FINAL

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

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

DECEMBER 2012

ABBREVIATIONS AND ACRONYMS

$\mu g/m^3$	micrograms per cubic meter
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ADEQ	Arizona Department of Environmental Quality
AIRFA	American Indian Religious Freedom Act
AMA	Active Management Area
AQCR	air quality control region
ARHA	Archeological and Historic Preservation Act
ARPA	Archaeological Resources Protection Act
AST	aboveground storage tank
AZ	Arizona highway
AZGFD	Arizona Game and Fish Department
BLM	Bureau of Land Management
BMP	Best Management Practice
BMTF	Borderland Management Task Force
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
DOI	U.S. Department of the Interior
DVD	digital video disc
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESCP	erosion-and-sediment control-plan
ESP	Environmental Stewardship Plan
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
GHG	greenhouse gas
HAP	hazardous air pollutant
I	Interstate
IIRIRA	Illegal Immigration Reform and Immigrant Responsibility Act
LBP	lead-based paint
mg/m^3	milligrams per cubic meter
mi^2	square mile
mph	miles per hour
MYIAQCR	Mojave-Yuma Interstate AQCR
NAAQS	National Ambient Air Quality Standards

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NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOA	Notice of Availability
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O_3	ozone
OPCNM	Organ Pipe Cactus National Monument
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
Pb	lead
PCB	polychlorinated biphenyl
PCE	primary constituent element
percent g	percentage of the force of gravity
PIAQCR	Pima Intrastate AQCR
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
PMO	Program Management Office
POE	Port of Entry
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
RVSS	Remote Video Surveillance System
SBInet	Secure Border Initiative
SEAIAQCR	Southeast Arizona Intrastate AQCR
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SME	Subject Matter Expert
SO_x	sulfur oxides
SO_2	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
tpy	tons per year
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USBP	U.S. Border Patrol
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USIBWC	United States Section International Boundary and Water Commission
UST	underground storage tank
VOC	volatile organic compound

COVER SHEET

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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 Arizona.

Proposed Action: CBP proposes to maintain and repair existing tactical infrastructure along the U.S./Mexico international border in Arizona, which is maintained by two USBP sectors: Tucson and Yuma. The Tucson Sector is entirely within Arizona, and the western portion of the Yuma Sector is in Arizona.

Report Designation: Final Environmental Assessment (EA).

Abstract: CBP proposes to maintain and repair existing tactical infrastructure along the U.S./Mexico international border in Arizona. The existing tactical infrastructure includes fences and gates, roads and bridges/crossovers, drainage structures and grates, lighting and ancillary power systems, and communication and surveillance tower components (including, but not limited to, Remote Video Surveillance System [RVSS] or Secure Border Initiative [SBInet] towers [which are henceforth referred to as towers]). The existing tactical infrastructure occurs in the Yuma and Tucson USBP sectors in Arizona.

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://cbp.gov/xp/cgov/border_security/ti/ti_docs/timr/*; by emailing AZcomments@TIMR-NEPA.com; or by written request to Mr. Charles McGregor, Jr., Environmental Manager, U.S. Army Corps of Engineers, Fort Worth District, Engineering and Construction Support Office (ECSO), 819 Taylor Street, Room 3B10, Fort Worth, Texas 76102; or by Fax: 817-886-6404.

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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 Arizona. 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 communication and surveillance tower components (including, but not limited to, Remote Video Surveillance System [RVSS] or Secure Border Initiative [SBInet] towers [henceforth referred to as towers]). The existing tactical infrastructure occurs in two U.S. Border Patrol (USBP) sectors: Tucson and Yuma.

The tactical infrastructure included in this analysis crosses multiple privately owned land parcels, and public lands managed by the Bureau of Land Management (BLM), the U.S. Forest Service (USFS), National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), and U.S. Department of Defense (DOD). The CBP Facilities Management and Engineering (FM&E) Office is responsible for maintenance and repair of tactical infrastructure (e.g., fences, roads, lights, towers, and drainage structures) to support CBP border security requirements.

This Environmental Assessment (EA) addresses the maintenance and repair of existing tactical infrastructure. Tactical infrastructure included in this EA is found in both USBP Sectors along the U.S./Mexico international border in Arizona. However, the maintenance and repair of tactical infrastructure assets that are already addressed in previous National Environmental Policy Act (NEPA) documents will not be included within the scope of this EA. This EA also does not address maintenance and repair of any tactical infrastructure on tribal lands in Arizona. 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.

This EA has been prepared through coordination with Federal and state agencies to identify and assess the potential impacts associated with the proposed maintenance and repair of tactical infrastructure. This EA is also 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 Arizona. 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 need for the Proposed Action is to ensure that the effective level of border security provided by the installed tactical infrastructure is not compromised by 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 environmental concerns they might have. As part of the NEPA process, CBP coordinated with the U.S. Environmental Protection Agency (USEPA); USFWS; Arizona Office of Historic Preservation; 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) was published in the *Yuma Sun*, *Tucson Citizen*, and *Arizona Daily Star* on 30 September 2011. This was done 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 have been incorporated into the Final EA.

During the 30-day public review and comment period for the Draft EA, CBP accepted comment submissions by fax, email, through the project-specific Web site, and by mail from the public; Federal and state agencies; Federal, state, and local elected officials; stakeholder organizations; and businesses. USFWS and NPS comment responses were received and have been incorporated into this EA.

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, lighting and ancillary power systems, and communication 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 due to normal deterioration due to wear and tear, natural disasters, and intentional destruction or sabotage. The existing tactical infrastructure is found along the U.S./Mexico international border in Arizona and cuts across multiple land ownership categories including lands under CBP ownership, lands managed by other Federal agencies, 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 Arizona. CBP will develop a comprehensive protocol for coordinating

the necessary maintenance and repair activities within the different classes of land ownership. The maintenance and repair of tactical infrastructure assets that are already addressed in previous NEPA documents are not included in this EA. In addition, tactical infrastructure assets that are covered by a waiver issued by the Secretary of Homeland Security are not included in this EA. No tactical infrastructure on tribal lands is included in this EA.

The USBP sectors along the U.S./Mexico international border in Arizona have identified a need for tactical infrastructure maintenance and repair to ensure their continued utility in securing the border. All maintenance and repair activities would be coordinated by the CBP FM&E Sector Coordinator in close coordination with the sector and managed by the Project Management Office's Maintenance and Repair Supervisor. CBP proposes to conduct tactical infrastructure maintenance and repair, as described in the following paragraphs.

Fences and Gates

Maintenance and repair of existing fences and gates would consist of welding metal fence components, replacing damaged or structurally compromised components, reinforcing or bracing foundations, repairing burrowing activities under fences and gates, repairing weather-related damages, and removing vegetation and 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 250 miles of fence on non-tribal lands in Arizona. The fencing consists of primary border fencing and a variety of perimeter security fencing for protecting sensitive infrastructure. Approximately 5 percent of the total number of fences in the Arizona region of analysis are considered in this EA.

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., ensuring 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. The exact number of miles of roads within Arizona could change over time to accommodate CBP needs.

CBP currently uses approximately 1,100 miles of road within the region of analysis, which represents an estimated 17.5 percent of all local roads within the area. Approximately 500 miles (8 percent) of local roadways within 25 miles of the U.S./Mexico international border in Arizona are covered under this EA.

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 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 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 250 such structures associated with the tactical infrastructure are proposed to be maintained and repaired in the Arizona region of analysis; approximately 20 percent are considered in this EA.

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. Appropriate best management practices (BMPs) would be followed for all herbicide use (see **Appendix E**). Herbicides safe for aquatic use would be used within aquatic systems. Application of terrestrial and aquatic herbicide would be made with products approved by the USEPA and the relevant Federal land management agency, where appropriate. Certified USBP sector or contract support personnel would use all herbicides in accordance with label requirements. Herbicide use would be part of an integrated approach that uses minimal quantities of herbicide. Heavy 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 (February 1 through September 1). 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.

Lighting and Ancillary Power Systems

Maintenance and repair would consist of the replacement of burned-out light bulbs, restoring/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 12 percent of the estimated 550 lighting and ancillary power systems within the Arizona region of analysis are considered in this EA.

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 communication 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 50 and 60 of the towers used by CBP in the Arizona region of analysis (approximately 75 percent) are considered in this EA.

Each of the towers has a small footprint; none exceeds 10,000 square feet. For all water and radio towers, the total amount of disturbance would not exceed 13.5 acres. Access roads to the tower 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 will 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. BMPs would be used 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 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 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 Arizona 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 all 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 Arizona. However, inclusion of the No Action Alternative is prescribed by the Council on Environmental Quality (CEQ) regulations and has been 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 region of analysis, 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. Herbicides would result in long-term, minor, direct, adverse effects on groundwater if spills were to occur.	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 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 applied 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 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	Air pollutant emissions would be generated as a result of grading, filling, compacting, trenching, and 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.
Cultural Resources	There is the potential for long-term, minor, adverse effects on archaeological sites from the grading of roads that have not been previously graded. All other activities have negligible to no potential to impact cultural resources.	Negligible or no potential to impact 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.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
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 it would result in gradual degradation of these roadways.
Hazardous Materials	Long-term, negligible to minor, adverse impacts on 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 paints (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 would be expected due to the deterioration of tactical infrastructure over time. No impacts on hazardous substances, petroleum products, hazardous and petroleum wastes, pesticides, ACMs, LBPs, and PCBs. 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.
Sustainability and Greening	Negligible.	Negligible.
Aesthetics and Visual Resources	Negligible.	Negligible.
Climate Change	Negligible.	Negligible.
Human Health and Safety	Negligible.	Negligible.
Utilities and Infrastructure	Negligible.	Negligible.

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APPENDICES

FIGURES

TABLES

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 Arizona. The existing 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, communication and surveillance tower components (including, but not limited to, 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 shown in **Figure 1-1**, the exact extent could change over time to accommodate CBP needs. The existing tactical infrastructure in Arizona occurs in two U.S. Border Patrol (USBP) sectors: Yuma and Tucson. The Tucson Sector is entirely within Arizona and a portion of the Yuma Sector is in Arizona.

The existing tactical infrastructure included in this analysis crosses multiple privately owned land parcels, and public lands managed by the U.S. Bureau of Land Management (BLM), U.S. Department of the Interior (DOI), National Park Service (NPS), U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), U.S. Department of Defense (DOD) and the State of Arizona. 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, lighting and ancillary power systems, and tower components) to support CBP border security requirements.

To accommodate changes in the location of border security threats, requests from landowners and land managers, and other changing situations, the location and amount of tactical infrastructure to be maintained and repaired under the Proposed Action as described in this Environmental Assessment (EA) could change over time. However, the BMPs that are described in **Appendix E** and the associated thresholds that would trigger further coordination with the USFWS were developed to apply to and address the potential impacts of all tactical infrastructure currently included in the program or that might be included in the future. If CBP proposes to add maintenance and repair of other existing tactical infrastructure within suitable habitat that exceeds the thresholds or would otherwise result in adverse effects not covered in the Biological Opinion associated with this project, then CBP would further discuss such maintenance and repair with USFWS.

This EA addresses the maintenance and repair of existing tactical infrastructure. However, the maintenance and repair of tactical infrastructure assets that are already covered in previous National Environmental Policy Act (NEPA) documents are not be included within the scope of this EA. This EA also does not address maintenance and repair of any tactical infrastructure on tribal lands in Arizona. 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.

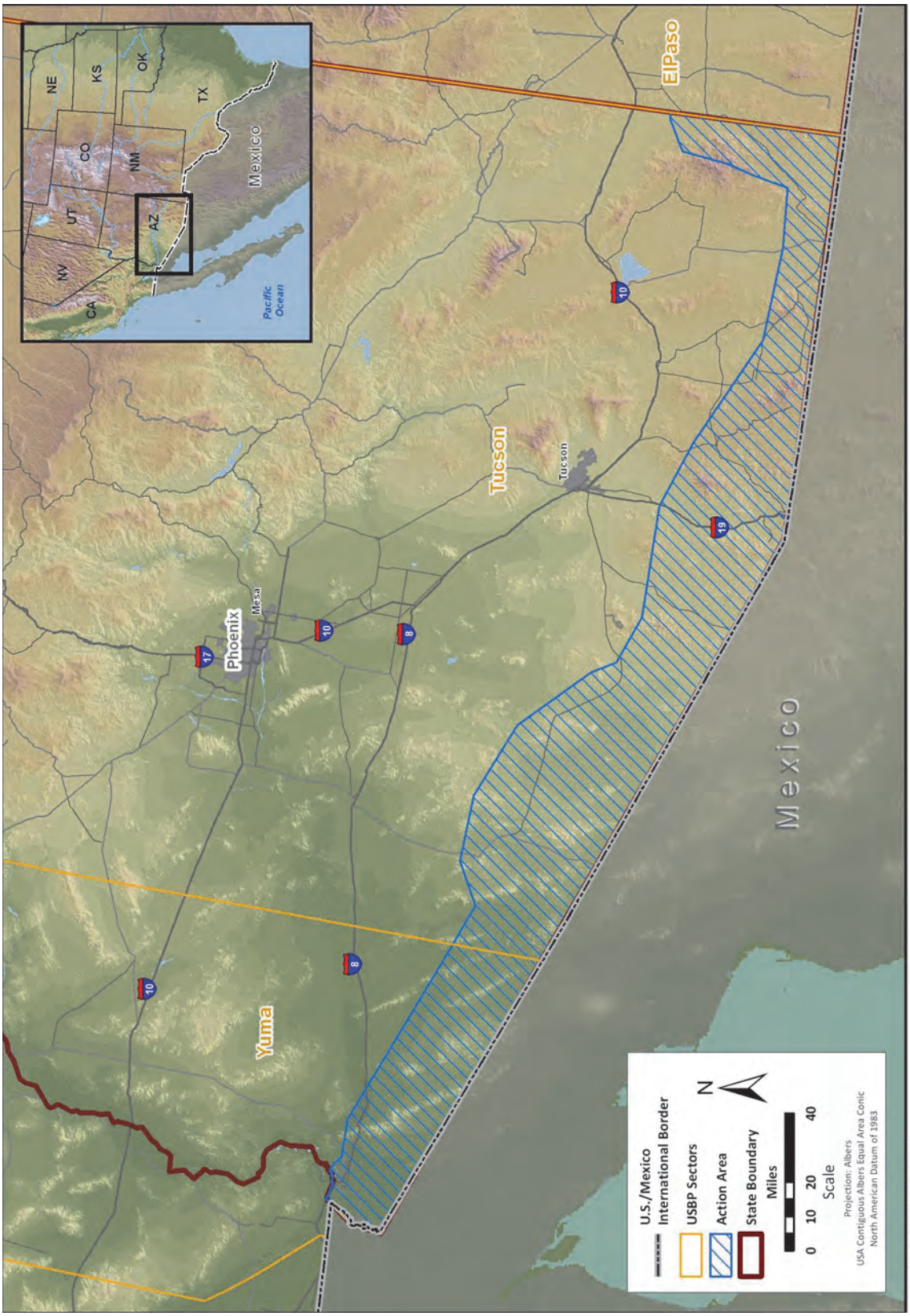


Figure 1-1. Region of Analysis for Proposed Tactical Infrastructure Maintenance and Repair Activities in Arizona

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 if the Secretary deems it 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 2008 waivers for construction of, among other things, pedestrian and vehicular fence along the international border (73 FR 19077 and 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, for the tactical infrastructure that was constructed under the April 2008, waivers, CBP prepared Environmental Stewardship Plans (ESPs) in lieu of NEPA documents. 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 would be implemented by CBP. ESPs are available on the Internet at the following location:

http://www.cbp.gov/xp/cgov/border_security/ti/ti_docs/sector.

Further to 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 maintenance and repair activities 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 region of analysis reflects CBP's environmental stewardship by better understanding the cumulative impacts and affirming its commitments to minimize the potential negative impacts. This EA discusses tactical infrastructure maintenance and repair activities and their attributes that would enhance positive environmental benefits.

This EA is divided 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 and alternatives considered, including 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. **Section 5** provides the references for the EA and **Section 6** provides a list of preparers and references for the EA.

1.1 USBP BACKGROUND

USBP has multiple 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's new and traditional missions, referred to in the preceding list, complement one another. 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 existing tactical infrastructure along the U.S./Mexico international border in Arizona maintained by the Yuma and Tucson 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 Arizona. In many areas, tactical infrastructure is a critical element of border security, which contributes as a force multiplier 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 need for the Proposed Action is to ensure that the effective level of border security provided by the installed tactical infrastructure is not compromised by impacts occurring through acts of sabotage, acts of nature, or a lack of maintenance and repair. CBP must ensure that tactical infrastructure functions as it is intended, which assists CBP with its mission requirements.

Tactical infrastructure would be maintained to ensure USBP agent safety by preventing potential vehicular accidents by minimizing and eliminating hazardous driving conditions.

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 the following when preparing an EA:

- 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 (ARPA), 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 has coordinated with agencies such as the U.S. Environmental Protection Agency (USEPA) Region 9; USFWS Southwest Region; Arizona Game and Fish Department (AZGFD); Arizona State Historic Preservation Office (SHPO); appropriate Native American Tribes and Nations; and other Federal, state, and local agencies. Agency responses have been incorporated into the analysis of potential environmental impacts. The following is a list of Federal and state agencies and stakeholder groups that have been coordinated with during the NEPA process:

- **Federal Agencies:**
  - USEPA Region 9
  - USFWS Southwest Region
  - USFWS Arizona Ecological Services
  - USFWS Cabeza Prieta National Wildlife Refuge (NWR)
  - USFS – Coronado National Forest
  - NPS – Coronado National Memorial and Organ Pipe Cactus National Monument
  - U.S. Army Corps of Engineers (USACE) Los Angeles District
  - DOD – Barry M. Goldwater Range
  - BLM Arizona State Office
  - BLM Yuma Field Office
  - BLM Lower Sonoran Field Office
  - BLM Tucson Field Office
  - BLM Safford Field Office
  - United States Section, International Boundary and Water Commission (USIBWC).
- **State Agencies:**
  - Arizona Department of Environmental Quality (ADEQ)
  - Arizona Department of Transportation
  - AZGFD
  - Arizona SHPO.
- **Stakeholders:**
  - Federally Recognized Native American Tribes and Nations.

A Notice of Availability (NOA) for the EA and draft FONSI was published in the *Yuma Sun*, and *Arizona Daily Star* on 30 September 2011. This was done to solicit comments on the Proposed Action and alternatives and involve the local community in the decisionmaking process. Substantive comments from the public and Federal, state, and local agencies have been incorporated into the Final EA and are included in **Appendix B**.

Hard copies of the Draft EA were also available for review during the public review period at the Yuma Public Library, Wellton Branch Library, Mission Branch Public Library, Rio Rico Public Library, Sierra Vista Public Library, and the Ajo Public Library. Throughout the NEPA process, the public can obtain information concerning the status and progress of the EA via the project Web site at *http://cbp.gov/xp/cgov/border_security/ti/ti_docs/timr/*.

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 PROPOSED ACTION AND ALTERNATIVES

Each action 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**). Alternatives must also meet requirements to ensure that each is practical, environmentally sound, economically viable, and complies with applicable 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 Arizona, either on foot or by vehicle traffic. The continuous maintenance and repair of the fences and gates, roads and bridges/crossovers, drainage structures and grates, 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.*** Ensure tower infrastructure sites are accessible to perform the appropriate maintenance and repair activities 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 would 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 resources agencies. Particular management focus would 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. Based on the implementation BMPs, the project is not likely to have more than a negligible effect on most threatened or endangered species in the project area. CBP has received concurrence from the USFWS that the project is not likely to adversely

affect these species. The project has the potential to adversely affect Sonoran Pronghorn, Pima pineapple cactus, Sonoran tiger salamander, and the Chiricahua leopard frog. CBP conducted formal consultation under the ESA for these species. A Biological Opinion, including an Incidental Take Statement for the animal species, was issued on November 6, 2012.

- *Wetlands and Floodplains*. The maintenance and repair of tactical infrastructure should be conducted in such a manner as to have negligible to minor impacts on wetlands, surface waters of the United States, and floodplain resources to the maximum extent practical. CBP is consulting with the USACE districts to minimize wetland and floodplain impacts and identify potential avoidance, minimization, and conservation measures.
- *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 in the process of consulting with the Arizona SHPO 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 Properties (ACHP), the Arizona SHPO, Federal agencies, and tribes. If the activity or project is not covered under the PA or if the EA and FONSI are issued prior to approval of the PA, CBP would be required to conduct the applicable Section 106 review for those activities that are not listed or until the activities are covered by an executed PA. Therefore, 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.

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 activities 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 this EA. If the scope of the 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) are not part of this analysis and are not discussed.

The USBP sectors along the U.S./Mexico international border in Arizona have identified a need for tactical infrastructure maintenance and repair to ensure their continued utility in securing the border. All maintenance and repair activities would be coordinated by the CBP FM&E Sector Coordinator and managed by the Program Management Office's (PMO) Maintenance and Repair Supervisor. Although the majority of anticipated tactical infrastructure can be found within the geographic areas shown in **Figure 1-1**, the exact extent 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, lighting and ancillary power systems, and towers not directly associated with the tactical infrastructure covered by the Secretary's waiver and prior NEPA documentation. Maintenance and repair standards for roads are shown 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 existing fences and gates would consist of welding metal fence components, replacing damaged or structurally compromised components, reinforcing or bracing foundations, repairing burrowing activities under fences and gates, repairing weather-related damages, and removing vegetation and 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 250 miles of fence on non-tribal lands in Arizona. The fencing consists of primary border fencing and a variety of perimeter security fencing for protecting sensitive infrastructure. Approximately 5 percent of the total fences and gates in the Arizona region of analysis are not waived or previously covered and are, therefore, considered in this EA under the Proposed Action.

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 of access roads and bridges would consist of filling in potholes, regrading road surfaces, implementing improved water-drainage measures (i.e., ensuring road crowns shed water and runoff flows to 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.

Maintenance of the existing roads would be in accordance with proven maintenance and repair standards. All of the road improvement 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. 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 and integrated bridge/crossover maintenance. Heavy equipment would be needed for activities such as grading, filling, and compacting. The majority of proposed maintenance and repair is for 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, making 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 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. The road maintenance and repair program described in this EA does not provide for upgrade of any existing roads, however, this EA also covers upgrades of approximately 60 miles of existing roads at Organ Pipe Cactus National Monument (OPCNM) which are identified in **Section 2.3.2**. All upgrades to roads would be completed per the Memorandum of Understanding established between CBP and the NPS. Any biological or cultural surveys would be completed in accordance with this Memorandum of Understanding (CBP 2012a).

CBP currently uses approximately 1,100 miles of road within the region of analysis, which represents an estimated 17.5 percent of all local roads within the area. Approximately 500 miles (8 percent) of local roadways within 25 miles of the U.S./Mexico international border in the Arizona region of analysis are considered in this EA. The remaining 600 miles of road used by CBP are not covered under this EA because they are covered under previous NEPA analysis or have been covered by a Secretary's waiver. The exact number of miles of roads within Arizona could change over time to accommodate CBP needs. Therefore, the number of miles of roads associated within the Proposed Action should be considered somewhat flexible and not constrained by a fixed quantifiable number. Future actions 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 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. During the planning process for such activities, appropriate

coordination with USACE would occur and appropriate permits would be acquired if necessary. In addition, maintenance and repair of riprap to maintain proper functionality is proposed, as is the necessary maintenance to low-water crossings.

Low-water crossings consist of concrete or riprap at waterway edges and articulated matting or similar hardened material in the middle. The function of the riprap is to protect the articulated matting 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.

The removal of any accumulated debris to create a sustainable, efficient low-water crossing could also occur. There are an estimated 250 drainage management structures associated with the tactical infrastructure to be maintained and repaired in the Arizona region of analysis; 20 percent of these structures are not waived or previously covered and are therefore considered in this EA.

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. Appropriate BMPs would be followed for all herbicide use (see **Appendix E**). Herbicides safe for aquatic use would be used within aquatic systems. Application of terrestrial and aquatic herbicide would be made with products approved by the USEPA and the relevant Federal land management agency, where appropriate. Certified USBP sector or contract support personnel would use all herbicides in accordance with label requirements. Herbicide use would be part of an integrated approach that uses minimal quantities of herbicide. Heavy 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 (February 1 through September 1). 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 will be limited. 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.

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 12 percent of the estimated 550 lighting and ancillary power systems associated with tactical infrastructure in the Arizona region of analysis have not been waived or previously analyzed and are therefore are subject to analysis in this EA under the Proposed Action.

Communications and Surveillance Towers. Communications and surveillance towers and components are mounted on a 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 50 and 60 of the towers used by CBP in the Arizona region of analysis (approximately 75 percent) have not been waived or previously analyzed and are therefore considered in this EA under the Proposed Action.

Each of the towers has a small footprint, and none exceeds 10,000 square feet. For all water and radio towers, the total amount of disturbance would not exceed 13.5 acres. 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 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 Arizona cuts across multiple landownership categories including lands under CBP ownership, lands managed by other state or Federal agencies, and private property. CBP would develop a comprehensive protocol for coordinating the necessary maintenance and repair activities within the different types of landownership.

CBP-owned Tactical Infrastructure. Tactical infrastructure plays an important role in CBP's border enforcement strategy. CBP would undertake necessary maintenance and repair activities to ensure the continuity of the intended functionality of the existing 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 Agencies. These tactical infrastructure assets are on public lands managed by the BLM, DOI, NPS, USFS, USFWS, and DOD. 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 has developed a Memorandum of Understanding with the NPS that describes how maintenance and repair of roads and other tactical infrastructure on OPCNM would be conducted as required. Similar agreements would be developed with other land management agencies as required. CBP actively participates in the Borderland Management Task Force (BMTF) working committee to coordinate these activities on a regular basis. If maintenance and repair activities would require disturbance beyond the current footprint, biological and cultural resources surveys would be conducted prior to the initiation of maintenance and repair work.

Roads specified in the Memorandum of Understanding with OPCNM are analyzed for upgrade in this document and include the following:

- **Bates Well Road** (13.49 miles) crossing the Growler Valley, Growler Wash, Bates Well, and reaching the northern border of the OPCNM
- **216 AR** (0.38 miles) west from AZ 85 along the northern border of the OPCNM to Tower 216
- **170 AR** (6.76 miles) through the Valley of the Ajo from I-85 west along Kuakatch Wash then south to the Alamo Wash, roughly parallel to I-85 to Tower 170
- **Pozo Nuevo Road** (15.55 miles) from a well at Quitobaquito near the border north to intersect with Bates Well Road
- **003 AR** (1.12 miles) from an intersection with Pozo Nuevo Road to Tower 003
- **South Puerto Blanco Drive** (13.33 miles) along the southern border from Quitobaquito to intersect with I-85 near the Lukeville POE
- **303 AR** (2.0 miles) from South Puerto Blanco Drive north towards the Senita Basin to Tower 303
- **Camino de Dos Republicas** (3.81 miles) along the southern border from an intersection at I-85 near the Lukeville POE east through the Gachado Line Camp and ending at Dos Lomitas Ranch (Blankenship Well)
- **310 AR** (2.44 miles) from Dos Lomitas Ranch (Blankenship Well) north through the Sonoyta Valley to Tower 310.

Tactical Infrastructure Assets on Tribal Land. As stated previously, the maintenance and repair of tactical infrastructure assets on tribal lands is not 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 private landowners. No maintenance and repair would occur without a consent agreement in place between CBP and cooperating landowners.

2.3.2.1 Tactical Infrastructure Mapped within the Region of Analysis in Arizona

The blue hatched area depicted on **Figure 1-1** is the geographic area where CBP tactical infrastructure would be found, 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 Arizona 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 the ranges of threatened and endangered species within the region of analysis. The maps depict additional activities occurring within the range of threatened and endangered species that would require use of species-specific BMPs, as formally agreed upon during consultation with the USFWS and are further discussed in the Biological Assessment (CBP 2012b).

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 a method to show the ranges 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 will 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 roads, the inspection, maintenance, and repair activity would occur periodically and reactive maintenance and repair would occur following intentional sabotages or weather events. During maintenance and repair of 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 weather 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 as needed 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 (including vegetation-control activities) would occur as needed and 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 conditions 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 (part of the PMO) field maintenance and repair representatives identify maintenance and repair needs.
- ***Step 2.*** A team of CBP PMO interdisciplinary subject matter experts (SMEs), including environmental staff, would decide on the best technical approach for ensuring desired specifications and standards and applicable BMPs are implemented.
- ***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 CBP's efforts to integrate the NEPA process with their 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 Arizona would request that FM&E 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 storm water 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 for analysis in the EA.

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 significant 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.

Table 2-1. Summary of Alternatives Identified

Management Approaches	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Maintenance and Repair Activities and Environmental Impacts	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.

2.5.2 No Maintenance and Repair of Tactical Infrastructure

Under this alternative, tactical infrastructure would not be maintained or repaired. This alternative would allow tactical infrastructure to degrade until breakdown of the infrastructure occurred and 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 also is preferred because it would be in line with the current tactical infrastructure maintenance and repair methodology covered by the Secretary's waiver and other NEPA documents.

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. Some were eliminated from detailed examination because of their inapplicability to this Proposed Action. 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 impact 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

This section presents the characteristics of the affected environment and an analysis of the potential direct and indirect impacts each alternative would have on the affected environment. Cumulative and other impacts are discussed in **Section 4**. All potentially relevant resource areas were initially considered in this EA. 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, on 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 maintenance and repair of tactical infrastructure would have a negligible 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 impacts on aesthetic and visual resources would not be expected.

Climate Change

On September 22, 2009, the USEPA issued a final rule for mandatory greenhouse gas (GHG) reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide (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 per year. The first emissions report is due in 2011 for 2010 emissions. Although GHGs are not currently regulated under the CAA, the USEPA has clearly indicated that GHG emissions and climate change are issues that need to be considered in future planning. GHGs are produced by the burning of fossil fuels and through industrial and biological processes.

Total estimated GHG emissions from maintenance and repair of tactical infrastructure would not exceed the reporting threshold and therefore would not be expected to affect climate. Emissions and their impact on air quality are discussed in **Section 3.10**.

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 sites. The proposed maintenance and repair would not expose members of the 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 project corridor, the likelihood of this project impacting 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 public 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.] § 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 in their 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 their 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 would result in a negligible amounts of resources used. Therefore, beneficial effects on sustainability and greening would be expected.

Utilities and Infrastructure

The proposed maintenance and repair of tactical infrastructure along the U.S./Mexico international border in Arizona would occur in remote areas far 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 project corridor, 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 vary among jurisdictions. For example, natural conditions of property can be described or categorized as vacant and undeveloped, recreational and open space, and Federal land. There are 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 (1) ensure orderly growth and (2) ensure 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 a proposed action needs to be evaluated for its potential effects on the proposed project corridor and adjacent land uses. The foremost factor affecting a proposed 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 proposed project corridor, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its permanence.

Wilderness as defined by the Wilderness Act of 1964 is ". . .an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions. . ." Lands designated as Wilderness are designated as such through acts of the United States Congress. Wilderness areas are to be managed to preserve wilderness character for the use and enjoyment of the American public into the future.

3.2.2 Affected Environment

Land uses in and adjacent to the region of analysis in Arizona, include rural, residential, private, and commercial, with the primary ownership designated as Federal land (CCAPD 2010). Part of the region of analysis is within the Federal government's 60-foot Roosevelt Reservation along the U.S./Mexico international border, the Cabeza Prieta NWR, the Coronado National Memorial, and the San Bernardino NWR. Additional special land uses within the region of analysis include OPCNM, Buenos Aires NWR, the Coronado National Forest, and BLM lands. The private lands within the impact corridor are primarily undeveloped desert and used for cattle grazing.

Roosevelt Reservation. The Roosevelt Reservation is within 60 feet of the international boundary between the United States and Mexico within the states of California, Arizona, and

New Mexico. The reservation was set aside in 1907 by President Theodore Roosevelt as a protection against the smuggling of goods between the United States and Mexico. Land use for the Roosevelt Reservation is designated for border enforcement (CBP 2007). Because the Roosevelt Reservation is designated for border enforcement, CBP both conducts operations and has constructed tactical infrastructure within the Roosevelt Reservation. In addition, the mission of the USIBWC is to ensure that any construction along the U.S./Mexico border does not adversely affect International Boundary Monuments or substantially impede floodwater conveyance within international drainages..

Coronado National Memorial. The 4,750-acre memorial in Hereford, Arizona, commemorates the first organized expedition into the southwestern United States by the conquistador Francisco Vasquez de Coronado in 1542. This area is flanked to the north by the Huachuca Mountains along the U.S/Mexico international border. The memorial is mostly grasslands, oak woodlands, and mixed forest.

Cabeza Prieta National Wildlife Refuge. The 860,000-acre Cabeza Prieta NWR plays a critical role in the recovery and protection of rare and sensitive species such as the federally endangered Sonoran pronghorn and the desert bighorn sheep, and the conservation of a diversity of desert wildlife representative of the Sonoran Desert (USFWS 2006a). It is located in Pima County in the Tucson Sector and shares 56 miles of the U.S./Mexico international border with Sonora, Mexico. This NWR covers 445,588 acres within the region of analysis.

Title III of the Arizona Desert Wilderness Act of 1990 designated approximately 93 percent (803,418 acres) of the Cabeza Prieta NWR as a wilderness in accordance with the Wilderness Act of 1964. This designation requires additional restrictions such as the prohibition of permanent or temporary roads, use of motorized vehicles or equipment, landing of aircraft, and structures and installations, except as minimally required to manage the area as wilderness. According to the Yuma County, Arizona, Zoning Ordinance, the Cabeza Prieta NWR is zoned as an Open Space, Recreation, and Resources Zoning District, which provides for recreational opportunities and space for public and private recreational parks, resorts, and similar facilities (YCDDS 2006).

Roads and trails within the Cabeza Prieta NWR scheduled for maintenance and repair include portions of the public access road El Camino del Diablo, one administrative trail (Tule Extension), and one unclassified trail (Los Vidrios) that lies between the El Camino del Diablo and the Border. The Los Vidrios trail was created by drug smuggling activity during the 1990s. None of the roads or trails were engineered or constructed for heavy use. This has resulted in significant damage to soil, vegetation, and altered water flow in some locations. The El Camino del Diablo has a non-wilderness buffer of 100 feet from its centerline and is aligned over a wash (San Cristobal) and a dry lake bed (Las Playas).

San Bernardino National Wildlife Refuge. The primary land use of the San Bernardino NWR is for the protection of wildlife and habitat within the refuge. The San Bernardino NWR was a 2,309-acre ranch that was acquired by the USFWS in 1982 to protect the water resources and provide habitat for endangered native fishes of the Yaqui River. The San Bernardino NWR is open to visitors for activities such as bird watching; photography; hiking; and dove, quail, and

cottontail rabbit hunting in season (USFWS undated a). It is located in Cochise County, Arizona, along the U.S./Mexico international border.

Organ Pipe Cactus National Monument. This national monument along the U.S./Mexico international border is south of Ajo, west of Tucson, and east of Yuma in Arizona. The monument was created to preserve a representative area of the Sonoran Desert. It is also the site of cultural resources that reflect long, widespread, and diverse occupations by American Indian, Mexican, and European groups (NPS 2009). Approximately 330,000 acres of OPCNM is in the region of analysis. A substantial amount of wilderness (610,000 acres) surrounding the monument is also within the region of analysis.

Buenos Aires National Wildlife Refuge. The Buenos Aires NWR is grassland flanked by mountains and riparian areas along the U.S./Mexico international border southwest of Tucson. It contains approximately 118,000 acres that is habitat for threatened and endangered plants and animals such as reintroduced quail, masked bobwhite (*Colinus virginianus ridgwayi*), and Sonoran pronghorn (*Antilocapra americana sonoriensis*). In addition, wetland areas are present along Arivaca Cienega Trail and Arivaca Creek and attract an abundance of birds (USFWS undated b).

Coronado National Forest. The Coronado National Forest is 1,780,000 acres in southeastern Arizona and southwestern New Mexico, mainly along the U.S./Mexico international border. It contains scattered mountain ranges that support a diverse type of plant communities (USFS undated).

Tohono O'odham Indian Reservation. The Tohono O'odham Indian Reservation is within the Sonoran Desert in south-central Arizona along the U.S./Mexico international border. Land within the Reservation consists of a wide desert valley interspersed with plains and mountains. The reservation is approximately 2.7 million acres in the region of analysis. Any future actions within the Tohono O'odham Indian Reservation would be analyzed under separate NEPA documentation.

Fort Yuma-Quechan Reservation. The Fort Yuma-Quechan Reservation is along both sides of the Colorado River near Yuma, Arizona. The reservation borders Arizona, California, and Mexico. Measuring 45,000 acres, the reservation is bisected on the south by Interstate 8. Any future actions within the Fort Yuma-Quechan Reservation would be analyzed under separate NEPA documentation.

Bureau of Land Management-Administered Lands. The BLM is responsible for managing public lands and resources for multiple uses. In Arizona, the BLM administers 12.2 million surface acres of public lands, including national monuments, national conservation areas, and recreation areas. BLM lands in the region of analysis include 48,369 acres.

3.2.3 Environmental Consequences

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 region of analysis. This alternative would be compatible with the existing land use categories in the region of analysis 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 Arizona would continue and tactical infrastructure would be maintained and repaired 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 that is also available for these uses. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. The 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 region of analysis along the U.S./Mexico international border in Arizona is located within the Basin and Range Physiographic Province, which is characterized by intensely deformed and intruded strata within elevated and depressed land. The province has more than 400 mountain ranges including the remains of crustal rocks that were uplifted by faulting along north-south lines. Eroded materials from the ranges moved downslope into the basins (U.S. Army 2001).

The valleys or basins begin downslope from the base of the rock outcrops. The weathered and transported materials become finer and the slopes decrease as the centers of the basins are approached. Vegetation is sparse and wind erosion is active and produces large sand dune areas in several locations (U.S. Army 2001).

Topography. The Basin and Range topography includes numerous roughly parallel fault-block mountain ranges trending north-south separated by nearly flat desert basins (U.S. Army 2001). Hilly areas are found throughout the region of analysis; however, mountains are most prevalent in the east (USACE 1994a). The mountains rise abruptly 2,000 to 5,000 feet above the intermountain desert basin (U.S. Army 2001). Mountain ranges along the U.S./Mexico international border in Arizona include the Atascosa Highlands and the Patagonia Mountains. The highest mountain peaks in the region of analysis are found in eastern Arizona.

Soils. There are 14 soil associations within the region of analysis. Susceptibility to erosion varies according to location and steepness of slope. High erosion potential is associated with mountain and upland/foothill areas, and, therefore, the potential would be greater in eastern Arizona. An example of highly erodible soils occurs in the San Cristobal Wash and Las Playas within the Cabeza Prieta NWR, which are extremely fine and highly erodible. Because of the difficulty involved in driving through these areas when the soil is wet or extremely dry, drivers have created parallel trails that avoid these spots (Las Playas and Los Vidrios). Where the Camino crosses San Cristobal Wash, the road is cut deeper as soils are removed during heavy rain events. The area of land affected by these roads and trails has increased beyond the road bed into adjacent areas where soil is temporarily more suitable for driving. This has led to further damage to soil crust and increased erosion, damage to vegetation, and altered natural water flow after precipitation events.

Shrink-swell potential tends to be highest in depositional areas, such as valley slopes and alluvial fan/valley floors where soils tend to consist of higher clay contents (USACE 1994b). Shrink-swell soils exist sporadically throughout Nogales and Yuma (AGS 2002).

The mountainside soils are shallow; steep; and, where sufficient soil is present, well-drained. Soils formed on uplands/foothills are transitional and show a variety of features that reflect local topography. They are shallow to deep, gently to steeply sloping, and well-drained. The surface can be deeply dissected, and rock outcrops might be exposed (USACE 1994a). Soils mapped within the tactical infrastructure maintenance and repair region of analysis are presented in **Appendix F**.

Prime Farmland. Of the 14 soil associations, one (McAllister) would be considered a prime farmland if irrigated, and one (Guest) would be considered a prime farmland if irrigated and protected from flooding. The soils classified as farmland soils if irrigated are not currently irrigated, and would not be irrigated under the Proposed Action and, therefore, would not be considered prime farmland soils as defined by the FPPA (NRCS 2003).

Geologic Hazards. Although seismic hazard is fairly low in much of Arizona, it is relatively high in the Yuma area. The Yuma area has experienced repeated damage from earthquakes that occurred in southern California or northern Mexico (AGS 2002). No earthquakes in Arizona have ruptured the surface in historic time; however, surface ruptures from earth fissures caused by subsidence do occur (AGS 2002). Approximately 12 faults have been identified within 30 miles of the U.S./Mexico international border in Arizona. Only one fault, the Algodones Fault in Yuma County, experienced a major rupture (seismic event with a magnitude of 6 or greater on the Richter scale) within the past 15,000 years, with an estimated major interval rupture of 5,000 to 10,000 years (AGS 1998). In addition to earthquakes in the Yuma area, there is also the potential for liquefaction (i.e., the flow of water-saturated sediments). The liquefaction potential in Yuma is increasing as urban development in low-lying areas adjacent to the Colorado and Gila rivers increases.

The U.S. Geological Survey (USGS) 2008 Arizona Seismic Hazard Map shows the seismic hazard rating for Arizona along the U.S./Mexico international border ranging from 6 to 40 percentage of the force of gravity (percent g), with the lowest rating between Nogales and Sasabe, Arizona, and the highest rating at San Luis (USGS 2008).

Other geologic hazards in southern Arizona include debris flows, landslides, and rock falls. These hazards typically occur along the steep slopes of the ranges; however, sediments can be transported to valley floors and are frequently deposited at the base of slopes and canyon mouths. These hazards can be triggered by intense precipitation or earthquakes. Only minor landslides (causing less than $2,500 in damages) since 1975 have occurred within the study area, all in Cochise County (State of Arizona 2007). It is possible that tactical infrastructure maintenance and repair activities could occur more frequently in areas subject to these hazards, such as the Huachuca Mountains in the Coronado National Memorial, which are inherently unstable and experience debris flows.

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 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

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

The maintenance and repair of roads classified as FC-3, FC-4, and FC-5 would have the greatest potential for erosion. Grading activities would result in short-term, minor, adverse impacts on soil resulting from erosion and sedimentation. Grading activities in terrain that is more rugged could result in greater potential for soil erosion and sedimentation than in flat terrain. Therefore, mountainous areas would be more susceptible to soil erosion and sedimentation during grading. Maintenance of the 700 miles of local roads would reduce the effects incurred from negligence, such as rutting, washout, and long-term soil erosion. 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. 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 soil from removal of vegetation and rock, which could result in increased erosion and sedimentation.

Any maintenance and repair to the communication and surveillance towers would be anticipated to result in a short-term, negligible impact from erosion of soils due to potential ground disturbance for repairs or replacement of equipment. This would be a localized impact. A short- to long-term, beneficial impact on soil could occur due to clearing blockages from drainage structures and low water crossings if blockages have caused water to back up onto normally dry soils, which could result 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.

Geological 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 to repair infrastructure and remove debris from a geological event. No impacts on geology would be expected from implementing the Proposed Action. No prime farmland soils exist within the region of analysis; therefore, no impacts on these soils would be expected to occur.

Control of vegetation could also result in a short- to long-term, minor, adverse increase in erosion and sedimentation. Herbicides could impact soil depending on the type of herbicide used. Application of herbicides to soil could result in leaching of chemicals. For example,

glyphosate is a chemical found in commonly used herbicides, and is strongly adsorbed onto soil particles, with low potential to move through soil to contaminate groundwater. Timing of application contributes to the effectiveness of an herbicide on target plants and on nontarget 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).

Short-term, minor, direct, adverse impacts on soil would occur from herbicide applications, as some chemicals adsorb strongly to soil, so the soil chemistry would be altered temporarily 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. BMPs would be implemented and an ESCP followed to minimize any adverse impacts on soils (see **Appendix E**).

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. 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 Arizona 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 in Arizona would continue and maintenance activities would occur on an as-needed basis. There is 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 as described in the Proposed Action on an as-needed basis and not periodically, the potential exists for an increased impact on soils from emergency 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 plants that are found within the region of analysis. This section describes the affected environment for 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 region of analysis (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 USGS's Gap Analysis Program mapping of the United States was used to achieve a finer resolution of the vegetative communities within the region of analysis (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 Arizona has been broadly classified under the Dry Domain ecoregion. 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.

The vegetation of southern Arizona is further classified under the Dry Domain/Temperate Desert Division (Bailey 1995). The temperate deserts of continental regions have low rainfall and strong temperature contrasts between summer and winter.

Within the region of analysis, Bailey's Temperate Desert Division is bisected into the American Semidesert and Desert Province, which spans the western portion of the region of analysis, and the Chihuahuan Desert Province encompasses the eastern portion. The American Semidesert includes the Mojave, Colorado, and Sonoran deserts. However, the Sonoran Desert of this province encompasses the entire western portion of the region of analysis. The most striking feature of the Sonoran Desert is the cactus-dominated vegetation communities, with giant saguaros and chollas being the most conspicuous (AGFD 2006). The portion of the Chihuahuan Desert within the region of analysis is commonly referred to as the Madrean sky island archipelago. The Madrean sky island region has exceptional species richness. The Madrean sky island archipelago has a mixture of species from the Nearctic and Neotropic regions and is world-renowned for its unique plant and animal diversity (BLM 2007, DeBano et al. 1995).

There are approximately 35 ecological systems in the region of analysis (NatureServe 2010a) (see **Appendix D**). The 11 largest ecological systems account for more than 95 percent of the

land cover. These are ecological systems that generally define the landscape and are described in the following paragraphs and in **Table 3-1** (NatureServe 2010a).

Table 3-1. Ecological System Features within the Region of Analysis

Ecological System	Percent of Region of Analysis	Location in Region of Analysis	Predominant Features
Sonora-Mojave Creosotebush-White Bursage Desert Scrub	27	Western portion	Sparse to moderately dense layer of broad-leaved and xeromorphic shrubs
Sonoran Paloverde-Mixed Cacti Desert Scrub	24	Hillsides, mesas, upper bajadas	Scattered saguaro cacti or sparse to moderately dense xeromorphic shrubs
Apacherian-Chihuahuan Semi-Desert Grassland and Steppe	11	Eastern; gently sloping bajadas	Desert grassland, mixed shrub-succulent, or xeromorphic oak savanna
Apacherian-Chihuahuan Mesquite Upland Scrub	10	Eastern; uplands	Invasive upland shrubland
Madrean Encinal	5	Eastern; foothills, canyons, bajadas, and plateaus	Woodlands with evergreen oaks
Chihuahuan Creosotebush, Mixed Desert, and Thorn Scrub	5	Eastern; flat to gently sloping desert basins and alluvial plains	Moderate to sparse shrub layer
North American Warm Desert Active and Stabilized Dune	3	Western	Unvegetated to sparsely vegetated active dunes and sandsheets
Chihuahuan Mixed Salt Desert Scrub	3	Eastern; alluvial plains, playas, and floodplains	Open-canopied shrublands
Madrean Pinyon-Juniper Woodland	2	Eastern; foothills, mountains, and plateaus	Madrean trees and shrubs
Cultivated Cropland	2	Lands surrounding Yuma, Arizona	Seasonal fluctuations in annual or perennial plant cover
Developed	1	Towns of Douglas, Naco, and Nogales	Permanent or semi-permanent structures, pavement, or unvegetated areas

Source: Nature Serve 2010a

Sonora-Mojave Creosote Bush-White Bursage Desert Scrub. This ecological system composes approximately 27 percent of the region of analysis. Occurring within the American Semidesert and Desert Province, this is the most common system of the western portion of the region of analysis. It forms a vegetation matrix in broad valleys, lower bajadas (lower slopes of mountains characterized by loose alluvial sediments and poor soil development), plains, and low hills in the lower Sonoran Desert. The system has a sparse to moderately dense layer (2 to 50 percent cover)

of broad-leaved and xeromorphic (drought-adapted) shrubs. Creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) are typically dominant, but many different shrubs, dwarf-shrubs, and cacti can also be found in typically sparse understories. This system can often appear as very open sparse vegetation, with the mostly barren ground surface as the predominant feature (NatureServe 2010a).

Sonoran Paloverde-Mixed Cacti Desert Scrub. This ecological system composes approximately 24 percent of the region of analysis. Occurring within the American Semidesert and Desert Province, this system is the second most common of the western portion of the region of analysis. It typically occurs on hillsides, mesas, and upper bajadas (lower slopes of mountains characterized by loose alluvial sediments and poor soil development) in southern Arizona. The vegetation is characterized by a scattered, emergent tree layer of saguaro cactus (*Carnegiea gigantea)* (10 to 52 feet tall) or a sparse to moderately dense canopy with xeromorphic deciduous and evergreen tall shrubs, including yellow paloverde (*Parkinsonia microphylla)* and creosote bush; and, less prominent, mesquite, desert ironwood, and ocotillo. The sparse herbaceous layer is composed of perennial grasses and forbs, with annuals seasonally present and occasionally abundant. On slopes, plants are often distributed in patches around rock outcrops where suitable habitat is present (NatureServe 2010a).

Apacherian-Chihuahuan Semi-Desert Grassland and Steppe. This ecological system covers approximately 11 percent of the region of analysis. Occurring within the Chihuahuan Desert Province, this is the most common system of the eastern portion of the region of analysis. It is a broadly defined desert grassland, mixed shrub-succulent, or xeromorphic oak savanna that is typical of southeastern Arizona and northern Mexico. It is found on gently sloping bajadas (lower slopes of mountains characterized by loose alluvial sediments and poor soil development) that support frequent fires throughout the Madrean sky islands, on mesas and steeper piedmont areas (deposits at the base of mountains derived from the weathering, transport, and deposition of the weathered materials by streams), and foothill and desert mountain slopes up to 5,480 feet in elevation. This system is characterized by a typically diverse assemblage of perennial grasses. Common species include black grama (*Bouteloua eriopoda*), hairy grama (*Bouteloua hirsuta*), Chino grama (*Bouteloua ramosa*), Rothrock's grama (*Bouteloua rothrockii*), sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), plains lovegrass (*Eragrostis intermedia*), bullgrass (*Muhlenbergia emersleyi*), bush muhly (*Muhlenbergia porteri*), curlyleaf muhly (*Muhlenbergia setifolia*), and James' galleta (*Pleuraphis jamesii*); succulent species of agave (*Agave* spp.), sotol (*Dasylirion* spp.), and yucca (*Yucca spp.*); short-shrub species of powderpuff (*Calliandra spp*.), mimosa (*Mimosa spp*.), and quinine (*Parthenium* spp.); and tall-shrub/short-tree species of acacia (*Acacia* spp.), mesquite (*Prosopis* spp.), and various oaks (*Quercus* spp.). Many of the historical desert grassland and savanna areas have been converted to this system through intensive grazing and other land uses (NatureServe 2010a).

Apacherian-Chihuahuan Mesquite Upland Scrub. This ecological system covers approximately 10 percent of the region of analysis. Occurring within the Chihuahuan Desert Province, this is the second most common system of the eastern portion of the region of analysis. It often occurs as invasive upland shrublands that are concentrated in the extensive desert grassland in foothills and piedmont deposits of the Chihuahuan Desert, but also extends into the sky island region. Substrates are typically derived from sediment deposited by water, and the soil makeup allows for infiltration and storage of winter precipitation in deeper soil layers.

Consequently, mesquites and other deep-rooted shrubs exploit this deep-soil moisture that is unavailable to grasses and cacti. Vegetation is typically dominated by honey mesquite (*Prosopis glandulosa)* or velvet mesquite (*Prosopis velutina)* and succulents. Mesquites and other deep-rooted shrubs exploit deep soil moisture, accumulated during winter precipitation, which is unavailable to grasses and cacti. Other dominant species include desert scrub viscid acacia (*Acacia neovernicosa*), whitethorn acacia *(Acacia constricta)*, one-seed juniper *(Juniperus monosperma*), or redberry juniper (*Juniperus coahuilensis)*. Over the past 100 years, the area occupied by this system has increased as a result of drought, overgrazing by livestock, and decreases in fire frequency (NatureServe 2010a).

Madrean Encinal. This ecological system covers approximately 5 percent of the region of analysis. Occurring within the Chihuahuan Desert Province, this is the third most common system of the eastern portion of the region of analysis. It is commonly found on foothills, canyons, bajadas, and plateaus within the sky islands of southeastern Arizona. These woodlands are dominated by Madrean evergreen oaks. Lower elevation stands are typically open woodlands or savannas where they transition into desert grasslands, chaparral, or, in some cases, desertscrub. Common evergreen oak species include Arizona white oak (*Quercus arizonica*), Emory oak (*Quercus emoryi*), dwarf oak (*Quercus intricate*), gray oak (*Quercus grisea*), Mexican blue oak (*Quercus oblongifolia)*, and Toumey oak (*Quercus toumeyi)*. Chaparral species such as point-leaf manzanita (*Arctostaphylos pungens*), alderleaf mountain mahogany (*Cercocarpus montanus*), bitterbrushes (*Purshia* spp.), Wright's silktassel (*Garrya wrightii*), Sonoran scrub oak (*Quercus turbinella*), birchleaf buckthorn (*Rhamnus betulifolia)*, or sumacs (*Rhus* spp.) can be present but do not dominate (NatureServe 2010a).

Chihuahuan Creosotebush, Mixed Desert, and Thorn Scrub. This ecological system covers approximately 5 percent of the region of analysis. Occurring within the Chihuahuan Desert Province, this is the fourth most common system of the eastern portion of the region of analysis. Stands typically occur in flat to gently sloping desert basins and on alluvial plains (plains created by deposition of sediment by rivers or streams). The vegetation is characterized by a moderate to sparse shrub layer (less than 10 percent cover on extremely dry sites) that is typically dominated by creosote bush and tarbush. Other shrubs or succulents that can also be scattered throughout the system are lechuguilla (*Agave lechuguilla*), mariola (*Parthenium incanum*), leatherstem (*Jatropha dioica*), crown of thorns (*Koeberlinia spinosa*), wolfberry species (*Lycium* spp.), and yucca species. Tarbush will often be the dominate species in silty basins that are found in this ecological system. In general, shrub diversity is relatively low as this ecological system lacks dominant thornscrub and other mixed desert scrub species. The herbaceous cover is typically low and composed of grasses such as black grama, false fluffgrass, bush muhly, tobosagrass (*Pleuraphis mutica*), burrograss (*Scleropogon brevifolius*), and alkali sacaton (*Sporobolus airoides*). Included in this ecological system are creosote bush-dominated shrublands with a sparse understory that occur on gravelly to silty upper-basin floors and alluvial plains. Desert pavement can be present on the soil surface (NatureServe 2010a).

North American Warm Desert Active and Stabilized Dune. This ecological system composes approximately 3 percent of the region of analysis. Occurring within the American Semidesert and Desert Province, this is the third most common system of the western portion of the region of analysis. Common throughout the warm deserts of North America, it is composed of unvegetated to sparsely vegetated (generally less than 10 percent plant cover) active dunes and

sandsheets derived from quartz or gypsum sands. The common vegetative species assemblages of this system include white bursage, desert sand verbena (*Abronia villosa*), sand sagebrush (*Artemisia filifolia*), four-wing saltbush, Colorado Desert buckwheat, creosote bush, big galleta, rosemary-mint species (*Poliomintha* spp.), mesquite species, dalea species (*Psorothamnus* spp.), little-leaf sumac (*Rhus microphylla)*, and mesa dropseed (*Sporobolus flexuosus)*. Characteristic processes of this system are dune "blowouts" and subsequent stabilization through the reestablishment of plants (NatureServe 2010a).

Chihuahuan Mixed Salt Desert Scrub. This ecological system covers approximately 3 percent of the region of analysis. Occurring within the Chihuahuan Desert Province, this is the fifth most common system of the eastern portion of the region of analysis. It includes extensive open-canopied shrublands in typically saline basins in the Chihuahuan Desert. Stands often occur on alluvial flats, around playas (dry lake basins), 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 species such as four-wing saltbush, mound saltbush (*Atriplex obovata*), or saltbush, along with species of iodine bush (*Allenrolfea)*, tar bush, pickleweed (*Salicornia*), seepweed (*Suaeda)*, or other salt-adapted plants. Grass species can include alkali sacaton, galleta grass, or saltgrass (*Distichlis spicata*) at varying densities (NatureServe 2010a).

Madrean Pinyon-Juniper Woodland. This ecological system covers approximately 2 percent of the region of analysis. Occurring within the Chihuahuan Desert Province, this is the sixth most common system of the eastern portion of the region of analysis. It is typically found on foothills, mountains, and plateaus in the Sierra Madre Occidentale and Sierra Madre Orientale in Mexico, Trans-Pecos Texas, southern New Mexico, and Arizona. This ecological system is closely associated with the sky island archipelago of southeastern Arizona. The soils are generally dry and rocky. The presence of Mexican pinyon (*Pinus cembroides*), border pinyon (*Pinus discolor)*, or other Madrean trees and shrubs is diagnostic of this woodland system. Redberry juniper, alligator juniper (*Juniperus deppeana*), Pinchot's juniper (*Juniperus pinchotii*), one-seed juniper, and pinyon pine (*Pinus edulis*) can be present to dominant. Madrean oaks such as Arizona white oak, Emory oak, gray oak, or Mohr oak (*Quercus mohriana*) can be also be dominant. Ponderosa pine (*Pinus ponderosa*) is absent or sparse. If present, understory layers are variable and can be dominated by shrubs or grasses (NatureServe 2010a).

Cultivated Cropland. This system covers approximately 2 percent of the region of analysis and is mostly concentrated in the lands surrounding Yuma, Arizona. Cultivated croplands typically have seasonal fluctuations in annual or perennial plant cover (NatureServe 2010a). In general, grading, fertilizer application, and irrigation have converted these areas to a completely different community type than what was originally present.

Developed. This system covers approximately 1 percent of the region of analysis. It is composed of areas of intensive use with much of the land constructed upon native vegetation or otherwise physically altered to an extent that native vegetation is no longer supported (Oberbauer et al. 2008). Developed land is highly modified and characterized by permanent or semi-permanent structures, pavement, or unvegetated areas.

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 removal, crushing, accidental spills, and temporary increases in turbidity and sedimentation. All maintenance and repair activities would occur within or adjacent to the existing footprints of tactical infrastructure.

Negligible to minor impacts on vegetation would occur from vegetation removal associated with vegetation control. Vegetation control would occur within existing footprints where vegetation is being maintained, while vegetation control would occur 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. In addition to the direct disturbance of vegetation associated with vegetation control, it could result in habitat disturbance resulting in the establishment of different plant communities (including invasive species).

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 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 bridge and road maintenance, and repair of damaged rip-rap, culverts, and other drainage structures and crossings, could result in direct and indirect impacts on aquatic plants and their habitat 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 and repair of roadways and of damaged rip-rap, culverts, and other drainage structures and crossings would reduce erosion, improve stream flow, and result in beneficial impacts on aquatic habitat and species. The design and implementation of road and trail maintenance would also allow for the natural flow of surface water during from precipitation events, which would help to restore the natural character of the wilderness in these areas. Under this alternative, a long-term, beneficial impact on erosion and sedimentation would occur 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**). The following are examples of BMPs that would be implemented with the Proposed Action to reduce impacts as necessary:

- If vegetation must be removed, allow natural regeneration of native plants by cutting vegetation with hand tools, mowing, trimming, or other removal methods that allow root systems to remain intact.
- Vegetation targeted for retention would be flagged to reduce the likelihood of being treated.
- Avoid the removal of mature trees providing shade or bank stabilization within the riparian area of any waterway during maintenance or repair activities.
- 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.
- 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 treated must be maintained.
- 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 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, as a consequence, maintenance and repair of tactical infrastructure usually would be performed on resources that are in disrepair. Under this alternative, the lack of coordinated environmental staff support and centralized planning would result in inefficiencies complying with NEPA and other environmental requirements and the eventual degradation of tactical infrastructure resulting in impacts. Maintenance and repair under this alternative would result in impacts on vegetation, such as conversion and degradation of habitat and plant communities from vegetation removal, 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, because 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 resources expected to occur within the region of analysis. Wildlife resources include native or naturalized terrestrial 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

Terrestrial Wildlife Resources. An abundance of high-quality habitat for wildlife exists within the region of analysis. This vast area is capable of supporting hundreds of wildlife species, including mammals, birds, reptiles, and amphibians.

Large ungulates adapted to surviving in the arid western regions of southwestern Arizona include desert bighorn sheep (*Ovis canadensis nelsoni*), desert mule deer (*Odocoileus hemionus eremicus*), and Sonoran pronghorn (*Antilocapra americana sonoriensis*). Javelina (*Tayassu tajacu*) also occurs within the higher elevations of the scattered mountain ranges. The Madrean sky island archipelagos of southeastern Arizona are world renowned for their unique plant and animal diversity (Felger and Wilson 1995). Some of the upland mammalian fauna associated with this region include mountain lion (*Puma concolor*), bobcat (*Felis rufus*), white-nosed coati (*Nasua narica*), white-tailed deer (*Odocoileus virginianus*), long-legged myotis (*Myotis volans*), cave myotis (*Myotis velifer*), Bailey's pocket mouse (*Chaetodipus baileyi*), yellow-nosed cotton rat (*Sigmodon ochrognathus*), and southern pocket gopher (*Thomomys umbrinus*) (Brown 1994).

The mammals that inhabit the scrublands and dunelands scattered across southern Arizona typically spend much of their time below ground or dormant during the heat of the day. Consequently, the region hosts large populations of burrowing rodents. The round-tailed ground squirrel (*Spermophilus tereticaudus*) is one of the most common small mammals of southern Arizona. Other mammals that occur in this region include the kit fox (*Vulpes macrotis*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), desert pocket mouse (*Chaetodipus penicillatus*), long-tailed pocket mouse (*Chaetodipus formosus*), desert kangaroo rat (*Dipodomys deserti*), and Merriam's kangaroo rat (*Dipodomys merriami*) (Brown 1994, USFS 1994).

The open, sparsely vegetated sandy plains and dunes of southwestern Arizona typically do not support the more diverse bird life associated with structurally taller and denser habitats. However, the uplands associated with the archipelago across southern Arizona are known for rich birdlife. Some of the more commonly known avian inhabitants of these uplands include Harris' hawk (*Parabuteo unicinctus*), white-winged dove (*Zenaida asiatica*), Inca dove (*Columbina inca*), elf owl (*Micrathene whitneyi*), brown-crested flycatcher (*Myiarchus tyrannulus),* pyrrhuloxia (*Cardialis sinuatus*), and the curve-billed thrasher (*Toxostoma curirostre*). Birds common in the Chihuahuan scrub and desert grasslands of southeastern Arizona include mourning dove (*Zenaida macroura***)**, phainopepla *(Phainopepla nitens*), red-tailed hawk (*Buteo jamaicensis*), burrowing owl (*Athena cunicularia),* northern harrier (*Circus cyaneus*), loggerhead shrike (*Lanius ludoviscianus*), rufus-crowned sparrow (*Aimophila ruficeps*), western kingbird (*Tyrannus verticalis),* turkey vulture (*Cathartes aura*), black-tailed gnatcatcher (*Polioptila melanura*), eastern meadowlark (*Sturnella magna*), cactus wren (*Campylorhynchus brunneicapillus*), and ash-throated flycatcher (*Myiarchus cinerascens*). Bird species common to the Madrean sky island archipelago of southeastern Arizona include Cooper's hawk (*Accipiter cooperii*), band-tailed pigeon (*Patagioenas fasciata*), Abert's towhee (*Piplio aberti*), ash-throated flycatcher, curve-billed thrasher, bridled titmouse (*Baeolophus wollweberi*), and bushtit (*Psaltriparus minimus*) (Brown 1994). Migratory bird breeding season in Arizona is February through August. Peak nesting season is February through May at lower elevations (less than 2,000 feet) in the desert regions.

The sandy plains and dunes of southwestern Arizona have resulted in a number of unique sand-adapted lizards and snakes. Examples of these are the fringe-toed horned lizard (*Uma notata*), banded sand snake (*Chilomeniscus cinctus*), and the sidewinder rattlesnake (*Crotalus cerastes*). The rocky outcrops, bajadas, talus slopes, washes, and gravel plains of south-central and southwestern Arizona each support a varied and often distinct assemblage of herpefauna species including the chuckwalla (*Sauromalus obesus*), desert spiny lizard (*Sceloporus magister*), long-tailed brush lizard (*Urosaurus graciosus*), southern desert horned lizard (*Phrynosoma platyrhinos calidiarum*), western whiptail (*Cnemidophorus tigris*), and desert glossy snake (*Arizona elegans eburnata*). Species of reptiles associated with the lowland scrublands scattered across all of southern Arizona include the collared lizard (*Crotaphytus bicinctores*), side-blotched lizard **(***Uta stansburiana*), western whiptail, and long-nosed leopard lizard (*Gambelia wislizenii*). Reptiles and amphibians associated with the Madrean uplands include the rock rattlesnake (*Crotalus lepidus*), green rat snake (*Elaphe triapsis*), bunchgrass lizard (*Sceloporus scalaris*), Tarahumara frog (*Rana tarahumarae*), barking frog (*Hylactophryne augusti*), and mountain skink (*Eumeces callicephalus*) (Brown 1994).

Aquatic Wildlife Resources. Wetlands, springs, and seeps are rare in the Sonoran Desert of southwestern Arizona, but are critical to a number of rare species such as the desert pupfish (*Cyprinodon macularius*) and the Quitobaquito pupfish (*Cyprinodon macularius*). The Madrean sky island archipelago of southeastern Arizona produce isolated, unique, and invaluable aquatic habitats. Topographically induced rainfall patterns and dry climate combine with the basin and range geology to produce disjointed perennial streams on mountain ranges and their alluvial deposits (water-deposited sediments) and pediments (gently inclined erosional surfaces carved in bedrock), isolated springs, and spring runs on both mountains and in the inter-basin, valley areas, and valley streams sustained by basin aquifers. The native fish fauna is not particularly diverse (13 species) but is uniquely adapted to survive harsh, limited aquatic habitats. This region is the

center of distribution for many unique and rare species such as the Gila chub (*Gila intermedia*), Gila topminnow (*Poeciliopsis occidentalis*), Yaqui (*G. purpurea*) and Sonora chubs (*G. ditaenia*), and Mexican stoneroller (*Campostoma ornatum*) (DeBano et al. 1995).

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 removal, 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 have the potential to result in conversion or degradation of habitat. In addition to the direct disturbance of habitat associated with vegetation removal, including the selective removal of woody plants, this activity could result in the establishment of invasive species.

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 planned 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, road, and drainage structure maintenance and repair activities could result in direct and indirect impacts on aquatic species and their habitat 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 habitat 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, repair of damaged rip-rap, 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 erosion and sedimentation would occur 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 under the No Action Alternative 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 through the use of appropriate BMPs (see **Appendix E**). The following are examples of BMPs that could be implemented with the Proposed Action to reduce impacts:

- Mechanical vegetation control should be timed to avoid the migration, breeding, and nesting timeframes of migratory birds (i.e., February 1 through September 1). Herbicide re-treatments could occur throughout the year. When initial mechanical and chemical vegetation control must be implemented during February 1 through September 1, a survey for nesting migratory birds would be conducted immediately prior to the start of activities. If an active nest is found, a buffer zone would be established around the nest and no activities would occur within that zone until nestlings have fledged and abandoned the nest.
- 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 of tactical infrastructure usually would be performed only on resources that are in disrepair.

Under this alternative, the lack of coordinated environmental staff support and centralized planning would result in inefficiencies complying with NEPA and other environmental requirements and the eventual degradation of tactical infrastructure. The No Action Alternative would result in greater impacts on wildlife than the Proposed Action because maintenance and repair activities would be reactionary. Under this alternative, impacts on wildlife, such as displacement of wildlife; habitat conversion and degradation from vegetation removal 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. For example, 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, because 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

The USFWS Southwest Region online database, Nature Serve data (NatureServe 2010a), species listing and recovery planning documents, and other information was used to determine the presence of species within the region of analysis. 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. These occurrence data require that a species is in appropriate habitat, at the appropriate time of the year, and is naturally occurring (NatureServe 2010a).

3.6.2 Affected Environment

The agencies that have primary responsibility for the conservation of plant and animal species in Arizona are the USFWS and AZGFD. 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 Arizona. Listed species for Cochise, Pima, Santa Cruz, and Yuma counties were obtained through the USFWS (Arizona field office). Data on species' elemental occurrences and distributions were obtained from the USFWS and NatureServe (NatureServe 2010b). There are 18 species federally listed as endangered and 7 species federally listed as threatened that are known to occur within the region of analysis and that could be affected by the Proposed Action (see **Table 3-2**). Those species and their designated or proposed critical habitat are described in the following paragraphs. Species that occur in terrestrial habitats are described first, followed by aquatic species.

An additional 12 threatened or endangered species occur within the four counties along the U.S./Mexico international border in Arizona. These species would not be affected by the Proposed Action because they do not occur or are very rare along the U.S./Mexico international border where tactical infrastructure is located, or because no activities will be conducted within or near habitat used by these species along or near the U.S./Mexico international border. These species include Kearney's slimpod (*Amsonia keareyana*), Nichol Turk's head cactus (*Echinocactus horizonthalonius var. nicholii*), San Bernardino springsnail (*Pyrgulopsis bernardino*), beautiful shiner (*Cyprinella formosa*), loach minnow (*Tiaroga cobitis*), Yaqui catfish (*Ictalurus pricei*), Yaqui chub (*Gila purpurea*), Yaqui topminnow (*Poeciliopsis occidentalis sonoriesis*), razorback sucker (*Xyrauchen texanus*), spikedace (*Meda fulgida*), northern aplomado falcon (*Falco femoralis septentrionalis*), and California least tern (*Sterna antillarum browni*) and are not further discussed.

3.6.2.1 Terrestrial Threatened and Endangered Species

Cochise pincushion cactus. This is a small, unbranched cactus, 0.5 to 2.4 inches in diameter and covered by white, cottony areoles (i.e., spine-bearing structures), overlapped by radial spines within the areoles. This species has a whitish appearance with pale yellow to light beige flowers that bloom in March. Flowers are followed by orange-red to scarlet fruits that dry to a brown color rather quickly and can contain up to 20 seeds. The cacti are found on hills of high-calcium Permian limestone, at elevations from 4,200 to 4,700 feet where Chihuahuan desert scrub transitions to semidesert grassland. Preferred soils are thin gravely loam over bedrock with

Table 3-2. Federally Listed Species That Could be Affected Within the Region of Analysis

Common Name	Scientific Name	Listing Status
Plants		
Canelo Hills ladies' tresses	*Spiranthes delitescens*	Endangered
Cochise pincushion cactus	*Coryphantha robbinsorum*	Threatened
Huachuca water umbel	*Lilaeopsis schaffneriana recurva*	Endangered, critical habitat
Pima pineapple cactus	*Coryphantha scheeri robustispina*	Endangered
Fish		
Desert pupfish	*Cyprinodon macularius*	Endangered
Gila chub	*Gila intermedia*	Endangered, critical habitat
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered
Quitobaquito pupfish	*Cyprinodon eremus*	Endangered, critical habitat
Sonoran chub	*Gila ditaenia*	Threatened, critical habitat
Amphibians and Reptiles		
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened, critical habitat
New Mexico ridge-nosed rattlesnake	*Crotalus willardi obscurus*	Threatened
Sonoran tiger salamander	*Ambystoma tigrinum stebbinsi*	Endangered
Birds		
Masked bobwhite	*Colinus virginianus ridgwayi*	Endangered
Mexican spotted owl	*Strix occidentalis lucida*	Threatened, critical habitat
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered, proposed critical habitat
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered
Mammals		
Jaguar	*Panthera onca*	Endangered
Lesser long-nosed bat	*Leptonycteris yerbabuenae*	Endangered
Ocelot	*Leopardus pardalis*	Endangered
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered

Source: NatureServe 2010b

gravel-sized limestone rocks or rubble inclusions. Substrates are low in nutrients, well-drained, and have a pH of 7.9 to 8.0. Plants typically grow in full sunlight with the densest colonies forming on bedrock or where bedrock is close to the surface (USFWS 1993a).

The Cochise pincushion cactus is scattered among three small limestone hills in San Bernardino Valley, southeastern Cochise County, Arizona, within an area of 4 to 6 square miles (mi^2). At least one population is known from northern Sonora, Mexico. Within their limited range, plants are found scattered, with a few dense clumps ranging from 100 to 1,000 individuals. The range of this species appears to be limited by the availability of optimal habitat (USFWS 1993a). NatureServe data indicate that there were two records of elemental occurrence of Cochise pincushion cactus in the region of analysis. These both occurred on the West Guadalupe Canyon USGS topographic quadrangle map (NatureServe 2010b).

Threats to the Cochise pincushion cactus include habitat degradation from cattle, wildlife, feral animals, illegal border activities, minerals exploration, development (USFWS 1993a) and competition from invasive plant species, especially grasses (USFWS 2007a). Survival and reproduction of the Cochise pincushion cactus could be affected by prolonged periods of severe drought.

Pima pineapple cactus. This cactus measures 4 to 18 inches tall and 3 to 7 inches in diameter. The central spine is stout and hooked, surrounded by an additional 6 to 15 straight radial spines in a cluster. The spines are usually straw-colored, becoming blackened with age. Plants can be single-stemmed, multi-headed, or can appear in clusters. Silky yellow flowers (rarely white) appear in early July with summer rains and continue through August. Fruits are green, ellipsoid, succulent, and sweet (USFWS 2000a).

This cactus species grows in the transition zone between the semidesert grasslands and Sonora desert scrub on alluvial bajadas (lower slopes of mountains characterized by loose alluvial sediments and poor soil development) and slopes of less than 10 percent grade at elevations between 2,300 to 4,600 feet (USFWS 2000a). The range is bordered by the Baboquivari Mountains to the west and the Santa Rita Mountains to the east. The range extends north to the vicinity of Tucson. Within the region of analysis, there are 27 records of elemental occurrence of the Pima pineapple cactus within the following USGS topographic quadrangle maps: Amado, Cerro Colorado, Fresno Wash, Kino Springs, Las Guijas, Mildred Peak, Palo Alto Ranch, Presumido Peak, and Wilbur Canyon (NatureServe 2010b).

The Pima pineapple cactus is threatened by illegal collection and habitat degradation, especially as a result of poor range management. Habitat has also been lost to mining, agriculture, road construction, urbanization, and aggressive nonnative grasses (USFWS 2000a).

New Mexico ridge-nosed rattlesnake. This species is a small (12 to 24 inches long), montane, grayish-brown rattlesnake with a distinct ridge on the tip of its snout. The diet of the New Mexico ridge-nosed rattlesnake consists of a broad range of prey including small mammals, birds, lizards, arthropods, and other snakes. Reproduction and birthing periods generally occur between early August and mid-October, with the majority of births occurring in mid-September. This species is active during periods of moderate temperatures, both daily and seasonally. New Mexico ridge-nosed rattlesnakes are active from April to October. The greatest periods of activity coincide with the rainy season in the Animas Mountains (July to September) (USFWS 1985).

The New Mexico ridge-nosed rattlesnake occurs in three remaining mountain populations within the Madrean sky island archipelago: Animas (New Mexico), Peloncillos (New Mexico and Arizona), and Sierra San Luis (Mexico). The distribution of this rattlesnake in the eastern portion of the region of analysis within southeastern Arizona is limited to the Peloncillo Mountains. Throughout these three ranges, the species is most commonly found in pine-oak or scrub-oak forests between 5,600 and 9,000 feet in elevation. In Arizona, this species is found in Peloncillo Mountains of Cochise County at elevations above 5,000 feet (USFWS 1985). Within these habitats, cool canyon bottoms with shaded rock outcrops or talus slopes are favored micro-habitats (Davis 2008). Deep narrow canyons that provide a greater potential for cool mesic conditions relative to surrounding habitats are especially important for the persistence of

the species in the northern and relatively arid portions of the rattlesnake's range (USFWS 1985). Critical habitat has been designated for New Mexico ridge-nosed rattlesnake (43 FR 34476–34480), which occurs within the region of analysis. NatureServe data indicate one elemental occurrence of the New Mexico ridge-nosed rattlesnake in the region of analysis within USGS topographic quadrangle map Skelton Canyon (NatureServe 2010b).

Natural threats to the ridge-nosed rattlesnake include predation, starvation, and pathogenic-related diseases that remain poorly understood (USFWS 1985). Other threats, more important to the decline in population numbers include over-collecting by the pet trade; and the alteration of habitat by fire suppression, climate change, grazing, mining, and development (USFWS 1985).

Masked bobwhite. The adult male masked bobwhite has a deep cinnamon-colored breast, black head and throat, and a crown feathers that darken with age. The female bobwhite has plumage that is mottled brown, black, and white, with a pale cinnamon-colored throat (USFWS 1995a). Habitat includes level plains and river valleys, open desert grasslands, semi-arid desert scrub, weedy bottomlands, grassy and herb-strewn valleys, and forb-rich plains. The grass and weed cover is seasonal, and tree and shrub cover varies geographically. The eastern and southern distribution coincides with the beginning of denser vegetation of drought deciduous thornscrub (Sinaloan thornscrub). It is limited in the west and northwest by the paucity of summer precipitation. Nesting occurs on the ground in heavy cover (NatureServe 2010a).

The distribution of the masked bobwhite includes south-central Arizona and Sonora, Mexico. The northern limit of historic range is defined by the Altar and Santa Cruz valleys in Arizona. It was extirpated from the United States by about 1900 and reintroduced at the Buenos Aires NWR in southern Arizona (NatureServe 2010a). Distribution is limited to elevations between 33 to 3,937 feet where mean rainfall is 10 to 20 inches. NatureServe data indicate 19 elemental occurrences of the masked bobwhite in the region of analysis on USGS Survey topographic quadrangle maps: Cumero Mountain, Fresno Wash, Las Guijas, Presumido Peak, and Wilbur Canyon (NatureServe 2010b).

The masked bobwhite was listed as endangered as a result of habitat loss due to overgrazing and possibly due to competition with other native species of quail (NatureServe 2010a).

Mexican spotted owl. The Mexican spotted owl has large, dark eyes, an overall dark to chestnut brown coloring, whitish spots on the head and neck, and white mottling on the abdomen and breast (USFWS 1995b). The Mexican spotted owl inhabits canyon and forest habitats across its range and is frequently associated with mature mixed-conifer, pine-oak, and riparian forests. Owls are usually found in areas with some type of water source such as perennial streams, creeks, and springs. Home range calculations for a single owl average 1,600 acres (650 hectares), while a mating pair's home range averages 2,000 acres (810 hectares) (USFWS 2004). Mexican spotted owls use a variety of habitats for foraging, including multi-layered forests with many potential patches. In areas within Arizona and New Mexico, forests used for roosting and nesting often contain mature or old-growth stands with complex structure. The breeding period for Mexican spotted owls is March through June (USFWS 1995b).

The range of the Mexican spotted owl extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah southward through Arizona, New Mexico, and far western Texas, through the Sierra Madre Occidental and Oriental, to the mountains at the southern end of the Mexican Plateau. About 91 percent of known Mexican spotted owls existing in the United States between 1990 and 1993 occurred on land administered by the USFS (USFWS 1995b). Most owls have been found within the 11 national forests of Arizona and New Mexico (USFWS 2004). Critical habitat has been designated for Mexican spotted owl (69 FR 53181–53298), which occurs within the region of analysis. NatureServe provides records for approximately 43 elemental occurrences of the Mexican spotted owl within USGS topographic quadrangle maps: Fort Huachuca, Harshaw, Huachuca Peak, Miller Peak, Montezuma Pass, Mount Hopkins, Mount Hughes, Mount Wrightson, Parajito Peak, Peña Blanca Lake, Pyeatt Ranch, and Ruby (NatureServe 2010b).

The primary threats to the Mexican spotted owl are even-aged timber harvest and the threat of catastrophic wildfire. Additional threats include development from oil, gas, and mining; and recreation (USFWS 1995b).

Southwestern willow flycatcher. This is a small bird, typically less than 6 inches in length with conspicuous light-colored wing bars (USFWS 2002a). The habitat requirements of the southwestern willow flycatcher include areas of dense riparian foliage and nesting habitat with trees and shrubs that include willows (*Salix* spp.) and box elder (*Acer negundo*) (USFWS 2002a). The breeding period for this species is April through September (USFWS 2002a).

The southwestern willow flycatcher breeding range extends from southern California north to Independence, Arizona; southwestern New Mexico; southern Utah; and formerly southern Nevada. The winter range includes areas from central Mexico to northwestern Colombia (NatureServe 2010a). Southwestern willow flycatcher territories have been detected in Arizona on the following rivers: Agua Fria, Gila, Little Colorado, Salt, San Pedro, Colorado, San Francisco, Hassayampa, Verde, Big Sandy, Santa Maria, Virgin, and Bill Williams; and on the following creeks: Pinal, Tonto, and Cienaga. Currently, population stability in Arizona is believed to be largely dependent on the presence of two large subpopulations (the Roosevelt Lake and San Pedro/Gila River confluence subpopulations).

Critical habitat has been designated for southwestern willow flycatcher (70 FR 60885–61009); however, it does not occur within the region of analysis. The USFWS announced a proposed revision to southwestern willow flycatcher designated critical habitat within the region of analysis. The proposed critical habitat areas are in Yuma County along and near the Colorado River, and in Santa Cruz County along the Santa Cruz River (76 FR 50542). Within the region of analysis, NatureServe provides records for approximately seven elemental occurrences of the southwestern willow flycatcher within USGS topographic quadrangle maps: Gadsen, Hereford, Lewis Springs, Yuma East, and Yuma West (NatureServe 2010b).

This species is threatened by the loss and degradation of cottonwood-willow riparian habitat and structurally similar riparian habitats. Increased irrigated agriculture and livestock grazing have aided brown-headed cowbird populations that, in turn, impact the southwestern willow flycatcher by parasitizing their nests. The current population exists in small, fragmented subpopulations, which increases the risk of local extirpation (NatureServe 2010a).

Yuma clapper rail. This is a small marsh bird with an average height of 8 inches. This species begins breeding in February and will nest from March with a peak in mid-May through June. Nests are made on stable substrates and are typically near shore in shallow water or in the interior of marshes over deeper water. The Yuma clapper rail occurs in freshwater marshes dominated by cattail (*Typha* spp.) and bulrush (*Scirpus* ssp.) with a mix of riparian trees and shrubs. These habitats are commonly backwaters, in the impoundments behind small dams or marsh habitats that are created in fields or cells with managed water levels (USFWS 1983).

The Yuma clapper rail is known to occur in Arizona, California, and Nevada. Occupied habitat in California exists in the Imperial Valley/Salton Sea area (USFWS 1983). Additionally, Yuma clapper rails are known to nest along the Colorado River, in wetlands surrounding the Coachella Canal, within the Imperial Valley, and the upper end of the Salton Sea at the Whitewater River delta and Salt Creek (NatureServe 2010a). NatureServe provides records for approximately seven elemental occurrences of the Yuma clapper rail within USGS topographic quadrangle maps: Gadsen, Ligurta, Wellton, Yuma East, and Yuma West (NatureServe 2010b).

Populations of the Yuma clapper rail are threatened by destruction, modification, and curtailment of its habitat and range. Increased development along the Lower Colorado River and interior Arizona rivers could have direct and indirect effects on clapper rail habitat through water management regimes (USFWS 1983). In addition, the presence and increase of selenium in clapper rail habitat has been identified as a potential threat to the survival and recovery of the clapper rail (USFWS 2006b).

Jaguar. The jaguar is a large, heavy-bodied, big-headed cat about 7 feet in length. This species is found near water in the warm tropical climate of savannah and forest and is rarely found in extensive arid areas. Individuals in Arizona have been found in Sonora desertscrub up through subalpine conifer forest. Most jaguar detections occurred in Madrean oak woodland communities; however, jaguars were also documented in open mesquite grasslands and desert scrub/grasslands on the desert valley floor (USFWS 2000b).

The historic range included California, Arizona, New Mexico, Louisiana, south through Texas, and into central South America. In Arizona, the species was found in mountainous parts of eastern Arizona to the Grand Canyon. The current range includes central Mexico and into central South America as far south as northern Argentina. There are no known breeding populations in the United States (USFWS 2000b).

In Arizona, potential habitat includes areas of forest, woodland, and grassland vegetation in the Baboquivari Mountains, the southern portion of the Altar Valley, a portion of the southern Santa Cruz River basin, and the San Pedro River basin south of Arivapa Creek. The few recent (2001 to 2007) jaguar observations in south-central Arizona near the Mexican border have primarily occurred in Madrean oak woodland communities; however, jaguars were also documented in open mesquite grasslands and desert scrub/grasslands on the desert valley floor (USFWS 2007b). In November 2011, the Arizona Game and Fish Department (AZGFD) confirmed the sighting of a jaguar southeast of Tucson, Arizona (AZGFD 2011a). In addition, a trail camera captured an image of the tail and hindquarters of a large cat on September 23, 2012. The AZGFD released a statement confirming the identification of the individual as a jaguar on October 16, 2012. The exact location was not released but AZGFD did state that it was observed

southeast of Tucson, Arizona (AZGFD 2012). Within the region of analysis, NatureServe provides records for approximately four elemental occurrences of the jaguar within USGS topographic quadrangle maps: Baboquivari Peak, Skelton Canyon, and Ruby Gadsen (NatureServe 2010b).

Threats to the jaguar include illegal shooting; overhunting of jaguar prey species; and habitat loss, fragmentation, and modification (USFWS 2000b). Large-scale changes in jaguar habitat have affected not only habitat for breeding and foraging, but also movement corridors.

Lesser long-nosed bat. This is a yellow-brown or cinnamon gray bat, with a total head and body measurement of approximately 3 inches. The tongue measures approximately the same length as the body. This species also has a small nose leaf. Habitat for the species includes mainly desert scrub habitat in the U.S. portion of its range. In Mexico, the species occurs up into high elevation pine-oak and ponderosa pine forests. Altitudinal range is from 1,600 to 11,500 feet. Within the United States, this species forages at night on nectar, pollen from columnar cacti (such as saguaros), and agaves with branched flower clusters (USFWS 2001a). Considerable evidence exists for the interdependence of *Leptonycteris* bat species and certain agaves and cacti. During daylight, lesser long-nosed bats roost in caves or abandoned mines.

The species historically ranged from southern Arizona in the Picacho Mountains, the Agua Dulce Mountains, and Chiricahua Mountains to southwestern New Mexico in the Animas and Peloncillo Mountains, and much of Baja California, Mexico (USFWS 1994). The current range is similar to historic; however, the number of occupied roost sites and the number of individuals per colony have recently declined drastically. These bats are seasonal (April to September) residents of southeastern Arizona, and possibly extreme western Arizona (i.e., Cochise, Pima, Santa Cruz, Graham, Pinal, and Maricopa counties, Arizona) (USFWS 2001a). Within the region of analysis, there are at least two maternity roost sites (Bluebird Mine and Copper Mountain Mine) and five post-maternity roost sites (Patagonia Bat Cave, Manila Mine, Coal Mine Springs, Cabeza Prieta NWR, and the State of Texas Mine) (USFWS 1994, USFWS 2005). A sixth post-maternity roost site, the Cave of the Bells, occurs immediately adjacent to the region of analysis (USFWS 1994). Within the region of analysis, NatureServe provides records for approximately 22 elemental occurrences of the lesser long-nosed bat within USGS topographic quadrangle maps: Agua Dulce Mountains, Bates Well, Guadalupe Canyon, Guadalupe Spring, Miller Peak, Mohawk SW, Montezuma Pass, Mount Hughes, O'Donnell Canyon, O'Neill Hills, Parajito Peak, Patagonia, Pyeatt Ranch, and West Guadalupe Canyon (NatureServe 2010b).

Excess harvest of agaves in Mexico; the collection of saguaro and organ pipe cactus in the United States; and the conversion of habitat for agricultural uses, livestock grazing, woodcutting, and other development might contribute to the decline of long-nosed bat populations. These bats are particularly vulnerable due to many individuals using only a small number of communal roosts (USFWS 2001a). In general, the trend in the overall number of lesser long-nosed bats has been stable or increasing in both the United States and Mexico. In part for this reason, the USFWS has recommended reclassifying the status of this species as threatened (USFWS 2007c).

Ocelot. This is a medium-sized nocturnal cat, measuring up to 3 feet in body length and weighing approximately twice as much as a large domestic cat. It is slender and covered with

attractive, irregularly shaped rosettes and spots that run the length of its body. The ocelot's background coloration can range from light yellow to reddish gray, to gold, and to a grayish gold color. The ocelot is divided into as many as 11 subspecies. Two subspecies occur in the United States, the Texas/Tamaulipas ocelot (*L.p. albescens*) and the Arizona/Sonora ocelot (*L.p. sonoriensis*). In general, the ocelot uses a wide range of habitats; however, this species does not seem to be a habitat generalist. In Arizona, little is known about habitat use. Some studies suggest that Arizona/Sonora ocelot are most often associated with tropical or subtropical habitat, including subtropical thornscrub, tropical deciduous forest, and tropical thornscrub (USFWS 2010a).

Historically this species was known to occur in the United States, primarily in California, Arizona, and Florida. The Arizona/Sonora ocelot subspecies is known to occur in southern Arizona and northwestern Mexico. This subspecies is isolated from the Texas/Tamaulipas ocelot by the Sierra Madre highlands and the Mexican Plateau. The first live Arizona/Sonora ocelot was documented in Cochise County, Arizona, in November 2009. In April 2010, an ocelot was found dead on a road near Globe, Arizona. In February 2011, the AZGFD reported an ocelot observed in the Huachuca Mountains of southern Arizona (AZGFD 2011b). In addition, a number of sightings of ocelot have been documented directly south of the U.S./Mexico international border in Sonora, Mexico (USFWS 2010a). NatureServe data do not provide any records of elemental occurrence of this species within the region of analysis.

Threats to the ocelot include destruction, modification, and curtailment of its habitat and range; collection for commercial, recreational, scientific, and educational purposes; and disease and predation (USFWS 2010a).

Sonoran pronghorn. The Sonoran pronghorn is the smallest and palest subspecies of pronghorn. The upper parts are tan; the underpart, rump, and two bands across the neck are white. The male has two black cheek patches. Both sexes have horns, although they are larger in males. Males weigh 100 to 130 pounds, while females weigh 75 to 100 pounds. Sonoran pronghorn populations typically occur in Sonoran desert scrub vegetation communities. Typical habitat ranges in elevation from 2,000 to 4,000 feet above mean sea level (USFWS 2002b). Sonoran pronghorns inhabit sites with good visibility and escape opportunities (e.g., alluvial fans and plains) but will use higher elevation alluvial fans and hills with less visibility where vegetation is more abundant. Their preferred forage is annual forbs, but they also use the shrubs and trees of desert washes and hills as the forbs dry. Vegetation associated with desert washes provides important thermal cover. Sonoran pronghorns use free-standing water when it is available and also rely on moisture from vegetation in addition to metabolic water (DHS 2008).

The U.S. subpopulation of wild Sonoran pronghorn currently occupies approximately 2,500 mi^2 of Federal lands in southwestern Arizona, including portions of the Barry M. Goldwater Range, Cabeza Prieta NWR, OPCNM, and a small area of BLM lands east of the Cabeza Prieta NWR and west of Highway 85. The Cabeza Prieta NWR lies at the heart of the Sonoran pronghorn range in Arizona and connects locations used on the Barry M. Goldwater Range and OPCNM. In 2002, extreme drought resulted in the loss of 85 percent of the U.S. Sonoran pronghorn herd and only 21 individuals existed in the United States (USFWS 2006c). Following the severe drought, emergency recovery actions were implemented by an interagency team and, as of December 2008, there were at least 68 Sonoran pronghorn in the United States in the wild, and

by July 2009, there were 73 Sonoran pronghorn in a captive breeding pen. The total number of Sonoran pronghorn at the beginning of 2009 was at least 131 individuals (USFWS 2006c). NatureServe data indicate two elemental occurrences of Sonoran pronghorn in the region of analysis within USGS topographic quadrangle maps: Wellton Hills and Granite Mountains South (NatureServe 2010b).

Conversion of habitat to other uses and barriers to movement caused by roads, canals, train tracks, and fences are the primary causes of the decline of the Sonoran pronghorn (USFWS 2002b).

3.6.2.2 Aquatic Threatened and Endangered Species

Canelo Hills ladies' tresses. This is a slender, erect member of the orchid family (Orchidaceae). Plants have five to ten grass-like leaves arising from the base of the stem. Flower stalks extend above the leaves, with up to 40 white flowers in a spiral arrangement. This species blooms July through August, but is otherwise difficult to observe as its leaves blend with other grasses and sedges. Canelo Hills ladies' tresses are short-lived perennials, surviving for only 4 to 5 years (Rice 2010).

Canelo Hills ladies' tresses grows in the fine-grained, highly organic, saturated soils of cienegas (i.e., spring fed marshes) and can be found growing dispersed among sedges and tall grasses up to an elevation of 5,000 feet. Anecdotal evidence indicates that this species might require some form of disturbance within its preferred habitat to become established (Rice 2010). Canelo Hills ladies' tresses have been observed in five locations along the San Pedro River watershed in Cochise and Santa Cruz counties. One population is found at the Arizona Nature Conservancy's Canelo Hills Ciénega. Three other populations are found on private land: one in the San Rafael Valley, one in the Babocomari Ciénega, and one in Turkey Creek Ciénega. The fifth population is on Coronado National Forest land in the Canelo Hills (USFWS 2010b, 62 FR 665–689). Most southern Arizona cienega habitats have been surveyed, so the potential for discovering new populations is low. Cienega habitats in New Mexico and Mexico have not been thoroughly studied so the potential for new populations in these areas remains (USFWS 2010b). NatureServe provides two records of elemental occurrence of Canelo Hills ladies' tresses on USGS topographic quadrangle map O'Donnell Canyon (NatureServe 2010b).

Canelo Hills ladies' tresses are rare and in decline. The limited number of locations and small populations at these locations makes this species particularly vulnerable to extinction. Direct threats include livestock grazing, improper fire management, competition with invasive plant species, water diversion and impoundments, and ground-water pumping (USFWS 2010b).

Huachuca water umbel. This is a semi-aquatic, herbaceous, perennial plant with slender erect leaves. The leaves are segmented, hollow cylinders. The flat-topped, rounded flower cluster is composed of 3 to 10 flowers that arise from the root nodes (USFWS 1999).

Huachuca water umbel is typically associated with perennial springs and stream headwaters that have permanently or seasonally saturated and highly organic soils between 4,000 to 6,500 feet. Huachuca water umbel requires wetland habitats, which are rare and declining in the southwestern United States. It is found in mid-elevation wetland communities in southern

Arizona (i.e., Santa Cruz, Cochise, and Pima counties) and northern Sonora, Mexico (USFWS 1999).

As of 1999, there were 20 known extant and six extirpated locations of this species. Extant sites occur primarily in five major watersheds: San Pedro River, Santa Cruz River, Río Yaqui/Bavispe, Río Sonora, and Río Magdalena. Huachuca water umbel populations currently occur in the United States along the Santa Cruz River and its tributaries in the San Rafael Valley; along Sonoita Creek; along the San Pedro River near the U.S./Mexico international border; along Cienega Creek and its tributaries on Las Cienegas National Conservation Area; and within Fort Huachuca Military Reservation, San Bernardino and Leslie Canyon NWRs, and other lands in eastern Cochise County (64 FR 37441–37453). Critical habitat has been designated for Huachuca water umbel (64 FR 37441–37453); and occurs within the region of analysis. NatureServe data indicate that there are 24 records of elemental occurrence of Huachuca water umbel in the region of analysis. These all occurred east of Nogales, Arizona, on USGS topographic quadrangle maps: Fairbank, Hereford, Huachuca Peak, Leslie Canyon, Lewis Springs, Lochiel, Miller Peak, Mustang Mountains, O'Donnell Canyon, San Bernardino Ranch, and Sonoita, (NatureServe 2010b).

Threats to the Huachuca water umbel include watershed degradation due to livestock grazing and development, trampling by livestock, diversion of water and dewatering of habitats, and flash flooding (USFWS 2001b).

Desert pupfish. This is a small fish, approximately 3 inches in length with narrow dark vertical bars on a silvery background. Its diet is varied and consists of plants, algae, detritus, and invertebrates. Males are larger than females and take on a bright blue body color with orange-tipped fins during the breeding season. The spawning season lasts from spring through autumn, though local conditions might allow for reproduction at any time of the year (USFWS 2010c). When particularly wet cycles in the regional weather patterns occur, the desert pupfish might take advantage of this and rapidly expand into newly flooded habitats, then shrink to a small population when those areas dry. Desert pupfish can withstand a range of environmental extremes, including high temperatures, high salinities, and low dissolved oxygen in comparison to other freshwater fish. They inhabit cienegas, springs, small streams, and along the edges of larger bodies of water. Waters tend to be clear and shallow with soft substrates (USFWS 1993b).

Natural populations of desert pupfish have been extirpated from Arizona, however at least 16 captive and wild reestablished populations now exist (USFWS 2010c). Critical habitat was designated for desert pupfish in California and at Quitobaquito Springs, Arizona (51 FR 10842–10851). The pupfish at Quitobaquito Springs are now considered a separate species (see below). NatureServe data indicate that there is one elemental occurrence of desert pupfish in the region of analysis, located on the Pyeatt Ranch USGS topographic quadrangle map (NatureServe 2010b).

Desert pupfish is declining due to dewatering of habitats such as springs, some headwaters, and lower reaches of streams and marshes; alteration of its habitat, including stream diversion, channelization, impoundment, and discharge regulation; other watershed impacts including domestic livestock grazing, timber harvest, mining, road construction, water pollution; and

competition or predation with nonnative species. Numerous historic habitats have dried up as a result of groundwater pumping, channel erosion, and water impoundment (USFWS 1993b).

Gila chub. This is a chunky, small-finned minnow (Cyprinidae) with a dark olive green to silvery coloration, fading to lighter on the belly. Males tend to be smaller with adults reaching 6 inches, while females can reach 8 inches. The Gila chub is found in small streams, pools, cienegas, and artificial impoundments, typically between 2,000 to 5,500 feet. They use a variety of stream habitats based on age class. Adult fish can be found in deep plunge-pools and eddies below swift-moving sections of river. Juvenile fish beyond their first year use the high velocity areas of the stream, and fish in their first year are found in shallow waters among the shelter of plants and debris (USFWS 2008a).

The historical distribution of the Gila chub likely extended to all suitable habitats within the Gila River Basin with the possible exception of the Salt River drainage above Roosevelt Lake. The Gila chub is found in only 29 small isolated populations, all of which are threatened. In Arizona, the chub is found in habitats in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapi counties (USFWS 2008a). Critical habitat has been designated for Gila chub (70 FR 66663–66721) and it occurs within the region of analysis. Within the region of analysis, NatureServe provides records for approximately one elemental occurrence of the Gila chub within USGS topographic quadrangle map O'Donnell Canyon (NatureServe 2010b).

The majority of Gila chub habitat has been destroyed or degraded to a point that it is not recoverable. What remains of native habitat is under heavy grazing pressure and is threatened by active mining operations. Increased recreational use has contributed to degradation of habitat, as has the introduction of nonnative species (USFWS 2008a).

Gila topminnow. This small, guppy-like, live-bearing fish is 1 to 2 inches long (USFWS 2008b). Males and females are each characterized by a tan- to olive-colored body and usually display a white belly (USFWS 1998). The Gila topminnow occurs in small streams, springs, and cienegas at elevations below 4,500 feet (USFWS 2008b). This species prefers shallow, warm, quiet waters with aquatic vegetation and debris for cover (USFWS 1998). The Gila topminnow occurs in deeper waters but tends to congregate near the surface (BLM 2005). It also is known to tolerate relatively high water temperatures and low dissolved oxygen levels (USFWS 2008b).

The Gila topminnow was historically common throughout the Gila River drainage at elevations below 5,000 feet, including the San Pedro River. Two collections exist from the San Pedro River from 1943 and 1978 (USFWS 1998). Currently, most of the populations in Arizona occur in the Santa Cruz River system within small streams, springs, and cienegas in Gila, Pinal, Graham, Yavapai, Santa Cruz, Pima, Maricopa, and La Paz counties (USFWS 2008b). Within the region of analysis, NatureServe provides records for approximately five elemental occurrences of the southwestern willow flycatcher within USGS topographic quadrangle maps: Mount Hughes, O'Donnell Canyon, Presumido Peak, and Ruby (NatureServe 2010b).

The primary threats on Gila topminnow are habitat destruction competition and predation from invasive nonnative species (USFWS 1998, USFWS 2008b). Land use practices such as livestock grazing, mining, timber cutting, road maintenance, and recreation can result in increased erosion, intensified flood events, and decreased groundwater storage, potentially affecting existing

populations and suitable habitats for future reintroductions. Urban and suburban population growth and development and associated increased groundwater pumping, alteration of streams and rivers, and increased water pollution also threaten the recovery efforts of the species (USFWS 1998).

Quitobaquito pupfish. Originally described as a subspecies of the desert pupfish, recent taxonomic studies indicate that the Quitobaquito pupfish is a distinct species. The Quitobaquito pupfish differs from the desert pupfish by having a slightly deeper and broader body and head. Quitobaquito pupfish are similar in their habitat requirements to desert pupfish; however, they are restricted in distribution to a single spring-fed pond (USFWS 2010d).

The Quitobaquito pupfish is known to occur in only three locations: Quitobaquito Spring just north of the U.S./Mexico international border in OPCNM; Rio Sonoyta in Sonora, Mexico; and within the Cabeza Prieta NWR (USFWS 2010d, ISDA 2005). The Cabeza Prieta location was recently established as part of an introduction program at the NWR (ISDA 2005). Critical habitat was designated for desert pupfish in California and at Quitobaquito Springs, Arizona (51 FR 10842–10851). NatureServe data indicate that there was one elemental occurrence of the Quitobaquito pupfish in the region of analysis on the Quitobaquito Springs USGS topographic quadrangle map (NatureServe 2010b).

The Quitobaquito pupfish was threatened by the introduction of nonnative golden shiner in 1968 or 1969, however this species was eradicated and the Quitobaquito pupfish population was reestablished (USFWS 2010d).

Sonora chub. This is a moderately chubby, dark-colored fish less than 5 inches long; it has two prominent black lateral bands on the sides and a dark oval spot at the base of the tail. Breeding males have red lower fins and a somewhat orange belly. The Sonora chub can be described as a tenacious, desert-adapted species, adept at exploiting small marginal habitats that can survive under severe environmental conditions. It is thought to be an opportunistic feeder that takes advantage of seasonally available food resources. The Sonora chub is endemic to streams of the Rio de la Concepcion drainage of Arizona and Sonora, Mexico. This species typically inhabits intermittent streams that occur near cliffs, boulders, or other cover in the channel and thrive in the largest, deepest, and most permanent pools, with bedrock-sand substrates and areas free of thick pads of floating algae (USFWS 1992).

In Arizona, it occurs in Sycamore Creek (Bear Canyon), a tributary of the Rio Altar, 15.5 miles west of Nogales in the region of analysis. Additionally, it occurs in two tributaries of Sycamore Canyon (Penasco Creek and an unnamed stream) and in California Gulch. Although the Sonora chub is stated as having a very limited range in the United States it is locally abundant in Sycamore Creek (USFWS 1992). Critical habitat has been designated for Sonora chub (51 FR 16042–16047) that occurs within the region of analysis. Within the region of analysis, NatureServe provides records for approximately four elemental occurrences of the Sonoran chub within USGS topographic quadrangle map Ruby (NatureServe 2010b).

The major threat to the Sonora chub is the modification of suitable habitat by human activities including grazing, mining, recreation, and the introduction of exotic species (USFWS 1992).

Chiricahua leopard frog. The Chiricahua leopard frog has a distinctive pattern on the rear of the thigh consisting of small, raised, cream-colored spots or tubercles on a dark background and often green coloration on the head and back (USFWS 2007d). The Chiricahua leopard frog is known to occur in cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,300 to 8,900 feet (USFWS 2008c). The species requires permanent or semi-permanent pools for breeding. The breeding season varies depending upon elevation. At higher elevations above 5,900 feet, the breeding season occurs between May and October, while at lower, warmer elevations below 5,900 feet the breeding season occurs from March through June (USFWS 2007d, Degenhardt et al. 1996). Overall frog abundance reaches its peak in August and September, with the transformation of tadpoles to sub-adults, and is lowest from December through March (Degenhardt et al. 1996).

The Chiricahua leopard frog occurs in central and southeastern Arizona; west-central and southwestern New Mexico; and northeastern Sonora and western Chihuahua, Mexico. The range of the species is split into two geographically isolated populations. The northern populations are located along the Mogollon Rim in Arizona east into the mountains of west-central New Mexico. The southern populations are in southeastern Arizona, southwestern New Mexico, and Mexico. Genetic analysis has indicated that the northern populations might be an undescribed, distinct species (USFWS 2007d). The current known distribution for the Chiricahua leopard frog within Arizona includes seven of the eight major historical drainages including Salt, Verde, Gila, San Pedro, Santa Cruz, Yaqui/Bavispe, and Magdalena river drainages (USFWS 2011).

Critical habitat has been designated for Chiricahua leopard frog (77 FR 16324–16424) that occurs within the region of analysis. Within the region of analysis, NatureServe provides records for approximately 111 elemental occurrences of the Chiricahua leopard frog within USGS topographic quadrangle maps Bartlett Mountain, Bob Thompson Peak, Campini Mesa, Canelo Pass, Cumero Mountain, Duquesne, Guadalupe Springs, Harshaw, Huachuca Peak, Lochiel, Miller Peak, Mount Hughes, Mount Wrightson, Murphy Peak, Nicksville, O'Donnell Canyon, Parajito Peak, Peña Blanca Lake, Ruby, San Bernardino Ranch, Tubac, and Wilbur Canyon (NatureServe 2010b).

Threats to the Chiricahua leopard frog include predation and possibly competition by nonnative species, especially bullfrogs, fish, and crayfish. Additional threats include the fungal disease chytridiomycosis, drought, degradation, and loss of habitat as a result of water diversions and groundwater pumping, livestock management, catastrophic wildfire, mining, and development (USFWS 2007d).

Sonoran tiger salamander. Adult Sonoran tiger salamanders have a color pattern with an irregular network of light coloration, often coupled with light spots, on a dark background color to a pattern of large, well-defined light or yellow spots or bars. Larvae are gray on the back of the head and tail with a light-colored belly. Cattle ponds or tanks are the primary habitat for Sonoran tiger salamanders. The most important habitat requirement for Sonoran tiger salamanders is the availability of standing water for breeding from January through June. Mammal burrows provide refuge for terrestrial salamanders in the terrestrial environment, enabling them to avoid extreme environmental conditions (USFWS 2002c).

Most known Sonoran tiger salamander populations exist in the San Rafael Valley, where they have been found in more than 50 ponds (USFWS 2002c). This species has been collected in the plains grassland and adjacent Madrean evergreen woodlands of Arizona (NatureServe 2010b). The range of the subspecies and its occupied and potentially occupied habitat is thought to extend from the crest of the Huachuca Mountains west to the crest of the Patagonia Mountains, including the San Rafael Valley and adjacent foothills from its origins in Sonora north to the Canelo Hills. Tiger salamanders have also been found in areas just outside the San Rafael Valley, such as Fort Huachuca, Harshaw Canyon, Copper Canyon, and Coronado Memorial. Within the region of analysis, NatureServe provides records for approximately 51 elemental occurrences of Sonoran tiger salamanders within USGS topographic quadrangle maps: Campini Mesa, Canelo Pass, Duquesne, Harshaw, Lochiel, Montezuma Pass, and O'Donnell Canyon (USFWS 2002c).

The Sonoran tiger salamander faces a number of threats, including disease and predation by non-native fish, crayfish, and bullfrogs. Habitat destruction and the increased probability of small populations being extirpated due to local random events (such as drought or disease) are also significant threats to the continued existence of the Sonoran tiger salamander (USFWS 2001c).

3.6.3 Environmental Consequences

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
- Diminishment of a species numbers, reproductive capabilities, or distribution such that it results in jeopardy.

Effects on threatened and endangered would be significant if species or habitats of high concern are adversely affected over relatively large areas. Effects would also be considered significant if disturbances cause reductions in population size or distribution of a species of high concern.

3.6.3.1 Alternative 1: Proposed Action

In general, short- and long-term, direct and indirect, effects on terrestrial and aquatic threatened and endangered species would be negligible. Impacts on threatened and endangered species would be avoided and minimized through the use of appropriate BMPs (see **Appendix E**). These determinations were based in part on the following factors.

- The Proposed Action involves the maintenance and repair of existing tactical infrastructure. Those activities would be conducted within and immediately 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 BMPs to avoid harming or harassing protected species and to minimize other direct and indirect adverse effects.

- When appropriate, surveys would be conducted prior to implementing maintenance and repair activities such as vegetation control within critical 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 would be negligible; 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 adversely affect protected species or adversely modify their critical habitat.

Formal consultation with the USFWS was completed for four species, Sonoran pronghorn, Pima pineapple cactus, Sonoran tiger salamander, and the Chiricahua leopard frog. A Biological Opinion, including Incidental Take Statements, for the wildlife species was issued on November 6, 2012.

Terrestrial Threatened and Endangered Species

Terrestrial Threatened and Endangered Plant Species. Short-term, direct and indirect effects on Pima pineapple cactus would range from negligible to minor. Short-term, indirect effects on Cochise pincushion cactus would be negligible. Potential direct impacts on threatened and endangered perennial plant species from maintenance and repair activities include direct injury and mortality from trampling or crushing by equipment, alteration of the plant seed bank, and habitat degradation from disturbance of soils. Potential indirect impacts on these species include increased erosion and sedimentation from alterations in hydrology, and increased potential for invasive species and fire. However, based on the implementation of BMPs designed to avoid or reduce impacts on these species, these impacts would be unlikely to occur.

To avoid direct effects and habitat degradation from removal of canopy cover, vegetation clearing (i.e., removal of vegetation to maintain line of sight or remove hiding locations from areas where vegetation has not been previously cleared) would not be conducted within suitable or critical habitat of any threatened or endangered plant species. Although most maintenance and repair activities would be conducted within previously disturbed areas, some activities would need to be conducted in areas immediately adjacent to the existing infrastructure footprint. For example, equipment might need to be operated off existing roads to remove debris from culverts and fences and to otherwise access and maintain infrastructure. To avoid direct and indirect impacts on individual listed plants and their habitats, no ground disturbance would occur outside the existing footprint in known habitat (see **Table 3-3**) or designated critical habitat of Cochise pincushion cactus. By avoiding suitable habitat where these protected plants occur, the maintenance and repair activities would not harm individual plants, cause habitat degradation, or otherwise adversely affect Cochise pincushion cactus directly.

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

Common Name	Habitat	Blooming Season
Canelo Hills ladies' tresses	Fine-grained, highly organic, saturated soils of cienegas (i.e., spring-fed marshes) and among sedges and tall grasses up to an elevation of 5,000 feet.	July–August
Cochise pincushion cactus	High-calcium Permian limestone at elevations from 4,200 to 4,700 feet where Chihuahuan desert scrub transitions to semidesert grassland.	March–April
Huachuca water umbel	Perennial springs, rivers, and stream headwaters that are permanently or seasonally saturated within Sonoran desertscrub, grassland, or oak woodlands between 4,000 to 6,500 feet.	July–August
Pima pineapple cactus	Transition zone between the semidesert grasslands and Sonora desert scrub on alluvial bajadas (lower slopes of mountains characterized by loose alluvial sediments and poor soil development) and slopes of less than 10 percent grade at elevations between 2,300 to 4,600 feet.	July–August

Pima pineapple cacti are habitat generalists and, therefore, can be found throughout a substantial portion of the project area. It is possible that some maintenance and repair activities would need to be conducted adjacent to tactical infrastructure in an area where this species occurs. In addition, Pima pineapple cacti can be difficult to detect, especially in dense grass cover (USFWS 2007e), and it is possible that one or more cacti would be missed during a survey and accidentally destroyed during the Proposed Action. To mitigate for the loss of Pima pineapple cactus habitat, CBP will purchase from a conservation bank approved by the USFWS Arizona Ecological Services Office one credit for each acre of suitable habitat lost. CBP would include an estimate of acreage of Pima pineapple cactus habitat lost in its annual report to USFWS and purchase credits in the conservation bank within 2 years of when the habitat loss occurred. Because almost all maintenance and repair activities would be conducted from existing roads and other disturbed areas, and disturbances outside of existing footprints would be required very infrequently, CBP anticipates that impacts on Pima pineapple cactus would range from insignificant to minor.

Maintenance activities that compact soils and change water infiltration could alter local hydrology by increasing sedimentation and runoff in suitable perennial plant species habitat. BMPs would be implemented to reduce sedimentation and runoff from roads and other infrastructure and minimize other potential indirect effects on this species. For example, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented prior to applicable maintenance activities (i.e., disturbances greater than 1 acre of exposed dirt or as required by the property owner or land manager). BMPs described in the SWPPP to reduce erosion would be implemented. The CBP environmental SME would consider areas with highly erodible soils when planning the maintenance activities and would require the use of measures such as waddles, aggregate materials, and wetting compounds where appropriate. Tactical infrastructure would be inspected periodically for the presence of erosion, and repair and maintenance would be implemented as necessary.

Recently disturbed soils can have an increased potential for invasive species such as Lehman's lovegrass (*Eragrostis lehmannian*) and Boer lovegrass (*Eragrostis chloromelas*) to become established. These and other invasive species tend to form dense stands that promote higher intensity fires that occur more frequently (USFWS 2007e). However, coordination with the CBP environmental SME would be conducted to determine if the maintenance activities occur in a highly sensitive area or an area that poses an unacceptable risk of transmitting invasive species. If it is determined that maintenance activities occur in such an area, the CBP cleaning protocol would be followed. In addition, 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.

In general, CBP will avoid direct and indirect impacts on Pima pineapple cactus by allowing no ground disturbance outside the existing infrastructure footprint in known habitat for this species without offsetting such impact by purchasing credits in an existing habitat conservation bank for Pima pineapple cactus. By generally avoiding suitable habitat where this species occurs, the Proposed Action would reduce the likelihood that it would harm individual plants, cause habitat degradation, or otherwise directly adversely affect this species.

By implementing BMPs to reduce sedimentation and runoff, and by reducing the potential for invasive species and fire, the Proposed Action would have short-term, indirect, negligible, beneficial and adverse effects on Cochise pincushion cactus. Implementation of BMPs should avoid or minimize any potential take of Pima pineapple cacti or habitat, additionally conservation measures will be applied if take is to occur over the life of this project. CBP will compensate for the loss of Pima pineapple cactus habitat by purchasing one credit from a conservation bank approved by the USFWS. By implementing BMPs and conservation measures, the Proposed Action would have short- and long-term, indirect and direct, negligible to minor, beneficial and adverse effects on Pima pineapple cactus.

New Mexico Ridge-Nosed Rattlesnake. Short-term, direct, effects on the New Mexico ridge-nosed rattlesnake would be negligible. Potential direct impacts on this species include the risk of direct injury and mortality from maintenance activities. This species is limited to a very small area within the project area, and maintenance and repair within that area would be limited to within and immediately adjacent to existing tactical infrastructure. BMPs designed to minimize or avoid impacts on New Mexico ridge-nosed rattlesnakes would be implemented, the potential for effects would be discountable, and any effects that might occur would be negligible. Maintenance activities would be avoided within defined New Mexico ridge-nosed rattlesnake habitat when New Mexico ridge-nosed rattlesnakes are active from April to October. New Mexico ridge-nosed rattlesnake habitat is defined as occupied habitat, critical habitat, and suitable habitat (i.e., pine-oak woodlands at high elevations of 5,500 to 9,000 feet) in the Peloncillo Mountains. If maintenance and repair activities cannot be avoided within the activity period, maintenance and repair vehicles would not exceed a speed of 15 to 20 mph during periods of elevated roaming and foraging activities from July through August within defined New Mexico ridge-nosed rattlesnake habitat.

All critical habitat designated for the New Mexico ridge-nosed rattlesnake is in New Mexico; thus, implementation of the Proposed Action in Arizona would have no effect on critical habitat of this species.

Avian Species. Short-term and long-term, direct effects on the threatened and endangered avian species, including masked bobwhite, Mexican spotted owl, southwestern willow flycatcher, and Yuma clapper rail would be negligible. Potential direct impacts on threatened and endangered avian species include noise disturbances from increased human presence, injury or mortality from collisions with maintenance vehicles and during maintenance activities, and habitat degradation from vegetation removal. As further described in **Section 2.3.3**, maintenance and repair activities would occur infrequently. For example, inspections and routine maintenance of access roads would occur up to four times per year, and routine maintenance of other tactical infrastructure would occur less often. These maintenance activities would include trips by vehicles ranging in size from pickup trucks to heavy equipment such as dump trucks and road graders. Noise effects associated with maintenance activities are expected to occur at any given location for 1 to a few days in duration.

Noise levels from pickup trucks are anticipated to be similar to noise levels of most vehicles currently using the roadways. Noise levels from multiple pieces of heavy equipment, such as backhoes, construction trucks, and front-end loaders, are anticipated to increase ambient sound levels temporarily. The distance and levels at which noise is likely to disturb avian species is dependent on the sensitivity of individual species. For example, Delaney et al. (1999) indicated that spotted owls can be affected less by nearby, nonthreatening activity than other raptors. Spotted owls can be flushed from nests at noise levels above 46 a-weighted decibels (dBA) from ground-based activities. However, flush response decreased with distance. No flush response was detected at a distance of 250 feet from the source during the non-nesting season and 2,690 feet from the source during nesting season. Although not statistically significant, spotted owls were less likely to flush later in the season. While this could be an indication of experience or habituation to the noise, it could not be differentiated from other factors such as seasonal influences.

Noise and visual disturbance associated with maintenance and repair activities could disrupt breeding and foraging behaviors of threatened and endangered avian species. For example, such disturbances could cause adult Mexican spotted owls to flush from roosts, but is unlikely to result in adults leaving a nest. As all maintenance activities would be conducted within or immediately adjacent to existing tactical infrastructure, and based on Delaney (1999), it is likely that any nest within the audible range of existing tactical infrastructure would be occupied by owls and other avian species that are habituated to noise. In addition, BMPs would be implemented that would avoid impacts during the nesting season (see **Table 3-4**). No maintenance and repair activities would be conducted within areas classified as protected activity centers of Mexican spotted owls during the nesting season.

Maintenance and repair activities could increase the potential for direct injury and mortality of threatened and endangered avian species. In general, birds are highly mobile and flush or relocate in response to disturbances and the potential for direct injury or morality is negligible. There are species and seasonal periods when birds are more susceptible to collisions. For example, masked bobwhites nest on the ground, increasing the potential for nest destruction, mortality of incubating hens, or loss of very young, less mobile chicks during the nesting season (USFWS 1995c). With the exception of Mexican spotted owl protected activity centers, there might be occasions when tactical infrastructure maintenance and repair would be

Table 3-4. Threatened and Endangered Avian Species Habitat, Nesting Season, and Known Tactical Infrastructure

Common Name	Habitat	Nesting Season	Current Amount of Tactical Infrastructure within the Range of this Species*
Masked bobwhite quail	Savannah grassland within Buenos Aires NWR.	July 1–November 30	There are up to 25 miles of roads analyzed in this EA that are within the known range of this species.
Mexican spotted owl	Closed-canopy forests (riparian, mixed conifer, pine-oak, and pinyon juniper woodland) and steep, narrow, entrenched, rocky canyons and cliffs within designated critical habitat.	March 1–June 30	There are up to 45 miles of roads, 5 culverts, 5 low water crossings, and 5 towers analyzed in this EA that are within the known range of this species.
Southwestern willow flycatcher	Dense riparian habitat along streams, rivers, lakesides, and other wetlands.	March 15–September 15	There are up to 10 towers and 10 gates analyzed in this EA that are within the known range of this species.
Yuma clapper rail	Freshwater marshes generally dominated by cattail (*Typha* spp.) and bulrush (*Scirpus* ssp.) with a mix of riparian trees and shrubs.	March 15–July 15	There are up to 10 gates analyzed in this EA that are within the known range of this species.

Note: * See **Appendix B** for a map of this tactical infrastructure.

required within threatened and endangered avian species suitable and designated critical habitat during the nesting season (see **Table 3-4**). In these cases, the following avoidance measures would apply. A qualified biologist would conduct a survey for threatened and endangered birds prior to initiating maintenance activities. If a threatened or endangered bird is present, a qualified biologist would survey for nests approximately once per week within 1,300 feet (for Mexican spotted owl) or 500 feet (all other species) of the maintenance area for the duration of the activity. If an active nest is found, no maintenance would be conducted within 1,300 feet (Mexican spotted owl) or 300 feet (all other species) of the nest until the young have fledged. In addition, all maintenance vehicles would be limited to a maximum speed of 35 mph on major unpaved roads (i.e., graded with ditches on both sides) and 25 mph on all other unpaved roads. Based on these considerations, the potential for injury to threatened and endangered avian species from striking a CBP maintenance vehicle is extremely unlikely.

Removal of vegetation could affect threatened and endangered avian species by reducing suitability of habitat if enough vegetation is removed that it fragments the habitat and alters its structure. Vegetation removal within suitable habitat for threatened and endangered avian species would be limited to the minimum necessary to maintain drivable access roads and to maintain the functionality of other tactical infrastructure and would be confined to the existing disturbed footprint. This limited vegetation control would be conducted outside of the nesting season (see **Table 3-4**).

There are five designated Mexican spotted owl critical habitat units within the project area. These units are within and near the Santa Rita, Atascosa, Pajarito, Patagonia, Huachuca, and Chiricahua mountains, and are all primarily within the Coronado National Forest. All activities within critical habitat would occur within and immediately adjacent to the footprint of existing tactical infrastructure, and BMPs designed to avoid impacts on critical habitat of this species would be implemented. Limited management of vegetation adjacent to existing tactical infrastructure would continue (e.g., trimming of branches and other vegetation removal where vegetation encroaches on road shoulders, and removal of understory vegetation within 10 feet of culverts to permit clearing of pipes). However, other vegetation clearing and control would not occur in Mexican spotted owl critical habitat (i.e., closed-canopy forests [riparian, mixed conifer, pine-oak, and pinyon juniper woodland] and steep, narrow entrenched rocky-canyons and cliffs). If vegetation clearing is to be conducted adjacent to suitable habitat of a threatened or endangered bird species (**Table 3-4**), qualified personnel with experience identifying suitable habitat of that species would delineate and clearly mark the suitable habitat to be avoided. In addition to the vegetation-clearing restrictions, no maintenance and repair activities would be conducted within areas classified as protected activity centers of Mexican spotted owl during the nesting season. If a Mexican spotted owl or PCEs are observed within the project area, then CBP would conduct further consultation with USFWS to avoid impacts. The maintenance and repair of tactical infrastructure, including continued management of vegetation adjacent to roads and other infrastructure, is not anticipated to measurably diminish the value of PCEs that are essential to conservation of the Mexican spotted owl within the aforementioned critical habitat units.

There is no critical habitat designated for the southwestern willow flycatcher in southern Arizona; therefore, maintenance and repair activities would have no effect on critical habitat of this species. However, USFWS announced a proposed revision to southwestern willow flycatcher designated critical habitat on August 15, 2011. This revision would increase the total designated critical habitat by approximately 2,090 stream miles in several counties in Arizona, California, Utah, Colorado, and New Mexico. Proposed critical habitat is in Yuma and Santa Cruz counties, within the project area (76 FR 50542–50629). Any activities within critical habitat would occur within and immediately adjacent to the footprint of existing tactical infrastructure, and BMPs designed to avoid impacts on critical habitat of this species would be implemented (see **Appendix E**). For example, vegetation clearing would not occur in suitable habitat within the range or critical habitat of threatened and endangered species. If a threatened or endangered species, PCE, or other indicators of suitable habitat occur within the project area, then further consultation with USFWS would be required.

Jaguar and Ocelot. Short- and long-term, direct and indirect effects on jaguars and ocelots due to road maintenance and repair would be negligible. Potential direct impacts on these species include the risk of direct injury and mortality from maintenance vehicles accessing tactical infrastructure and changes in behavior resulting from noise and other disturbances associated with human presence during maintenance and repair activities. Occurrences of jaguar and ocelot in Arizona are extremely rare. Between 1996 and 2007 there were only four jaguars observed in New Mexico and Arizona combined (USFWS 2007b). In November 2011, the Arizona Fish and Game Department confirmed the sighting of a jaguar southeast of Tucson, Arizona (AZGFD 2011c). In November 2009, an ocelot was observed in Cochise County, Arizona, and in April 2010, an individual was found dead on the road near Globe, Arizona (USFWS 2010e).

Prior to these observations, the last known ocelot in Arizona was shot by a hunter in 1964 (USFWS 2010f).

Maintenance and repair activities would occur within or immediately adjacent to existing tactical infrastructure, and would result in no measureable degradation, modification, or habitat fragmentation of undisturbed areas where jaguars and ocelots potentially occur. The presence of maintenance crews and equipment, and their associated noise, could cause jaguars and ocelots to move away from an area or otherwise modify their behavior. Because most repair and maintenance activities would be completed within an area in less than 1 day, and almost all would be completed within a few days, any displacement or other associated adverse effects would be temporary and minor. Additionally, because jaguars and ocelots are so rare in the project area, the potential for individual jaguars or ocelots to encounter maintenance activities is extremely unlikely to occur.

Lesser Long-nosed Bat. Short- and long-term, direct effects on lesser long-nosed bat from removal of forage plants (columnar cactus [i.e., saguaro and organ pipe] and agave) or potential disturbances caused by maintenance and repair activities in close proximity to occupied roosts would be negligible. The potential direct impacts on this species include disruption of normal roosting and foraging behavior due to noise and lighting associated with maintenance and repair activities, and degradation of foraging habitat from vegetation removal. Based on the implementation of BMPs designed to avoid or reduce impacts on lesser-long nosed bats, these impacts would be extremely unlikely to occur.

Noise from daytime maintenance activities could disturb bats roosting near the maintenance area. The distance at which noise is likely to disturb roosting bats is dependent on the sensitivity of the bat species and the type of roost structure. Because lesser long-nosed bats roost in caves and abandoned mine shafts, they would not be as sensitive to noise as tree-roosting bats. CBP would not conduct maintenance activities within or at the entrance to caves or mineshafts and, therefore, would not disturb roosting bats.

Maintenance activities that occur at night have the potential to interfere with a bat's ability to locate and find food (Schaub et al. 2008), and bats might avoid areas where maintenance noise is present. Maintenance and security lighting have the potential to impact bat behavior, altering commuting routes to foraging habitat (Stone et al. 2009). However, work at night within 5 miles of any known roost sites of the lesser long-nosed bat would be minimized from mid-April through mid-September. 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 lesser long-nosed bat habitat.

Considerable evidence exists for the interdependence of *Leptonycteris* bat species and certain agaves and cacti (USFWS 2001a). To avoid affecting the availability of these important forage species, removal of columnar cacti (i.e., saguaro and organ pipe) and agave within the range of the lesser long-nosed bat would be limited as much as possible while still maintaining drivable access roads and 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 would conduct a survey to identify and flag all columnar cactus and agave to be avoided. In addition, CBP would comply with all

requirements of land management agencies for the protection and replacement of cacti and yucca.

Sonoran Pronghorn. Short- and long-term, direct and indirect effects on the Sonoran pronghorn would be negligible to minor. Potential direct impacts on this species include the risk of direct injury and mortality from collisions with maintenance vehicles accessing tactical infrastructure, loss of habitat, behavioral and physiological impacts resulting from noise and other disturbances associated with human presence during maintenance and repair activities, and changes in behavior associated with avoidance of particular areas. Potential indirect effects on the Sonoran pronghorn include increased potential for fire, introduction and spread of invasive species, and disturbance impacts from greater use and higher speeds on roads.

Direct impacts from vehicle collisions are very rare. As reported in the 2002 Final Revised Sonoran Pronghorn Recovery Plan, only two individuals were recorded as having been killed or injured by vehicles (USFWS 2002b). Both of these incidents occurred along highways, and there has never been a vehicle collision along the roads identified for maintenance and repair by CBP. Vehicles currently using the roads to be maintained or repaired include NPS, USFWS, and BLM administrative vehicles; CBP patrol and administrative vehicles; and vehicles of visitors to OPCNM and Cabeza Prieta NWR. The USFWS issues approximately 4,000 vehicle permits for access to the Cabeza Prieta NWR annually. In addition, USFWS recently opened roads within the refuge to all-terrain vehicles and street-legal motorcycles, which is expected to increase public use of these roads.

As described in **Section 2.3.3**, maintenance and repair activities would occur infrequently; therefore, overall impacts associated with increases in vehicle use within the range of this species resulting from the maintenance and repair activities would be negligible. For example, maintenance of access roads within the range of this species would occur no more than four times per year, and routine maintenance of other tactical infrastructure would occur less frequently. These maintenance activities would include trips by vehicles ranging in size from pickup trucks to heavy equipment such as dump trucks and road graders. In addition, most repair and maintenance activities would be completed within an area in less than 1 day, and almost all would be completed within a few days. Thus, any displacement of Sonoran pronghorn caused by maintenance or repair would be very infrequent and temporary. All maintenance vehicles would be limited to a maximum speed of 35 mph on major unpaved roads (i.e., graded with ditches on both sides) and 25 mph on all other unpaved roads. Due to the relatively low number of maintenance vehicles, slow speeds, and the fact that a collision between vehicles and pronghorn has never occurred along the roads proposed to be maintained, it is extremely unlikely that there would be a collision between a maintenance vehicle and a Sonoran pronghorn.

Most maintenance of roads, culverts, and low-water points would occur within the footprint of existing tactical infrastructure. However, repairs and upgrades to some roads and water crossings, such as those planned in OPCNM, would require the replacement of culverts, addition of erosion-control structures, and other actions outside of, but immediately adjacent to, the footprint of existing infrastructure. Those actions would result in a minor loss of Sonoran pronghorn habitat where new erosion-control features and other structures are added, and would result in long-term, beneficial effects by reducing erosion and improving water flow. For example, planned road upgrades on OPCNM would require raising the roadbed to accommodate

appropriate-sized culverts, and, at some locations, adding riprap along the edge of washes immediately adjacent to existing roads. Most of these repairs and upgrades would be confined to roads and drainage channels, which provide limited forage or cover potential for pronghorn. These road improvements are anticipated to result in no measurable fragmentation of pronghorn habitat and no measurable impact on the 1.6-million-acre range of the pronghorn.

The presence of maintenance crews and equipment, and their associated noise, could cause pronghorns to move away from an area temporarily or otherwise modify their behavior. The most recent and detailed examination of effects of human activities on behavior of unconfined Sonoran pronghorn was conducted by Krausman et al. (2004), who evaluated the effects of military aerial- and ground-based activities on Sonoran pronghorns. The investigators determined that ground-based activities were associated with changes in behavior about 40 percent of the time and running or trotting away less than 5 percent of the time. The study concluded that Sonoran pronghorn habituated to both military overflight and ground-based activities and that behavior patterns of individuals exposed to military activities were similar to those of individuals that are not exposed to military activities. Krausman et al. (2004) concluded that impacts of aerial- and ground-based military activities on pronghorn were not biologically significant.

Krausman et al. (2004) suggested that Sonoran pronghorn females and fawns might be more sensitive to anthropogenic stimuli than other members of the population, and recommended that all ground-based activities that alert or startle females and their fawns should be terminated. To avoid disturbing fawns, maintenance activities would be avoided during the fawning season (March 15 to July 31) and maintenance activities that must occur within occupied or suitable Sonoran pronghorn habitat (i.e., Sonoran desert scrub communities) during the fawning season would require consultation with USFWS and other relevant Federal land managers.

Krausman et al. (2004) also sampled ambient sound levels on portions of the Barry M. Goldwater Range routinely used by pronghorn for 242 days between fall 1998 and summer 1999. Krausman's research team recorded average 24-hour sound levels of 65 dBA and peak levels as high as 122 dBA during training periods. When combined with their observations of behavior during overflight events, Krausman et al. (2004) concluded that pronghorn habituated to military activities, including noise. This is similar to other researchers who concluded that Sonoran pronghorn either habituate to noise or that noise impacts are minor (Workman et al. 1992 and Weisenberger et al. 1996).

Several studies indicate that large mammals exhibit physiological responses to human transportation-related stressors. Weisenberger et al. (1996) conducted studies of the impacts of simulated overflights on the heart rates of penned desert bighorn sheep and mule deer. He reported that while heart rates and activity patterns increased with simulated overflights, heart rates returned to normal within 1 to 3 minutes and activity patterns returned to normal within about 4 minutes. Based on the results from this study, the authors concluded that aircraft noise events were of such short duration and recovery was so rapid that it was unlikely that low flying aircraft would result in adverse impacts on the species.

Using immunoassays of fecal glucocorticoid levels (a sensitive and noninvasive measure of physiological stress response) in wolves and elk from three national parks where the animals

were exposed to snowmobile traffic, Creel et al. (2002) determined that glucocorticoid levels were higher in animals exposed to snowmobile traffic. However, the authors concluded that the animals were able to compensate for any physiological impacts of snowmobile traffic and exhibited normal patterns of survival and recruitment.

The only study of physiological impacts (heart rate and core temperature) of human disturbance conducted on a different pronghorn subspecies was completed by Workman et al. (1992) who reported single exposure trials of two penned female pronghorn to six different ground-based stimuli and recorded differing responses from the two female pronghorn antelope. The lowest response rate of these two individuals was to vehicular traffic, which is similar in nature to the proposed action in this case. Workman et al. (1992) also reported multiple trials of five aircraft overflight scenarios (supersonic and subsonic jets, propeller-driven and rotary-winged aircraft) of penned and unpenned antelope and concluded that pronghorn habituated to these overflights as documented by reduced heart rate level increases and duration during subsequent overflight trials. The stress levels of pronghorn in the U.S. population are currently unknown and could range from normal to highly stressed, and stress levels could be influenced by a variety of human and environmental variables (Krausman et al. 2004).

Additional BMPs would also be implemented to avoid effects on Sonoran pronghorn. Road maintenance would be conducted no more than four times per year within the range of this species. The number of vehicle trips per day to and from maintenance sites would be minimized to reduce the likelihood of disturbing Sonoran pronghorn in the area or injuring an animal on roads. Vehicle convoys, multi-passenger vehicles, and other methods would be used to reduce the number of vehicle trips needed. During maintenance and repair activities, if a Sonoran pronghorn is observed within 1 mile of the activity, any work that could disturb the animal would cease. For vehicle operations, this would entail stopping the vehicle until the Sonoran pronghorn moves away. Vehicles could continue at reduced speeds (10 to 15 mph) after the Sonoran pronghorn moves away or retreats from the area in the direction from which the vehicle came. All motorized equipment would possess properly working mufflers and would be kept properly tuned to reduce backfires. All motorized generators would be in baffle boxes (a sound-resistant box placed over or around a generator), would have an attached muffler, or would use other noise-abatement methods in accordance with industry standards. CBP would also provide funding in the total amount of $100,000 over the life of the project, which would be used by USFWS to construct or maintain wildlife waters or forage enhancement plots within the range of the Sonoran pronghorn.

Recently, USFWS stated the agency was unaware of any confirmed incidental take resulting from any Federal actions across the range of the species (USFWS 2010a), exclusive of capture of pronghorn for management purposes. There has been no documented take arising from CBP activities since 2010, and no take is anticipated. The introduction of exotic species would have an indirect effect on Sonoran pronghorns by reducing the quality of habitat, potentially affecting pronghorn occurrence and abundance through habitat degradation and altered fire regimes. CBP would implement BMPs to avoid these indirect impacts. The CBP environmental SME would identify the maintenance activities occurring in highly sensitive areas or areas that pose an unacceptable risk of transmitting invasive species, and would require implementation of the CBP protocol for cleaning vehicles. In addition, 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. Due to the implementation of BMPs, indirect effects are unlikely to occur. Incidental take of the Sonoran pronghorn is reasonably certain to occur from the continued implementation of the Proposed Action in the form of harassment due to the effects of human disturbance and direct mortality or injury as a result of a collision with CBP (or contract personnel) vehicle. However, as stated in the Biological Opinion this level of anticipated take is not likely to result in jeopardy of the species.

Aquatic Threatened and Endangered Species

Aquatic Threatened and Endangered Plant Species. Short-term, indirect effects on the Canelo Hills ladies' tresses and Huachuca water umbel would be negligible. Potential direct impacts on threatened and endangered aquatic plant species from maintenance and repair activities include direct injury and mortality from trampling or crushing by equipment, alteration of the plant seed bank, and habitat degradation from disturbance of soils. Potential indirect impacts on these species include increased erosion and sedimentation from alterations in hydrology, and increased potential for invasive species and fire. Based on the implementation of BMPs designed to avoid or reduce impacts on these species, these impacts would be extremely unlikely to occur.

To avoid direct effects and habitat degradation from removal of canopy cover, vegetation clearing (i.e., removal of vegetation to maintain line of sight or remove hiding locations from areas where vegetation has not been previously cleared) would not be conducted within suitable or critical habitat of any threatened or endangered plant species. Although most maintenance and repair activities would be conducted within previously disturbed areas, some activities would need to be conducted in areas immediately adjacent to the existing infrastructure footprint. For example, equipment might need to be operated off of existing roads to remove debris for culverts and fences and to otherwise access and maintain infrastructure. To avoid direct and indirect impacts on individual listed plants and their habitats, no ground disturbance would occur outside the existing footprint in known habitat (see **Table 4-1**) or designated critical habitat of Canelo Hills ladies'-tresses and Huachuca water umbel, or within 0.25 miles upstream of critical habitat or other suitable habitat of Canelo Hills ladies' tresses and Huachuca water umbel without further consultation with the USFWS. By avoiding suitable habitat where these protected plants occur, maintenance and repair activities would not harm individual plants, cause habitat degradation, or otherwise directly adversely affect Huachuca water umbel or Cochise pincushion cactus.

Maintenance activities that compact soils and change water infiltration could alter local hydrology by increasing sedimentation and runoff in suitable perennial plant species habitat. BMPs would be implemented to reduce sedimentation and runoff from roads and other infrastructure and minimize other potential indirect effects on this species. For example, cleaning or modification of culverts and other work within drainages that could cause sedimentation or otherwise affect water quality or quantity would not occur within, or within 0.25 miles upstream of, critical habitat or other suitable habitat of aquatic plant species (i.e., Huachuca water umbel and Canelo Hills ladies' tresses) without further consultation with the USFWS. In addition, an SWPPP would be prepared and implemented prior to applicable maintenance activities (i.e., disturbances greater than 1 acre of exposed dirt or as required by the property owner or land manager). BMPs described in the SWPPP to reduce erosion would be implemented. The CBP environmental SME would consider areas with highly erodible soils when planning the maintenance activities and would require the use of measures such as

waddles, aggregate materials, and wetting compounds where appropriate. Tactical infrastructure would be inspected periodically for the presence of erosion, and repair and maintenance would be implemented as necessary.

Recently disturbed soils can have an increased potential for invasive species such as Lehman's lovegrass and Boer lovegrass to become established. These and other invasive species tend to form dense stands that promote higher intensity fires that occur more often (USFWS 2007e). However, coordination with the CBP environmental SME would be conducted to determine if the maintenance activities occur in a highly sensitive area or an area that poses an unacceptable risk of transmitting invasive species. If it is determined that maintenance activities occur in such an area, the CBP cleaning protocol would be followed. In addition, 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.

By implementing BMPs to reduce sedimentation and runoff, and by reducing the potential for invasive species and fire, maintenance and repair activities would have negligible beneficial and adverse, indirect effects on threatened and endangered perennial plant species.

There currently is no tactical infrastructure to be maintained within Huachuca water umbel critical habitat. The Proposed Action would not result in direct, indirect, or cumulative effects that would appreciably diminish the value of PCEs within Huachuca water umbel critical. All activities would be restricted to within and immediately adjacent to the footprint of existing tactical infrastructure within designated critical habitat, and vegetation clearing would not occur in designated critical habitat of Huachuca water umbel.

Desert Pupfish, Gila Chub, Gila Topminnow, Quitobaquito Pupfish, and Sonoran Chub. Short-term, indirect effects on threatened or endangered species of fish would be negligible from activities associated with the vegetation control, near- and in-water maintenance activities, and activities designed to maintain drainage structures and low water crossings (cleaning blocked drainages, resizing and replacement of culverts, repairing or adding riprap, removing debris and trash, and repairing grates). Potential indirect impacts on these species include increased potential for erosion and sedimentation, changes in hydrology from groundwater pumping and water diversion, and the introduction of nonnative invasive species.

Maintenance activities could alter the quality of surface water within and downstream of maintenance areas. However, impacts on water quality would be localized and temporary, and BMPs would be implemented to reduce sedimentation and runoff from roads and other infrastructure and minimize other potential indirect effects on these species. Clearing of riparian vegetation would not occur within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation. In addition, cleaning or modification of culverts and other work within drainages that could cause sedimentation or otherwise affect water quality or quantity would not occur within, or within 0.25 miles upstream of, critical habitat or other suitable habitat without further consultation with the USFWS. General BMPs listed in **Appendix E** to protect water resources also would be implemented.

Introduction of nonnative invasive species can impact threatened and endangered fish species. Contamination of ground and surface waters would be avoided 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. In addition, CBP would 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 nonnative invasive species or disease vectors based on the best available information provided by USFWS. CBP also would 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 would be used when within one mile of such habitats.

Within the region of analysis, critical habitat for the Gila chub is designated in two tributaries of the Babocomari River, O'Donnel Creek, and Turkey Creek (70 FR 66664–66721), which are about 13 and 17 miles north of the international border, respectively. There currently is no tactical infrastructure to be maintained within these critical habitat units. These units are primarily on Coronado National Forest, but also on private land and land managed by the BLM.

Quitobaquito Springs and a 100-foot buffer around that spring were designated as critical habitat for the desert pupfish in 1986. At that time, the Quitobaquito pupfish was considered a subspecies of the desert pupfish. There currently is no tactical infrastructure to be maintained within this critical habitat unit, although CBP does need to maintain the access road to Quitobaquito Springs.

All critical habitat for the Sonora chub occurs within the project area, including portions of Sycamore Creek, an unnamed tributary, Penasco Creek, and Yank's Spring. This habitat is entirely within Coronado National Forest. There currently is no tactical infrastructure to be maintained within these critical habitat units.

Maintenance and repair activities would not result in direct, indirect, or cumulative effects that would appreciably diminish the value of constituent elements within critical habitat of these fishes. All activities would occur within and immediately adjacent to the footprint of existing tactical infrastructure, and BMPs designed to avoid impacts on critical habitat of this species would be implemented. For example, no in-water work would occur within designated critical habitat without further consultation with the USFWS, riparian vegetation within 100 feet of aquatic habitat would not be cleared, and use of herbicides within critical habitat would not occur without approval from the USFWS. In addition, clearing would not occur in suitable habitat within designated critical habitat without further consultation with the USFWS.

Chiricahua Leopard Frog and Sonoran Tiger Salamander. Short-term, direct and indirect effects on Chiricahua leopard frogs would be negligible to minor. Potential direct impacts on these species include habitat degradation and the risk of direct injury or mortality from maintenance activities. Potential indirect impacts include increased sedimentation, introduction of nonnative invasive species, and the spread of the fungal disease chytridiomycosis. Based on the implementation of BMPs designed to avoid or reduce impacts on Chiricahua leopard frogs and Sonoran tiger salamanders, these impacts would be unlikely to occur.

Maintenance of roads, culverts, and low water points would occur within or immediately adjacent to existing tactical infrastructure. To avoid affecting habitat for these species, maintenance and repair activities would be designed and implemented so that the hydrology of streams, ponds, and other habitat is not altered. By conducting in-water maintenance and repair

streams, ponds, and other habitat is not altered. By conducting in-water maintenance and repair activities and ensuring that the hydrology of their habitat is not altered, maintenance and repair work would have negligible to minor, direct adverse effects on the habitat of Chiricahua leopard frogs and Sonoran tiger salamanders.

Direct injury, mortality, or behavioral changes could occur if adult Chiricahua leopard frogs or Sonoran tiger salamanders disperse into areas being maintained or repaired. To minimize the possibility that individuals of these species are harmed, in-water work within Chiricahua leopard frog critical habitat would be conducted during the active season (May through September) so that frogs can escape to the best of their ability. A qualified biologist would monitor ground-disturbing maintenance activities and use of heavy equipment to be conducted in vegetated or undisturbed areas. For Chiricahua leopard frogs, monitoring will occur prior to and during activities located within 1 mile overland of critical habitat, 3 miles downstream of that habitat along ephemeral drainages, and 5 miles downstream of that habitat along perennial streams. If a frog is found in the project area and is in danger of being harmed, work will cease in the area of the frog until either the qualified biological monitor can safely move the individual to a nearby location or the frog moves away on its own.

To minimize the possibility that Sonoran tiger salamanders are harmed, in-water work within the range of this species would occur during period of low or no flow A qualified biologist would monitor all ground-disturbing maintenance activities and use of heavy equipment that occurs within 0.1 mile of Sonoran tiger salamander suitable habitat (i.e., cattle ponds and tanks with standing water). This monitoring would occur for all maintenance and repair activities to be conducted in vegetated or undisturbed areas. If a Sonoran tiger salamander is observed, the monitor will photograph the dorsal side of the salamander if possible without handling the salamander, record the geographic coordinates of its location, and report the location to the Arizona Ecological Services Office of the USFWS within 72 hours. If a salamander is found in the project area and is in danger of being harmed, work would cease in the area of the species until either the qualified biological monitor can safely move the individual to a nearby location or the salamander moves away on its own.

The BMPs aimed at avoiding harm to Chiricahua leopard frog and Sonoran tiger salamanders could conflict. As such, in areas where there is overlap between Sonoran tiger salamander and Chiricahua leopard frog ranges, CBP will implement BMPs for the proposed activity based on the species most likely to occur in the area and the potential for effects on either species.

Conducting work during periods of low flow and monitoring for the presence of these species during maintenance activities would reduce, but not eliminate, the possibility that Chiricahua leopard frogs or Sonoran tiger salamanders would be harmed during maintenance and repair activities. In areas where maintenance and repair activities took place the previous year within 0.3 miles of the known occupied habitat for Sonoran tiger salamander and Chiricahua leopard frog, CBP would conduct one additional monitoring visit (by a permitted biologist) following the first significant rainfall event of the monsoon season to determine the effectiveness of BMPs implemented.

Predation by nonnative species including catfish (*Ictalurus* spp.), American bullfrogs (*Lithobates catesbeianus*), and others has been identified as one of the primary threats to the Chiricahua

leopard frog. In addition, population declines and extirpation of amphibian populations associated with chytridiomycosis has been documented in Arizona (USFWS 2007d). Maintenance activities that occur in areas where nonnative invasive species and chytridiomycosis are known to occur can provide a catalyst for the spread and introduction of these into sensitive, less-disturbed areas. However, if maintenance activities occur in a highly sensitive area or an area that poses an unacceptable risk of transmitting diseases and invasive species, the CBP protocol for cleaning vehicles and equipment would be implemented. In addition, disease prevention protocols would be employed if the project is in areas known or likely to harbor chytridiomycosis. In such cases, if vehicle and equipment use would occur in more than one frog habitat, all equipment would be cleaned and dried or disinfected before it is moved to another habitat.

Maintenance activities could alter the quality of surface water within the maintenance area and downstream. However, impacts on water quality would be localized and temporary and BMPs would be implemented to reduce sedimentation and runoff from roads and other infrastructure and minimize other potential indirect effects on this species. Clearing of riparian vegetation would not occur within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation and would not occur without approval from the USFWS. To minimize impacts from habitat degradation due to sedimentation and effects on water quality and quantity, a site-specific SWPPP and a spill protection plan would be prepared and regulatory approval would be sought as required by regulations for maintenance and repair activities that could result in sedimentation and that occur within 0.3 miles of suitable habitat. General BMPs listed in **Appendix E** to protect water resources would also be implemented.

By implementing BMPs to reduce sedimentation and other indirect effects on amphibian habitat, avoiding the spread of nonnative invasive species and the fungal disease chytridiomycosis, and conducting a regularly scheduled inspection and maintenance program, and the implementation of conservation measure, the potential for adverse indirect effects on Chiricahua leopard frogs and Sonoran tiger salamanders would be temporary and minor. Incidental take of Chiricahua leopard frog and Sonoran tiger salamander is reasonably certain to occur from implementation of the Proposed Action. There is some potential for take of individual Chiricahua leopard frogs of various life stages (frogs, tadpoles, and eggs) in the form of harm resulting from the increased flow of sediment into occupied habitat due to proposed activities conducted within or upstream of aquatic habitat. For example, individuals could be harmed through changes in the water chemistry, or as a result of heavy sediment deposits covering eggs, tadpoles, and clogging gills. Take of Chiricahua leopard frogs could also occur through direct mortality or harm from trampling (human or machine), and harm or harassment through habitat modification (e.g., as a result of maintenance and repair along roads and/or the transmittal of disease). Incidental take of Sonoran tiger salamander is anticipated as a result of increased flow of sediment into occupied habitats. Implementation BMPs and conservation measures will effectively reduce the potential for take, there is some potential for take to occur if measures to reduce sedimentation are not effective.

Critical habitat for the Chiricahua leopard frog has been designated for 39 units, 12 of which are within the project area. Each unit includes one to several tanks, springs, ponds, or other aquatic habitat and many also include dispersal habitat such as perennial, ephemeral, or intermittent drainages. Proposed critical habitat extends for 20 feet beyond the high water line or boundary

of the riparian and upland vegetation of each pond, tank, or spring, and also extends 328 feet upstream of that aquatic habitat. Proposed critical habitat also extends 328 feet on either side of most drainages included as dispersal or other habitat.

Maintenance and repair activities would not result in direct, indirect, or cumulative effects that would appreciably diminish the value of PCEs within these proposed critical habitat units or any other Chiricahua leopard frog habitat that could be designated as critical. Most activities within critical habitat would occur within and immediately adjacent to the footprint of existing tactical infrastructure, and BMPs designed to avoid impacts on critical habitat of this species would be implemented. For example, any in-water work (e.g., clearing, repairing, and replacing culverts) within critical or other suitable habitat of these species would occur during periods of low or no flow. In addition, that work would be designed and implemented so that the hydrology of streams, ponds, and other habitat is not altered. Riparian vegetation within 100 feet of critical habitat would not be cleared, use of herbicides within critical habitat would not occur without approval from the USFWS, and clearing of vegetation would not occur in critical habitat without further consultation with USFWS. Use of herbicides within critical habitat would not be allowed unless approved by the USFWS. Thus, maintenance and repair activities would not be likely to adversely affect designated Chiricahua leopard frog habitat.

3.6.3.2 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 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. Therefore, maintenance and repair of tactical infrastructure would be performed only on resources in disrepair. The lack of coordinated environmental staff support and formalized planning under this alternative would result in inefficiencies complying with NEPA, the ESA, and other environmental requirements. Implementation of this alternative would result in impacts on threatened and endangered species, including conversion and degradation of habitat from vegetation removal, 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.

By completing maintenance and repair work on an as-needed basis, the potential exists for increased impacts on threatened and endangered species. Without a centralized planning process, maintenance and repair specifications would not be established and standardized BMPs might not be implemented. For example, without a standardized BMP requiring that the footprint of the maintenance area be flagged or marked, habitat for threatened and endangered species immediately adjacent to the maintenance footprint could be impacted if maintenance activities go 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 Sonoran tiger salamander. For example, it might not allow the implementation of BMPs that require scheduling preventative maintenance during periods of low or no flow when some aquatic species are less vulnerable. Thus, some threatened and endangered species and 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, because the potential for habitat disturbances would be greater due to a lack of a proactive approach to maintenance and repair.

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. The region of analysis spans the length of the U.S./Mexico international border within Arizona, and encompasses two ecoregions. The first is the Sonoran Basin and Range Ecoregion, which is typified by hot, arid conditions, and two rainy seasons per year, with an average annual precipitation of 0 to 10 inches with 0 to 0.2 inches of runoff. Average annual evaporation is as much as 140 inches in this area (USEPA 2007, USGS 1995a). The other ecoregion is the Madrean Archipelago Ecoregion, also known as the Sky Islands (USEPA 2007, USGS 2010a), in southeastern Arizona. This area has dramatic gradients in topography, temperature, and precipitation, ranging from hot, semiarid plains at lower elevations, to a cool, wet, climate at higher elevations. The Madrean Archipelago Ecoregion also has a biannual precipitation regime, characterized by winter rainfall and summer thunderstorms (USGS 2010a). It is influenced by monsoons from the south, with 10 to 20 inches of rainfall a year, and average annual evaporation rates of approximately 80 to 110 inches with 0.2 to 5 inches of runoff (USGS 1995a, Griffith et al. 2006).

Groundwater. All aquifers in the region of analysis are classified as basin and range aquifers (USGS 1995a, USGS 1995b). Aquifer recharge primarily occurs from precipitation in the surrounding mountains, but also can occur through percolation from irrigation, reservoirs, and canals. Discharge from the aquifers typically occurs from evaporation to streams or springs and well withdrawals.

Groundwater withdrawal from wells is the largest method of discharge from basin and range aquifers. Approximately half of the water withdrawn is lost to the atmosphere by evapotranspiration; the other half percolates through the soil and eventually recharges the aquifer. In some of the more urban and developed basins in Arizona, the rate of withdrawal is about 200 times the rate of recharge, and in some areas of large water level declines, land subsidence, and earth fissures have resulted. Land subsidence from compaction of the unconsolidated sediments in the aquifers ranges from 1 foot in most of the state to up to 15 feet in the more developed areas (USGS 1995a).

The largest groundwater basins associated with this portion of the region of analysis are the Lower Gila Basin, the Tucson Active Management Area (AMA), and the Safford Basin. The Lower Gila Basin is in southwestern Arizona, and covers approximately 7,309 mi^2. It contains five large reservoirs, the largest being the Imperial Reservoir, and two rivers, the Gila and the Colorado. The largest source of natural recharge is runoff and the Gila River floodplain. Water quality in this basin is generally poor; 250 of the wells have exceeded drinking water standards, primarily from excess fluoride. Other commonly exceeded parameters are arsenic, cadmium, lead, nitrates, selenium, and total dissolved solids. Water use is generally for irrigation, with some industrial and municipal use as well. There are eight wastewater treatment facilities in the basin (ADWR 2010a).

The Tucson AMA is 3,869 mi^2 with two large reservoirs and numerous streams and springs. Primary recharge of the aquifer is from groundwater inflow, infiltration of runoff into stream channels, and recharge from precipitation in the mountains. Drinking water standards exceeded parameters for arsenic, lead, nitrates, fluoride, beryllium, cadmium, organics, mercury, copper, chromium, zinc, total dissolved solids, radionucleotides, and selenium at 356 sites from wells, springs, and mines. Municipal water is the greatest use of groundwater in the Tucson AMA, followed by industrial and agricultural demand. There are 25 wastewater treatment facilities in the area (ADWR 2010b).

The Safford Basin is approximately 4,747 mi^2 with 12 large reservoirs and numerous springs and streams, including the Gila, Blue, and San Carlos rivers. Water quality testing at 114 well, mine, and spring sites yielded results that exceeded drinking water standards for parameters such as fluoride, arsenic, total dissolved solids, nitrates, and lead. The groundwater demand for Safford Basin is almost exclusively agricultural. There are 13 wastewater treatment facilities in this basin, at least one of which recharges the aquifer through an unlined impoundment (ADWR 2010c).

3.7.3 Environmental Consequences

A proposed action could 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

Short-term, negligible to minor, indirect, adverse impacts could occur on groundwater and hydrology from vegetation and debris removal, which could cause the deposition of fill materials or increased erosion into groundwater recharge areas. During maintenance and repair USBP sector personnel and contract-support personnel well-versed in grading techniques would be employed. 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 groundwater or hydrology would be expected from maintenance and repair of existing FC-1 and FC-2 roads if standard BMPs, such as spill prevention measures, erosion and sediment controls, and proper equipment maintenance are implemented. Maintenance and repair of FC-3, FC-4, and FC-5 roads could lead to short-term, negligible to minor, adverse impacts on hydrology and groundwater during maintenance and repair activities, such as grading and other ground-disturbing activities, that would result in erosion and sedimentation. Water required for the activities would be trucked in from approved, offsite sources. In addition, maintenance and repair of FC-4 roads could require the removal of vegetation and rock, which could alter the flow of water and percolation of rain water into the ground, resulting in a long-term, negligible to minor, adverse impact on groundwater recharge. Any maintenance and repair to FC-4 roads would not lead to a change in the characteristics of the road.

Long-term, minor beneficial impacts on groundwater and hydrology would occur through properly maintained roads, which would reduce the effects incurred from negligence, such as washout and long-term sedimentation.

Rutting can occur along graded earth and sand roads and rutting 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. Maintenance and repair of the existing roads would have short- and long-term, minor to moderate, beneficial impacts on hydrology and 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 quite 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. 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 road tactical infrastructure 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 (see **Appendix E**). 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 and hydrology 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-intensive approach first and only progresses in intensity if necessary. Implementation of BMPs to maintain runoff on site during maintenance and repair activities would minimize potential for adverse effects on downstream water quality.

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 occur. 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. 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 enacted, 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 areawide waste treatment management planning processes 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 2010c).

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 2001a). 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 2001b).

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

There is one regional watershed in southern Arizona, the Lower Colorado watershed. This large watershed is divided into several subwatersheds, six of which are in the region of analysis. From west to east, they are the Lower Colorado, Lower Gila, Sonora, Middle Gila, Upper Gila, and the Rio de Bavispe subwatersheds (USGS 2010b).

Lower Colorado River Watershed and Lower Gila Watershed

The Lower Colorado River and the Lower Gila watershed are evaluated as a single unit by the ADEQ (ADEQ 2009). The major surface waters are the Colorado and the Gila rivers. The Colorado-Lower Gila watershed covers approximately 14,460 mi^2, and is sparsely populated with the exception of a few urban areas along the Colorado River. Much of the land area is in Federal ownership, in the form of military bases and wildlife refuges. The remaining private and tribal land is used primarily for agriculture and grazing. In total, the watershed has approximately 450 miles of perennial streams, 145 miles of intermittent streams, 14,000 miles of ephemeral streams, and almost 37,000 acres of lakes (ADEQ 2009).

Colorado River. The Colorado River is the major water resource in the southwestern United States. There are numerous dams along the river, including the Hoover, Parker, and Davis dams, which are used to generate hydroelectric power, deliver irrigation and drinking water, and perform flood control functions (USBR 2009). The lower portion of the river (below Hoover Dam) is generally considered to be in good health, with no segments on the USEPA 303(d) list; however, it is on the Arizona state impaired waters list for selenium and low dissolved oxygen (USEPA 2010d).

Gila River. For simplicity, the water quality issues of the entire Gila River are included in the following discussion, although there are separate watersheds for the upper, middle, and lower reaches. The Gila River originates in New Mexico and flows west across Arizona until it reaches the Colorado River. There are numerous dams and reservoirs on the river. Most of the Lower Gila River is ephemeral, and flows only during precipitation events and upstream dam releases. Flow during dry conditions in some reaches of the river is primarily from wastewater effluent and irrigation return (ADEQ 2009). The Middle Gila River is on the USEPA 303(d) list for DDT metabolites, toxaphene, and chlordane, while the Upper Gila River is listed for suspended sediments. The Lower Gila River is on the Arizona state impaired waters list for selenium and boron, the Middle Gila for sediments and boron, and the Upper Gila for suspended sediments, *E.coli*, and selenium (USEPA 2010d).

Other surface waters. Hunter's Hole, a series of interconnected ponds along the Lower Colorado River, has exceeded acceptable levels of selenium in the past. Painted Rock Borrow Pit Lake, associated with Painted Rock Reservoir off the Gila River, is listed as impaired for dissolved oxygen (CRWQCB 2007).

Sonora Watershed

The Sonora watershed is divided into three subwatersheds in the region of analysis, the Rio Sonyata, the Rio de la Conception, and the Rio de Bavispe (USGS 2010b).

Middle Gila Watershed

The Middle Gila watershed is divided into two subwatersheds in the region of analysis, the Santa Cruz and the San Pedro-Willcox (USGS 2010b). As water quality data are most readily obtainable from the ADEQ, the state watershed divisions (Santa Cruz and San Pedro) will be used for the discussion of this area.

Santa Cruz Watershed

The Santa Cruz watershed is approximately 11,100 mi^2. Tribal lands account for approximately 40 percent of the watershed, with another 40 percent owned by the state and Federal government, and 20 percent in private ownership. The major land use is grazing, and there are active and abandoned mines throughout the area (ADEQ 2009). Approximately 85 miles of perennial streams, 550 miles of intermittent streams, and 11,040 miles of ephemeral streams are in the Santa Cruz watershed, along with 10,889 acres of perennial lakes and 11,119 acres of nonperennial lakes (ADEQ 2009). The major river of this watershed is the Santa Cruz River.

Santa Cruz River. The Santa Cruz River begins in Arizona, flows south into Mexico for approximately 25 miles, and then returns into Arizona, where it discharges into the Gila River (USEPA 2010e). Much of the river has good water quality, but sections downstream of the Mexican border are on the USEPA 303(d) impaired waters list for *E.coli* (USEPA 2010e), and exceedances of dissolved oxygen, pH, chlorine, and mercury have been measured (ADEQ 2009).

Other Surface Waters. Alum Gulch, Three R Canyon, and Cox Gulch, which are all streams in the Santa Cruz watershed, are on the USEPA 303(d) list as impaired for cadmium, copper, zinc, and pH. In addition, Nogales Wash is listed as impaired for ammonia, chlorine, copper, and *E.coli*, and Sonoita Creek is on the 303(d) list for zinc (USEPA 2010e, ADEQ 2009).

San Pedro Watershed

The San Pedro watershed includes 7,015 mi^2 in Arizona, with a very small area in the extreme southwestern corner of New Mexico. There are historic copper, silver, and gold mines in the area, but most are inactive. Approximately 60 percent of the land is owned by the Federal and state government, and the rest is privately owned. There are 195 miles of perennial streams, 665 miles of intermittent streams, and 6,610 miles of ephemeral streams in this watershed. There are also 1,319 acres of perennial lakes and almost 30,000 acres of nonperennial lakes in the area. The major surface waters in the San Pedro watershed within the region of analysis include the San Pedro River and the Whitewater Draw (ADEQ 2009).

San Pedro River. The San Pedro River begins in Mexico and flows north, where it enters the Gila River. Some sections of the San Pedro River are on the USEPA 303(d) impaired waters list for *E.coli* and nitrate, and are on the state impaired waters list for selenium. Other common historic and current exceedances in the San Pedro River include chromium, arsenic, lead, mercury, dissolved oxygen, copper, manganese, and suspended sediments (ADEQ 2009).

Whitewater Draw. Whitewater Draw is in extreme southeastern Arizona, and is a key component to the Whitewater Draw Wildlife Area, managed by the State of Arizona. Much of the area was converted to agriculture but restoration projects are ongoing (AGFD 2010). Whitewater Draw is a major drainage in Arizona and a tributary to the Rio de Bavispe in Mexico. No sections of the draw are listed as impaired by the USEPA (USEPA 2010d, ADEQ 2009).

Other surface waters. Two small streams in the San Pedro watershed are on the USEPA 303(d) impaired waters list. Brewery Gulch is listed as impaired for copper, with additional exceedances of lead and pH levels. Mule Gulch is impaired for pH, copper, zinc, and cadmium, and exceedances for lead have also been measured. Numerous other small streams and creeks in the watershed have excessive amounts of copper, pH, lead, mercury, and low dissolved oxygen levels, but are not currently on the 303(d) list (ADEQ 2009).

Upper Gila Watershed

The Upper Gila watershed covers 15,100 mi^2 of New Mexico and Arizona (USGS 2010b) and is considered a sparsely populated agricultural area. Other land uses include grazing, recreation, and forestry lands. In the Arizona portion of the watershed, there are approximately 550 miles of perennial streams, 1,020 miles of intermittent streams, and 10,100 miles of ephemeral streams, with 11,812 acres of perennial lakes (ADEQ 2009). The Upper Gila watershed is divided into several subwatersheds, with only the San Simon watershed in the Arizona portion of the region of analysis. It is approximately 2,230 mi^2 (USGS 2010b) with the major surface water being the San Simon River.

San Simon River. The San Simon River is a major tributary to the Gila River. It has no segments on the USEPA 303(d) list (USEPA 2010e), but a significant amount of the silt load entering the impaired Upper Gila River is attributed to this stream (Brandau et al. 2005).

Other surface waters. There are no additional waters on the USEPA 303(d) list for this watershed, but portions of Cave Creek, a major tributary to the San Simon River, are considered impaired by the state due to high selenium levels. Dankworth Pond and Roper Lake are two small systems in the watershed that are considered naturally impaired by low dissolved oxygen as a result of groundwater upwelling (NRCS 2007).

Rio de Bavispe Watershed

The Rio de Bavispe Watershed drains south and extends into New Mexico and Mexico. Black Draw, and further upstream at Whitewater Draw, are tributaries to the Rio de Bavispe in Mexico. The Rio de Bavispe joins the Rio Yaqui, which discharges into the Gulf of California.

Black Draw. Black Draw, also known as the San Bernardino Creek, is an intermittent stream in the southeastern corner of Arizona in Chochise County (ADWR 2011). Black Draw contains the lowest elevation within the San Bernardino Valley Basin where Black Draw exits the basin. No water quality exceedances exist for this stream (ADWR 2010d).

3.8.2.2 Wetlands

Arizona has an arid climate, and less than one percent of the land area contains wetlands. Numerous streams and wetlands throughout the state have been modified or drained, resulting in the loss of more than one-third of the original wetlands. The arid conditions and seasonally varying precipitation significantly influence wetland formation and distribution in the state (USGS 1996).

The most extensive wetlands are in riparian zones. Palustrine (marsh-like) forested riparian ecosystems associated with the Lower Colorado, Lower Gila, Santa Cruz, and San Pedro rivers are the most common wetlands found in the region of analysis. Playa lakes are another wetland type in the region, predominately in southeastern Arizona. Playa lakes are seasonally flooded depressions in alkali flats, and are considered lacustrine (lake-like) habitats. Numerous springs and seeps are also found in the region of analysis, particularly along the major rivers. Cienegas are wet flats or valleys that are formed by multiple springs, and are found in the southeastern and south-central regions. Cienegas can be palustrine forested (dominated by woody vegetation) or palustrine emergent (contains small plants that grow up and out of the water). Palustrine habitats are small permanent or intermittent water bodies that are less than 20 acres in size, which can include marshes, swamps, bogs and fens Arroyos and palm oases are also found in the area (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 and debris removal, and bridge repair, 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, waters, 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 (see **Appendix E**).

USBP sector personnel and contract-support personnel well-versed in grading techniques would be employed for such activity. It is proposed that any fill 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.

Pertinent Federal, state, and local permits would be obtained for any work, including work that could occur in jurisdictional drainages, waterways, or wetlands. CBP is consulting with the USACE Los Angeles District to minimize wetland impacts and identify potential avoidance,

minimization, and conservation measures. Maintenance and repair of the existing roads 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 the towers.

No impacts on surface water resources would be expected from routine repair and maintenance of existing FC-1 and FC-2 roads if standard BMPs are implemented and any necessary local, state, or Federal permitting requirements are met. Maintenance of FC-3, FC-4, and FC-5 roads would minimize erosion and deposition of potentially contaminated road material (e.g., oils, metals) into wetlands, surface waters, washes, 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 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.

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.

All necessary erosion-control BMPs would be adopted to ensure stabilization of the project areas. Implementation of BMPs to maintain runoff on site during maintenance and repair activities would minimize potential for adverse effects on downstream water quality. Pertinent Federal, state, and local permits would be obtained for any work, including work that might occur in jurisdictional drainages, waterways, or wetlands.

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, washes, and other water-related features. Blocked drainage structures could increase flood risk. In addition, all BMPs might not 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, 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

Some of the water bodies in the region of analysis that are listed as having a 100-year floodplain include the Colorado River, Gila River, Cuerda de Lena, San Simon Wash, Menagers Lake, Vamon Wash, Aguirre Lake, the Santa Cruz River, Whitewater Draw, and Silver Creek (FEMA 2010).

3.9.3 Environmental Consequences

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

3.9.3.1 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 management 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, or towers, would be expected. USBP sector personnel and contract-support personnel well-versed in grading techniques would be employed for such activity. The addition of fill material to these ramps to achieve the proposed objective would be kept to a minimum. 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 and FC-2 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 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. Maintenance and repair of FC-3 and FC-4 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. Improper maintenance could result in increased erosion or introduction of fill material into the floodplain area. A poorly regraded surface could result in rapid deterioration of the surface. 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 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. Improper maintenance could result in short- to long-term, negligible to minor, direct and indirect, adverse impacts on floodplains by increasing erosion and adding fill materials 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 improperly sized culverts would have long-term, minor, direct, adverse impacts on floodplains by restricting flow; whereas replacing improperly 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. Any maintenance and repair to FC-4 roads would not change the overall characteristics of the road.

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. 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). 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. 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 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 negligible impacts on floodplains to the maximum extent practical. CBP is consulting with the USACE Los Angeles District 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.

Implementation of BMPs to maintain runoff on site during maintenance and repair activities would minimize potential for adverse effects on downstream water quality. Pertinent Federal, state, and local permits would be obtained for work that might occur in floodplains.

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 of not only 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.

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) measured as either volatile organic compounds (VOCs) or total nitrogen oxides (NO_x), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur oxides (SO_x), 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. **Table 3-5** presents the USEPA NAAQS.

Federal Prevention of Significant Deterioration (PSD) regulations apply in attainment areas to a major stationary source (i.e., source with the potential to emit 250 tons per year [tpy] of any criteria pollutant), and a significant modification to a major stationary source (i.e., change that adds 15 to 40 tpy to the facility's potential to emit depending on the pollutant). PSD regulations can also apply to stationary sources if (1) a proposed project is within 10 kilometers of national parks or wilderness areas, i.e. Class I Areas, and (2) 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]).

Table 3-5. 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	Quarterly average	1.5 µg/m^3	Same as Primary
	Rolling 3-Month Average	0.15 µg/m^3 (2)	Same as Primary
NO_2	Annual Arithmetic Mean	53 ppb (3)	Same as Primary
	1-hour	100 ppb (4)	None
PM_{10}	Annual Arithmetic Mean	--	Same as Primary
	24-hour (5)	150 µg/m^3	Same as Primary
$PM_{2.5}$	Annual Arithmetic Mean (6)	15 µg/m^3	Same as Primary
	24-hour (7)	35 µg/m^3	Same as Primary
O_3	8-hour (8)	0.075 ppm (2008 Standard)	Same as Primary
	8-hour (9)	0.08 ppm (1997 Standard)	Same as Primary
	1-hour (10)	0.12 ppm	Same as Primary
SO_2	Annual Arithmetic Mean	0.03 ppm	0.5 ppm (3-hour) (1)
	24-hour (1)	0.14 ppm	0.5 ppm (3-hour) (1)
	1-hour	75 ppb (11)	None

Source: USEPA 2010f

Notes: Parenthetical values are approximate equivalent concentrations.

1. Not to be exceeded more than once per year.
2. Final rule signed 15 October 2008.
3. 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.
4. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective 22 January 2010).
5. Not to be exceeded more than once per year on average over 3 years.
6. To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
7. To attain this standard, the 3-year average of the weighted annual of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006).
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).
9. a. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
   b. The 1997 standard – and the implementation rules for that standard – will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
   c. USEPA is in the process of reconsidering these standards (set in March 2008).
10. a. USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard (anti-backsliding).
    b. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
11. Final rule signed on June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Key: ppm = parts per million; ppb = parts per billion; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter,

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source has the potential to emit more than 100 tpy of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs. 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 defines the sources and kinds of HAPs.

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 natural processes and human activities include CO_2, methane, and nitrous oxide. GHGs are mainly produced by the burning of fossil fuels and through industrial and biological processes. On September 22, 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 first emissions report is due in 2011 for 2010 emissions. GHG emissions will also be factors in PSD and Title V permitting and reporting, according to a USEPA rulemaking issued on June 3, 2010 (75 FR 31514). GHG emissions thresholds of significance for stationary sources are 75,000 tons CO_2 equivalent per year and 100,000 tons CO_2 equivalent per year under these permit programs.

3.10.2 Affected Environment

Table 3-6 shows the county, air quality control region (AQCR), and attainment status for counties along the U.S./Mexico international border in Arizona. All sectors are described in further detail on the following pages.

Table 3-6. Tactical Infrastructure Maintenance and Repair Air Quality Control Regions and Attainment Status in Arizona

County	AQCR	Attainment Status
Pima, Santa Cruz, and Cochise	Pima Intrastate Southeast Arizona Intrastate	Moderate nonattainment for PM_{10} Moderate nonattainment for PM_{10} and $PM_{2.5}$ (P) Attainment/unclassified for all other criteria pollutants
Yuma	Mojave-Yuma Intrastate	Serious nonattainment for PM_{10} Nonattainment for $PM_{2.5}$ (P) Nonattainment for CO (P) Attainment/unclassified for all other criteria pollutants

Source: USEPA 2010g
Key: (P) = Portion of the county

The ADEQ oversees the implementation of the Federal CAA in the State of Arizona. Yuma County, Arizona, is within the Mojave-Yuma Intrastate AQCR (MYIAQCR) (40 CFR 81.268). A portion of Yuma County has been characterized by the USEPA as a Federal unclassified nonattainment area for CO, and a Federal moderate nonattainment area for PM_{10}. The

MYIAQCR has been characterized as unclassified/attainment for all other criteria pollutants (USEPA 2010g).

Pima County, Arizona, is within the Pima Intrastate AQCR (PIAQCR) (40 CFR 81.269). The air quality in the PIAQCR, including Pima County, has been characterized by the USEPA as a Federal moderate nonattainment area for PM_{10}, and as unclassified/attainment for all other criteria pollutants (USEPA 2010g).

Santa Cruz and Cochise counties, Arizona, are within the Southeast Arizona Intrastate AQCR (SEAIAQCR) (40 CFR 81.272). A portion of Santa Cruz and Cochise counties has been characterized by the USEPA as a Federal moderate nonattainment area for PM_{10} and $PM_{2.5}$. The SEAIAQCR has been characterized as unclassified/attainment for all other criteria pollutants (USEPA 2010g).

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 State Implementation Plan (SIP) or permit limitations/requirements
- Emissions representing an increase of 100 tpy for any attainment criteria pollutant (NO_x, VOCs, CO, PM_{10}, $PM_{2.5}$, sulfur dioxide [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 substantially affect air quality. **Table 3-7** presents these thresholds, by regulated pollutant. As shown in **Table 3-7**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

Table 3-7. Conformity *de minimis* Emissions Thresholds

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

The Proposed Action would only generate temporary air pollutant emissions as a result of grading, filling, compacting, and other maintenance and repair activities. These emissions 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 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 maintenance and repair equipment and particulate matter emissions as fugitive dust from ground-disturbing activities. Emissions of all criteria pollutants would result from maintenance and repair activities including combustion of fuels from on-road haul trucks transporting materials and employee 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. 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.

Arizona 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 necessary 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 number of miles of roads maintained and repaired by CBP within Arizona could change over time to accommodate CBP needs (e.g., illegal border activity has 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 analyzed in this EA would require other routine maintenance and repair activities such as vegetative management, soil stabilization measures, filling potholes, and minor repairs. **Table 3-8** describes the approximate mileage and acreage that would be graded 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. 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. Future actions would require separate NEPA analysis. A detailed description of air quality impacts in Arizona is described in the following paragraphs.

Table 3-8. Approximate Tactical Infrastructure Maintenance and Repair Area That Would Be Graded By Sector in Arizona

Sector	Approximate Mileage Under Consideration in this EA	Mileage Included in Air Quality Analysis	Area Included in Air Quality Analysis (acres)
Tucson	645	129	313
Yuma	55	11	27
Total	**700**	**140**	**340**

Assumptions:

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.

Area of land disturbance considered in this air quality analysis assumes the width of disturbance would be 20 feet multiplied by the length.

Notes:

Yuma Sector Example: Mileage Included in Air Quality Analysis (11) x 5,280 feet/mile x 20 feet wide / 43,560 ft^2/acre = 27 acres.

A road (less than 5.6 miles in length) associated with the El Paso sector extends from New Mexico into Arizona.

Pima County has been characterized by the USEPA as a Federal moderate nonattainment area for PM_{10}, and as unclassified/attainment for all other criteria pollutants (USEPA 2010g). Santa Cruz and Cochise counties have been characterized by the USEPA as a Federal moderate nonattainment area for PM_{10} (portion) and $PM_{2.5}$ (portion), and as unclassified/attainment for all other criteria pollutants (USEPA 2010g). Yuma County has been characterized by the USEPA as a Federal unclassified nonattainment area for CO (portion), Federal moderate nonattainment area for PM_{10} (portion), and as unclassified/attainment for all other criteria pollutants (USEPA 2010g). General Conformity Rule requirements are applicable to those activities not qualifying for exemption. The Proposed Action would generate emissions well below *de minimis* levels with the exception of fugitive dust (PM_{10}). PM_{10} emissions generated by the Proposed Action with BMPs in place have been estimated to be approximately 387 tpy (see **Appendix G**). Although emissions are estimated to be above the 100 tpy threshold, all emissions would be short-term. In addition, activities planned would qualify for exemption under the General Conformity Rule.

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 Arizona 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 (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Noise Metrics and Regulations. Although human response to noise varies, measurements can be calculated with instruments that record instantaneous sound levels in decibels. 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 3-9** 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 3-9. 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.

Maintenance and Repair 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 3-10** lists noise levels associated with common types of maintenance and repair equipment.

Table 3-10. Predicted Noise Levels for Maintenance and Repair Equipment

Potential Maintenance and Repair 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 U.S./Mexico international border in Arizona is characterized by desert and mountain landscapes. Property uses include public lands, national forest, national monuments, wildlife refuges, Native American reservations, and farm/ranch land. The region of analysis contains both urban/mixed use areas and rural/undeveloped areas. The areas 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 within the region of analysis include the City of Yuma, Gadsden, San Luis, Sells, Nogales, Naco, and Douglas.

In addition to vehicle and industry noise, natural sources of noise also occur within the region of analysis. In Arizona, most natural noise occurs from dusk until dawn. Many animals in the desert are dormant during the day due to extreme temperatures, and several nocturnal species are present (see **Sections 3.5** and **3.6** for a discussion on wildlife and threatened and endangered species). Furthermore, birds are most active just before dawn and as the sun is setting. Weather-related noise is another source of natural noise, such as thunder during the monsoon season (July through September). High winds also cause natural noise.

The areas south of the region of analysis in Mexico include the cities of San Luis Rio Colorado, Sonoita, Heroica Nogales, Naco, and Agua Prieta, which are urban/mixed use areas. Prominent sources of noise in these areas are most likely from vehicle traffic and industry. The closest populations in Mexico are approximately 50 feet from the region of analysis. 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. If visitors travel to areas where infrastructure maintenance and repair is being performed, they would be susceptible to noise intrusion impacts. Examples of expected cumulative maintenance and repair noise during daytime hours at specified distances are shown in **Table 3-11**. These sound levels were predicted at 50, 300, 500, 1,000, and 3,000 feet from the source of the noise.

Table 3-11. 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 3-11**. 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, and in fewer locations along the U.S./Mexico international border in Arizona. 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 effect than those 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. Therefore, short-term impacts on noise from implementing the No Action Alternative would be expected to be greater than the Proposed Action, but long-term impacts would be less than the Proposed Action.

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 ARPA, 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 time when the New World was first inhabited by humans is known as the Paleoindian Period. The earliest well-established occupations in North America are associated with fluted projectile points that date around 10,000 B.C. 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 the Southwest (c. 8500 B.C.–A.D. 200) (Cordell 1984, Fagan 2005). Both of these periods are 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.

In the Southwest, the late prehistoric period is characterized by ceramic production, horticulture or agriculture, and increased sedentism. Archaeologists recognize three major and two minor cultural traditions in the Southwest at this time (Cordell 1984). Three of these traditions extend near or across the U.S./Mexico international border. The Patayan tradition (after A.D. 875) is centered on the Colorado River and extends into southeast California and southwest Arizona. It is characterized by paddle-and-anvil pottery, hunting and floodplain agriculture, and pithouse dwellings. The Hohokam tradition (circa A.D. 400–1500) of south-central Arizona is characterized by paddle-and-anvil pottery, irrigation agriculture, single-unit rectangular dwellings, low-platform mounds, ball courts, and cremations. The Mogollon tradition (250 B.C.–A.D. 1450) extends from southeastern Arizona across southern New Mexico and into the westernmost part of Texas. It is characterized by red and brown scraped-and-polished pottery, equal dependence on hunting and agriculture, round pithouses and then rectangular dwellings, large ceremonial structures formally similar to houses, and inhumation (Fagan 2005). The late prehistoric period (after circa A.D. 900) is marked by the adoption of the bow and arrow and ceramic production.

3.12.2.2 Regional History

The first European expedition into Arizona was led by the Spanish Franciscan Marcos de Niza in 1539. Arizona was thereafter explored during a 1540–42 expedition led by Francisco Vásquez de Coronado. The goal of this famous expedition was to find the fabled Seven Golden Cities of Cibola. Spanish missions were established in southern Arizona as early as the 1690s. The first Spanish presidio (fortified town) at Tubac, however, was not established until 1752. Tucson was

founded 23 years later. On September 27, 1821, Spain recognized the independence of Mexico. This new country included what is today California, Arizona, New Mexico, and Texas. The Treaty of Guadalupe Hidalgo, signed on February 2, 1848, ended the Mexican-American war and formalized the border. The treaty also ceded California and much of modern-day Arizona and New Mexico to the United States. The remaining southernmost portions of modern-day Arizona and New Mexico were ceded to the United States under the Gadsden Purchase, which was ratified by the Senate on April 25, 1854. The modern U.S./Mexico international border was fully established at this time. Arizona became the 48th state on February 14, 1912.

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 1 historic district were identified during these surveys. The following is a brief review of these data for Arizona.

A total of 282.7 miles was surveyed for cultural resources along the Arizona border as part of the Joint Task Force Six and Vehicle Fence 70 programs. Another 76.7 miles of project area and 35 acres (14.2 hectares) of construction staging areas were surveyed as part of the Vehicle Fence 300 and Pedestrian Fence 225 programs. The latter consists of 16.8 miles of fence in the Yuma Sector and 59.9 miles of fence and roads in the Tucson Sector. A total of 359.4 miles has therefore been surveyed to date along the U.S./Mexico international border in Arizona. These surveys identified 198 cultural resources, including 53 sites with prehistoric components and 29 border monuments. Data recovery or extensive subsurface testing was conducted at 14 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 impacts 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, most of 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 Arizona SHPO would take place prior to the grading of roads that have not been previously graded. Archaeological surveys of these roads could 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, ACHP, SHPOs, and Federal agencies and 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, 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 may 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 conduct the applicable Section 106 review for the activities that are not listed. In other words, CBP is required to initiate a new consultation under 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 an Inadvertent Discovery Plan that details crewmember responsibilities for reporting in the event of a discovery during maintenance and repair activities. The plan 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 15 meters (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

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, therefore has the potential to impact historic properties and have an adverse effect on cultural resources. The No Action Alternative does not guarantee that BMPs would be implemented during emergency repair activities.

There would be no PA 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 NHPA. 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 are within or near to the region of analysis and could reasonably be affected by the proposed action. Traffic relates to changes in the number of vehicles on roadways and highways as a result of a proposed action.

3.13.2 Affected Environment

Arizona contains a multitude of roads within the region of analysis, including Interstate- (I) 8 and I-19, the two most heavily traveled highways in the region. I-8 extends from the border of California and Arizona and runs through a portion of the region of analysis before angling northeast to terminate near the city of Tucson. I-19 extends north-south from Tucson to Nogales. Other smaller, two-lane highways include U.S. Highway- (US) 95 near Yuma, Arizona Highway- (AZ) 85 near OPCNM, AZ-82 near Nogales, AZ-83 and AZ-92 near Sierra Vista, and US-191 and AZ-80 near Douglas. Numerous paved and unpaved tertiary roadways are present throughout much of the region of analysis.

The majority of roadways are classified as FC-3 and FC-4 roadways and extend across mostly undeveloped property. Due to the remoteness of the region, very little public traffic is present, and the USBP is the primary user of these roadways. Many roads proposed for maintenance and repair extend across the Barry M. Goldwater Range, the USFS property, and the BLM property.

FC-3 roads are crowned and often have storm water drainage ditches on either side. Features such as bridges, low water crossings, and security gates are present along many of these roads. FC-4 roads are unpaved, single-lane roads with limited grading and base material that measure approximately 10 feet wide. FC-4 roads usually are not crowned and do not have formal storm water drainage features. The primary function of the roadways proposed for maintenance and repair is to support USBP efforts to limit illegal border intrusion. Most of these roads extend across undeveloped land and the vast majority of vehicles to traverse these roads are USBP vehicles. Very little public traffic is present.

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.

CBP's current maintenance and repair regiment is generally designed to address issues as they occur. Obvious potholes, ruts, and washouts are repaired as issues are noticed, but preventative

maintenance, such as properly crowning and grading roadways and removing debris from drainage ditches, often is not done until an issue has occurred. While such reactive maintenance keeps roadways passable, it does not address long-term maintenance requirements. Gradual roadway degradation can occur from CBP's lack of a formal, long-term maintenance plan.

3.13.3 Environmental Consequences

Impacts on transportation are evaluated by the ability of existing roadways to accommodate changes in traffic. Adverse effects would occur if drivers experience high delays because the proposed maintenance and repair activities 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 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 preventing the roadways from falling into disrepair and improving the conditions of those roadways that have already fallen into disrepair. Periodic maintenance would lessen the potential for the gradual degradation of the roadways rather than only making small-scale, reactionary repairs as is currently done (see **Section 3.13.3.2**). Periodic maintenance would ensure that roadways adhere to national quality standards.

Traffic impacts would be most notable closer to the location of a given repair and maintenance effort and less noticeable farther away. Larger highways such as I-8 and the two-lane Arizona 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 CBP, the public would not be impacted by these roadway closures or detours. The roadway closures and detours would be temporary and CBP would experience only minor disruptions to daily efforts to limit illegal border intrusion. All tactical infrastructure maintenance and repair efforts would be spread over many years and would be scattered across the entire region of analysis in Arizona. As such, all short-term effects on transportation are expected to be limited.

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, such as wilderness 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 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 the USBP would not increase in frequency and most of the roads proposed for repair and maintenance are not accessible by the public.

3.13.3.2 Alternative 2: No Action Alternative

The No Action Alternative would result in the continuation of the existing CBP roadway maintenance and repair procedures 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 maintenance requirements. Repairs performed on an as-needed basis would not be considered sustainable in quality because it 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, which would be anticipated to result in a shorter disruption to the flow of traffic. Therefore, 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.

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 materials (ACMs), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). The USEPA is given authority to regulate these special hazard substances by 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 is 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 ADEQ Waste Programs Division regulates the management of hazardous substances, petroleum products, and hazardous and petroleum wastes in Arizona. The ADEQ's hazardous waste inspection and compliance program ensures that facilities are treating, storing, and disposing of hazardous wastes in accordance with the regulations. The ADEQ Waste Programs Division also regulates the operation of aboveground storage tanks (ASTs) and underground storage tanks (USTs). The ADEQ's pollution prevention program requires businesses to reduce toxic substances at the source, minimize the generation of hazardous waste, and prevent the release of pollutants to the environment. It requires all industrial facilities within a certain threshold of hazardous waste generation and toxic substance use to perform a pollution prevention analysis and to file an annual Pollution Prevention Plan.

USBP or its contractors 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. These materials are used for or are generated directly from maintenance and repair activities. The primary hazardous substances and petroleum products used 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. The hazardous and petroleum wastes are recycled or disposed of off site in accordance with Federal, state, and local regulations.

USBP stations within the Arizona tactical infrastructure area that are listed in the USEPA RCRAInfo database are Yuma and Nogales. Both of these stations are listed as inactive RCRA hazardous waste handlers with no current permit (USEPA 2011a).

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 region of analysis (CBP 2008a, CBP 2008b). There is one active National Priorities List site (U.S. Marine Corps Air Station Yuma; USEPA ID: AZ0971590062) within the region of analysis (USEPA 2011b).

Pesticides. The Arizona Department of Agriculture Environmental Services Division and the State Office of Pest Management are jointly responsible for the oversight of pesticide production and use, and worker and sensitive populations' safety in Arizona. The main duties performed by these agencies are to register and license pesticide companies or products in accordance with Federal and state laws, and enforce pesticide use compliance to ensure established buffer zones are adhered to, environmental concerns are met, and people are protected.

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

The region of analysis is heavily agricultural, with elaborate irrigation systems fed by the Colorado River, and, therefore, are likely to have a large number of pesticide storage facilities and a large volume of pesticide applications.

Solid Wastes. Solid wastes in Arizona are regulated by a combination of mandated laws promulgated by the Federal, state, and regional Councils of Government. The ADEQ Waste Programs Division regulates the treatment, storage, transport, and disposal of solid waste in Arizona.

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 offsite 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 region of analysis.

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 on 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, increasing the probability of a spill or release. Greater volume of these materials could be required under the Proposed Action than under the No Action Alternative. Prior to pesticide application, ADEQ would be consulted for the appropriate permits or instruction on the quantity and approved application techniques.

No impacts on 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. If maintenance and repair activities require disturbance of a known or encountered solid waste landfill, ADEQ 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.

No impacts on solid waste would be expected. The volumes of solid waste produced during the repair and maintenance activities would be negligible and are not anticipated to increase.

3.14.3.2 Alternative 2: No Action Alternative

No impacts on hazardous substances, petroleum products, hazardous and petroleum wastes, or pesticides would be expected from the implementation of No Action Alternative as the existing storage, transport, handling, use, generation, and disposal of hazardous substances, petroleum products, and hazardous and petroleum wastes as described in **Section 3.14.2** would continue.

No impacts on 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 these materials. 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.

Long-term, negligible to minor, adverse impacts on solid waste would be expected from implementation of the No Action Alternative. This 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. 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 region of influence (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 Arizona: Cochise, Pima, Santa Cruz, and Yuma. 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 dismissed from further detailed analysis.

Socioeconomic Resources

The socioeconomic baseline conditions are presented using three spatial levels: (1) county-level data for the ROI, (2) state-level data for Arizona, and (3) national-level data. County-level data are included in the analysis to provide a baseline condition. Data for Arizona and the United States are included for comparative purposes.

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 2009, the population in Arizona increased 73 percent, an increase of nearly 3 million

people from 3.65 million in 1990 to 6.32 million in 2009. Growth in Arizona by percentage was much greater than the United States from 1990 to 2009. The United States grew 21 percent from 1990 to 2009 with population increasing from 248.7 million in 1990 to 301.5 million in 2009 (U.S. Census Bureau 1990, U.S. Census Bureau 2009).

Approximately 373 miles of the U.S./Mexico international border occurs within four counties in Arizona: Cochise, Pima, Santa Cruz, and Yuma. From 1990 to 2009 Yuma County's population growth was similar to Arizona, with 77 percent and 73 percent growth, respectively. In Yuma County, the population grew from approximately 106,000 people in 1990 to 189,000 people in 2009. Over the 19-year period ending in 2009, population growth in Cochise, Pima, and Santa Cruz counties was 31 percent, 48 percent, and 43 percent, respectively. The growth rate for each of these counties was greater than the United States at 21 percent, but less than Arizona at 73 percent. Pima County, which contains the City of Tucson, experienced the largest numerical increase in population, with an increase of 330,000 people reported between 1990 and 2009 (U.S. Census Bureau 1990, U.S. Census Bureau 2009). Complete population data for the four counties, Arizona, and the United States are displayed in **Table 3-12**.

Table 3-12. Population Estimates for Border Counties in Arizona, the State of Arizona, and the United States, 1990, 2000, and 2009

Geographic Area	1990	2000	2009	Percent Change		
				1990 to 2000	2000 to 2009	1990 to 2009
Cochise County	97,624	117,755	127,613	21%	8%	31%
Pima County	666,880	843,746	990,213	27%	17%	48%
Santa Cruz County	29,676	38,381	42,550	29%	11%	43%
Yuma County	106,895	160,026	188,983	50%	18%	77%
Arizona	3,665,228	5,130,632	6,324,865	40%	23%	73%
United States	248,709,873	281,421,906	301,461,533	13%	7%	21%

Sources: U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2009

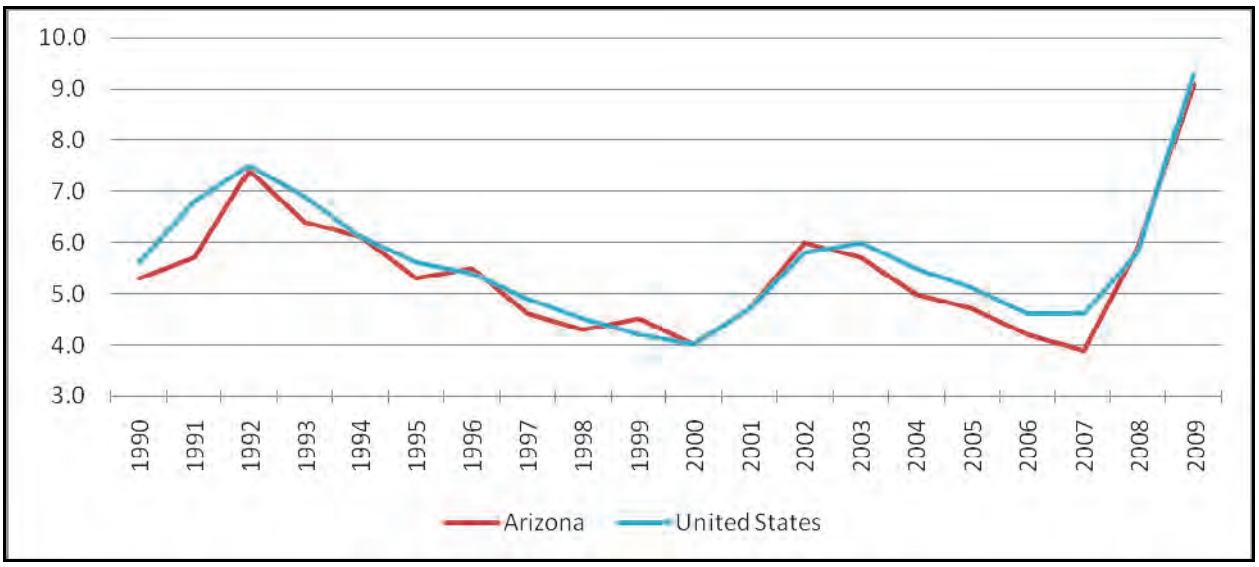
Employment Characteristics. The largest percentage of people employed by industry in Arizona and the United States is in the educational services, and health care and social assistance industry, composing approximately 19 and 22 percent respectively of all employed positions for these regions. The second largest industry is the retail trade industry accounting for approximately 12 percent of all those employed in Arizona and the United States. The agriculture, forestry, fishing and hunting, and mining industry is the smallest industry by percentage of those employed in Arizona (1.3 percent) and the United States (1.8 percent) (U.S. Census Bureau 2009). **Table 3-13** contains data for Arizona and the United States for all 13 industries as defined by the U.S. Census Bureau.

Figure 3-1 displays unemployment data for Arizona and the United States. From 1990 to 2000, Arizona and the United States follow a similar trend. From 2004 to 2009, the unemployment rate in Arizona was less or similar to the unemployment rate for the United States. The highest annual unemployment occurred in 2009. In Arizona, the lowest unemployment rate was in 2007 with 3.9 percent unemployment. In the United States, the annual unemployment rate was lowest in 2000, at 4.0 percent (BLS 2010).

Table 3-13. Employment by Industry in Arizona and the United States by Percentage, 2009

Industry	Arizona	United States
Population 16 years and over in labor force	1,895,684	94,056,060
Agriculture, forestry, fishing and hunting, and mining	1.3	1.8
Construction	9.9	7.4
Manufacturing	7.9	11.2
Wholesale trade	2.9	3.2
Retail trade	12.1	11.5
Transportation and warehousing, and utilities	4.9	5.1
Information	1.9	2.4
Finance and insurance, and real estate and rental and leasing	8.3	7.1
Professional, scientific, and management, and administrative and waste management services	11.1	10.3
Educational services, and health care and social assistance	19.4	21.5
Arts, entertainment, and recreation, and accommodation and food services	10.2	8.8
Other services, except public administration	4.7	4.8
Public administration	5.2	4.7

Source: U.S. Census Bureau 2009



Source: BLS 2010

Figure 3-1. Annual Unemployment Rates for Arizona and the United States, 1990–2009

The largest percentage of people employed within one industry in Cochise, Pima, and Yuma counties is the educational services, and health care and social assistance industry with 20 percent, 24 percent, and 17 percent, respectively, relatively similar to Arizona overall at 20 percent. In Santa Cruz County, the retail trade industry is the largest with 18 percent of all persons employed, and the educational services, and health care and social assistance industry

employs 17 percent of the population 16 years and older. The smallest industry in Yuma County is the information industry, composing 1 percent of all positions. In Pima and Santa Cruz counties, the smallest industry is the agriculture, forestry, fishing and hunting, and mining industry with 1 percent and 2 percent respectively. The wholesale trade industry in Cochise County accounts for approximately 1 percent of all positions by industry (U.S. Census Bureau 2009).

Racial, Ethnic, and Youth Population Characteristics. The southwestern United States contains a large Hispanic or Latino population. The Hispanic or Latino population in Arizona (30 percent) is much larger when compared to the United States (15 percent). The American Indian/Alaskan Native population accounts for 4 percent of the population in Arizona, compared to less than 1 percent for the entire United States. The Black or African-American population in Arizona was less by percentage when compared to the United States. The percentage of the population younger than 18 years of age in the United States was estimated at 25 percent. In Arizona, the percentage of the population younger than 18 years of age is 26 percent (U.S. Census Bureau 2009). **Table 3-14** lists the racial and ethnic characteristics for the border region.

Table 3-14. Racial and Ethnic Characteristics for Border Counties in Arizona, the State of Arizona, and the United States 2009

Race and Ethnicity	Cochise County	Pima County	Santa Cruz County	Yuma County	Arizona	United States
Total Population	127,613	990,213	42,550	188,983	6,324,865	301,461,533
Percent of population younger than 18	24.6	23.7	32.5	29.4	26.4	24.6
White	59.1	57.2	18.7	39.2	58.5	65.8
Black or African American	4.0	3.1	0.1	1.8	3.4	12.1
American Indian and Alaska Native	0.8	2.5	0.5	1.0	4.1	0.7
Asian	1.8	2.4	0.3	1.0	2.4	4.3
Native Pacific Islander	0.3	0.1	0.5	0.1	0.2	0.1
Some Other Race	0.1	0.3	0.0	0.2	0.2	0.2
Two or More Races	2.4	1.6	0.1	1.0	1.5	1.6
Hispanic or Latino	31.5	32.8	79.9	55.7	29.8	15.1

Source: U.S. Census Bureau 2009

Environmental Justice and the Protection of Children

The four counties along the U.S./Mexico international border in Arizona contain varying levels of minority populations. In Santa Cruz County, nearly 80 percent of the population is identified as Hispanic or Latino, which is greater than the 30 percent Hispanic or Latino population in Arizona. Yuma County also contains a large Hispanic or Latino population at 56 percent of the

overall population. The remaining two counties, Cochise and Pima, contain Hispanic or Latino populations similar to Arizona, at 32 percent and 33 percent, respectively. Cochise and Pima counties contain a youth population (25 percent and 24 percent, respectively) that is smaller by percentage when compared to Arizona (26 percent). In Santa Cruz and Yuma counties, the youth population is slightly larger by percentage (33 percent and 30 percent, respectively) when compared to Arizona (26 percent) (see **Table 3-14**) (U.S. Census Bureau 2009).

Low-income and Poverty Characteristics. The overall poverty rate and rate of families living below the poverty level in Arizona is 14.7 percent and 10.5 percent, respectively. These rates are similar to the overall poverty rate and families living in poverty rate in the United States, which are 13.5 percent and 9.9 percent, respectively (U.S. Census Bureau 2009).

The median household income in Arizona was similar when compared to the United States. In Arizona, the median household income is $50,296, similar to the $51,425 median household income for the United States (U.S. Census Bureau 2009).

The four counties along the U.S./Mexico international border in Arizona contain poverty rates greater than Arizona overall. Median household incomes in the four counties are less than Arizona's median household income. The lowest median household income was in Santa Cruz County at $37,204, $13,092 less than Arizona's median household income. Santa Cruz County also contained the largest overall poverty rate and family poverty rate of the four counties examined. See **Table 3-15** for complete poverty rate data for Arizona (U.S. Census Bureau 2009).

Table 3-15. Poverty Rates and Median Household Income for Border Counties in Arizona

Geographic Area	Overall Poverty Rate	Family Poverty Rate	Median Income
Cochise County	16.3	12.5	$43,304
Pima County	15.7	10.7	$45,885
Santa Cruz County	22.1	17.9	$37,204
Yuma County	19.9	16.8	$38,854
Arizona	14.7	10.5	$50,296
United States	13.5	9.9	$51,425

Source: U.S. Census Bureau 2009

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 Arizona 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 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, direct and indirect, adverse and beneficial impacts on demographics would be expected during periods when maintenance and repair occur. 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 within each area would adequately be able to meet the demand for workers. The short-term nature and scale of the Proposed Action would not induce indirect population growth in the region.

It is assumed that materials for maintenance and repair would be sourced locally and local contractors would be used. 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 jobs within companies that supply goods and services. Creation of any long-term employment in the region would not be anticipated.

Direct beneficial impacts would result from increases to payroll earnings and taxes and the purchase of materials required for the Proposed Action. 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.

Environmental Justice and the Protection of Children. Much of the tactical infrastructure that would be maintained and repaired as a part of the tactical infrastructure to be maintained and repaired runs through or adjacent to many rural settlements, small towns, and neighborhoods

within larger cities. Property owners and residents might be affected by visual intrusion, noise, and temporary disruptions during maintenance activities.

The Proposed Action would have short- to long-term, indirect, beneficial impacts on protection of children in the areas along the U.S./Mexico international border. The maintenance and repair of tactical infrastructure would 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 in Arizona would not be addressed. In addition, the tactical infrastructure would not be considered sustainable in quality, resulting in the gradual degradation. If the No Action Alternative were implemented, short-term local employment benefits from the purchase of maintenance and repair materials and a temporary increase in maintenance and repair 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 IMPACTS

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 complimentary to and 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 Yuma and Tucson Sectors along the U.S./Mexico international border to address future border security needs.

Cumulative Tactical Infrastructure in Arizona

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 recently constructed and existing tactical infrastructure within the USBP Yuma and Tucson sectors.

Table 4-1. Descriptions of Other Recent Tactical Infrastructure in Arizona

USBP Sector	Description of Recent Tactical Infrastructure Covered under Waiver
Yuma	• C-1. 41 miles of pedestrian and vehicle fence along the boundary of Barry M. Goldwater Range. • C-2B. 3.9 miles of primary pedestrian wire mesh fence, access gates, and maintenance road along the Salinity Canal west of San Luis in Yuma County, Arizona. [a] • CV-2. 8.82 miles of vehicle fence and 28 miles of roads within the Roosevelt Reservation adjacent to Cabeza Prieta NWR in Yuma County, Arizona. [b] • CV-2A. 1.6 miles of vehicle fence with approximately 3.1 miles of existing roads within the Roosevelt Reservation adjacent to Cabeza Prieta NWR in Yuma County, Arizona. [b] • CV-1A. 4.5 miles of vehicle fence with approximately 0.5 miles of roads from Morales Dam south to West County 13th Street near Yuma, Arizona. [b] • CV-1B. Approximately 2.25 miles of vehicle fence along Cocopah Indian Reservation land.
Tucson	• DV-3A, DV-3B, DV-4A, and DV-4B. Approximately 50 miles of vehicle fence along Tohono O'odham Nation land. • D-5B/D-6. 7.5 miles of primary pedestrian fence (Bollard-style) with use of Normandy vehicle fence in floodplain areas, and maintenance roads beginning east of the DeConcini POE in Santa Cruz County, Arizona. [c] • CV-2A, CV-3, and DV-1. 35.1 miles of vehicle fence along Cabeza Prieta NWR. • D-2. 5.3 miles of pedestrian fence along OPCNM. • E2A. 6.3 miles of primary pedestrian fence (Bollard-style, estimated at 5.8 miles long) with use of Normandy vehicle fence and post-on-rail fence (estimated at 0.5 miles long) at the termini, and access/maintenance roads on the western edge of the San Pedro River extending westward into the Coronado National Forest in Cochise County, Arizona. [c] • EV-1A/EV-1B. 13.9 miles of vehicle fence (Normandy and post-on-rail-styles) within the Roosevelt Reservation in the San Rafael Valley in Santa Cruz and Cochise counties, Arizona. [d] • FV-1B. 16.5 miles of vehicle fence (post-on-rail-style) and 8.0 miles of roads within the Roosevelt Reservation in the San Rafael Valley near the City of Douglas within Cochise County, Arizona. [d] • Other. 2.8 miles of primary fence in downtown Nogales, Arizona. • Other. 6 to 8 miles of border road west of Nogales, Arizona. [e] • Integrated Fixed Towers. 12 IFTs and 5.1 miles of access and approach roads in the Douglas Station AOR.

Sources:
a CBP 2010b
b CBP 2010c
c CBP 2010d
d CBP 2010e

For the purposes of the cumulative impacts analysis, this summary includes tactical infrastructure subject to maintenance and repair on reservation lands of the Quechan and Cocopah tribes and the Tohono O'odham Nation. **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 and maintenance of tactical infrastructure would require a separate NEPA analysis.

Table 4-2. Summary of All Tactical Infrastructure Assets in Arizona

Asset (units)	Approximate Total
Fences and Gates (miles)	300
Roads and Integrated Bridges/Crossovers (miles)	1,100
Drainage Management Structures (number)	250
Vegetation Control Areas (miles)	16
Lighting and Ancillary Power Systems	550
Towers (number)	80
Equipment Storage Areas (acres)	290

Note: Table is based on GIS data from Baker dated October 9, 2012. Totals provided should be considered approximate as asset data are refined and added.

Long-term effects that would be expected as a result of maintenance and repair of tactical infrastructure along the U.S./Mexico international border in Arizona are discussed further.

The maintenance and repair activities analyzed in this cumulative impacts analysis would be to the same as those described in **Section 2.2** 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 future CBP maintenance and repair activities 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 each 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 region of analyses. 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 region of analysis. 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. 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. All CBP tactical infrastructure would be a component of the selective maintenance and repair centralized work plan. 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 the past and present actions, though there is quality habitat in the region of analysis 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**, USBP has prepared a Biological Assessment for this project in the region of analysis and consulted 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 findings of the Biological Opinion support this assessment of the cumulative impacts on threatened and endangered species.

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 20 federally listed threatened or endangered plant or animal species that are known to occur or have the potential to occur within the geographical region of analysis (see **Table 3-2**). **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 and designated critical habitat with the goal of recovery.

The USFWS Biological Opinion concurred that the Proposed Action would be expected to have negligible effects on most, and potentially adverse effects on four, threatened or endangered species that have been identified as potentially occurring in the region of analysis. Under the

Biological Opinion, further conservation measures and BMPs were created to further protect these species. 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 Opinion and this EA would ensure any impacts to threatened and endangered species would be minimized and therefore the cumulative impacts to species would not be significant.

4.2.7 Hydrology and Groundwater

Water quality and quantity of aquifers in the region of analysis has 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. Cumulatively, effects on hydrology and groundwater from the maintenance and repair of tactical infrastructure would also be negligible to minor.

4.2.8 Surface Waters and Waters of the United States

Surface water quality of subwatersheds within the region of analysis has historically been moderately affected by various inputs, including agricultural and livestock runoff, urban runoff, septic and wastewater discharges, 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. Due to the arid climate, less than 1 percent of the land area contains wetlands; historically, more than one-third of original Arizona wetlands have been modified or drained (USGS 1996).

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. Removal of vegetation and debris 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 Tucson and Yuma sectors operate within AQCRs that are in nonattainment for one or more criteria pollutants. The Proposed Action would have short-term, minor, localized, adverse effects on air quality during maintenance and repair activities. Ground disturbance activities could result in cumulative, adverse effects on air quality if there are multiple projects occurring at the same time and in the same vicinity within the region of analyses. 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 would only be expected 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 operation of machinery could combine with existing noise sources or other construction-type activities to produce a temporary cumulative effect on sensitive noise 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 all ground-breaking activities were subsequently monitored. No effects on cultural resources were identified in the Environmental Stewardship Summary Reports 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. The cumulative effects on cultural resources from the maintenance and repair of past present and foreseeable future tactical infrastructure projects when considered in conjunction with the Proposed Action would be negligible since all activity would occur within previously disturbed or environmentally cleared footprints.

4.2.13 Roadways and Traffic

Most of the region of analysis 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 region of analysis. 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 region of analysis 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 construction sites, and handled in accordance with all Federal and Arizona laws and regulations. Localized adverse effects could occur in the event of a spill, but the potential for cumulative adverse effects is negligible to minor. Cumulatively, effects on hazardous materials and waste management from the maintenance and repair of tactical infrastructure would also be negligible to minor.

4.2.15 Socioeconomic Resources, Environmental Justice, and Protection of Children

The populations of Cochise, Pima, Santa Cruz, and Yuma counties have grown 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 all tactical infrastructures 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 Arizona. 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 Proposed Action 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 adversely affect 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 region of analysis.

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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 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 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

Interested Party List

Copies of the Coordination Letter and Draft EA will be sent to the following agencies and interested parties during the Draft EA public review period:

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Notice of Availability published in the *Arizona Daily Star* on September 23, 2011.

PCC to host White House Hispanic summit

ARIZONA DAILY STAR

Pima Community College will be the site of a White House Hispanic Community Action Summit next month.

More than a dozen White House officials and leaders from federal agencies will meet with about 150 local leaders on Oct. 15 at PCC's West Campus, 2202 W. Anklam Road.

"This is a tremendous honor for the college and for Southern Arizona," Chancellor Roy Flores said in an announcement Wednesday.

The group will discuss jobs, education, health care and immigration.

A previous summit took place in Orlando, Fla., and another will be in Las Vegas.

Notice of Availability

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- Ajo Public Library, 33 North Plaza Street, Ajo, Arizona 85321-2463

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(c) By email to: *AZcomments@TIMR-NEPA.com*
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(e) By Fax to: (240) 554-2511

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Publish September 23, 2011 Arizona Daily Star

LAW & ORDER

BRIEFS

Immigrant smuggling brings almost 5 years

A Sierra Vista man has been sentenced to nearly five years in prison for smuggling immigrants.

Terry Lee Chance, 39, pleaded guilty in April to conspiracy to transport aliens for profit and making false statements, the U.S. Attorney's Office says.

While on pretrial release for the charges, prosecutors say Chance transported another group of illegal immigrants.

When law enforcement approached him at a checkpoint on U.S. Route 90 near Whetstone, police say he fled.

Chance was eventually apprehended and told agents that one of the immigrants had put a gun to his head and forced him to flee the checkpoint.

Border Patrol agents later concluded that he made up the story.

The Associated Press

2 incidents net pot worth about $1.1M

More than a ton of marijuana, estimated at $1.1 million, has been seized along

Jerry Ramon Jackson, 23, was arrested on suspicion of aggravated assault in the Aug. 31 shooting. Jackson and the man met at an apartment complex in the 2300 block of West Ina Road after the older man answered an ad for the computer tablet, said a Pima County Sheriff's Department news release. The gunman jumped into the victim's car, shot the driver in the shoulder and ran away, investigators say.

Sheriff's deputies arrested Jackson on Wednesday at an apartment in the 2800 block of West Broadway.

Jamar Younger

Eighth site to get photo enforcement

The Tucson Police Department has finished installing its eighth set of photo-enforcement cameras.

The newest cameras are to start snapping drivers at East Ajo Way and South Sixth Avenue on Oct. 1, a Tucson Police Department news release said.

Drivers will receive written warning notices for the first 30 days of operations. Motorists will start receiving tickets on Oct. 31.

Jamar Younger

Body in apartment spurs homicide probe

Officers found a man's

Notice of Availability published in the *Yuma Sun* on September 23, 2011.

Arizona man sentenced to death in family's murder

ASSOCIATED PRESS

Health coverage for Arizona children among lowest in nation

BY MAX LEVY

ARIZONA'S UNINSURED CHILDREN

STATE GLANCE

ASSOCIATED PRESS

ASU moves closer to having Lake Havasu City campus

Indiana man indicted on child abuse charges

Man's body found inside a Tucson apartment

AWC

BORDER

PHOTO BY /YUMA SUN

COCHISE COUNTY SHERIFF LARRY A. DEVER, president of the Border Sheriff's Coalition, said at the organization's annual meeting at the Quechan Casino Resort Thursday and today, that while the jurisdictions along the border differ in many ways, they share the same problems when it comes to dealing with border-related crimes.

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- Rio Rico Public Library, 1069 Yavapai Drive, # T, Arizona 85648-1592
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- Ajo Public Library, 33 North Plaza Street, Ajo, Arizona 85321-2463

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(e) By Fax to: (240) 504-2511

When submitting comments, please include your name and address, and identify your comments as for the Tactical Infrastructure Maintenance and Repair Along the U.S./Mexico International Border in Arizona.

ECONOMY

English and Spanish versions of the Notice of Availability published in the *Arizona Daily Star* on September 30, 2011.

ROSEMONT

Miranda said.

He also made several organizational changes to make the city more business-friendly.

It's not clear if Quigley will get a raise on his $132,000 salary for his pro-

from the city.

Miranda will not receive a increase on his $167,000 salary for his interim appointment. Letcher made $211,000 a year.

Miller, who worked under two former managers before

the job. "I happy, I'm willing, and I'm able to do it," she said.

A new business and economic development manager will be hired to coordinate economic development and business-related poli-

and communication outreach efforts on the Web and through social media while on temporary assignment to the IT department. Her employment at the city will last only until February.

Parisi said she will con-

structure by having the city's annexation team report to Tucson Water, and the Planning and Zoning Department report directly to him.

The change in oversight of planning and zoning,

"It begins with abetting people up here who have a passion for the city of Tucson," Miranda said. "I felt I needed to put a team in place that has the same vision that I do for the community."

City Council members said little about Miranda's changes. Councilwoman Karin Uhlich said she needed more time to review the changes.

Councilman Steve Kozachik said Miranda has the ability to do what he wants, but said he hoped he wasn't luring people from other jobs for what could amount to a temporary position.

There were a lot of questions in the ranks regarding McBride, said Councilman Paul Cunningham, and the manager felt it was best to make a change.

He said he is a fan of Quigley's, and that Miller was someone Miranda felt had familiarity with the office and could hit the ground running.

"It's only for the next six months, anyway," Cunningham said. "It's only on a temporary basis."

Contact reporter Rob O'Dell at 573-4346 or rodell@azstarnet.com

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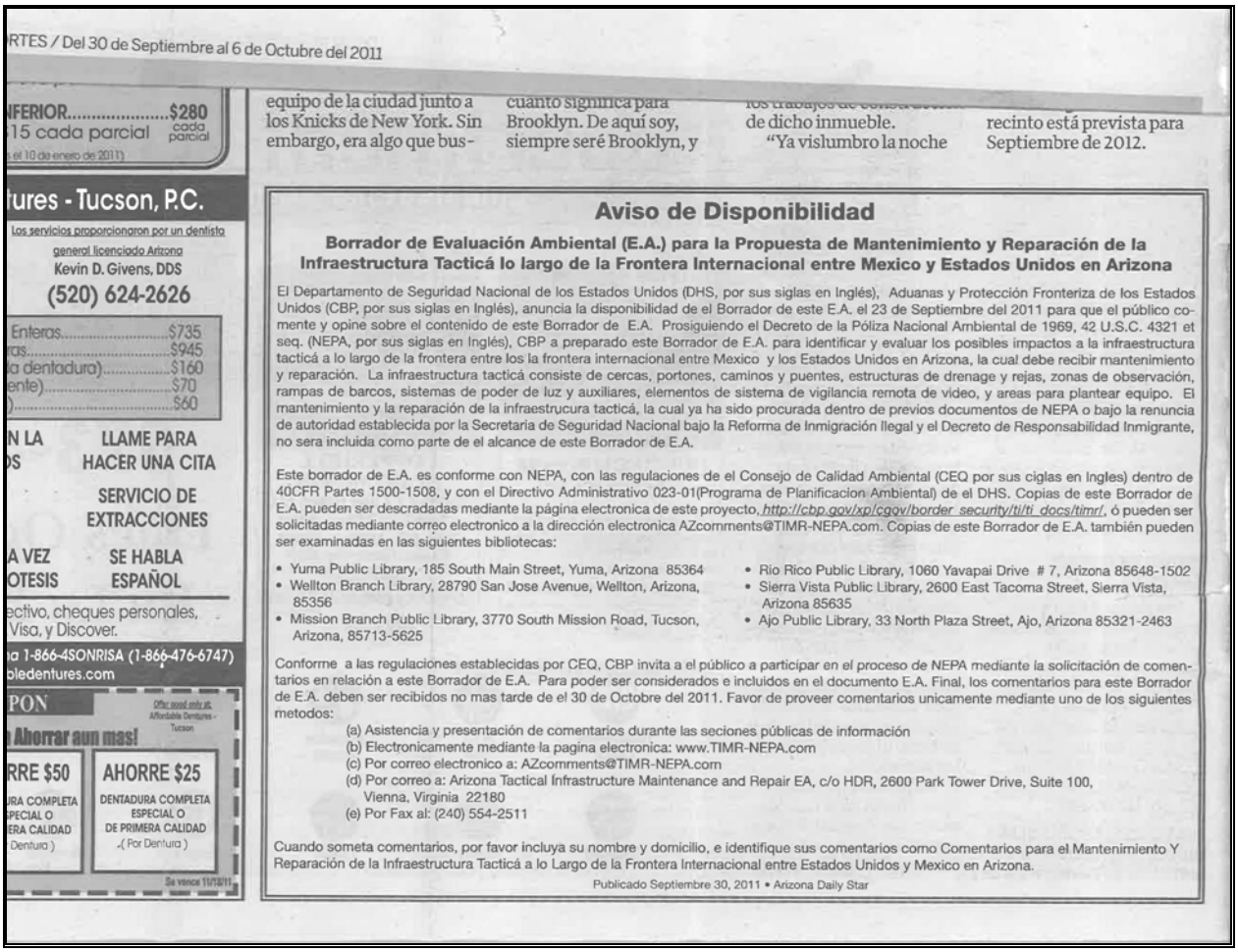
Publish September 30, 2011 • Arizona Daily Star



equipo de la ciudad junto a los Knicks de New York. Sin embargo, era algo que bus-

cuanto significa para Brooklyn. De aquí soy, siempre seré Brooklyn, y

de dicho inmueble.
"Ya vislumbro la noche

recinto está prevista para Septiembre de 2012.

Aviso de Disponibilidad

Borrador de Evaluación Ambiental (E.A.) para la Propuesta de Mantenimiento y Reparación de la Infraestructura Tacticá lo largo de la Frontera Internacional entre Mexico y Estados Unidos en Arizona

El Departamento de Seguridad Nacional de los Estados Unidos (DHS, por sus siglas en Inglés), Aduanas y Protección Fronteriza de los Estados Unidos (CBP, por sus siglas en Inglés), anuncia la disponibilidad de el Borrador de este E.A. el 23 de Septiembre del 2011 para que el público comente y opine sobre el contenido de este Borrador de E.A. Prosiguiendo el Decreto de la Póliza Nacional Ambiental de 1969, 42 U.S.C. 4321 et seq. (NEPA, por sus siglas en Inglés), CBP a preparado este Borrador de E.A. para identificar y evaluar los posibles impactos a la infraestructura tacticá a lo largo de la frontera entre los la frontera internacional entre Mexico y los Estados Unidos en Arizona, la cual debe recibir mantenimiento y reparación. La infraestructura tacticá consiste de cercas, portones, caminos y puentes, estructuras de drenage y rejas, zonas de observación, rampas de barcos, sistemas de poder de luz y auxiliares, elementos de sistema de vigilancia remota de video, y areas para plantear equipo. El mantenimiento y la reparación de la infraestrucura tacticá, la cual ya ha sido procurada dentro de previos documentos de NEPA o bajo la renuncia de autoridad establecida por la Secretaria de Seguridad Nacional bajo la Reforma de Inmigración Ilegal y el Decreto de Responsabilidad Inmigrante, no sera incluida como parte de el alcance de este Borrador de E.A.

Este borrador de E.A. es conforme con NEPA, con las regulaciones de el Consejo de Calidad Ambiental (CEQ por sus ciglas en Ingles) dentro de 40CFR Partes 1500-1508, y con el Directivo Administrativo 023-01(Programa de Planificacion Ambiental) de el DHS. Copias de este Borrador de E.A. pueden ser descradadas mediante la página electronica de este proyecto, http://cbp.gov/xp/cgov/border_security/ti/ti_docs/timr/, ó pueden ser solicitadas mediante correo electronico a la dirección electronica AZcomments@TIMR-NEPA.com. Copias de este Borrador de E.A. también pueden ser examinadas en las siguientes bibliotecas:

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Conforme a las regulaciones establecidas por CEQ, CBP invita a el público a participar en el proceso de NEPA mediante la solicitación de comentarios en relación a este Borrador de E.A. Para poder ser considerados e incluidos en el documento E.A. Final, los comentarios para este Borrador de E.A. deben ser recibidos no mas tarde de el 30 de Octobre del 2011. Favor de proveer comentarios unicamente mediante uno de los siguientes metodos:

(a) Asistencia y presentación de comentarios durante las seciones públicas de información
(b) Electronicamente mediante la pagina electronica: www.TIMR-NEPA.com
(c) Por correo electronico a: AZcomments@TIMR-NEPA.com
(d) Por correo a: Arizona Tactical Infrastructure Maintenance and Repair EA, c/o HDR, 2600 Park Tower Drive, Suite 100, Vienna, Virginia 22180
(e) Por Fax al: (240) 554-2511

Cuando someta comentarios, por favor incluya su nombre y domicilio, e identifique sus comentarios como Comentarios para el Mantenimiento Y Reparación de la Infraestructura Tacticá a lo Largo de la Frontera Internacional entre Estados Unidos y Mexico en Arizona.

Publicado Septiembre 30, 2011 • Arizona Daily Star

English and Spanish versions of the Notice of Availability published in the *Yuma Sun* and its partner paper *Bajo el Sol* on September 30, 2011.

STATE GLANCE

ASSOCIATED PRESS

Wildfire in northern Arizona burns 6,000 acres

PLEASANT VALLEY — The burned acreage numbers are continuing to grow on a lightning-caused northern Arizona wildfire.

Tonto National Forest officials say the so-called Tunner fire is 35 percent contained as of Thursday night after charring 6,000 acres near Young.

The fire started Aug. 30 near the peak of Armer Mountain in the Sierra Anchos.

The fire reached the Arizona Elks Youth Camp Tuesday night, but cooler days protected the camp by conducting burn-out operations between the fire and the creek.

Smoke is visible in the Tonto Basin, Globe, Young and Payson areas.

More burnout operations were done Thursday in the Workman Creek area.

Security breach delays flights at Mesa airport

PHOENIX — Transportation Security Administration officers had to re-screen an estimated 300 passengers at Phoenix-Mesa Gateway Airport.

Then was after police say a woman who was "a little confused" opened a door she shouldn't have.

Police didn't release the name and age of the woman.

Flights were grounded for several hours Thursday afternoon at the regional airport.

The Arizona Republic says passengers in planes waiting to depart and all those inside the terminal where the incident took place had to be re-screened by TSA.

Remains ID'd as Phoenix man missing since 2004

GLENDALE — Authorities say human remains found at a Glendale excavation site last month have been identified as those of a Phoenix man missing for more than seven years.

Glendale police say 52-year-old Robert Anthony Baynard was last seen on June 23, 2004.

They say he left his Phoenix residence either on foot or on a black mountain bike, which he was known to ride in the area of 6700 W Bethany Home Road in Glendale.

On Aug. 11, construction crews were excavating a vacant lot north of Bethany Home Road and west of 67th Avenue and found human bones.

The remains were sent by Glendale police to the Maricopa County Medical Examiner's Office. DNA tests positively identified Baynard.

Police say Baynard was diagnosed schizophrenic, but it's unknown how he died.

Northern Arizona man arrested in custodial interference

HOLBROOK — Northern Arizona authorities have arrested a man who allegedly kidnapped his teenage son in Idaho in a custody battle.

Navajo County Sheriff's officials say 47-year-old Alex Neskovich Jr. is being held on suspicion of felony kidnapping and custodial interference.

He remained jailed Thursday on a $35,000 bond.

Authorities say Neskovich was taken into custody in Holbrook and provided information as to where his son could be located.

They say the 14-year-old boy allegedly was kidnapped by Neskovich during a scheduled visitation in Idaho Falls and had been missing for about three weeks.

Sheriff's officials say the boy was located by the FBI in Show Low and returned to his mother in Idaho.

It's unclear whether Neskovich has a lawyer yet.

Man accused in ATM skimming case

TEMPE — A Phoenix man is in custody in connection with an ATM skimming scam at a Tempe bank.

Tempe police said Thursday that 28-year-old Ray Cumez is being held on two outstanding felony warrants plus suspicion of computer tampering, forgery and aggravated identity theft.

Authorities say Cumez allegedly placed a skimming device on an ATM at a US Bank branch on June 5.

Police say video surveillance shows someone installing the skimming device.

Detectives later received a tip identifying the suspect as Cumez. It took months before he was booked in a Phoenix home.

Police say evidence of other skimming activity in the form of forged credit cards encoded with stolen credit card numbers were found in Cumez's possession.

It was unclear Thursday whether Cumez has an attorney for his case.

CHIEF

FROM PAGE A1

be more professional. They already are, but I want to bring them up to the next level."

He said his priority will be ensuring continued training of the officers to meet new challenges in crime fighting and law enforcement.

A native of Phoenix who began his career with that city's police department at age 20, Munoz will receive a starting salary of $85,000 plus $2,500 for moving expenses.

Munoz hopes to bring another veteran of the Phoenix Police Department, Arturo Ramos, to San Luis as his second in command after the retirement of Police Capt. Javier Nuno.

FUNERAL NOTICES

Lucia Isagawa

Lucia Isagawa, 88, of San Luis, Ariz., died Sept. 28, 2011, at Yuma Regional Medical Center.

Born June 1, 1923, in Los Angeles, she was a pharmacy technician for Food City Grocery Stores.

A wake will be 5 to 10 p.m. Saturday at Desert Valley Mortuary Chapel, with rosary and scripture reading at 7 p.m.

Kenneth R. Rogers

Kenneth R. Rogers, 81, died Sept. 23, 2011, at his Yuma home.

Born Jan. 30, 1930, in Yorkville, Ohio, he was an aircraft machinist and veteran of the U.S. Army Air Corps.

Graveside services will be 10 a.m. Saturday at San Luis Vista Cemetery.

Bryn 'Breeda' Wilson

Bryn "Breeda" Wilson, 80, of Yuma, died Sept. 17, 2011, in Yuma.

She was born Nov. 8, 1930, in Kirksville, Mo.

Memorial services will be 10 a.m. Saturday at Grace Bible Fellowship, 300 S. 4th Ave. Yuma Mortuary and Crematory is handling arrangements, including cremation.

Linda Flores

Linda Flores, 65, of Yuma, died Sept. 25, 2011, in San Diego.

Born Oct. 20, 1945, in Jalisco, Mexico, she was a homemaker.

A wake will be 2 to 10 p.m. Sunday at Desert Valley Mortuary Chapel, with rosary at 7 p.m. Mass will be 9 a.m. Monday at Immaculate Conception Catholic Church. Burial will follow at Desert Lawn.

MATTHEW BOWYER/SUN YUMA SUN

CORT BACON WILL BE RUNNING in this year's New York Marathon this November to support the Tillman Foundation.

RUN

FROM PAGE A1

good." He has donated some of the fees from his own home inspection business.

He invites Yuma individuals, businesses and groups to help his cause. To contribute, go to his personal fundraising page at http://bit.ly/q8stUg (case-sensitive link).

The New York Marathon will be his "very first (full) marathon and probably my last," said Bacon, who is married with two kids, ages 5 and 2.

"I'm built like a fire hydrant, so running a marathon will be a huge accomplishment that I can scratch off my bucket list."

He figured if he's going to run a marathon, he might as well run the New York Marathon. "It's one of the more prestigious. It's a big deal. I jumped at the chance."

Bacon points out that being able to run in the marathon is an (unlikely) opportunity for him. The New York Road Runners Association, which puts on the 26.2-mile marathon, guaranteed the Tillman Foundation 40 spots. Upward of 45,000 run in the event.

"It's difficult to get into. It's almost like a lottery," Bacon said.

Fitness is fairly new to him. He has been training since January, but the journey began last year.

"It's been a long personal journey. Last winter I lost about 37 pounds and turned to running to help keep the weight off."

He has run nonstop 13 miles "to make sure" he can do it, and recently he ran 42 miles.

He also ran the P.F. Chang's Rock 'n' Roll Half Marathon in San Diego in June "as the first step towards my goal."

To contact Bacon, call 920-9550. For more background on the Tillman Foundation, go to http://www.pattillmanfoundation.org/.

COUNCIL

FROM PAGE A1

cut short by recall efforts against her.

She was first elected to the council in 2000 but was ousted in 2003 in one of several recall effort launched against various mayors and council members over the past decade. In 2005, she was named to a vacant council seat, only to be ousted in another recall election the following year.

"In the two terms that I have been on the council, I have gone through a recall. I have always said I have the desire to return and finish a term, serving my community as I have done on the school board," she said.

Her son, she said, "is one person, and I am another. He makes his own decisions, and I make mine. The community knows my reputation."

Rafael Torres left the council in July amid a legal opinion that he had violated his official duties as a councilman as a result of his belated return of unused funds the city had advanced him to cover his costs of travel on city business.

City travel policies required him to return the money within 10 days of the travel. Under state law, a public office holder in Arizona can be removed from office if found to have violated his or her "official duties."

Torres waited seven months to return a $1,289 left over from a total of $1,852 advanced him in April 2009 to represent the city at a conference in Washington, D.C.

After an investigation by the Arizona Auditor

GLORIA TORRES is sworn into the San Luis council where she will serve until March.

MOHAMMED QUSAIBATI/SUN

BAD EL NO.

General's Office, the Yuma County Attorney's Office charged him with a single felony charge of theft. In a plea agreement, Torres pleaded guilty to a misdemeanor count of obstruction of government operations.

William J. Sims, the outside attorney whose opinion the city had sought, concluded that Torres' actions that led to his guilty plea amounted to a violation of his duties, and thus his seat became vacant.

Obituary

Judy Autrey Dyson

Judy Autrey Dyson was welcomed into her heavenly home on Monday, September 26, 2011. Judy was born on March 9, 1943 in Watonga, Oklahoma.

JUDY DYSON

Judy was a long time member of First Christian Church. A resident of Yuma since childhood, she was an elementary school teacher for Yuma School District No.1 until she retired after 28 years in the classroom. Judy was known as Mrs. D or Mama Eagle to her students. She lived to teach and make a difference in the lives of the many students she worked with throughout her career. Judy was honored to be named Teacher of the Year 1999-2000 and Who's Who of Teachers. She was a member of Assistance League of Yuma, D.A.R.E., and was invited to study Brain Based Education at the Jonas Salk Institute. One of her greatest pleasures was working with student teachers and helping them learn the joys of teaching.

Judy is survived by Tom, her loving and devoted husband of 47 years. Their children Alicia & Michael Davenport and Alan & Kari Dyson. Her mother Ann L. Autrey. Her brother Larry and wife Carolyn Autrey along with their children Jayme & Robert Griffith and Grant & Trey Autrey. Great Niece Anabella Griffith. William Dyson, Wade & Jody Dyson. Jeff & Karla Dyson and several other loved family and friends. Judy loved to spend time with her three special blessings Annie Christa, Dylan Jay and Aubrey Kay Davenport. They will miss their Mammaw very much and promise to tell future cousins all about the Mammaw who loved them and prayed for them before they were even born.

Judy was preceded in death by her Daddy, Alfred L. (Al) Autrey, her grandmother, Alice "Mammaw" Mickle, her in-laws, Wade and Violet Dyson, her beloved great niece, Kaiya Violet Dyson and sweet little angels we never met here on earth, but rejoice with her now.

A praise and celebration service of Judy's life will be held on October 2, 2011, at First Christian Church 3261 South Avenue 6E at 3:00 pm. In lieu of flowers, donations may be made to Judy's memory to First Christian Church or Hospice of Yuma.

Judy lived her faith and shared it with others through her Card Ministry or in person. She loved to make others smile and find the joy in life. As we, her family, honor her life and mourn her passing, we rejoice in knowing that she is now in the presence of our Lord and Savior, Jesus Christ. We thank you for being a part of her life and sharing in the joy she gave to all she touched. "Well done, thou good and faithful servant... enter thou into the joy of thy Lord." Matthew 25:21.

Please sign the guestbook at www.yumasun.com/obituaries

Notice of Availability

Draft Environmental Assessment (EA) for the Proposed Maintenance and Repair of Tactical Infrastructure Along the U.S./Mexico International Border in Arizona

The U.S. Department of Homeland Security (DHS), U.S. Customs and Border Protection (CBP) announces the availability of the Draft EA on September 23, 2011 and invites public comment on the Draft EA. Pursuant to the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq., NEPA, CBP has prepared the Draft EA to identify and assess the potential impacts of tactical infrastructure along the U.S./Mexico international border in Arizona that must be maintained and repaired. The tactical infrastructure consists of fencing and gates; roads and bridges/crossovers; drainage structures and grates; observation towers; road ramps; lighting and ancillary power systems; Remote Video Surveillance System components; and equipment staging areas. The maintenance and repair of tactical infrastructure, which is already addressed in previous NEPA documents or under the border patrol's discretion by the Secretary of Homeland Security under the Illegal Immigration Reform and Immigrant Responsibility Act, are not included within the scope of this EA.

The Draft EA complies with NEPA, the Council on Environmental Quality (CEQ) regulations at 40 CFR Parts 1500–1508, and DHS Management Directive 023-01 (Environmental Planning Program). Copies of the Draft EA can be downloaded from the project Web site at http://www.cbp.gov/xp/cgov/border_security/bdl_tactical_infr/eis/ or can be requested by emailing AZcommenting@DHS.GOV. Hard copies of the Draft EA can be reviewed at the following locations:

- Yuma Public Library, 350 South Main Street, Yuma, Arizona 85364
- Wellton Branch Library, 28750 Dome Avenue, Wellton, Arizona 85356
- Mission Branch Public Library, 3770 South Mission Road, Tucson, Arizona 85713-5626
- Rio Rico Public Library, 1060 Yavapai Drive # 1, Rio Rico, Arizona 85648-1560
- Sierra Vista Public Library, 2600 East Fry Boulevard, Sierra Vista, Arizona 85635
- San Pedro Public Library, 5 North Plaza Street, San Pedro, Arizona 85321-2462

Pursuant to the CEQ's regulations, CBP invites public participation in the NEPA process through the solicitation of comments on the Draft EA. In order to be considered for inclusion in the Final EA, comments on the Draft EA must be received by October 24, 2011. Please provide comments using only one of the following methods:

(a) Hand-deliver your submission of comments at the public information sessions;
(b) Comment via through the Web site: www.CBPNEPA.com;
(c) Scanned to AZcommenting@DHS.GOV; or
(d) By mail to: Antonio Trevino, Environmental Management Division, Border Patrol Headquarters, 2300 Clarendon Blvd., Suite 1137, Arlington, Virginia 22201.

When submitting comments, please include your name and address, and identify your comments as on the Tactical Infrastructure Maintenance and Repair Notice for U.S./Mexico International Border in Arizona.

www.bajoelsol.com

EN ESCENA

Ahora en DVD 'Modern Family'

Foto cortesía Arenas Group

LA FAMILIA moderna está de vuelta ahora en DVD para provocar más risas y para dejar más satisfechos a los seguidores más fanáticos de esta comedia.

ARENAS GROUP

Incluyendo una gran cantidad de segmentos exclusivos y escenas nunca vistas, Twentieth Century Fox Television presenta "Modern Family": la completa segunda temporada en Blu-ray y DVD, la familia está de vuelta para provocar más risas y dejará satisfechos a los seguidores más fanáticos.

Cada set incluye 24 episodios de la serie aclamada por la crítica además de entrevistas a la familia, escenas más extensas o suprimidas, una recopilación de chistes, un video musical y mucho más.

La historia:

El clan Prichett tiene a Jay como jefe de familia, un verdadero hombre sufriendo la crisis de la mediana edad, y que se ha vuelto a casar con una mujer mucho más joven que él, Gloria, cuya pasión y lealtad es igual a la de su hijo de 11 años, Manny, un niño muy precoz. La integración de esta nueva familia, lleva implícito mucho aprendizaje, choques culturales, algunos extraños malentendidos y muchas dulces victorias.

La hija mayor de Jay, Claire, tiene su propia familia. Claire y Phil son los orgullosos padres de tres niños con quienes quieren tener una relación abierta, sana y honesta. Pero eso no es fácil, especialmente cuando hay una hija adolescente que está creciendo demasiado rápido, además la hija de en medio es demasiado avispada para su propio bien, y un hijo atolondrado. Además Phil quiere ser el padre genial. Mientras Claire solo pretende hacer lo mejor posible para llevar su hogar en forma organizada y estricta, decidida a no dejar que sus hijos tengan la niñez rebelde que ella tuvo.

El hermano de Claire, el hijo ya crecido de Jay, Mitchell adoptó un bebé vietnamita con su compañero con el que tiene viviendo cinco años, Cameron. Los opuestos se atraern en este hogar, Cameron tiene una maravillosa personalidad con una cierta propención a lo dramático, mientras que Mitchell es el más serio de los dos. Se equilibran mutuamente y son padres adorables que tratan de hacer lo mejor con su hijo.

Cada una de estas tres familias son únicas y juntos da una visión honesta y a menudo cómica de las relaciones a vece cálidas y a veces complicadas.

El reparto de "Modern Family se compone de: Ed O'Neill como Jay, Julie Bower como Claire, Ty Burrell como Phil, Sofía Vergara como Gloria, Jesse Tyler Ferguson en el papel de Mitchell, Erie Stonestreet como Cameron, Sarah Hyland en el papel de Hayley, Nolan Could es Luke, Ariel Winter como Alex y Rico Rodríguez como Manny.

Más detalles visitando: abc.go.com/modernfamily

Aviso de Disponibilidad

Borrador de Evaluación Ambiental (E.A.) para la Propuesta de Mantenimiento y Reparación de la Infraestructura Táctica lo largo de la Frontera Internacional entre México y Estados Unidos en Arizona

El Departamento de Seguridad Nacional de los Estados Unidos (DHS, por sus siglas en Inglés), Aduanas y Protección Fronteriza de los Estados Unidos (CBP, por sus siglas en Inglés), anuncia la disponibilidad del Borrador de este E.A. el 23 de Septiembre del 2011 para que el público comente y opine sobre el contenido de este Borrador de E.A. Prosiguiendo el Decreto de la Póliza Nacional Ambiental de 1969, 42 U.S.C. 4321 et seq. (NEPA, por sus siglas en Inglés). CBP a preparado este Borrador de E.A. para identificar y evaluar los posibles impactos a la infraestructura táctica a lo largo de la frontera entre los la frontera internacional entre México y los Estados Unidos en Arizona, la cual debe recibir mantenimiento y reparación. La infraestructura táctica consiste de cercas, portones, caminos y puentes, estructuras de drenaje y rejas, zonas de observación, rampas de barcos, sistemas de poder de luz y auxiliares, elementos de sistema de vigilancia remota de video, y áreas para plantear equipo. El mantenimiento y la reparación de la infraestructura táctica, la cual ya ha sido procurada dentro de previos documentos de NEPA o bajo la renuncia de autoridad establecida por la Secretaria de Seguridad Nacional bajo la Reforma de Inmigración Ilegal y el Decreto de Responsabilidad Inmigrante, no será incluida como parte de el alcance de este Borrador de E.A.

Este borrador de E.A. es conforme con NEPA, con las regulaciones del Consejo de Calidad Ambiental (CEQ por sus siglas en Ingles) dentro de 40CFR Partes 1500-1508, y con el Directivo Administrativo 023-01(*Programa de Planificacion Ambiental*) de el DHS. Copias de este Borrador de E.A. pueden ser descargadas mediante la página electrónica de este proyecto, *http://cbp.gov/xp/cgov/border_security/tvti_docs/timr/*, ó pueden ser solicitadas mediante correo electrónico a la dirección electrónica *AZcomments@TIMR-NEPA.com*. Copias de este Borrador de E.A. también pueden ser examinadas en las siguientes bibliotecas:

- Yuma Public Library, 185 South Main Street, Yuma, Arizona 85364
- Wellton Branch Library, 28790 San Jose Avenue, Wellton, Arizona, 85356
- Mission Branch Public Library, 3770 South Mission Road, Tucson, Arizona, 85713-5625
- Rio Rico Public Library, 1060 Yavapai Drive #7, Arizona 85648-1502
- Sierra Vista Public Library, 2600 East Tacoma Street, Sierra Vista, Arizona 85635
- Ajo Public Library, 33 North Plaza Street, Ajo, Arizona 85321-2463

Conforme a las regulaciones establecidas por CEQ, CBP invita al público a participar en el proceso de NEPA mediante la solicitación de comentarios en relación a este Borrador de E.A. Para poder ser considerados e incluidos en el documento E.A. Final, los comentarios para este Borrador de E.A. deben ser recibidos no más tarde del 30 de Octubre del 2011. Favor de proveer comentarios únicamente mediante uno de los siguientes métodos:

(a) Asistencia y presentación de comentarios durante las sesiones públicas de información
(b) Electrónicamente mediante la página electrónica: *www.TIMR-NEPA.com*
(c) Por correo electrónico a: *AZcomments@TIMR-NEPA.com*
(d) Por correo a: Arizona Tactical Infrastructure Maintenance and Repair EA, c/o HDR, 2600 Park Tower Drive, Suite 100, Vienna, Virginia 22180
(e) Por Fax al: (240) 554-2511

Cuando someta comentarios, por favor incluya su nombre y domicilio, e identifique sus comentarios como Comentarios para el Mantenimiento Y Reparación de la Infraestructura Táctica a lo Largo de la Frontera Internacional entre Estados Unidos y México en Arizona.

Sample transmittal letter sent to interested parties.

September 23, 2011

The Honorable Ronnie Lupe
Chairman
White Mountain Apache Tribal Council
202 East Walnut Street
Whiteriver, AZ 85941
P.O. Box 700

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

Dear *The Honorable Ronnie Lupe:*

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

The maintenance and repair of tactical infrastructure that is already addressed in previous NEPA documents is not included within the scope of this EA. In addition, maintenance and repair of tactical infrastructure constructed under the waiver authority granted to the Secretary of Homeland Security under the Illegal Immigration Reform and Immigrant Responsibility Act is also excluded from this EA. 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 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 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 October 23, 2011. Please provide comments using only one of the following methods:

(a) Electronically at *http://cbp.gov/xp/cgov/border_security/ti/ti_docs/timr/*

(b) By email to AZcomments@TIMR-NEPA.com

(c) By mail to: Arizona Tactical Infrastructure Maintenance and Repair EA, c/o HDR, 2600 Park Tower Drive, Suite 100, Vienna, Virginia 22180

(d) By fax to 240-554-2511. When submitting comments, please include your name and address, and identify your comments as for the Arizona Tactical Infrastructure Maintenance and Repair 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://cbp.gov/xp/cgov/border_security/ti/ti_docs/timr/*. Hard copies of the Draft EA and FONSI can be reviewed at the Yuma Public Library, Wellton Branch Library, Mission Branch Public Library, Rio Rico Public Library, Sierra Vista Public Library, and the Ajo Public Library.

For additional information, please contact:

Mr. Charles McGregor, Jr.
Environmental Manager
U.S. Army Corps of Engineers
Fort Worth District, Engineering and Construction Support Office
819 Taylor Street
Room 3B10
Fort Worth, Texas 76102

Sincerely,

David Boyes
Project Manager
HDR, Inc.

Enclosure: Draft EA and FONSI

Email from RECON Environmental requesting a hard copy of the Draft EA.

From: Susy Morales
To: AZcomments
Subject: Request - Hard copy of Draft EA
Date: Friday, September 30, 2011 1:54:20 PM

Good morning,

We would like to request a hard copy of the Draft EA for the Proposed Maintenance and Repair of Tactical Infrastructure Along the U.S./Mexico International Border in Arizona. Please send to my attention to the address below. Thank you.

Susy Morales

Senior Environmental Planner/Wildlife Biologist

RECON Environmental, Inc.

525 W. Wetmore Rd, Suite 111

Tucson, Arizona 86705

P (520) 325-9977

F (520) 293-3051

A Company of Specialists

Email from the Cocopah Indian Tribe requesting a copy of the Draft EA and FONSI.

From: Jill McCormick
To: AZcomments
Subject: Draft EA for the Proposed Tactical Infrastructure Maintenance and Repair Along the U.S./Mexico Border
Date: Thursday, October 06, 2011 12:37:15 PM
Importance: High

Hello,
I received a copy, via our Tribal Chairwoman, of the letter of notification for the availability of the Draft EA an FONSI last week. The letter references enclosures of the Draft EA and FONSI, however they were not sent with the letter. I would like to have a hard copy of each document sent to me at the address listed below.
Thank you,

H. Jill McCormick, M.A.
Cultural Resources Manager
Cocopah Indian Tribe
14515 S. Veterans Dr.
Somerton, AZ 85350
Cell: 928-503-2291
Office: 928-627-4849

Letter from the National Park Service about the Organ Pipe Cactus National Monument

United States Department of the Interior

NATIONAL PARK SERVICE
INTERMOUNTAIN REGION
12795 West Alameda Parkway
P.O. Box 25287
Denver, Colorado 80225-0287

IN REPLY REFER TO:
L7617 (IMR-D)

OCT 2 0 2011

Christopher J. Colacicco
Program Manager,
Real Estate and Environmental Services Division,
Border Patrol Facilities and Tactical Infrastructure
Program Management Office
1301 Constitution Ave. NW, Suite B-155
Washington, DC 20229

Dear Mr. Colacicco,

Thank you for the opportunity to review the Environmental Assessment Addressing Proposed Tactical Infrastructure Maintenance and Repair along the US/Mexico International Border in Arizona. We appreciate the work that CBP has done to address many of our concerns and comments in the draft EA.

Organ Pipe Cactus National Monument (OPCNM) and Coronado National Memorial (CNM) have worked together on the review of this revised EA, and have provided comments on sections that are still of concern to us. The attached matrix contains our combined National Park Service (NPS) comments.

As always, we would like to work with you and your staff towards achieving our respective missions, and we are available any time to discuss our concerns. Please feel free to contact Lee Baiza, Superintendent, (520) 387-6849 x 7500, or Mark Sturm, Chief of Resource Management OPCNM, at (520) 387-6849 x 7110 to further discuss our comments.

Sincerely,

John Wessels
Regional Director,
Intermountain Region

cc: Mark Ruggiero, Coronado National Memorial
Lee Baiza, Organ Pipe Cactus National Monument

Letter Received from the U.S. Fish and Wildlife Service Cabeza Prieta National Wildlife Refuge.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Cabeza Prieta National Wildlife Refuge
1611 N. 2nd Avenue
Ajo, AZ 85321-1634

September 12, 2012

Christopher J. Colacicco
Division Director, RE and ENV Services Division
Border Patrol Facilities and Tactical Infrastructure
Facilities Management and Engineering
1301 Constitution Ave. NW, Suite B-155
Washington DC 20004

Dear Mr. Colacicco:

This letter is in response to the "*Draft Environmental Assessment Addressing Proposed Tactical Infrastructure Maintenance and Repair Along the U.S./Mexico International Border in Arizona*" (otherwise known as the TIMR EA). I apologize for the late response to this EA but wanted to at least identify a major oversight in the EA and offer some language that may help to rectify that. The EA did not address one of the major trust resources that we manage on the Cabeza Prieta National Wildlife Refuge. This resource is congressionally designated wilderness and with the exception of the Camino del Diablo, which is located in a 200 foot wide corridor that runs through wilderness, the other trails being considered for maintenance or repair actually occur in wilderness.

If it is not too late, you may want to incorporate the information below into the draft EA document before it is finalized.

Definition of the Resource

Wilderness as defined by the Wilderness Act of 1964 is ". . . an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions. . ." Lands designated as Wilderness are designated as such through acts of the United States Congress. Wilderness areas are to be managed to preserve wilderness character for the use and enjoyment of the American public into the future.

Affected Environment

Wilderness

The Arizona Desert Wilderness Act of 1990 (Title III) designated 803,418 acres of the Cabeza Prieta NWR as Wilderness with two provisions relative to border law enforcement and military activities. The border law enforcement provision state's that the wilderness designation of Cabeza Prieta lands shall not . . " be construed as precluding or otherwise affecting continued border operations." Even though under wilderness legislation, temporary and permanent roads are strictly prohibited, the border law enforcement provision allows CBP to continue to use the area for law enforcement purposes.

Roads and trails slotted for maintenance/improvement under the TIMR program include portions of the public access road El Camino del Diablo, one administrative trail (Tule Extension), and one unclassified

trail (Los Vidrios) that lies between the Camino del Diablo and the Border. The Los Vidrios trail was created by drug smuggling activity during the 90s. None of the roads or trails were engineered or constructed for heavy use. This has resulted in significant damage to soil, vegetation, and altered water flow in some locations. The Camino del Diablo has a non-wilderness buffer of 100 feet from its centerline and is aligned over a wash (San Cristobal) and a dry lake bed (Las Playas). The soils in San Cristobal Wash and the Las Playas are extremely fine and highly erodible. Because of the difficulty involved in driving these areas when the soil is wet or extremely dry, drivers have created parallel trails that avoid these spots (Las Playas and Los Vidrios). Where the Camino crosses San Cristobal Wash, the road is cut deeper as soils are removed with heavy rain. The area of land affected by these roads and trails has increased beyond the road bed into adjacent areas where soil is temporarily more suitable for driving. This has led to further damage to soil crust and increased erosion, damage to vegetation, and altered natural water flow after precipitation events.

Alternative 1: Proposed Action

The trails proposed for maintenance/improvement within wilderness are important to border law enforcement activities. The Refuge is fairly large with four main mountain ranges. Much of the illegal activities and interdiction efforts occur within the flat valleys. Both the Los Vidrios and Tule Extension provide access from the Camino del Diablo to the border. Because these trails are required for border law enforcement, it would be better for wilderness character to maintain or improve them as sustainable trails rather than continue current use and negative impacts on wilderness. If the trails are maintained, vehicles would be able to traverse the trail with no need of creating adjacent parallel routes that increase the area of wilderness that is damaged. With appropriate maintenance/improvement, the adjacent damaged areas could be restored to improve wilderness character. The design and implementation of road and trail maintenance must allow for the natural flow of surface water resulting from precipitation events. If this is done properly it would help to restore the natural and untrammeled character of the wilderness in these areas. A negative affect would remain on the undeveloped character and opportunities for a primitive form of recreation.

Alternative 2: No Action Alternative

Continued current use without proper maintenance and/or improvement will continue to negatively affect wilderness character and the area of land affected is likely to increase as further erosion causes vehicles to create more adjacent paralleling trails in new soils. Roads on fine soils will continue to cut deeper and deeper when soils are wet. Vehicle traffic will continue to move off the original road to new soils with no or shallower cutting. Vegetation will continue to be pushed back and the area of soil made inhospitable to vegetation establishment will increase. Rain will move into these cut areas and move along the road bed rather than a more natural path. The No Action Alternative would have a negative impact on the untrammeled, natural, undeveloped, and opportunities for primitive recreation wilderness characters.

Thank you for the opportunity to respond to the EA. We appreciate your patience and look forward to continuing our close working relationship.

Sincerely,

Sidney C. Slone
Refuge Manager
Cabeza Prieta NWR

In reply, refer to SHPO-2005-2621(107416)

September 5, 2012

Steve Hodapp
U.S Customs and Border Protection
1300 Pennsylvania Avenue NW
Washington, DC 20229

Re: Review of Draft Environmental Assessment, Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Border in Arizona

Dear Mr. Hodapp:

Thank you for submitting a copy of the draft Environmental Assessment (DEA) to this office for review. I recognize that the DEA does not fulfill or supplant consultation with this office or purposes of Section 106 of the National Historic Preservation Act on the proposed undertakings. However, I have read the DEA and have the following comments in regard to cultural resources and one historic property in particular:

1. On page ES-8, both the Alternative 1 and Alternative 2 actions are expected to have no to minimal adverse effects on cultural resources. However, I am not aware that all necessary cultural resource surveys have been submitted for review to this office under the Section 106 process. One important survey for the Camino del Diablo within the Cabeza Prieta National Wildlife Refuge and the Organ Pipe National Monument was submitted to this office in draft form but was not finalized. Thus, I believe it is premature to say that the actions will have no or minimal adverse effects.
2. Maintenance and repair of existing infrastructure may still impact known historic properties. Compliance with Section 106 of the National Historic Preservation Act (NHPA) is essential in these situations.
3. The road known as El Camino del Diablo is recorded as a historical-period archaeological site, AZ X:7:3(ASM), which has been determined eligible for listing in the National Register of Historic Places (NRHP). Continued use and modification (e.g., by a process known as "road dragging") by the U.S. Border Patrol (USBP) of this historic property may constitute an adverse effect. Paradoxically, this road is crucial to USBP's interdiction efforts. Proposed actions under this DEA should be considered for their potential to mitigate such adverse effects. It is also important to distinguish maintenance and repair proposed for this road from the standard actions for non-NRHP eligible roads. Plans for maintenance and repair to this road should be developed in consultation with this office and other interested parties as part of the Section 106/NHPA process. As a first step, I recommend that U.S. Customs and Border Protection (CBP) consider importing suitable desert soil to infill and restore the original road grade and width, instead of

Arizona State Parks • 1300 W. Washington Street • Phoenix, AZ 85007
Phone/TTY: (602) 542-4174 • Fax: (602) 542-4188

more drastic measures such as use of gravel. In addition to being more in keeping with the Secretary of the Interior's Standards for the Treatment of Historic Properties, the use of soil would be more likely to enable USBP to continue their ability to observe cross-border violations across this road.

4. Several NRHP-eligible historic properties are adjacent to El Camino del Diablo and may have been adversely affected by widening, vehicle diversion off the original roadbed and resultant rutting, and erosion. I also am concerned that these actions and processes may harm environmentally sensitive plants in vicinity of the road.
5. The El Camino del Diablo road lies within the El Camino del Diablo Historic District, which was listed in the NRHP in 1978. Although the district is defined as a band within one-half mile on either side of the road, the relation of the road to the district and the history that resulted in the district is unclear. I encourage CBP to support research this issue.
6. On page 3-72, reference is made to a Programmatic agreement (PA) concerning ground-disturbing activities. This PA still in a preliminary stage, so it is premature to say anything about specific stipulations or their contents. I also note that on page 3-72, lines 28–31 conflict with lines 32–41, whereby the first section states no adverse effects will occur and the second section outlines procedures for dealing with adverse effects.
7. On page 3-73 the EA states that CBP would develop an Inadvertent Discovery Plan. This plan should be submitted to this office for review prior to its implementation.
8. On page E-15, section 1 under Cultural Resources, discovery situations should be expanded to all cultural remains, not only to Native American ancestral remains.

I believe the goals of this EA are extremely important and worth support. Maintenance and repair of tactical infrastructure has the potential to have less impact on cultural resources than the alternative of no action. I look forward to working with CBP and other parties on the historic preservation aspects of this DEA.

Sincerely,

James Cogswell

James Cogswell, Ph.D.
Archaeological Compliance Specialist
State Historic Preservation Office

Letter Received from the U.S. Fish and Wildlife Service Arizona Ecological Services Office

United States Department of the Interior

Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
22410-2011-TA-0505-R001

October 21, 2011

Mr. Chris Colacicco
U.S. Customs and Border Protection
Real Estate and Environmental Services Division,
Border Patrol Facilities and Tactical Infrastructure
1301 Constitution Avenue NW, Suite B-155
Washington, DC 20229

RE: Comments on the Draft Environmental Assessment Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Border

Dear Mr. Colacicco:

The U.S. Fish and Wildlife Service (FWS) has performed a review of the U.S. Customs and Border Protection's (CBP) Draft Environmental Assessment (DEA) made available for public review on September 23, 2011 for the proposed tactical infrastructure maintenance and repair (TIMR) along the U.S./Mexico international border in Arizona. The project consists of maintenance and repair of existing tactical infrastructure including gates, roads, bridges/crossovers, drainage structures and grates, open observation zones, lighting, ancillary power systems, Remote Video Surveillance Systems (RVSS) and a boat ramp. The existing tactical infrastructure occurs in U.S. Border Patrol (USBP) Yuma and Tucson Sectors within Cochise, Pima, Santa Cruz and Yuma counties, Arizona.

We are submitting the attached updated comment response matrix (CRM) and reiterate our primary concerns identified during our preliminary review of the document submitted to you on August 29, 2011 (22410-2011-TA-0505). Many of our initial comments have yet to be addressed in the TIMR DEA, and are restated here for your consideration.

Per our conference call on October 19, 2011 with Mr. Sonny Oh and Mr. Steve Hodapp of CBP, we will request maps and corresponding geospatial data that better define the proposed TIMR action in Arizona in a separate letter from Mr. Jon Andrew of DOI, which you will receive shortly. This letter will also request data for California, New Mexico, and Texas. We initially

requested this information when it was shown to our office in a presentation on May 24, 2011. In addition, during the October 19th conference call, CBP committed to revise the TIMR EA to include a detailed implementation plan as part of the proposed action that identifies how CBP will work with its contractors, land managers, and the FWS to conduct maintenance and repair projects and incorporate best management practices over the life of the project. This information will aid us in determining if effects to listed species are insignificant or discountable. Many of the issues identified in our comments on the DEA are also pertinent to section 7 consultation under the Endangered Species Act (ESA) and will be discussed in further detail during section 7 consultation. (see attached CRM).

Summary of Primary Concerns Identified

- It was our understanding that the actions included within the TIMR project would only be those actions with insignificant or discountable effects to listed species as defined within the section 7 regulations of the Endangered Species Act (Act). As currently described in the DEA, the proposed TIMR project does not meet the criteria for insignificant or discountable effects to listed species. As discussed in our conference call with you on October 19, 2011, we recommend that CBP either revise the proposed action to include only those with insignificant or discountable effects, or request formal consultation under section 7 of the Act on a programmatic basis. A process outlining how future technical infrastructure projects will ultimately become part of TIMR needs to be described so that it is clear how these additional future actions will be carried out in compliance with the guidelines and best management practices (BMPs) described in the TIMR DEA and biological assessment (BA).

- Direct effects from maintenance and repair activities, including harm or harassment of federally-listed species, would require formal consultation. Although most references to direct effects have been removed from the Environmental Consequences section of the DEA, the proposed activities that could result in direct effects to listed species have not changed. CBP had previously indicated that the TIMR EA would only include proposed actions that were not likely to adversely affect threatened and endangered species, and therefore could be addressed through informal consultation; other actions that would rise above the not likely to adversely affect threshold should be addressed in separate, future formal consultations. Alternatively, these issues all could be addressed through a formal programmatic consultation. Discussion in the DEA should focus on potential impacts to listed and sensitive species and their habitats, but specific discussions of potential take and issues related to section 7 ESA consultation should be removed from the DEA and addressed in the DBA.

- The FWS requests that the CBP provide clarification on the project footprint within the region of analysis illustrated in the DEA. Maps provided in Appendix D appear to show approximately 500-600 miles of "access roads" within the "region of analysis". The DEA states that 700 miles of roads are under consideration. Please clarify whether the access roads in Appendix D represent the locations of all tactical infrastructure

considered under the proposed action. It is our recommendation that fencing (vehicle and pedestrian) be included in the scope of TIMR. Locations of fences, gates, bridges/crossovers, drainage structures and grates, open observation zones, boat ramp, lighting and ancillary power systems, and RVSS components should also be indicated on the maps. If the tactical infrastructure project locations or activities cannot be specified, please clearly state why in the DEA (*e.g.* homeland security).

- FWS believes that any vegetation control outside the existing footprint of tactical infrastructure is outside of the scope of the DEA and should be addressed as a separate action in a future NEPA document. Including areas that have not been previously disturbed in the potential footprint of this action distinguishes this activity as a "new Federal action", not a maintenance activity. We also recommend that all acreages and types of impacts that will occur to native vegetation be quantified in the DEA.

- The DEA proposal to avoid impacts to threatened and endangered species and critical habitat through the implementation of BMPs will require further review by FWS before the adequacy of these measures can be commented upon. In general, without knowing where federally-listed species or corresponding habitats occur within the proposed activity area, it would be difficult to avoid affects when the proposed action will potentially cause habitat loss and degradation, noise, crushing, mortality, or injury of general wildlife and plants. These issues will be discussed in more detail in our comments on the DBA.

- FWS recommends that actions requiring Federal permits, such as a Clean Water Act 404 permit, be submitted as separate projects in order to allow the appropriate level of review during the NEPA process.

Should project plans change or if additional information on the distribution of listed or proposed species becomes available, we recommend that you contact our office to determine if additional concerns or issues need to be considered. We encourage your coordination of this project with the Tohono O'odham Nation's Wildlife and Vegetation program and the Arizona Game and Fish Department. In keeping with our trust responsibilities to American Indian Tribes, by copy of this letter, we will notify the Tohono O'odham Nation, which may be affected by the proposed action. We encourage you to invite the Bureau of Indian Affairs to participate in the review of your proposed action.

We look forward to continued cooperation on the TIMR project. Please contact Cat Crawford (520) 670-6150 (x232) or Jean Calhoun (x223) with any questions regarding this letter. Thank you for your continued efforts to conserve endangered species.

Sincerely,

for Steven L. Spangle
Field Supervisor

Enclosure: CRM for TIMR DEA

cc (hard copy with enclosure):
Field Supervisor, Fish and Wildlife Service, Phoenix, AZ (2)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Tohono O'odham Nation Wildlife and Vegetation Program, Sells, AZ (Attn: Karen Howe)
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

cc (electronic copy w/o enclosure):
Field Supervisor, Arizona Game and Fish Department, Tucson, AZ (Attn: John Windes)
DOI Border Coordinator, Phoenix, AZ (Attn: Kathy Pedrick)

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APPENDIX C

Road Classifications and Maintenance and Repair Standards

APPENDIX C

TACTICAL INFRASTRUCTURE CLASSIFICATIONS AND MAINTENANCE AND REPAIR STANDARDS

Introduction

The tactical infrastructure would 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 (e.g., BLM, USFS) 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 road beds.

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.

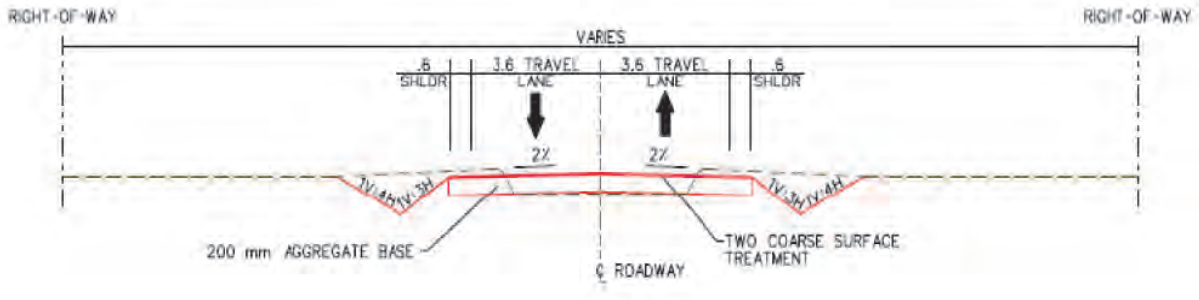

Figure C-2. FC-1 Paved Road (Diagram)

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

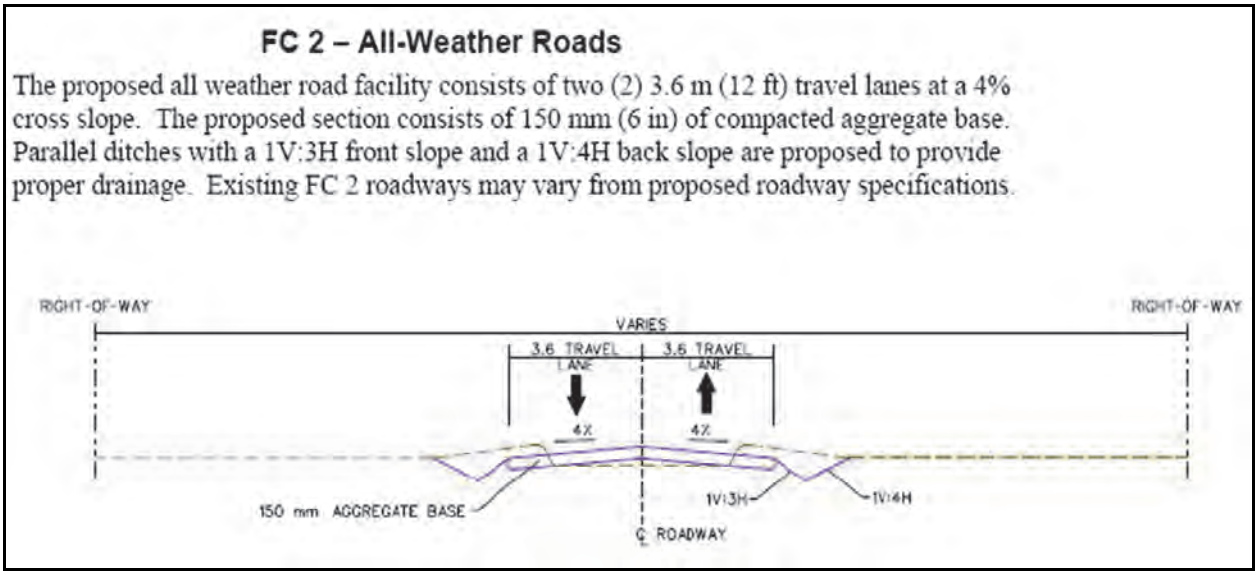

Figure C-4. FC-2 All-Weather Road (Diagram)

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

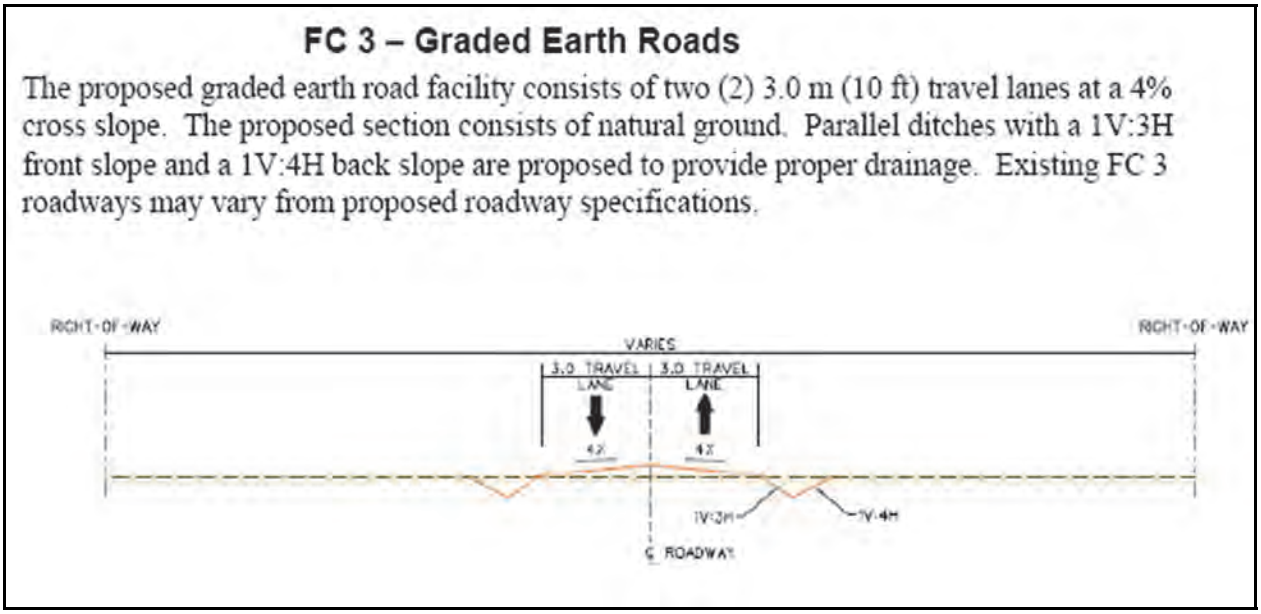

Figure C-6. FC-3 Graded Road (Diagram)

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

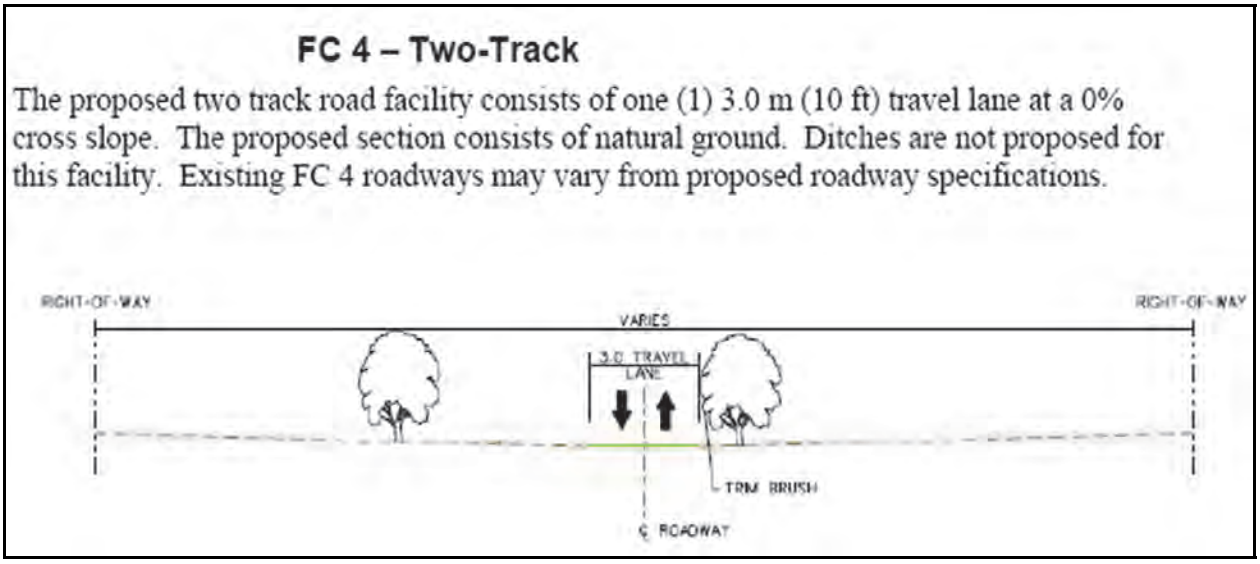

Figure C-8. FC-4 Two-Track Road (Diagram)

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 activities. 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 a strip of low-growth vegetation might exist. 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 might 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 Region of Analysis

APPENDIX D

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

There are approximately 35 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 region of analysis are described below. These ecological systems were extracted from NatureServe Explorer (NatureServe 2010).

Additionally, supplementary detailed maps of the tactical infrastructure along the U.S./Mexico international border in Arizona are on the enclosed DVD. In addition to displaying existing tactical infrastructure, the maps display the ranges of threatened and endangered species within the region of analysis. The maps depict additional activities occurring within the range of threatened and endangered species that would require use of species-specific BMPs, as formally agreed upon during consultation with the USFWS and is further discussed in the Biological Assessment (CBP 2012). 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 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 would provide CBP with a visual framework for applying appropriate maintenance and repair solutions in sensitive areas.

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

Ecological Systems
Sonora-Mojave Creosotebush-White Bursage Desert Scrub*
Sonoran Paloverde-Mixed Cacti Desert Scrub*
Apacherian-Chihuahuan Semi-Desert Grassland and Steppe*
Apacherian-Chihuahuan Mesquite Upland Scrub*
Madrean Encinal*
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub*
North American Warm Desert Active and Stabilized Dune*
Chihuahuan Mixed Salt Desert Scrub*
Madrean Pinyon-Juniper Woodland*
Cultivated Cropland*
Developed*
Undifferentiated Barren Land
North American Warm Desert Riparian Mesquite Bosque
North American Warm Desert Bedrock Cliff and Outcrop
Mogollon Chaparral
Sonoran Mid-Elevation Desert Scrub
Madrean Pine-Oak Forest and Woodland
Quarries, Mines, Gravel Pits and Oil Wells
Sonora-Mojave Mixed Salt Desert Scrub
Madrean Upper Montane Conifer-Oak Forest and Woodland
North American Warm Desert Volcanic Rockland
North American Warm Desert Wash
Recently Burned
Introduced Riparian and Wetland Vegetation
Chihuahuan Succulent Desert Scrub
North American Warm Desert Riparian Woodland and Shrubland
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub
Open Water (Fresh)
North American Warm Desert Lower Montane Riparian Woodland and Shrubland
Madrean Juniper Savanna
North American Arid West Emergent Marsh
North American Warm Desert Pavement
Rocky Mountain Aspen Forest and Woodland
Chihuahuan Sandy Plains Semi-Desert Grassland
Southern Rocky Mountain Pinyon-Juniper Woodland

Note: *Ecological systems that generally define and compose 95 percent of the landscape within the Arizona region of analysis.

Map Index for Arizona Threatened and Endangered Species

Twenty-five 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 threatened and endangered species within the region of analysis are detailed in the following maps. **Click on the species names provided below to view the range map for that species**.

Terrestrial Threatened and Endangered Species:

- Click here to view the species range map for ***Canelo Hills ladies' tresses***
- Click here to view the species range map for ***Cochise pincushion cactus***
- Click here to view the species range map for ***Huachuca water umbel***
- Click here to view the species range map for ***Pima pineapple cactus***
- Click here to view the species range map for ***New Mexico ridge-nosed rattlesnake***
- Click here to view the species range map for ***Masked bobwhite***
- Click here to view the species range map for ***Mexican spotted owl***
- Click here to view the species range map for ***Southwestern willow flycatcher***
- Click here to view the species range map for ***Yuma clapper rail***
- Click here to view the species range map for ***Jaguar***
- Click here to view the species range map for ***Lesser long-nosed bat***
- Click here to view the species range map for ***Ocelot***
- Click here to view the species range map for ***Sonoran pronghorn***

Aquatic Threatened and Endangered Species:

- Click here to view the species range map for ***Desert pupfish***
- Click here to view the species range map for ***Gila chub***
- Click here to view the species range map for ***Gila topminnow***
- Click here to view the species range map for ***Quitobaquito pupfish***
- Click here to view the species range map for ***Sonoran chub***
- Click here to view the species range map for ***Chiricahua leopard frog***
- Click here to view the species range map for ***Sonoran tiger salamander***

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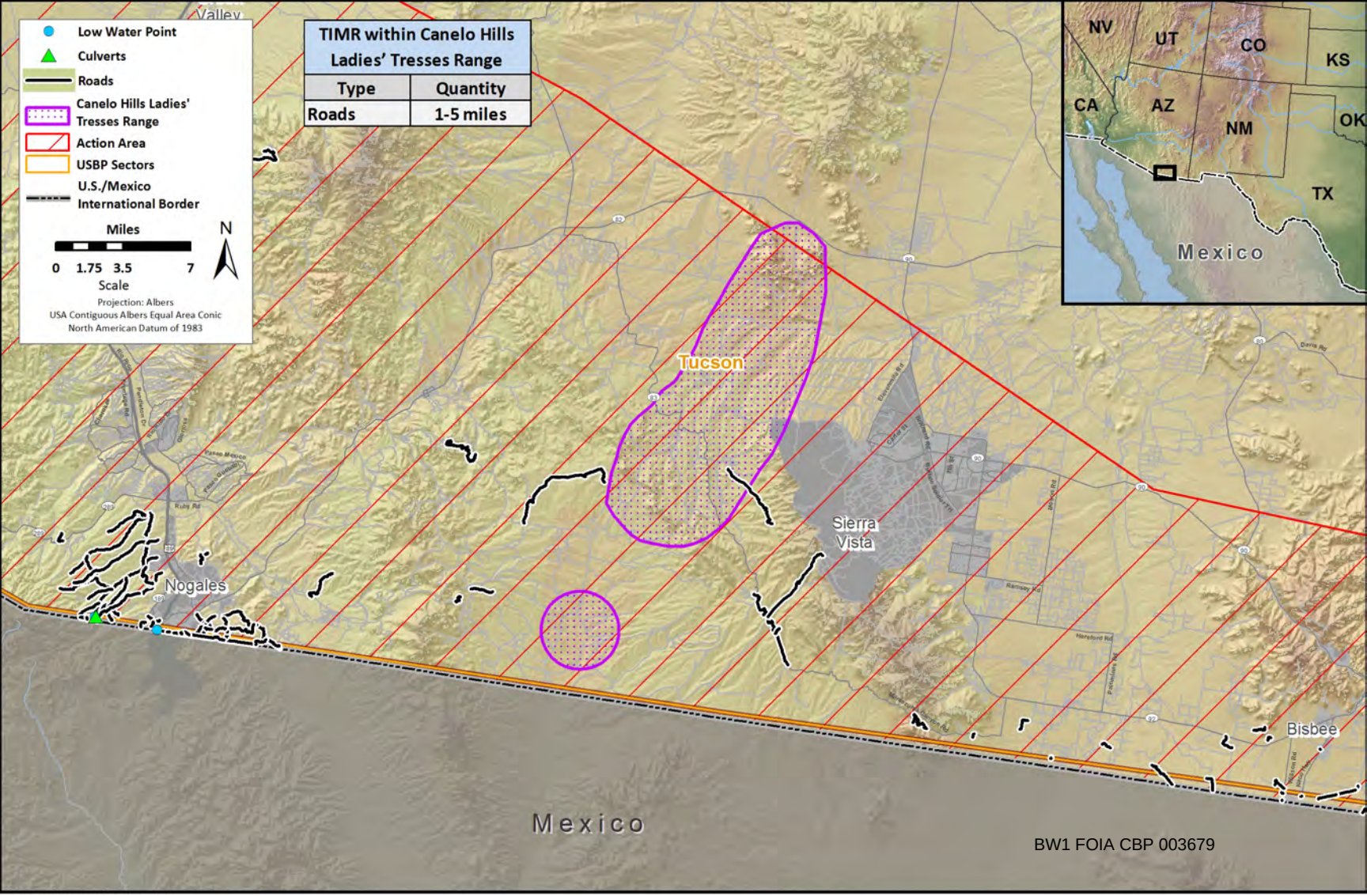
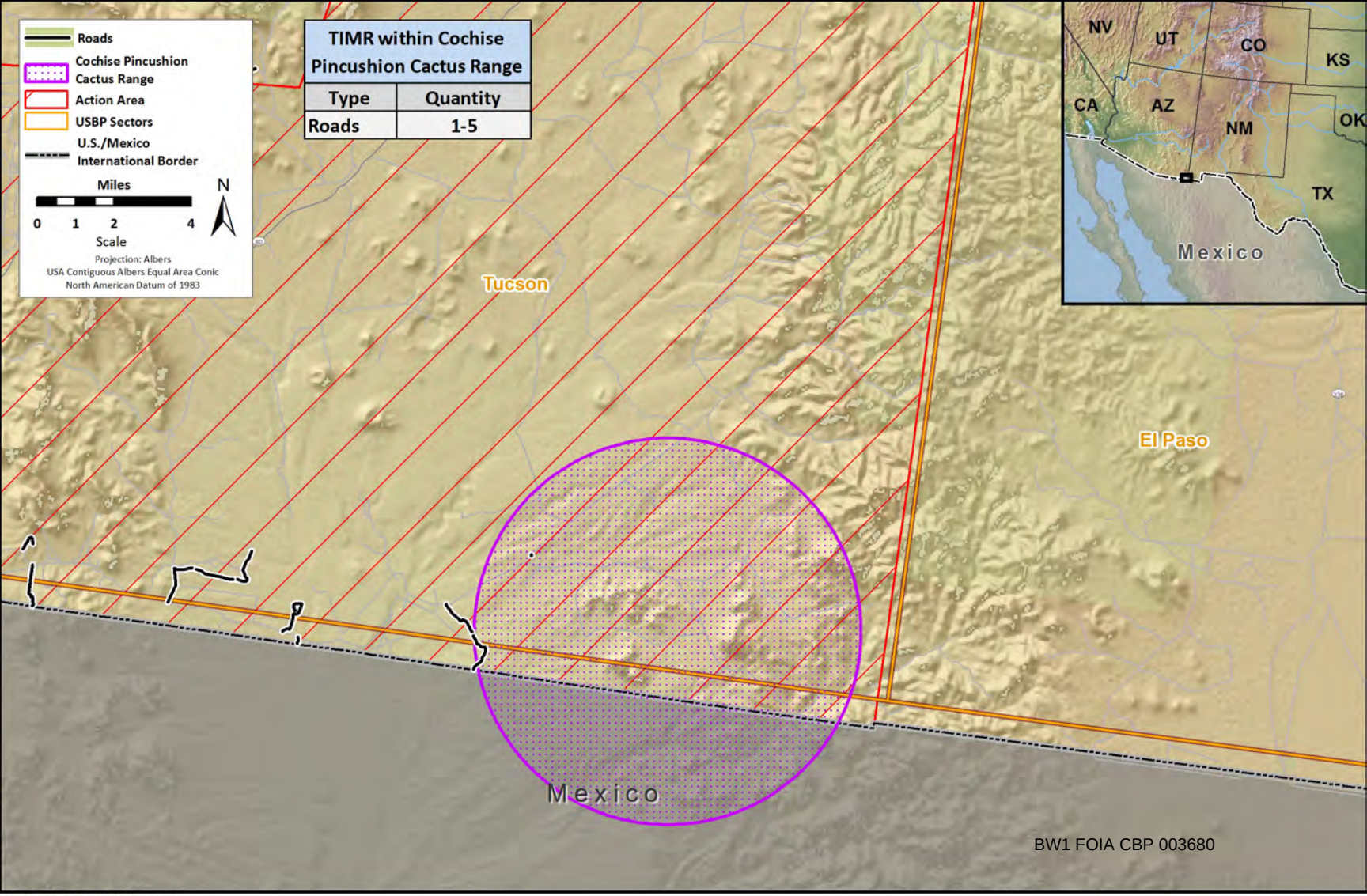


Source: ESRI StreetMap USA 2010



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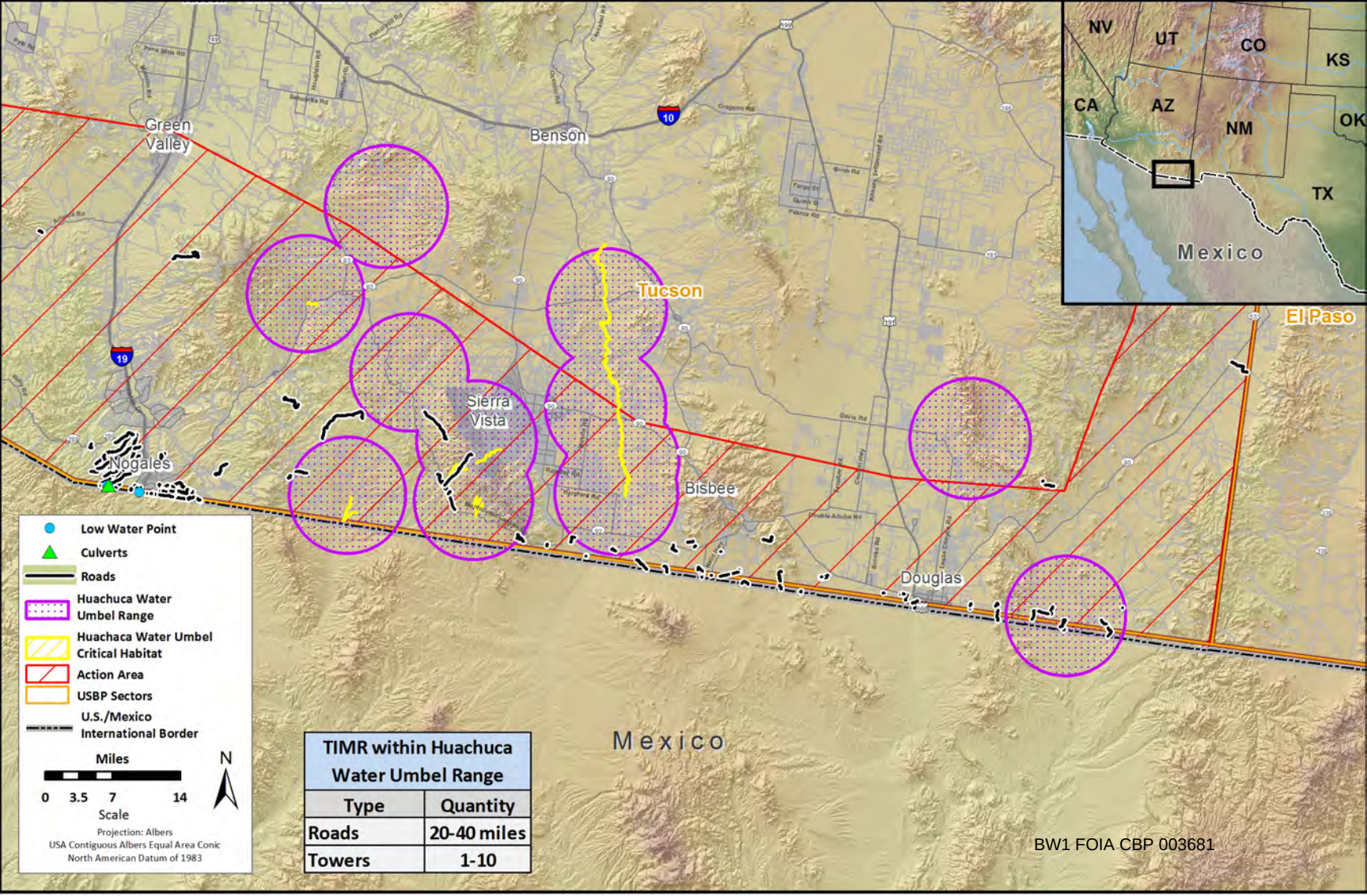
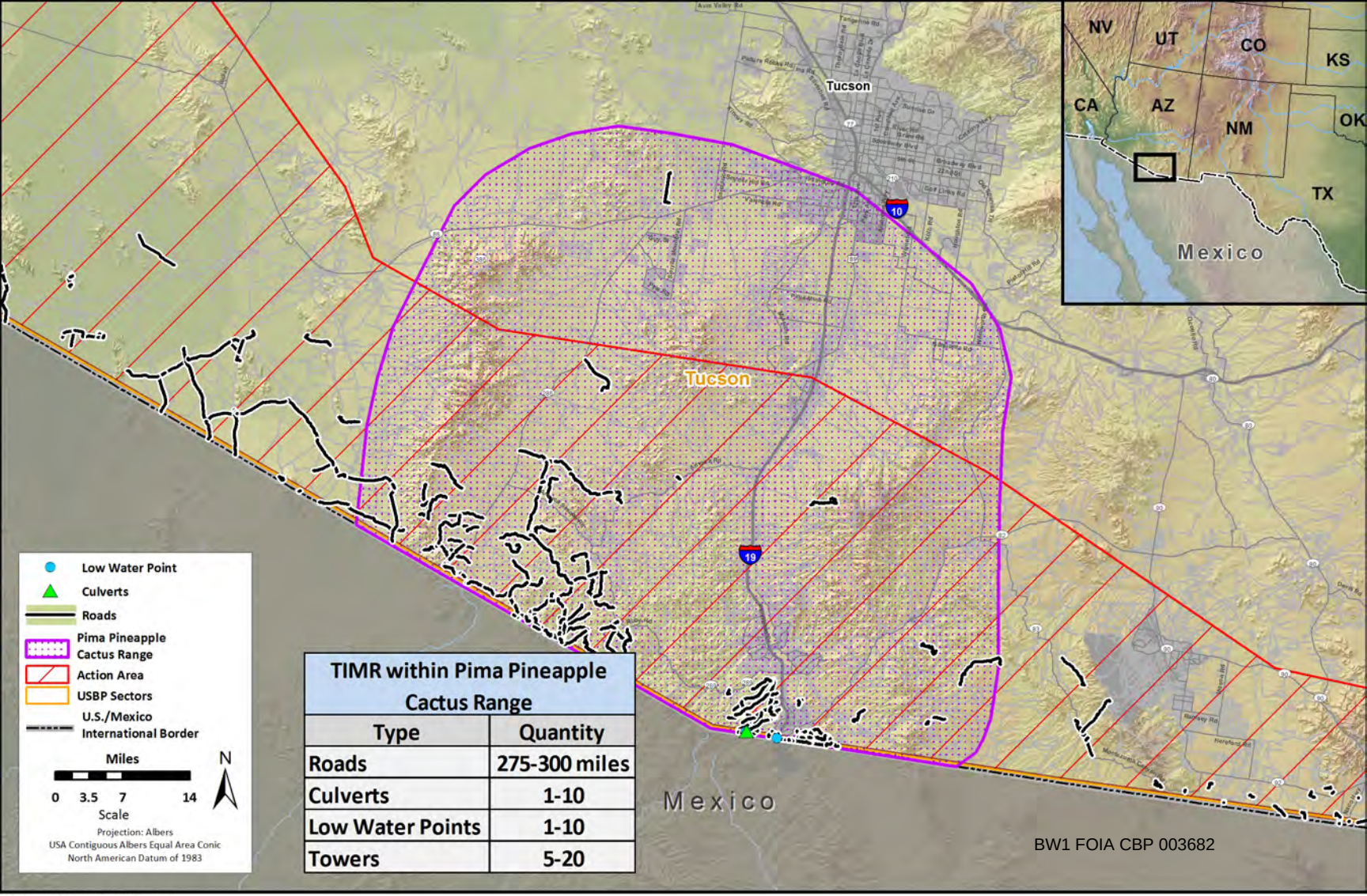


TIMR within Huachuca Water Umbel Range	
Type	Quantity
Roads	20-40 miles
Towers	1-10

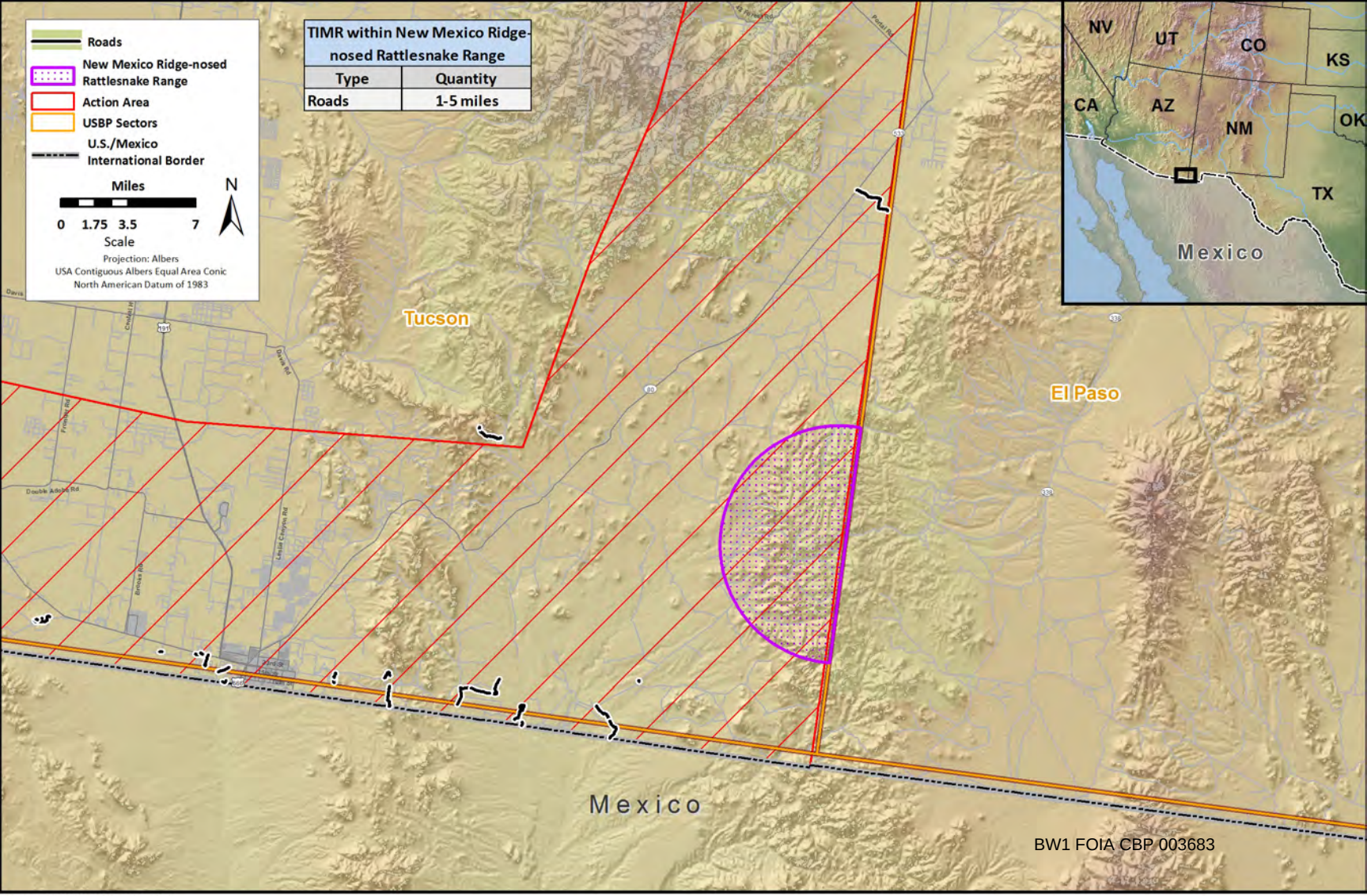
BW1 FOIA CBP 003681

Source: ESRI StreetMap USA 2010



TIMR within Pima Pineapple Cactus Range	
Type	**Quantity**
Roads	275-300 miles
Culverts	1-10
Low Water Points	1-10
Towers	5-20

Source: ESRI StreetMap USA 2010



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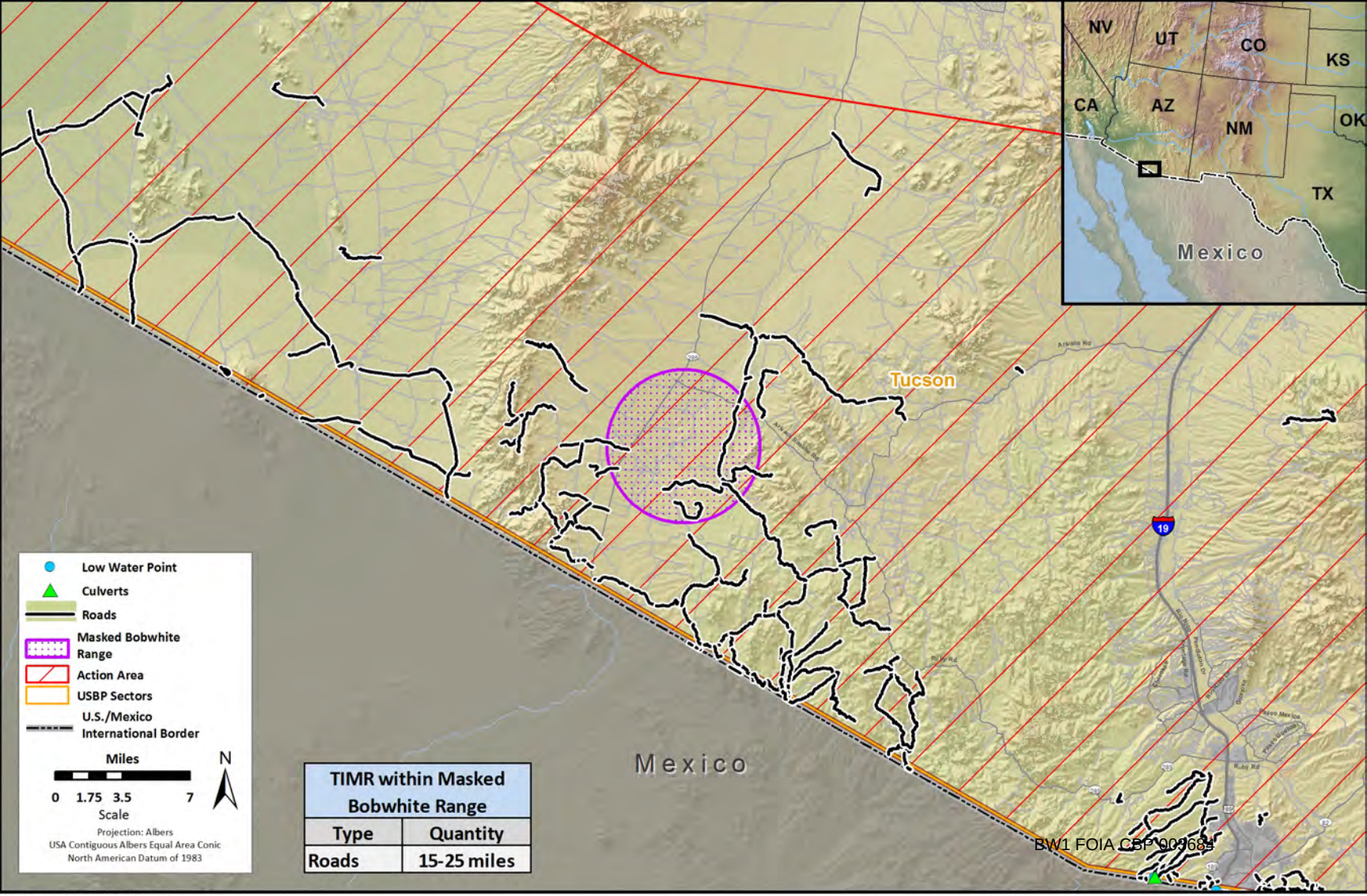
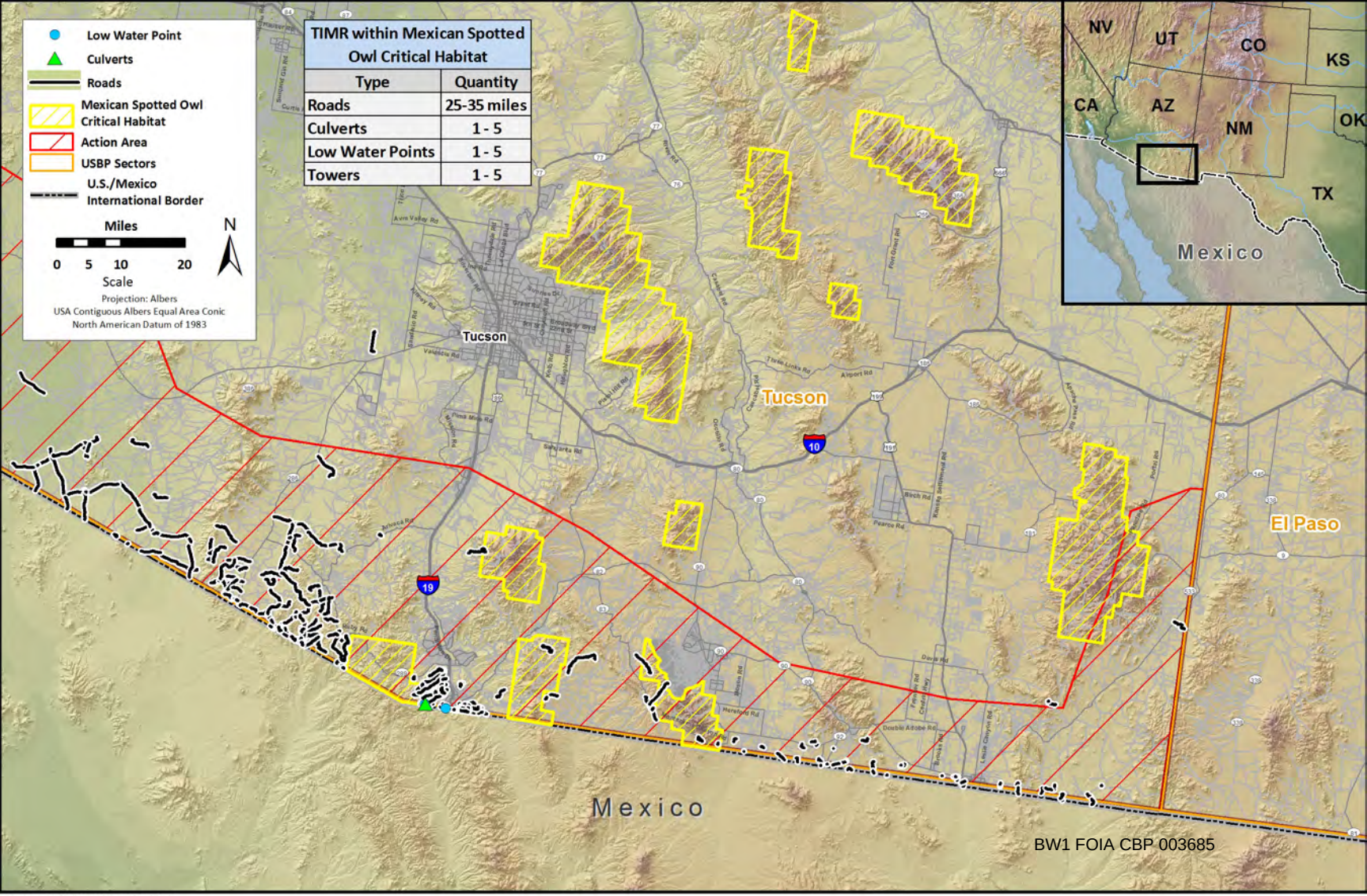


TIMR within Masked Bobwhite Range	
Type	Quantity
Roads	15-25 miles

Source: ESRI StreetMap USA 2010



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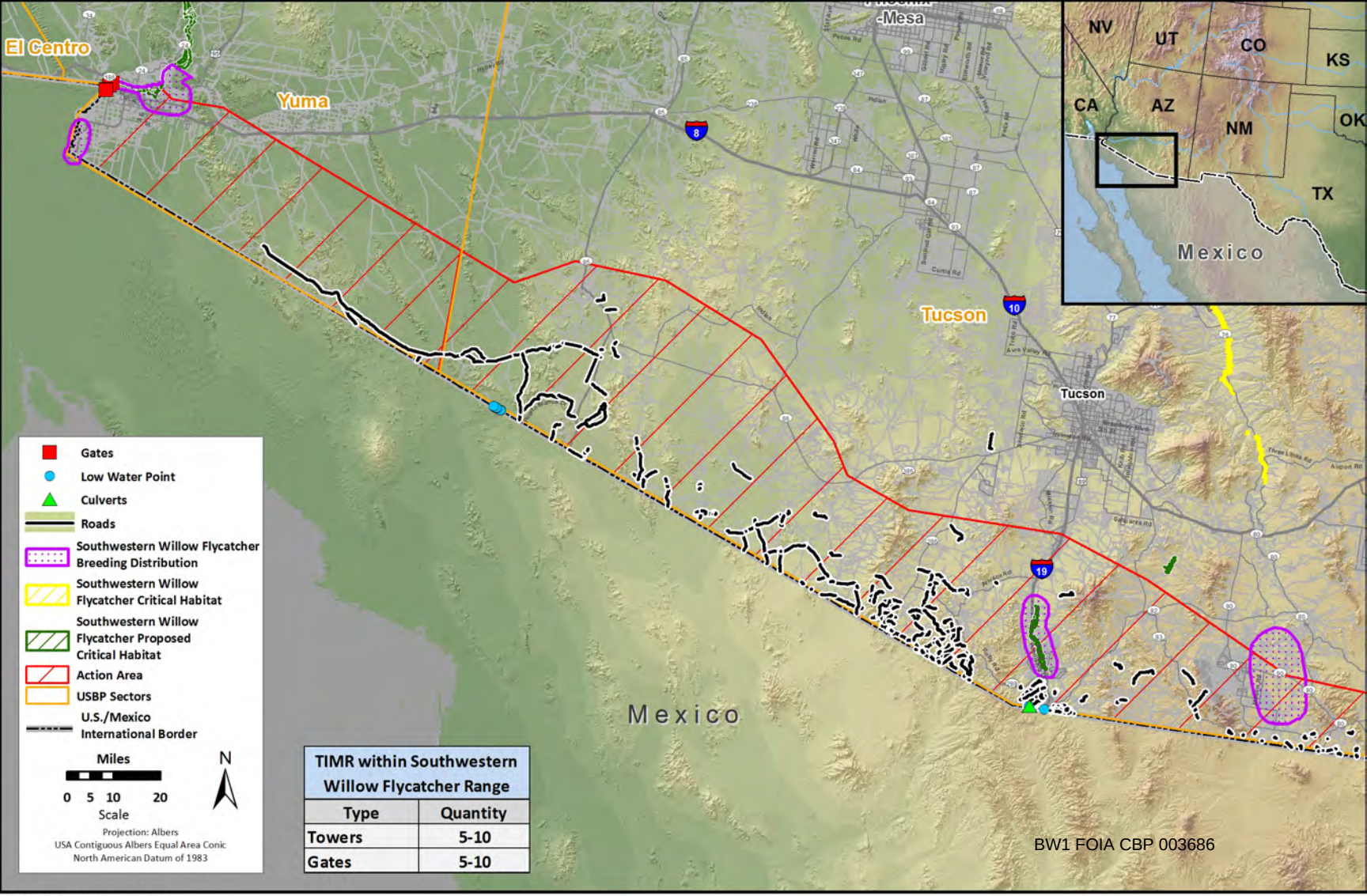
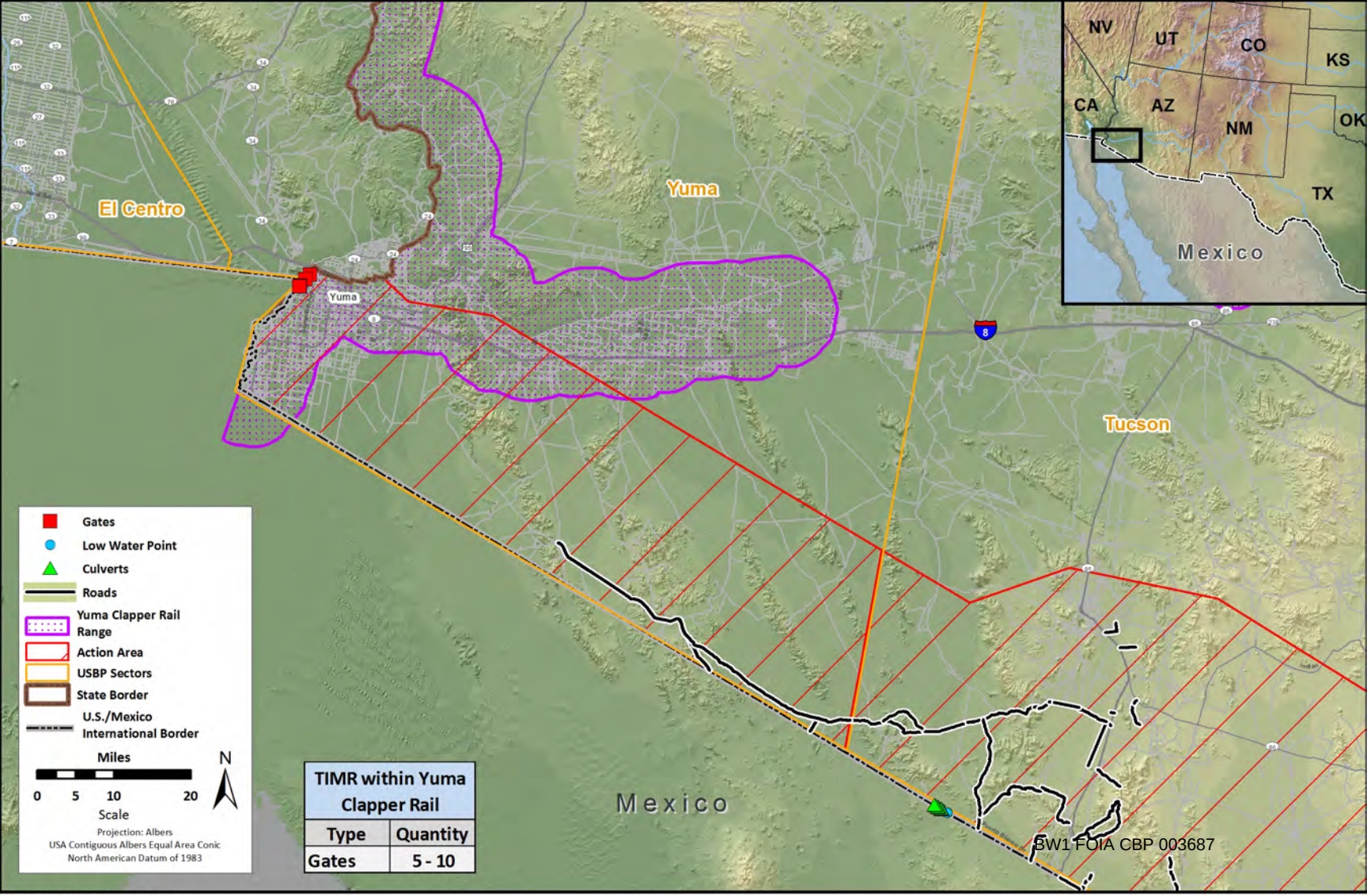


TIMR within Southwestern Willow Flycatcher Range	
Type	Quantity
Towers	5-10
Gates	5-10

BW1 FOIA CBP 003686

Source: ESRI StreetMap USA 2010



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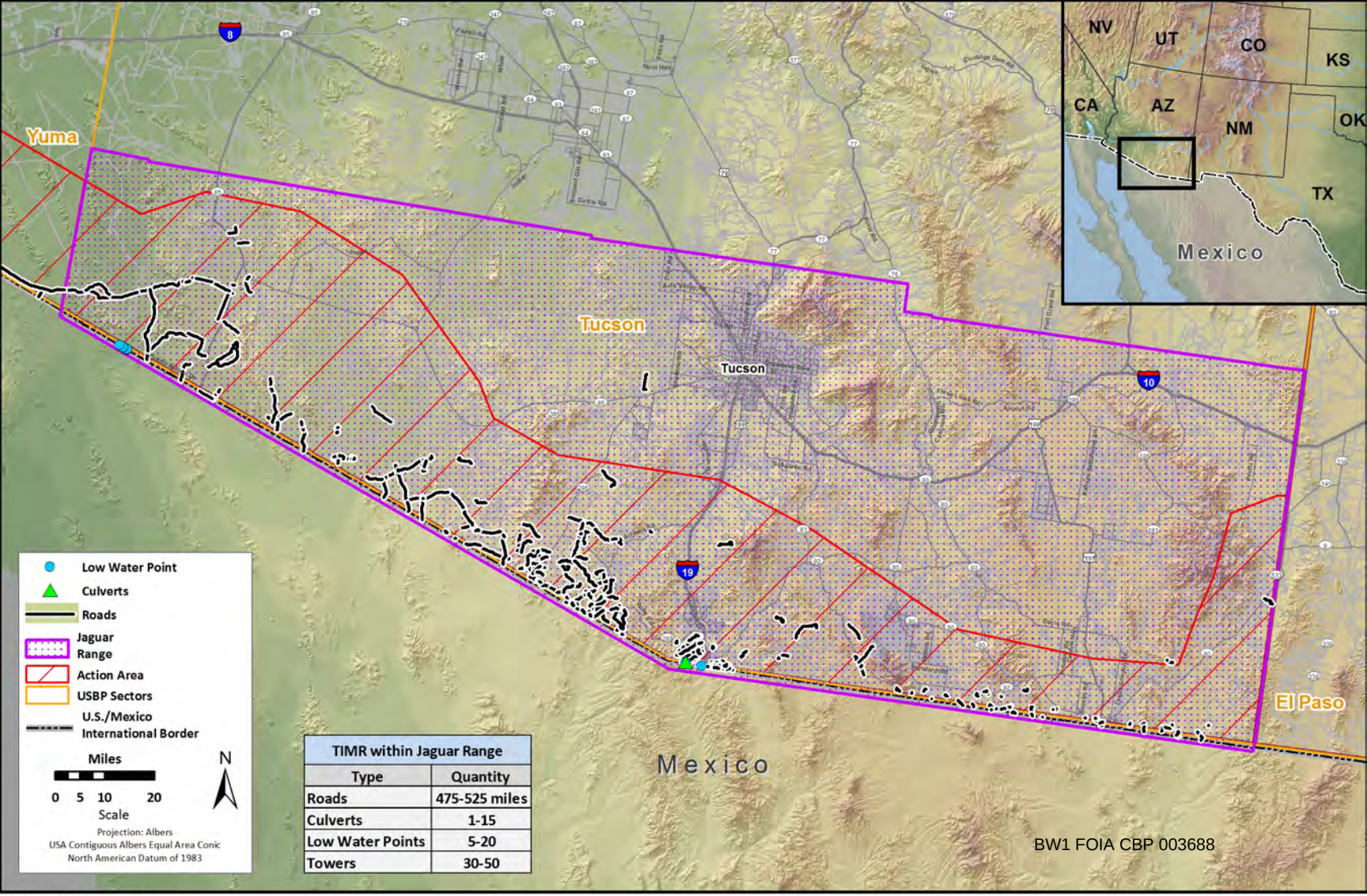
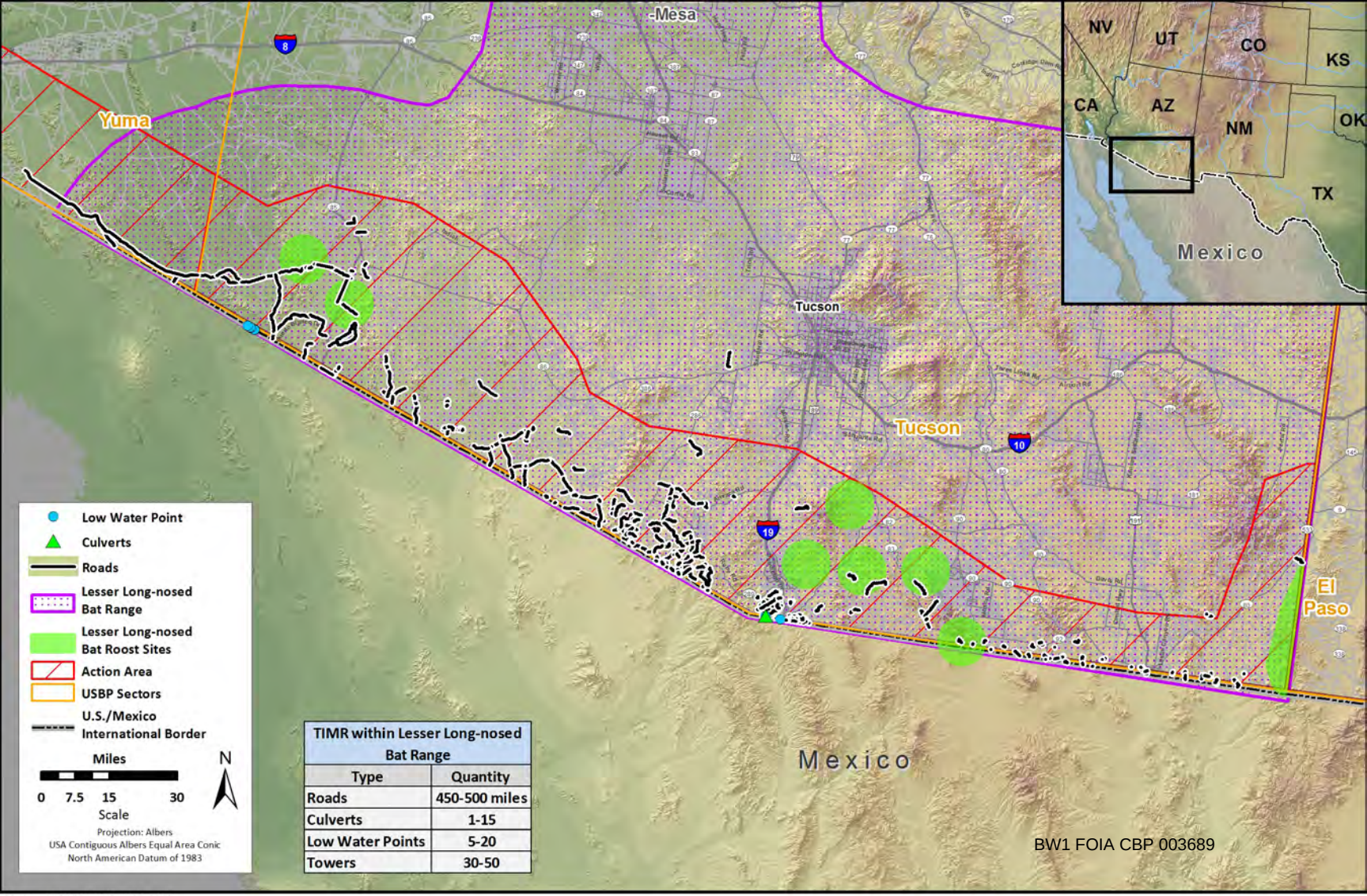


TIMR within Jaguar Range	
Type	Quantity
Roads	475-525 miles
Culverts	1-15
Low Water Points	5-20
Towers	30-50

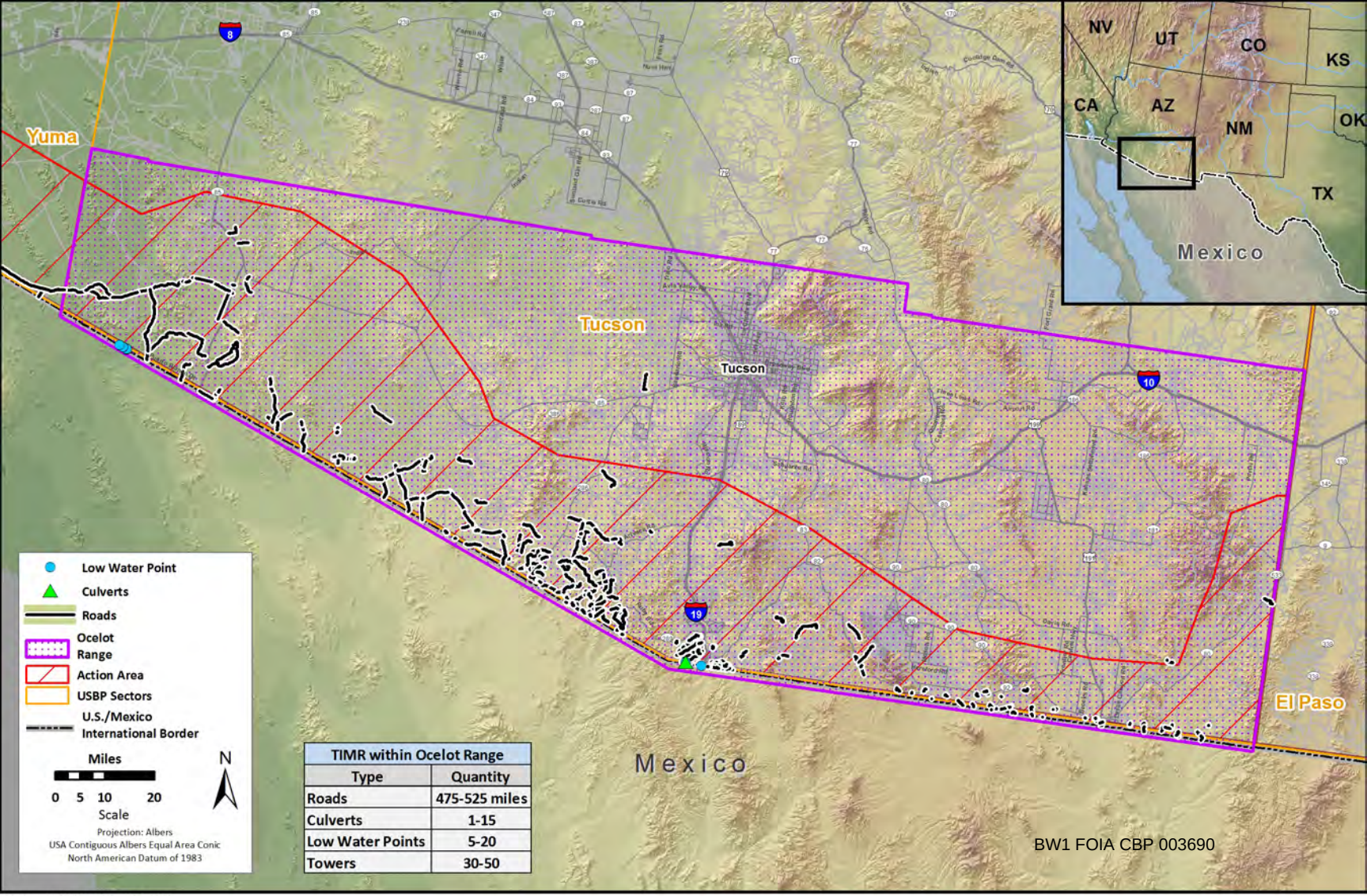
Source: ESRI StreetMap USA 2010



TIMR within Lesser Long-nosed Bat Range	
Type	Quantity
Roads	450-500 miles
Culverts	1-15
Low Water Points	5-20
Towers	30-50

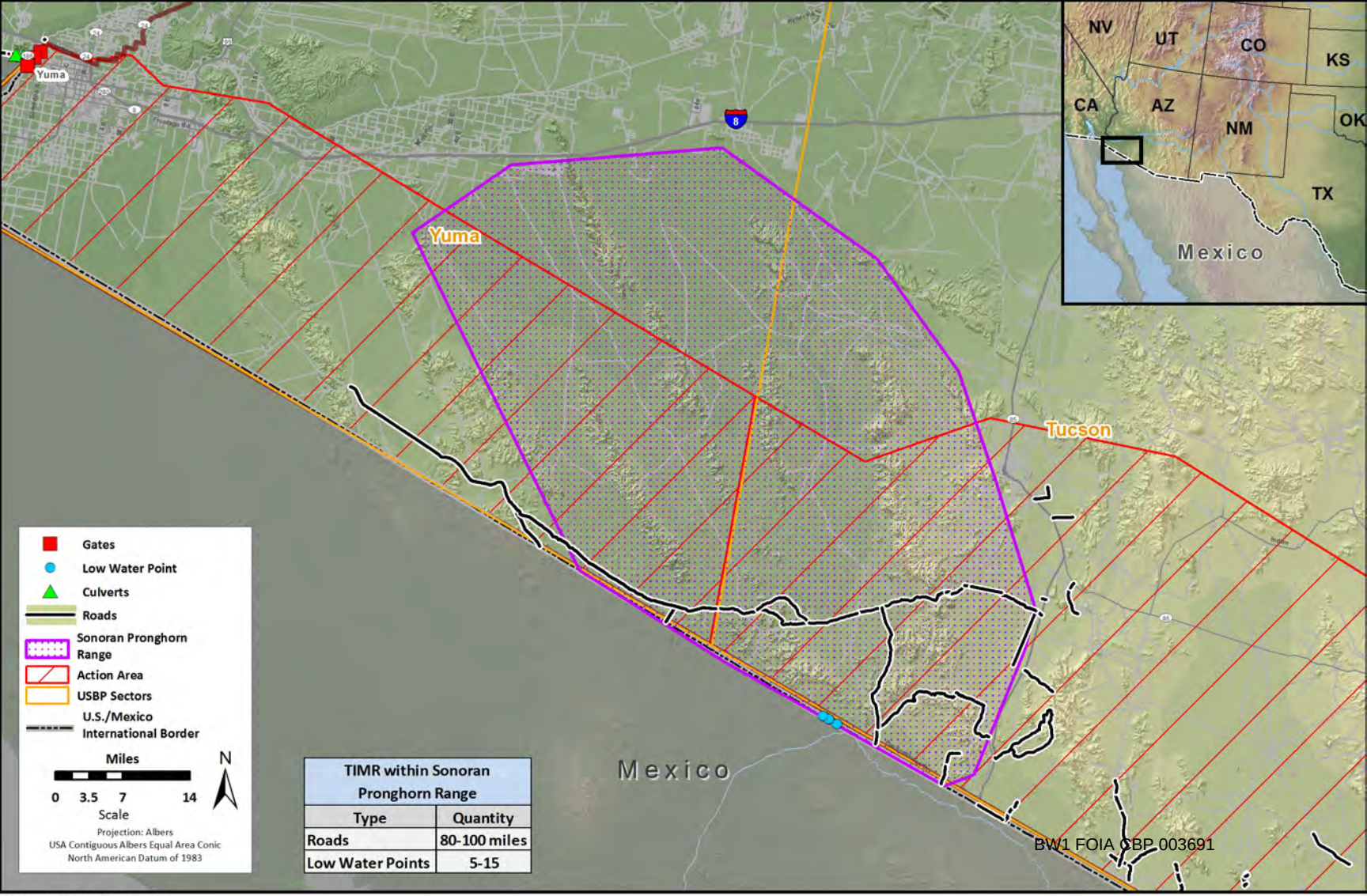
BW1 FOIA CBP 003689

Source: ESRI StreetMap USA 2010



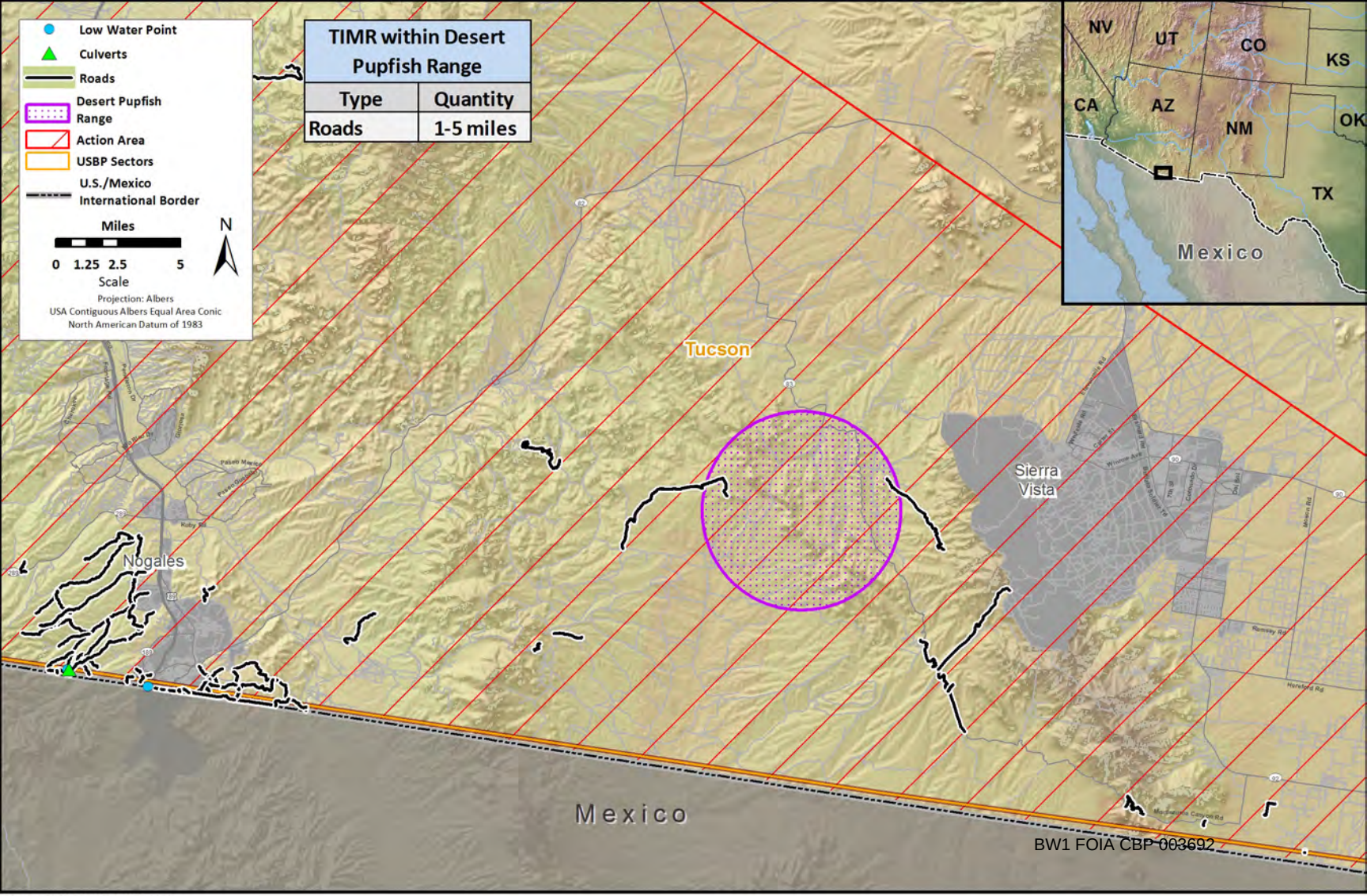
TIMR within Ocelot Range	
Type	Quantity
Roads	475-525 miles
Culverts	1-15
Low Water Points	5-20
Towers	30-50

Source: ESRI StreetMap USA 2010



TIMR within Sonoran Pronghorn Range	
Type	Quantity
Roads	80-100 miles
Low Water Points	5-15

Source: ESRI StreetMap USA 2010



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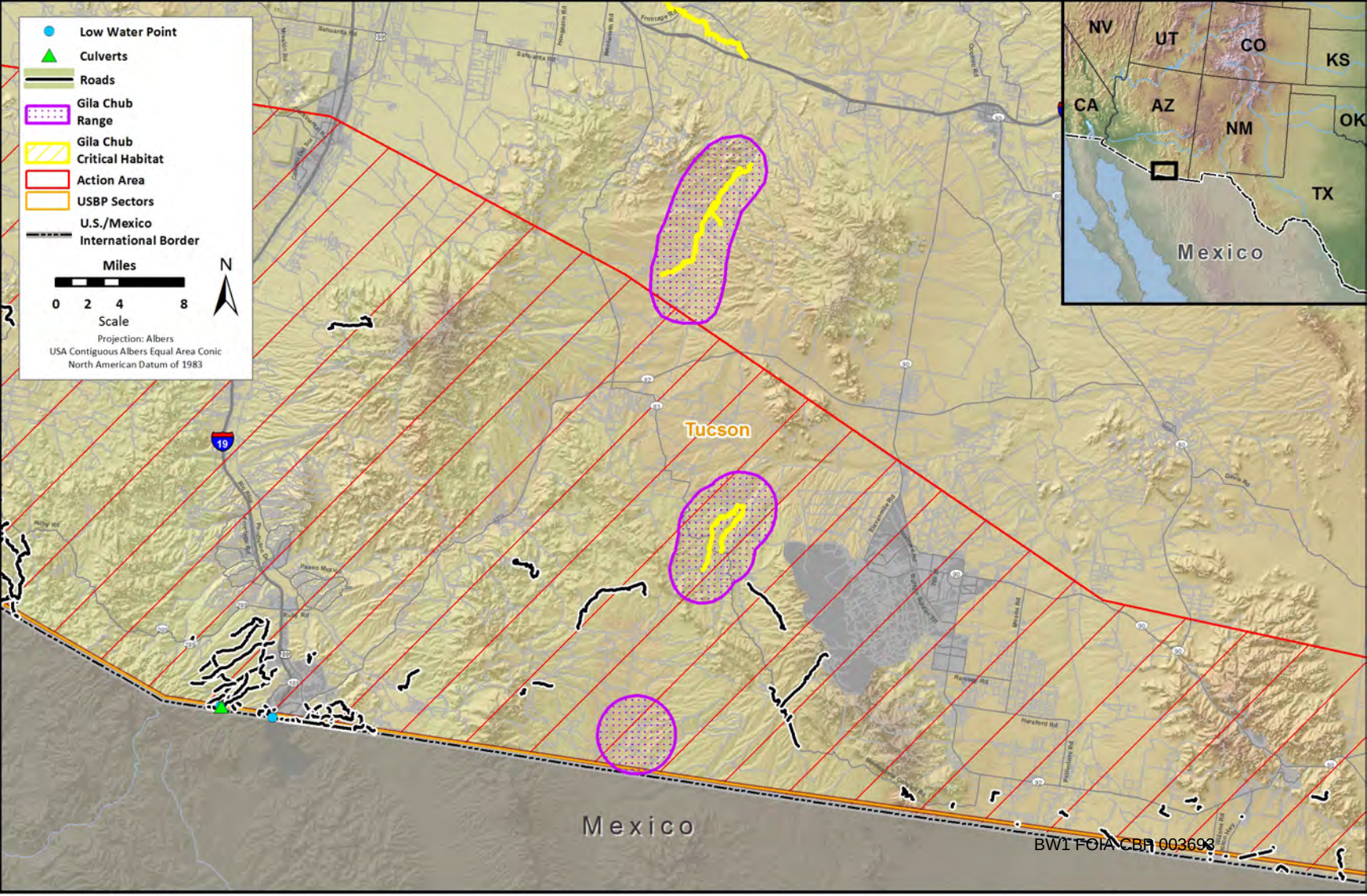

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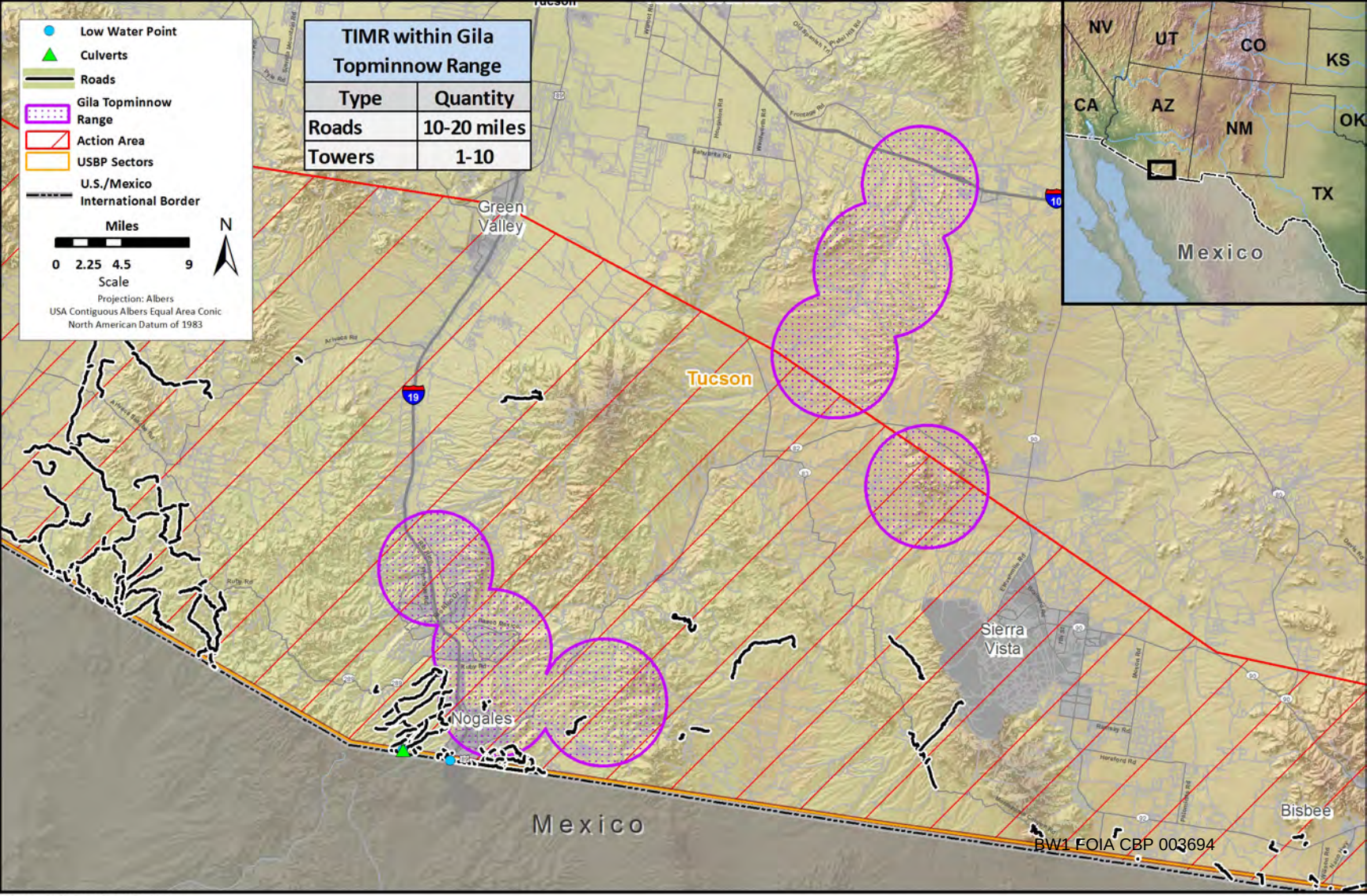
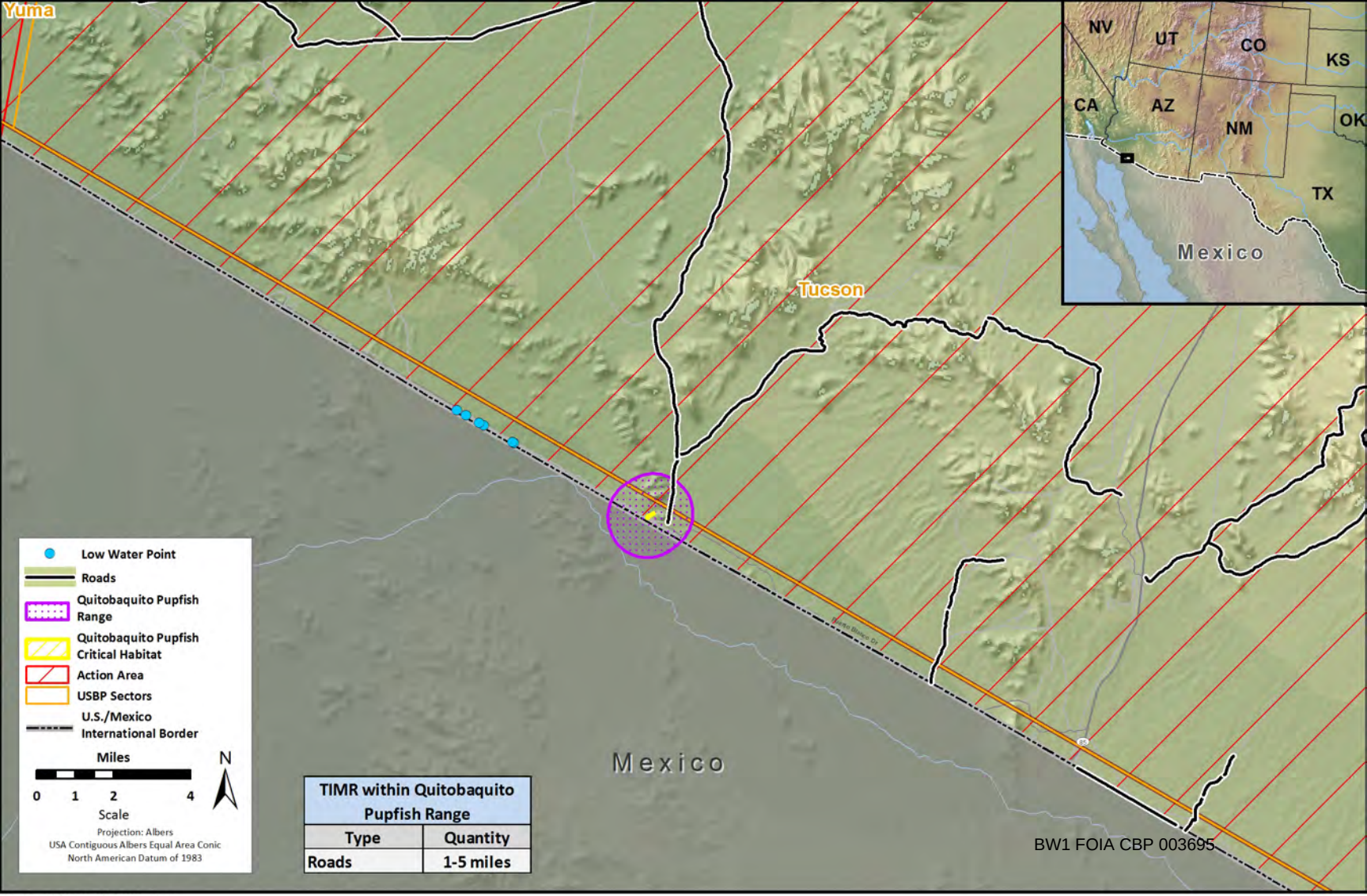


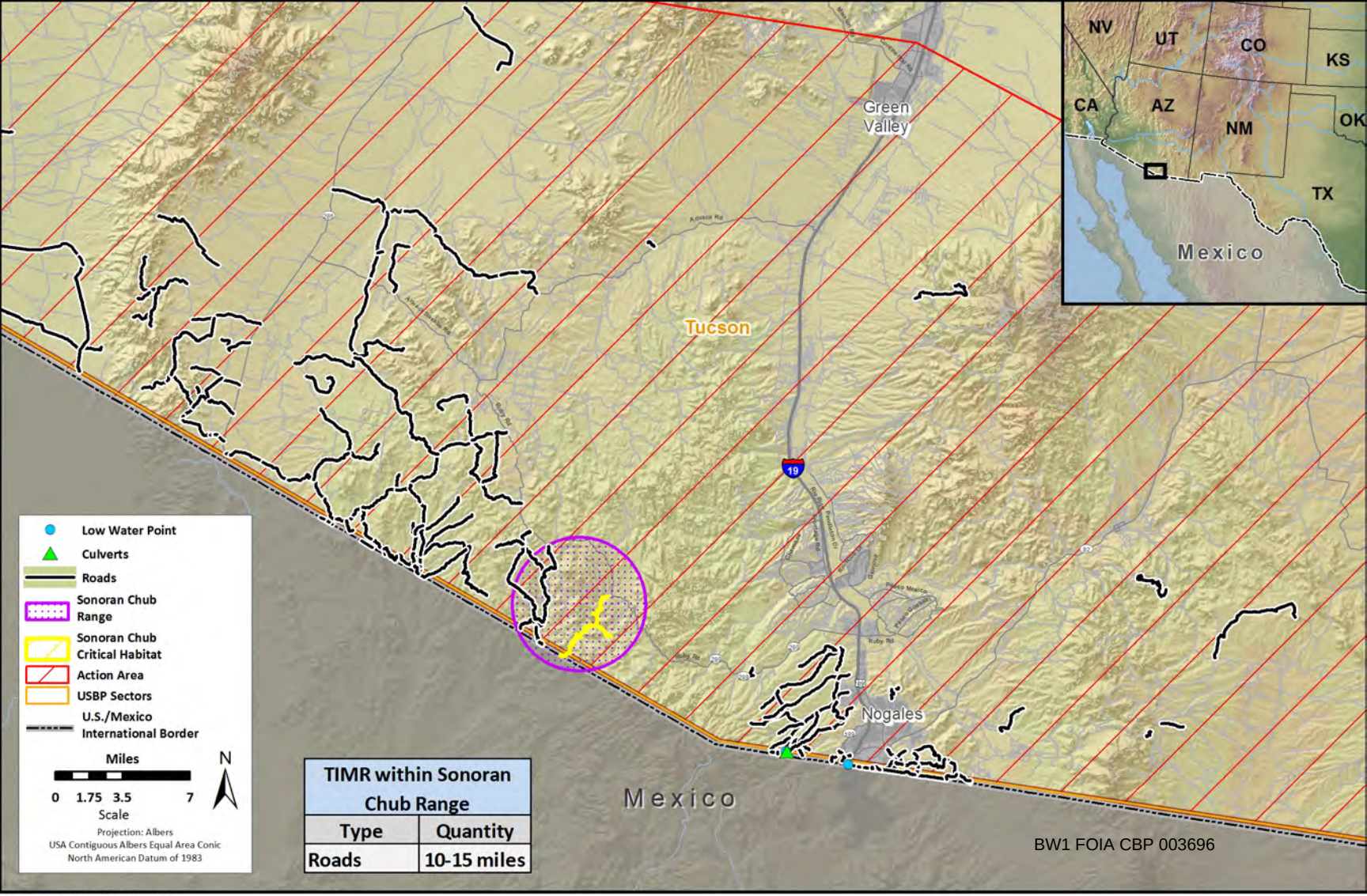
Source: ESRI StreetMap USA 2010



TIMR within Quitobaquito Pupfish Range	
Type	Quantity
Roads	1-5 miles

BW1 FOIA CBP 003695

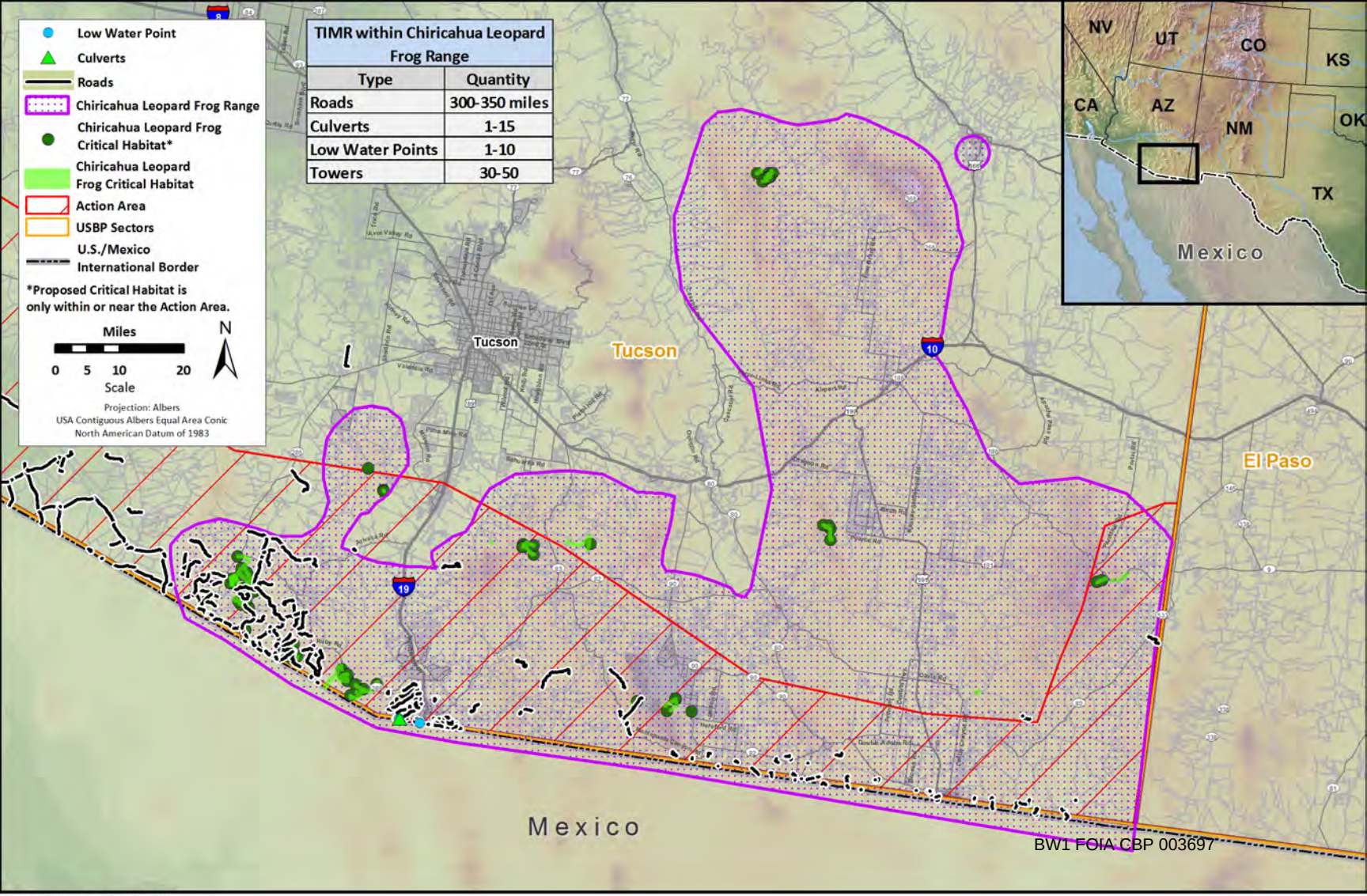
Source: ESRI StreetMap USA 2010



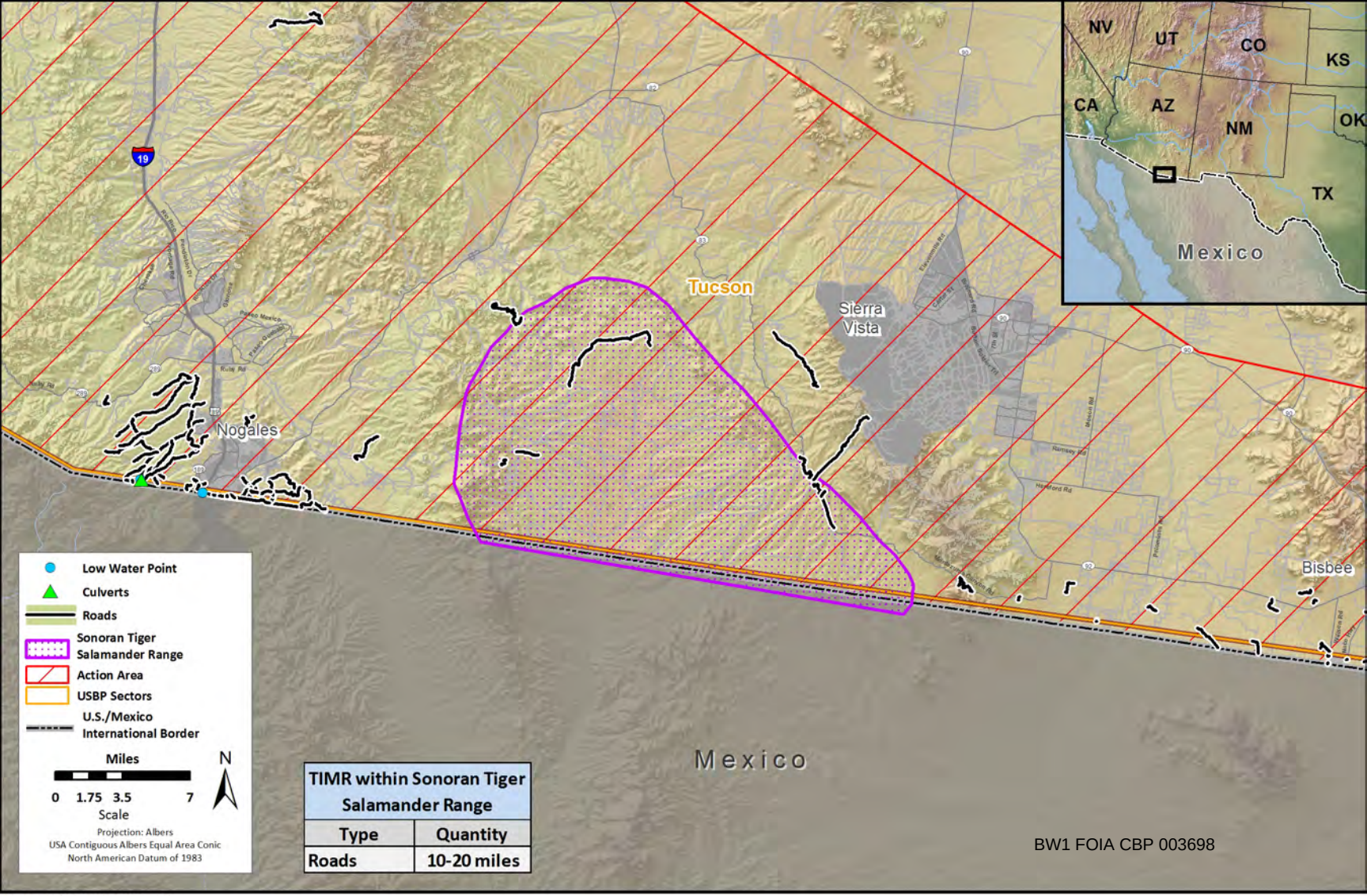
TIMR within Sonoran Chub Range	
Type	Quantity
Roads	10-15 miles

BW1 FOIA CBP 003696

Source: ESRI StreetMap USA 2010



Source: ESRI StreetMap USA 2010


NV
UT
CO
KS
CA
AZ
NM
OK
TX
Mexico
Tucson
Sierra Vista
Nogales
Bisbee
Mexico
Low Water Point
Culverts
Roads
Sonoran Tiger Salamander Range
Action Area
USBP Sectors
U.S./Mexico International Border
Miles
0 1.75 3.5 7
Scale
N
Projection: Albers
USA Contiguous Albers Equal Area Conic
North American Datum of 1983
TIMR within Sonoran Tiger Salamander Range
Type
Quantity
Roads
10-20 miles
BW1 FOIA CBP 003698
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 this Biological Assessment, 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, 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 C**. 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 threatened and endangered species could occur at each project location. The environmental subject matter expert 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 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 existing developed or previously used 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 tactical infrastructure maintenance and repair activities will take place on a Federal agency's land, the appropriate agency's herbicide policy must be followed for vegetation control. 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 U.S. Customs and Border Control (CBP) environmental SME to determine if the maintenance 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 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 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, use hand tools, mowing, trimming, or 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 outside the project footprint within endangered species habitat will be restored to pre-activity levels." This BMP does not apply to any non-native, invasive vegetation control that may occur as part of the TIMR 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 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 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 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.
7. 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.

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 activities. In areas where there are no threatened and endangered or other species concerns, the personnel performing the maintenance activity are responsible for monitoring the implementation of general maintenance and repair BMPs to avoid impacts on the environment.
2. To protect individuals of 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 (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 the tactical infrastructure within suitable habitat and within the range or designated critical habitat of threatened and endangered species will be limited. 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 TIMR maintenance personnel of the listed species that occur within the Program area, penalties for violation of state or Federal laws, implementation of included conservation actions/BMPS, and reporting requirements.
5. Check visible space underneath all vehicles and heavy equipment for listed species and other wildlife prior to moving vehicles and equipment at the beginning of each workday and after vehicles have idled for more than 15 minutes.
6. Coordinate with the CBP environmental SME to determine if the maintenance 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 activities occur in such an area, follow the CBP cleaning protocol.
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 one 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 (February 1 through September 1). Herbicide retreatments could occur throughout the year. When initial mechanical and chemical vegetation control must be implemented during February 1 through September 1, 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 of 300 feet will be established around the nest and no activities will occur within that zone until nestlings have fledged and abandoned the nest.
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 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 activities until the birds have left the nest. Confirmation that all young have fledged should be made by qualified personnel.

Species Specific BMPs

Fishes: Desert Pupfish *(Cyprinodon macularius)*, Gila Chub *(Gila intermedia)*, Gila Topminnow *(Poeciliopsis occidentalis occidentalis)*, Quitobaquito pupfish (*Cyprinodon eremus*), and Sonoran Chub *(Cyprinodon eremus)*

1. No in-water work will occur within streams or other waterbodies with known occurrences or designated critical habitat without further consultation with the USFWS.
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.

Perennial Plants: Canelo Hills Ladies'-tresses *(Spiranthes delitescens)*, Cochise Pincushion Cactus *(Coryphantha robbinsorum)*, Huachuca Water Umbel/Cienega False Rush *(Lilaeopsis schaffneriana recurva)*, and Pima Pineapple Cactus *(Coryphantha scherriv var. robustispina)*

1. No ground disturbance will occur outside the existing footprint in suitable habitat or designated critical habitat of Canelo Hills ladies'-tresses, Huachuca water umbel, and Cochise pincussion cactus, and areas within 0.25 miles upstream of suitable habitat or critical habitat of Canelo Hills ladies'-tresses and Huachuca water umbel, without further consultation with the USFWS.
2. Use of herbicides will not occur within areas of suitable habitat within the range or designated critical habitat of threatened or endangered plant species (see **Table A-1** and **Appendix C**) unless approved by the USFWS.
3. Cleaning or modification of culverts and other work in drainages that could cause sedimentation or otherwise affect water quality or quantity will not occur within, or within 0.5 miles upstream of, areas where Canelo Hills ladies' tresses or Huachuca water umbel occur without further consultation with the USFWS.

Chiricahua Leopard Frog *(Lithobates chiricahuensis)*

1. During the active season of the species (May through September) within designated critical habitat and within dispersal range of the species (1,3, or 5 miles depending on persistence of water in the aquatic system) of designated critical habitat, a qualified

biologist will monitor ground-disturbing maintenance activities and use of heavy equipment immediately prior to and during maintenance activities. Monitoring will occur

Table A-1. Threatened and Endangered Plant Species Suitable Habitat and Blooming Season

Common Name	Habitat	Blooming Season
Canelo Hills ladies' tresses	Fine-grained, highly organic, saturated soils of cienegas (i.e., spring-fed marshes) and among sedges and tall grasses up to an elevation of 1,524 meters (5,000 feet).	July–August
Cochise pincushion cactus	High-calcium Permian limestone, at elevations from 1,280 to 1,433 meters (4,200 to 4,700 feet) where Chihuahuan desert scrub transitions to semi-desert grassland.	March–April
Huachuca water umbel	Perennial springs, rivers, and stream headwaters that are permanently or seasonally saturated within Sonoran desertscrub, grassland or oak woodlands between 1,219 to 1981 meters (4,000 to 6,500 feet).	June–August
Pima pineapple cactus	Transition zone between the semi-desert grasslands and Sonora desert scrub on alluvial bajadas (lower slopes of mountains characterized by loose alluvial sediments and poor soil development) and slopes of less than 10 percent grade at elevations between 701 to 1,402 meters (2,300 to 4,600 feet).	July–August

prior to and during activities located within one mile overland of critical habitat or other locations where this species might occur, 3 miles downstream of that habitat along ephemeral drainages, and 5 miles downstream of that habitat along perennial streams. If a Chiricahua leopard frog is found in the project area and is in danger of being harmed (e.g. in the path of vehicles or foot traffic), work will cease in the area of the frog until either the qualified biological monitor can safely move the individual to a nearby location in accordance with USFWS Endangered Species Permit requirements, or it moves away on its own.

2. In-water work within critical habitat of the species will occur during the active season (May through September) so that frogs can escape to the best of their ability. (This BMP may conflict with Sonoran tiger salamander BMP #2. In areas where there is overlap between Sonoran tiger salamander and Chiricahua leopard frog ranges, CBP will base TIMR Program activity implementation on the species most likely to occur in the area and on the potential for effects to either species). In addition, maintenance will be designed and implemented so that the hydrology of streams, ponds, and other habitat is not altered.

3. A site-specific SWPPP and a spill protection plan will be prepared and regulatory approval sought, as required by regulations, for maintenance and repair activities that could result in sedimentation and that occur within 0.3 miles of critical or other occupied habitat. This will include, but is not limited to, placing straw bale type sediment traps at the inlet of ponds or stock tanks and upstream of drainages known to be occupied by the species or within critical habitat of the species.

4. To prevent the spread of amphibian diseases among drainages via water or mud on maintenance vehicles and equipment, all maintenance work within Chiricahua leopard frog critical habitat shall conform to amphibian disease prevention protocols as described in the Recovery Plan for the Chiricahua leopard frog. Equipment would either be disinfected between uses at different sites or rinsed and air dried.
5. Any use or storage of chemicals or fuels will be kept 0.3 miles away from critical habitat and other locations where this species occurs.
6. Routine road maintenance practices will be implemented to avoid prolonged establishment of road and tire ruts within and adjacent to Chiricahua leopard frog critical habitat.
7. Use of herbicides will not occur within 0.3 miles of Chiricahua leopard frog critical habitat or other suitable habitat within the range of this species, unless approved by the USFWS.
8. Prior to any in-water work within critical habitat of this species, CBP will contact USFWS personnel at the Arizona Ecological Services Office to determine if frogs will be salvaged and placed in holding facilities until work is complete. Capture, movement, and holding of frogs would be accomplished by permitted biologist at the expense of CBP under all appropriate State and Federal permits, including permit conditions to ensure minimal harm or mortality."

Sonoran Tiger Salamander *(Ambystoma tigrinum stebbinsi)*

1. A qualified biologist will monitor all ground-disturbing maintenance activities and use of heavy equipment that occurs within 0.1 mile of Sonoran tiger salamander suitable habitat (i.e., cattle ponds and tanks with standing water) within the range of this species, immediately prior to and during the maintenance activity. This monitoring will occur for all maintenance and repair activities to be conducted in vegetated or undisturbed areas. Burrows of fossorial animals identified by the monitor will be left intact if possible. If a Sonoran tiger salamander is observed, the monitor will photograph the dorsal side of the salamander if possible without handling the salamander, record the geographic coordinates of its location, and report the location to the Arizona Ecological Services Office of the USFWS within 72 hours. If the salamander is in danger of being harmed (e.g. in the path of vehicles or foot traffic), work will cease in the area of the species until either the qualified biological monitor can safely move the individual to a nearby location in accordance with the USFWS Endangered Species Permit requirements, or it moves away on its own.
2. In-water work within the range of this species will occur during period of low or no flow to minimize the chance of encountering a salamander (This BMP may conflict with Chiricahua leopard frog BMP #2. In areas where there is overlap between Sonoran tiger salamander and Chiricahua leopard frog ranges, CBP will base TIMR Program activity implementation on the species most likely to occur in the area and on the potential for effects to either species). In addition, maintenance will be designed and implemented so that the hydrology of streams, ponds, and other habitat is not altered.
3. A site-specific SWPPP will be prepared and regulatory approval sought, as required by regulations, for maintenance and repair activities that could result in sedimentation and

that occur within 0.3 miles of suitable habitat within the range of this species. This will include, but is not limited to, placing straw bale type sediment traps at the inlet of ponds or stock tanks known to be occupied by the species.

4. Use of herbicides will not occur within 0.3 miles of Sonoran tiger salamander suitable habitat within the range of this species, unless approved by the USFWS.
5. Maintenance vehicles and equipment will be operated at speeds of 25 mph or less within 0.3 miles of Sonoran tiger salamander suitable habitat within the range of this species during the breeding season (January through June).
6. All maintenance activities within 0.3 miles of Sonoran tiger salamander suitable habitat within the range of this species will be conducted during daylight hours.
7. To prevent the spread of amphibian diseases among drainages via water or mud on maintenance vehicles and equipment, all maintenance work within known, occupied Sonoran tiger salamander habitat shall conform to amphibian disease prevention protocols as described in the Recovery Plan for the Sonoran tiger salamander. Equipment would either be disinfected between uses at different sites or rinsed and air dried.

New Mexico Ridge-nosed Rattlesnake *(Crotalus willardi obscures)*

1. Maintenance vehicles will not exceed a speed of 15 to 20 mph during periods of elevated roaming and foraging activities from July through August within New Mexico ridge-nosed rattlesnake habitat (i.e., pine-oak woodlands at high elevations of 1,475 and 2,800 meters [5,600 to 9,000 feet]).

Birds: Masked Bobwhite *(Colinus virginianus ridgwayi)*, Mexican Spotted Owl *(Strix occidentalis lucida)*, Southwestern Willow Flycatcher *(Empidonax trailli extimus)*, and Yuma Clapper Rail *(Rallus longirostris yumanensis)*

1. No maintenance and repair activities will be conducted within areas classified as protected activity centers of Mexican spotted owls during the nesting season.
2. Vegetation control in suitable habitat of threatened or endangered bird species (see **Table A-2** for a description of suitable habitat and nesting season for each species) will be limited to the minimum necessary to maintain drivable access roads and to maintain the functionality of other tactical infrastructure. This limited vegetation control will be conducted outside of the nesting season (see **Table A-2**). 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 PCE.
3. For all other maintenance activities to be conducted within suitable habitat of a threatened or endangered bird species during the nesting season (see **Table A-2**), the following avoidance measures will apply. A qualified biologist will conduct a survey for threatened and endangered birds prior to initiating maintenance activities. If a threatened or endangered bird is present, a qualified biologist will survey for nests approximately once per week within 1,300 feet (Mexican spotted owl) or 500 feet (all other species) of the maintenance area for the duration of the activity. If an active nest is found, no

maintenance will be conducted within 1,300 feet (Mexican spotted owl) or 300 feet (all other species) of the nest until the young have fledged.

Table A-2. Threatened and Endangered Bird Species Suitable Habitat and Nesting Season

Common Name	Suitable Habitat	Nesting Season
Masked bobwhite quail	Savannah grassland within Buenos Aires NWR	Jul 1–Nov 30
Mexican spotted owl	Closed-canopy forests [riparian, mixed conifer, pine-oak, and pinyon juniper woodland] and steep, narrow, entrenched, rocky canyons and cliffs within designated critical habitat	Mar 1–Jun 30
Southwestern willow flycatcher	Dense riparian habitat along streams, rivers, lakesides, and other wetland	Mar 15–Sep 15
Yuma clapper rail	Freshwater marshes generally dominated by cattail [*Typha* spp.] and bulrush [*Scirpus* ssp.] with a mix of riparian trees and shrubs	Mar 15–Jul 15

Lesser Long-nosed Bat *(Leptonycteris yerbabuenae)*

1. Removal of columnar cacti (i.e., saguaro and organ pipe) and 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 columnar cactus (i.e., saguaro and organ pipe) and agave to be avoided.
2. No maintenance and repair activities will be conducted within 0.5 miles of any known lesser long-nosed bat roost between mid-April through mid-September. UFWS will provide CBP with an updated list and maps of known lesser long-nosed bat roosts.
3. For maintenance and repair activities that will take place greater than 0.5 miles and less than 5 miles of any known lesser long-nosed bat roost, limit activities to daylight hours only from mid-April through mid-September to avoid effects on 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.

Sonoran Pronghorn *(Antilocapra americana sonoriensis)*

1. Minimize the number of daily vehicle trips required for maintenance to reduce the likelihood of disturbing Sonoran pronghorn in the area or injuring an animal on the road. The use of vehicle convoys, multi-passenger vehicles, and other methods are appropriate. This can be adjusted if additional personnel and equipment will complete the work faster and thus reduce the time of the disturbance.

2. During maintenance activities, if a Sonoran pronghorn is observed by a maintenance crew upon arrival at the work site and within 1 mile of the work site, delay beginning use of heavy mobile equipment (road grader, dump trucks, etc) until the animal(s) move greater than one mile from the work site. When driving on roads, stop the vehicle if pronghorn are observed in front of or forward of the vehicle. As their distance from the road extends and it is obvious that the pronghorn is (are) departing, proceed forward at reduced speed of 10 to 15 mph.
3. No Program activities will occur during the fawning season (March 15 to July 31) within suitable Sonoran pronghorn habitat (i.e., Sonoran desert scrub communities) within the range of this species. Some flexibility with these dates is possible, depending on forage conditions. If CBP determines that TIMR activities is needed in these areas during the fawning season, exceptions to working during the fawning season may be granted through coordination with the UFWS and other the relevant Federal land managers, depending on forage conditions.

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 prior to applicable maintenance activities (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 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 (EO) 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 (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 ground 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 ground 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 ground 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.

Air Quality

1. *Arizona State Law 49-474.05* - Applies in PM_{10} Nonattainment areas - Site Superintendent, Water Truck Drivers, and Dust Control Coordinators (DCC) will be required to be trained once every 3 years on dust-control measures. If disturbance is greater than 1 acre, a DCC will be required to be on site at all times during dust-generating activities.
2. *Arizona Administrative Code - R18-2-604 - Open Areas* - restricts fugitive dust emissions from open areas including, but not limited to, driveways, parking areas, vacant lots, dry washes, and riverbeds. Good modern practices for earth-moving/excavating activities will be implemented. These include using approved dust suppressants or adhesive soil stabilizers, paving, covering, landscaping, continuous wetting, or detouring maintenance and repair areas, barring access to maintenance and repair areas, or other acceptable means of reducing significant amounts of airborne dust.
3. *Arizona Administrative Code - R18-2-605 - Roadways and Streets* - restricts fugitive dust emissions from roadways and alleys, including the transportation of materials over those roadways or alleys. Dust and other particulates shall be kept to a minimum by employing the following techniques: temporary paving, dust suppressants, wetting down of roadways, detouring through traffic, or by other reasonable means.
4. *Arizona Administrative Code - R18-2-606 - Materials Handling* - restricts fugitive dust emissions from nonpoint sources associated with operations such as material crushing, screening, handling, transporting, or conveying. No crushing, screening, handling, transporting, or conveying of materials or other operations likely to result in significant amounts of airborne dust will occur without taking reasonable precautions (such as the use of spray bars, wetting agents, dust suppressants, covering the load, and hoods to cover maintenance and repair areas) to prevent excessive amounts of particulate matter from becoming airborne.
5. *Arizona Administrative Code - R18-2-607 - Storage Piles* - restricts fugitive dust emissions from material stacking, piling, or similar storage methods. Organic or inorganic dust-producing material will not be stacked, piled, or otherwise stored without taking reasonable precautions to reduce excessive amounts of particulate matter from becoming airborne, such as chemical stabilization, wetting, or covering. Stacking and reclaiming machinery used near storage piles will be operated at all times to prevent excessive amounts of particulate matter from becoming airborne.

6. *Yuma County Ordinance - 05 -01* - During maintenance and repair in Yuma County, a construction activity sign will be required in PM_{10} Nonattainment areas.
7. *Pima County Code - 17.12.470 - Fugitive dust activity permits* – No person shall conduct, cause, or allow land stripping, earthmoving, blasting, trenching, or road construction without first obtaining an activity permit from the Control Officer.
8. *Santa Cruz County Ordinance - 2001-06* - Dust- and erosion-control methods are required and a permit for grading is required.
9. *Cochise County Land Clearing Ordinance - 00-030* - A clearing permit is required for disturbances of 1 acre or more, which includes approval of dust-control measures. Clearing permit for road maintenance is exempt if initial road construction occurred before July 17, 2000.

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 (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, 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 Arizona 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 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. Implement proper and routine maintenance of all vehicles and other maintenance equipment such that emissions are within the design standards of all maintenance equipment.
8. 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.
9. Do not use paints more than 15 years old. They could contain toxic levels of lead.
10. 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.
11. 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 Region of Analysis

APPENDIX F

Soils within the Tactical Infrastructure Maintenance and Repair Area of Analysis

Table F-1. Soil Properties of Soils Mapped along the U.S./Mexico international Border in Arizona

Map Unit Name	Counties	Erosion Potential	Farmland Classification	Permeability
Arizona				
Coolidge-Wellton-Antho	Yuma	Slight	None	Moderately rapid
Imperial-Glenbar-Holtville	Yuma	Slight	None	Slow to moderate
Harqua-Perryville-Gunsight	Yuma	Slight	None	Moderately slow
Rillito-Gunsight-Pinal	Pima, Yuma	Slight	None	Moderate to rapid
Comora-Pima	Santa Cruz	Slight	None	Slow
Gothard-Crot-Stewart	Cochise	Slight	None	Moderately slow
Elfrida	Cochise	Slight	None	Moderately slow
Karro	Cochise	Slight	None	Moderate to slow
McAllister	Cochise	Slight	Prime Farmland soil if Irrigated	Slow
Mohave	Cochise	Slight	None	Moderately slow
Dry Lake-Playa	Cochise	Slight	None	Moderately slow
Comoro-Anthony-Grabe	Cochise	Slight	None	Moderately rapid
Vinton-Gila	Cochise, Pima	Slight	None	Rapid
Guest	Cochise	Slight	Prime Farmland soil if irrigated and protected from flooding	Slow to very slow

Sources: NRCS 2003, NRCS 2011

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APPENDIX G

Air Quality Emissions Calculations

Summary	Summarizes total emissions by calendar year for the Proposed Action in Arizona
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	4.25	0.26	1.60	0.08	0.26	0.25	504.04
Construction Fugitive Dust	-	-	-	-	386.91	38.69	-
Construction Commuter	0.11	0.11	0.99	0.001	0.01	0.01	131.48
TOTAL	***4.36***	***0.37***	***2.59***	***0.09***	***387.18***	***38.95***	***635.52***

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

CO_2 emissions converted to metric tons =	***576.41***	***metric tons***	
State of Arizona's CO_2 emissions =	***103,014,944***	***metric tons***	*(EIA 2011)*
Percent of State of Arizona's CO_2 emissions =	***0.0006%***	***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**		
Arizona Grading Activities	14,784,000	ft^2	Road Grading would be 140 miles by 20 feet wide
Total General Construction Area:	14,784,000	ft^2	
	339.4	acres	
Total Demolition Area:	0	ft^2	(none)
	0.0	acres	
Total Pavement Area:	0	ft^2	(none)
	0.0	acres	
Total Disturbed Area:	14,784,000	ft^2	
	339.4	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	34	1415.802	87.618	534.137	28.316	86.547	83.951	168011.896
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:	14,784,000	339.39	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	8,494.81	525.71	3,204.82	169.90	519.28	503.71	1,008,071
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	-	-	-	-	-	-	0
Architectural Coatings	-	-	-	-	-	-	0
Total Emissions (lbs):	**8,494.81**	**525.71**	**3,204.82**	**169.90**	**519.28**	**503.71**	**1,008,071**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	8,494.81	525.71	3,204.82	169.90	519.28	503.71	1,008,071
Total Project Emissions (tons)	4.25	0.26	1.60	0.08	0.26	0.25	504.04

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	339.4	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	773.82	386.91	77.38	38.69
Total	**773.82**	**386.91**	**77.38**	**38.69**

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: 339.4 acres/yr (from Combustion Worksheet)
Qty Equipment: 102.0 (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	339.39	42.42
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	339.39	165.93
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	169.70	171.11
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	169.70	70.20
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	339.39	119.03
TOTAL								568.69

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

(Equip)(day)/yr: 568.7
Qty Equipment: 102.0
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