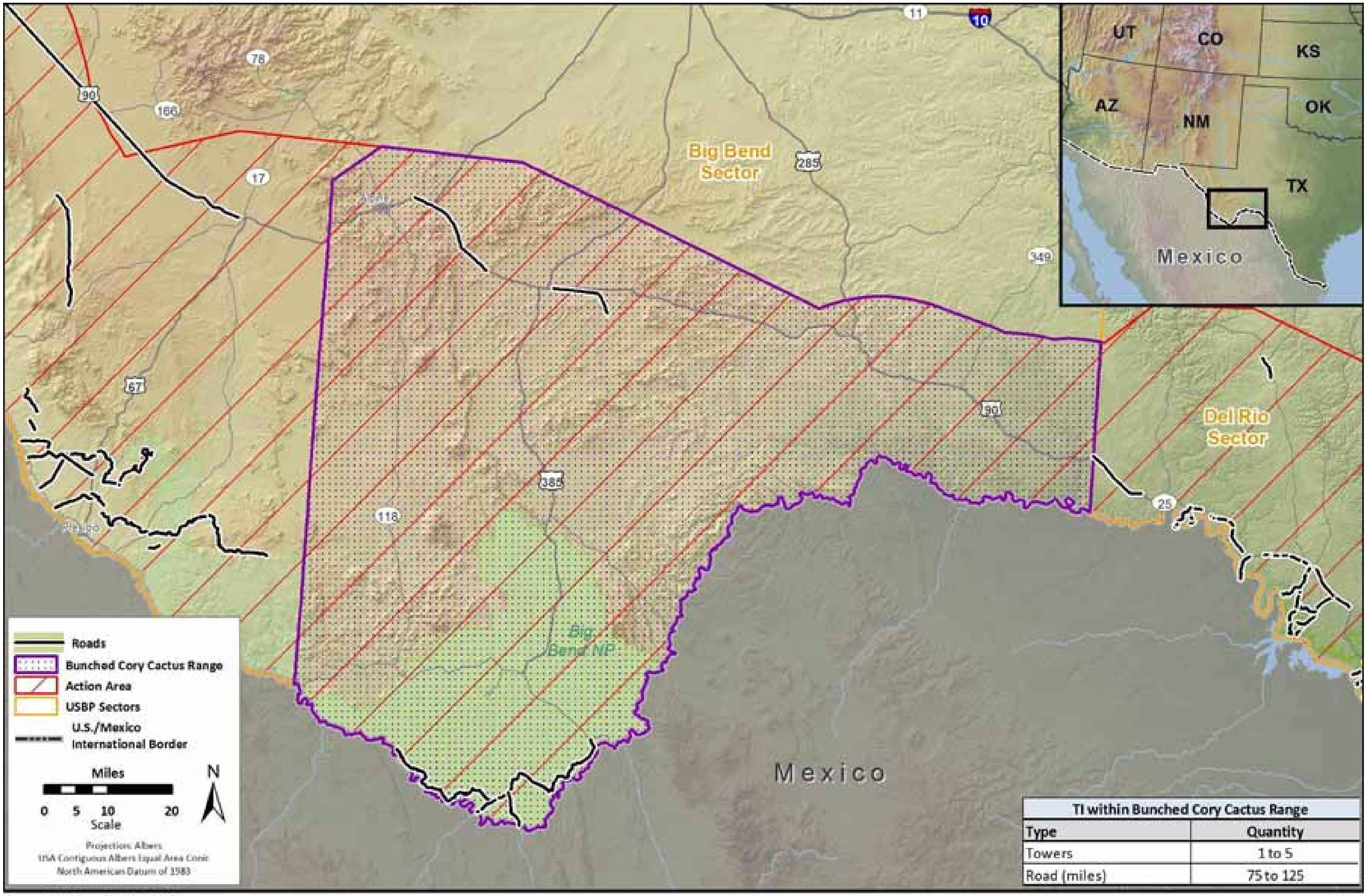


TI within Ashy Dogweed Range

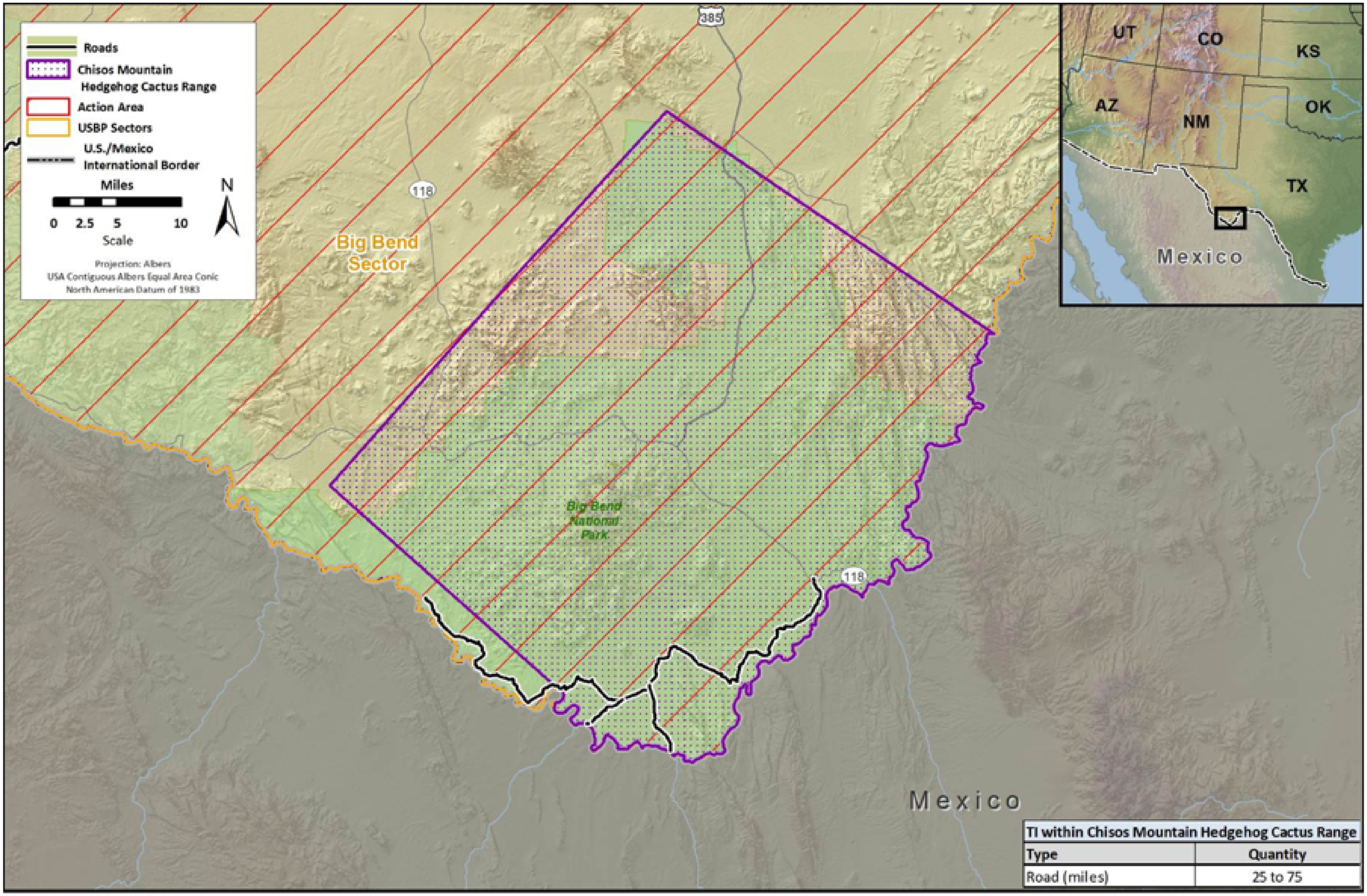
Type	Quantity
Road (miles)	1 to 5

Source: ESRI StreetMap USA 2010



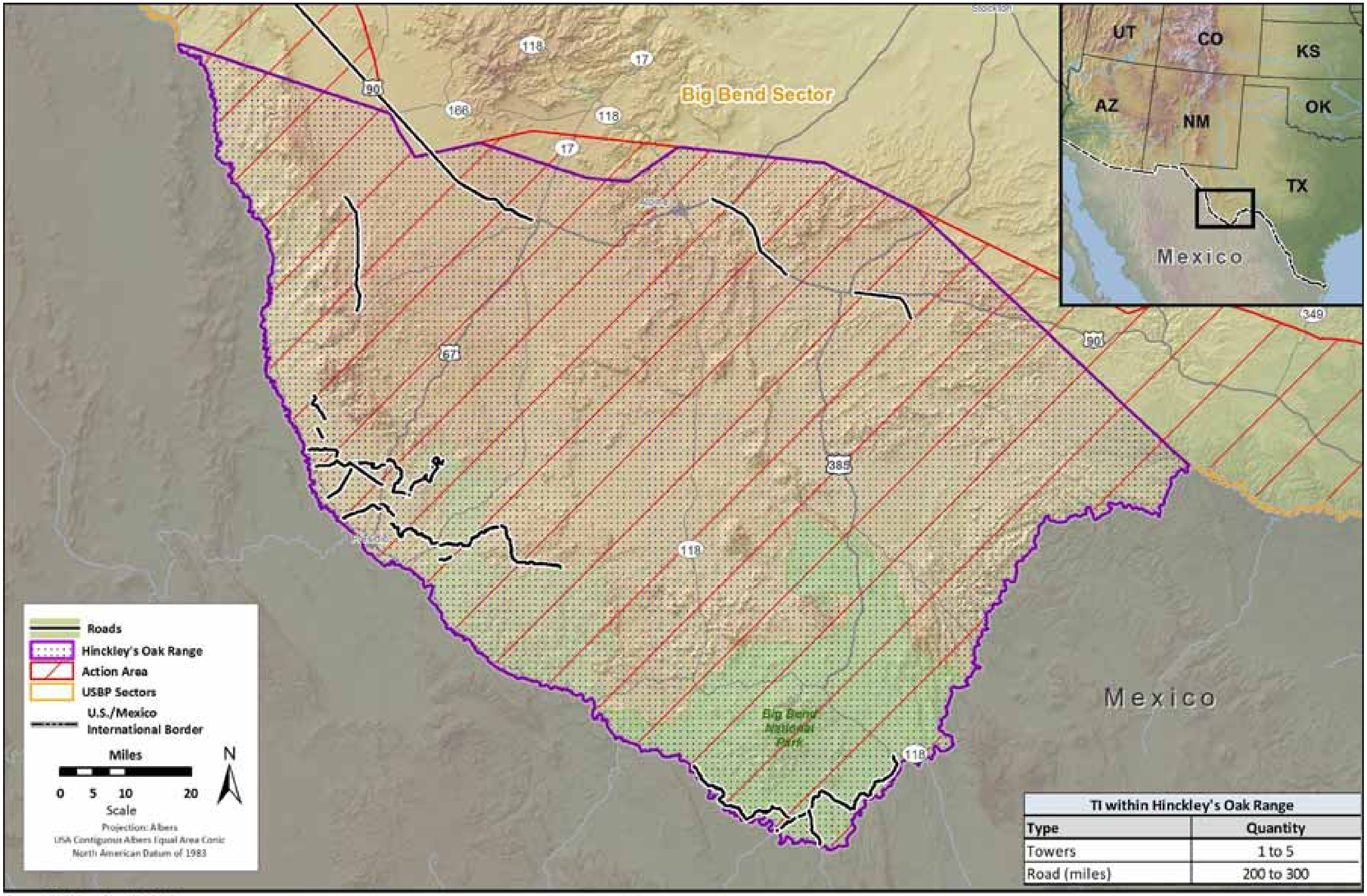
TI within Bunched Cory Cactus Range	
Type	Quantity
Towers	1 to 5
Road (miles)	75 to 125

Source: ESRI StreetMap USA 2010



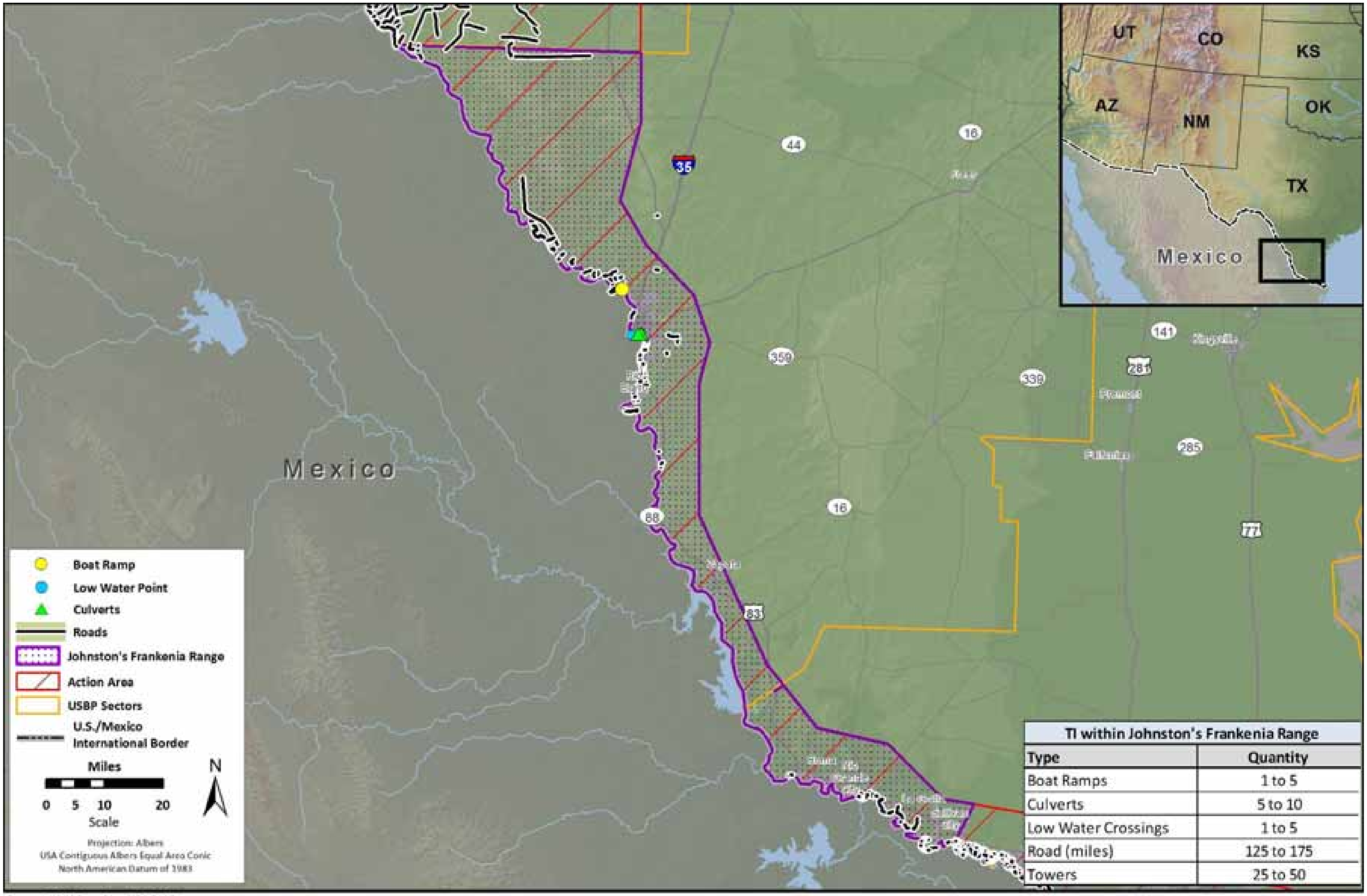
TI within Chisos Mountain Hedgehog Cactus Range	
Type	Quantity
Road (miles)	25 to 75

Source: ESRI StreetMap USA 2010



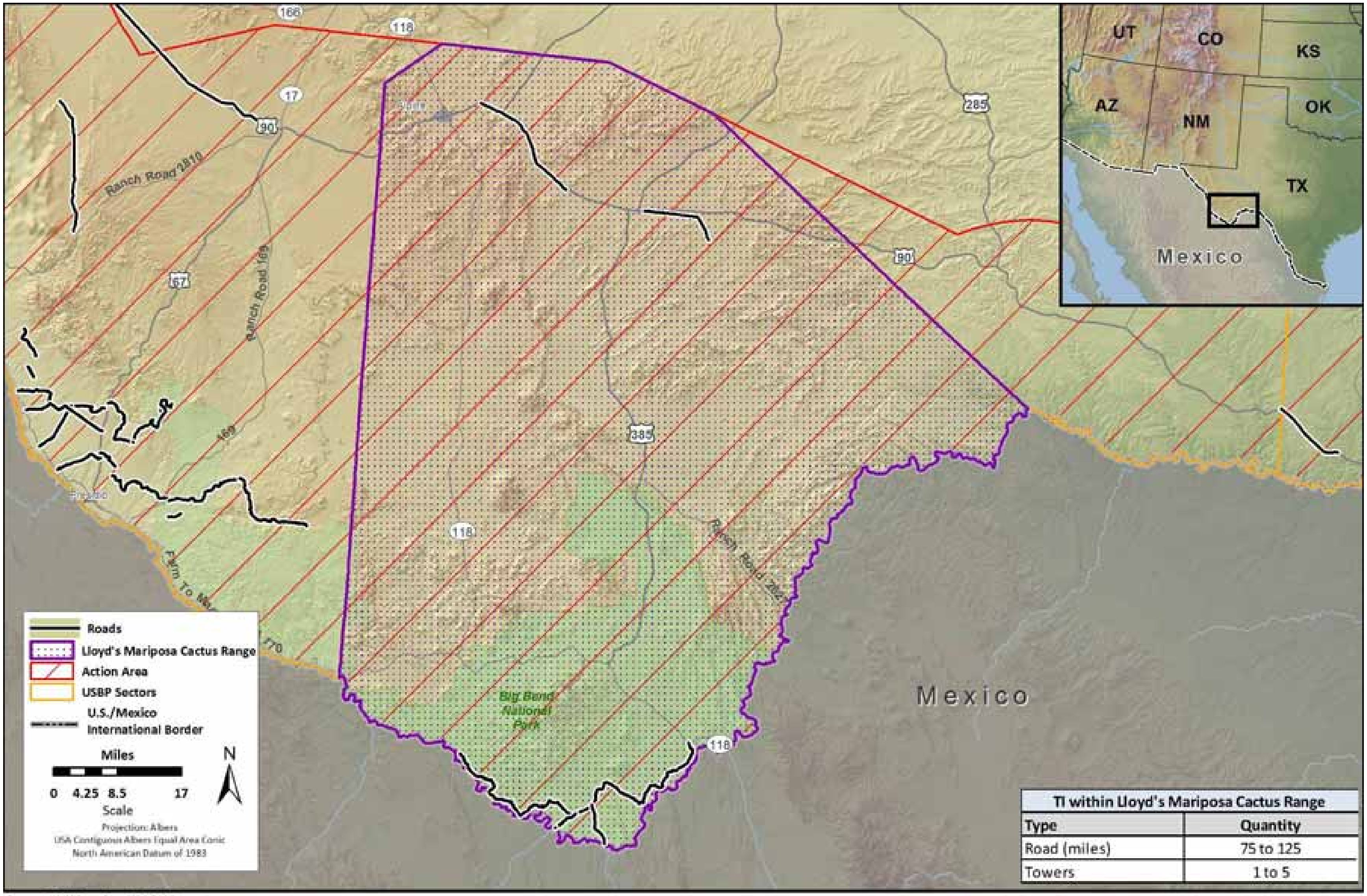
TI within Hinckley's Oak Range	
Type	Quantity
Towers	1 to 5
Road (miles)	200 to 300

Source: ESRI StreetMap USA 2010



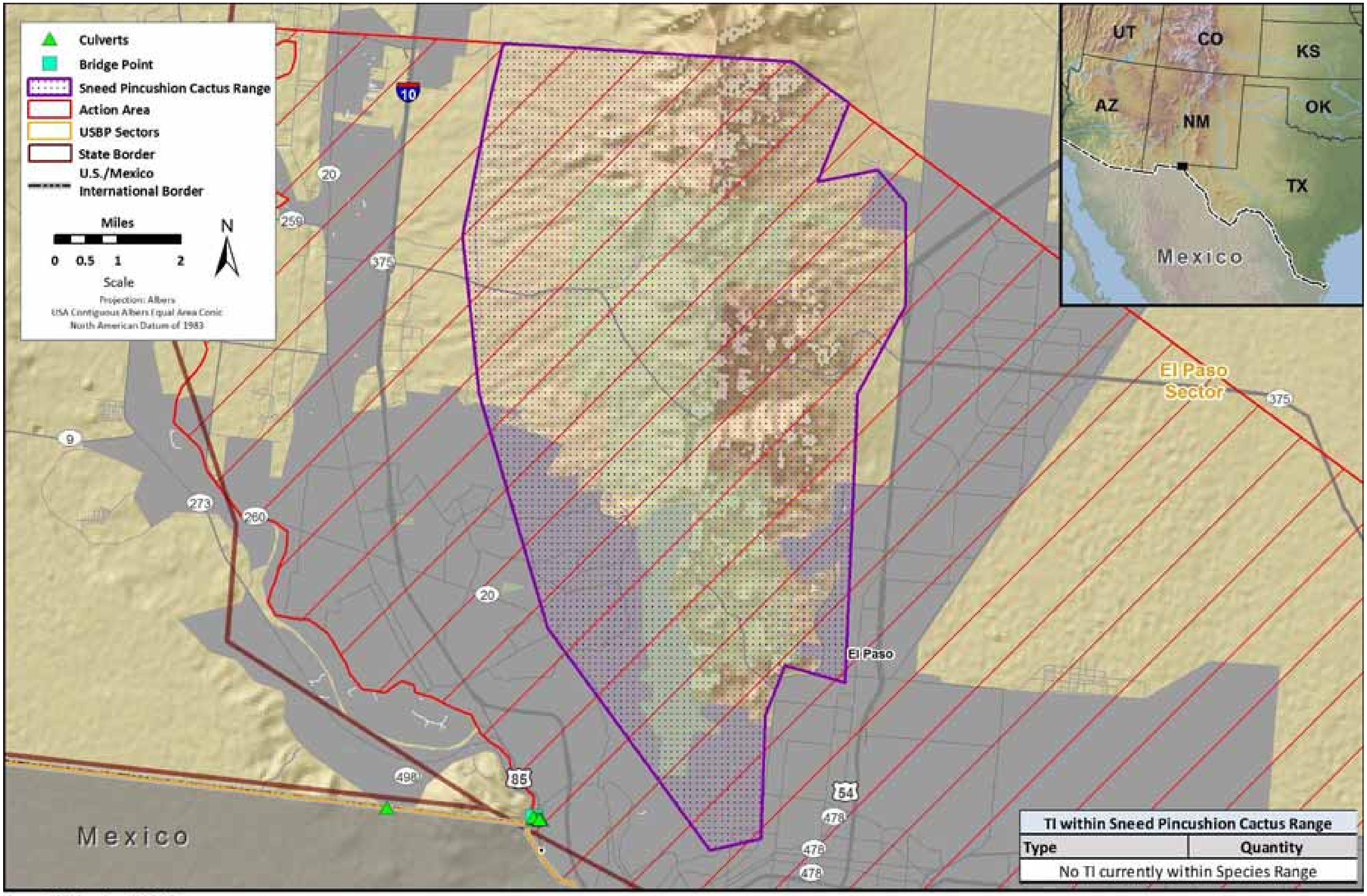
TI within Johnston's Frankenia Range	
Type	Quantity
Boat Ramps	1 to 5
Culverts	5 to 10
Low Water Crossings	1 to 5
Road (miles)	125 to 175
Towers	25 to 50

Source: ESRI StreetMap USA 2010



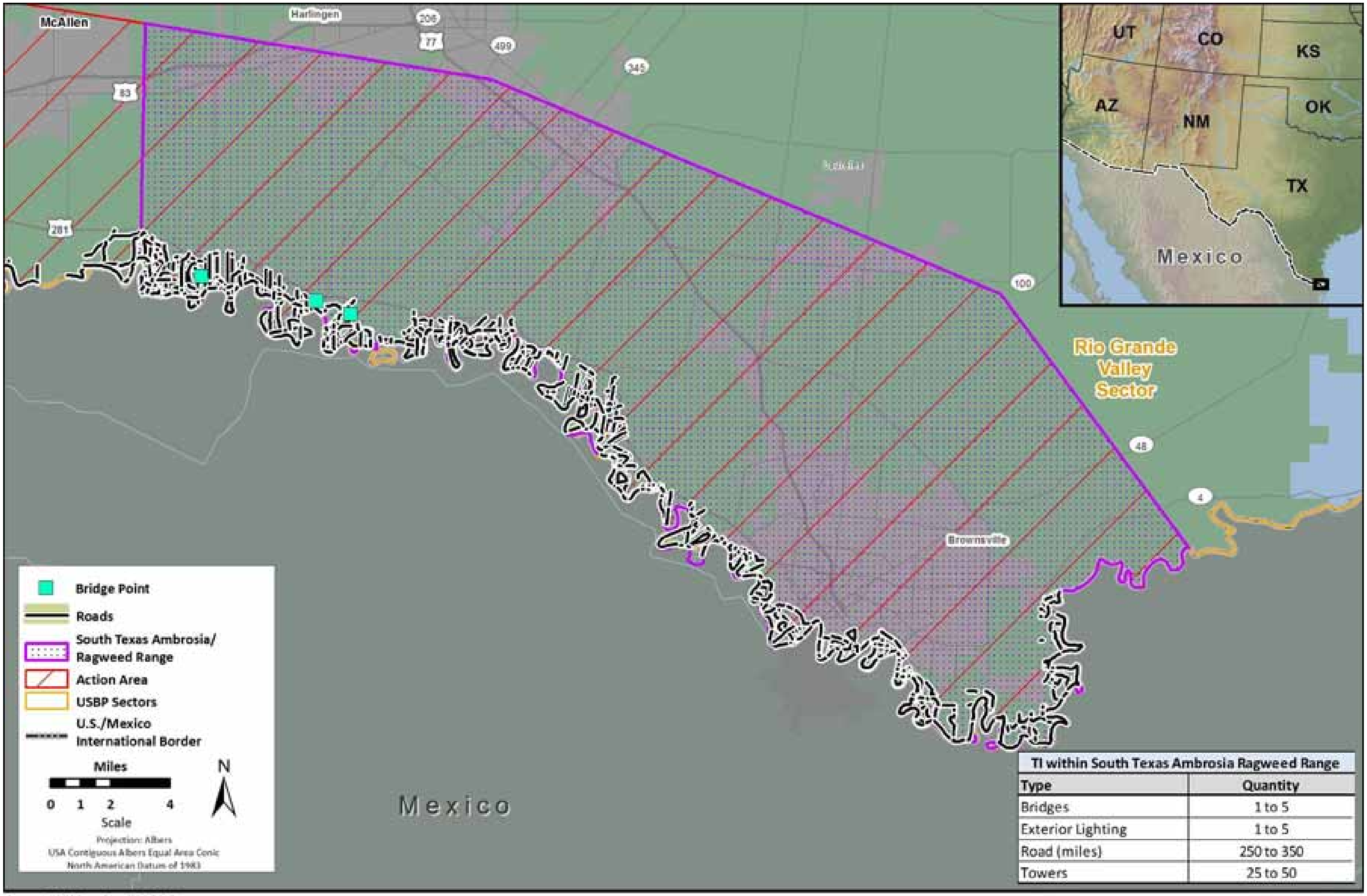
TI within Lloyd's Mariposa Cactus Range	
Type	Quantity
Road (miles)	75 to 125
Towers	1 to 5

Source: ESRI StreetMap USA 2010



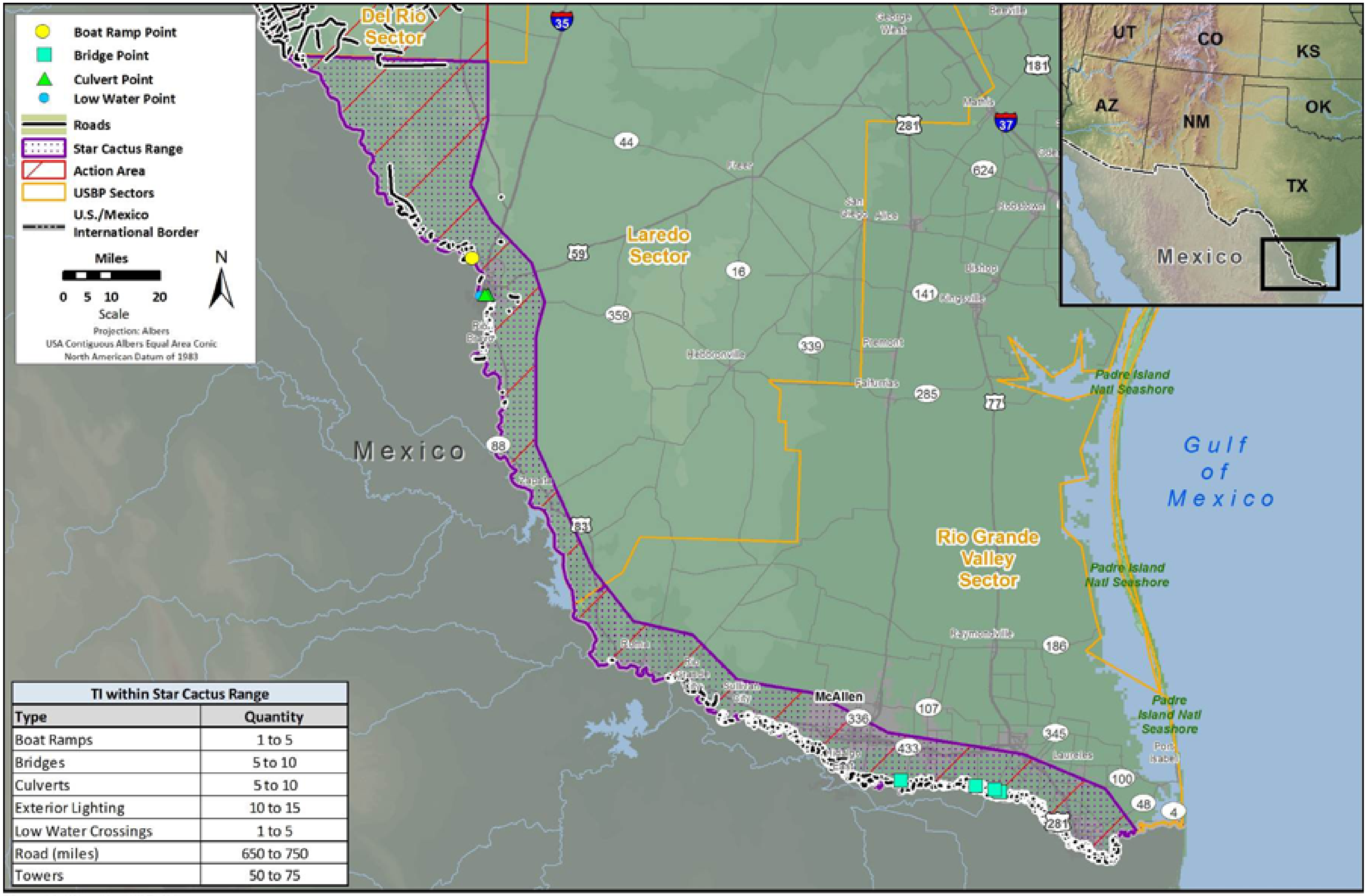
TI within Sneed Pincushion Cactus Range	
Type	Quantity
No TI currently within Species Range	

Source: ESRI StreetMap USA 2010



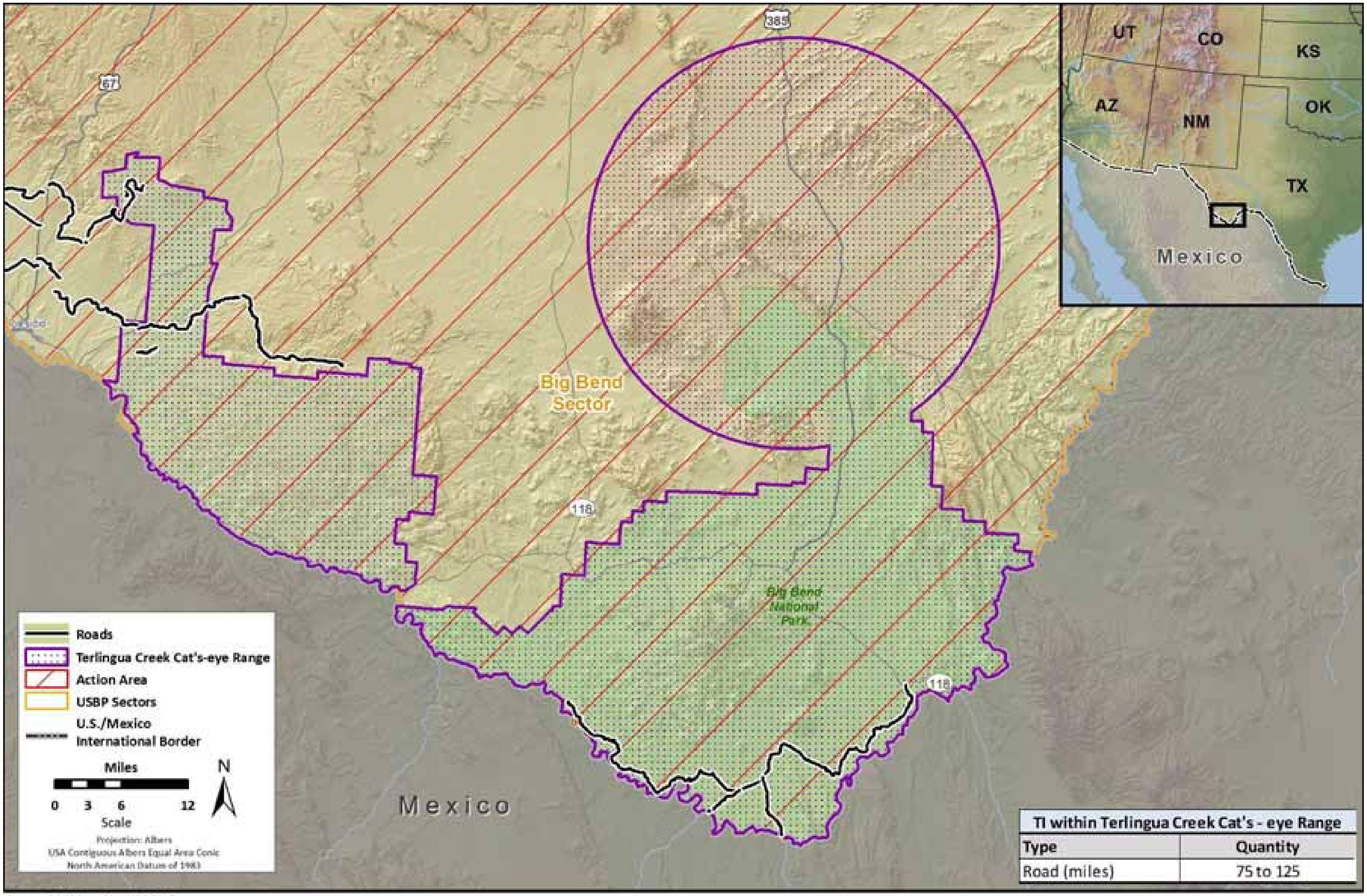
TI within South Texas Ambrosia Ragweed Range	
Type	Quantity
Bridges	1 to 5
Exterior Lighting	1 to 5
Road (miles)	250 to 350
Towers	25 to 50

Source: ESRI StreetMap USA 2010



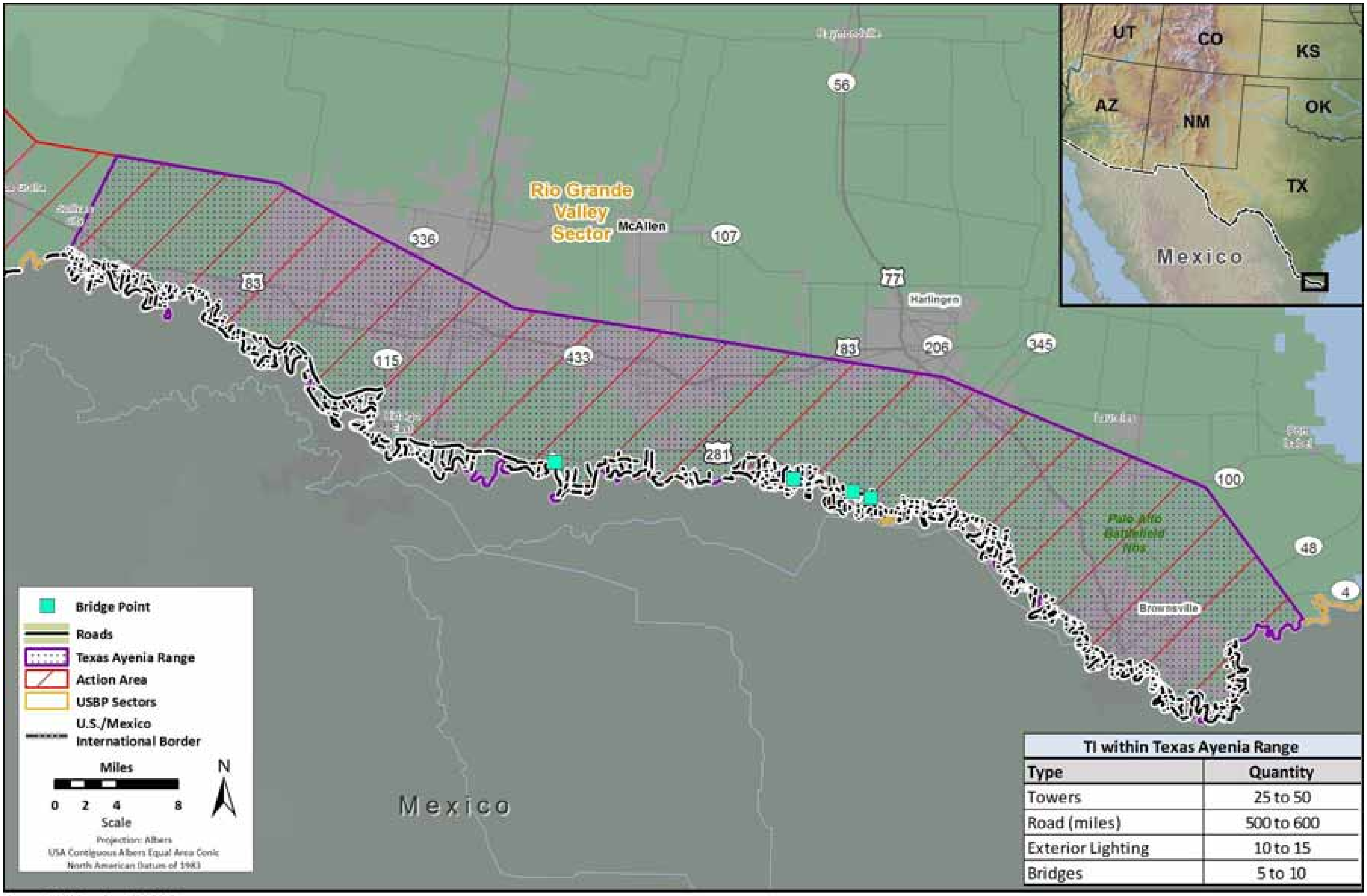
TI within Star Cactus Range	
Type	**Quantity**
Boat Ramps	1 to 5
Bridges	5 to 10
Culverts	5 to 10
Exterior Lighting	10 to 15
Low Water Crossings	1 to 5
Road (miles)	650 to 750
Towers	50 to 75

Source: ESRI StreetMap USA 2010



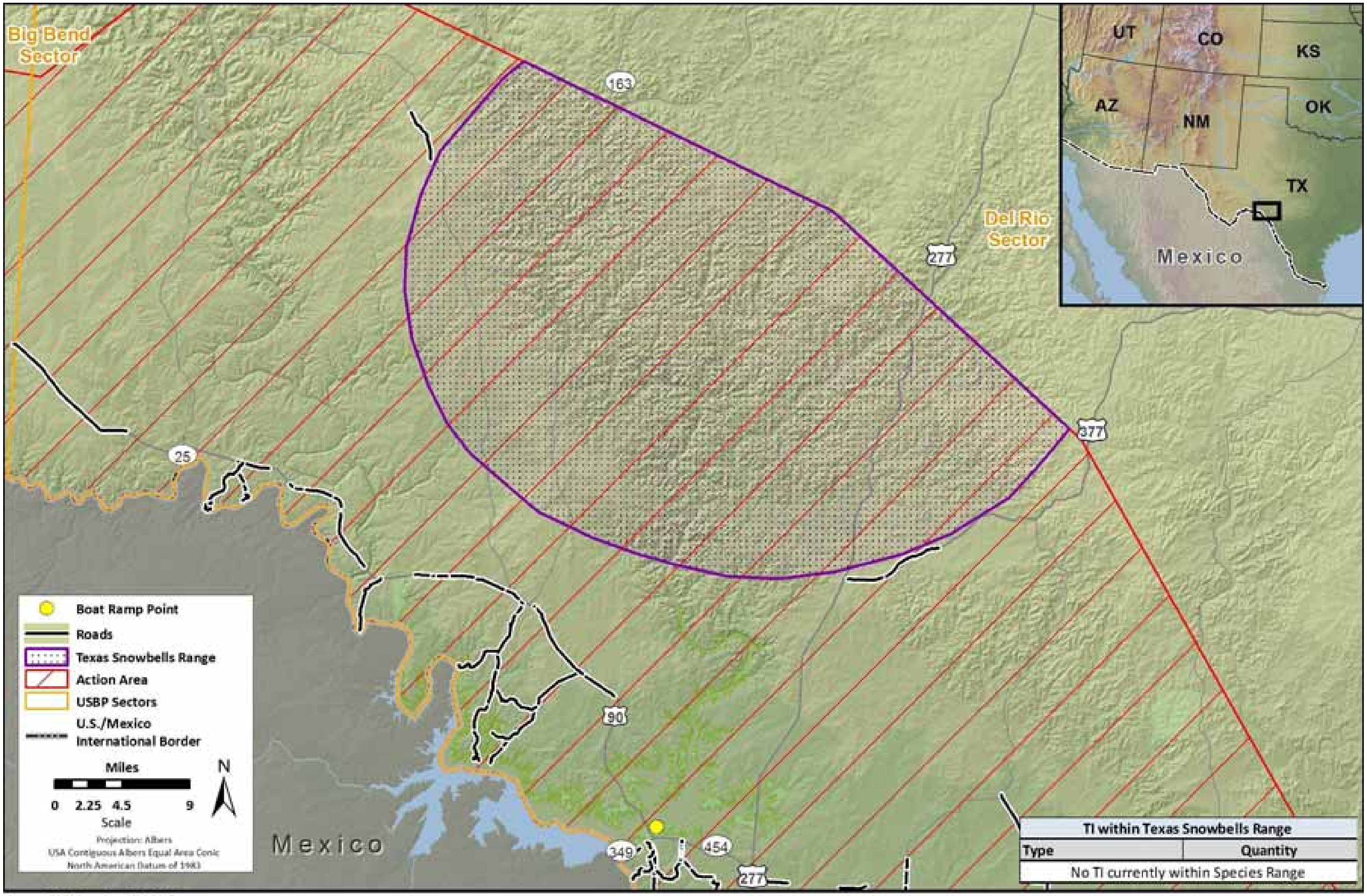
TI within Terlingua Creek Cat's - eye Range	
Type	Quantity
Road (miles)	75 to 125

Source: ESRI StreetMap USA 2010



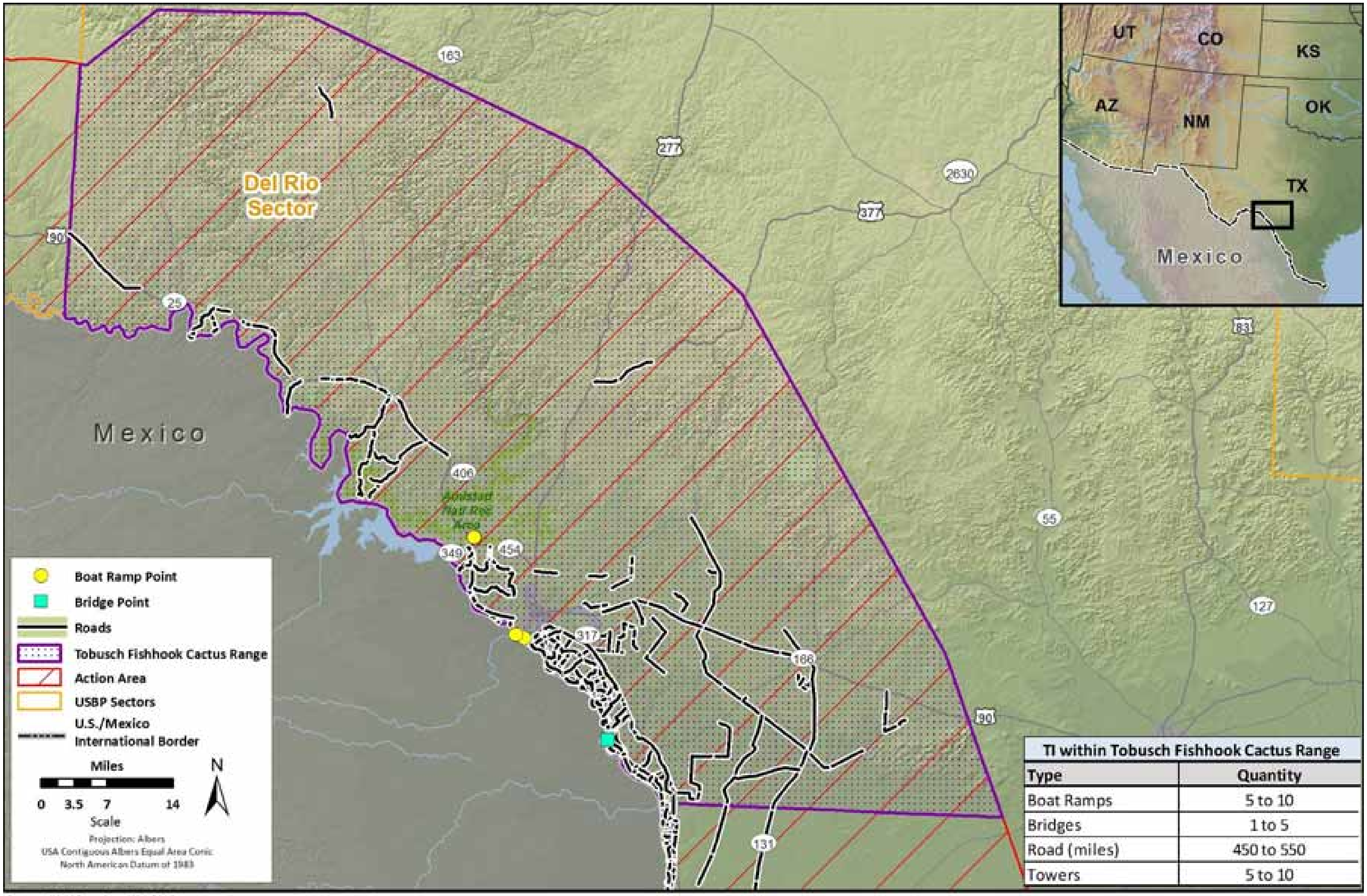
TI within Texas Ayenia Range	
Type	**Quantity**
Towers	25 to 50
Road (miles)	500 to 600
Exterior Lighting	10 to 15
Bridges	5 to 10

Source: ESRI StreetMap USA 2010



TI within Texas Snowbells Range	
Type	Quantity
No TI currently within Species Range	

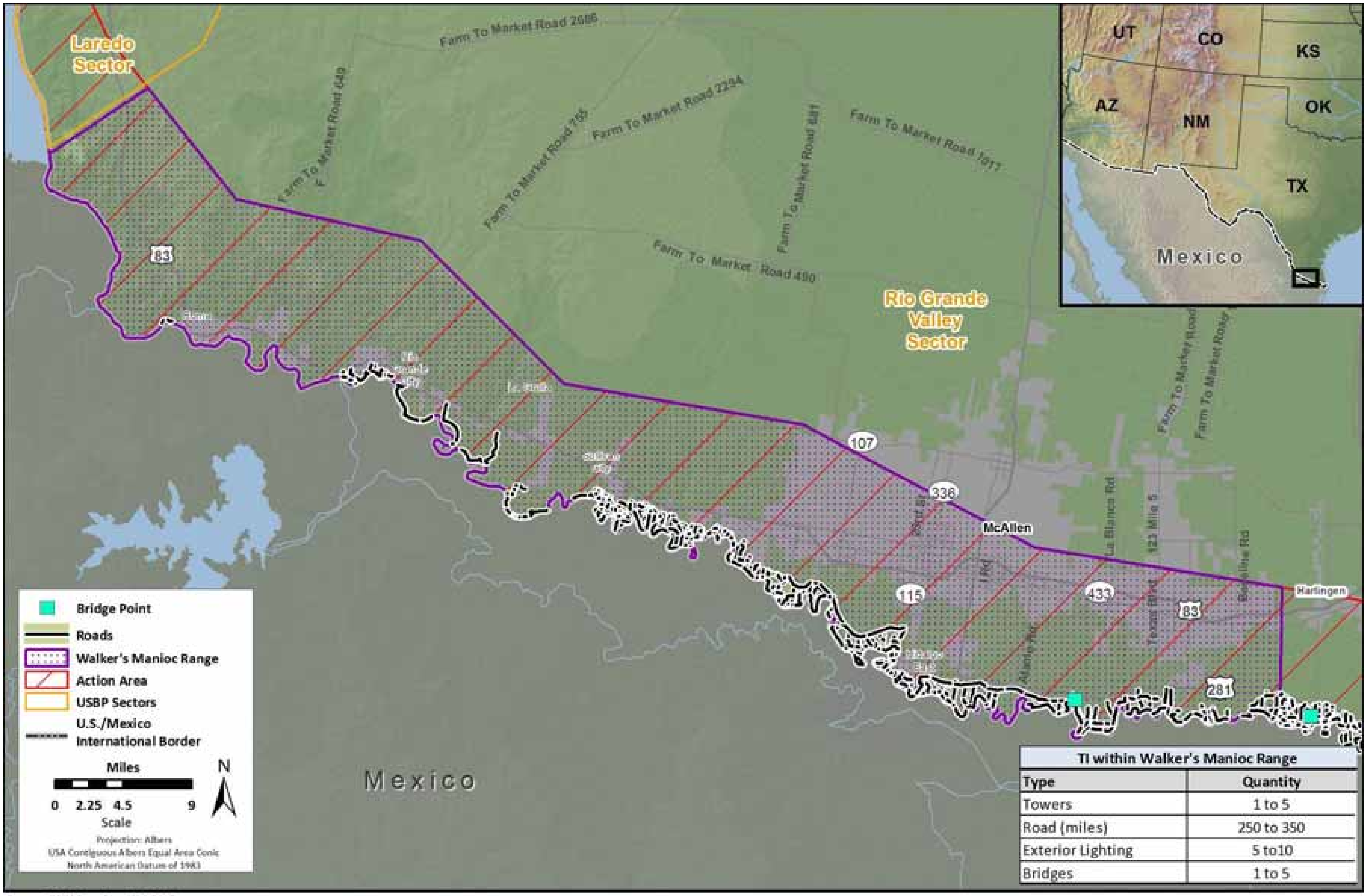
Source: ESRI StreetMap USA 2010



TI within Tobusch Fishhook Cactus Range

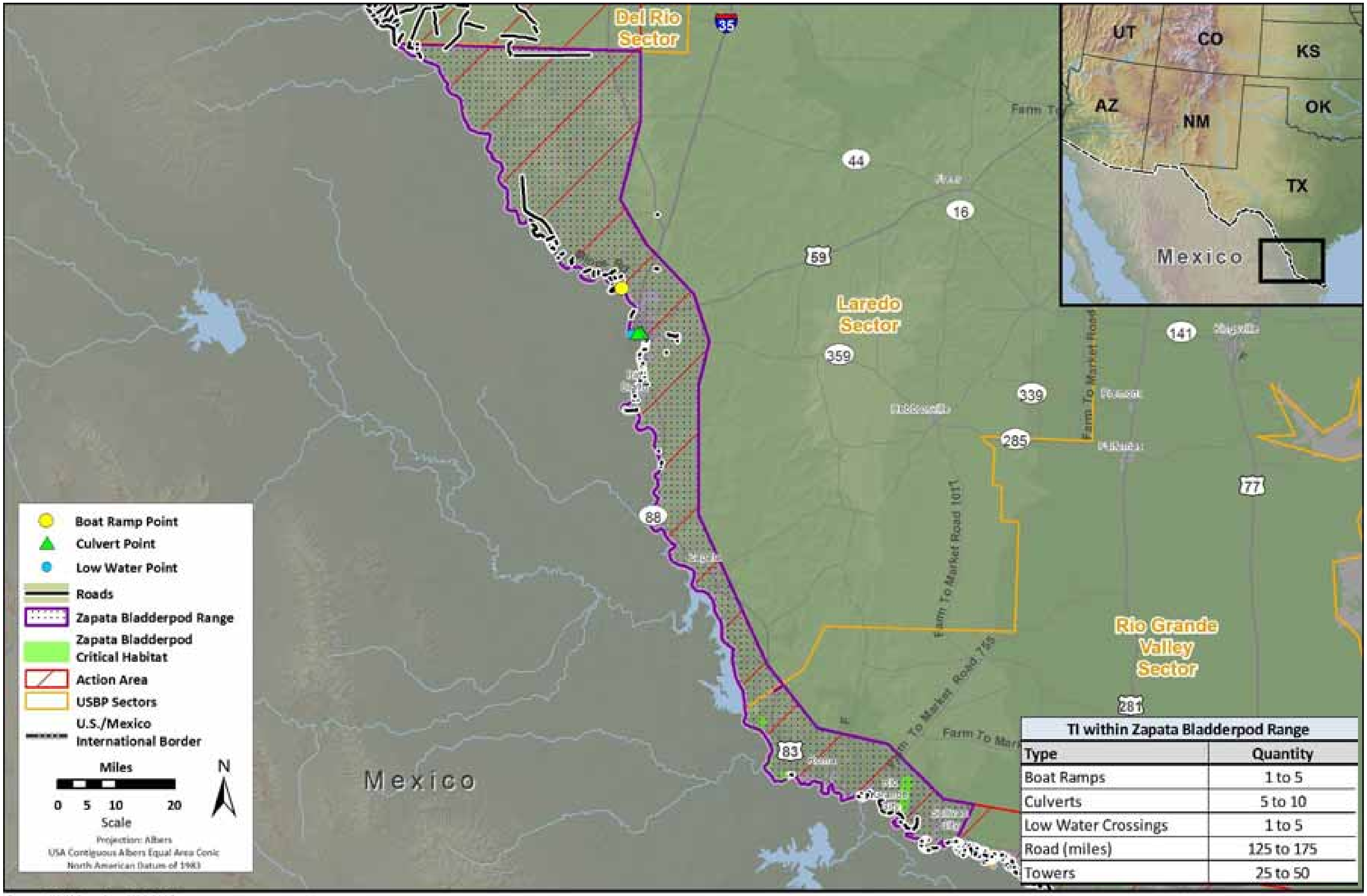
Type	Quantity
Boat Ramps	5 to 10
Bridges	1 to 5
Road (miles)	450 to 550
Towers	5 to 10

Source: ESRI StreetMap USA 2010



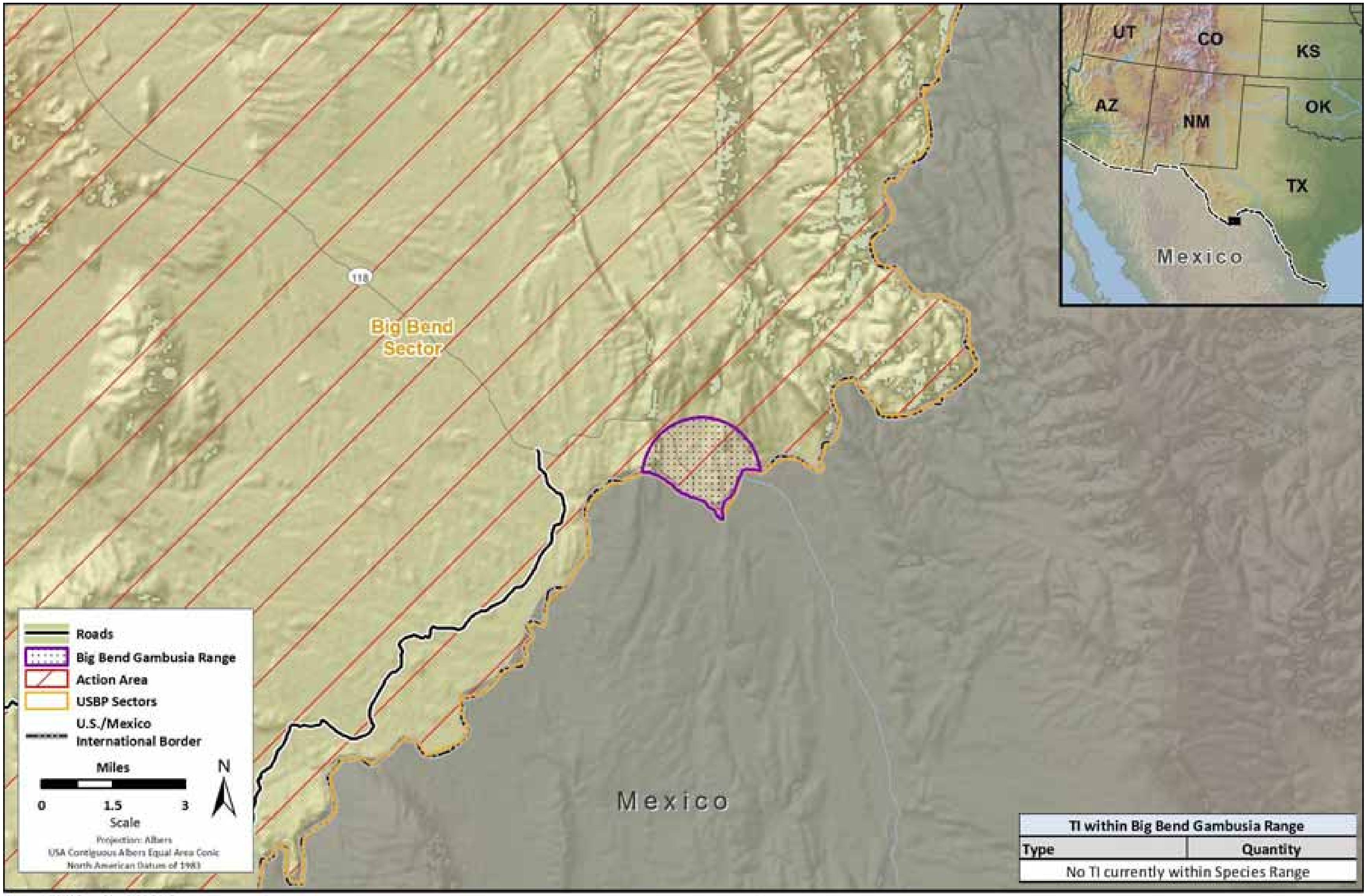
TI within Walker's Manioc Range	
Type	Quantity
Towers	1 to 5
Road (miles)	250 to 350
Exterior Lighting	5 to10
Bridges	1 to 5

Source: ESRI StreetMap USA 2010



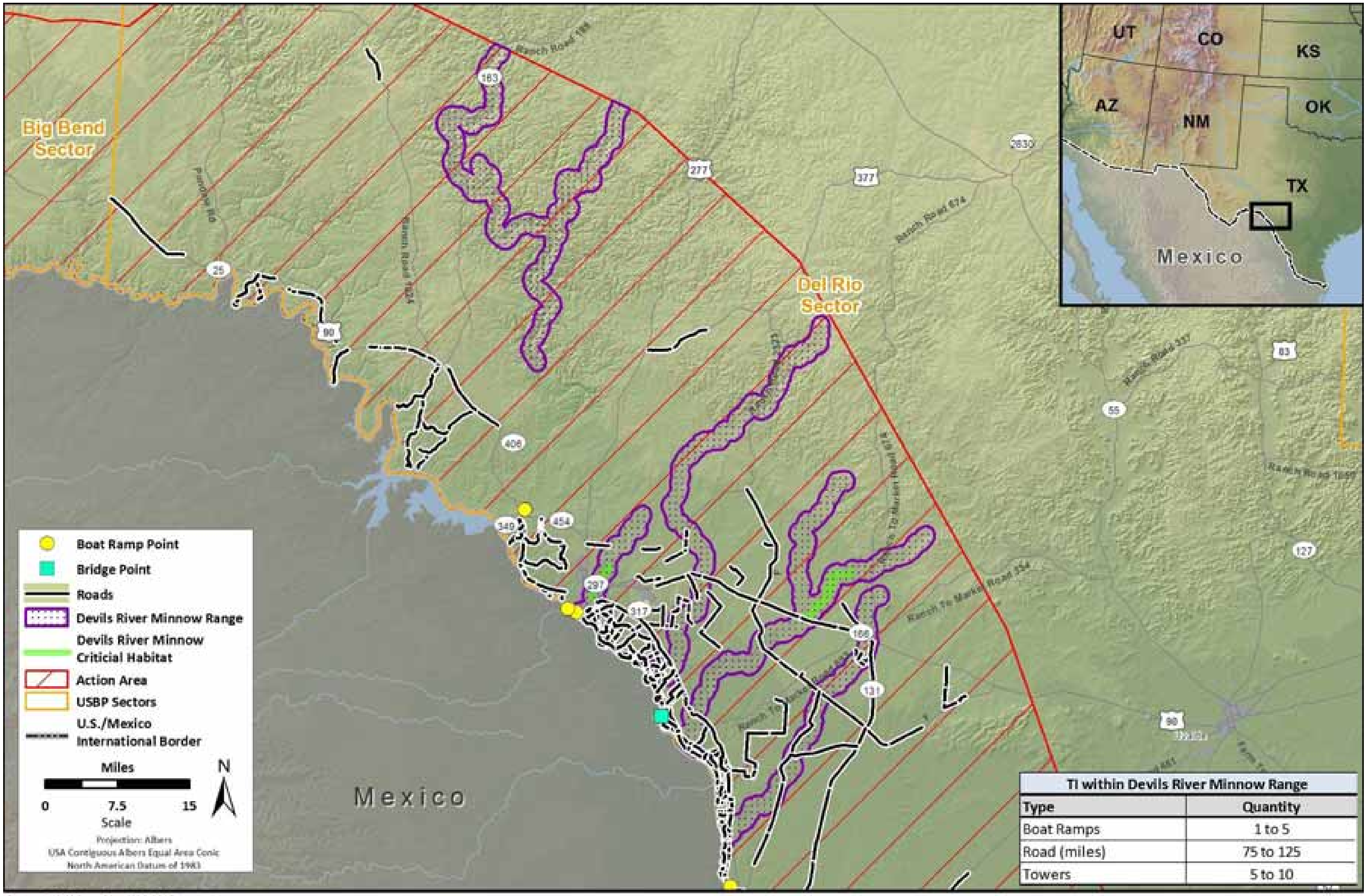
TI within Zapata Bladderpod Range	
Type	Quantity
Boat Ramps	1 to 5
Culverts	5 to 10
Low Water Crossings	1 to 5
Road (miles)	125 to 175
Towers	25 to 50

Source: ESRI StreetMap USA 2010



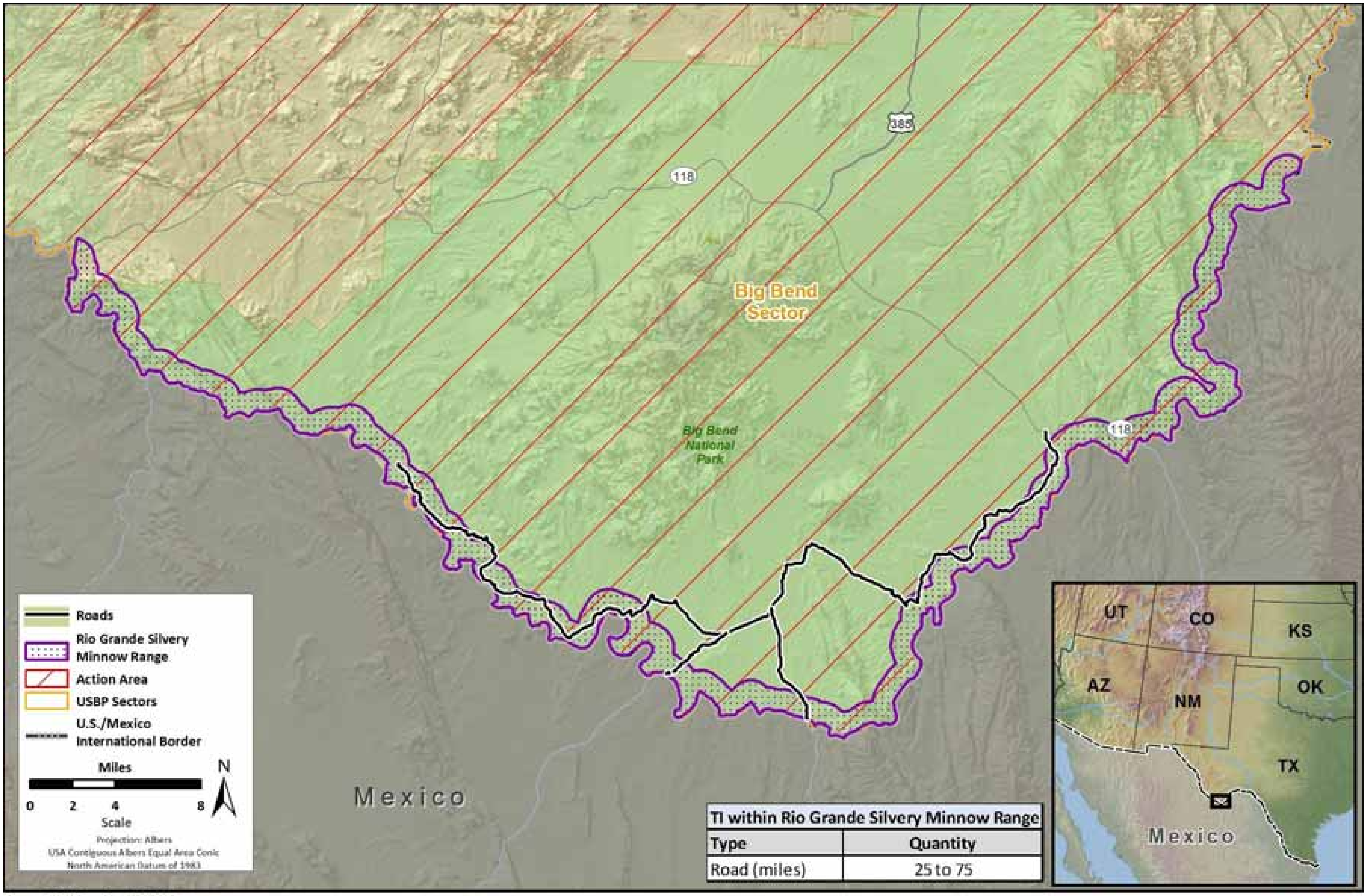
TI within Big Bend Gambusia Range	
Type	Quantity
No TI currently within Species Range	

Source: ESRI StreetMap USA 2010



TI within Devils River Minnow Range	
Type	Quantity
Boat Ramps	1 to 5
Road (miles)	75 to 125
Towers	5 to 10

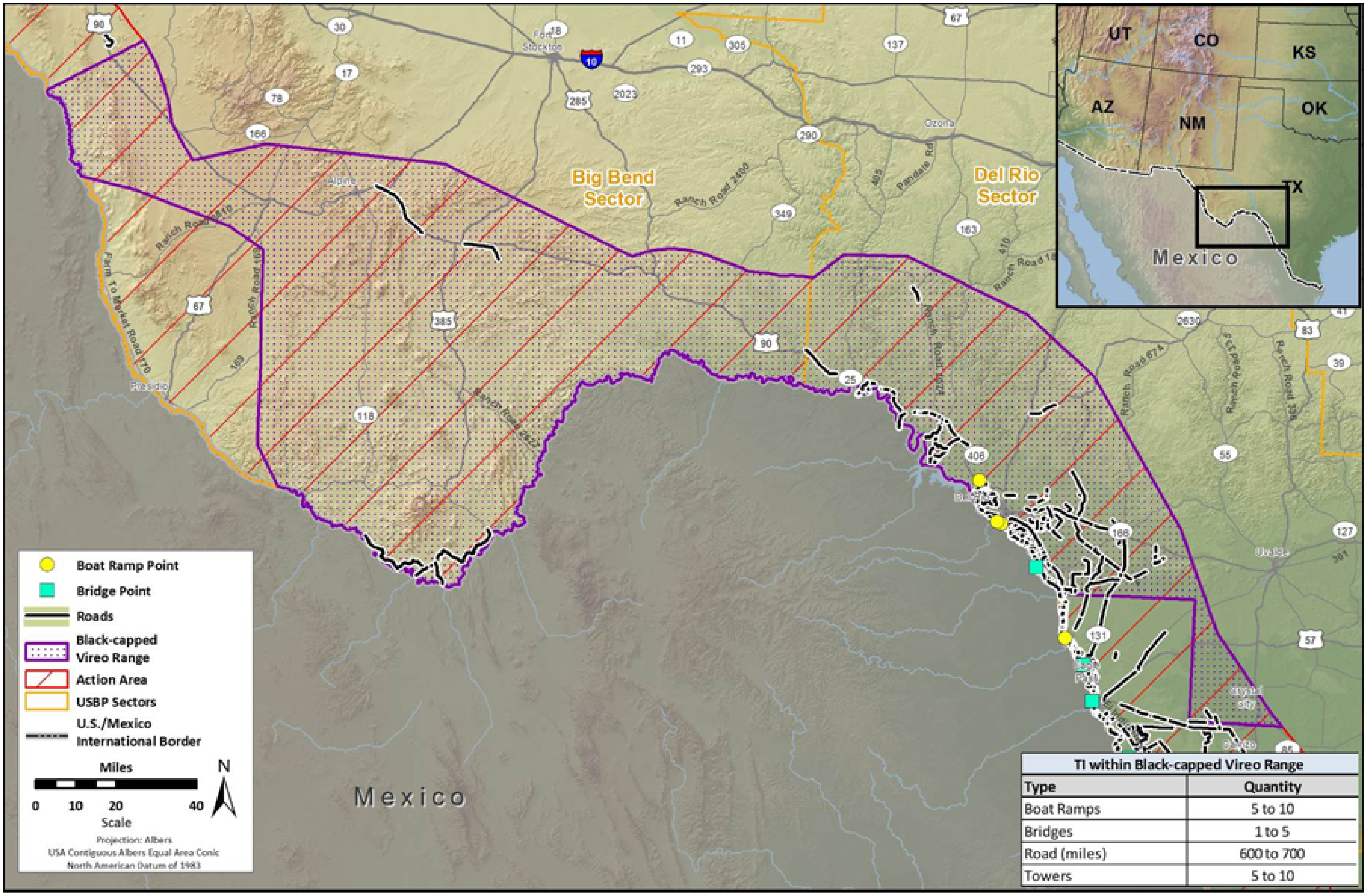
Source: ESRI StreetMap USA 2010



TI within Rio Grande Silvery Minnow Range	
Type	Quantity
Road (miles)	25 to 75

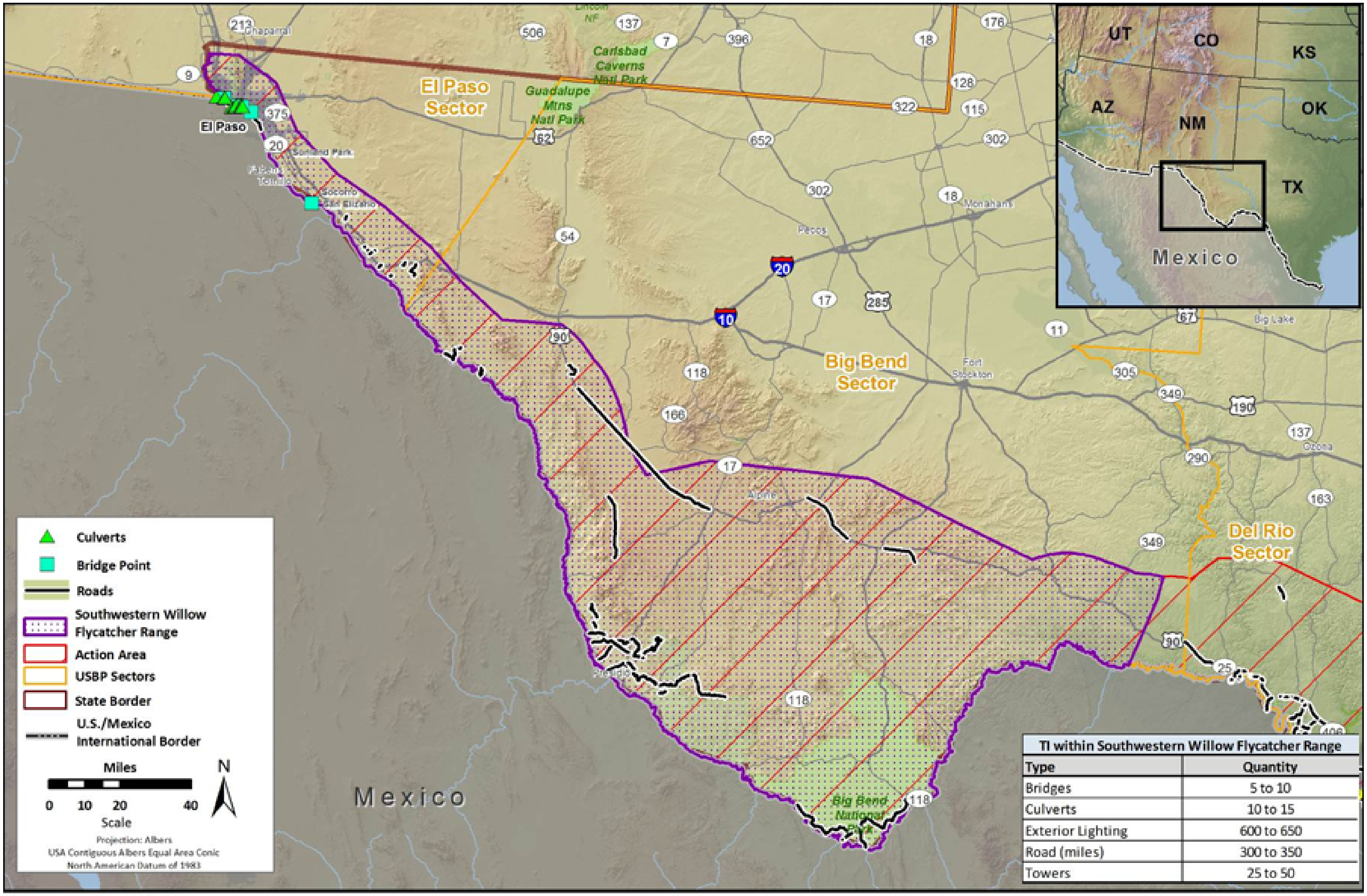
Projection: Albers
USA Contiguous Albers Equal Area Conic
North American Datum of 1983

Source: ESRI StreetMap USA 2010



TI within Black-capped Vireo Range	
Type	Quantity
Boat Ramps	5 to 10
Bridges	1 to 5
Road (miles)	600 to 700
Towers	5 to 10

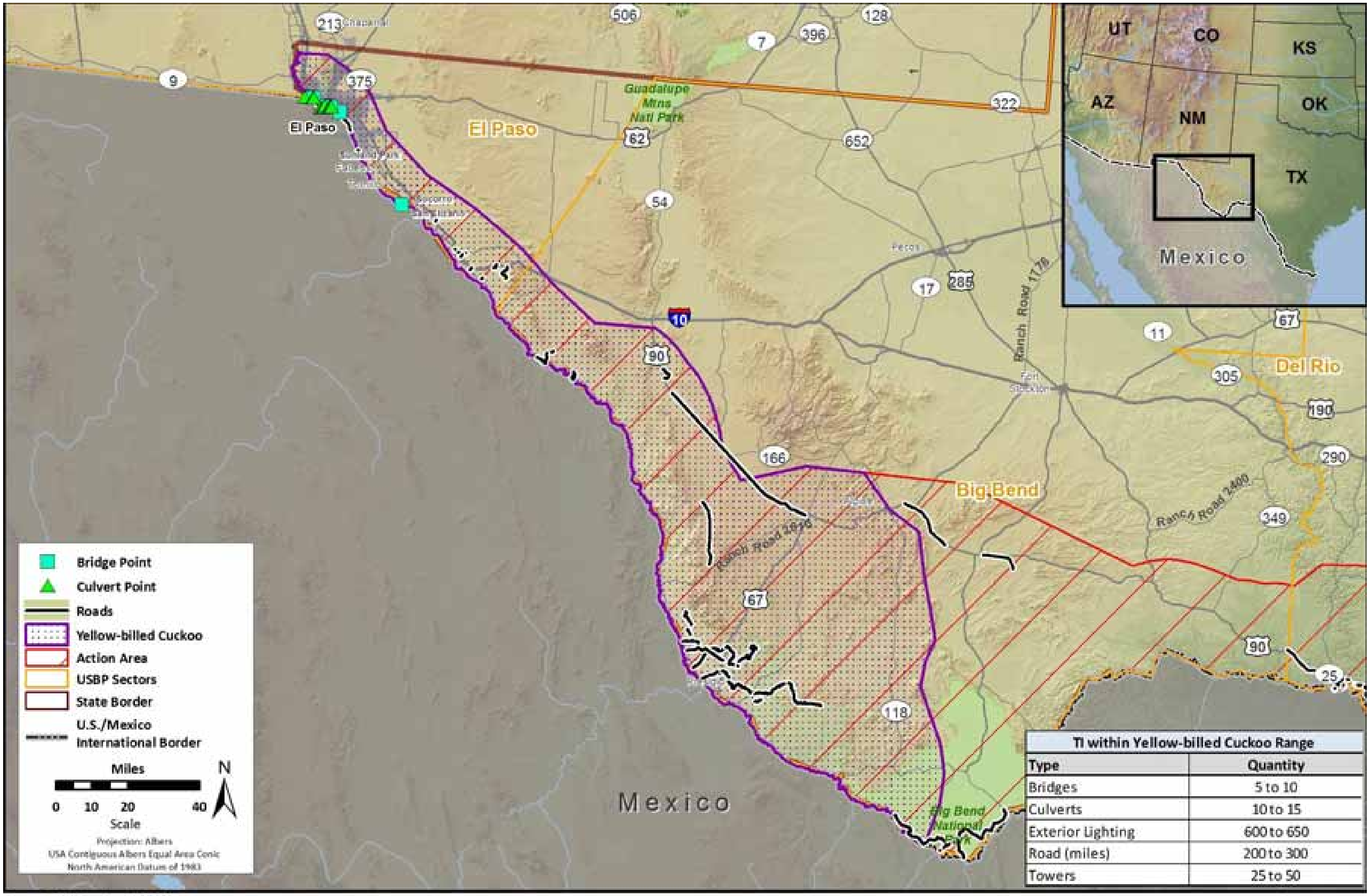
Source: ESRI StreetMap USA 2010



TI within Southwestern Willow Flycatcher Range

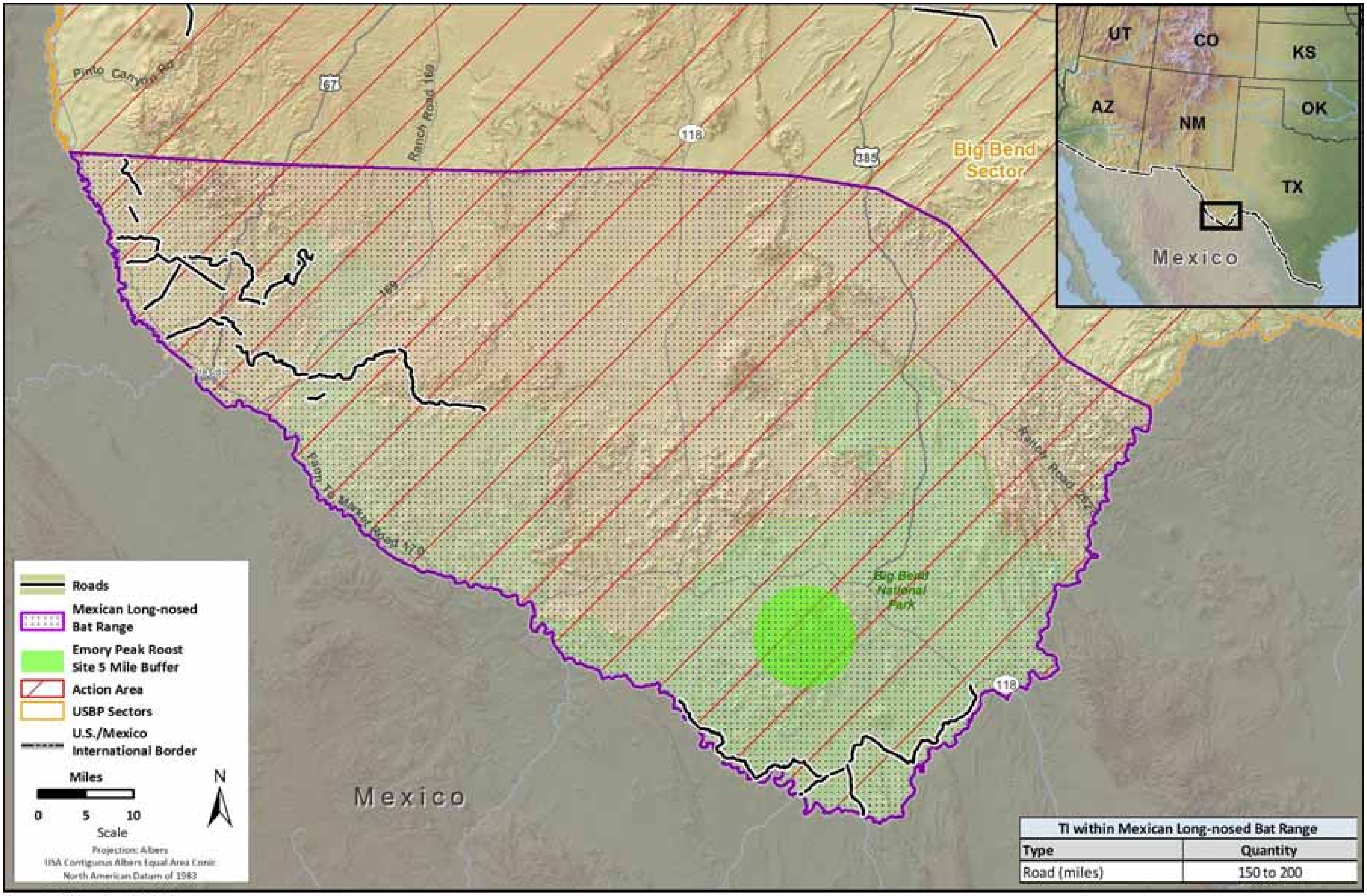
Type	Quantity
Bridges	5 to 10
Culverts	10 to 15
Exterior Lighting	600 to 650
Road (miles)	300 to 350
Towers	25 to 50

Source: ESRI StreetMap USA 2010



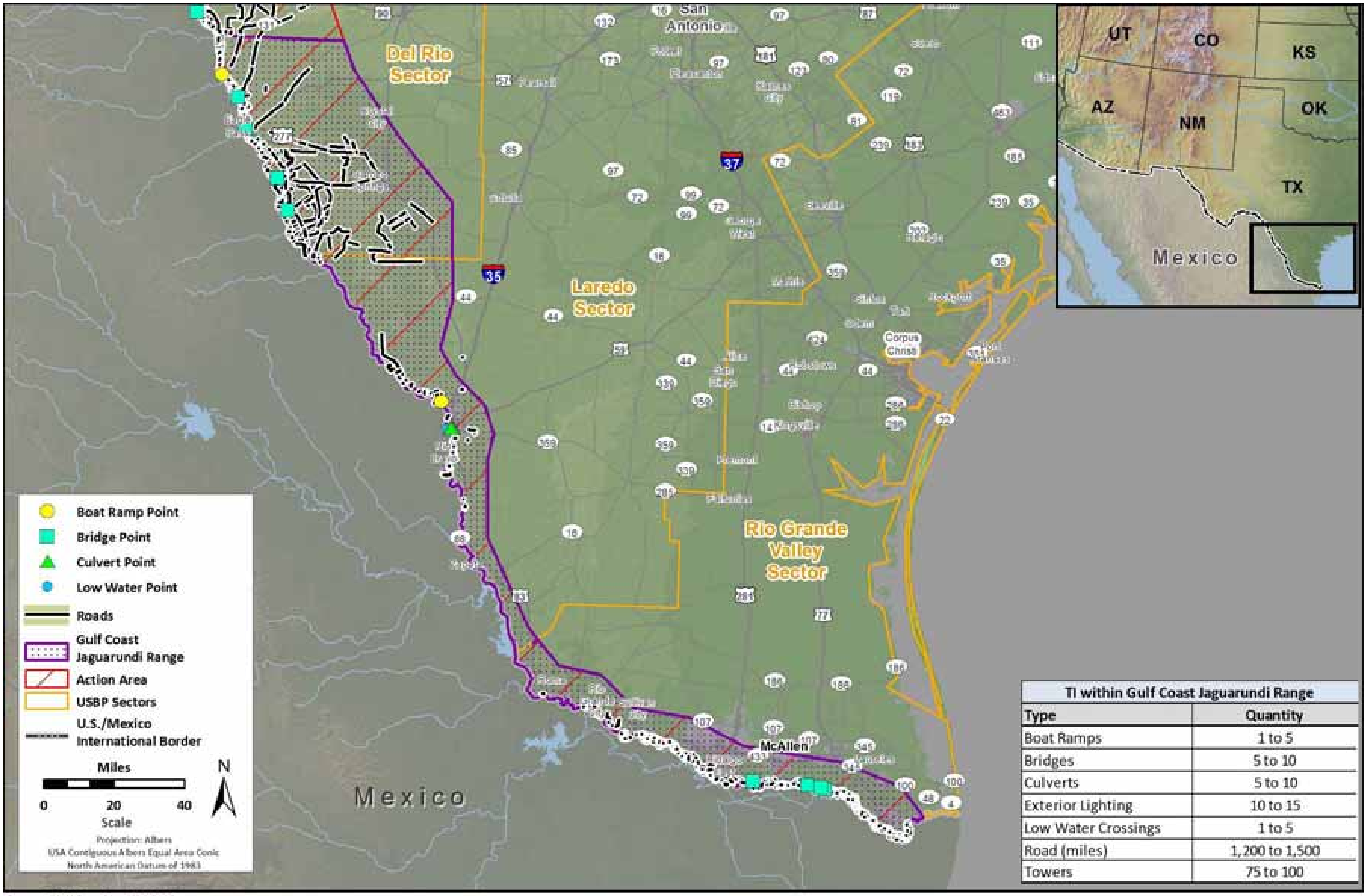
TI within Yellow-billed Cuckoo Range	
Type	Quantity
Bridges	5 to 10
Culverts	10 to 15
Exterior Lighting	600 to 650
Road (miles)	200 to 300
Towers	25 to 50

Source: ESRI StreetMap USA 2010



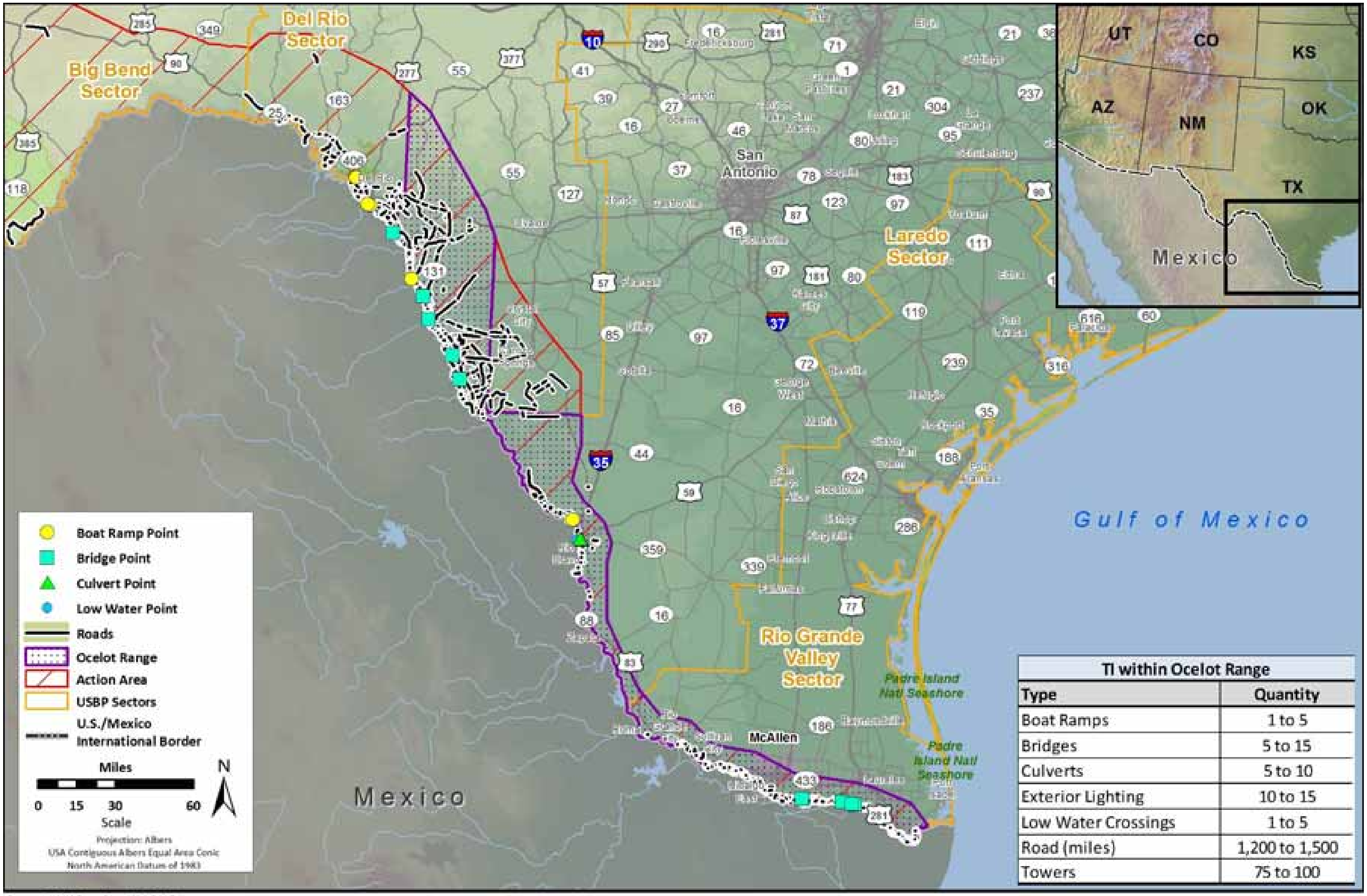
TI within Mexican Long-nosed Bat Range	
Type	Quantity
Road (miles)	150 to 200

Source: ESRI StreetMap USA 2010



TI within Gulf Coast Jaguarundi Range	
Type	Quantity
Boat Ramps	1 to 5
Bridges	5 to 10
Culverts	5 to 10
Exterior Lighting	10 to 15
Low Water Crossings	1 to 5
Road (miles)	1,200 to 1,500
Towers	75 to 100

Source: ESRI StreetMap USA 2010



TI within Ocelot Range	
Type	Quantity
Boat Ramps	1 to 5
Bridges	5 to 15
Culverts	5 to 10
Exterior Lighting	10 to 15
Low Water Crossings	1 to 5
Road (miles)	1,200 to 1,500
Towers	75 to 100

Source: ESRI StreetMap USA 2010

APPENDIX E

Best Management Practices

APPENDIX E

Best Management Practices

The following best management practices (BMPs) will be implemented for all Selective Maintenance and Repair Program activities. As described in **Section 1.2** of the Biological Assessment associated with this EA, U.S. Customs and Border Control (CBP) will use an established planning and work development process to identify the BMPs that must be implemented for each project. To identify species-specific BMPs that must be implemented, CBP environmental subject matter experts (SMEs) will identify which species potentially occur in the geographic location of each maintenance and repair activity using information such as that shown in **Appendix D**. They will then consider other available sources of information, such as prior survey data, aerial photographs, site visits, and previously developed environmental documentation, to evaluate whether suitable habitat for federally listed threatened and endangered species could occur at each project location. The environmental SME will also determine if a survey conducted by a qualified biologist is required prior to maintenance and repair activities to determine if habitat is present or is required by a BMP. If necessary, the environmental SMEs will hold further consultation with the U.S. Fish and Wildlife Service (USFWS) to clarify any compliance requirements.

Land Use

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

Geology and Soil Resources

1. Silt fencing and floating silt curtains should be installed and maintained to prevent movement of soil and sediment and to minimize turbidity increases in water.
2. Implement routine road maintenance practices to avoid making windrows with the soils once grading activities are complete and use any excess soils on site to raise and shape the road surface.
3. Only apply soil-binding agents during the late summer/early fall months to avoid impacts on federally listed species. Do not apply soil-binding agents in or near (within 100 feet) surface waters (e.g., wetlands, perennial streams, intermittent streams, washes). Only apply soil-binding agents to areas that lack any vegetation.
4. Obtain materials such as gravel, topsoil, or fill from sources that are compatible with the project area and are from legally permitted sites. Do not use materials from undisturbed areas adjacent to the project area.

Vegetation

1. Herbicide and pesticide applications must be made under the supervision of a licensed applicator. A log of the chemical used, amount used, and specific location must be maintained.

2. If mechanical methods are used to remove invasive plants, the entire plant should be removed and placed in a disposal area. If herbicides are used, the plants will be left in place. All chemical applications on federally managed land must be used in coordination with the Federal land manager. Training to identify nonnative invasive plants will be provided for CBP personnel or contractors, as necessary.

3. If the maintenance and repair activities will take place on a Federal agency's land, the appropriate agency's herbicide policy for vegetation control must be followed. Contractors applying herbicides must verify that the appropriate agency's policy is being followed, if it exists. This information should be requested from the contracting officer's technical representative (COTR).

4. New guidance from the U.S. Environmental Protection Agency (USEPA) on herbicide application in riparian areas is imminent. Check with COTR on the status of these regulations prior to applying herbicide in such areas.

5. Coordinate with the CBP environmental SME to determine if the maintenance or repair activities occur in a highly sensitive area or an area that poses an unacceptable risk of transmitting diseases and invasive species. If it is determined that maintenance or repair activities occur in such an area, follow the CBP cleaning protocol.

6. A fire prevention and suppression plan will be developed and implemented for all maintenance and repair activities that require welding or otherwise have a risk of starting a wildfire.

7. Identify fill material, sandbags, hay bales, and mulch brought in from outside the project area by its source location. Use sources that are sterile or weed-free.

8. Clearly demarcate the perimeter of all new areas to be disturbed using flagging or temporary construction fencing. Do not allow any disturbance outside that perimeter. Riparian vegetation should be protected during maintenance and repair activities.

9. Avoid the removal of mature trees providing shade or bank stabilization within the riparian area of any waterway during maintenance or repair activities.

10. If vegetation must be removed, allow natural regeneration of native plants by cutting vegetation with hand tools, mowing, trimming, or using other removal methods that allow root systems to remain intact to prevent disturbance that encourages establishment of invasive plant species. In addition, all soils that are disturbed that will not otherwise be stabilized during maintenance and repair activities shall be reseeded using species native to the project vicinity. This BMP does not apply to any non-native, invasive vegetation control that may occur as part of the tactical infrastructure maintenance and repair Program.

11. Vegetation targeted for retention will be flagged for avoidance to reduce the likelihood of being treated.

12. Periodic inspections of tactical infrastructure by the CBP SME will be conducted to evaluate and document conditions, including erosion, and to ensure that prescriptions are followed and performed in the appropriate community types. As necessary, maintenance or repair will be scheduled to minimize erosion and correct other adverse conditions.

13. Clearing of riparian vegetation will not occur within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.

Wildlife

1. If hollow bollards are necessary, cover hollow bollards (i.e., those that will be filled with a reinforcing material such as concrete) to prevent wildlife from entrapment. Deploy covers (and ensure they remain fully functioning) when the posts or hollow bollards arrive on the site and are unloaded, until they are filled with reinforcing material.
2. Ensure temporary light poles and other pole-like structures used for maintenance and repair activities have anti-perch devices to discourage roosting by birds.
3. Clearing of riparian vegetation will not occur within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.
4. Minimize animal collisions during maintenance and repair 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, poor weather, curves), do not exceed speeds of 25 mph.
5. Do not permit pets owned or under the care of the contractor or sector personnel inside the project boundaries, adjacent native habitats, or other associated work areas.
6. To prevent entrapment of wildlife species, ensure excavated, steep-walled holes or trenches are either completely covered by plywood or metal caps at the close of each work day, or include one or more escape ramps (at no greater than 1,000-foot intervals and sloped less than 45 degrees) constructed of earth fill or wooden planks.
7. Each morning before the start of maintenance or repair activities and before excavated, steep-walled holes or trenches are filled, ensure they are thoroughly inspected for trapped animals. Ensure that any animals discovered are allowed to escape voluntarily (by escape ramps or temporary structures), without harassment, before maintenance or repair activities resume; or are removed from the trench or hole by a qualified person and allowed to escape unimpeded.

Threatened and Endangered Species and Other Protected Species

General BMPs

1. Coordinate with COTR or environmental SME to determine which threatened and endangered species could occur in the vicinity of maintenance and repair activities. In areas where there are no threatened and endangered or other species concerns, the personnel performing the maintenance or repair activity are responsible for monitoring the implementation of general maintenance and repair BMPs to avoid impacts on the environment.
2. To protect individual federally listed species within the project area, 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 (i.e., 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. Vegetation control outside the immediate footprint of tactical infrastructure within suitable habitat and within the range or designated critical habitat of threatened and endangered species. If a threatened or endangered species, primary constituent element (PCE), or other indicators of suitable habitat occur within the project area, then further consultation with USFWS will be required
4. Develop and implement a training program to inform maintenance or repair personnel of the federally listed species that occur within the Program area, penalties for violation of Federal or state laws, proper implementation of included BMPs, and reporting methods.
5. Check visible space underneath all vehicles and heavy equipment for federally 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.
6. Coordinate with the CBP environmental SME to determine if the maintenance or repair activities occur in a highly sensitive area or an area that poses an unacceptable risk of transmitting diseases and invasive species. If it is determined that maintenance or repair activities occur in such an area, follow the CBP cleaning protocol for all equipment.
7. Equipment staging areas shall be located at previously used staging areas or at least 0.3 miles away from known, occupied sites of listed aquatic species.
8. CBP will not use surface water from aquatic or marsh habitats for maintenance and repair projects, if that site supports aquatic federally listed species or if it contains non-native invasive species or disease vectors based on the best available information provided by USFWS.
9. CBP will not use surface water from untreated sources, including water used for irrigation purposes, for maintenance and repair projects located within one mile of aquatic habitat for federally-listed aquatic species. Groundwater or surface water from a treated municipal source will be used when within 1 mile of such habitats.

Migratory Bird BMPs

1. Initial mechanical and chemical vegetation clearing and subsequent mechanical vegetation control should be timed to avoid the migration, breeding, and nesting timeframe of migratory birds (March 15 through September 15). Herbicide retreatments could occur throughout the year. When initial mechanical and chemical vegetation 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 (91 meters [300 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. A survey for migratory birds will also be conducted prior to all other maintenance and repair activities to be implemented during the nesting period in areas where migratory birds might be nesting.

3. If maintenance or repair is scheduled during the migratory bird-nesting season, take steps to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and structures, 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 intrusive maintenance and repair activities until the birds have left the nest. Confirmation that all young have fledged should be made by qualified personnel.

Species Specific BMPs

Federally Listed Plants in the Action Area: 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)*, Sneed pincushion cactus *(Coryphantha sneedii* var. *sneedii)*, South Texas ambrosia *(Ambrosia cheiranthifolia)*, star cactus *(Astrophytum asterias)*, Terlingua Creek cat's-eye *(Cryptantha crassipes)*, Texas ayenia *(Ayenia limitaris)*, Texas snowbells *(Styrax platanifolius* ssp. *texanus)*, Walker's manioc *(Manihot walkerae)*, and Zapata bladderpod *(Lesquerella thamnophila)*. **Table E-1** presents the suitable habitat and blooming seasons for these species.

1. Vegetation control in suitable habitat of threatened or endangered plant species will be avoided unless a survey is conducted by a qualified biologist (see **Table E-1** for a description of suitable habitat). If vegetation-control activities occur in areas of known occurrences of these species, critical habitat, and suitable habitat and are unavoidable then a qualified biologist will conduct a survey during the appropriate blooming season (see **Table E-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.
2. If maintenance and repair activities will occur in undisturbed areas outside of the footprint of tactical infrastructure in areas of suitable habitat within the range or designated critical habitat of threatened or endangered plant species (see **Table E-1**), a qualified biologist will conduct a survey during the appropriate blooming season within the maintenance or repair area. An area of sufficient size will be flagged in order to create a buffer large enough to ensure that threatened and endangered plant species are not directly or indirectly affected. In addition, if PCE's are observed within critical habitat, those areas will be avoided or further consultation with USFWS will be required. Use of herbicides will not occur within areas of suitable habitat within the range or designated critical habitat of threatened or endangered plant species unless approved by the USFWS.

Table E-1. Federally Listed Threatened and Endangered Plant Species That Could Occur Within the Action Area

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 650-750 meters (1,950-2,250 feet) in Chihuahuan desert vegetation.	March-July
Hinckley's oak	Dry limestone slopes at elevations between 1,066 and 1,370 meters (3,500 and 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 elevation between 750 and 1,050 meters (2,500 and 3,500 feet).	July-August
Tobusch fishhook cactus	Eastern Edwards Plateau of Texas on high stream banks.	April-September
Sneed pincushion cactus	Cracks on vertical limestone cliffs and ledges within semi-desert grasslands at elevations of 1,200 to 2,350 meters (3,900 to 7,700 feet).	March-May
South Texas ambrosia	Subtropical woodland communities within coastal prairies and savannas with well drained, heavy soils at low elevations from 7 to 20 meters (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 elevation between 955 and 1,045 meters (3,150 and 3,450 feet).	March-May

Common Name	Habitat	Blooming Season
Texas ayenia	Open ground, on the edges of thickets, or within thickets, and on dry, alluvial clay soils.	Year-round
Texas snowbells	Edwards Plateau Vegetation Area. Lightly wooded areas with vertical limestone and dolomite cliffs.	March-May
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

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

1. No in-water work will occur within suitable habitat in watersheds with known occurrences or designated critical habitat without further consultation with the USFWS (see **Table E-2** for a description of suitable habitat).
2. Cleaning or modification of culverts and other work within drainages that could cause sedimentation or otherwise affect water quality or quantity will not occur within, or within 0.25 miles upstream of, critical habitat or other suitable habitat without further consultation with the USFWS.
3. Use of herbicides will not occur in streams or other waterbodies with known occurrences within the range or designated critical habitat unless approved by the USFWS.

Table E-2. Threatened and Endangered Fish Species Habitat

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.

Federally Listed Birds in the Action Area: black-capped vireo (*Vireo atricapilla*), southwestern willow flycatcher (*Empidonax trailli extimus*), and yellow-billed cuckoo (*Coccyzus americanus*). **Table E-3** presents the suitable habitat and nesting seasons for these species.

1. Vegetation control in suitable habitat of threatened or endangered bird species will be limited to the minimum necessary to maintain drivable access roads and to maintain the functionality of other tactical infrastructure (see **Table E-3** for a description of suitable habitat and nesting season for each species). This limited vegetation control will be conducted outside of the nesting season. 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 PCEs.
2. For all other maintenance and repair activities to be conducted within suitable habitat of a threatened or endangered bird species during the nesting season, the following avoidance measures will apply. A qualified biologist will conduct a survey for threatened and endangered birds prior to initiating maintenance and repair activities. If a threatened or endangered bird is present, a qualified biologist will survey for nests approximately once per week within 152 meters (500 feet) of the maintenance or repair area for the duration of the activity. If an active nest is found, no maintenance or repair will be conducted within 152 meters (500 feet) of the nest until the young have fledged.

Table E-3. Threatened and Endangered Bird Species Suitable Habitat and Nesting Season

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 through mid-September
Southwestern willow flycatcher	Dense riparian habitats along streams, rivers, lakesides, and other wetlands	Mar 15–Sep 15
Yellow-billed cuckoo	Low to moderate elevation riparian woodlands greater than or equal to 50 acres in size.	June 15-August 31

Federally Listed Mammals in the Action Area: Mexican long-nosed bat (*Leptonycteris nivalis*)

1. Removal of agave will be limited to the minimum necessary to maintain drivable access roads and to maintain the functionality of other tactical infrastructure. Prior to conducting any maintenance or repair activity outside of the existing disturbed footprint of tactical infrastructure within the range of this species, a qualified biologist will conduct a survey to identify and flag all agave to be avoided.
2. No maintenance and repair activities will be conducted June through August within 0.5 miles of any known roost (i.e., Emory Peak Cave in Big Bend National Park) identified and agreed upon by the USFWS and CBP.
3. For maintenance and repair activities that will take place more than 0.5 miles and less than 5 miles of important Mexican long-nosed bat roost (i.e., Emory Peak Cave in Big Bend National Park), limit activities to daylight hours only from June through August to avoid effects to bats in bat roosts. If night lighting is unavoidable: (1) minimize the

number of lights used; (2) place lights on poles pointed down toward the ground, with shields on lights to prevent light from going up into sky, or out laterally into landscape; and (3) selectively place lights so they are directed away from native vegetation.

<u>*Gulf Coast jaguarundi (Herpailurus yagouaroundi cacomitli) and ocelot (Leopardus pardalis)*</u>

1. Avoid noise and lighting impacts during the night by conducting maintenance activities during daylight hours only. If night lighting is unavoidable, light should shine directly onto the work area to ensure worker safety and efficiency, and light should not exceed 1.5 foot-candles in jaguarundi and ocelot habitat (i.e., dense thornscrub).

Water Resources

1. The environmental SME must be consulted to validate the need for site-specific storm water pollution prevention plans (SWPPPs), spill protection plans, and regulatory approvals. Site-specific SWPPPs and spill protection plans will be prepared and regulatory approval sought, if necessary, in cases of highly sensitive work sites and large scopes of work that pose a significant risk. Where a site-specific SWPPP is not necessary, the personnel performing the maintenance will comply with a generic SWPPP and spill protection plan that covers most routine maintenance and repair activities. Prior to arrival on the work site, key personnel will understand correct implementation of these BMPs and their responsibility to address deficiencies.
2. The environmental SME will provide locations that have the potential for wetlands or other waters of the United States. If no current existing U.S. Army Corps of Engineers (USACE) jurisdictional determination is available, a delineation will be conducted and jurisdictional determination will be obtained from the USACE. Prior to conducting any activities that have the potential to affect wetlands and other waters of the United States, all Federal and state Clean Water Act (CWA) Section 404 individual or applicable nationwide permits and 401 and other applicable permits will be obtained.
3. Prepare and implement an SWPPP as required by regulation prior to applicable maintenance and repair activities (i.e., those with greater than 1 acre of exposed dirt or as required by property manager). Implement BMPs described in the SWPPP to reduce erosion. Consider areas with highly erodible soils when planning the maintenance and repair activities and incorporate measures such as waddles, aggregate materials, and wetting compounds in the erosion-control BMPs.
4. Coordinate with the environmental SME to determine which maintenance activities occur within the 100-year floodplain. Maintenance activities within the 100-year floodplain will be conducted in a manner consistent with Executive Order 11988 and other applicable regulations.
5. All maintenance contractors and personnel will review the CBP-approved spill protection plan and implement it during maintenance and repair activities.
6. Coordinate with the environmental SME to ensure that CWA permits are in place for any changes to existing boat ramps.

7. Contact the environmental SME to coordinate with waterway permitting agencies when performing work below the ordinary high water mark.
8. Wastewater from pressure washing must be collected. A ground pit or sump can be used to collect the wastewater. Wastewater from pressure washing must not be discharged into any surface water.
9. If soaps or detergents are used, the wastewater and solids must be pumped/cleaned out and disposed of in an approved facility. If no soaps or detergents are used, the wastewater must first be filtered or screened to remove solids before being allowed to flow off site. Detergents and cleaning solutions must not be sprayed over or discharged into surface waters.
10. If the surrounding area has dense, herbaceous cover (i.e., primarily grasses) and there are no listed plant species or habitat for such, the wastewater (with or without detergent) could be discharged directly to the grassy area without collection or filtering as long as it is well dispersed and all the wastewater can percolate into the grass and soil. If wastewater runs off the grassy area, it must be filtered.
11. Prevent runoff from entering drainages or storm drains by placing fabric filters, sand bag enclosures, or other capture devices around the work area. Empty or clean out the capture device at the end of each day and properly dispose of the wastes.
12. 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.
13. Avoid contamination of groundwater and surface waters by collecting concrete wash water in open containers, and frequently disposing of it on site by application as a binder to riprap areas. Avoid contamination of groundwater and surface waters by storing any water that has been contaminated (e.g., with maintenance materials, oils, equipment residue) in closed containers on site until removed for disposal. In upland areas, storage tanks must be on-ground containers.
14. Avoid contamination of groundwater and surface waters by ensuring that water tankers that convey untreated surface water do not discard unused water where it has the potential to enter any aquatic or wetland habitat.
15. Cease work during heavy rains and do not resume work until conditions are suitable for the movement of equipment and materials.
16. Uncured concrete should not be allowed to enter the water.
17. Work should be done from the top of the bank or a floating barge, when practicable. Heavy equipment use within the active flowing channel should be avoided.
18. Floating dock components containing foam must be encapsulated to prevent the introduction of foam particles into the water.
19. For all in-water work in streams, sediment barriers will be used to avoid downstream effects of turbidity and sedimentation.
20. Do not pressure wash more than the area to be painted or treated (e.g., for graffiti removal) each day.

21. If the purpose of cleaning is for graffiti removal, spot clean, steam clean, or scrape dirty areas rather than pressure washing entire sections of fence or levee wall.
22. Operate pressure-washing equipment according to manufacturer's recommendations.
23. Except for emergency repairs required to protect human life, limit work within drainages to dry periods to reduce effects on downstream water quality.
24. Riprap should be placed on a layer of geotextile fabric to prevent underlying sediment from being washed out through the openings of the riprap.
25. Riprap should be keyed into the wash/streambed to ensure its stability and effectiveness.

Noise

1. All Occupational Safety and Health Administration requirements will be followed with respect to maintenance and repair noise impacts. Ensure all motorized equipment possess properly working mufflers and are kept properly tuned to reduce backfires. Ensure all motorized generators will be in baffle boxes (i.e., a sound-resistant box that is placed over or around a generator), have an attached muffler, or use other noise-abatement methods in accordance with industry standards. For activities involving heavy equipment that could generate noise, 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.

Cultural Resources

1. If Native American human remains are discovered during maintenance and repair of tactical infrastructure, CBP will consult with culturally affiliated tribes and the Texas State Historic Preservation Officer regarding their management and disposition in compliance with Native American Graves Protection and Repatriation Act.
2. Obtain all pertinent training materials for cultural resources for the areas where maintenance and repair activities will occur. Prior to arrival on the work site, ensure key personnel are aware of the cultural resources potentially occurring in the project area and understand the proper BMPs to implement should cultural resources be encountered in the project area.

Roadways and Traffic

1. Access maintenance and repair sites using designated, existing roads. Do not allow any off-road vehicular travel outside those areas. Ensure all parking is in designated disturbed areas. For longer-term projects, mark designated travel corridors with easily observed removable or biodegradable markers.
2. All contractors and maintenance personnel will operate within the designed/approved maintenance corridor.

Hazardous Materials and Waste Management

1. Where hazardous and regulated materials are handled, workers should collect and store all fuels, waste oils, and solvents in clearly labeled closed tanks and drums within a secondary containment system that consists of an impervious floor and bermed sidewalls capable of containing the volume of the largest container stored therein.
2. All paints and cleaning materials should be approved by the appropriate land manager.
3. Use a ground cloth or an oversized tub for paint mixing and tool cleaning. Properly dispose of the wastes.
4. Enclose spray-painting operations with tarps or other means to minimize wind drift and to contain overspray.
5. Clean paintbrushes and tools covered with water-based paints in sinks plumbed to a sanitary sewer or in portable containers that can be dumped into sanitary sewer drains. Never clean such tools in a natural drainage or over a storm drain.
6. Brushes and tools covered with non-water-based paints, finishes, thinners, solvents, or other materials must be cleaned over a tub or container and the cleaning wastes disposed of or recycled at an approved facility. Never clean such tools in a natural drainage or over a storm drain.
7. If maintenance or repair activities will continue at night, direct shielded light only onto the area required for worker safety and productivity. Lights will not exceed 1.5-foot candles within the lit area.
8. Implement proper and routine maintenance of all vehicles and other maintenance and repair equipment such that emissions are within the design standards of all equipment.
9. Use water-based paints instead of oil-based paints. Look for the words "Latex" or "Cleanup with water" on the label. Do not rinse into natural drainages (e.g., creeks, irrigation canals, wetlands) or storm drains.
10. Do not use paints more than 15 years old. They could contain toxic levels of lead.
11. Use ground or drop cloths underneath painting, scraping, sandblasting, and graffiti removal work. Properly dispose of the waste and scraps collected on the drop cloth.
12. 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.

Socioeconomic Resources, Environmental Justice, and Protection of Children

No BMPs were identified for socioeconomic resources, environmental justice, or the protection of children.

APPENDIX F

Soils Mapped within the
Tactical Infrastructure Maintenance
and Repair Action Area

APPENDIX F

Soils within the Tactical Infrastructure Maintenance and Repair Action Area

Table F-1. Soil Properties of Soils Mapped within the U.S./Mexico Study Area

Map Unit Name	Counties	Erosion Potential	Farmland Classification	Permeability
Nickel-Del Norte-Canutio-Badland	El Paso, Hudspeth, Jeff Davis, Presidio, Brewster	Moderate	None	Moderate to moderately rapid
Volco-Rock Outcrop-Lozier-Hodgkins-Brewster	El Paso, Jeff Davis	Severe	None	Moderate to moderately rapid
Wink-Pintura-Bluepoint	El Paso	Slight	None	Moderate to moderately rapid
Tigua-Harkey-Glendale-Gila	Hudspeth	Slight	None	Moderate
Bluepoint-Badland	Hudspeth	Slight	None	Rapid
Wink-Hueco	Hudspeth	Slight	None	Moderate to moderately rapid
Upton-Tencee-Sanderson-Reakor-Reagan	Hudspeth, Jeff Davis, Presidio, Brewster	Moderate	None	Moderate
Ratliff-Lozier-Conger	Jeff Davis	Moderate	None	Moderate
Rock outcrop-Lozier	Jeff Davis, Presidio, Brewster	Severe	None	Slight
Rock outcrop-Liv-Brewster	Presidio, Brewster	Severe	None	Slight
Rock outcrop-Beach-Allamore	Presidio	Severe	None	Slight
Wink-Simona-Mimbres-Agustin	Presidio, Brewster	Slight	None	Moderate to moderately rapid
Verhalen-Redona-Reagan-Musquiz	Presidio, Brewster	Slight	None	Slight
Lomalta-Galveston-Sejita	Cameron	Slight to moderate	None	Slight to moderate
Rio Grande-Camargo-Matamoros	Starr, Hidalgo, Cameron,	Moderate	Prime farmland	Moderate
Harlingen-Laredo-Lagloria	Hidalgo, Cameron	Slight to moderate	Prime Farmland soil if irrigated	Very slow to moderate

Map Unit Name	Counties	Erosion Potential	Farmland Classification	Permeability
Hidalgo-Willacy-Delfina	Hidalgo, Cameron	Slight	Prime Farmland soil	Moderate to moderately rapid
Sarita-Falfurrias-Nueces	Starr, Hidalgo	Slight	None	Moderate to moderately rapid
McAllen-Hidalgo-Brennan	Starr, Hidalgo, Cameron	Slight	Prime Farmland soil if irrigated	Moderate to moderately rapid
Delmita-Zapata	Webb, Zapata, Starr, Hidalgo	Slight	None	Moderate to moderately rapid
Catarina-Montell-Jimenez	Maverick, Webb, Zapata, Starr, Hidalgo	Slight	None	Very slow to moderate
Monteola-Montell-Zapata	Webb	Slight	None	Very slow to moderate
Duval-Webb-Zapata	Maverick, Webb, Zapata	Slight	None	Moderate
Uvalde-Montell-Zapata	Maverick	Slight	None	Very slow to moderate

APPENDIX G

Air Quality Emissions Calculations

Summary	Summarizes total emissions by calendar year for the Proposed Action for the Texas USBP Sectors
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Construction Commuter	Estimates emissions for construction workers commuting to the site.

Air Quality Emissions from the Proposed Action

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	11.37	0.70	4.29	0.23	0.69	0.67	1,349.04
Construction Fugitive Dust	-	-	-	-	1,039.13	103.91	-
Construction Commuter	0.11	0.11	0.99	0.001	0.01	0.01	131.48
TOTAL	***11.48***	***0.81***	***5.28***	***0.23***	***1,039.83***	***104.59***	***1,480.52***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons =	***1,342.83***	***metric tons***	
State of Texas' CO_2 emissions =	***622,690,081***	***metric tons***	*(EIA 2011)*
Percent of State of Texas' CO_2 emissions =	***0.0002%***	***metric tons***	

Source: U.S. Department of Energy, Energy Information Administration (EIA). 2011. State Carbon Dioxide Emissions Summary by State.
Available online: <http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html>. Accessed 17 January 2011.

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Texas USBP Sector Grading Activities	39,705,600	ft^2	Road Grading would be 376 miles by 20 feet wide
Total General Construction Area:	39,705,600	ft^2	
	911.5	acres	
Total Demolition Area:	0	ft^2	(none)
	0.0	acres	
Total Pavement Area:	0	ft^2	(none)
	0.0	acres	
Total Disturbed Area:	39,705,600	ft^2	
	911.5	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	95.742%	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	91	3789.352	234.506	1429.601	75.787	231.642	224.693	449678.898
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			0.000					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	39,705,600	911.52	6	(from "Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	0	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	22,736.11	1,407.03	8,577.61	454.72	1,389.85	1,348.16	2,698,073
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	-	-	-	-	-	-	0
Architectural Coatings	-	-	-	-	-	-	0
Total Emissions (lbs):	**22,736.11**	**1,407.03**	**8,577.61**	**454.72**	**1,389.85**	**1,348.16**	**2,698,073**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	22,736.11	1,407.03	8,577.61	454.72	1,389.85	1,348.16	2,698,073
Total Project Emissions (tons)	11.37	0.70	4.29	0.23	0.69	0.67	1,349.04

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006

$PM_{2.5}$ Emissions

$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Roadway Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	911.5	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Roadway Construction	-	-	-	-
General Construction Activities	2,078.25	1,039.13	207.83	103.91
Total	**2,078.25**	**1,039.13**	**207.83**	**103.91**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 911.5 acres/yr (from Combustion Worksheet)

Qty Equipment: 274.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.

An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.

200 hp bulldozers are used for site clearing.

300 hp bulldozers are used for stripping, excavation, and backfill.

Vibratory drum rollers are used for compacting.

Stripping, Excavation, Backfill and Compaction require an average of two passes each.

Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	911.52	113.94
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	911.52	445.63
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	455.76	459.56
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	455.76	188.54
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	911.52	319.69
TOTAL								1527.35

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 1,527.4

Qty Equipment: 274.0

Grading days/yr: 5.6

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used.

The average roundtrip commute for a construction worker =	40	miles
Number of construction days =	240	days
Number of construction workers (daily) =	25	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 27 May 2009.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**220.354**	**219.357**	**1983.062**	**2.586**	**20.875**	**13.148**	**262963.764**
tons	**0.110**	**0.110**	**0.992**	**0.0013**	**0.0104**	**0.0066**	**131.482**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers