U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
Border Protection

SEP 13 2007

The Honorable William Rhodes, Governor
ATTN: Mr. Barnaby V. Lewis
Gila River Indian Community
Cultural Resources Management Program
315 W. Casa Blanca Rd.
Sacaton, AZ 85247

SUBJECT: Section 106 Project Re-Initiation in support of an Environmental Assessment for the siting, construction and operation of a technology-based border security system near Tucson, Arizona

Dear Governor Rhodes:

The Secure Border Initiative (SBI), SBI*net* System Program Office (SPO), a program in the Commissioner's Office of U.S. Customs and Border Protection (CBP), is preparing an Environmental Assessment (EA) for the siting, construction, and operation of a technology-based border security system that will cover a portion of the international border in Arizona. The EA will be prepared in compliance with Section 102(c) of the National Environmental Policy Act (NEPA) of 1969, as amended, the Council on Environmental Quality's NEPA implementing regulations at 40 C.F.R. 1500 et seq., and Department of Homeland Security's *Management Directive 5100.1 – Environmental Planning Program* and Section 106 of the National Historic Preservation Act, as amended.

SBI is a comprehensive, multi-year plan to secure U.S. borders, reduce illegal cross border activity, and transform border control through technology and infrastructure. SBI*net* is the component of SBI that is designing, developing, and implementing technology and tactical infrastructure to secure the border by detecting and identifying border entries, classifying threats, and implementing effective and efficient resolution. For this proposed action, SBI*net* plans to design, develop, and deploy technology-based solutions to deter and prevent illegal entries in the Tucson Border Patrol Sector.

While no final decisions have been made, the proposed action to be described and analyzed in an EA would cover a portion of the United States-Mexico border designated as the Tucson Border Patrol Sector. The sector is comprised of twelve Arizona counties, and contains eight Border Patrol Stations (Ajo, Casa Grande, Douglas, Naco, Nogales, Sonoita, Tucson, and Willcox). The Sector is divided into three geographic operational corridors.

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SBI*net* intends to evaluate the following potential environmental impact areas:

- Land Use and Zoning
- Geology/Soils/Geotechnical concerns
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- Floodplains
- Wetlands
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- Vehicular Transportation
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- Socioeconomics/Environmental Justice
- Solid and Hazardous Waste Generation
- Energy Use
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We look forward to hearing any concerns you may have regarding known sacred sites or other traditional cultural properties within the proposed project area.

Cultural resource pedestrian surveys are required to determine the existence of cultural resources within the pertinent project areas. Once those surveys have taken place, a report will be produced and sent to you for review and comment and at that time we will ask the State Historic Preservation Officer for concurrence with the appropriate determinations.

If you have any questions pertaining to this project, please do not hesitate to contact Ms. Patience Patterson, Environmental Branch Manager at (202) 344-1131, or Michael Potter, Project Manager, 1300 Pennsylvania Avenue, NW, Room 7.5, Washington, DC 20229 at (202) 344-1928.

Sincerely,

Rowdy Adams for

Kirk Evans
Program Manager, SBI*net*

Copy furnished:

Michael Potter, Project Manager
1300 Pennsylvania Avenue, NW
Room 7.5
Washington, DC 20229

U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
Border Protection

SEP 13 2007

The Honorable Wayne Taylor, Jr., Chairman
ATTN: Mr. Leigh J. Kuwanwisiwma
Hopi Tribal Council
Main Street
Kykotsmovi, AZ 86039

SUBJECT: Section 106 Project Re-Initiation in support of an Environmental Assessment for the siting, construction and operation of a technology-based border security system near Tucson, Arizona

Dear Chairman Taylor:

The Secure Border Initiative (SBI), SBI*net* System Program Office (SPO), a program in the Commissioner's Office of U.S. Customs and Border Protection (CBP), is preparing an Environmental Assessment (EA) for the siting, construction, and operation of a technology-based border security system that will cover a portion of the international border in Arizona. The EA will be prepared in compliance with Section 102(c) of the National Environmental Policy Act (NEPA) of 1969, as amended, the Council on Environmental Quality's NEPA implementing regulations at 40 C.F.R. 1500 et seq., and Department of Homeland Security's *Management Directive 5100.1 – Environmental Planning Program* and Section 106 of the National Historic Preservation Act, as amended.

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Rowdy Adams for

Kirk Evans
Program Manager, SBI*net*

Copy furnished:

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1300 Pennsylvania Avenue, NW
Room 7.5
Washington, DC 20229

U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
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SEP 13 2007

Mr. James Garrison, State Historic Preservation Officer
ATTN: Ms. Joanne Medley
Arizona State Parks
1300 West Washington
Phoenix, Arizona 85007

SUBJECT: Section 106 Project Re-Initiation in support of an Environmental Assessment for the siting, construction and operation of a technology-based border security system near Tucson, Arizona. **Ref: SHPO-2007-1248/1362 (33613/33641)**

Dear Mr. Garrison:

In response to your stamped comment of our non-consultation under Section 106, dated August 2, 2007 for our letter, and the above-mentioned reference number, the following will serve as our re-initiation of the Section 106 compliance for the project noted above.

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Rowdy Adams for

Kirk Evans
Program Manager, SBI*net*

Copy furnished:

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1300 Pennsylvania Avenue, NW
Room 7.5
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S.H.P.O.- 2007-1248 (34277)
S.H.P.O.- 2007-1362 (34278)

U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
Border Protection

SEP 13 2007

RECEIVED
SEP 14 2007
ARIZONA STATE PARKS/S.H.P.O

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ATTN: Ms. Joanne Medley
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Sincerely,

Rowly Adams for

Kirk Evans
Program Manager, SBI*net*

Thank you for the information. We look forward to continuing to consult and reviewing survey reports.
Joanne Hedley
for SHPO
Oct. 19, 2007

TOHONO O'ODHAM NATION
CULTURAL AFFAIRS PROGRAM
P.O. BOX 837 • SELLS, ARIZONA 85634
Telephone (520) 383-3622 • Fax (520) 383-3377

September 20, 2007

Kirk Evans
Program Manager, SBInet, U.S. Department of Homeland Security
U.S. Customs and Border Protection
Washington, D.C. 20229

Dear Mr. Evans:

Thanks you for your letter of September 13, 2007, informing the Tohono O'odham Nation of a Section 106 project Re-Initiation in Support of an Environmental Assessment (EA) for the siting, construction and operation of a technology-based border security system near Tucson, Arizona.

The Cultural Affairs Office has a few comments:

1. Please make sure a draft EA is sent to the Tohono O'odham Nation with a minimum of 30 days allowed for comments to be returned.

2. Please send copies of the EA to the following individuals for review

   Ned Norris, Chairman, Tohono O'odham Nation, P.O. Box 837, Sells, Arizona 85634

   Verlon Jose, Chairman, Tohono O'odham Nation Legislative Council P.O. Box 837, Sells, Arizona 85634

   Marla Henry, Chairwoman, Chukut Kuk District, Tohono O'odham Nation P.O. Box 278, Sells, Arizona 85634

   Geneva Ramon, Chairwoman, Gu Vo District, Tohono O'odham Nation, P.O. Box 880 Ajo, Arizona 85321

   Selso Villegas, Director, Department of Natural Resources, Tohono O'odham Nation, P.O. Box 837, Sells, Arizona 85634

   Karen Howe, Ecologist, Wildlife and Vegetation Management, Department of Natural Resources, Tohono O'odham Nation P.O. Box 837, Sells, Arizona 85634

   Peter L. Steere, Manager, Cultural Affairs Office, Tohono O'odham Nation P.O. Box 837, Sells, Arizona 85634

3. **The description of the proposed action is very general, please keep the Tohono O'odham Nation informed when you are able to designate a more specific area that will be covered by this EA.**

4. **On page 2 of your letter – paragraph 4 – line 4 "Alter" is spelled Altar**

   Also in paragraph 4 - In your description of the West Desert corridor, you mention that the Organ Pipe Cactus National Monument, but neglect to mention that a significant portion of this land is taken up by the lands of the Tohono O'odham Nation (3 million acres – 65 + miles of border with Mexico. Hopefully this oversight will be addressed in the draft EA.

5. **Please send copies of the design phase of the proposal to the Tohono O'odham Nation when completed in the Fall, 2007.**

6. **Since a significant portion of the geographic area of the EA will be on the lands of the Tohono O'odham Nation – the Cultural Affairs Office will have approval review on who will conduct the cultural resource inventories on Tohono O'odham Lands. The Wildlife and Vegetation Management Program should have approval review over who will conduct biological surveys on Tohono O'odham lands.**

7. **Any specific project areas for towers, fences etc. located on the Tohono O'odham Nation need to be reviewed and approved by the appropriate District government. The Chukut Kuk and Gu Vo Districts are the two districts of the Tohono O'odham Nation that border on Mexico.**

8. **Suggest that when your very general proposed action is better defined, more specific and detailed, that you contact the Chairman of the Tohono O'odham Nation to make arrangements for a presentation at a public meeting in Sells.**

Sincerely,

Peter L Steere

Peter L. Steere, Manager
Cultural Affairs Office
Tohono O'odham Nation
P.O. Box 837
Sells, Arizona 85634

cc:

Patience Patterson, Environmental Branch Manager
Michael Potter, Project Manager

AK-CHIN INDIAN COMMUNITY

Cultural Resources Office

42507 W Peters & Nall Road • Maricopa, Arizona 85239 • Telephone: (520) 568-1369 • Fax: (520) 568-1366

September 25, 2007

Patience Patterson
Environmental Branch Manager
U.S. Customs and Border Protection
1300 Pennsylvania Avenue
NW, Room 7.5
Washington, DC 20229

Re: EA for the siting, construction, and operation of a technology-based border security system near Tucson, Arizona

Dear Ms. Patterson:

The Ak-Chin Cultural Resources Office did receive a letter dated September 13, 2007 regarding the above-referenced undertaking. The purpose of this security system is to deter and prevent illegal entries into the Tucson Border Patrol Sector.

AT this time, our office will defer comments to the Tohono O'odham Nation for comments.

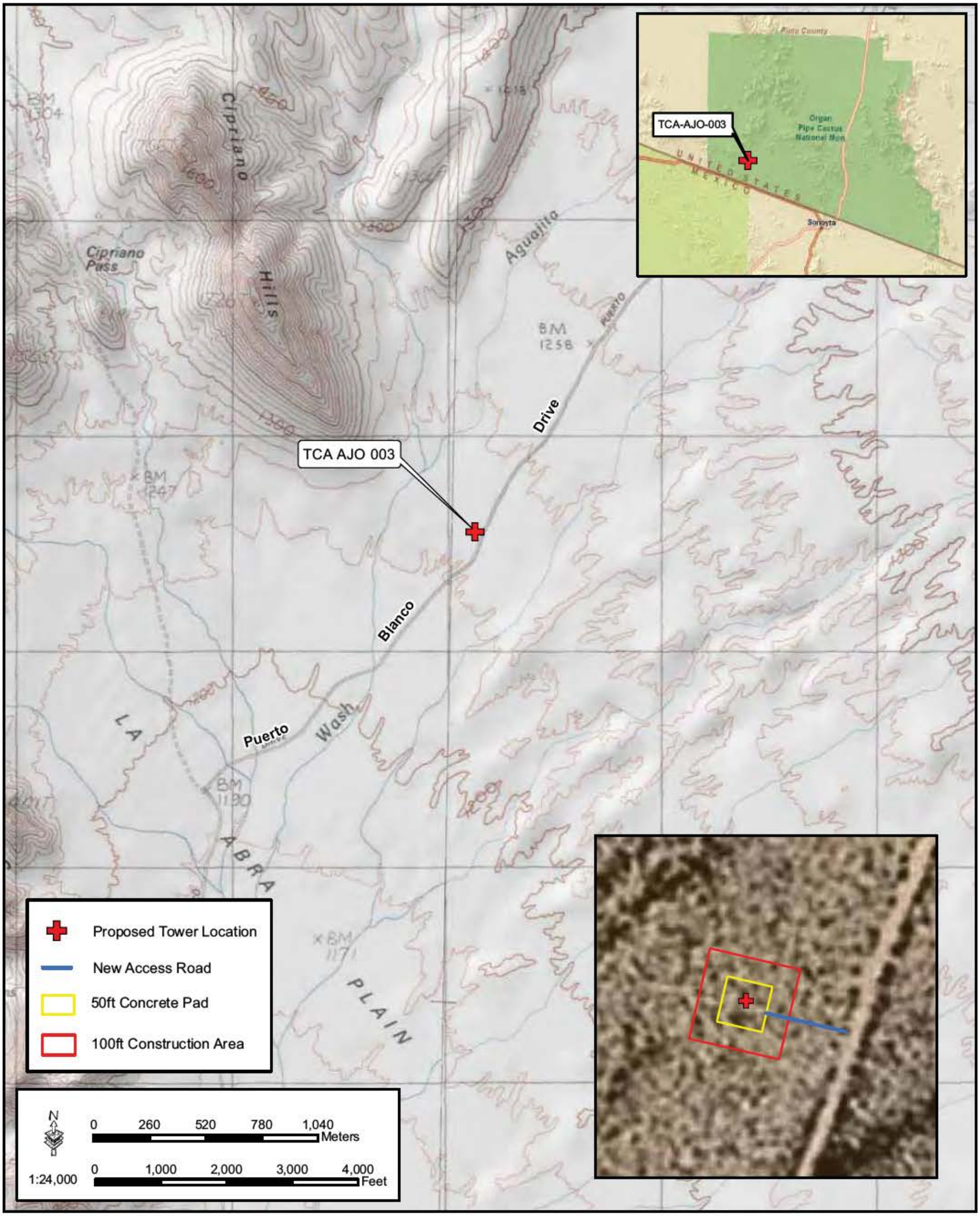
Thank you for informing our office about this undertaking. If you have any questions, please call me at (520) 568-1369. I can also be reached via email at: Ggilbert@ak-chin.nsn.us.

Sincerely,

Gary Gilbert

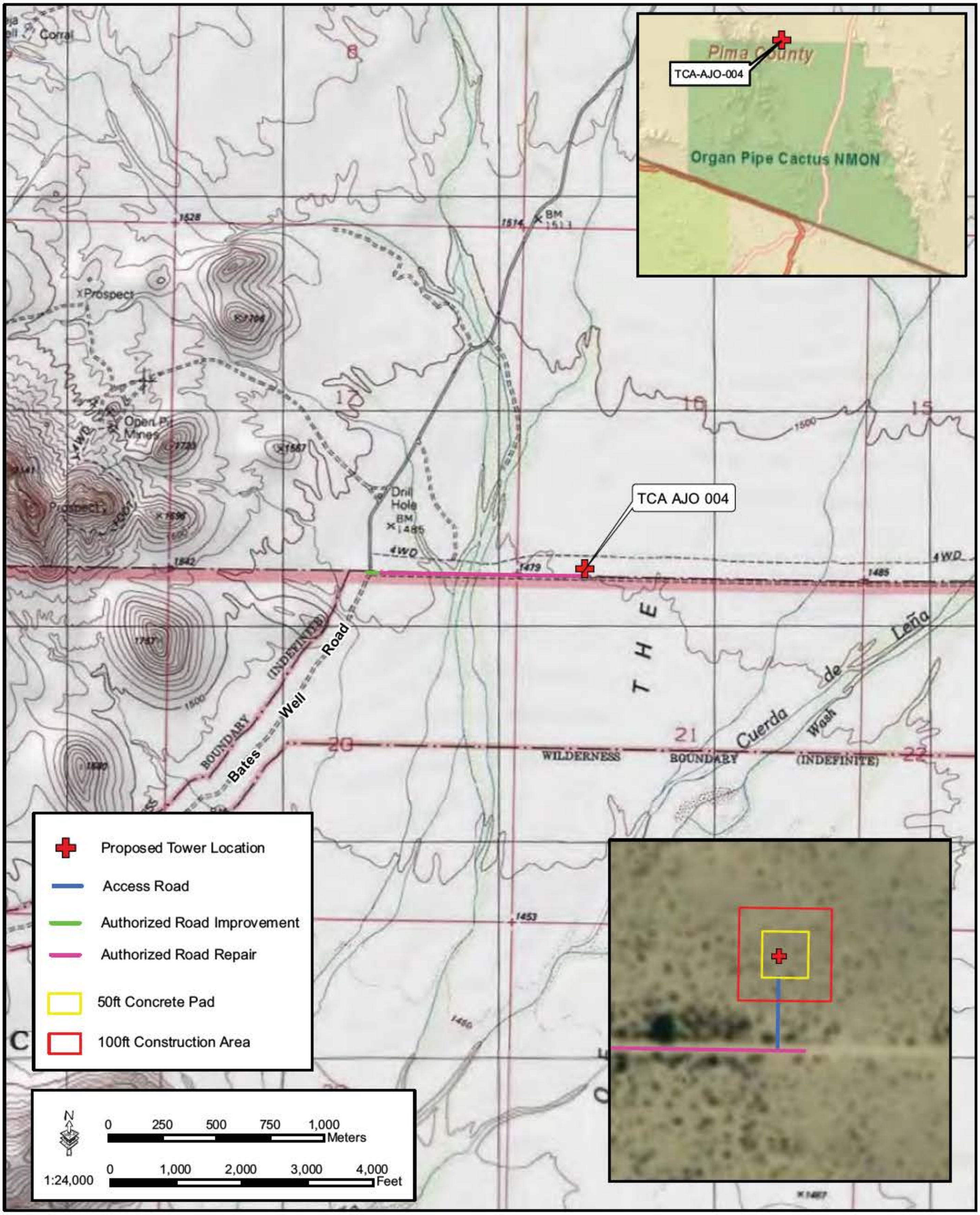
Gary Gilbert
Cultural Resources Technician II
Cultural Resources Office
Ak-Chin Indian Community

APPENDIX C
TOWER SITE MAPS



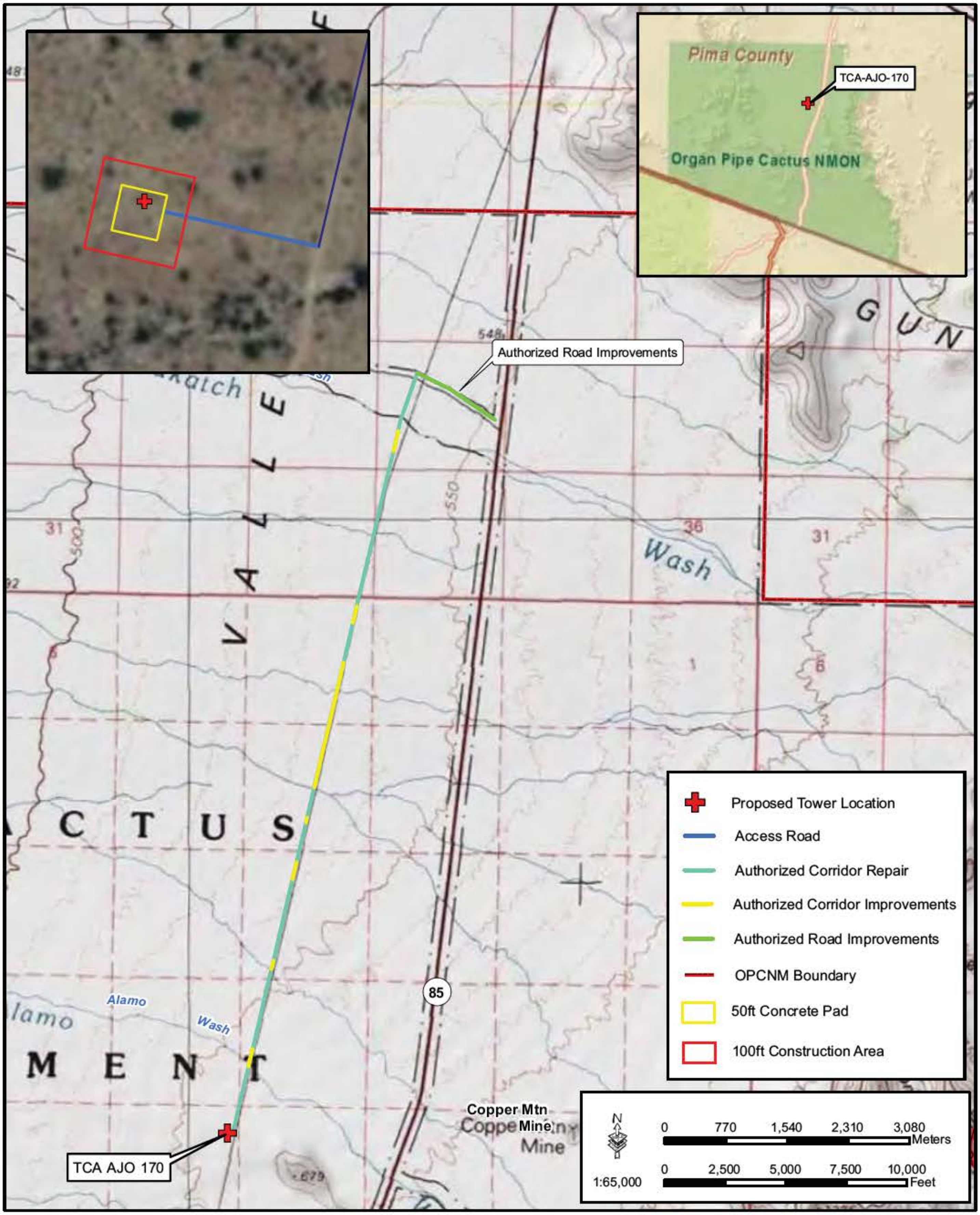
TCA-AJO-003 Tower and Access Road

April 2009



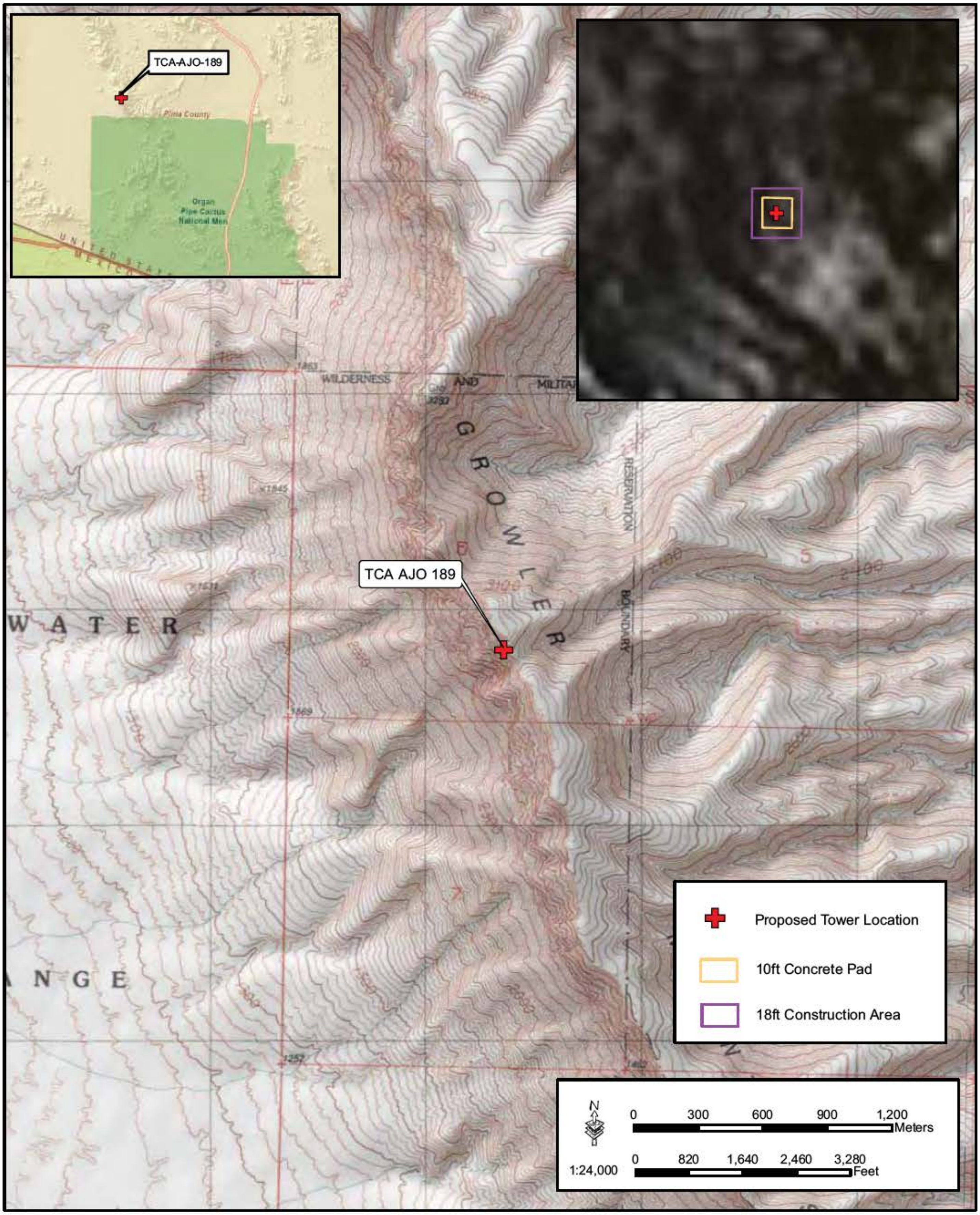
TCA-AJO-004 Tower and Access Road

August 2009



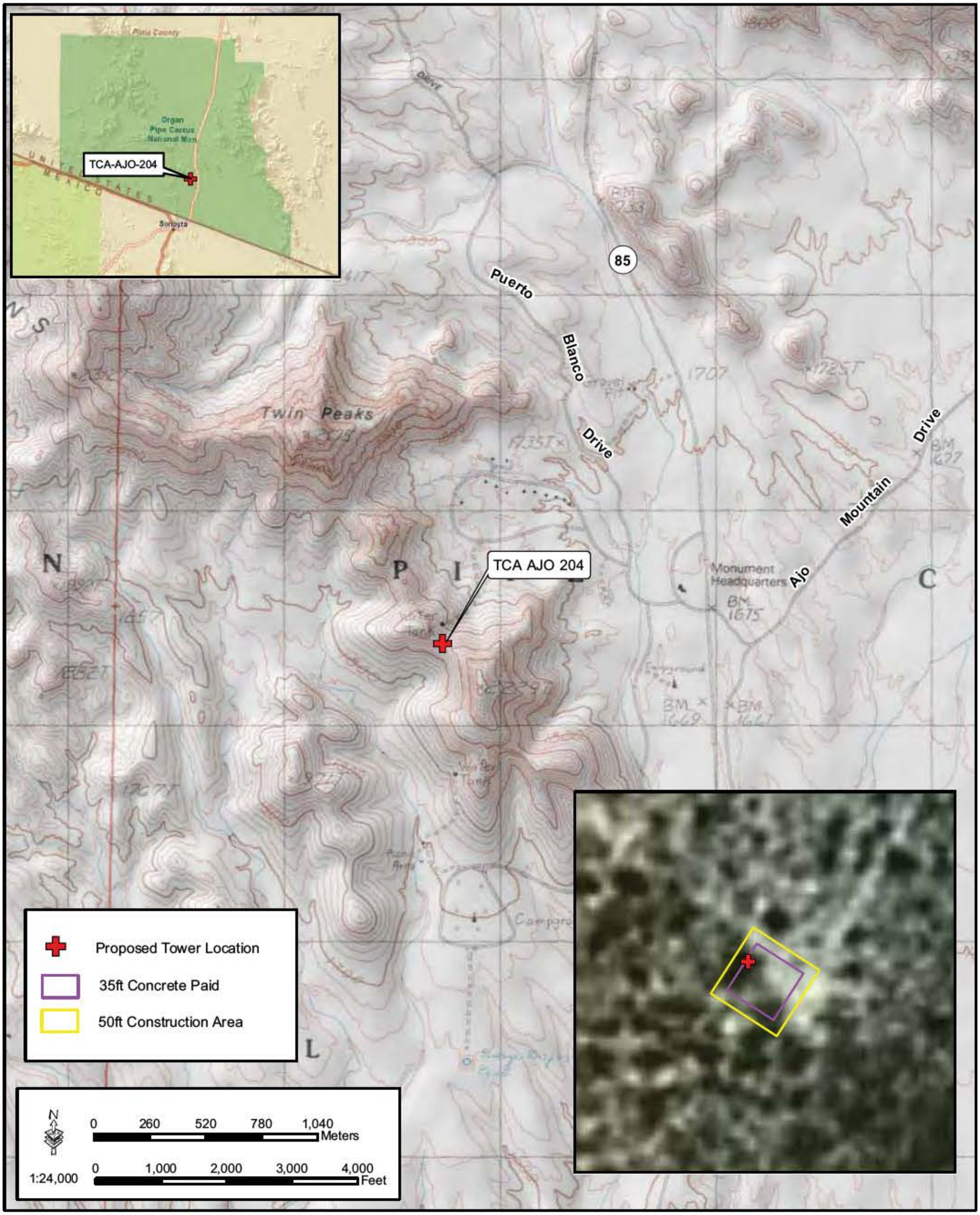
TCA-AJO-170 Tower and Access Road

August 2009



TCA-AJO-189 Tower

March 2009



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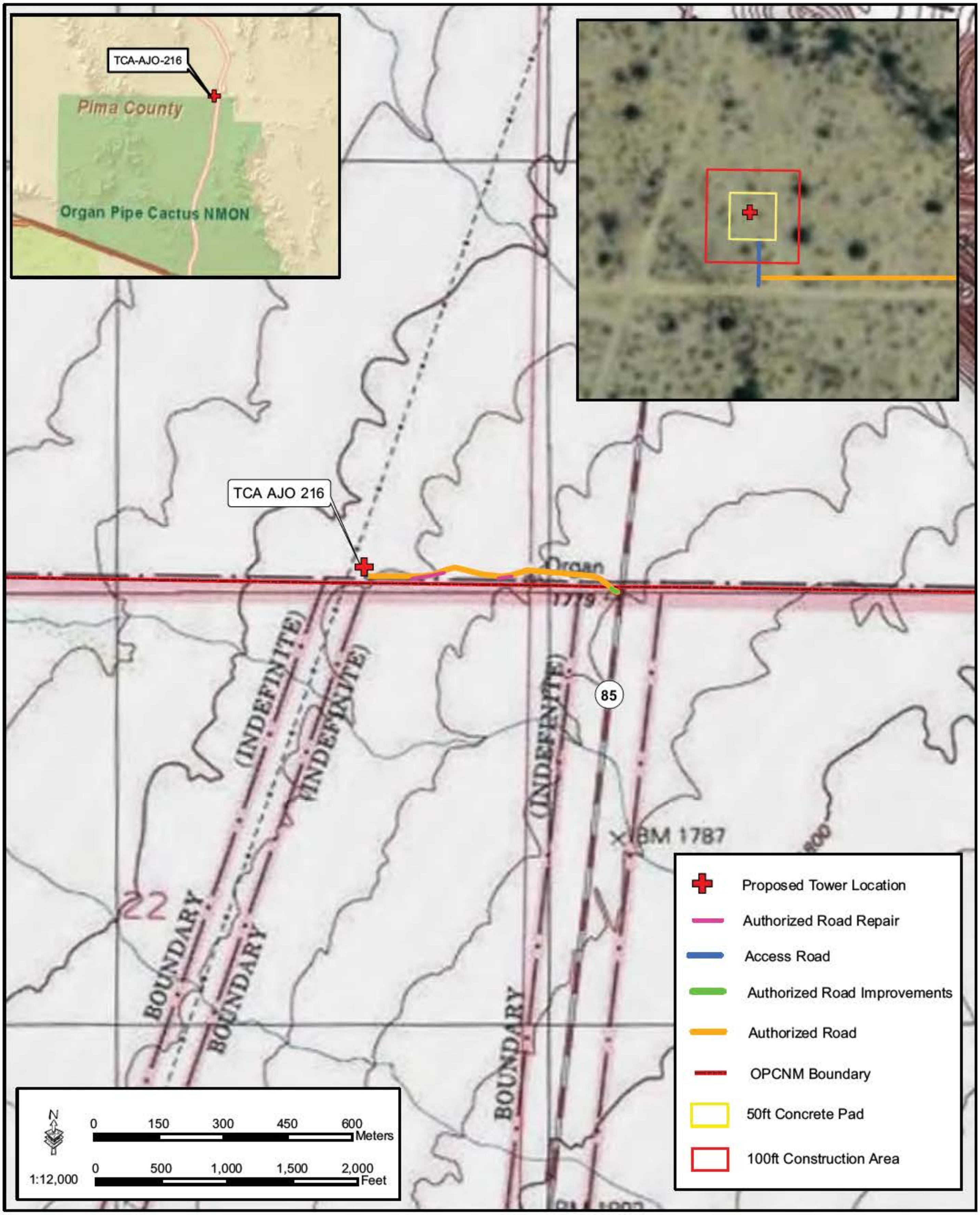
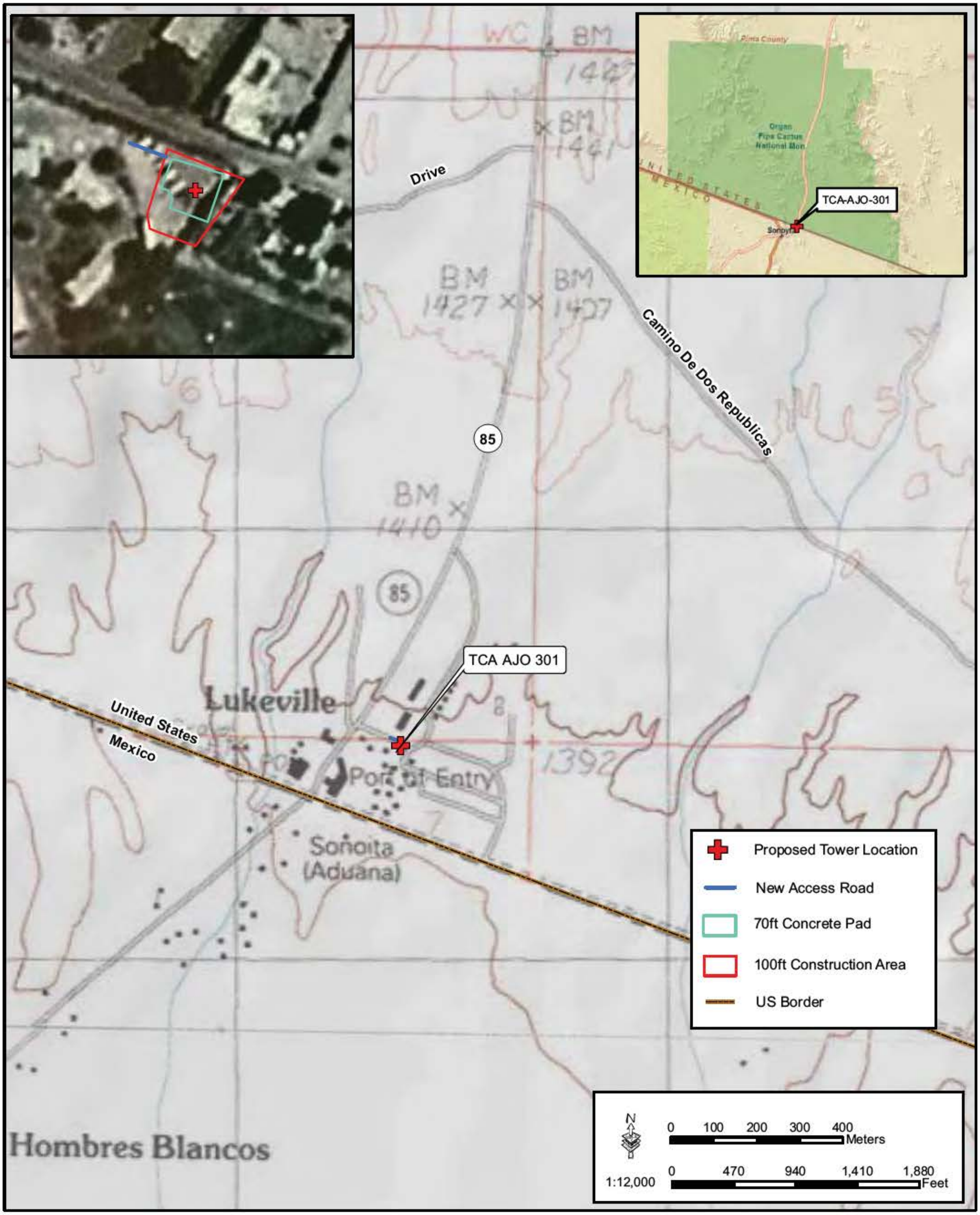
March 2009



TCA-AJO-216 Tower and Access Road

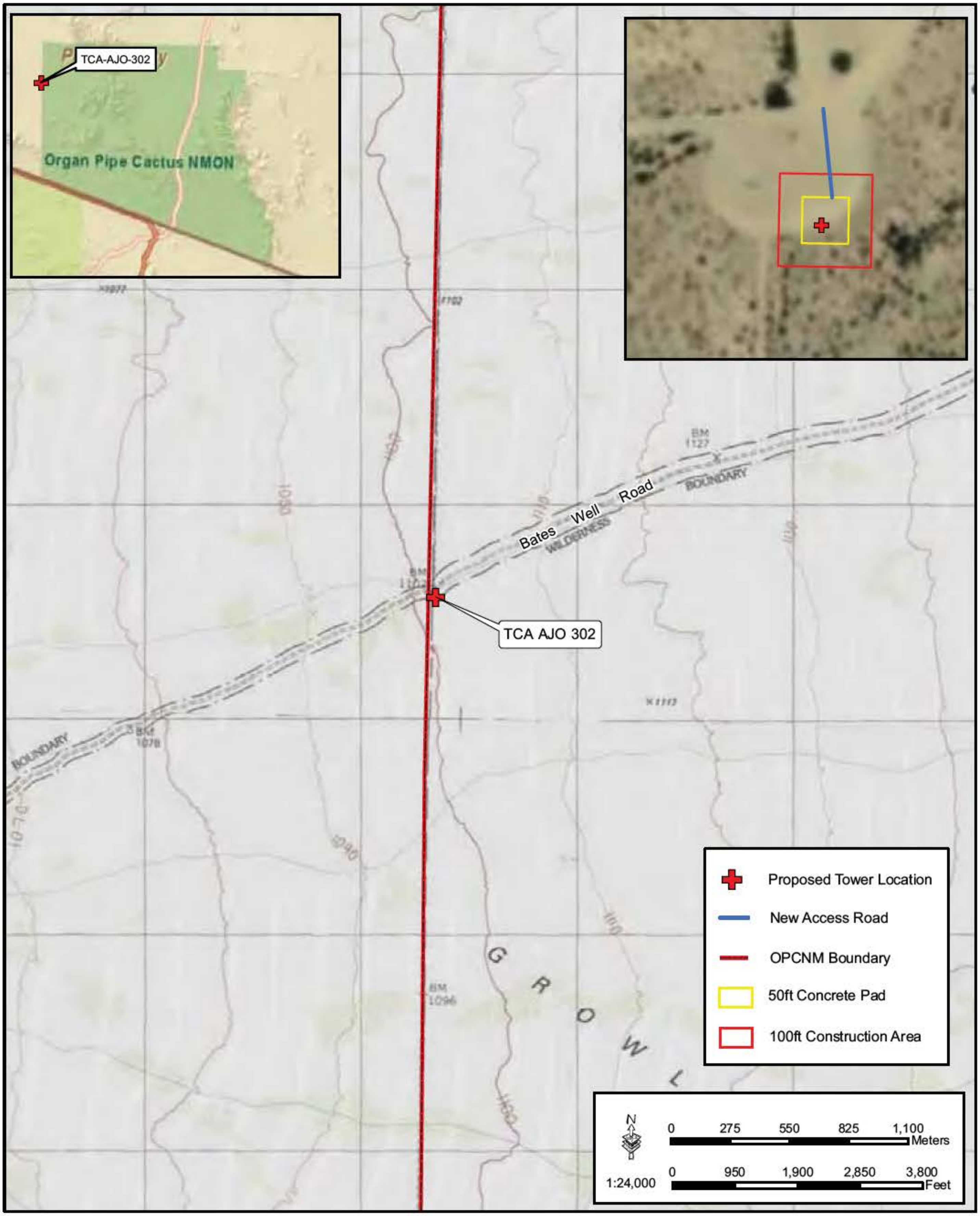
GSRC

August 2009



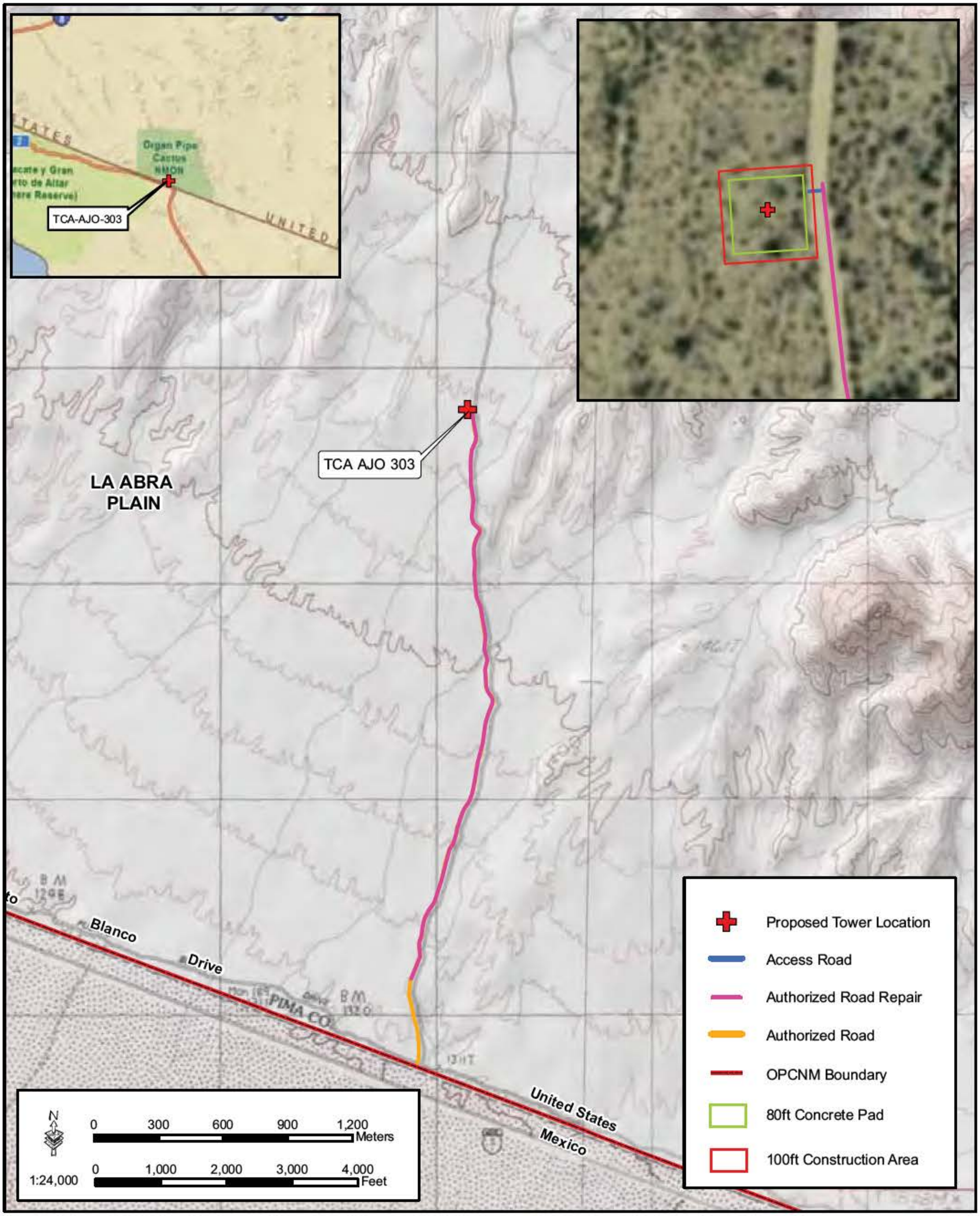
TCA-AJO-301 Tower

April 2009



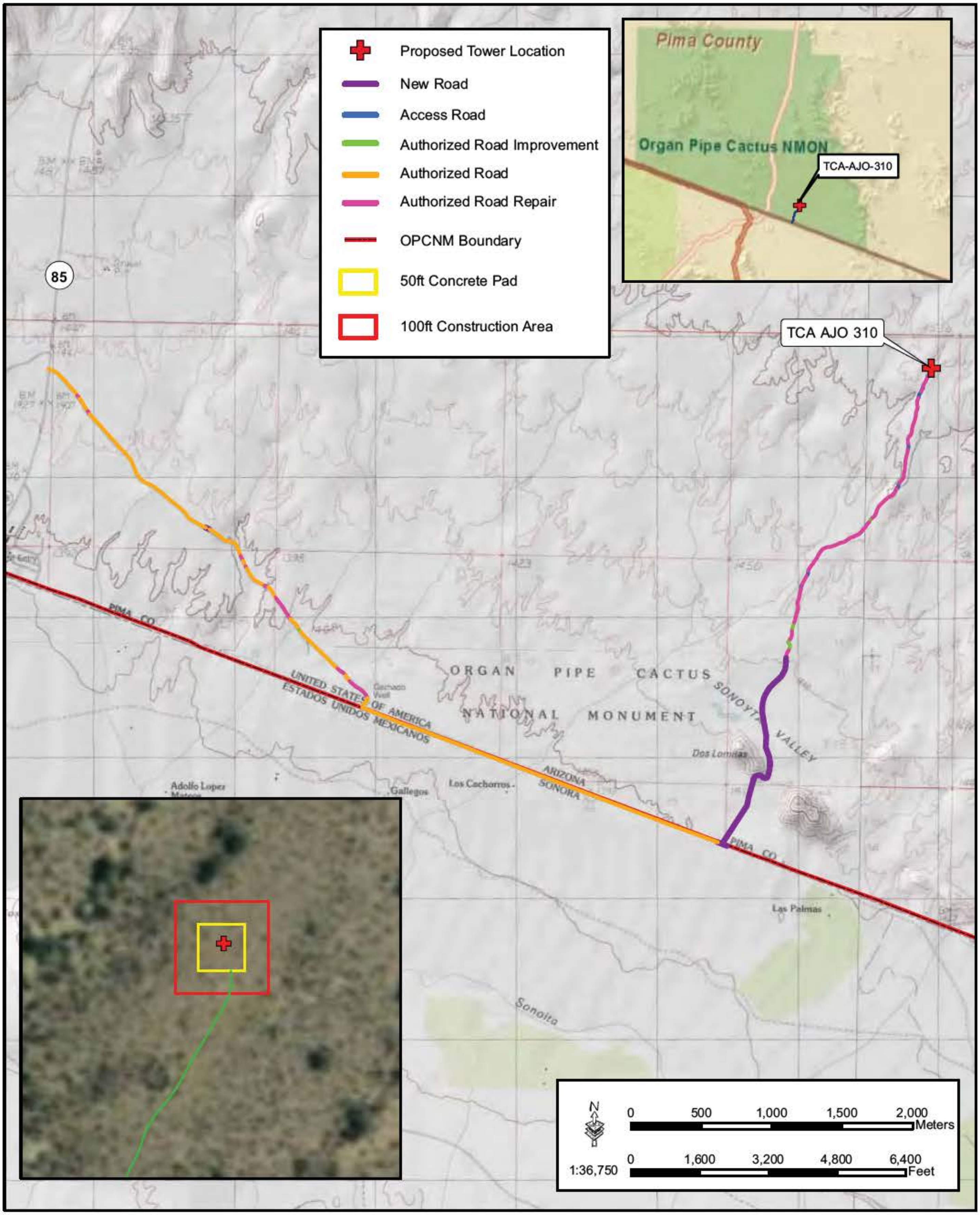
TCA-AJO-302 Tower and Access Road

March 2009



TCA-AJO-303 Tower and Access Road

September 2009



TCA-AJO-310 Tower and Access Road

GSRC

June 2009

APPENDIX D
BIOLOGICAL EVALUATION OF 14 PROPOSED
CUSTOMS AND BORDER PROTECTION TOWER LOCATIONS

A BIOLOGICAL EVALUATION OF 14 PROPOSED CUSTOMS AND BORDER PROTECTION TOWER LOCATIONS

WITHIN THE ORGAN PIPE CACTUS NATIONAL MONUMENT

Pima County

Prepared for:
United States Customs and Border Protection
Secure Border Initiative (SBI*net*)

Submitted to:
The Boeing Company
499 Boeing Blvd.
PO Box 240002
Huntsville, AL 35824-6402

Submitted by:
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Version 1.6
4 December 2008

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1.0 EXECUTIVE SUMMARY

Harris Environmental Group, Inc. (Harris Environmental) was contracted by the Boeing Company (Boeing) to conduct biological surveys in support of the Secure Border Initiative (SBI*net*) program in the Organ Pipe Cactus National Monument (OPCNM). SBI*net* is part of the United States Department of Homeland Security (DHS) strategy efforts to control international borders through the transformation and improvement of technology, infrastructure, staffing and response platforms. The proposed United States Customs and Border Protection (CBP) action involves construction activities to erect a tower at 14 locations with some ancillary equipment and minor road improvements (Figure 1.1). Biological field surveys were conducted at all of the proposed tower locations and along portions of any existing roadway that would require improvements to facilitate the project.

CBP is preparing a Biological Assessment and an Environmental Assessment for proposed installations within the project area. CBP is conducting consultation with the United States Fish and Wildlife Service (USFWS) and acquiring all applicable land-use permits from OPCNM, Bureau of Land Management (BLM), Arizona State Land Department (ASLD) and other pertinent resource agencies. Table 1.1 shows land jurisdictions and federally-listed species that may occur within the project area. Table 1.2 contains land jurisdictions and a summary of other special-status species of concern to federal and state agencies. Some of the identified species concerns may be eliminated through project design and the incorporation of conservation and avoidance measures into project plans as determined through agency consultation.

The objectives of this Biological Evaluation (BE) were to determine whether habitats in the project area may support special status species. A special status species is any species of interest to any regulatory or management agency of the federal, state, or local government. The special status species considered in this BE were identified from a list published by the USFWS through their Information Planning and Consultation (IPaC) system and the species list provided for Pima County. Other special-status species were identified using the Arizona Game and Fish Department's (AGFD) Heritage Data Management System (HDMS) and the BLM sensitive species list.

The area of potential effect (APE) considered for this project included all of the proposed tower locations and portions of any existing roadway that would require improvements to facilitate the project. The Lesser long-nosed bat and the Sonoran pronghorn are both federally protected species with the potential to occur within the APE. The Lesser long-nosed bat is federally-listed as *endangered* and as a *wildlife species of special concern* in the State of Arizona (AGFD 2008) and has the potential to occur at all 14 proposed tower sites. Sonoran pronghorn is listed as *endangered* and as a *species of concern* in the State of Arizona (AGFD 2008) and has the potential to occur at eight proposed tower sites. Other special-status species such as Sonoran desert tortoise, and birds protected by the Migratory Bird Treaty Act (MBTA) are known to occur at all proposed tower locations (see Table 1.2).

Figure 1.01 Overview of the proposed tower locations

Table 1.1. Summary of land jurisdictions and federally protected species concerns.

Tower	Jurisdiction	Species protected under the ESA
TCA-AJO-003	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-004	BLM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-008	OPCNM, ASLD	Lesser Long-nosed Bat
TCA-AJO-091	OPCNM	Lesser Long-nosed Bat
TCA-AJO-170	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-204	OPCNM	Lesser Long-nosed Bat
TCA-AJO-209	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-214	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-301	GSA	Lesser Long-nosed Bat
TCA-AJO-302	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-303	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-304	OPCNM	Lesser Long-nosed Bat
TCA-AJO-308	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-310	ASLD	Lesser Long-nosed Bat

Table 1.2. Summary of land jurisdictions and other special status species concerns.

Tower	Jurisdiction	Other special status species concerns
TCA-AJO-003	OPCNM	MBTA bird species, Sonoran desert tortoise
TCA-AJO-004	BLM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-008	OPCNM, ASLD	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, ANPL protected plant species
TCA-AJO-091	OPCNM	MBTA bird species, Sonoran desert tortoise, red-back whiptail
TCA-AJO-170	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-204	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, red-back whiptail
TCA-AJO-209	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-214	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, red-back whiptail
TCA-AJO-301	GSA	MBTA bird species, Sonoran desert tortoise
TCA-AJO-302	OPCNM	MBTA bird species, Sonoran desert tortoise
TCA-AJO-303	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-304	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, red-back whiptail
TCA-AJO-308	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-310	ASLD	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, ANPL protected plant species

2.0 INTRODUCTION

Project Summary

Part of the SBI*net* plan includes the installation of towers equipped with surveillance and communications equipment. CBP is preparing an Environmental Assessment for this project that covers locations within the operational region defined as *Organ Pipe* which mostly utilizes land in the OPCNM. This report documents the results of a biological evaluation conducted for 14 proposed tower compounds. Under consideration for this report is ground activity and construction-associated disturbances that would adversely affect natural resources. Consultation with the USFWS is being conducted by CBP.

Project Description

The proposed action involves construction activities to erect a tower at 14 locations with some ancillary equipment and minor road improvements. Biological field surveys were conducted at all of the proposed tower locations and along portions of any existing roadway that would require improvements to facilitate the project. Tower compounds typically encompass about 0.4 hectare (1.0 acre). The tower and its supporting equipment are secured within a 15 meter (m) by 15 m (50 feet [ft] by 50 ft) fenced area. Limited surface disturbance will be necessary to accommodate the tower, grounding rods, communications and power equipment. Unattended Ground Sensors (UGS) will require additional surface disturbance. Cameras and radar units will be mounted on each tower. Microwave equipment will relay data between sites. Aircraft anti-collision lighting will be incorporated above the highest point on each tower.

A propane fueled generator will be used when commercial power is unavailable or for emergency power. Liquid propane tanks will be mounted on pre-formed concrete slabs. Maintenance will include changing oil, oil filter, spark plugs, engine coolant, and batteries. Each generator will be placed in an enclosure and will have a spill containment basin with a volume five times that of the total engine fluids. On average, the generator sound levels range from 82.0 dBA at 1 m (3 ft) to 72.5 dBA at 10 m (34 ft). Solar panels will be a part of the build for all towers which minimizes the use of generators. Road improvements may be required to accommodate construction equipment, materials, and service trucks. Typical construction access roads are 5 m (15 ft) wide with an additional 1 m (4 ft) of shoulder vegetation cut back.

3.0 METHODS

Between October and December 2007 and during March, April, August, and September of 2008, Harris Environmental conducted field visits to 14 proposed tower locations and associated ingress/egress routes for the CBP *Organ Pipe* project. Survey work was conducted by biologists John Cornell, Stephen Emerson, John Lindsey, Robin Llewellyn, Elizabeth Majchrowicz and Thomas Staudt.

Tower compounds and portions of approach and access roads were subjected to systematic pedestrian survey to collect information regarding vegetation communities and wildlife habitat in or adjacent to the APE. Prior to fieldwork, surveyors were provided with lists of special status plants and wildlife known to occur near the project area along with information regarding key life requisites, associations with specific types of vegetation or substrates, and known elevation range for a given species. Information collected for each tower was recorded on a standardized data sheet.

The APE for this project includes a total of 203.86 hectares (503.76 acres). The coverage includes (Table 3.1 and Table 3.2):

- Block Survey of about 0.4 hectares (1.0 acre) at 14 distinct parcels; for a total of about 5.6 hectares (14 acres) and
- Linear Survey along about 49.27 kilometers (km)/30.61 miles (mi) of roadway. The examined corridor was 40 m-wide (132 ft-wide) with 20 m (66 ft) of coverage on either side of the roadway centerline. Total linear survey coverage was about 198.20 hectares (489.76 acres).

Each field team consisted of the Harris Environmental biologist and archaeologist, Boeing Systems Engineers, a CBP agent, and a team of civil engineers charged with recording geo-referenced spatial data and planning routings and road improvements (if any). Boeing and CBP handled the acquisition of all rights of entry for surveyed areas.

Table 3.1 Approximate survey coverage at each location.

Preferred Towers	Block Survey		Linear Road Survey	
	Acres	Hectares	Miles	Kilometers
TCA-AJO-003	1	0.40	3.33	5.36
TCA-AJO-004	1	0.40	0.64	1.02
TCA-AJO-170	1	0.40	6.03	9.70
TCA-AJO-204	1	0.40	0.00	0.00
TCA-AJO-209	1	0.40	0.82	1.32
TCA-AJO-301	1	0.40	0.00	0.00
TCA-AJO-302	1	0.40	10.05	16.17
TCA-AJO-303	1	0.40	1.34	2.16
TCA-AJO-304	1	0.40	0.00	0.00
TCA-AJO-308	1	0.40	2.91	4.68
TCA-AJO-310	1	0.40	1.19	1.92
Rejected Towers				
TCA-AJO-008	1	0.40	4.31	6.94
TCA-AJO-091	1	0.40	0.00	0.00
TCA-AJO-214	1	0.40	0.00	0.00
Totals	**14**	**5.60**	**30.62**	**49.27**

Table 3.2. Summary of tower compound location information.

Tower	Latitude	Longitude	Jurisdiction	Elevation (amsl)
Preferred Tower Locations				
TCA-AJO-003	31.97806	-112.99953	OPCNM	374 m (1,227 ft)
TCA-AJO-004	32.20079	-112.89474	BLM	452 m (1,483 ft)
TCA-AJO-170	32.09547	-112.79696	OPCNM	563 m (1,846 ft)
TCA-AJO-204	31.95224	-112.81270	OPCNM	586 m (1,921 ft)
TCA-AJO-209	32.20058	-112.91929	BLM	492 m (1,615 ft)
TCA-AJO-301	31.88105	-112.81508	GSA	426 m (1,398 ft)
TCA-AJO-302	32.13009	-113.08538	OPCNM	336 m (1,102 ft)
TCA-AJO-303	31.92797	-112.88192	OPCNM	444 m (1,458 ft)
TCA-AJO-304	31.95661	-112.80584	OPCNM	516 m (1,693 ft)
TCA-AJO-308	32.18275	-112.94334	OPCNM	434 m (1,424 ft)
TCA-AJO-310	31.893536	-112.745856	ASLD	463 m (1,519 ft)
Rejected Tower Locations				
TCA-AJO-008	31.91848	-112.73198	OPCNM	498 m (1,634 ft)
TCA-AJO-091	32.0401	-112.68800	OPCNM	1,204 m (3,950 ft)
TCA-AJO-214	32.09705	-112.97344	OPCNM	727 m (2,385 ft)

Establishing Lists of Special Status Species for Consideration

The special status species considered in this BE were identified from a list published by the USFWS through their IPaC system and the species list provided for Pima County. Other special-status species were identified using the AGFD HDMS and the BLM sensitive species lists.

Other Relevant Documents

In addition to a review of published species lists, documents pertinent to the management of the OPCNM were reviewed, including the following:

- Biological Assessment: International Boundary Vehicle Barrier. Organ Pipe Cactus National Monument (NPS 2003).
- Biological Opinion for the Permanent Vehicle Barrier Project on the Barry M. Goldwater Range and Cabeza Prieta National Wildlife Refuge, Arizona. (USFWS 2006).
- Organ Pipe Cactus Final General Management Plan Development Concept Plans Environmental Impact Statement (NPS 1997).
- Draft Supplemental EIS Re-Analysis of Cumulative Impacts on the Sonoran Pronghorn (NPS 2001).
- Supplement to the Draft General Management Plan (NPS 1996).

Best Management Practices (BMP)

In 2006, CBP and USFWS entered into a *Statement of Work* to develop an expedited consultation system for achieving compliance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended. The IPaC system is intended to provide CBP with current information on species and critical habitats that may be adversely affected by CBP activities. The BMPs should be addressed in project planning and if implemented as part of the proposed action, would avoid, minimize and/or mitigate for the potential adverse effects to listed or proposed threatened or endangered species, candidate species and proposed or designated critical habitat.

USFWS will review specific information on this project and determine project-specific BMPs and mitigation measures through ESA Section 7 consultation. USFWS provided information on their IPaC system and the 2007 BMP to CBP via email in June 2007 and during an early consultation meeting regarding this project (October 16, 2007). USFWS requested that an IPaC query for species occurring in the project area be included in the Biological Evaluation and information included in the 2007 BMP be considered during project design.

The Arizona Ecological Services Office (AESO) developed potential BMPs using biological information on the 34 threatened and endangered species that occur in southern Arizona. According to USFWS, draft BMPs were discussed with CBP on the 4th and 5th of April 2007 at the CBP Tucson Sector office and on the 20th of April 2007 at the Yuma Sector office (USFWS 2007). Comments on the draft BMPs from CBP were discussed in meetings on the 8th and 9th of May 2007. At that meeting the decision was made to focus BMP development on the construction and maintenance portion of the CBP project list. Thus, the draft BMP document developed at the May 2007 meeting should be considered as applicable to construction.

4.0 ENVIRONMENTAL SETTING

The SBI*net Organ Pipe* project extends across approximately 48 km (30 mi) of the U.S. and Mexico International Border that includes land within portions of southwestern Pima County. The project area begins at the southwestern boundary of the Tohono O'odham Nation and extends west to the southern extent of the San Cristobal Valley and Growler Valley. The proposed locations of the *Organ Pipe* towers fall within two unique subdivisions of the Sonoran desertscrub biotic community as defined by Brown (Brown 1994) and Brown and Lowe (Brown and Lowe 1980). A biotic community is generally described as a community or aggregation of distinct organisms or species occurring within the same habitat or region. The two subdivisions within the project area are described below; Appendix A provides a key for the scientific names of plants and animals used in this report.

Sonoran Desertscrub — Arizona Upland Subdivision

The Arizona upland subdivision of Sonoran desertscrub is characterized by slopes, broken surface areas and dissected sloping plains. The dominant upper-story trees represented throughout this subdivision include blue palo verde, foothill palo verde, ironwood, mesquite and cat-claw acacia. The prevalence of multiple cacti and succulent species within the Arizona upland subdivision is of great significance in characterizing the overall structure and composition of this landscape. The genera *Cylindropuntia* and *Opuntia* are by far the best represented in terms of the numbers of species present throughout the Sonoran desertscrub community. The following are well represented within this subdivision: buckhorn cholla, cane cholla, staghorn cholla, chain-fruit cholla, teddy bear cholla, desert Christmas cactus, pencil cholla, saguaro, organ pipe cactus, senita, night-blooming cereus, hedgehog cactus and fishhook barrel cactus.

Sonoran Desertscrub — Lower Colorado River Subdivision

The lower Colorado River subdivision is the driest and least vegetated of the Sonoran desertscrub subdivisions because of high temperatures and low precipitation. The resulting vegetative structure is also the least variable and diverse. The lower elevations generally offer less topographic relief. Drainages typically take two basic forms distinguished by whether or not they provide “through-flow” to a significant regional drainage. Plants typically associated with the drainage areas of the lower Colorado River subdivision are: mesquite, ironwood, blue palo verde, smoketree, desert willow, desert honeysuckle, canyon ragweed, cat-claw acacia, burrobrush anderson wolfberry and desert broom. Away from drainages, the dominant plant species are creosote, white bursage, ocotillo, brittlebush, foothill palo verde, saguaro and ironwood.

Non-Native Plants and Noxious Weeds

Non-native plants and noxious weeds are typically associated with disturbed areas and were observed at some tower locations during field surveys.

Geomorphology

Arizona is part of the Basin and Range Province of the southwest where linear mountain ranges alternate with basins of varying widths. All of the mountains in the OPCNM are fault-block ranges, but they differ in topography because of differences in type and age of the formations.

They can be classed into four groups:

- Flat-topped, cliff-edged mesas topped with Quaternary basalt lava flows, as in the Bates Mountains of the northwest part of the monument. Slight faulting and tilting of the basalt lavas show that mountain building forces were active here in comparatively recent times (Chronic 1988).
- Quite rugged, deeply eroded ranges of Tertiary volcanic rocks, with tilted layers of lava, tuff and breccia faulted upward, as in the Ajo Range and the northwest slope of the Puerto Blanco Mountains (Chronic 1988).
- Rounded hills of Mesozoic granite, such as those near Senita Basin in the southern Puerto Blanco Mountains (Chronic 1988).
- Rougher hills of light-colored Mesozoic metamorphic rock-gneiss and schist-as in the rugged central part of the Puerto Blanco Mountains (Chronic 1988).

Of the rocks types exposed in these ranges, the gneiss and schist are the oldest, the basalt lava flows the youngest. Mesozoic granite intruded the gneiss and schist. Volcanism came early enough in Tertiary period that most Tertiary volcanic rocks were bent and broken during mid-Tertiary mountain-building and later disrupted again by Basin and Range faulting.

Geologic Units

The proposed tower locations occur within three geologic units, Quaternary superficial deposits, early Pleistocene to latest Pliocene superficial deposits, middle Miocene to Oligocene volcanic and sedimentary rocks, and Pliocene to middle Miocene deposits.

Quaternary Superficial Deposits (Undivided) (0-2 Ma1)

These deposits include unconsolidated to strongly consolidated alluvial and aeolian deposits, including coarse, poorly sorted alluvial-fan and terrace deposits on middle and upper piedmonts and along large drainages; sand, silt and clay on alluvial plains and playas; and wind-blown sand deposits (AGS 2000). Tower locations in this unit are TCA-AJO-004 and TCA-AJO-302.

Early Pleistocene to Latest Pliocene Superficial Deposits (0.75-3 Ma)

These deposits include coarse relict alluvial-fan deposits form rounded ridges or flat isolated surfaces that are moderately to deeply incised by streams. The deposits are generally topographically high and have undergone substantial erosion. Deposits are moderately to strongly consolidated and commonly contain coarser grained sediment than younger deposits in the same area (AGS 2000).Tower locations in this unit include TCA-AJO-008, TCA-AJO-170, TCA-AJO-301, TCA-AJO-303, and TCA-AJO-310.

Middle Miocene to Oligocene Volcanic and Sedimentary Rocks, Undivided (11-38 Ma)

These deposits include lava, tuff, fine-grained intrusive rock and diverse pyroclastic rocks. These compositionally variable volcanic rocks include basalt andesite, dacite and rhyolite. Thick felsic volcanic sequences form prominent cliffs and range fronts. This unit includes regionally extensive ash-flow tuffs. Most volcanic rocks are 20-30 Ma in central and western Arizona (AGS 2000). Tower locations in this unit include TCA-AJO-091, TCA-AJO-204, TCA-AJO-209, TCA-AJO-214, TCA-AJO-304, and TCA-AJO-308.

Pliocene to Middle Miocene Deposits (2-16 Ma)

These deposits include moderately to strongly consolidated conglomerate and sandstone deposited in basins during and after late Tertiary faulting. The unit includes lesser amounts of mudstone, siltstone, limestone and gypsum. The deposits are generally light gray or tan and commonly form high rounded hills and ridges in modern basins and prominent bluffs. Deposits of this unit are exposed widely in the dissected basins of southeastern and central Arizona (AGS 2000). A single tower location, TCA-AJO-003, occurs in this unit.

Soils

A soil association consists of a group of related geomorphological areas that contribute to the composition of the soil mantle covering the earth's surface. Each association consists of two or more soils that occur together in a characteristic and repetitious manner (Hendricks 1985). Soils associated with the proposed tower locations in the *Organ Pipe* project area are mostly hyperthermic arid soils prevalent at low elevations across much of western and southwestern Arizona.

Hyperthermic Arid Soils

The soils in the *Organ Pipe* area are generally formed from mixed alluvium and colluvium and derived from igneous, basalt, and granite sources. The soils range from deep to shallow, and are well drained. Texture varies from very stony, sandy, and gravelly loams to bedrock and clay (Hendricks 1985). Hyperthermic Soil types (HA) have a mean soil temperature of more than

[1] Ma is defined as "Million Years Ago"

22°C (72°F) and less than 250 millimeters (10 inches) mean annual precipitation and occur across much of south western Arizona, being found in Yuma and western Pima County. Within this type, three different soil associations are present across the proposed tower locations.

- **(HA1) Torrifluvents Association:** Deep, stratified, coarse to fine texture, nearly level to gently sloping soils on floodplains and lower alluvial fans.

- **(HA4) Gunsight-Rillito-Pinal Association:** Deep and shallow, limy, gravelly, medium and moderately coarse-textured, nearly level to strongly sloping soils on alluvial surfaces and valley plains.
- **(HA6) Lithic Camborthids-Rock Outcrop-Lithic Haplargids Association:** Shallow, gravelly and cobbly, moderately coarse to moderately fine textured, gently sloping to very steep soils and rock outcrops on hills and mountains.

5.0 TOWER DESCRIPTIONS AND FIELD OBSERVATIONS

PREFERRED TOWER LOCATIONS

TCA-AJO-003

TCA-AJO-003 is located within the OPCNM in southwestern Pima County, approximately 4.7 km (2.9 mi) north of the U.S./Mexico International Border and 20.4 km (12.7 mi) northwest of the Lukeville Point of Entry (POE) (Figure 5.01). The tower compound is southeast of the Cipriano Hills at an elevation of 374 m (1,227 ft) amsl. The substrate at the tower compound is mostly gravel with scattered cobbles and the soils are composed of sandy loam with coarse sand (Photograph 5.01).

TCA-AJO-003 is on the OPCNM and approached via North Puerto Blanco Drive an unpaved road that connects with South Puerto Blanco Road and provides access to the core of the park along an approximate 40 mile loop road. The approach route travels north within the non-wilderness corridor that exists between the western edge of La Abra Plain and the eastern flank of Quitobaquito Hills. Access to TCA-AJO-003 would be via a short, unpaved road extending from North Puerto Blanco Drive. Survey coverage for this proposed tower installation included the 0.4 hectare (1.0 acre) tower compound, access road, and an approximate 4.4 km (2.5 mi) portion of North Puerto Blanco Drive (Figure 5.02).

Field Observations

TCA-AJO-003 and the surrounding area are within the Arizona Upland Subdivision. Plants include blue palo verde, cat-claw acacia, chain-fruit cholla, creosote, foothill palo verde, graythorn, ironwood, ocotillo, saguaro, triangle-leaf bursage, wolfberry and mixed forbs. Wildlife and evidence of wildlife include Harris' hawk (*Parabuteo unicinctus*), raven (*Corvus* sp.), whiptail (*Aspidoscelis* sp.), zebra-tailed lizard (*Callisaurus draconoides*) and jackrabbit (*Lepus* sp.) scat. Special status species documented include organ pipe cactus, which is categorized as *salvage restricted* on the ADA protected native plant list. The tower compound is approximately 0.4 km (0.2 mi) east of Aguajita Wash, which supports a xeroriparian vegetation community.

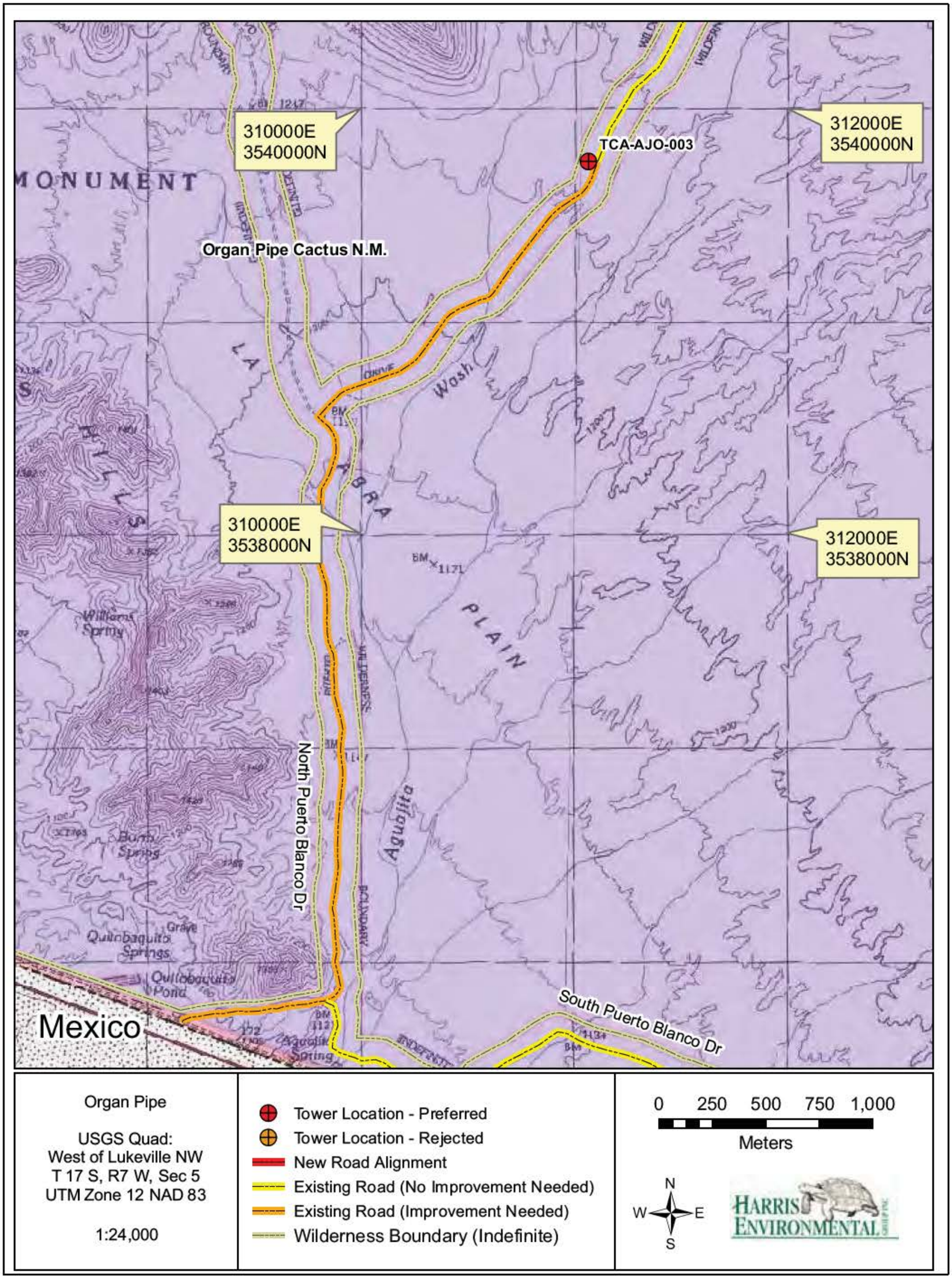


Figure 5.01 UTM registered location and land jurisdiction for TCA-AJO-003.

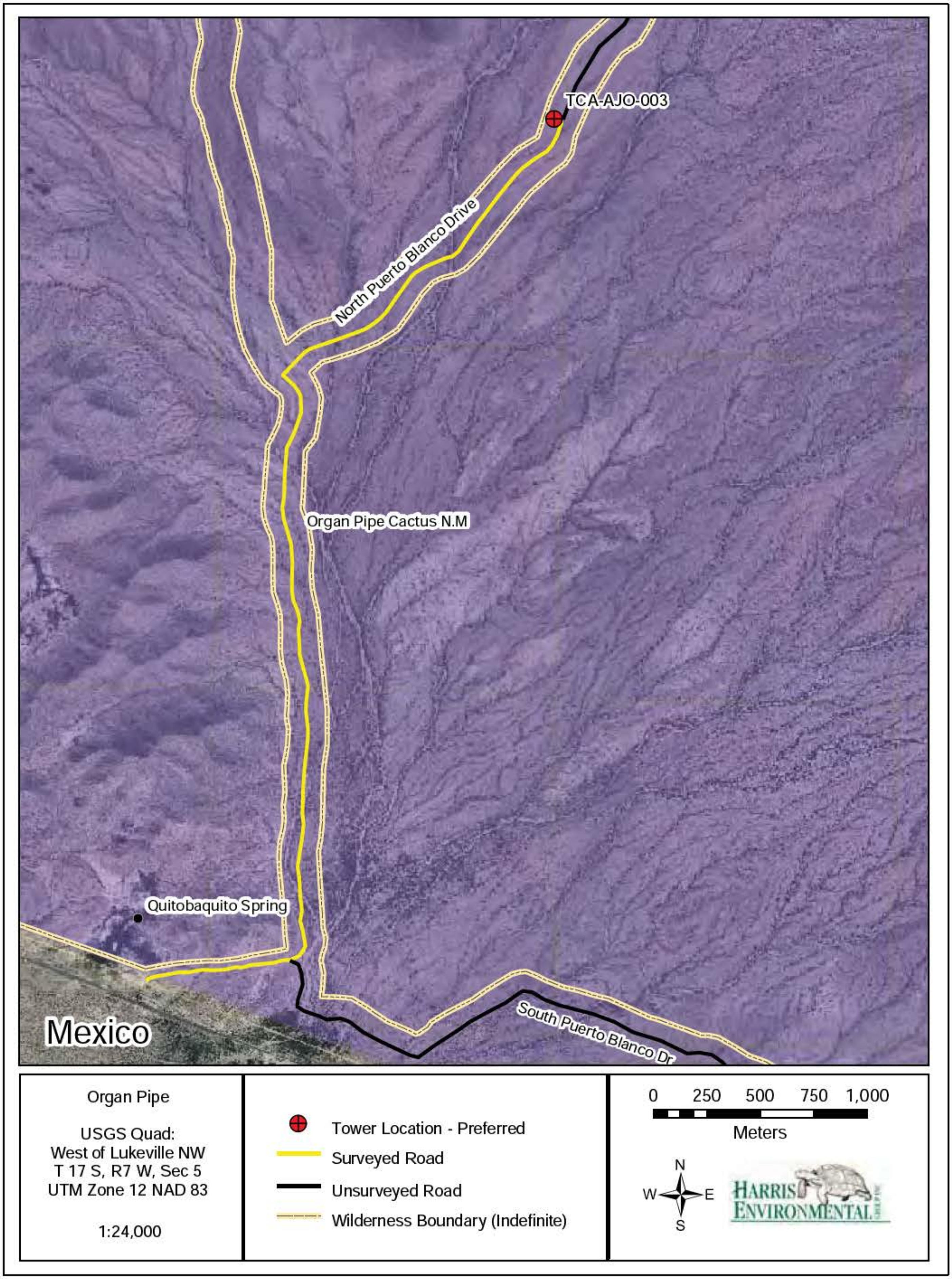


Figure 5.02 Tower Location and Surveyed Area for TCA-AJO-003.

Photograph 5.01 Center of TCA-AJO-003 looking south.

TCA-AJO-004

TCA-AJO-004 is located on BLM land in western Pima County immediately north of the OPCNM border (Figure 5.03). The site is approximately 32.1 km (20.0 mi) north of the U.S./Mexico International Border, and 36.4 km (22.5 mi) northwest of the Lukeville POE. The compound is located at the western edge of the Valley of the Ajo, east of Scarface Mountain and west of the Cuerda de Lena Wash (Photograph 5.02). The elevation is 452 m (1,483 ft) amsl. The substrate at the compound is gravel, with soils composed of fine sandy loam with a high percentage of silt.

TCA-AJO-004 shares a similar position in the northwest part of the OPCNM near TCA-AJO-308 and TCA-AJO-209. TCA-AJO-004 is located 0.9 km (0.6 mi) west of Cuerda de Leña Wash. The location is approached via two possible routes: Approach Route 1 from the east and State Route (SR) 85 and Approach Route 2 from the west via Bates Well Road. Approach Route 1 accesses TCA-AJO-004 via SR 85 south from the Town of Why for about 10.3 km (6.4 mi) and then via an unpaved, unmaintained OPCNM road called "Road 59.4" by CBP personnel. The tower compound is located just off the unpaved route about 13.1 km (8.1 mi) west of SR 85. Approach Route 2 accesses TCA-AJO-004 via Bates Well Road, an OPCNM maintained dirt road. Using this approach, access to TCA-AJO-004 is via an existing and maintained unpaved road that intersects with Bates Well Road about 19.3 km (12.0 mi) south and west of its intersection with the Tucson-Ajo Highway.

Approach Route 1 was rejected to avoid adverse effects to an historic ranch house identified along the route. Only the portion of Approach Route 2 that would require improvements was surveyed. Total survey coverage for this proposed tower installation included the 0.4 hectare (1.0 acre) tower compound, the full extent of the roadway segments that would require improvements on Approach Route 1 and Approach Route 2 (Figure 5.04).

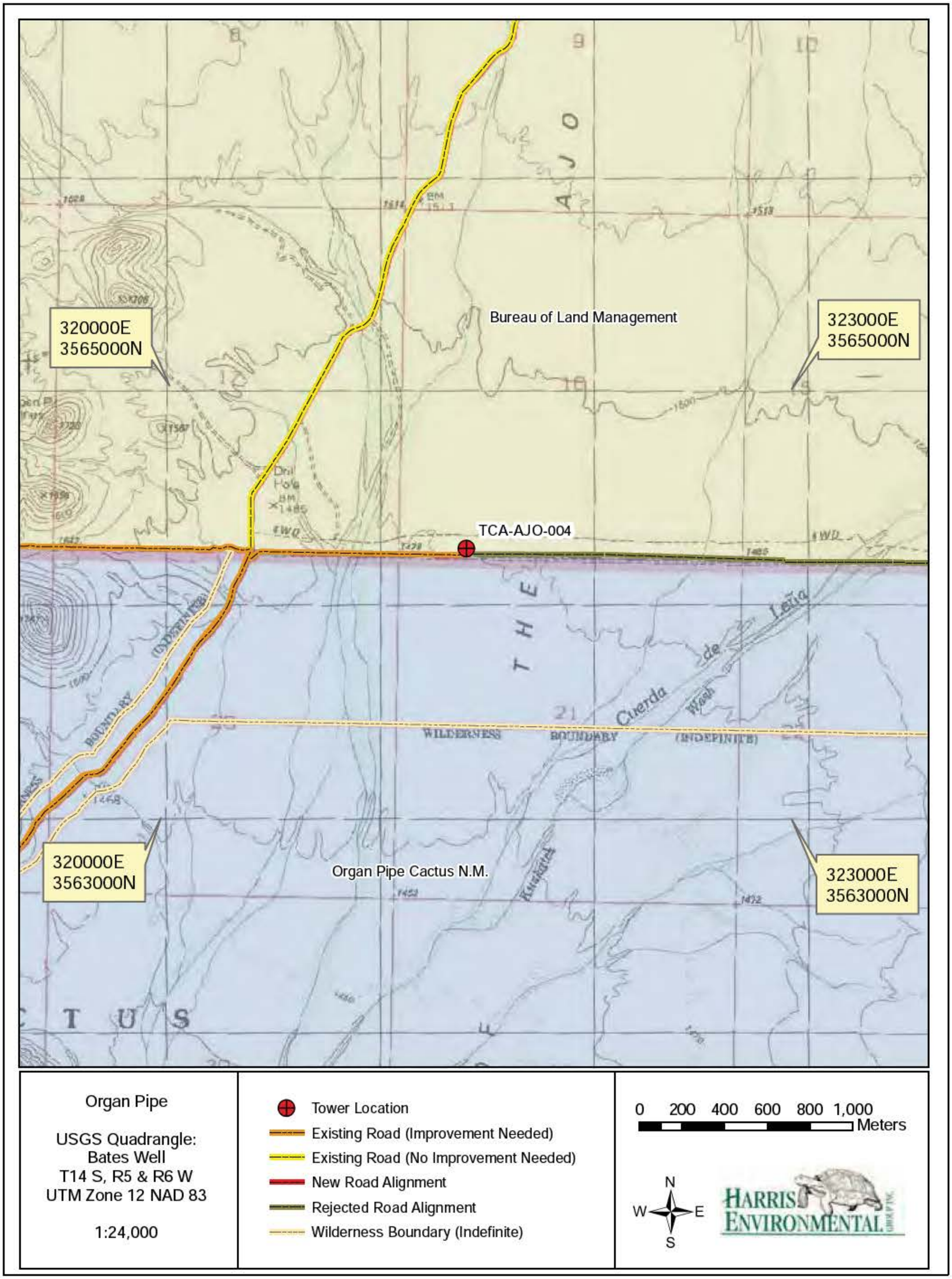
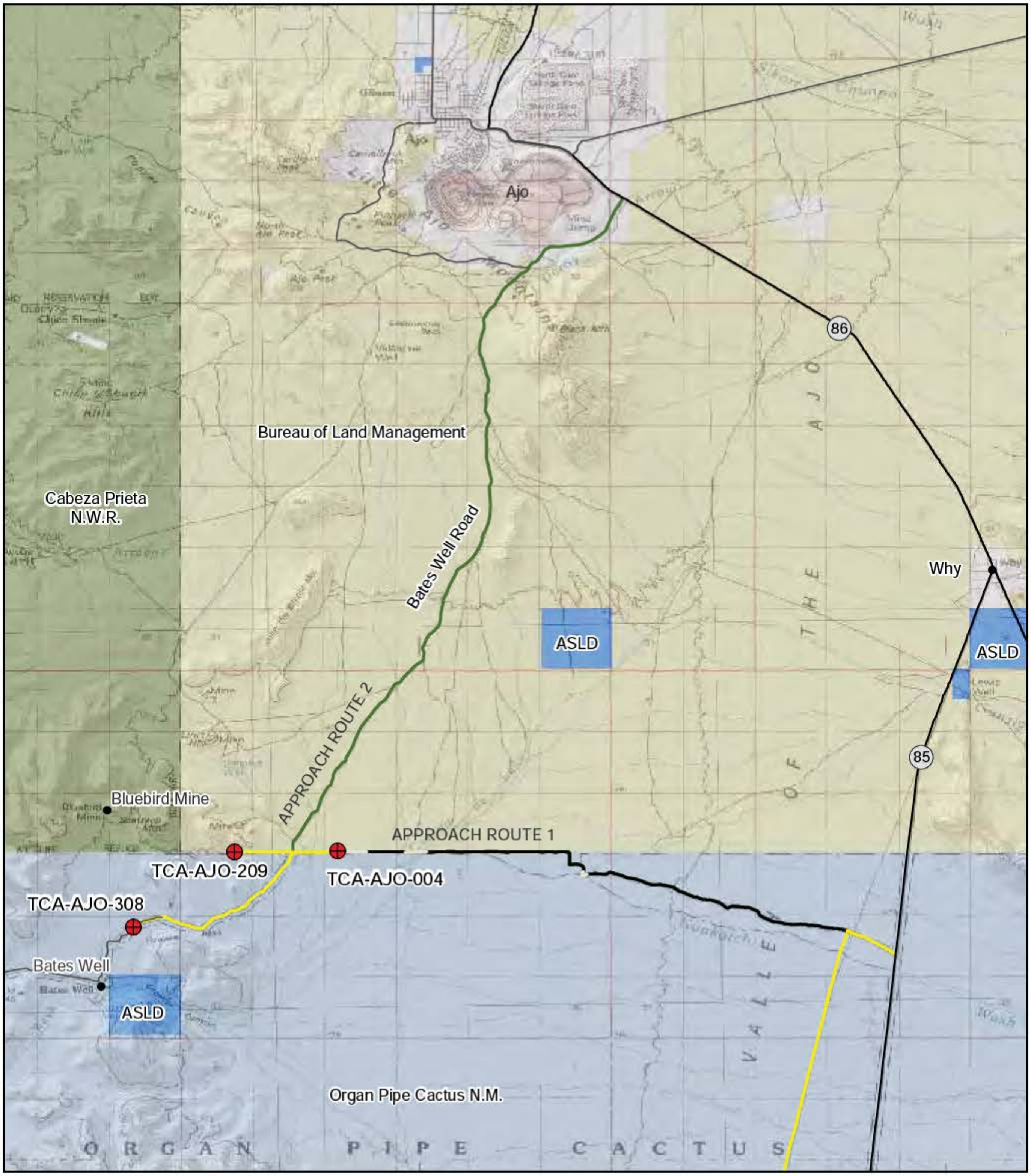


Figure 5.03 UTM registered location and land jurisdiction for TCA-AJO-004.



Organ Pipe

Pima County, AZ
T14S R5W

1:150,000

- Tower Location - Preferred
- Tower Location - Rejected
- Preferred Route - Surveyed
- Preferred Route - Not Surveyed
- Rejected Route - Surveyed
- Rejected Route - Not Surveyed

0 1 2 3 4 Miles

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Figure 5.04 Tower Location and Surveyed Area for TCA-AJO-004.

Photograph 5.02 TCA-AJO-004 at tower compound center looking south.

Field Observations

TCA-AJO-004 and the surrounding area are within the Lower Colorado River Subdivision of Sonoran desertscrub. Plants observed during the survey include cat-claw acacia, creosote, fishhook barrel cactus, velvet mesquite, white bursage and mixed grasses and forbs. Wildlife and evidence of wildlife documented at the tower compound include avian, lizard and jackrabbit scat. Special status species were not observed during the field survey. The tower compound is approximately 0.5 km (0.3 mi) east of an unnamed wash and 0.9 km (0.6 mi) west of the Cuerda de Leña Wash, both supporting xeroriparian vegetation.

TCA-AJO-170

TCA-AJO-170 is located within the OPCNM in southwestern Pima County, approximately 23.9 km (14.9 mi) north of the U.S./Mexico International Border and the Lukeville POE (Figure 5.05). The tower compound is at the southern end of the Valley of the Ajo, south of Alamo Wash, west of SR 85. The elevation at the tower compound is 563 m (1,846 ft) amsl. The substrate and soils at the tower compound are composed of alluvial gravel mixed with sand (Photograph 5.03).

Approach to TCA-AJO-170 would be via an unpaved, unmaintained road that branches off SR 85 about 26 km (15 mi) north of Lukeville. The road travels west for 1.2 km (0.7 mi) then turning south and stretching 9 km (5.5 mi) before arriving at the proposed tower compound. Access to TCA-AJO-170 would be via a short section of new road stemming from the existing approach route. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and 9.7 km (6.03 mi) of access road (Figure 5.06).

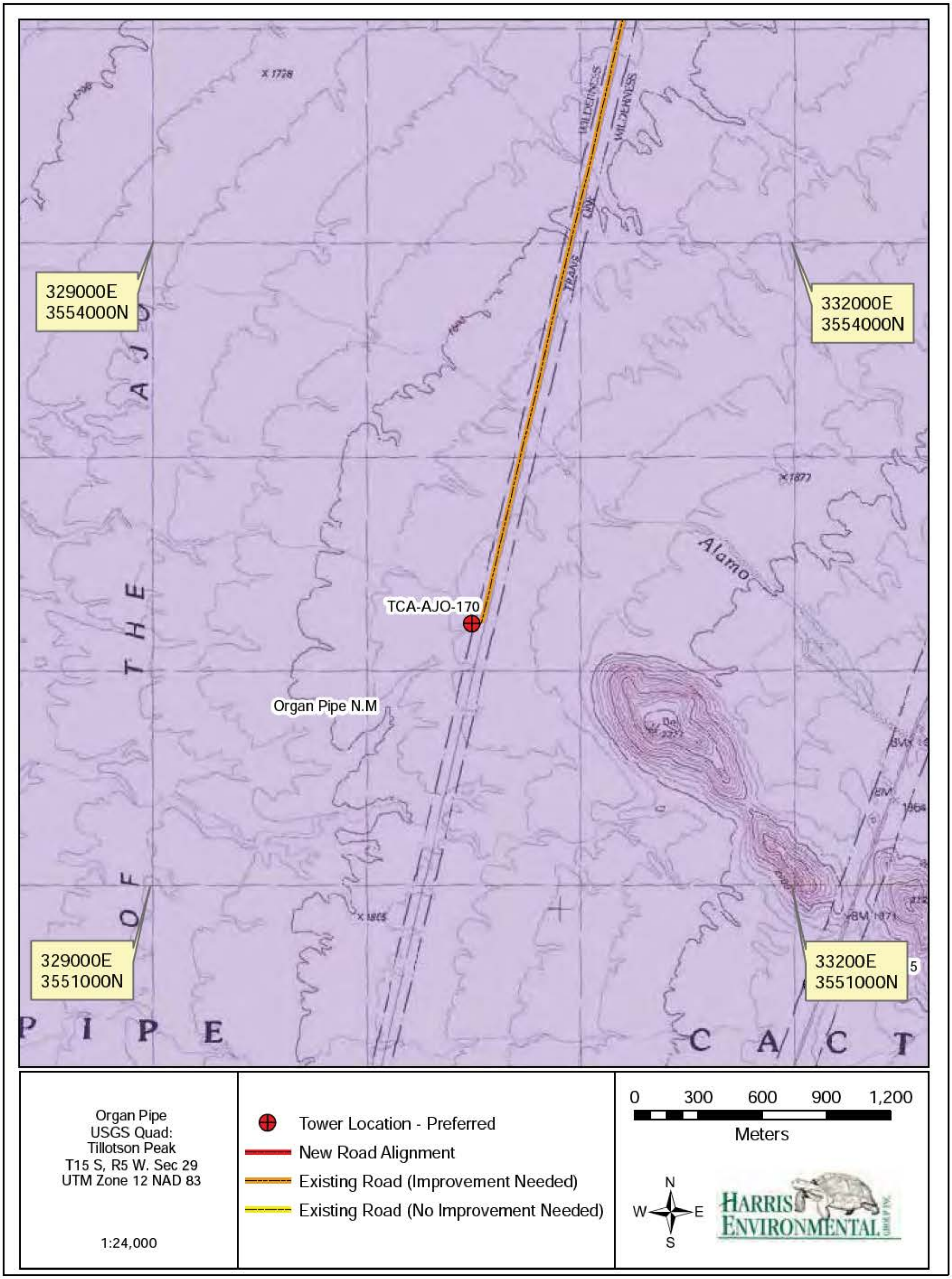


Figure 5.05 UTM registered location and land jurisdiction for TCA-AJO-170.

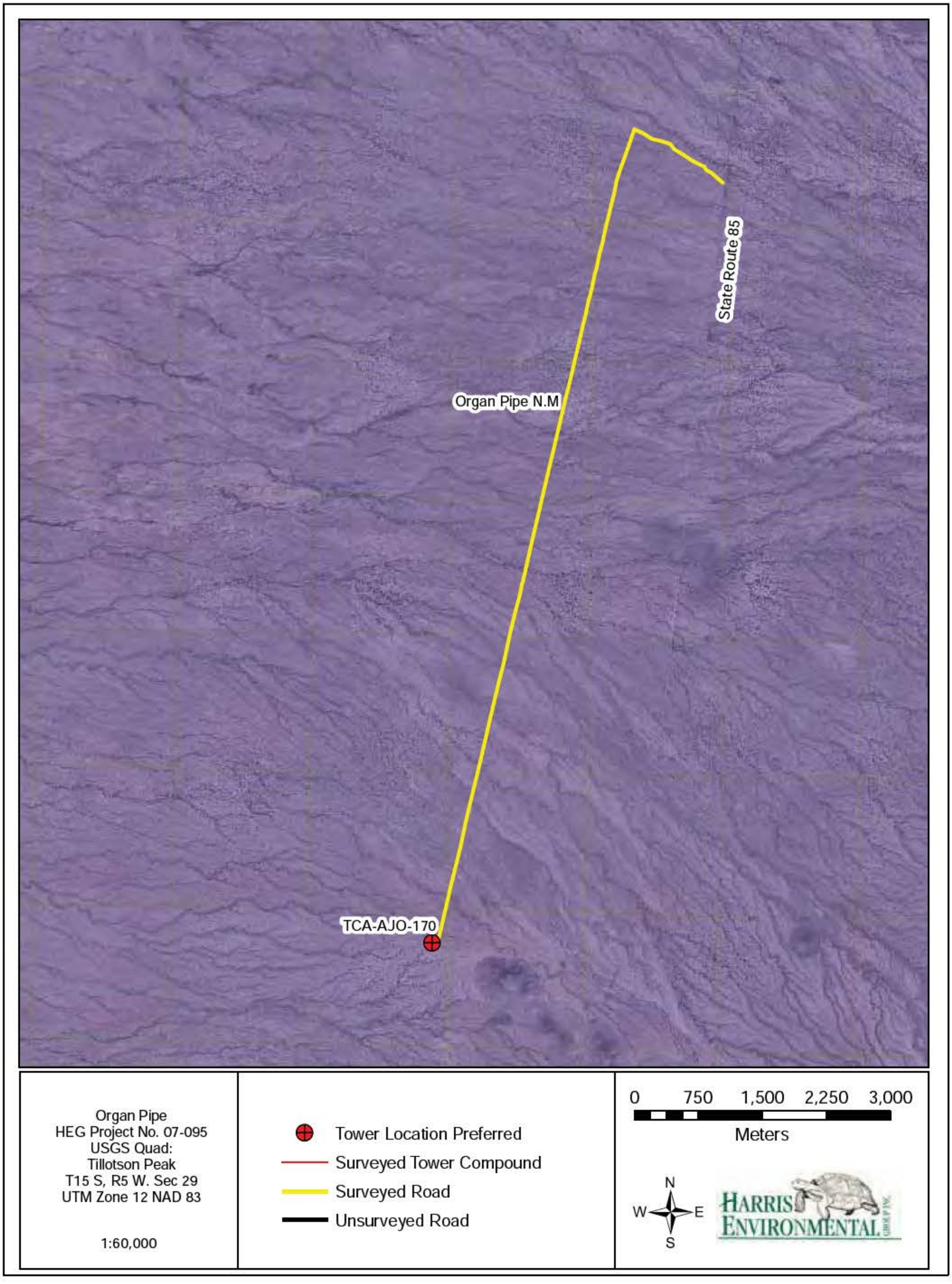


Figure 5.06 Tower location and surveyed area for TCA-AJO-170.

Photograph 5.03 TCA-AJO-170 center looking east.

Field Observations

TCA-AJO-170 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include buckhorn cholla, chain-fruit cholla, creosote, ironwood, ocotillo, palo verde, saguaro and triangle-leaf bursage. Wildlife and evidence of wildlife documented at the tower compound include black-tailed gnatcatcher (*Polioptila melanura*), Gila woodpecker (*Melanerpes uropygialis*), side-blotched lizard (*Uta stansburiana*), western white-throated woodrat midden and Gambel's quail (*Callipepla gambelii*) dusting spots. Special status species were not observed during the field survey. The tower compound is located on a broad swale between two unnamed drainages, approximately 1.0 km (0.6 mi) south of Alamo Wash that support xeroriparian vegetation.

TCA-AJO-204

TCA-AJO-204 is located in western Pima County on the OPCNM approximately 8 km (5 mi) north of the Lukeville POE and the U.S./Mexico International Border (Figure 5.07). The tower compound is approximately 1.2 km (0.7 mi) west of the monument headquarters at an elevation of about 598 m (1,962 ft) amsl. The site is positioned at the extreme southeastern end of the Puerto Blanco Mountains on a small saddle between two hill-tops south of Twin Peaks. The dominant substrate is fractured rock and gravel (Photograph 5.04).

Access to TCA-AJO-204 would be via air lift. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.08).

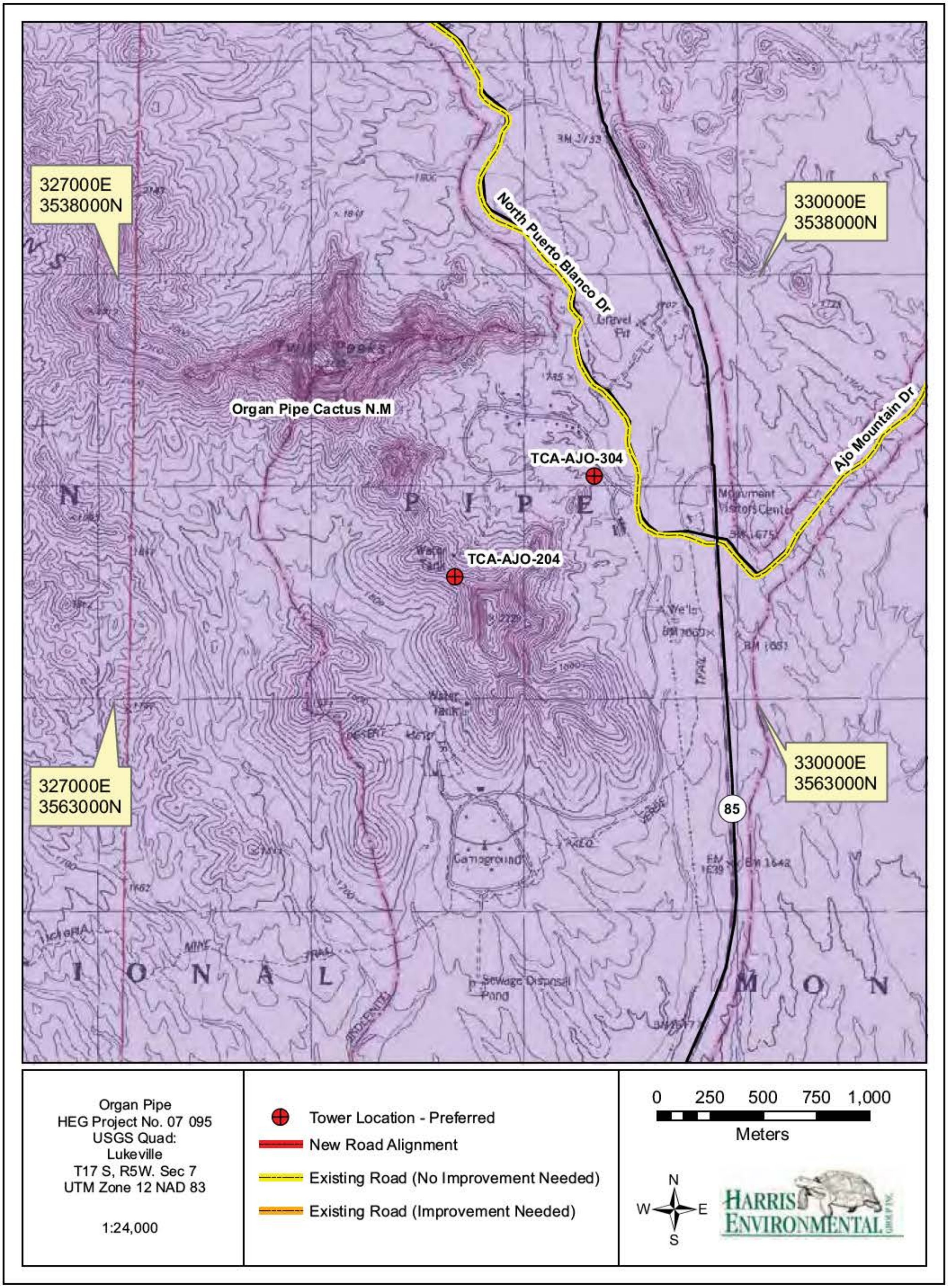


Figure 5.07 UTM registered location and land jurisdiction for TCA-AJO-204.

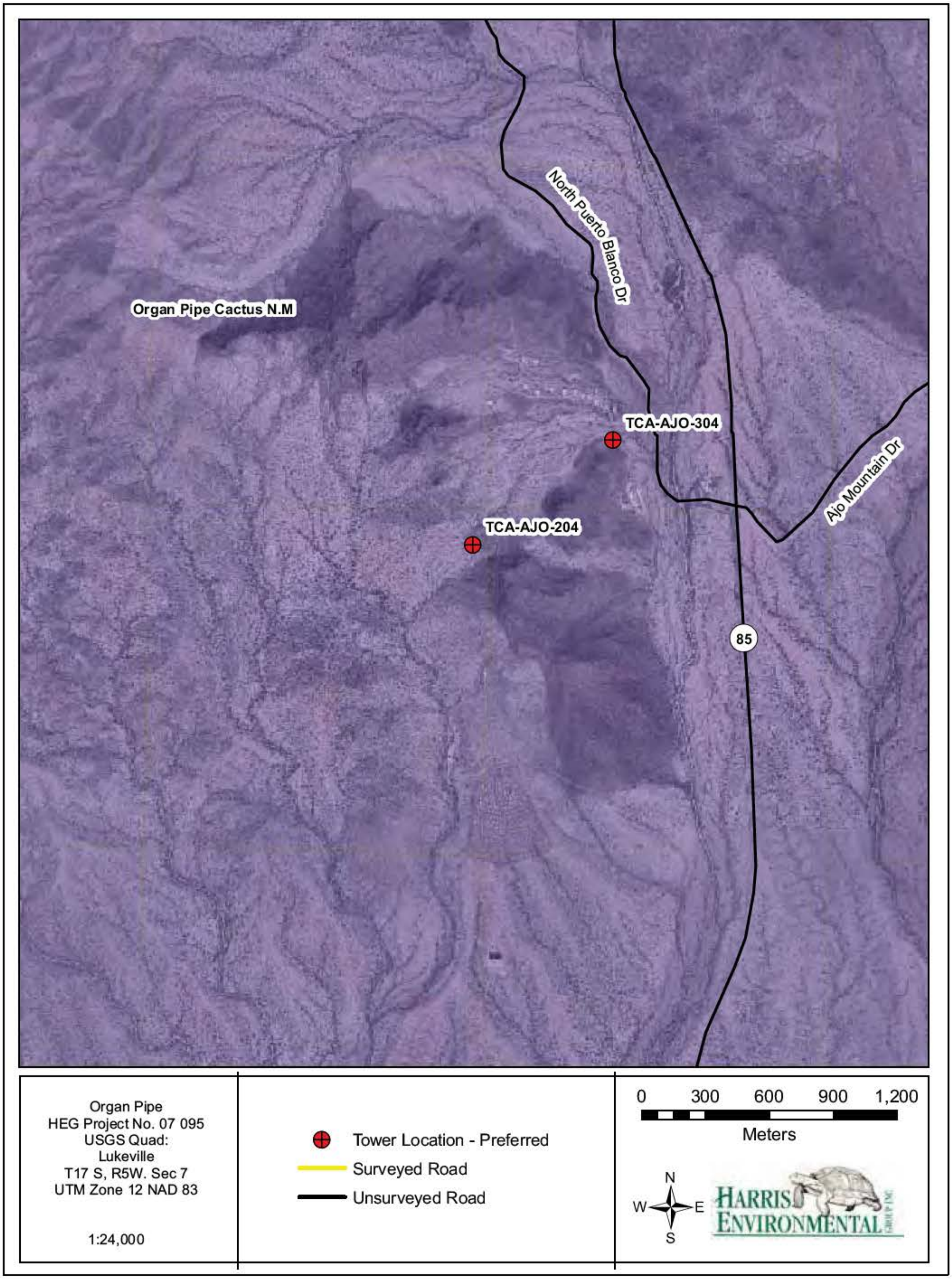


Figure 5.08 Tower location and surveyed area for TCA-AJO-204.

Photograph 5.04 TCA-AJO-204 center looking south.

Field Observations

TCA-AJO-204 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include cane cholla, creosote, hedgehog cactus, organ pipe cactus, palo verde, saguaro, teddy bear cholla and triangle-leaf bursage. Wildlife and evidence of wildlife documented at the tower compound include phainopepla (*Phainopepla nitens*) and rock wren (*Salpinctes obsoletus*). Organ pipe cactus, a *salvage restricted* species, was observed at this tower location. The tower compound is approximately 0.5 km (0.3 mi) east of an unnamed drainage of the Puerto Blanco Mountains. This drainage supports xeroriparian vegetation.

TCA-AJO-209

TCA-AJO-209 was included in *A Biological Evaluation of 60 Proposed Tower Locations for the Tucson West Sector* (Harris Environmental 2008). The information is repeated in this document because this tower is now included in the *Organ Pipe* operational area. TCA-AJO-209 is in western Pima County, approximately 18.6 km (11.6 mi) southwest of the town of Why and 32.2 km (20.0 mi) north of the international border. The proposed installation for the tower compound is on BLM land; however, the southern portion of the surveyed tower compound partially extends on to OPCNM land. Elevation is approximately 492 m (1,615 ft) amsl. Substrate at the tower compound is composed of basalt and limestone cobbles and gravel with soil composed of silty loam with coarse sand (Photograph 5.05).

TCA-AJO-209 is approached via Bates Well Road an OPCNM maintained road. Access to TCA-AJO-209 would be via an existing and maintained unpaved road that intersects with Bates Well Road about 19.3 km (12.0 mi) south and west of its intersection with the Tucson-Ajo Highway. The tower compound is about 1.3 km (0.8 mi) west of Bates Well Road. Some road improvements are proposed for the access road and a portion of Bates Well Road. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and the full extent of the roadway segments that would require improvements (Figure 5.09 and Figure 5.10).

Photograph 5.05 TCA-AJO-209 center looking east.

Field Observations

TCA-AJO-209 and the surrounding area are within the Lower Colorado River Subdivision of Sonoran desertscrub. Plants observed during the survey include foothill palo verde, creosote, limberbush, triangle-leaf bursage, brittlebush, white ratany, saguaro, organ pipe cactus, teddy bear cholla, staghorn cholla, golden-spined hedgehog and mixed grasses and forbs. Wildlife documented included jackrabbit, raven, rodent burrows and a zebra-tailed lizard. Special status species documented include Emory's barrel cactus, organ pipe cactus and staghorn cholla. These species are all categorized as *salvage restricted* on the Arizona Department of Agriculture protected native plant list.

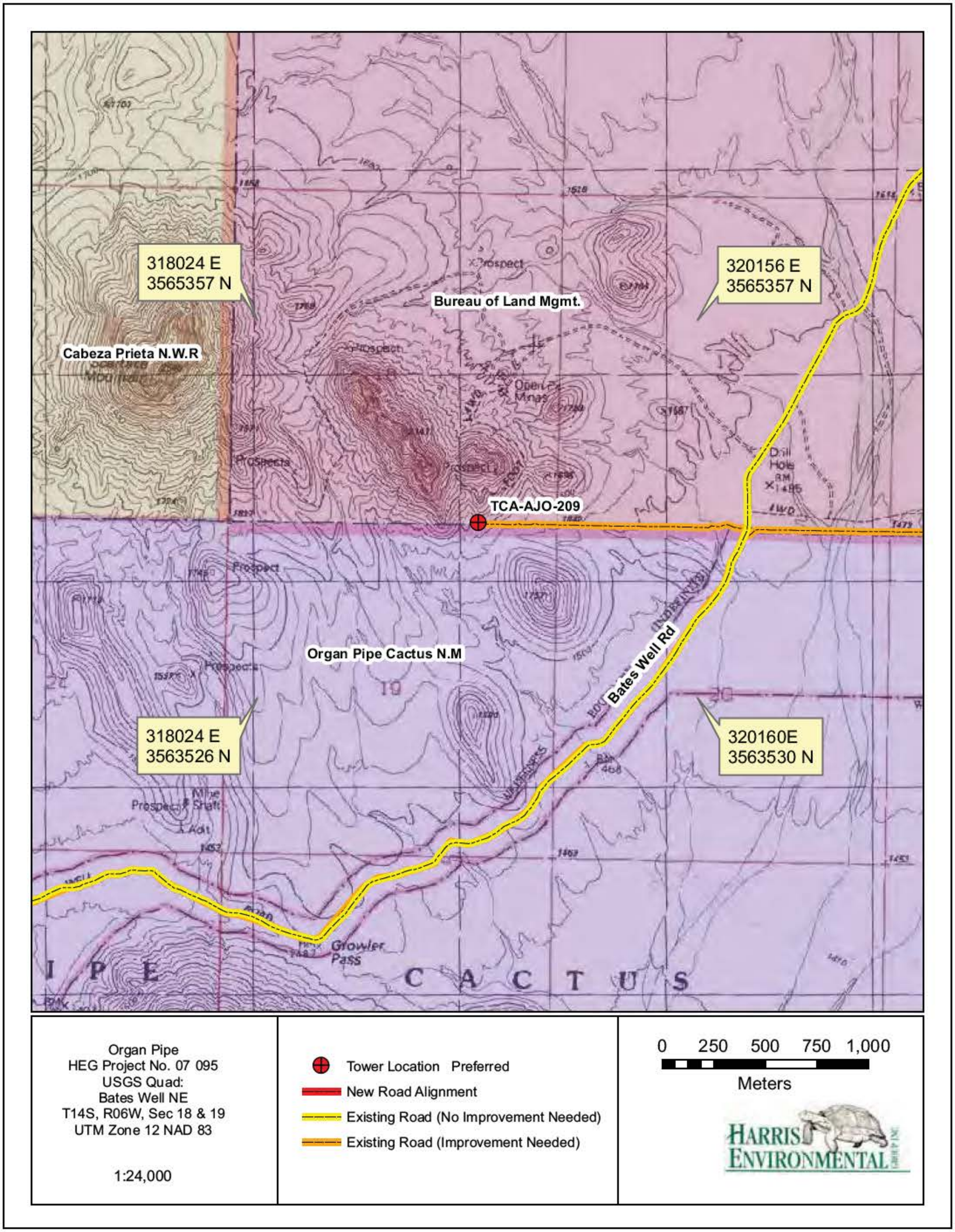
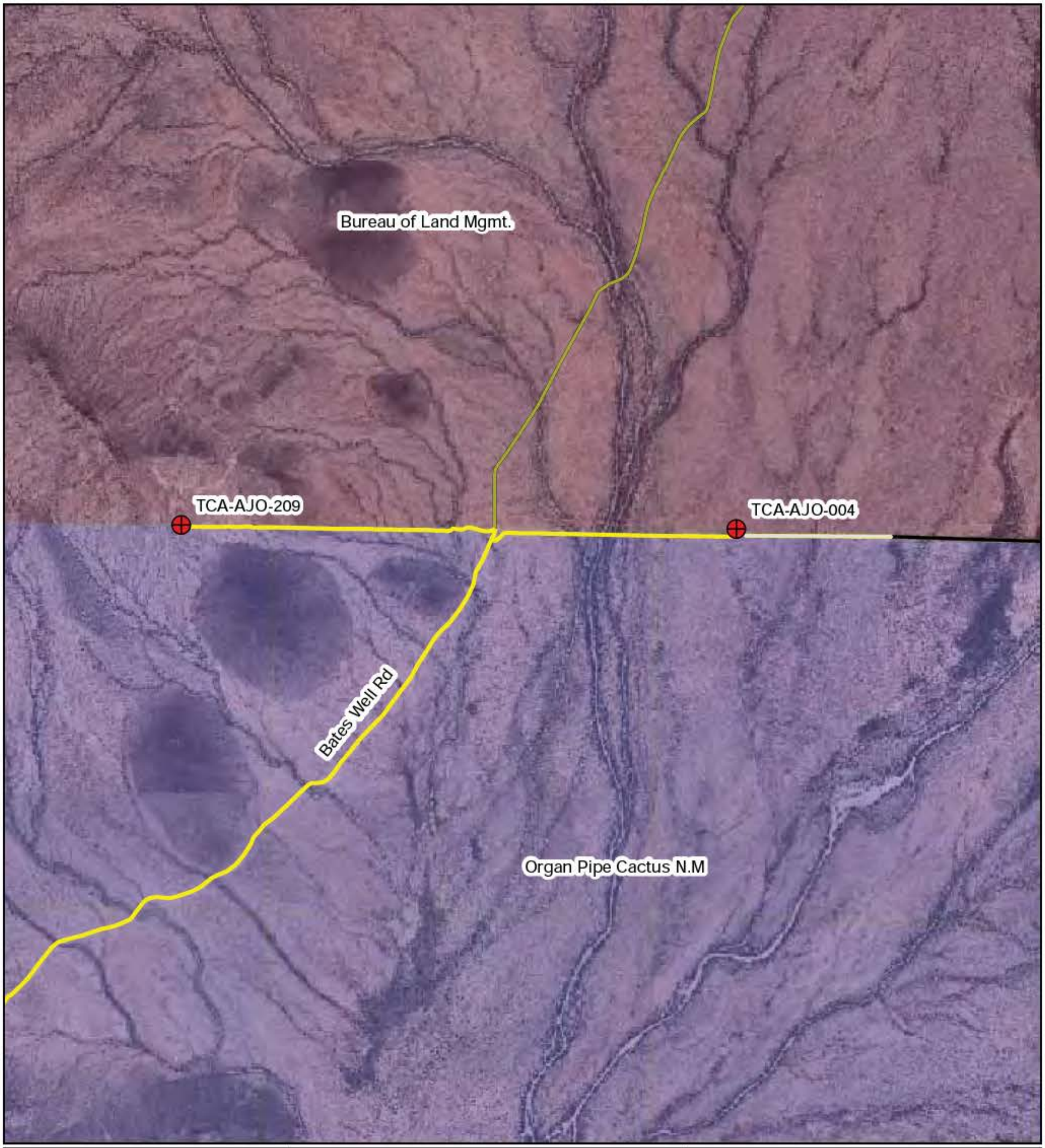


Figure 5.09 UTM registered location and land jurisdiction for TCA-AJO-209.



Organ Pipe

USGS Quad:
Bates Well NE
T14S, R06W, Sec 18 & 19
UTM Zone 12 NAD 83

1:24,000

Tower Location - Preferred
Preferred Route - Surveyed
Preferred Route - Not Surveyed
Rejected Route - Surveyed
Rejected Route - Not Surveyed

0 250 500 750 1,000
Meters

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Figure 5.10 Tower Location and Surveyed Area for TCA-AJO-209.

TCA-AJO-301

TCA-AJO-301 is located at the Lukeville POE at the southern border of the OPCNM, southwestern Pima County (Figure 5.11). The tower compound is located within a modified open area surrounded by high oleander hedges. The elevation is 426 m (1,398 ft) amsl. The substrate at the tower compound is partly bare ground, with soils composed of sandy to gravelly loam (Photograph 5.06).

Photograph 5.06 TCA-AJO-301 center looking south.

TCA-AJO-301 is approached from the Town of Why via SR 85 to the Lukeville POE and is accessed via a paved road that winds through the existing facility buildings. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.12).

Field Observations

TCA-AJO-301 and the surrounding area are within the Arizona Upland subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include Mexican palo verde, oleander, Russian thistle and velvet mesquite. Wildlife or special status species were not observed at the tower compound during the field survey.

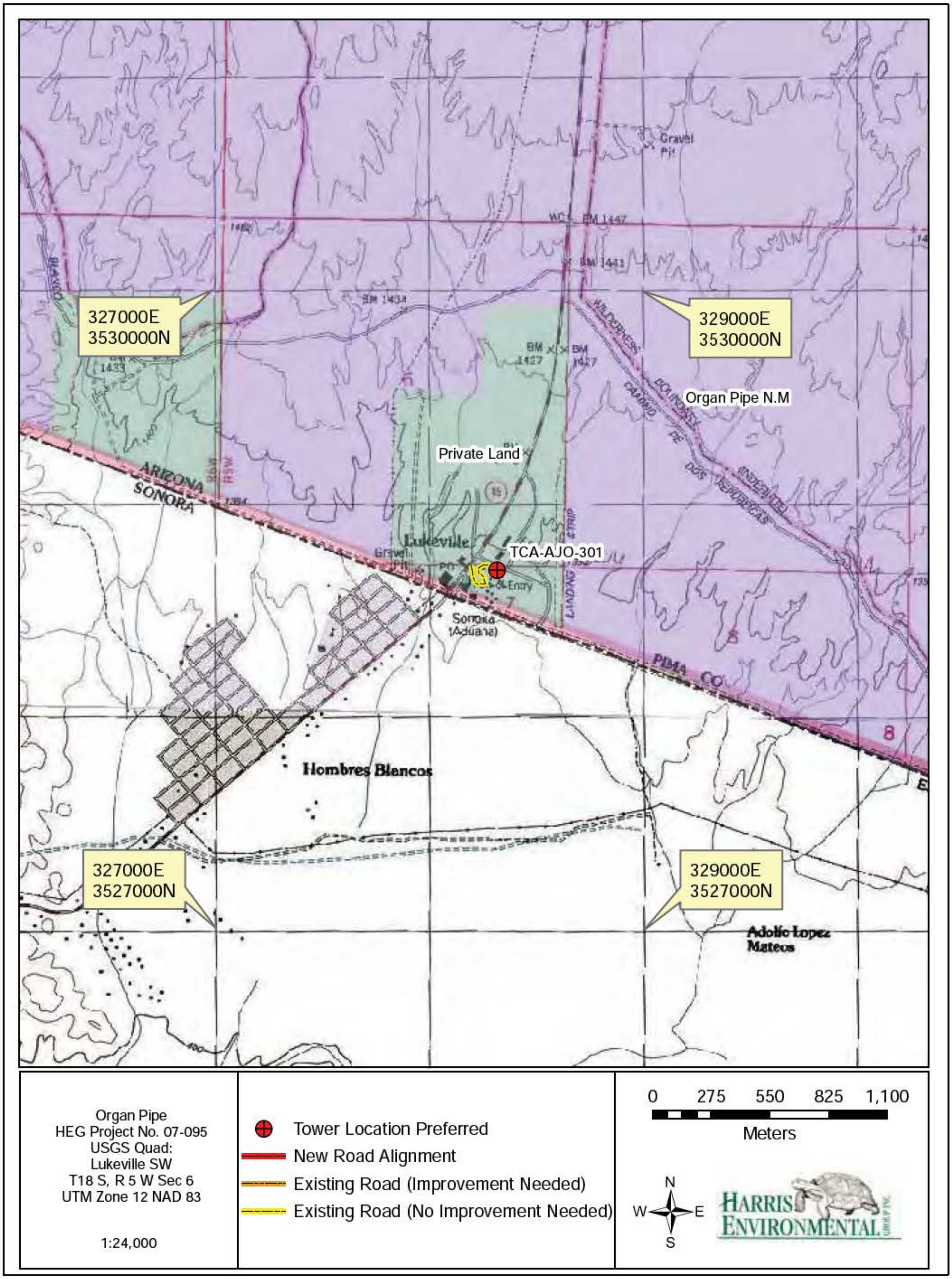


Figure 5.11 UTM registered location and land jurisdiction for TCA-AJO-301.

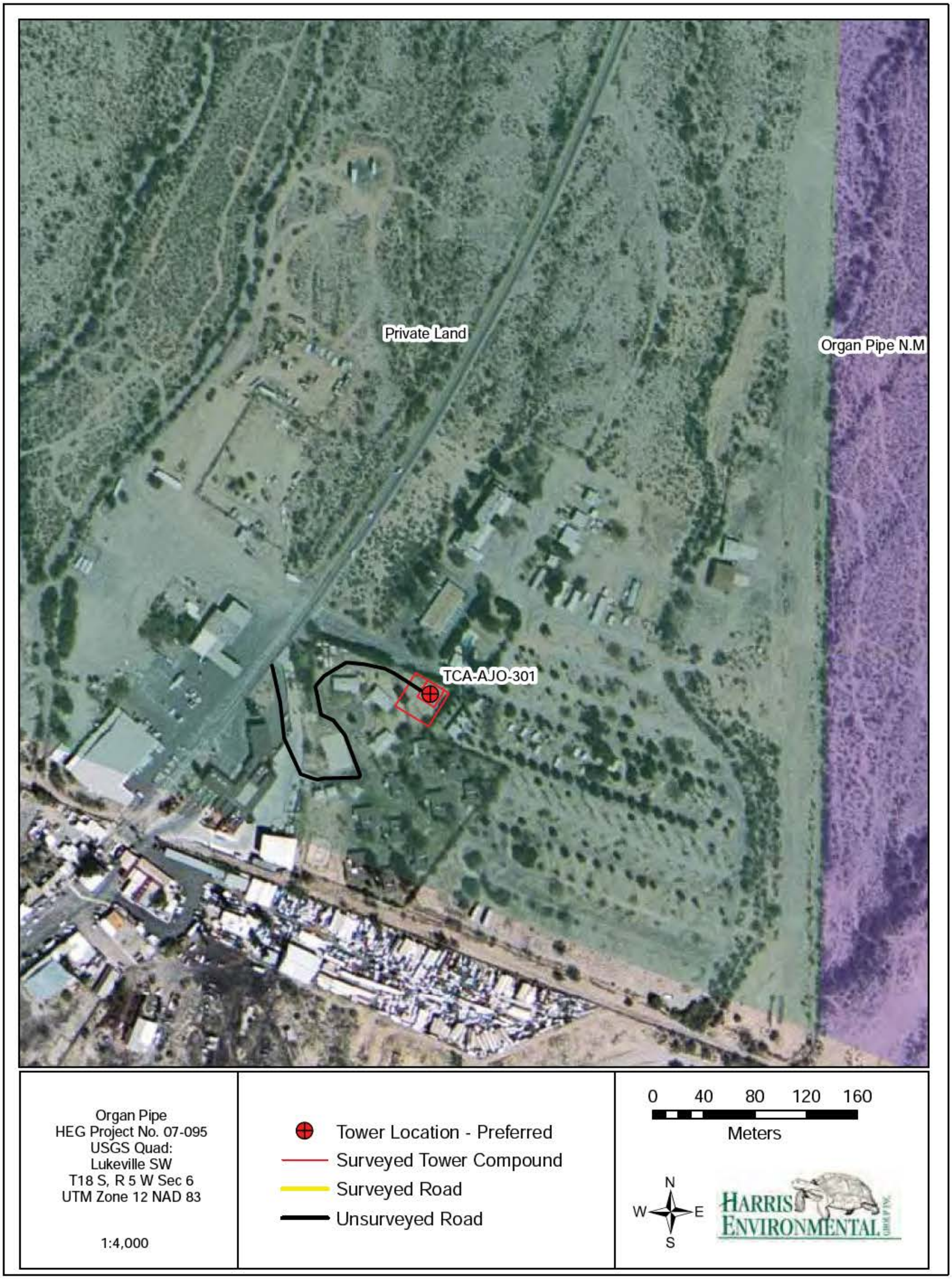


Figure 5.12 Tower location and surveyed area for TCA-AJO-301.

TCA-AJO-302

TCA-AJO-302 was previously surveyed and recorded as TCA-AJO-286 and is located at the western border of the OPCNM adjacent to the Cabeza Prieta National Wildlife Refuge (CPNWR) (Figure 5.13). The tower compound is approximately 18.6 km (11.6 mi) north of the U.S./Mexico border at the southeast end of the lower San Cristobal Valley. The elevation is 336 m (1,102 ft) amsl. The substrate at the tower compound is silty to sandy soil, devoid of rock (Photograph 5.07).

Photograph 5.07 TCA-AJO-302 center looking south.

Approach to TCA-AJO-302 would be via Bates Well Road an unpaved OCPNM-maintained road that is reached from SR 85. This western section of the access road traverses the greater Growler Valley and crosses the highly braided Growler Wash midway between Bates Well and the location for TCA-AJO-302. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and the full extent of the access routes (Figure 5.14).

Field Observations

TCA-AJO-302 and the surrounding area are within the Lower Colorado River subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include creosote, triangle-leaf bursage and mixed forbs. Wildlife and evidence of wildlife documented at the tower compound include western whiptail (*Aspidoscelis tigris*), desert cottontail (*Sylvilagus audubonii*) scat and rodent (Rodentia) burrows. Special status species were not observed during the field surveys. The tower compound is located between two tributaries of San Cristobal Wash that support a xeroriparian vegetation community.

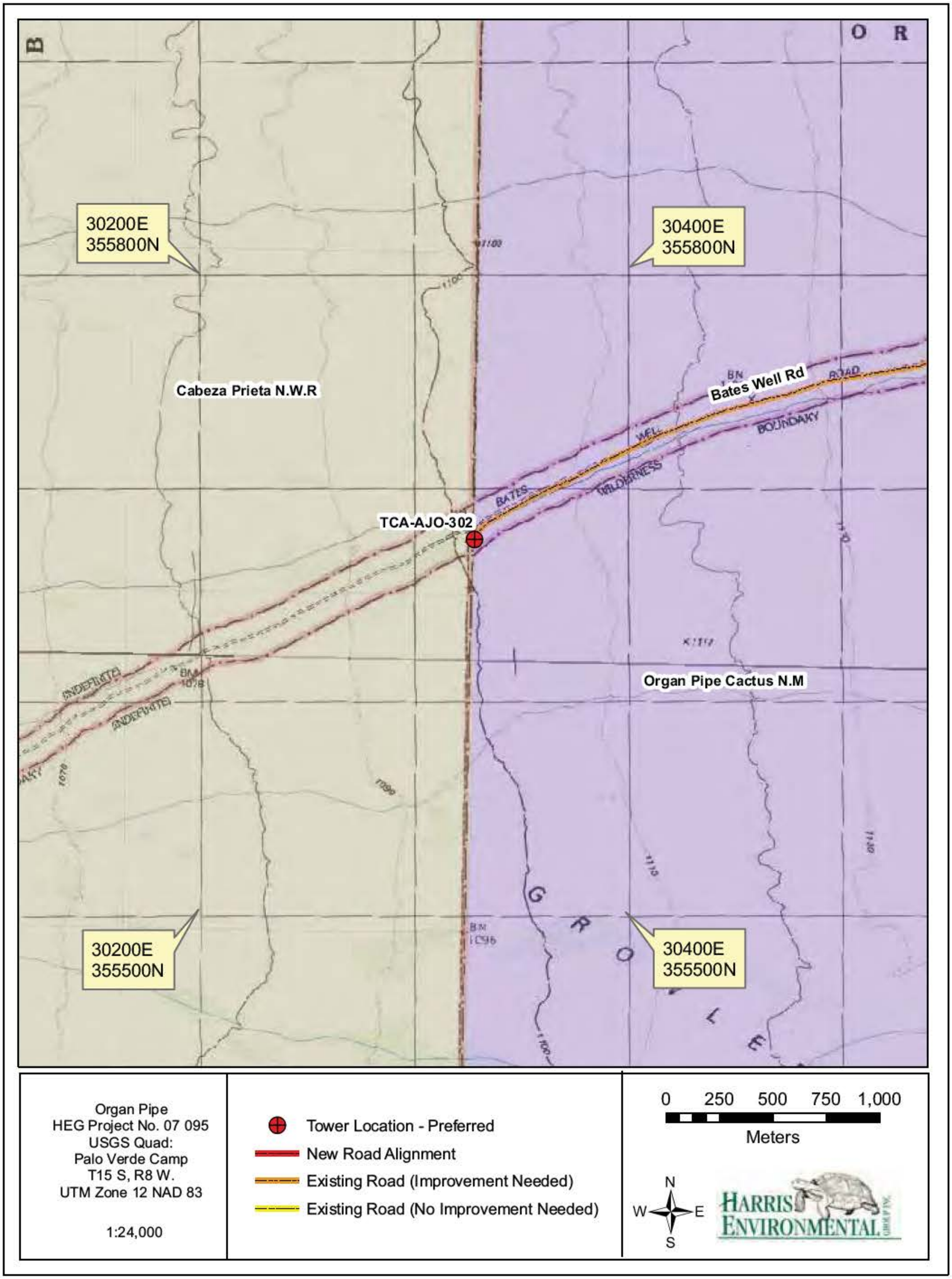


Figure 5.13 UTM registered location and land jurisdiction for TCA-AJO-302

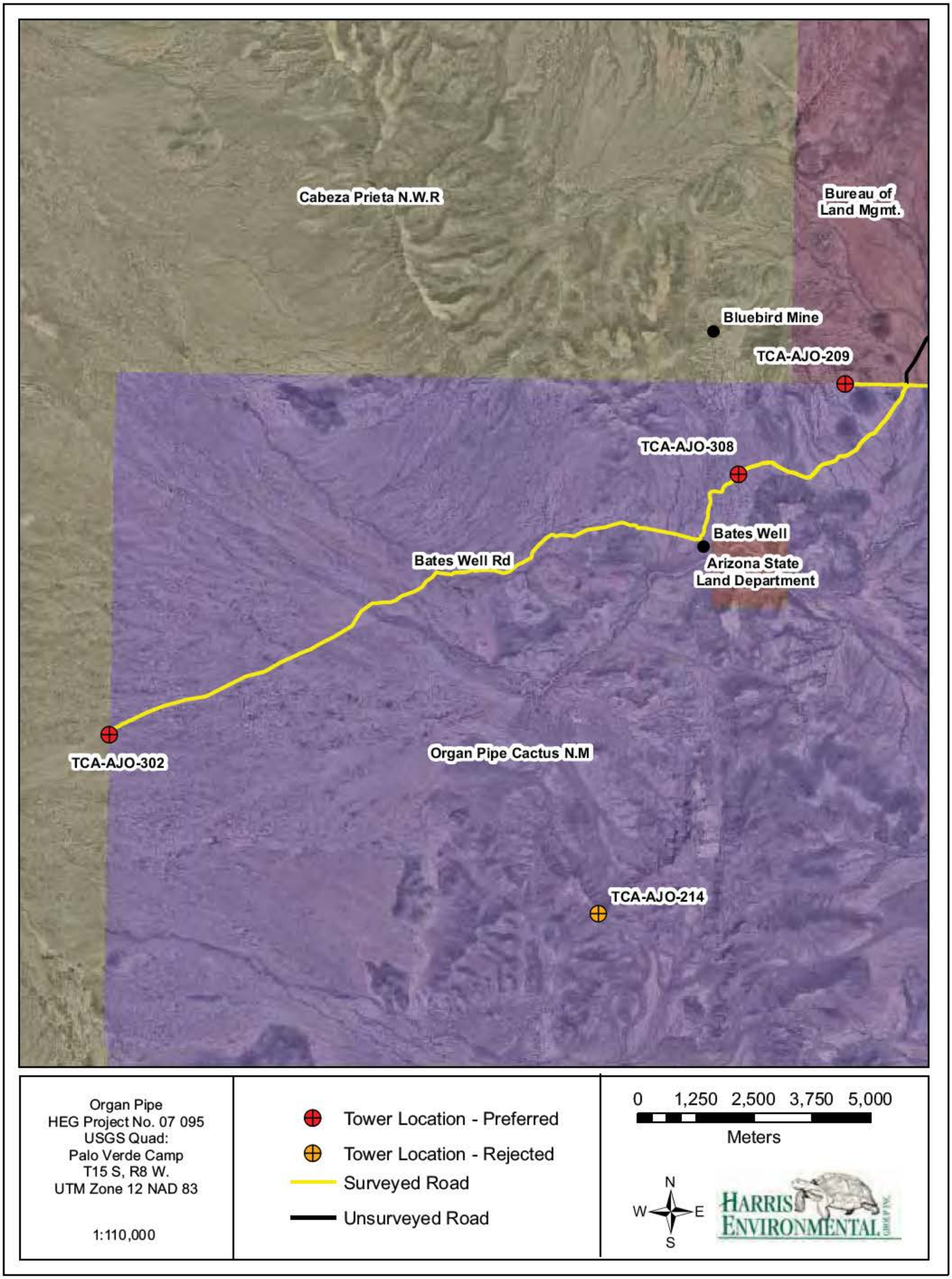


Figure 5.14 Tower location and surveyed area for TCA-AJO-302.

TCA-AJO-303

TCA-AJO-303 is located within the OPCNM, approximately 2.9 km (1.8 mi) north of the U.S./Mexico International Border and 8.1 km (5.0 mi) northwest of the Lukeville POE in southwestern Pima County (Figure 5.15). The tower compound is located at the eastern end of La Abra Plain at the western base of the Sonoyta Mountains. The elevation is 444 m (1,458 ft) amsl. The substrate at the tower compound is sand and small gravel and soils are composed of sandy loam (Photograph 5.08).

Photograph 5.08 TCA-AJO-303 center looking northwest.

TCA-AJO-303 is approached from the Lukeville POE via the International Border Road and is accessed via a maintained National Park Service road approximately 6.6 km (4.1 mi) west of the Lukeville POE. The tower compound is adjacent to the western shoulder of the access road and is located in a flat area that includes the road within the survey area. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and portions of the approach road (Figure 5.16).

Field Observations

TCA-AJO-303 and the surrounding area are within the Arizona Upland subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include bursage, creosote, ocotillo, saguaro and velvet mesquite. A tree lizard (*Urosaurus* sp.) was the only wildlife documented at the tower compound. Special status species were not observed during field surveys. The tower compound is located between two unnamed drainages of the Puerto Blanco and Sonoyta Mountains which support xeroriparian vegetation.

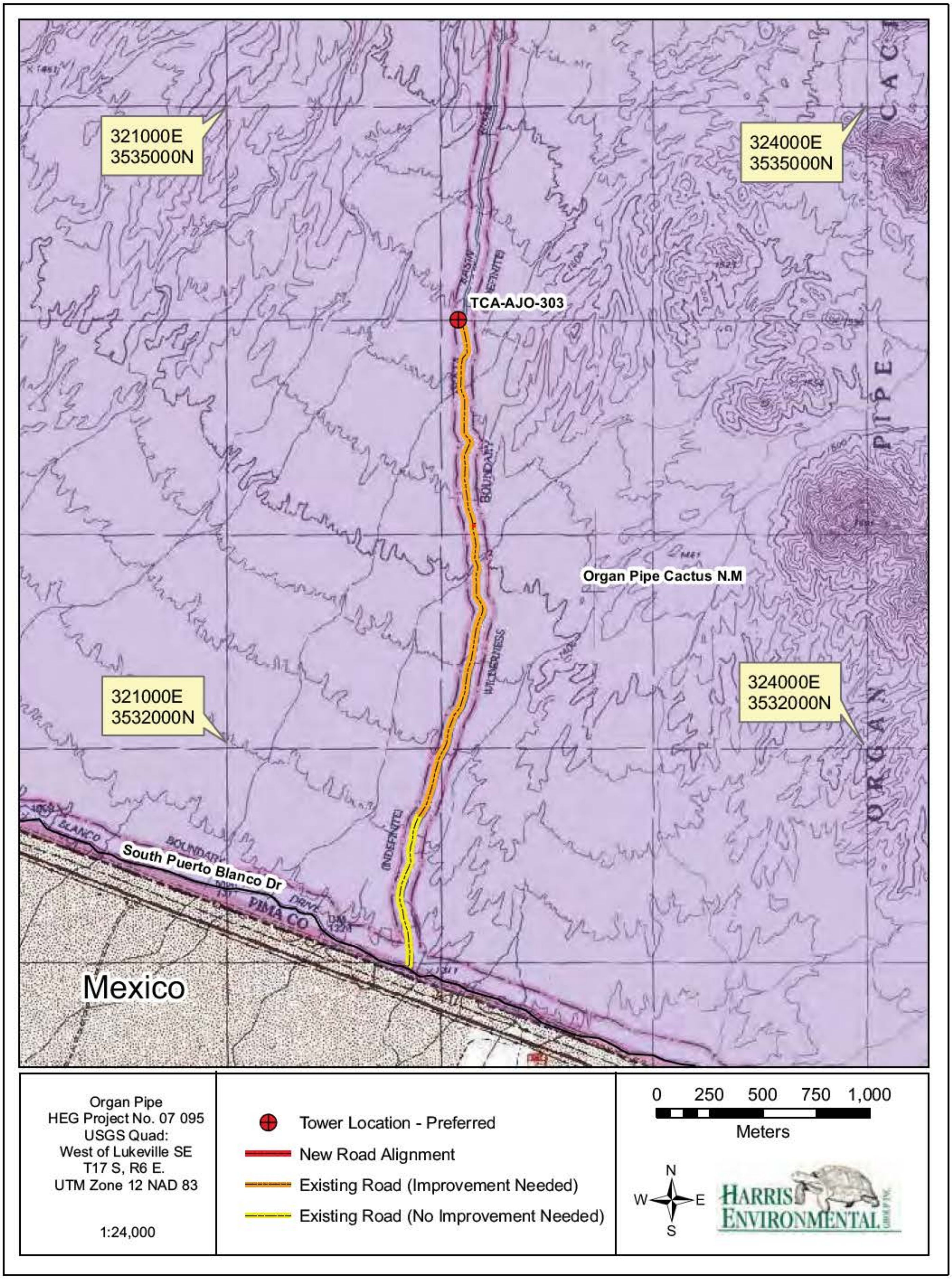


Figure 5.15 UTM registered location and land jurisdiction for TCA-AJO-303.

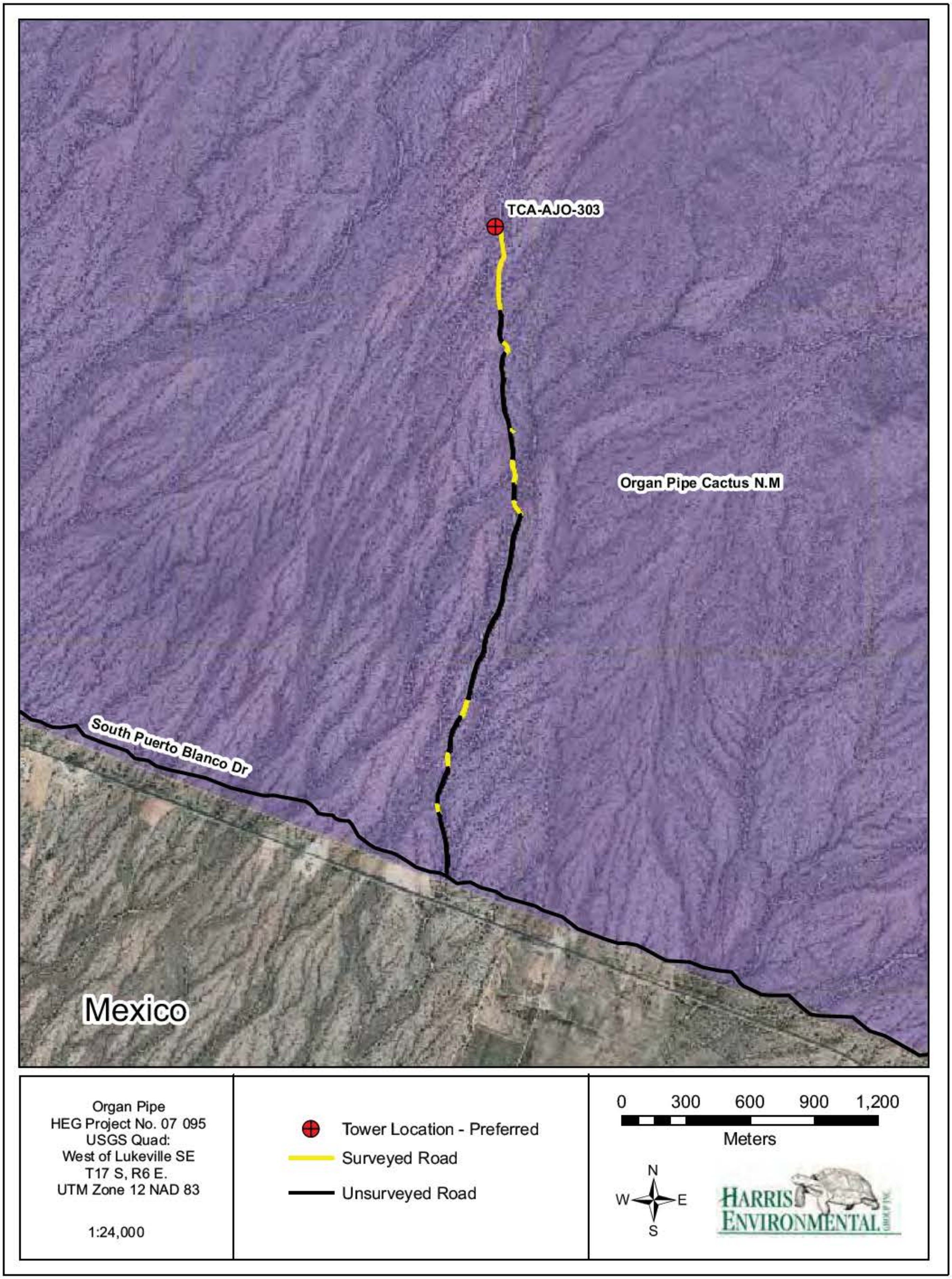


Figure 5.16 Tower location and surveyed area for TCA-AJO-303.

TCA-AJO-304

TCA-AJO-304 is located in the OPCNM, approximately 8.8 km (5.5 mi) north of the U.S./Mexico International Border and the Lukeville POE in southwestern Pima County (Figure 5.17). The tower compound is at the base of a small ridge at the southeast end of the Puerto Blanco Mountains approximately 0.5 km (0.3 mi) northwest of the monument headquarters. The elevation is 516 m (1,693 ft) amsl. The substrate at the tower compound is granitic cobble and pebbles and the soils are composed of volcanic, granitic, and limestone deposits (Photograph 5.09).

Photograph 5.09 TCA-AJO-304 center looking south.

TCA-AJO-304 is approached from the Town of Why via SR 85 to a paved road heading west from the OPCNM headquarters and is accessed via a small unpaved area within the tower compound. The proposed route traverses federal land and requires some surface disturbance along this section of the proposed access. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.18).

Field Observations

TCA-AJO-304 and the surrounding area are within the Arizona Upland subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include brittlebush, buckhorn cholla, creosote, foothill palo verde, hedgehog cacti, ocotillo, organ pipe cacti, saguaro, staghorn cholla, teddy bear cholla, triangle-leaf bursage and mixed grasses and forbs. Wildlife documented at the tower compound include cactus wren, Gambel's quail, Gila woodpecker, phainopepla and western whiptail. Staghorn cholla and organ pipe cacti, both categorized as *salvage restricted* species on the ADA projected native plants list, were observed during field surveys. The tower compound is approximately 0.1 km (0.5 mi) northwest of a small unnamed drainage that supports xeroriparian vegetation.

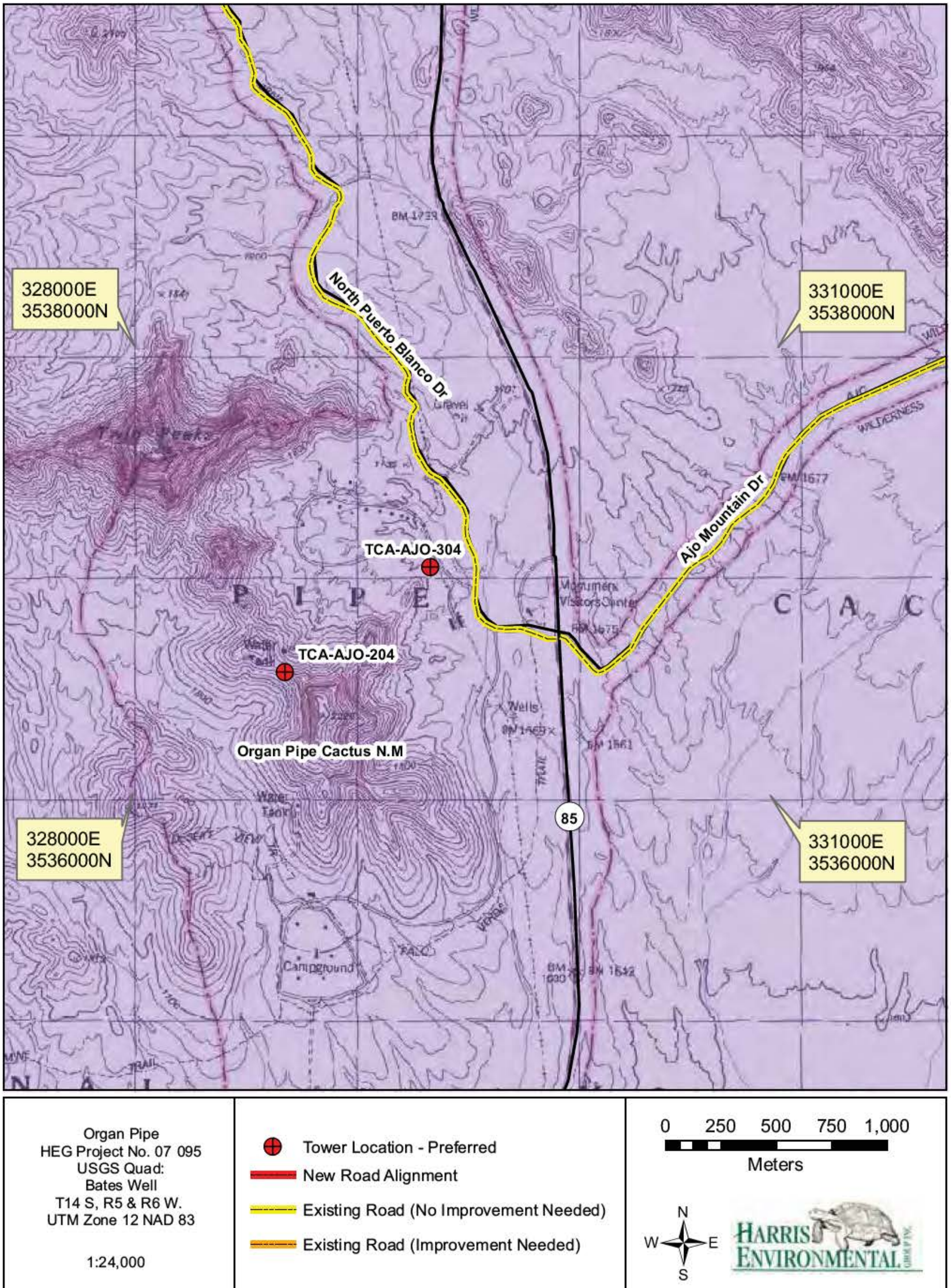


Figure 5.17 UTM registered location and land jurisdiction for TCA-AJO-304.

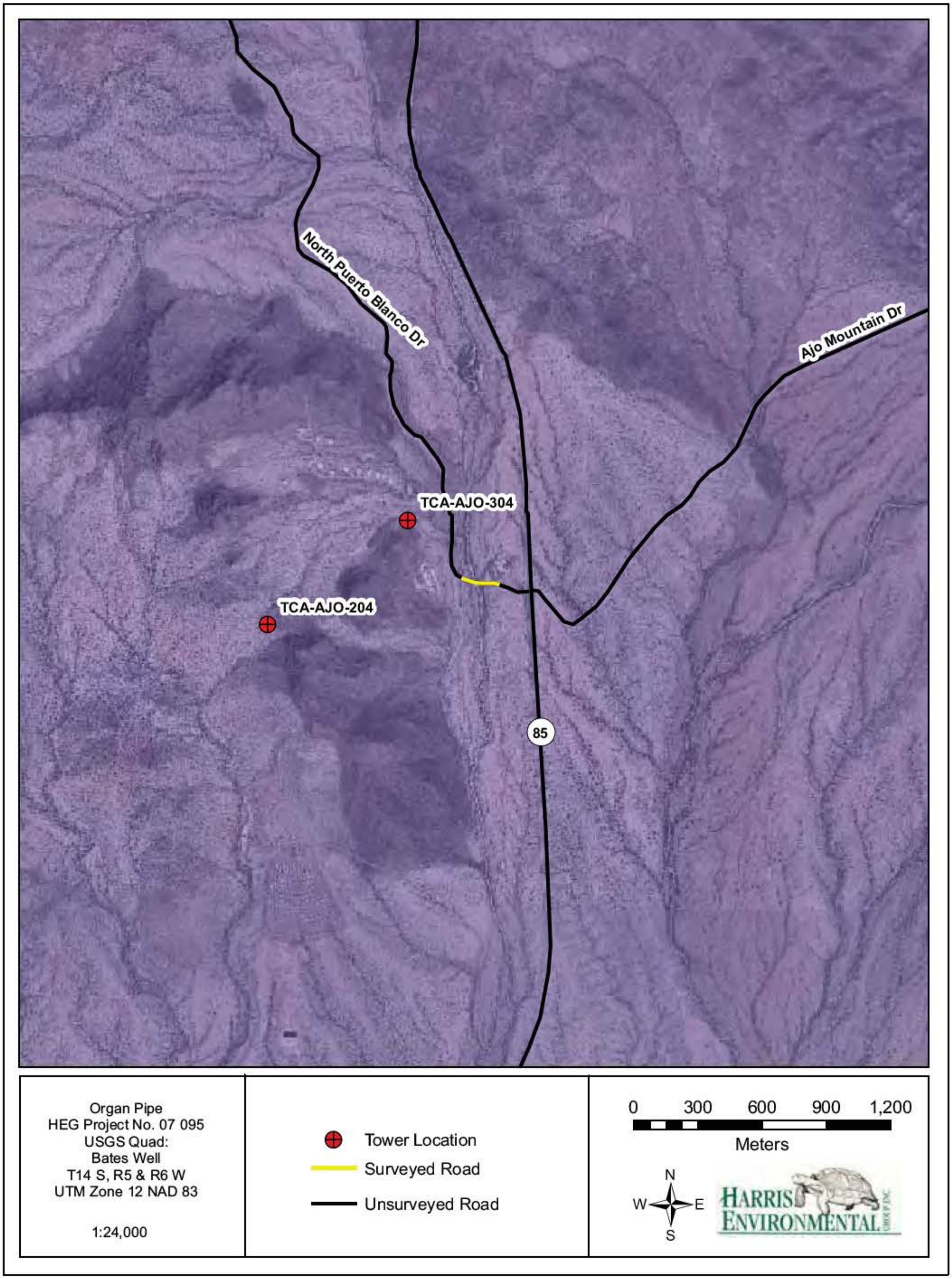


Figure 5.18 Tower location and surveyed area for TCA-AJO-304.

TCA-AJO-308

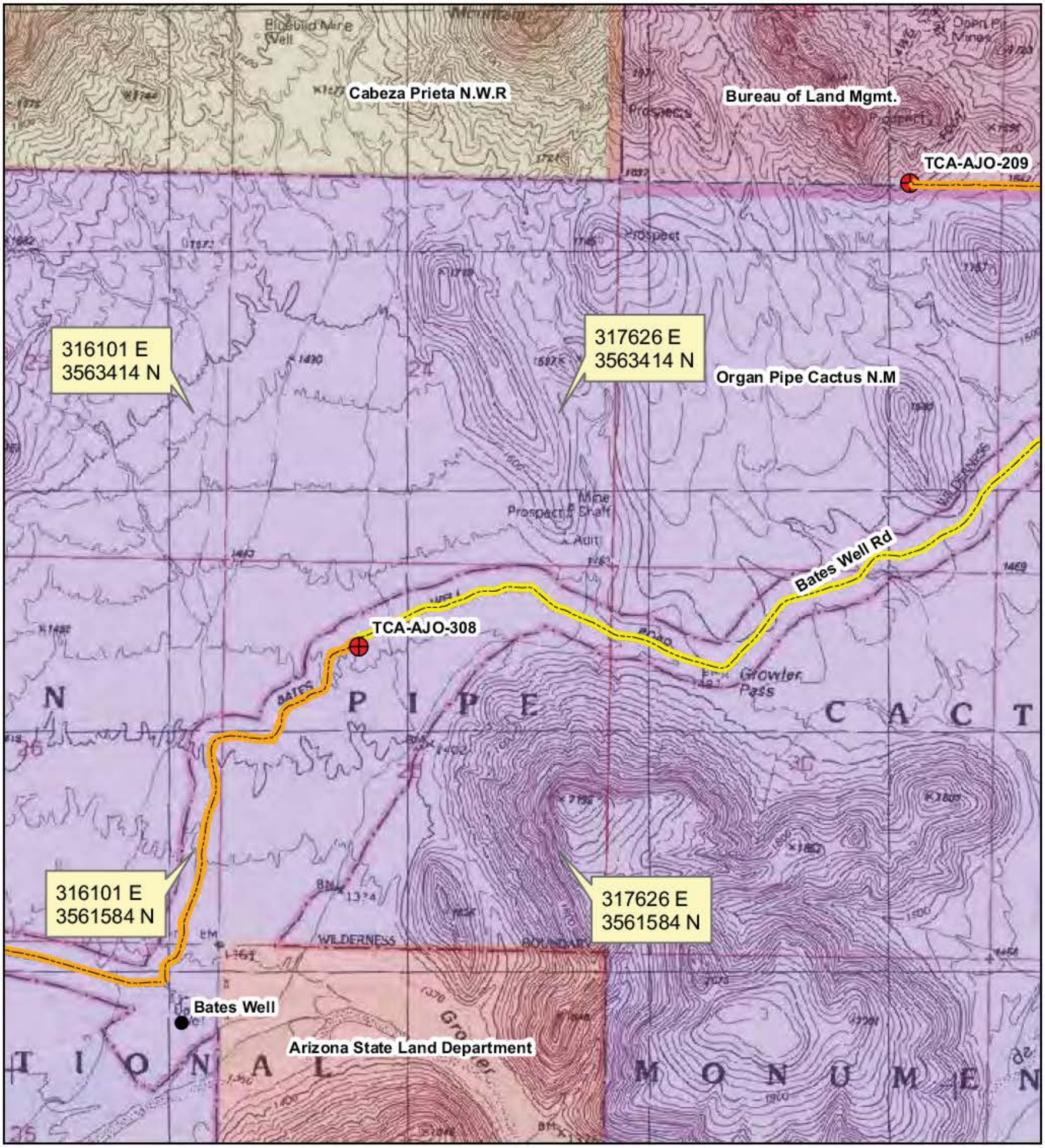
TCA-AJO-308 is located within the OPCNM in southwestern Pima County, approximately 21.3 km (13.2 mi) southwest of the Town of Why and 29.3 km (18.2 mi) north of the International Border (Figure 5.19). The tower compound is located near Growler Pass, between the Growler Mountains and the Bates Mountains. The elevation is 434 m (1,424 ft) amsl. The substrate at the tower compound is composed of angular rock and gravel with some sand (Photograph 5.10).

Photograph 5.10 TCA-AJO-308 looking south.

Approach to TCA-AJO-308 would be via Bates Well Road an unpaved OCPNM-maintained road that is reached from SR 85. Access to the tower compound is gained from the south shoulder of Bates Well Road within the tower compound. Survey coverage included the 0.4 ha (1.0 acre) tower compound (Figure 5.20).

Field Observations

TCA-AJO-308 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include foothill palo verde, ironwood, creosote, white ratany, triangle-leaf bursage, white bursage, ocotillo, golden-spined hedgehog, pencil cholla, saguaro, buckhorn cholla, teddy bear cholla, chain-fruit cholla and mixed grasses and forbs. There was no evidence of wildlife or special status species documented at the tower compound.



Organ Pipe
HEG Project No. 07 095
USGS Quad:
Bates Well SW
T14S, R07W, Sec 25
UTM Zone 12 NAD 83

1:24,000

Tower Location - Preferred
New Road Alignment
Existing Road (No Improvement Needed)
Existing Road (Improvement Needed)

0 250 500 750 1,000
Meters

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Figure 5.19 UTM registered location and land jurisdiction for TCA-AJO-308.

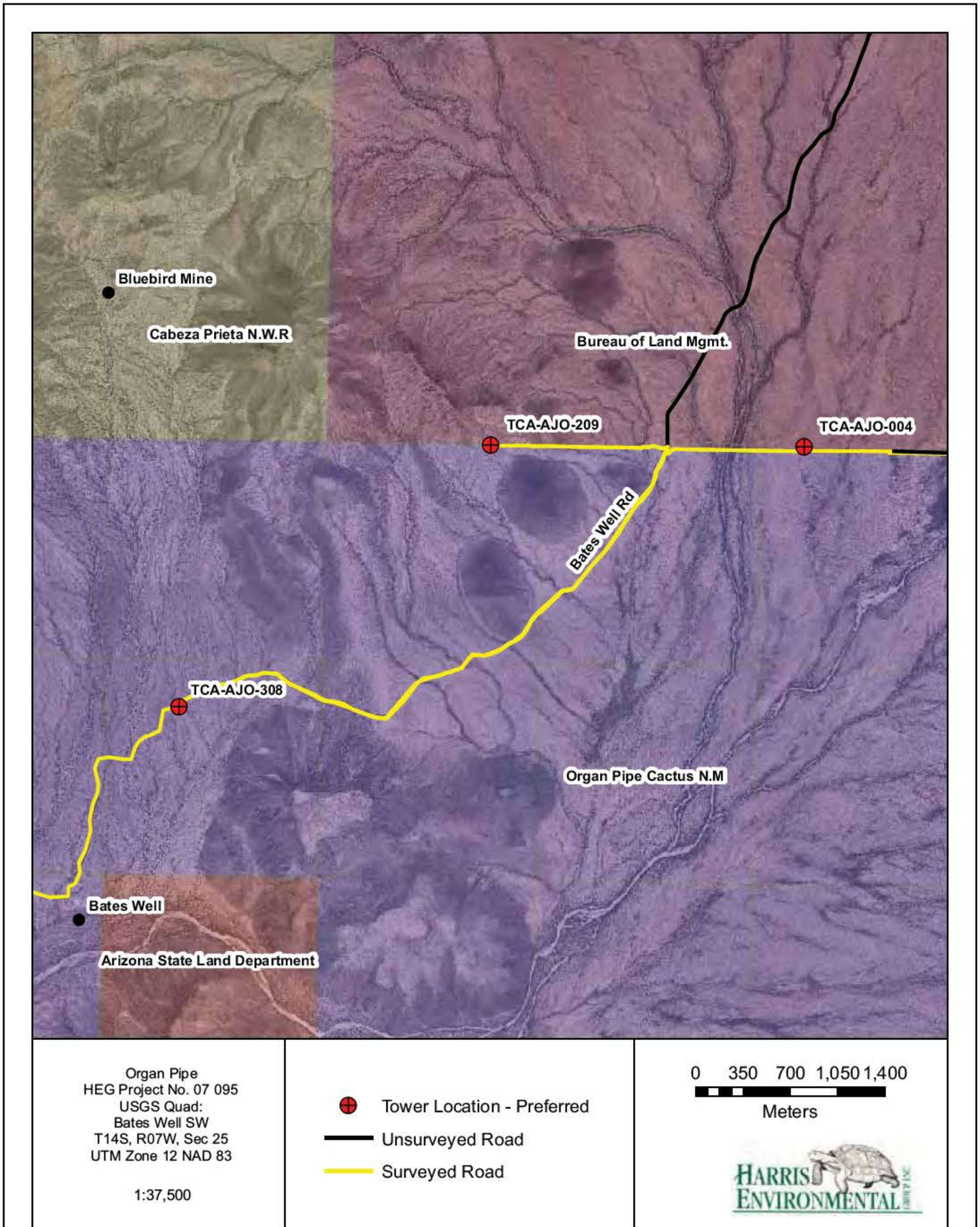

Figure 5.20 Tower location and surveyed area for TCA-AJO-308.

TCA-AJO-310

The proposed compound for TCA-AJO-310 is 7.0 km (4.3 mi) northeast of the Lukeville POE and 4.0 km (2.5 mi) north of the U.S./Mexico International Border (Figure 5.21). The compound is located within Sonoyta Valley southwest of the Ajo Mountains. Elevation is approximately 463 m (1,519 ft) amsl. The substrate at the compound is composed of angular gravel with some larger rocks, and soils are composed of fine sand with some silt (Photograph 5.11).

Photograph 5.11 TCA-AJO-310 center looking south.

TCA-AJO-310 is approached from the Lukeville POE via the International Border Road and the compound is accessed via an existing jeep trail heading north to the compound just east of Dos Lomitas approximately 2.0 km (1.2 mi) northwest of Blankenship Well. Survey coverage within ASLD land included the 0.4 ha (1.0 acre) tower compound and approximately 1.92 km (1.19 mi) of the proposed access road (Figure 5.22).

Field Observations

TCA-AJO-310 and the surrounding area are within the Arizona upland subdivision of Sonoran desertscrub. Plants observed during the survey include velvet mesquite, foothill palo verde, ironwood, creosote, triangle-leaf bursage, ocotillo, golden-spined hedgehog, chain-fruit cholla, buckhorn cholla, and mixed grasses and forbs. Wildlife documented at the compound included white-winged dove (*Zenaida asiatica*), Gila woodpecker (*Melanerpes uropygialis*) and verdin (*Auriparus flaviceps*). There were no special status species documented. The compound is between two unnamed xeroriparian washes.

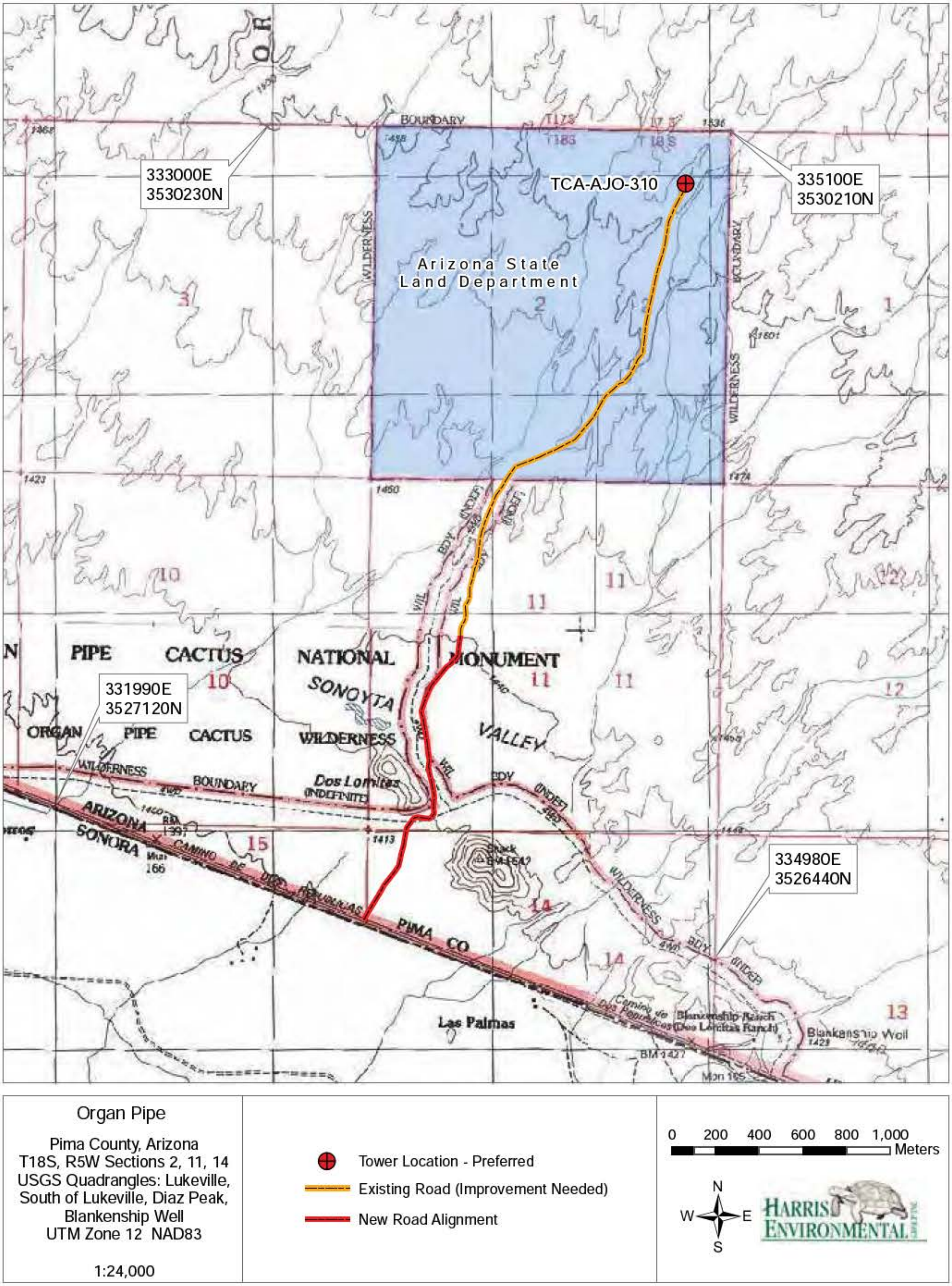

Figure 5.21 UTM registered location and land jurisdiction for TCA-AJO-310.

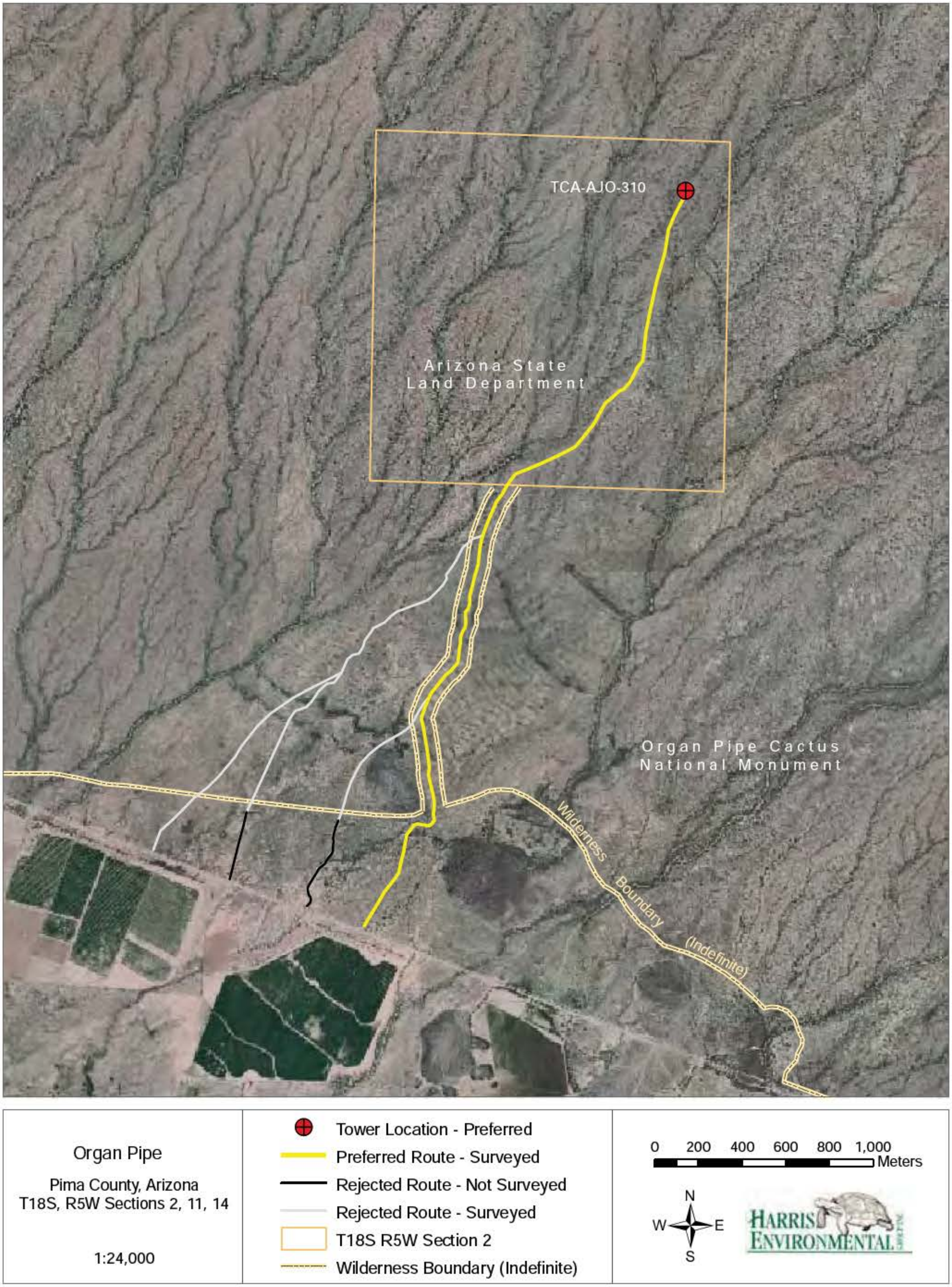

Figure 5.22 Tower location and surveyed area for TCA-AJO-310

REJECTED TOWER LOCATIONS

TCA-AJO-008

TCA-AJO-008 is located within the OPCNM in southwestern Pima County, approximately 7.2 km (4.5 mi) north of the U.S./Mexico International Border and 9.1 km (5.6 mi) northeast of the Lukeville POE (Figure 5.23). The tower compound is located in the Sonoyta Valley, west of the Ajo Range and east of SR 85 at an elevation of 498 m (1,634 ft) amsl. The substrate at the tower compound is described as desert pavement with scattered gravel and cobbles. Soils are composed of sand and silt with a low percentage of clay (Photograph 5.12).

TCA-AJO-008 is approached via the unpaved International Border Road leading east from the Lukeville POE. Approximately 5.7 km (3.6 mi) east of the Lukeville POE three alternate entry routes off of the border road heading northeast were examined to potentially provide access to the proposed tower location. Survey coverage for this rejected tower location included the 0.4 hectare (1.0 acre) tower compound and three rejected access routes, with the exception of about 0.5 mi of the southern end of the central access route and 0.5 mi of the southern end of the easternmost route (Figure 5.24).

Field Observations

TCA-AJO-008 and the surrounding area are within the Arizona Upland Subdivision of Sonoran desertscrub. Plants observed during the survey include buckhorn cholla, chain-fruit cholla, creosote, foothill palo verde, ironwood, saguaro, triangle-leaf bursage, velvet mesquite, white bursage, white ratany and mixed grasses and forbs. Wildlife and evidence of wildlife documented at the tower compound include cactus wren (*Campylorhynchus brunneicapillus*), turkey vulture (*Cathartes aura*), jackrabbit scat and a western white-throated woodrat (*Neotoma albigula*) midden. Desert night-blooming cereus were documented during the field survey and are categorized as s*alvage restricted* on the ADA protected native plant list. The tower compound is located approximately 0.2 km (0.1 mi) west of an unnamed drainage of the Ajo Mountains which supports a xeroriparian vegetation community.

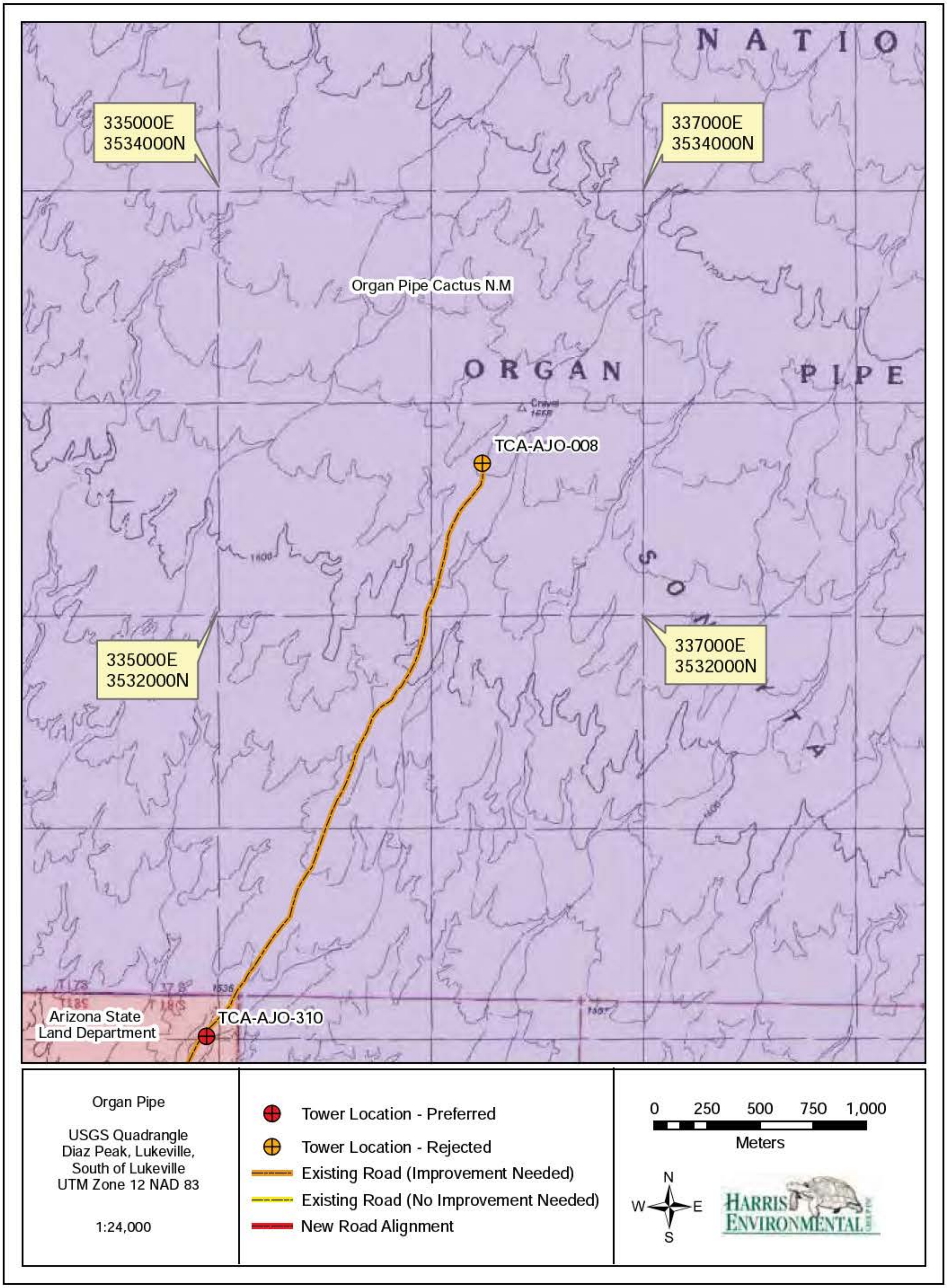

Figure 5.23 UTM registered location and land jurisdiction for TCA-AJO-008.

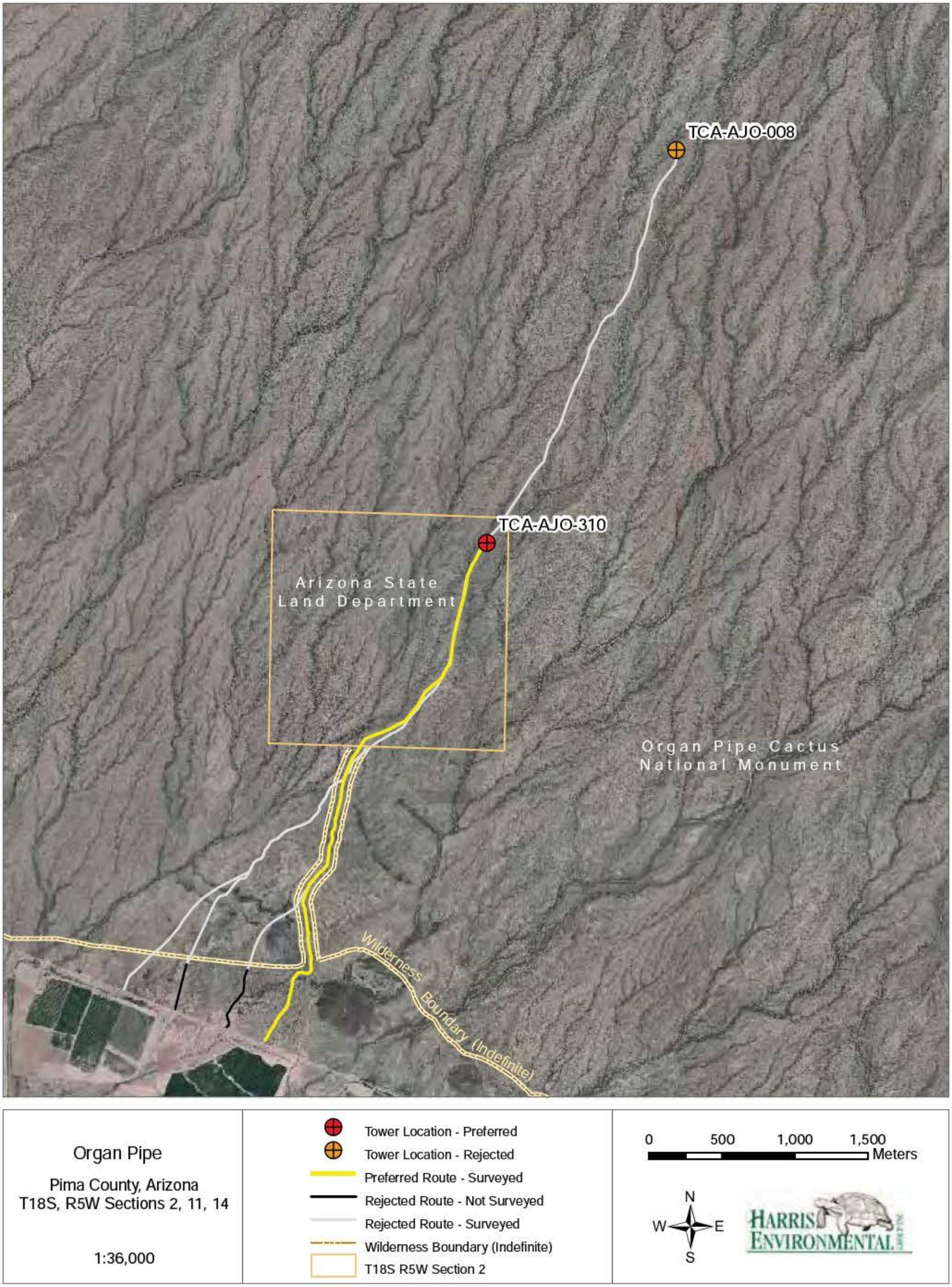

Figure 5.24 Tower Location and Surveyed Area for TCA-AJO-008.

Photograph 5.12 Center of TCA-AJO-008 looking east.

TCA-AJO-091

TCA-AJO-091 is located within the OPCNM in southwestern Pima County approximately 20.9 km (13.0 mi) north of the U.S./Mexico International Border and 21.5 km (13.4 mi) northeast of the Lukeville POE (Figure 5.25). The location is near the Tohono O'odham Nation western land boundary. The proposed tower compound is located on a flat top of a high basalt dome within the Ajo Mountains at an altitude of 1,447 m (4,748 ft) amsl. Surrounding land is rugged and undeveloped. Granite and volcanic basalt rock outcrops account for much of the tower compound site with decomposing rocky soils providing a substrate for vegetative communities on the peak of this mountain (Photograph 5.13).

Access to TCA-AJO-091 would be via air lift. The steepness and ruggedness of the terrain precludes access to the tower by ground vehicles. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.26).

Field Observations

TCA-AJO-091 and the surrounding area are within the mapped boundaries of the Arizona Upland Subdivision of Sonoran desertscrub; however, vegetation in the tower compound area more closely corresponds to Brown's (1994) semidesert Grassland. Plants observed during the survey include agave, Arizona rosewood, beargrass, juniper, ocotillo, pine-needle milkweed and prickly-pear. A peregrine falcon (*Falco peregrinus*), which is a federal *Species of Concern*, was documented during the field survey. The tower compound is approximately 0.7 km (0.4 mi) east of Arch Canyon which supports xeroriparian vegetation.

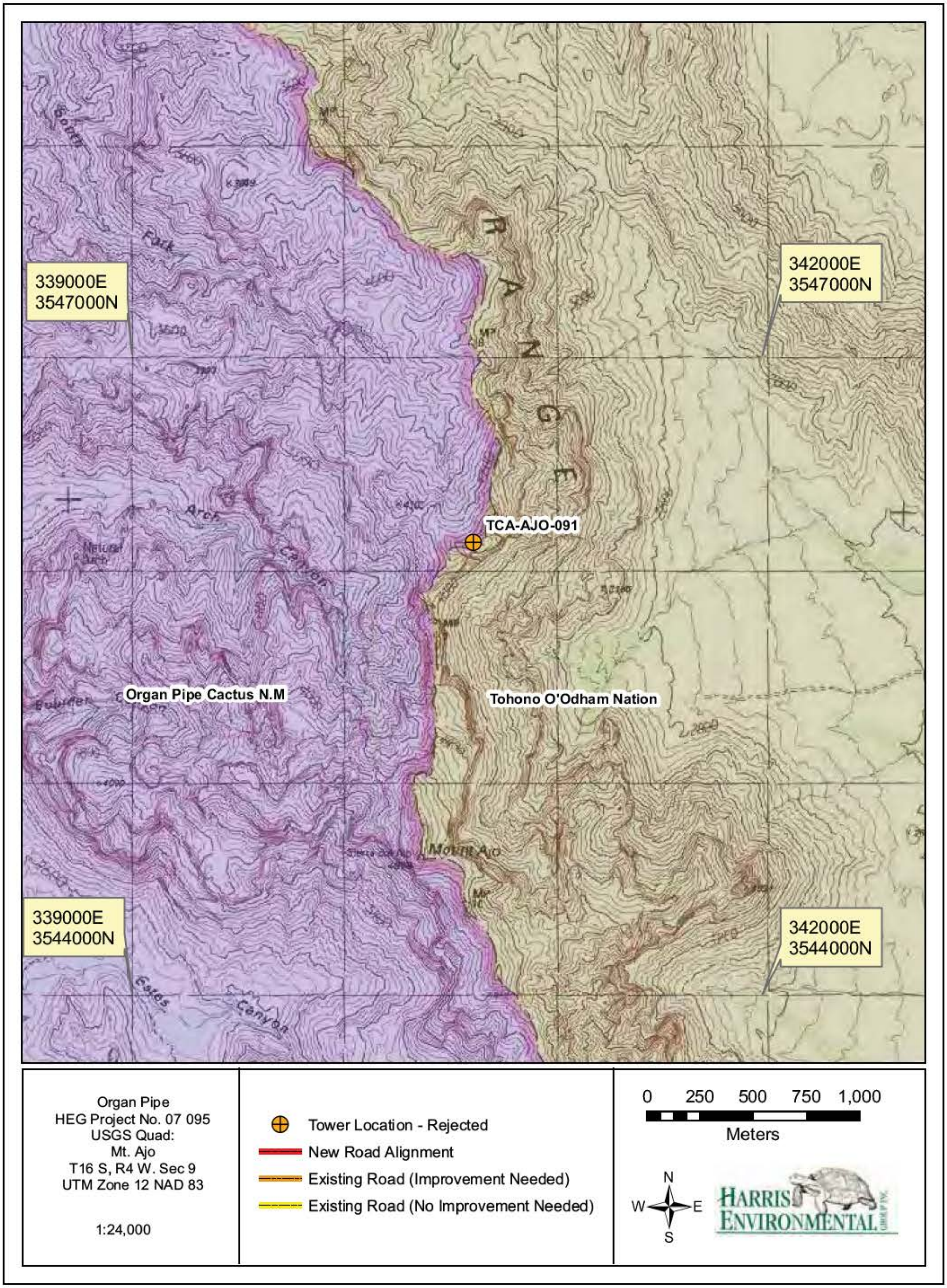

Figure 5.25 UTM registered location and land jurisdiction for TCA-AJO-091.

Organ Pipe
HEG Project No. 07 095
USGS Quad:
Mt. Ajo
T16 S, R4 W. Sec 9
UTM Zone 12 NAD 83

1:10,000

Tower Location - Rejected
Surveyed Road
Unsurveyed Road

0 125 250 375 500
Meters

N W E S

HARRIS ENVIRONMENTAL GROUP INC.

Figure 5.26 Tower location and surveyed area for TCA-AJO-091

Photograph 5.13 Overview of TCA-AJO-091 looking east-southeast.

TCA-AJO-214

TCA-AJO-214 is located in western Pima County on the OPCNM approximately 33.0 km (20.0 mi) southwest of the community of Ajo and 28.2 km (17.5 mi) northwest of the Lukeville POE (Figure 5.27). This location is on a high peak west of Kino Peak in the Bates Mountains at an elevation of 850 m (2,790 ft) amsl. The tower compound is covered with cobbles and small basalt boulders decomposing from the mountain bedrock (Photograph 5.14).

Access to TCA-AJO-214 would be via air lift but the location was rejected. SR 85 is 19 km (12 mi) to the east of the tower. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.28).

Field Observations

TCA-AJO-214 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include Emory's barrel cactus, foothill palo verde, ocotillo, organ pipe cactus, saguaro, triangle-leaf bursage and white bursage. Wildlife observed at the tower compound includes Gila woodpecker and kingbird (*Tyrannus* sp.). Organ pipe cactus and Emory's barrel cactus, both categorized as *salvage restricted* on the Arizona protected native plant list, were observed during the field survey.

Photograph 5.14 TCA-AJO-214 center looking west.

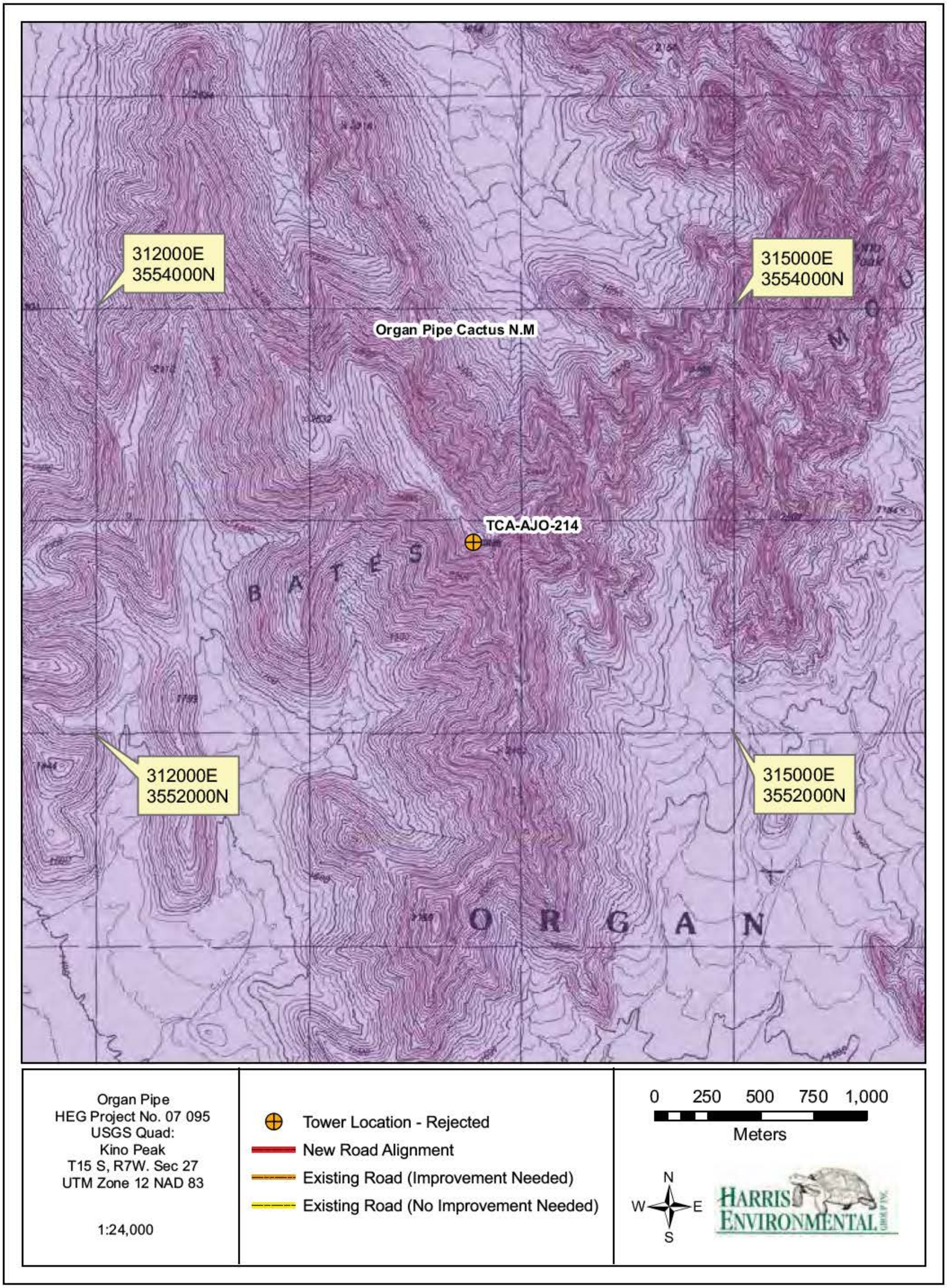

Figure 5.27 UTM registered location and land jurisdiction for TCA-AJO-214.

Figure 5.28 Tower location and surveyed area for TCA-AJO-214.

6.0 RESULTS

The objectives of this BE were to determine whether habitats in the project area may support special status species. A special status species is any species of interest to any regulatory or management agency of the federal, state, or local government. The special status species considered in this BE were identified from a list published by the USFWS through their IPaC system and the species list provided for Pima County. Other special-status species were identified using the AGFD HDMS and the BLM's sensitive species list.

The OPCNM is known to support populations of lesser long-nosed bat and Sonoran pronghorn. Both are federally listed as *endangered* by USFWS and the species also are listed as *wildlife of special concern* in Arizona by AGFD (AGFD 2008). The implementation of any of the proposed tower locations evaluated by this BE have the potential to affect the lesser long-nosed bat. The Sonoran pronghorn has the potential to be affected by eight tower locations. These species are discussed further in the following section on *Species Protected under the Endangered Species Act*. Other special status species also were evaluated and include federal *species of concern*, *wildlife of special concern* in the State of Arizona, *state protected plants*, and *BLM-sensitive* species. The proposed action has the potential to affect 19 species under these designations. These results are discussed in the following section on *Other Special Status Species*.

Species Protected Under the Endangered Species Act

Federally listed, *proposed*, or *candidate* species are known to occur within Pima County (Table 6.1). The known range and suitable habitat for each of these species was reviewed and contrasted with the findings of the biological survey for each proposed tower location. The table indicates "YES" in the Potential to Occur column when the proposed towers or access roads are within the known range and have suitable habitat for *federally-listed*, *proposed*, or *candidate* species. Species outside the known range or that do not have suitable habitat are listed as "NO" under Potential to Occur and are not further discussed in this report.

Lesser Long-nosed Bat (*Leptonycteris yerbabuenae*)

The lesser long-nosed bat is federally-listed as *endangered* and as a *wildlife species of special concern* in the State of Arizona (AGFD 2008). Declines in lesser long-nosed bat populations are attributed to reductions in the size and number of maternity colonies as a result of roost site exclusion and disturbance in Sonora and Arizona (AGFD 2003). Further causes may be related to large-scale depletions of agaves in Mexico for tequila production.

Life History Information

This nectarivorous bat consumes the pollen and fruit of agaves and columnar cacti including saguaro and organ pipe cactus. In Arizona, this bat typically forages from dusk to dawn from April through September and has been documented foraging up to 48 km (30 mi) from daytime roost sites in a single nighttime foraging event. Gravid females begin to arrive in Arizona in early April and gather at large maternity colonies. Males arrive later and form separate, smaller colonies. One offspring is born annually in May and is volant by late June. Maternity colonies dissociate by the end of July (AGFD 2003).

Table 6.1. Federally listed, proposed and candidate species occurring in Pima County.

Species by Taxa	Status			Potential to Occur
	ESA	BLM	State	
Amphibians				
Chiricahua leopard frog *Lithobates chiricahuensis*	LT		WSC	NO
Sonoran tiger salamander *Ambystoma tigrinum stebbinsi*	LE		WSC	NO
Birds				
bald eagle *Haliaeetus leucocephalus*	LT(PDL)		WSC	NO
California brown pelican *Pelecanus occidentalis californicus*	LE			NO
masked bobwhite *Colinus virginianus ridgewayi*	LE		WSC	NO
Mexican spotted owl *Strix occidentalis lucida*	LT(DCH)		WSC	NO
southwestern willow flycatcher *Empidonax trailii extimus*	LE(DCH)		WSC	NO
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C		WSC	NO
Yuma clapper rail *Rallus longirostris yumanensis*	LE		WSC	NO
Fish				
desert pupfish *Cyprinodon macularis*	LE(DCH)		WSC	NO
Gila chub *Gila intermedia*	LE(DCH)		WSC	NO
Gila topminnow *Poeciliopsis occidentalis occidentalis*	LE		WSC	NO
Quitobaquito desert pupfish *Cyprinodon eremus*	LE		WSC	NO
Sonora chub *Gila ditaenia*	LT(DCH)		WSC	NO
Mammals				
jaguar *Panthera onca*	LE		WSC	NO
lesser long-nosed bat *Leptonycteris curasoe yerbabuenae*	LE		WSC	**YES**
ocelot *Leopardus pardalis*	LE		WSC	NO
Sonoran pronghorn *Antilocapra americana sonoriensis*	LE		WSC	**YES**
Reptiles				
Sonoyta mud turtle *Kinosternon sonoriense longifemorale*	C			NO

Table 6.1. *(continued).*

Plants				
Acuña cactus *Echinomastus erectocentrus acunensis*	C		HS	NO
Canelo Hills ladies' tresses *Spiranthes delitescens*	LE		HS	NO
Huachuca water umbel *Lilaeopsis schaffneriana recurva*	LE(DCH)		HS	NO
Kearney blue star *Amsonia kearneyana*	LE		HS	NO
Nichol's turk's head cactus *Echinocactus horizonthalonius nicholii*	LE		HS	NO
Pima pineapple cactus *Coryphantha scheeri robustispina*	LE		HS	NO
Key to Status: C = Candidate, DCH = Designated Critical Habitat, HS = Highly Safeguarded, LE = Listed Endangered, LT = Listed Threatened, PDL = Post delisting, WSC = Wildlife of Special Concern				

Lesser long-nosed bat ranges from the southern United States to northern South America in semiarid to arid habitats. Suitable roosting habitat within commuting distance of the food source is requisite. In Arizona, lesser long-nosed bat roosts in caves, mines, and tunnels in desert scrub, grassland, and oak woodlands from 363 m to 2,231 m (1,190 to 7,320 ft) amsl. This bat does not hibernate and leaves Arizona during the winter migration to the southern portions of its range (AGFD 2003).

Habitat Evaluation and Suitability

Lesser long-nosed bat has the potential to occur at all 14 proposed tower sites. The largest documented maternity colony of lesser long-nosed bats (16,000 to 25,000 adult females in May/June) is located in the OPCNM at the Copper Mountain Mine (NPS 2003). A second large maternity roost is also known from the Bluebird Mine on the eastern border of the CPNWR located in the Growler Mountains adjacent to OPCNM. The Bluebird Mine supports an estimated 3,000 lesser long-nosed bats at the peak of annual occupancy (USFWS 2006). Lesser long-nosed bats are extremely sensitive to human disturbance and abandoned the mine in 2002, 2003 and 2005 because of disturbance from illegal activities. In 2004, the bats returned to the mine after CPNWR staff installed a high steel fence to prevent disturbance. The bats returned to the mine in 2005 but abandoned the site again when the fence was damaged (presumably by illegal immigrants or smugglers). Approximate distances to these maternity colonies are presented in Table 6.2.

Discussion

The potential effects this project may have on lesser long-nosed bats include disturbance to maternity colonies and roosting sites, disturbance to foraging areas and placement of obstructions between known colonies or roosting sites and foraging areas. Potential detrimental effects could occur from removal of vegetation, use of artificial light, noise near roosting or maternity colonies, collision hazards and human disturbance from foot and vehicle traffic, or construction of tower structures near roosts or maternity colonies. In addition, the potential to disrupt foraging and migration routes should be considered. A possible beneficial effect to the lesser long-nosed bat may occur from the reduction in illegal pedestrian and vehicle traffic in the OPCNM.

USFWS established a suggested list of Best Management Practices (BMPs) to address construction and maintenance effects on lesser long-nosed bat. The BMPs (USFWS 2007) recommend that proposed towers should be located at least 8.0 km (5.0 mi) from any known roost site and that project infrastructure is not located between roosts and known foraging sites because of potential disturbance to bats traveling between the two locations. TCA-AJO-004, TCA-AJO-170, TCA-AJO-209 and TCA-AJO-308 all occur within 8.0 km (5.0 mi) from known roost sites and may require additional consultation to analyze potential project effects, particularly if tower deployment is scheduled between May 1 and September 30 because of these towers' proximity to known maternity roosts.

Table 6.2. Distances to known lesser long-nosed bat maternity colonies.

TOWER ID	Bluebird Mine (km)	Bluebird Mine (mi)	Copper Mtn. Mine (km)	Copper Mtn. Mine (mi)
TCA-AJO-003	26.1	16.2	26.9	16.7
TCA-AJO-004	5.2	**3.2***	17.8	11.1
TCA-AJO-008	38.2	23.7	19.8	12.3
TCA-AJO-091	31.0	19.2	8.6	5.4
TCA-AJO-170	19.1	11.9	4.4	**2.7***
TCA-AJO-204	31.3	19.4	17.0	10.6
TCA-AJO-209	3.0	**1.9***	19.6	12.2
TCA-AJO-214	12.7	7.9	21.0	13.1
TCA-AJO-301	38.5	23.9	24.7	15.3
TCA-AJO-302	15.6	9.7	31.8	19.8
TCA-AJO-303	31.8	19.8	22.4	13.9
TCA-AJO-304	31.1	19.3	16.4	10.2
TCA-AJO-308	3.1	**1.9***	20.5	12.8

* These towers are located within 5 miles of a maternity roost.

In the event that tower site preparation or road modifications displace an agave or columnar cacti, affected plants should be salvaged and transplanted. If the plant is not salvageable, a replacement should be purchased and planted outside the APE. Salvage, transplantation, and container planting should be carried out in accordance with a restoration plan which should include guidelines for success criteria and post-transplant monitoring.

Sonoran Pronghorn (*Antilocapra americana sonoriensis*)

Sonoran pronghorn is listed as *endangered* and as a *species of concern* in Arizona (AGFD 2008). Population declines for Sonoran pronghorn in the state are attributed to loss of habitat and drought. Sonoran pronghorn habitat has been drastically altered in southwestern Arizona by the desiccation of major rivers and overgrazing of cattle. Although cattle grazing in key pronghorn habitat ceased in the early 1980s, populations have not recovered. In Mexico, the exploitation of habitat for grazing and agriculture, as well as poaching are still causing population declines. The presence of fences in key areas of pronghorn movement also is a significant factor in pronghorn mortality, particularly when they restrict accessibility to food and water resources (AGFD 2002).

Life History Information

Sonoran pronghorn is recognized as the smallest of the five extant subspecies of pronghorn. In Arizona, they are found on the CPNWR, OPCNM, Luke Air Force Barry M. Goldwater Gunnery Range (BMGR) and the Tohono O'odham Indian Reservation. In Mexico, they are believed to be confined to northwest Sonora. Sonoran pronghorn habitat is characterized by broad alluvial valleys separated by block-faulted mountains within the Lower Sonoran Desert life zone (AGFD 2002). The population of Sonoran pronghorn in the United States has been as low as 18 individuals in the last decade (USFWS, informal consultation meeting, 16 October 2007). The population is the focus of intensive cooperative management efforts to recover this species. The USFWS is managing a portion of the remaining population as a semi-captive herd on the CPNWR. The 2007 population numbers approximately 80 individuals (USFWS, informal consultation meeting, 16 October 2007).

Habitat Evaluation and Suitability

The current range of Sonoran pronghorn is restricted to portions of the Tohono O'odham Nation, the CPNWR, OPCNM and the BMGR (AGFD 2002). The remaining population in the United States is closely monitored and managed by USFWS. Within the proposed project area Sonoran pronghorn has the potential to occur in the vicinity of eight proposed towers: **AJO-003, AJO-004, AJO-170, AJO-209, AJO-214, AJO-302, AJO-303, and AJO-308**.

Although the proposed towers positioned east of SR 85 contain suitable habitat for Sonoran pronghorn, the International Vehicle Barrier Biological Assessment (NPS 2003) states that SR 85 marks the eastern boundary of the population occurring in the U.S. and the species "no longer (or very rarely) occurs" east of this roadway. Only three records exist of pronghorn east of SR 85 from thirty years of documentation with the most recent occurrences recorded in 2002 (NPS 2003).

Sonoran pronghorn are known to occur within the OPCNM throughout the year. During summer, individuals from north and west of the monument migrate to areas in the southwestern portion of the OPCNM, further emphasizing the importance of conserving the viability of the "crucial habitat" which exists within OPCNM (NPS 2003). Telemetry data and visual records from the monument have shown that areas associated with the Valley of the Ajo, the Growler Valley and San Cristobal Wash are commonly occupied by this species (NPS 2003).

Discussion

Potential adverse effects to this species that should be considered in project evaluation include removal of vegetation, disturbance of individuals during construction, maintenance, and CBP activity related to ongoing law enforcement operations. USFWS is particularly concerned with disturbance of mothers and fawns in their first year because of the potential lower recruitment success (USFWS, informal consultation meeting, 16 October 2007). The potential beneficial effects of the project stemming from reduced illegal pedestrian and vehicle traffic also should be considered in project evaluation. USFWS established a suggested list of BMPs to address construction and maintenance effects on Sonoran pronghorn such as presence of a biological monitor during construction, limiting access during certain times of the year, ceasing activities when pronghorn are observed and placing limits on the use of certain types of noise or artificial light within movement corridors (USFWS 2007).

Other Special Status Species

This section addresses the potential for other special status species to occur at each proposed tower location including federal *Species of Concern*, BLM *Sensitive* species, Arizona *Wildlife of Special Concern* and protected native plants. Table 6.3 presents the list of species observed (marked with "O") or potentially occurring in the proposed project area (marked with an asterisk). Refer to Appendix C for the list of all other special status species reviewed for this study but determined to have potential to occur.

Table 6.3. Special status species potentially occurring within the *Organ Pipe* project area.

Common Name	Scientific Name	ESA Status	BLM Status	State Status	TCA-AJO-003	TCA-AJO-004	TCA-AJO-008	TCA-AJO-091	TCA-AJO-170	TCA-AJO-204	TCA-AJO-209	TCA-AJO-214	TCA-AJO-301	TCA-AJO-302	TCA-AJO-303	TCA-AJO-304	TCA-AJO-308	TCA-AJO-310
American peregrine falcon	*Falco peregrinus anatum*	SC		WSC				O										
cactus ferruginous pygmy owl	*Glaucidium ridgewayi cactorum*	SC		WSC	*	*	*		*	*	*				*	*	*	*
tropical kingbird	*Tyrannus melancholicus*			WSC	*	*	*	*	*	*	*	*	*	*	*	*	*	*
western burrowing owl	*Athene cunicularia hypugaea*	SC		WSC	*		*		*					*	*			*
big free-tailed bat	*Nyctinomops macrotis*	SC	S		*	*	*	*	*	*	*	*	*	*	*	*	*	*
California leaf-nosed bat	*Macrotus californicus*	SC		WSC	*	*	*	*	*	*	*	*	*	*	*	*	*	*
cave myotis	*Myotis velifer*	SC	S		*	*	*	*	*	*	*	*	*	*	*	*	*	*
greater western bonneted bat	*Eumops perotis californicus*	SC			*	*	*	*	*	*	*	*	*	*	*	*	*	*
pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	SC			*	*	*	*	*	*	*	*	*	*	*	*	*	*
pocketed free-tailed bat	*Nyctinimops femorosaccus*		S			*					*							
spotted bat	*Euderma maculatum*		S	WSC	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Underwood's mastiff bat	*Eumops underwoodi*	SC	S		*	*	*	*	*	*	*	*	*	*	*	*	*	*
Mexican rosy boa	*Charina trivirgata trivirgata*	SC	S			*	*		*	*	*	*			*	*	*	*
red-back whiptail	*Aspidoscelis burti xanthonota*	SC						*		*		*				*		
Sonoran desert tortoise	*Gopherus agassizii*	SC		WSC	*	*	*	*	*	*	*	*		*	*	*	*	*
desert night-blooming cereus	*Peniocereus greggii* var. *transmontanus*			SR			O											O
Emory's barrel cactus	*Ferocactus emoryi*			SR							O	O						
Organ pipe cactus	*Stenocereus thurberi*			SR	O					O	O	O				O		
stag-horn cholla	*Opuntia versicolor*			SR							O					O		

Key to Status: S = Sensitive, SC = Species of Concern, SR = Salvage Restricted, WSC = Wildlife of Special Concern

There is potential habitat for 19 special status species in the project area including four bird species, eight bat species, and three reptile species. Four special status plant species were observed in the project area. These species have varying levels of legal protection depending on the particular species, land jurisdiction on which it occurs, and activity that is being proposed. All of the bird species are protected under the MTBA and may have additional management guidelines when potentially affected by projects on federal land. The OPCNM and BLM have species management guidelines for federal *species of concern* and *BLM-sensitive* species that may require avoidance or mitigation as part of land-use approvals. Removal of ANPL listed plant species from state or private properties requires a permit from the ADA. More information on regulatory context is presented in Section 7.0 and further discussed in Section 8.0.

Migratory Birds

Potential affects to bird species listed under the MBTA, potential loss of habitat for, or potential to kill individuals should be considered. Avoidance measures should be incorporated into project design when possible. Bird species protected under MBTA that may occur in the project area include American peregrine falcon, cactus ferruginous pygmy-owl, tropical kingbird, and western burrowing owl (see Table 6.3). The MBTA prohibits take of any migratory bird, including any part, nest, or egg of any such bird. If construction is proposed during the breeding season for these species (January through September[7]), pre-construction nesting surveys can be conducted to locate active nests. Construction should not occur within 152 m (500 ft) of an active nest.

Special Status Plants

Federally-listed species or other federal plant species of special concern do not occur within the proposed project area. Several plant species that are considered sensitive species by other resources agencies or the ASLD were observed at some tower locations (see section below and Table 6.3). Removal of these species should be avoided where possible and removal of these species from ASLD or private properties requires a permit from the ADA.

Desert Night-blooming Cereus (*Peniocereus greggii var. transmontanus*)

- TCA-AJO-008: multiple individuals are located along the access road.

Emory's Barrel Cactus (*Ferocactus emoryi*)

- TCA-AJO-214: one individual observed within the tower compound.
- TCA-AJO-209: four individuals observed within the tower compound.

Organ Pipe Cactus (*Stenocereus thurberi*)

- TCA-AJO-003: one individual observed along the access road.
- TCA-AJO-170: one large individual (minimum 16 heads) observed near compound center.
- TCA-AJO-204: one individual observed within the tower compound.
- TCA-AJO-209: nine individuals observed within the tower compound.
- TCA-AJO-214: four individuals observed within the tower compound.

Staghorn Cholla (*Opuntia versicolor*)

- TCA-AJO-209: Staghorn cholla observed within the tower compound.
- TCA-AJO-304: Staghorn cholla observed within the tower compound.

[7] The specific breeding season varies by species.

7.0 REGULATORY CONTEXT

Endangered Species Act (ESA)

USFWS maintains a list of *threatened* and *endangered* species in each county. The list includes species that are candidate for listing and proposed to be listed for protection under the ESA, as amended (16 USC §1531 *et seq*.). The ESA specifically prohibits *take* of a listed species. *Take* is "…to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct" (ESA, Section 3, paragraph 19). Further, *harm* is "…an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering" (50 CFR §17.3). USFWS also tracks species protected under legal conservation agreements, which precludes the need for protection through listing. Such species are typically categorized as *Species of Concern* (SC).

Migratory Birds Treaty Act (MBTA)

USFWS enforces the MBTA of 1918 (16 USC 703-712) as amended. The MBTA prohibits individuals to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, including any part, nest, or egg of any such bird." USFWS maintains a list of birds protected under the MBTA.

Bureau of Land Management (U.S. Department of the Interior)

BLM sensitive species are taxa that are not federally listed, proposed, or candidate species. BLM policy is to provide these species with the same level of protection as is provided for candidate species. BLM Manual 6840 states that this designation is intended "to ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed". The Sensitive Species designation is normally used for species that occur on BLM administered lands for which BLM has the capability to significantly affect the conservation status of the species through management.

The BLM Manual 6840 provides the following factors by which a native species may be listed as "*Sensitive*":

(1) Species that could become endangered or extirpated from a state, or within a significant portion of its range in the foreseeable future;

(2) Species under status review by the USFWS and/or National Marine Fisheries Service;

(3) Species undergoing significant current or predicted downward trends in: habitat capability that would reduce a species' existing distribution; and/or population or density such that federally-listed, proposed, candidate, or State-listed status may become necessary;

(4) Species that typically consist of small and widely dispersed populations;

(5) Species that inhabit ecological refugia, or specialized or unique habitats; or

(6) Species that are State-listed, but which may be better conserved through application of BLM sensitive species status.

Desert Tortoise

The BLM has specific guidance for desert tortoise management and compensation contained in the *Strategy for Desert Tortoise Habitat Management on Public Lands in Arizona* (BLM IM No. AZ-92-46) and *Supplemental Guidance for Desert Tortoise Compensation* (BLM IM No. AZ-99-008). Acquisition of land-use permits on BLM property that results in loss of habitat for Sonoran desert tortoise may require compensation. The *Guidelines for Handling Sonoran Desert Tortoises Encountered During Development Projects* (AGFD 1997) should be followed if desert tortoises are encountered during construction and need to be moved from the construction area.

Wildlife of Special Concern in Arizona

All resident, migratory, native and introduced wildlife in Arizona are property of the state, except fish and bullfrogs (*Rana catesbeiana*) in private ponds, or wildlife and birds held in captivity under permit. The AGFD is charged with managing wildlife under the provisions of the Arizona Revised Statutes (ARS) Title 17 and the Arizona Administrative Code (AAC) Title 12, Chapter 4. The AGFD tracks animal and native plant species. The AGFD formerly listed 116 species as extinct, endangered, threatened and candidate in Arizona (AGFD 1988). While these terms were identical to those used by USFWS, the AGFD categories were advisory and provided no legal protection for take or habitat modification. To avoid confusion, AGFD drafted a list of *Wildlife of Special Concern in Arizona* (WSC) that eliminated the endangered and threatened categories. The revised list is not yet officially approved, but it is published for public review (AGFD 1996). The AGFD HDMS currently identifies species from both lists (AGFD 1988, 1996) as WSC.

Native Plants of Arizona

The Arizona Department of Agriculture administers the Arizona Native Plant Law ([ANPL] 7 ARS §3-901 *et seq*.), although the AGFD maintains the database and tracks many of the plants protected under the legislation. The ANPL categorizes many native plants as *highly safeguarded* (HS), *salvage restricted* (SR), *salvage assessed* and *harvest restricted*. The *highly safeguarded* category includes native plants in Arizona that are in jeopardy or in danger of extinction. The *salvage restricted* category is extensive and includes native plants that are vulnerable to theft or vandalism. *Salvage assessed* plants have sufficient value to support the cost of salvage. *Harvest restricted* plants are subject to excessive harvest because of their intrinsic value.

It is unlawful to destroy, collect and transport protected native plants from private or state lands without permission from the landowner and a permit from the Arizona Department of Agriculture. No permit, tag, or seal is required to transplant native plants within the same parcel on federal or tribal lands. Landowners may legally destroy or remove plants growing on their land, but must notify the Arizona Department of Agriculture 20 to 60 days prior to the destruction of any protected native plants. Exceptions exist for destroying protected native plants that include maintenance of developed properties less than 4 ha (10 acres), maintenance of existing utilities and their associated rights of way and emergencies.

8.0 DISCUSSION

CBP is preparing a Biological Assessment and an Environmental Assessment for proposed installations within the *Organ Pipe* project area. CBP is conducting consultation with the USFWS and acquiring all applicable land-use permits from OPCNM, BLM, ASLD and other pertinent resource agencies. The APE considered for this project included all of the proposed tower locations and portions of any existing roadway that would require improvements to facilitate the project.

The lesser long-nosed bat and the Sonoran pronghorn are both federally protected species with the potential to occur within the APE. The lesser long-nosed bat is federally-listed as *endangered* and as a *wildlife species of special concern* in the State of Arizona (AGFD 2008). The species has the potential to occur at all 14 proposed tower sites. Sonoran pronghorn is federally listed as *endangered* and as a *species of concern* in the State of Arizona (AGFD 2008) and has the potential to occur at eight proposed tower sites (see Table 1.1). Other special-status species such as Sonoran desert tortoise, and birds protected by MBTA are known to occur at all proposed *Organ Pipe* tower locations (see Table 1.2).

CBP is acquiring applicable land-use permits from OPCNM, BLM, and ASLD. The OPCNM and BLM have species management guidelines for federal *species of concern* and *BLM-sensitive* species that may require avoidance or mitigation as part of land-use approvals. Direct handling of any special status wildlife species requires acquisition of appropriate scientific collecting permits. Removal of ANPL listed plant species from ASLD land or private properties requires a permit from the Arizona Department of Agriculture.

Construction and maintenance of border security infrastructure is a significant component of this project. The BMPs may apply to CBP activities where there will be ground, light and/or noise disturbance to federally-listed species near the project area because of the placement, replacement, relocation, or maintenance of facilities, including roads. Some maintenance activities may not create new ground disturbance, but may introduce noise or lighting impacts or physical off-site effects. Depending on the federally-listed species or habitat within the project area some or all of the categories of BMPs should be included in the project plan (USFWS 2007).

Construction and maintenance activities that may occur within or near the habitat of a federally-listed species should conduct species-specific surveys if habitat is present. Survey protocols exist for several species and should be followed if necessary to accurately discern presence or absence. Protocols are provided via the IPaC system[8]. If species are not found following protocol surveys, then implementation of measures to minimize disturbance to individuals would not be necessary. However, other practices may still be required to avoid, minimize and mitigate impacts to habitat if habitat components were adversely affected.

[8] The IPaC system is a beta system and the field protocols were not yet available at the time this document was prepared.

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APPENDIX A

Common and Scientific Plant Names used in this report.

Common name	Scientific name
Acuña cactus	*Echinomastus erectocentrus acunensis*
Agave	*Agave* sp.
Ajo rock daisy	*Perityle ajoensis*
Anderson wolfberry	*Lycium andersonii*
Aravaipa wood fern	*Thelypteris puberula sonorensis*
Arizona giant sedge	*Carex ultra*
Arizona rosewood	*Vauquelinia californica*
Bartram stonecrop	*Graptopetalum bartramii*
beardless chinch weed	*Pectis imberbis*
beargrass	*Nolina microcarpa*
blue palo verde	*Parkinsonia floridum*
blue sand lily	*Triteleiopsis palmeri*
brittlebush	*Encelia farinosa*
broadleaf twayblade	*Listera convallarioides*
buckhorn cholla	*Cylindropuntia acanthocarpa*
buffelgrass	*Pennisetum ciliare*
burrobrush	*Hymenoclea salsola*
bursage	*Ambrosia* sp.
cactus apple	*Opuntia englemannii flavispina*
cane cholla	*Cylindropuntia spinosior*
Canelo Hills ladies' tresses	*Spiranthes delitescens*
canyon ragweed	*Ambrosia ambrosioides*
cat-claw acacia	*Acacia greggii*
chain-fruit cholla	*Cylindropuntia fulgida*
Chisos coral root	*Hexalectris revoluta*
counter-clockwise fishhook cactus	*Mammalaria mainiae*
creosote	*Larrea tridentata*
crested coral root	*Hexalectris spicata*
Dahlia rooted cereus	*Peniocereus striatus*
Dalhouse spleenwort	*Asplenium dalhousiae*
desert broom	*Baccharis sarothroides*
desert Christmas cactus	*Cylindropuntia leptocaulis*
desert honeysuckle	*Anisacanthus thurberi*
desert night-blooming cereus	*Peniocereus greggii* var. *transmontanus*
desert willow	*Chilopsis linearis*
Emory's barrel cactus	*Ferocactus emoryi*
fallen ladie's tresses	*Schiedeella arizonica*
fishhook barrel cactus	*Ferocactus wislizenii*
foothill palo verde	*Parkinsonia microphyllum*
Gentry indigobush	*Dalea tentaculoides*
golden barrel cactus	*Ferocactus cylindraceus eastwoodiae*

Appendix A (*continued*).

Common name	Scientific name
golden-spined hedgehog	*Echinocereus englemannii*
Goodding's onion	*Allium gooddingii*
graythorn	*Ziziphus obtusifolia*
heathleaf wild buckwheat	*Eriogonum ericifolium ericifolium*
hedgehog cactus	*Echinocereus* sp.
Huachuca golden aster	*Heterotheca rutteri*
Huachuca water umbel	*Lilaeopsis schaffneriana recurva*
ironwood	*Olneya tesota*
juniper	*Juniperus* sp.
Kearney blue star	*Amsonia kearneyana*
Kelvin cholla	*Cylindropuntia* x *kelvinensis*
Kofa barberry	*Berberis harrisoniana*
large-flowered blue star	*Amsonia grandiflora*
Lemmon cloak fern	*Notholaena lemmonii*
Lemmon lily	*Lilium parryi*
limberbush	*Jatropha* sp.
littleleaf false tamarind	*Lysiloma watsonii*
magenta-flower hedgehog	*Echinocereus fasciculatus*
mesquite	*Prosopis* sp.
Mexican palo verde	*Parkinsonia mexicana*
needle-spined pineapple cactus	*Echinomastus erectocentrus erectocentrus*
Nichol's turk's head cactus	*Echinocactus horizonthalonius nicholii*
night-blooming cereus	*Peniocereus greggii*
ocotillo	*Fouquieria splendens*
oleander	*Nerium oleander*
organ pipe cactus	*Stenocereus thurberi*
Palmer amaranth	*Amaranthus palmeri*
palo verde	*Parkinsonia* sp.
pencil cholla	*Cylindropuntia arbuscula*
pine-needle milkweed	*Asclepias linaria*
Pima Indian mallow	*Abutilon parishii*
Pima pineapple cactus	*Coryphantha scheeri robustispina*
Plummer onion	*Allium plummerae*
prickly-pear	*Opuntia* sp.
Pringle hawkweed	*Hieracium pringlei*
Russian thistle	*Salsola iberica*
saguaro	*Carnegiea gigantea*
saiya	*Amoreuxia gonzalezii*
San Carlos wild buckwheat	*Eriogonum capillare*
San Pedro River wild buckwheat	*Eriogonum terrenatum*
Santa Cruz striped agave	*Agave parviflora parviflora*
senita	*Lophocereus schotti*
slender adder's mouth	*Malaxis tenuis*
smoke tree	*Dalea spinosa*
staghorn cholla	*Cylindropuntia versicolor*
teddy bear cholla	*Cylindropuntia bigelovii*

Appendix A (*continued*).

Common name	Scientific name
Thornber fishhook cactus	*Mammalaria thornberi*
Thurber Indian mallow	*Abutilon thurberi*
Thurber's bog orchid	*Platanthera limosa*
Trelease agave	*Agave schottii treleasei*
triangle-leaf bursage	*Ambrosia deltoidea*
Tumamoc globeberry	*Tumamoca macdouglii*
varied fishhook cactus	*Mammalaria viridiflora*
velvet mesquite	*Prosopis velutina*
whisk fern	*Psilotum nudum*
wolfberry	*Lycium* sp.

Appendix B: IPaC Species List

U.S. Fish & Wildlife Service

Information, Planning and Consultation System

Trust resources list

Printed on:
Jun 5, 2008

Project location: Pima, AZ within 25 miles of the US / Mexico border

Listed species in the vicinity of your project:

Amphibians	
Chiricahua leopard frog (*Calopogon chiricahuensis*)	Threatened
Birds	
masked bobwhite (*Calopogon virginianus*)	Endangered
Mexican spotted owl (*Calopogon occidentalis*)	Threatened
southwestern willow flycatcher (*Calopogon traillii*)	Endangered
Fishes	
desert pupfish (*Calopogon macularius*)	Endangered
Gila chub (*Calopogon intermedia*)	Endangered
Gila topminnow (*Calopogon occidentalis*) Population: U.S.A. only	Endangered
Flowering Plants	
Kearney's blue-star (*Calopogon kearneyana*)	Endangered
Pima pineapple cactus (*Calopogon scheeri*)	Endangered
Mammals	
jaguar (*Calopogon onca*)	Endangered
lesser long-nosed bat (*Calopogon curasoae*)	Endangered
ocelot (*Calopogon pardalis*)	Endangered
Sonoran pronghorn (*Calopogon americana*)	Endangered

FWS Refuges in the vicinity of your project:

Buenos Aires National Wildlife Refuge	(520) 823 4251 P.O. BOX 109 SASABE, AZ 85633
Cabeza Prieta National Wildlife Refuge	(520) 387 6483 1611 NORTH SECOND AVENUE AJO, AZ 85321

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APPENDIX C

Other Special Status Species Evaluated

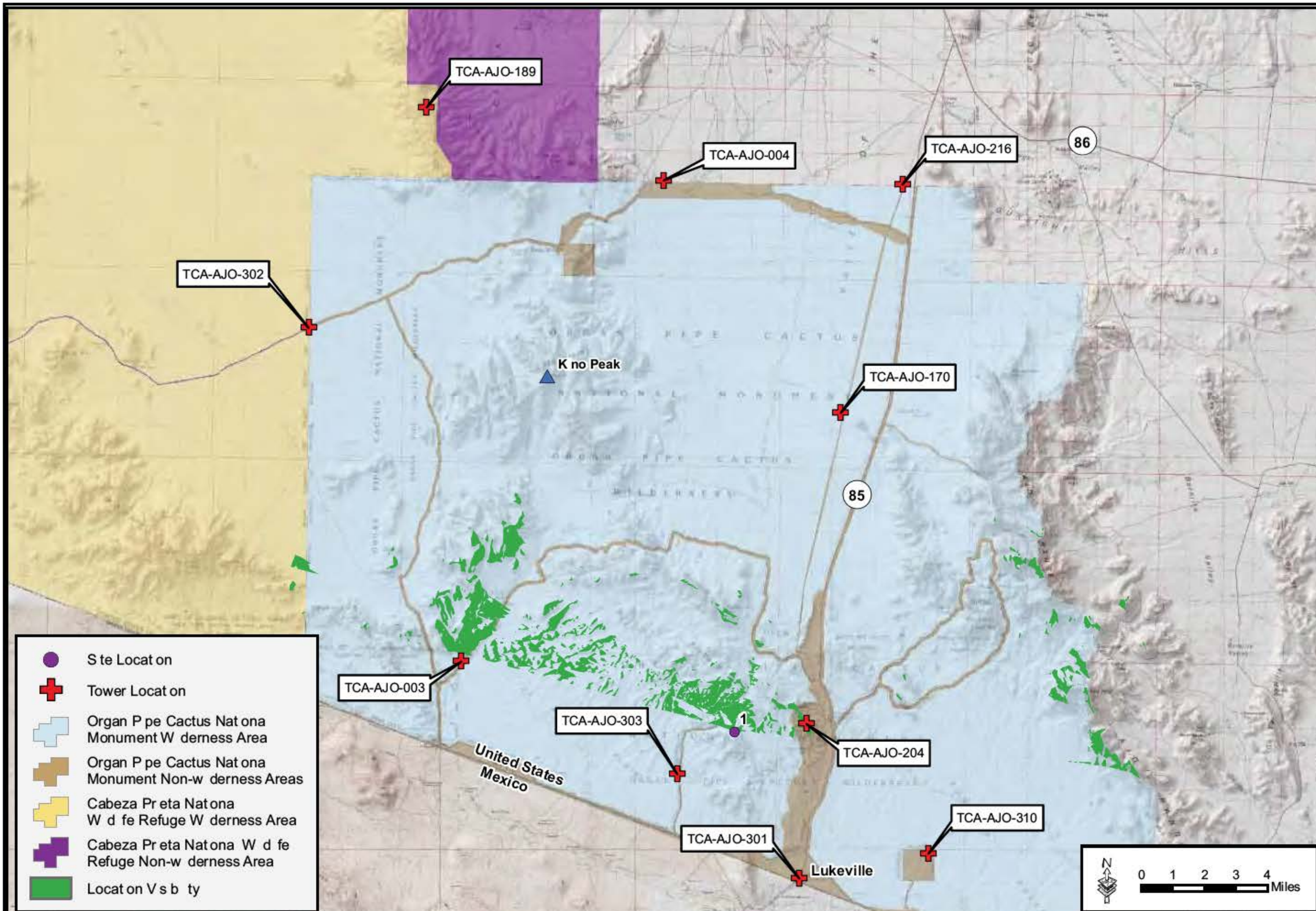
Key to Status: HS = Highly Safeguarded, S = Sensitive, SC = Species of Concern, SR = Salvage Restricted, WSC = Wildlife of Special Concern

Common Name	Scientific Name	ESA Status	BLM Status	State Status
Amphibians				
Great Plains narrow-mouthed toad	*Gastrophryne olivacea*			WSC
lowland burrowing treefrog	*Pternohyla fodiens*			WSC
lowland leopard frog	*Lithobates yavapaiensis*	SC		WSC
western barking frog	*Eleutherodactylus augusti cactorum*			WSC
Birds				
baird’s sparrow	*Ammodramus bairdii*	SC		WSC
black-bellied whistling duck	*Dendrocygna autumnalis*			WSC
black-capped gnatcatcher	*Polioptila nigriceps*			WSC
common black hawk	*Buteogallus anthracinus*			WSC
crested caracara	*Caracara cheriway*			WSC
elegant trogon	*Trogon elegans*			WSC
fulvous whistling duck	*Dendrocygna bicolor*	SC		
northern buff-breasted flycatcher	*Empidonax fulvifrons pygmaeus*	SC		WSC
northern goshawk	*Accipiter gentilis*	SC		WSC
northern gray hawk	*Buteo nitidus maximus*	SC		WSC
osprey	*Pandion haliaetus*			WSC
rose-throated becard	*Pachyramphus aglaiae*			WSC
thick-billed kingbird	*Tyrannus crassirostris*			WSC
tropical kingbird	*Tyrannus melancholicus*			WSC
Fish				
desert sucker	*Catostomus clarki*	SC	S	
Gila longfin dace	*Agosia chrysogaster chrysogaster*	SC	S	
Invertebrates				
Quitobaquito tryonia	*Tryonia quitobaquitae*	SC		
Sabino Canyon damselfly	*Argia sabino*	SC		
San Xavier talussnail	*Sonorella eremite*	SC		
Mammals				
Arizona myotis	*Myotis occultus*	SC	S	
Mexican long-tounged bat	*Choeronycteris mexicana*	SC		WSC
pocketed free-tailed bat	*Nyctinimops femorosaccus*		S	
spotted bat	*Euderma maculatum*		S	WSC
western red bat	*Lasiurus blossevillii*			WSC
western yellow bat	*Lasiurus xanthinus*			WSC
yellow-nosed cotton rat	*Sigmodon ochrognathus*	SC		
Reptiles				
brown vinesnake	*Oxybelis aeneus*			WSC
canyon giant spotted whiptail	*Aspidoscelis burti stictogrammus*	SC	S	
desert rosy boa	*Charina trivirgata gracia*	SC	S	
northern Mexican gartersnake	*Thamnophis eques megalops*	SC		WSC
Texas horned lizard	*Phrynosoma cornutum*	SC	S	
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*		S	
Yuman Desert fringe-toed lizard	*Uma rufopunctata*	SC		WSC

Appendix C (*continued*).

Common Name	Scientific Name	ESA	BLM	State
Plants				
Ajo rock daisy	*Perityle ajoensis*			SR
Aravaipa wood fern	*Thelypteris puberula sonorensis*		S	
Arizona giant sedge	*Carex ultra*		S	
Arizona Sonoran rosewood	*Vauquelinia californica sonorensis*		S	
Bartram stonecrop	*Graptopetalum bartramii*	SC	S	SR
beardless chinch weed	*Pectis imberbis*	SC		
blue sand lily	*Triteleiopsis palmeri*		S	SR
broadleaf twayblade	*Listera convallarioides*			SR
cactus apple	*Opuntia englemannii flavispina*			SR
Catalina beardtoungue	*Penstemon discolor*			HS
Chisos coral root	*Hexalectris revoluta*		S	SR
counter-clockwise fishhook cactus	*Mammalaria mainiae*			SR
crested coral root	*Hexalectris spicata*			SR
Dahlia rooted cereus	*Peniocereus striatus*			SR
Dalhouse spleenwort	*Asplenium dalhousiae*		S	
fallen ladie's tresses	*Schiedeella arizonica*			SR
Gentry indigobush	*Dalea tentaculoides*	SC	S	HS
golden barrel cactus	*Ferocactus cylindraceus eastwoodiae*			SR
Gooddings onion	*Allium gooddingii*	SC		HS
Huachuca golden aster	*Heterotheca rutteri*	SC	S	
Kelvin cholla	*Opuntia* x *kelvinensis*			SR
Kofa barberry	*Berberis harrisoniana*		S	
large-flowered blue star	*Amsonia grandiflora*	SC		
Lemmon cloak fern	*Notholaena lemmonii*	SC		
Lemmon lily	*Lilium parryi*	SC		SR
littleleaf false tamarind	*Lysiloma watsonii*			SR
magenta-flower hedgehog cactus	*Echinocereus fasciculatus*			SR
needle-spined pineapple cactus	*Echinomastus erectocentrus erectocentrus*	SC		SR
Pima Indian mallow	*Abutilon parishii*	SC	S	SR
Plummer onion	*Allium plummerae*			SR
Pringle hawkweed	*Hieracium pringlei*	SC		
saiya	*Amoreuxia gonzalezii*	SC		HS
San Carlos wild buckwheat	*Eriogonum capillare*	SC		SR
Sand Pedro River wild buckwheat	*Eriogonum terrenatum*		S	
Santa Cruz striped agave	*Agave parviflora parviflora*	SC		HS
senita	*Lophocereus schottii*			SR
slender adder's mouth	*Malaxis tenuis*			SR
Thornber fishhook cactus	*Mammalaria thornberi*			SR
Thurber Indian mallow	*Abutilon thurberi*			SR
Thurber's bog orchid	*Platanthera limosa*			SR
Trelease agave	*Agave schottii treleasei*	SC		HS
Tumamoc globeberry	*Tumamoca macdouglii*		S	SR
varied fishhook cactus	*Mammalaria viridiflora*			SR
whisk fern	*Psilotum nudum*			HS
Wiggins milkweed vine	*Metastelma mexicanum*	SC		

APPENDIX E
VIEWSHED MAPS



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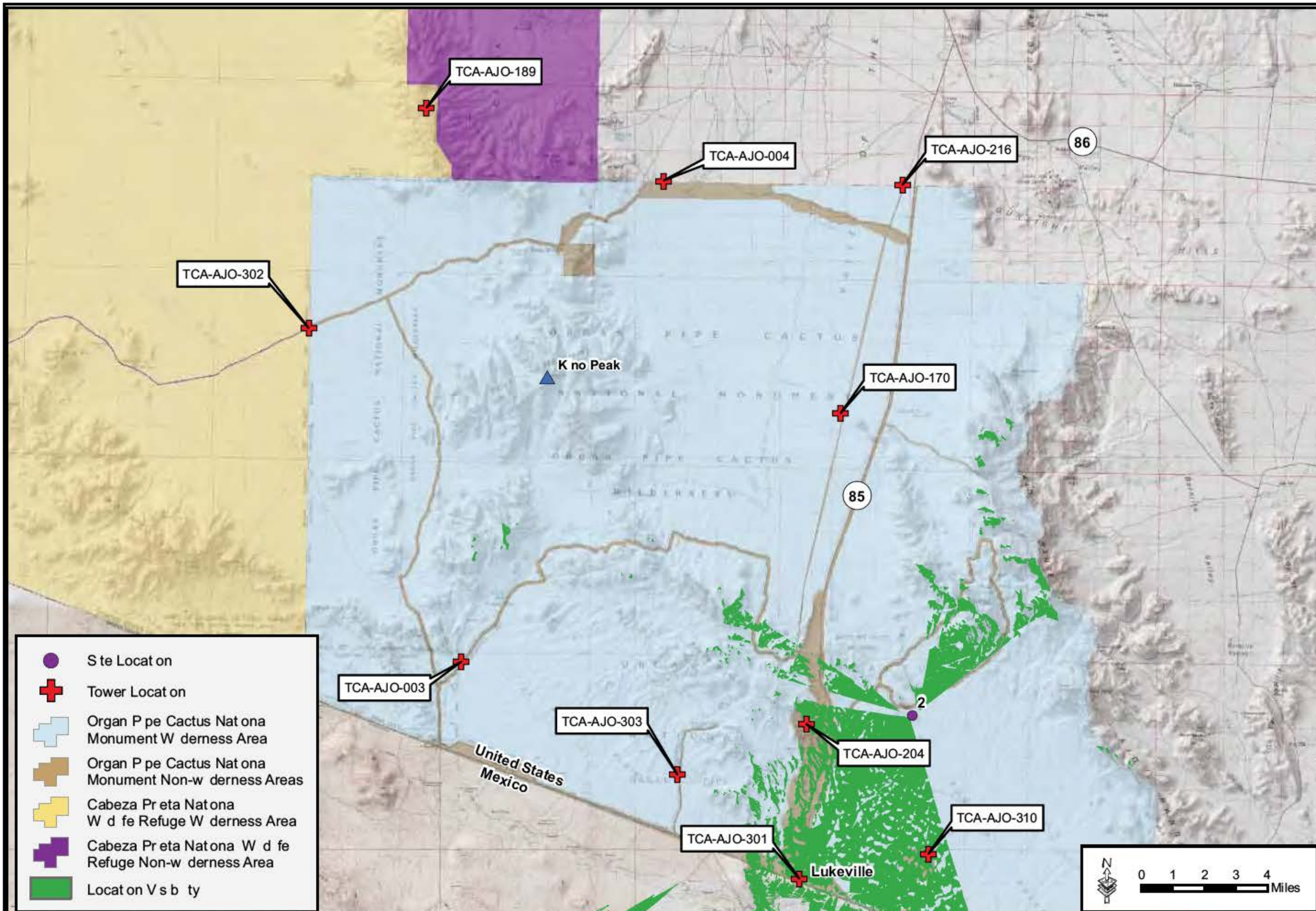

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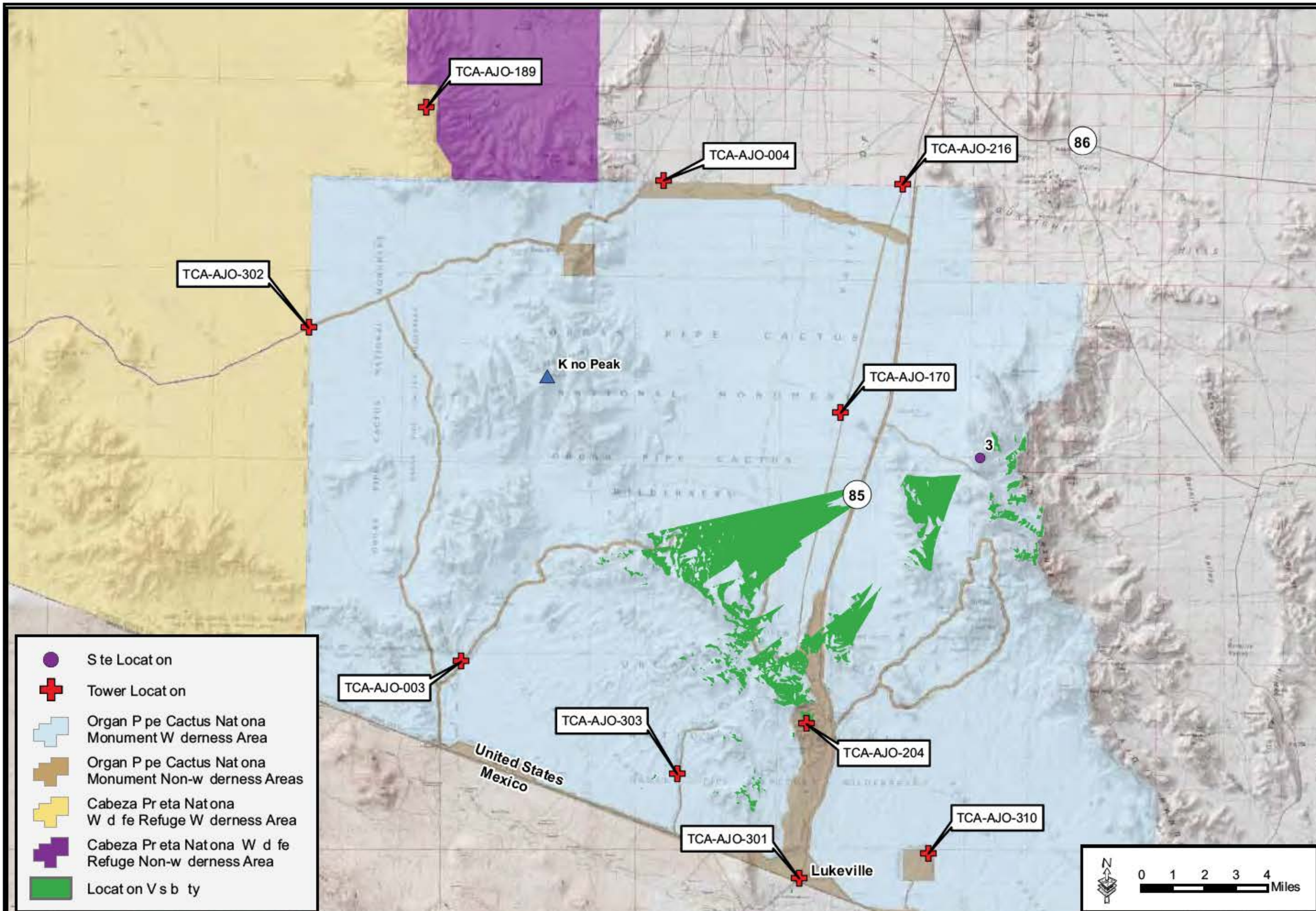

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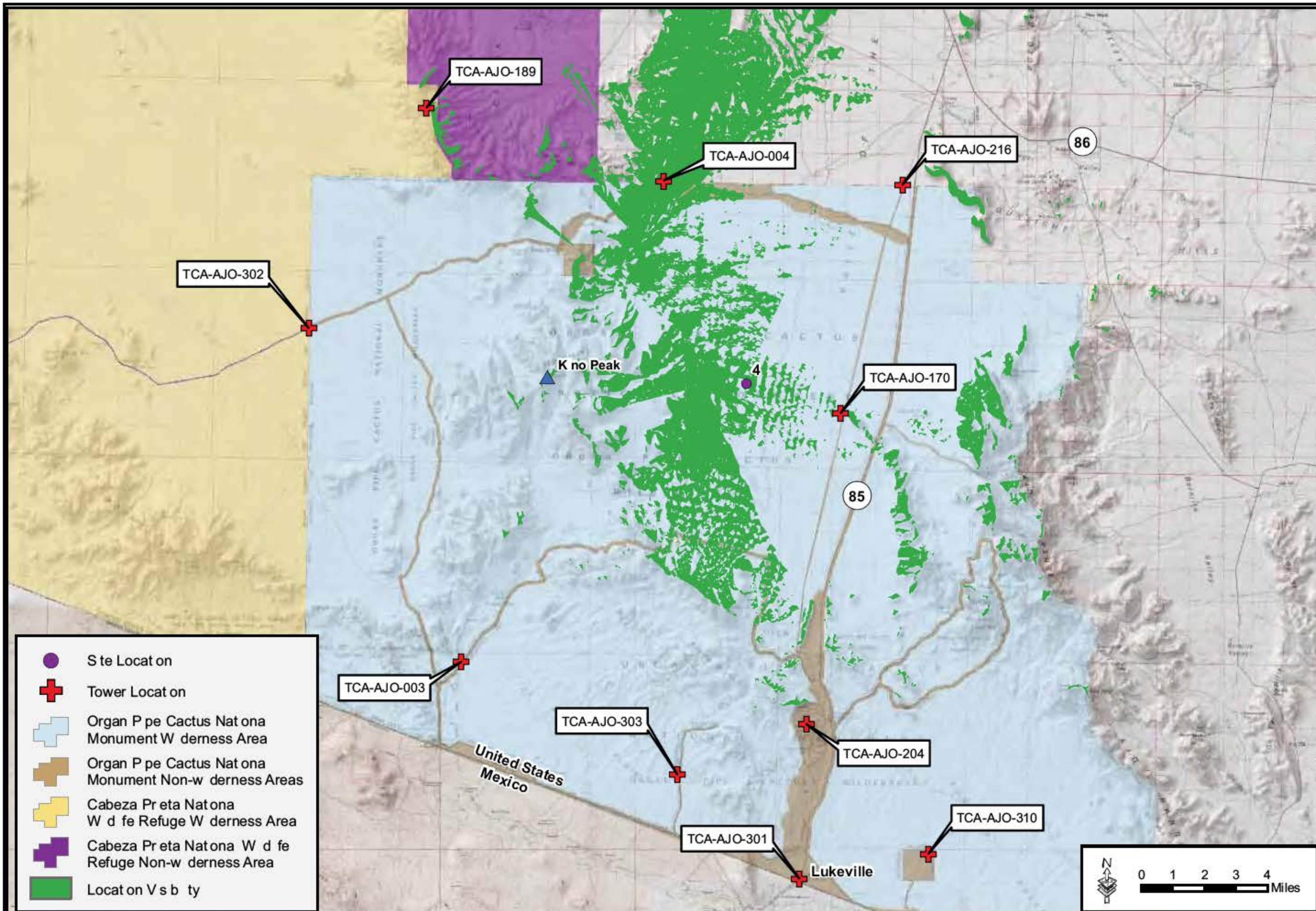

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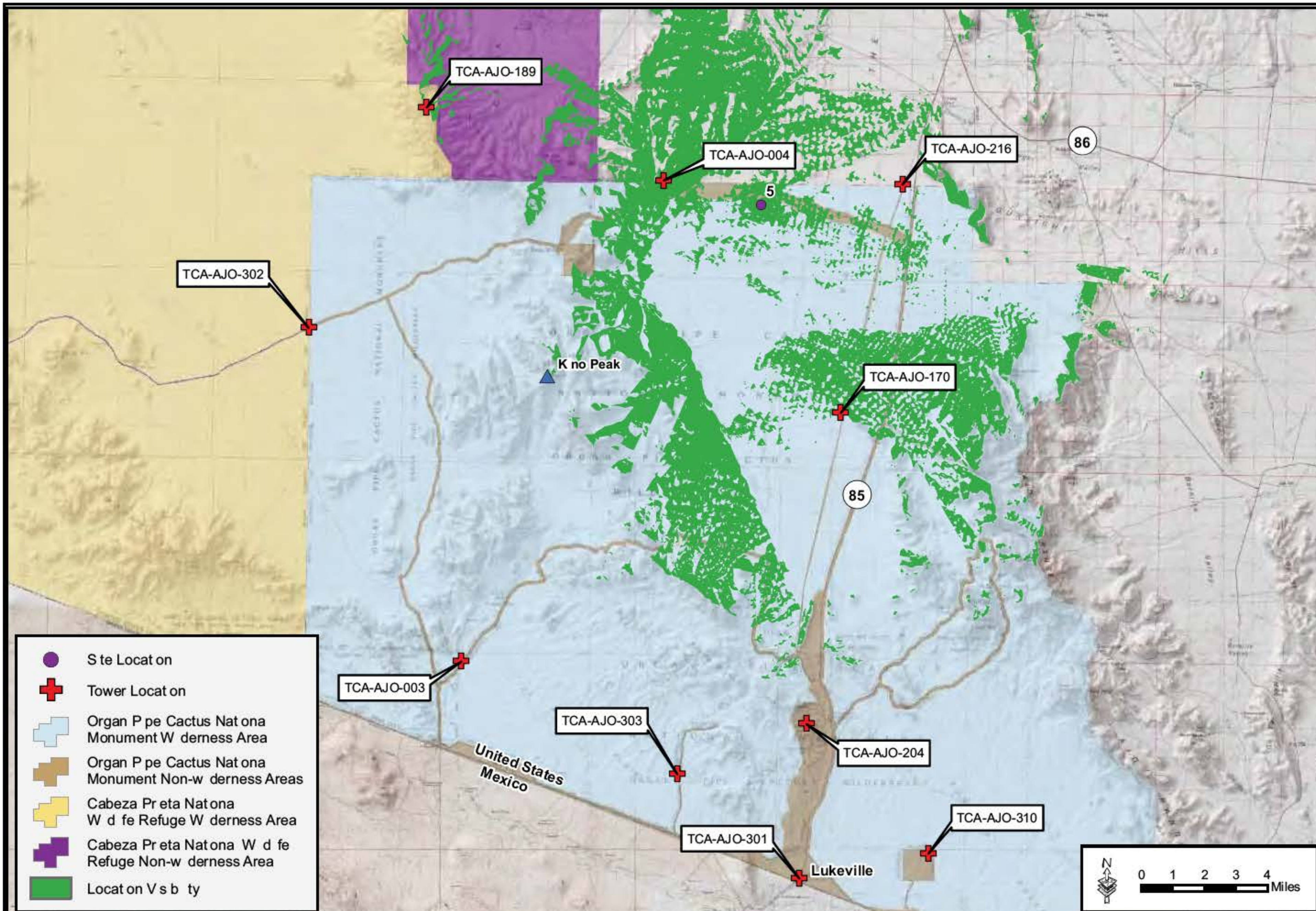

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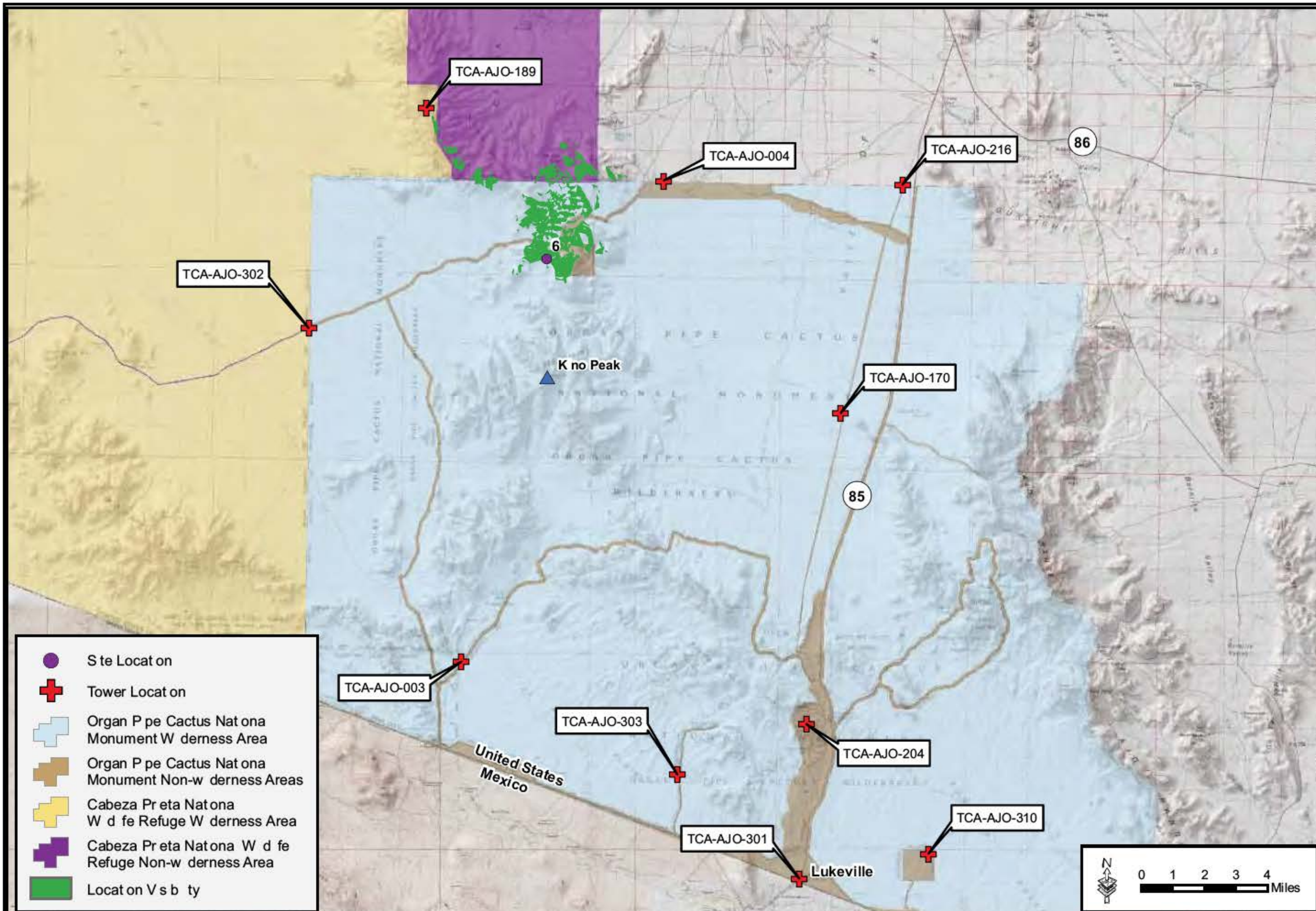

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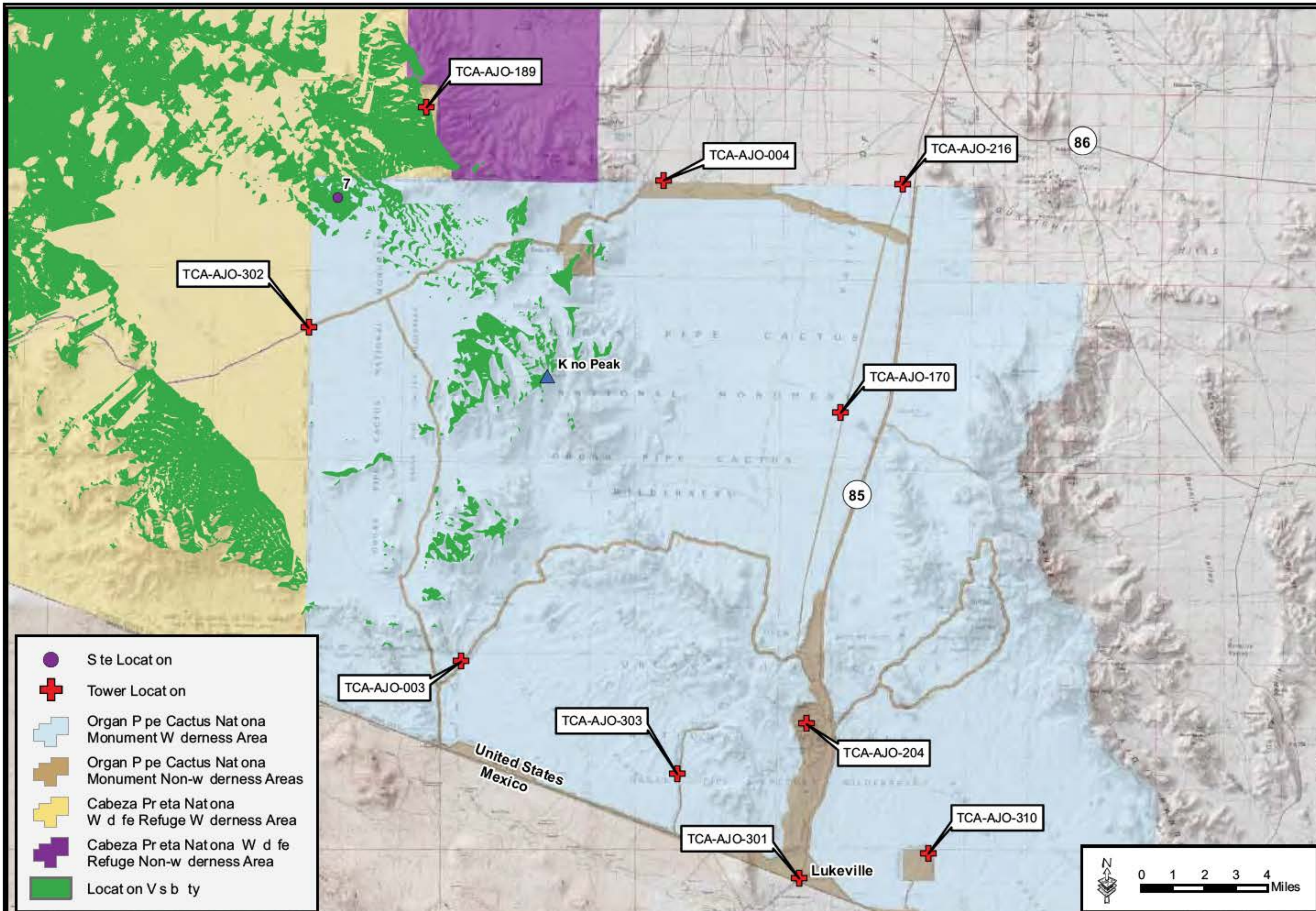

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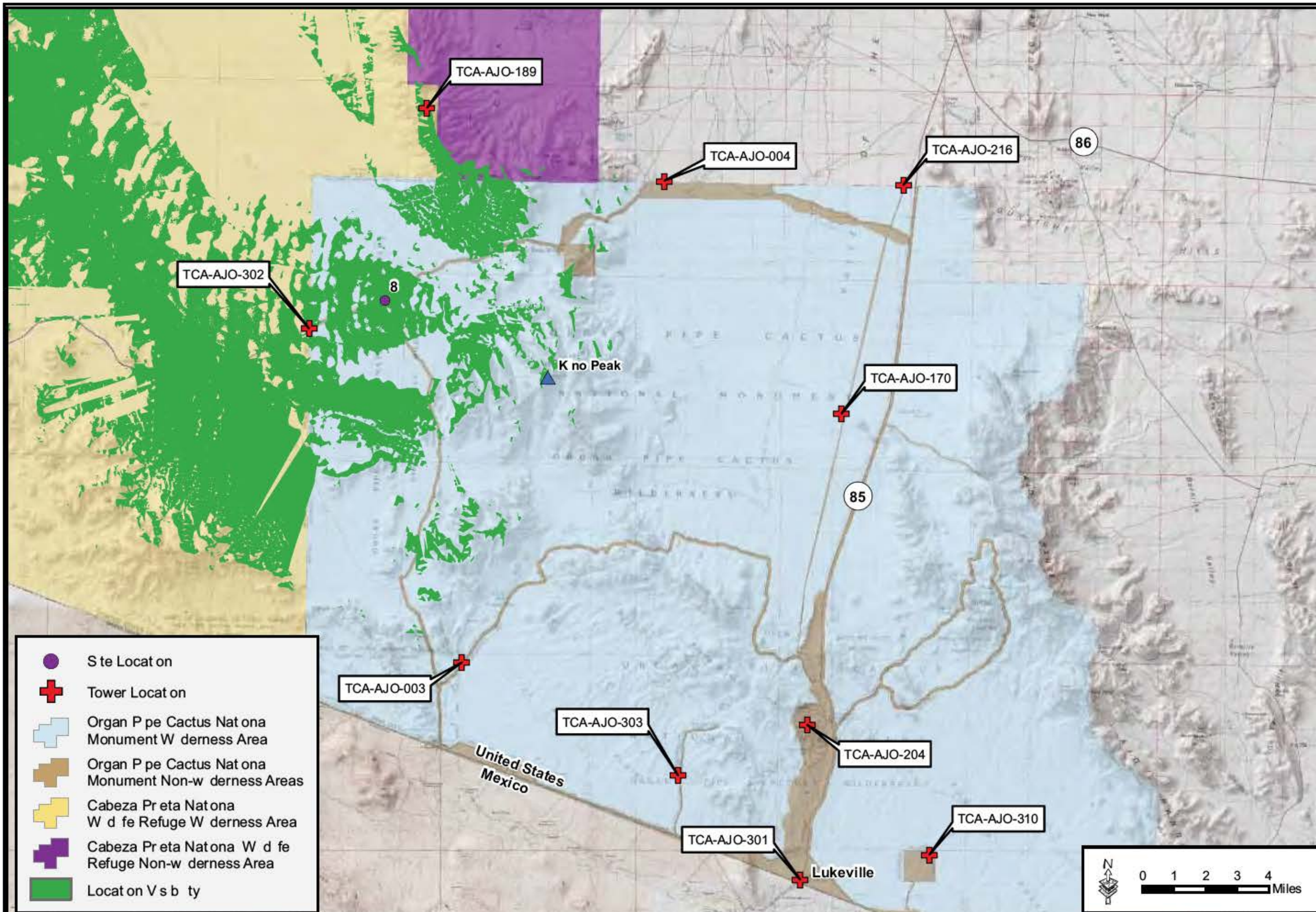

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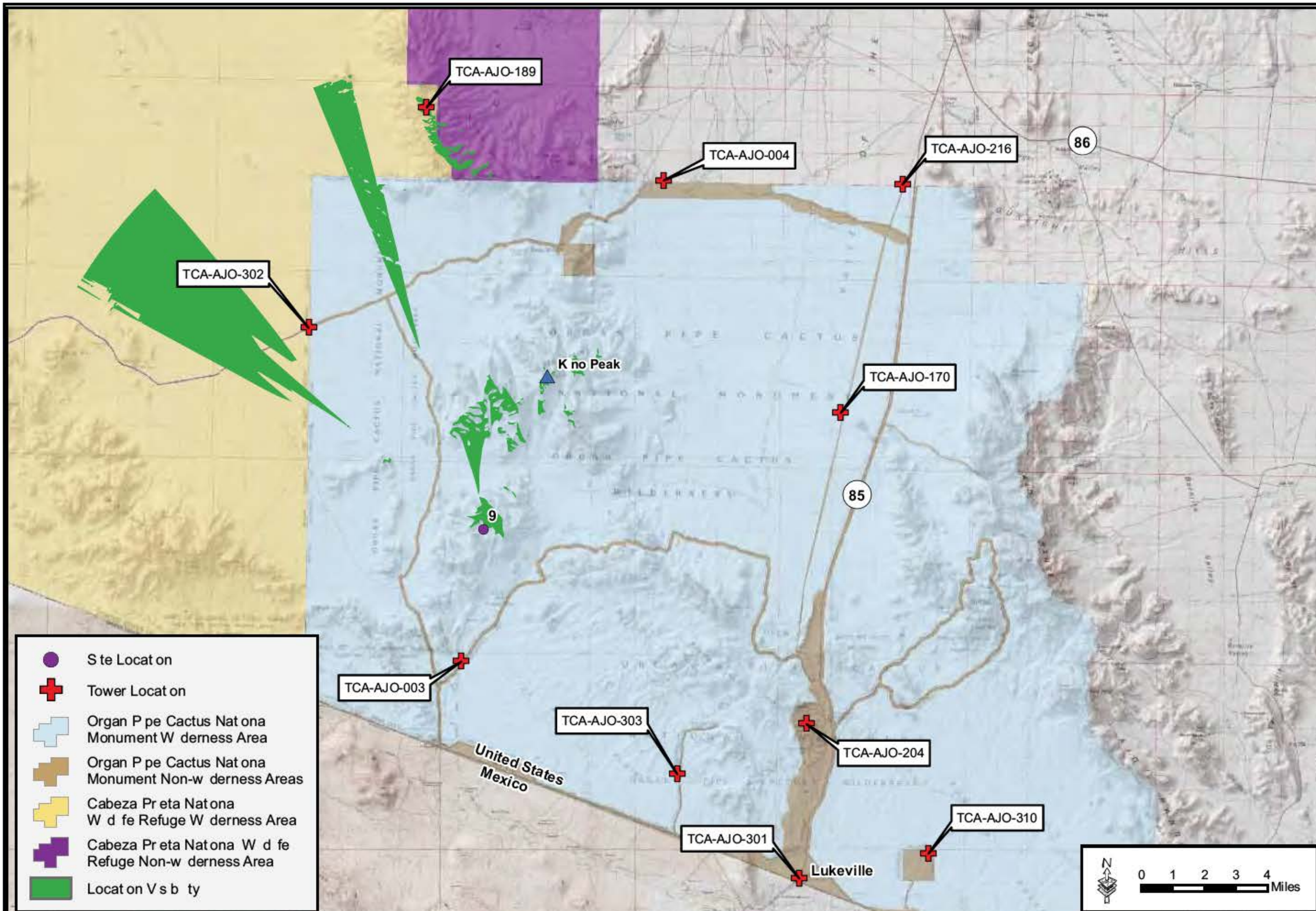

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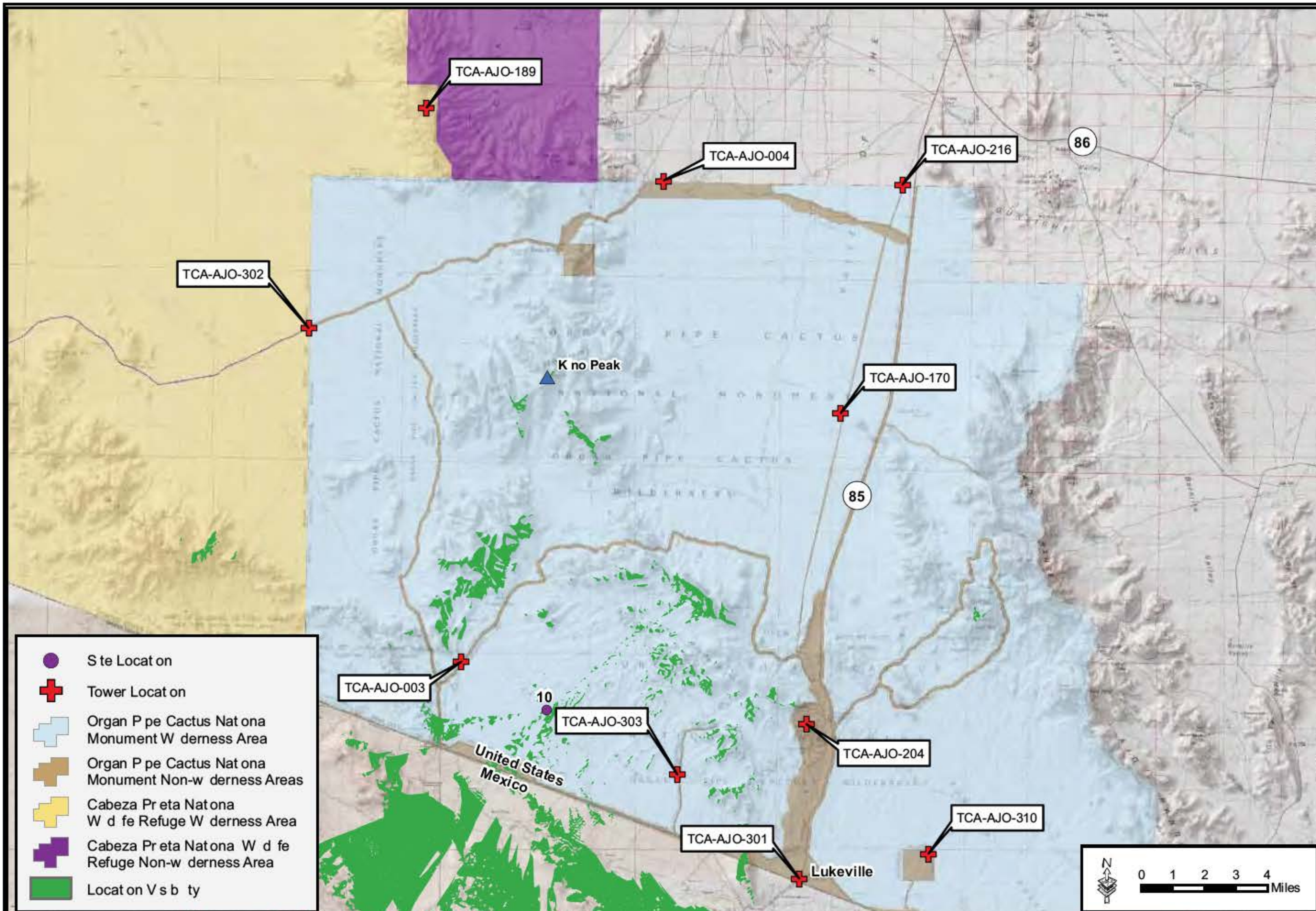

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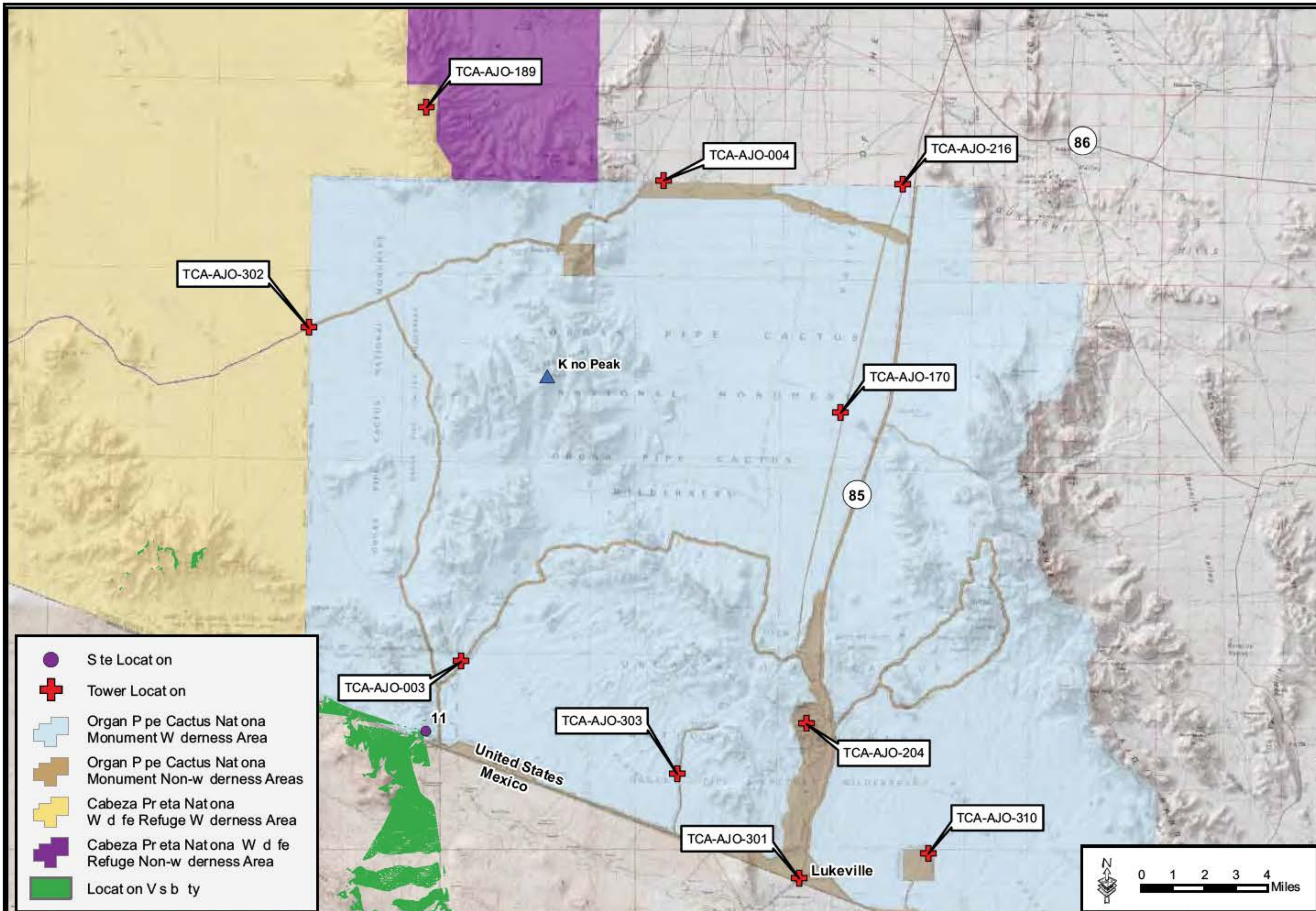

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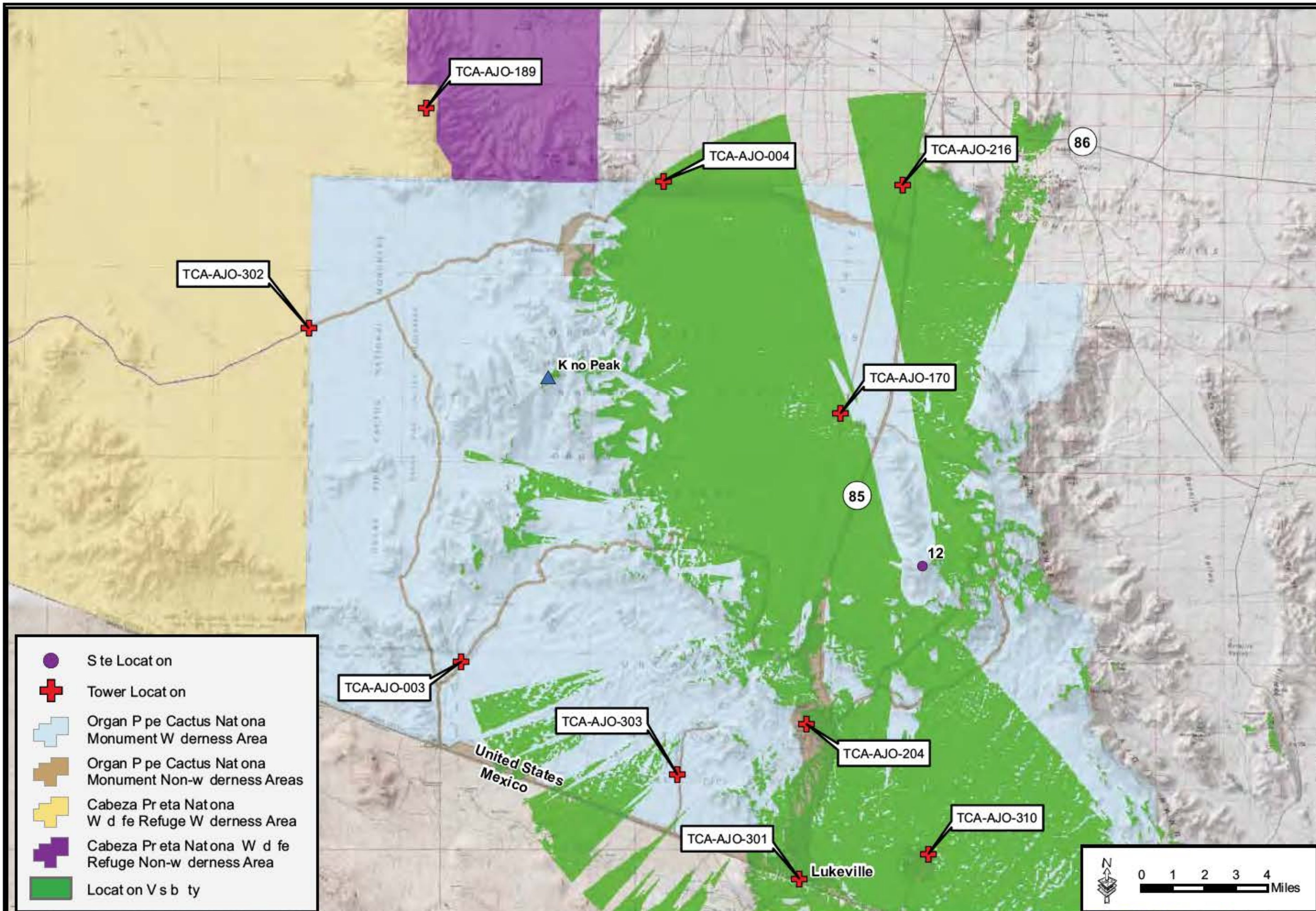

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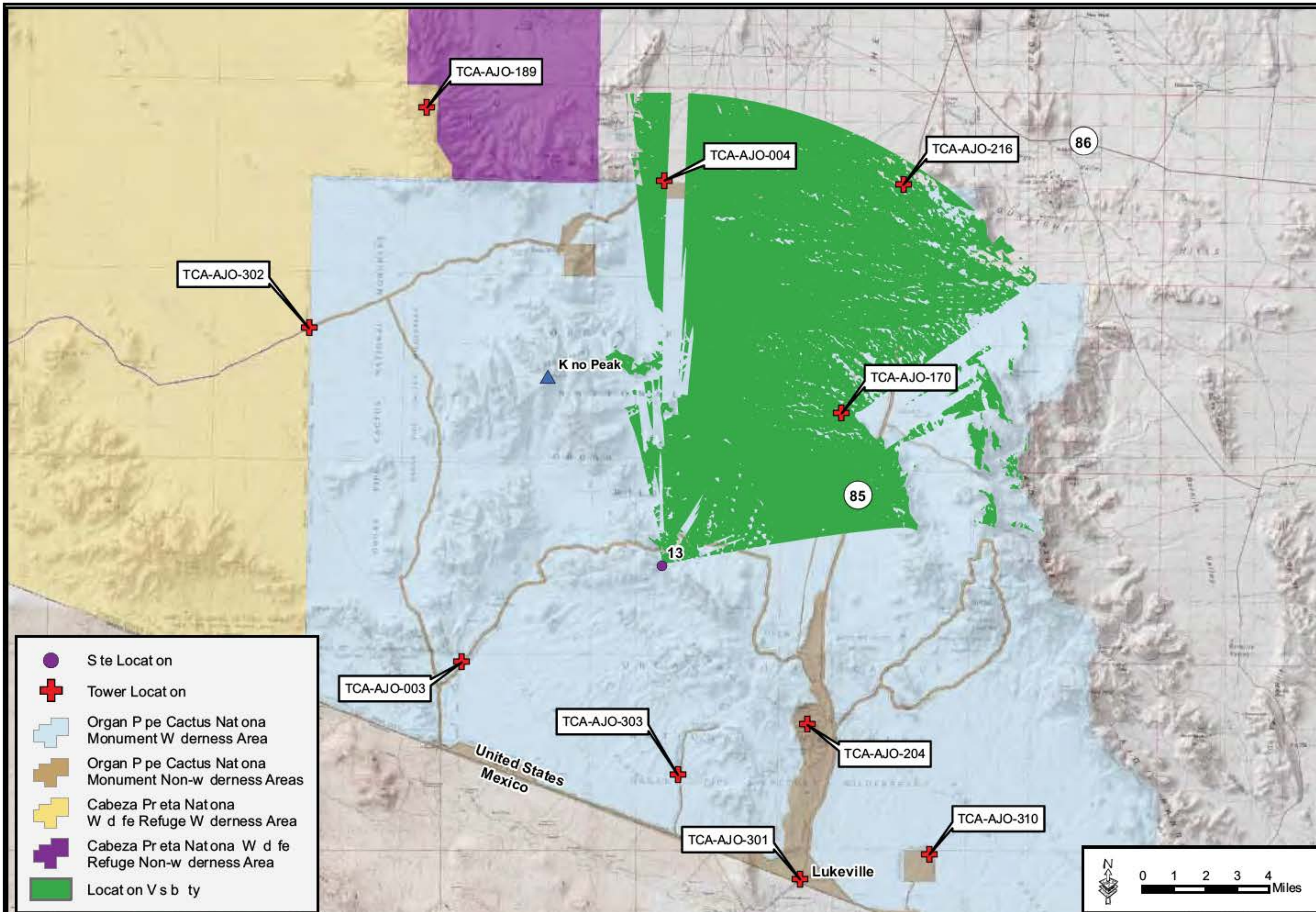

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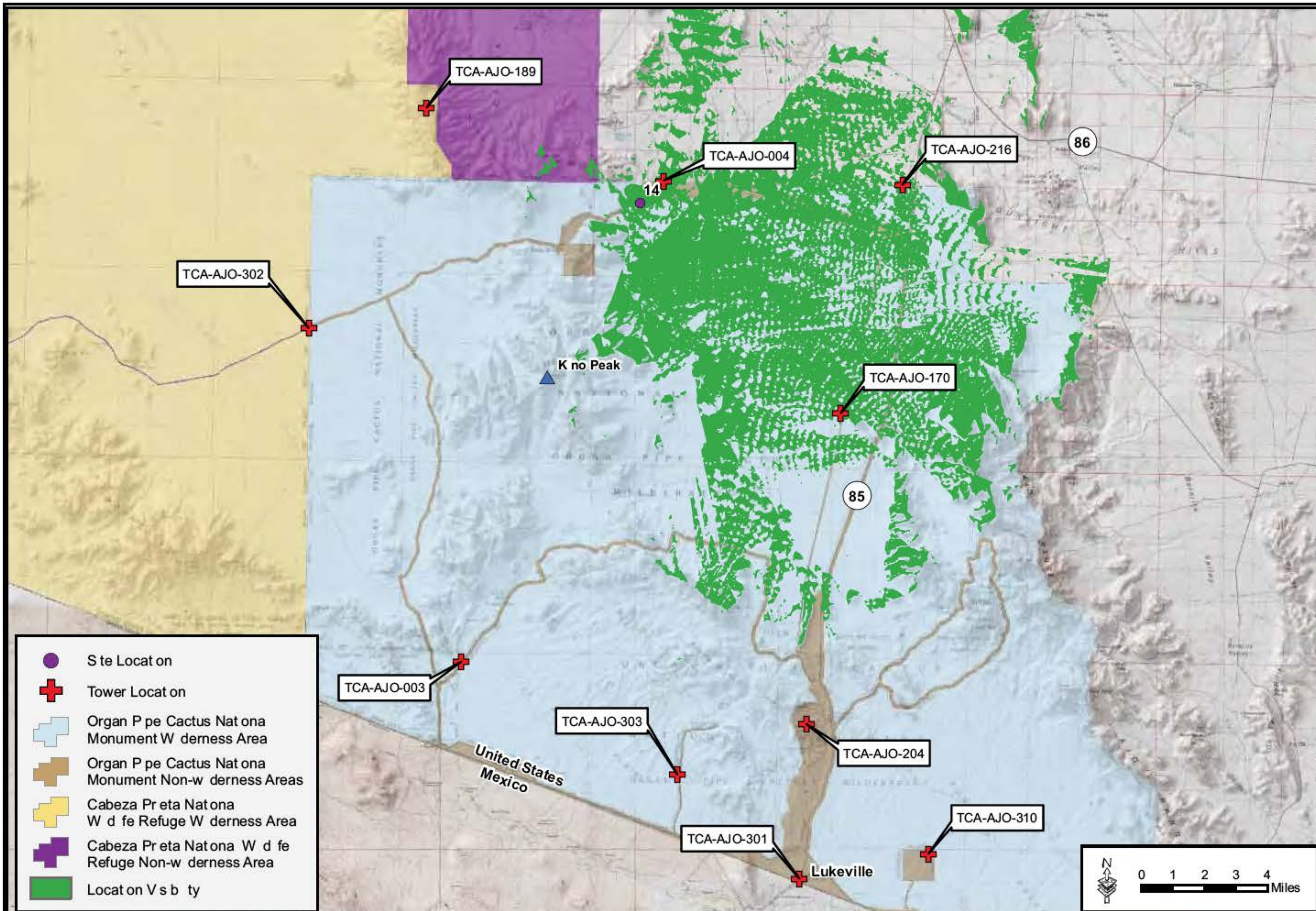

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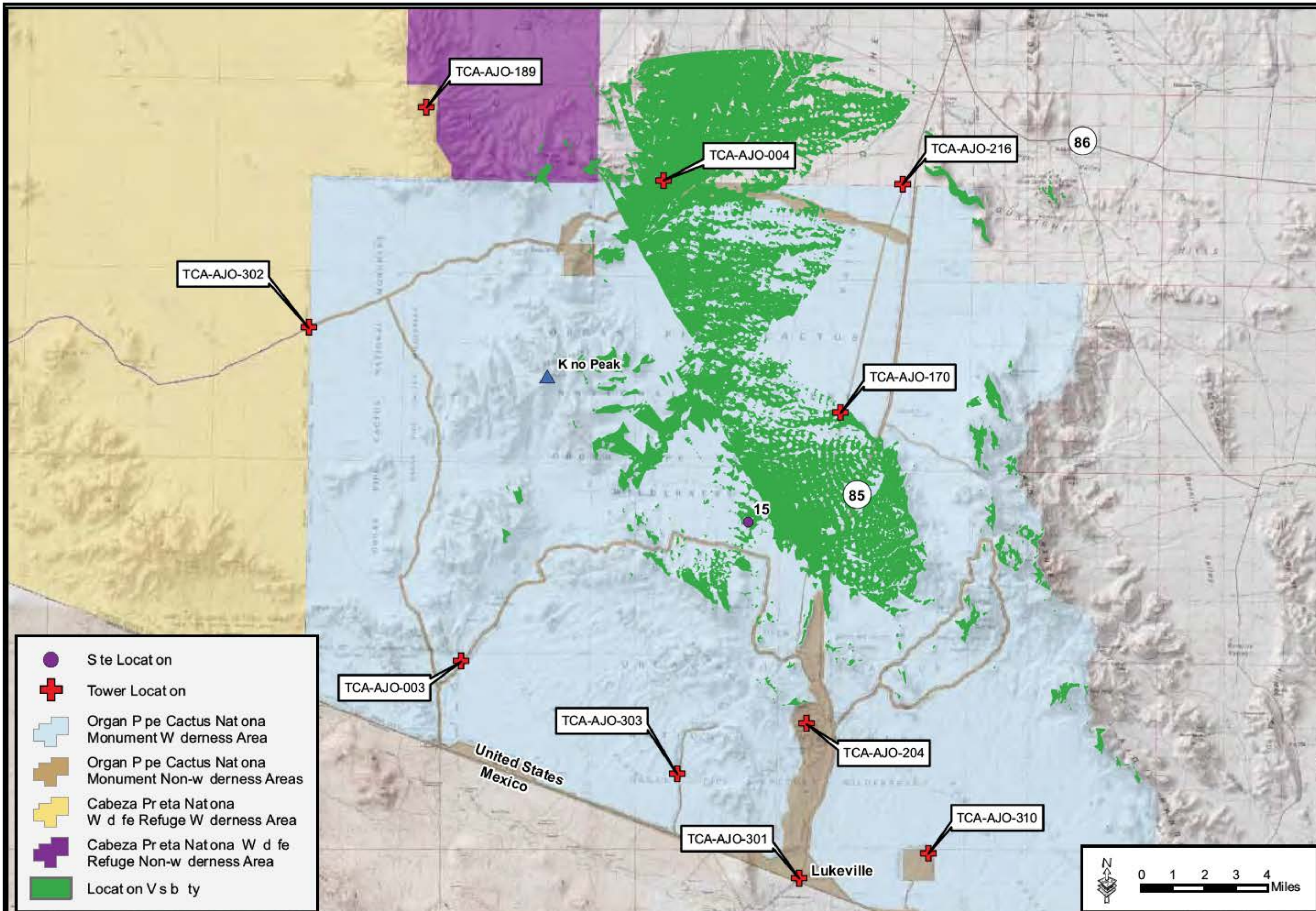

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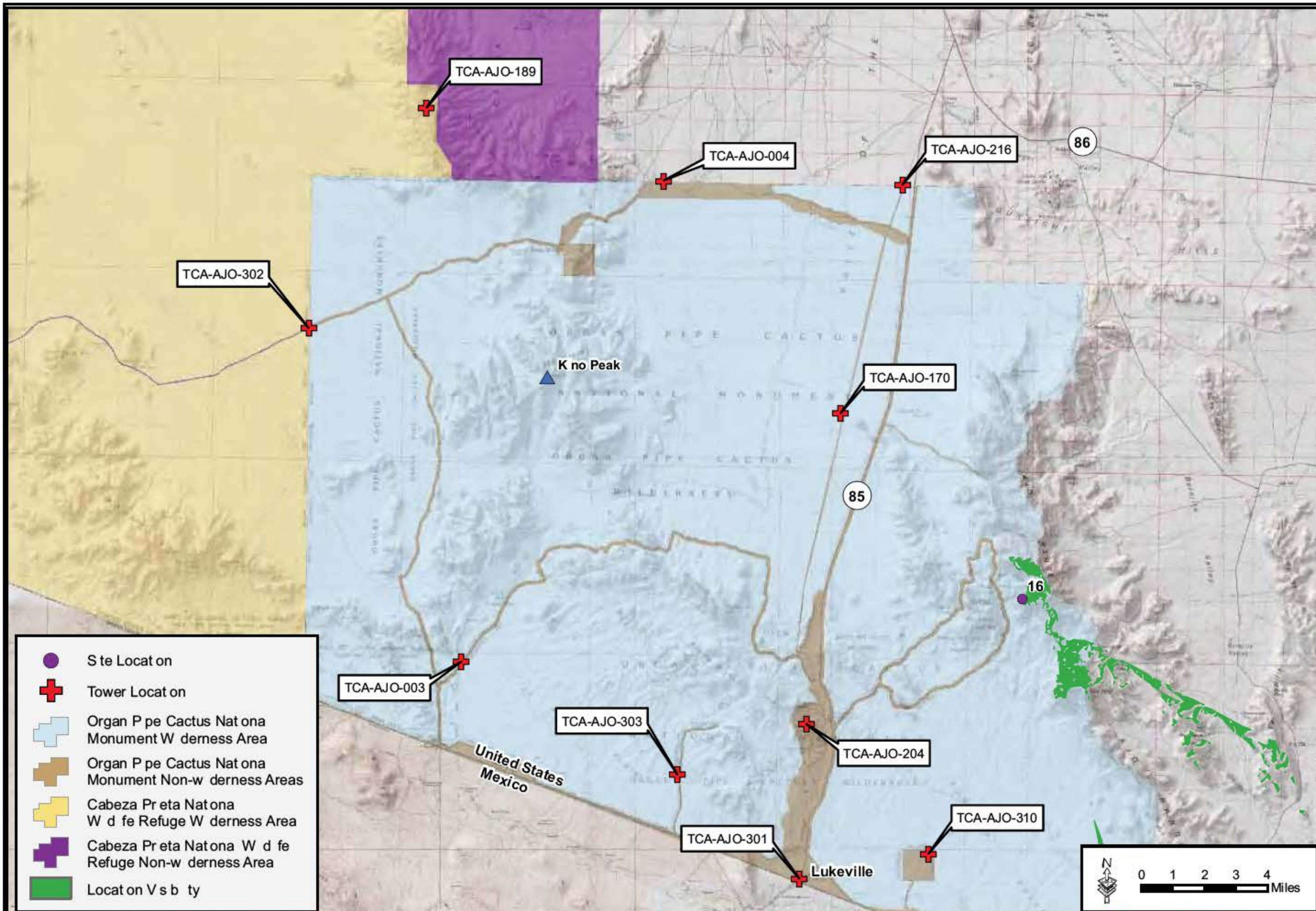

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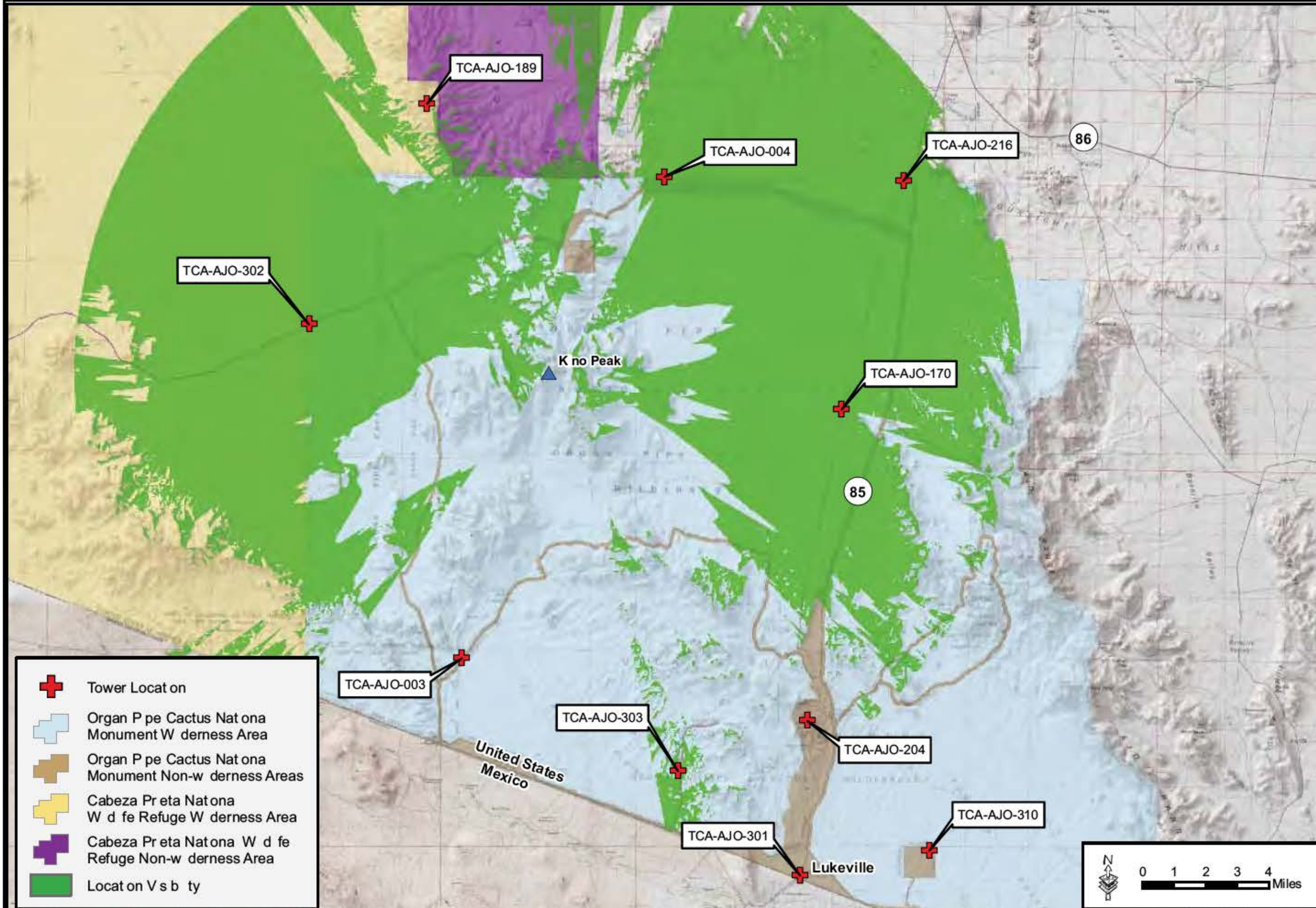
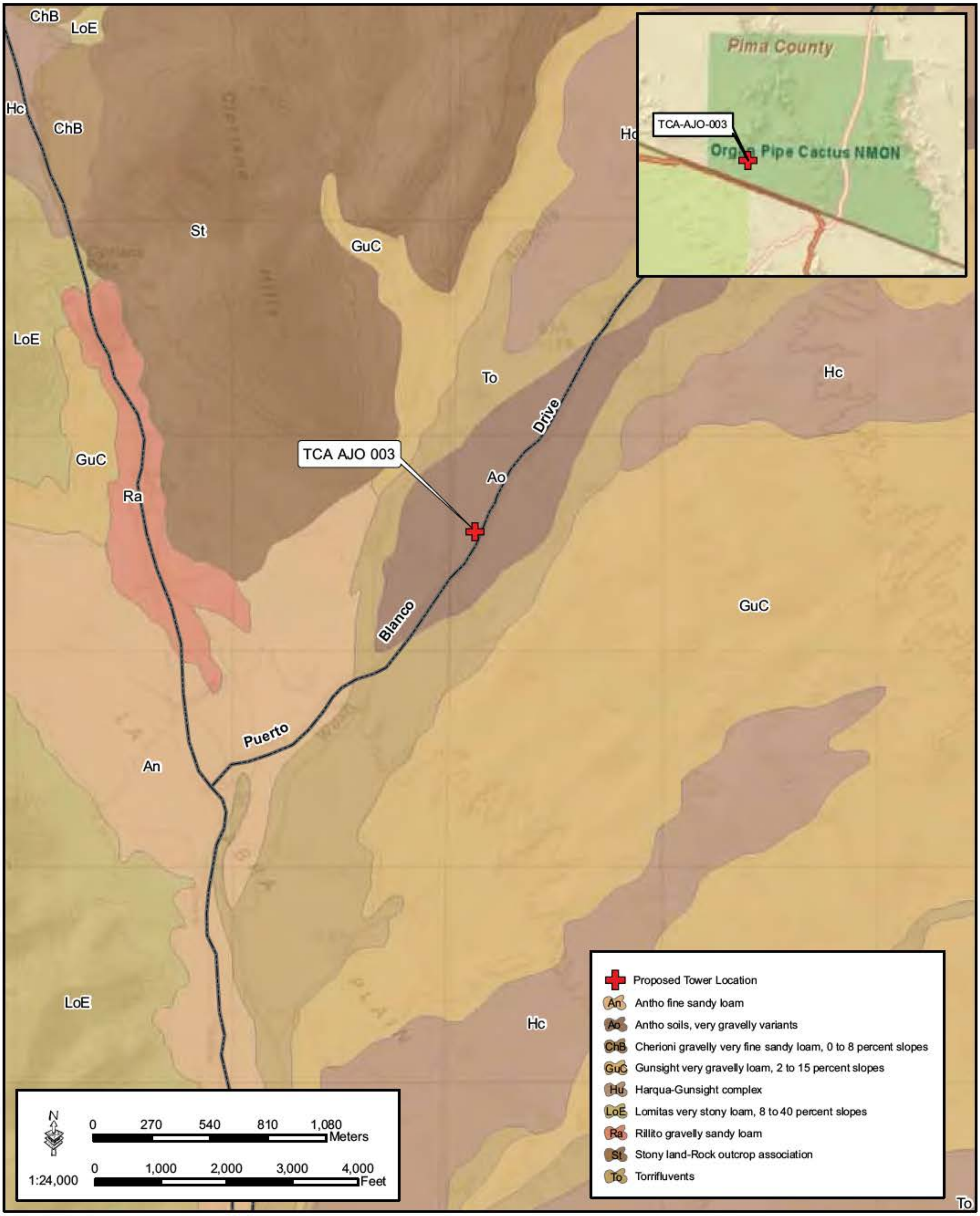


Viewshed Analysis of Kino Peak

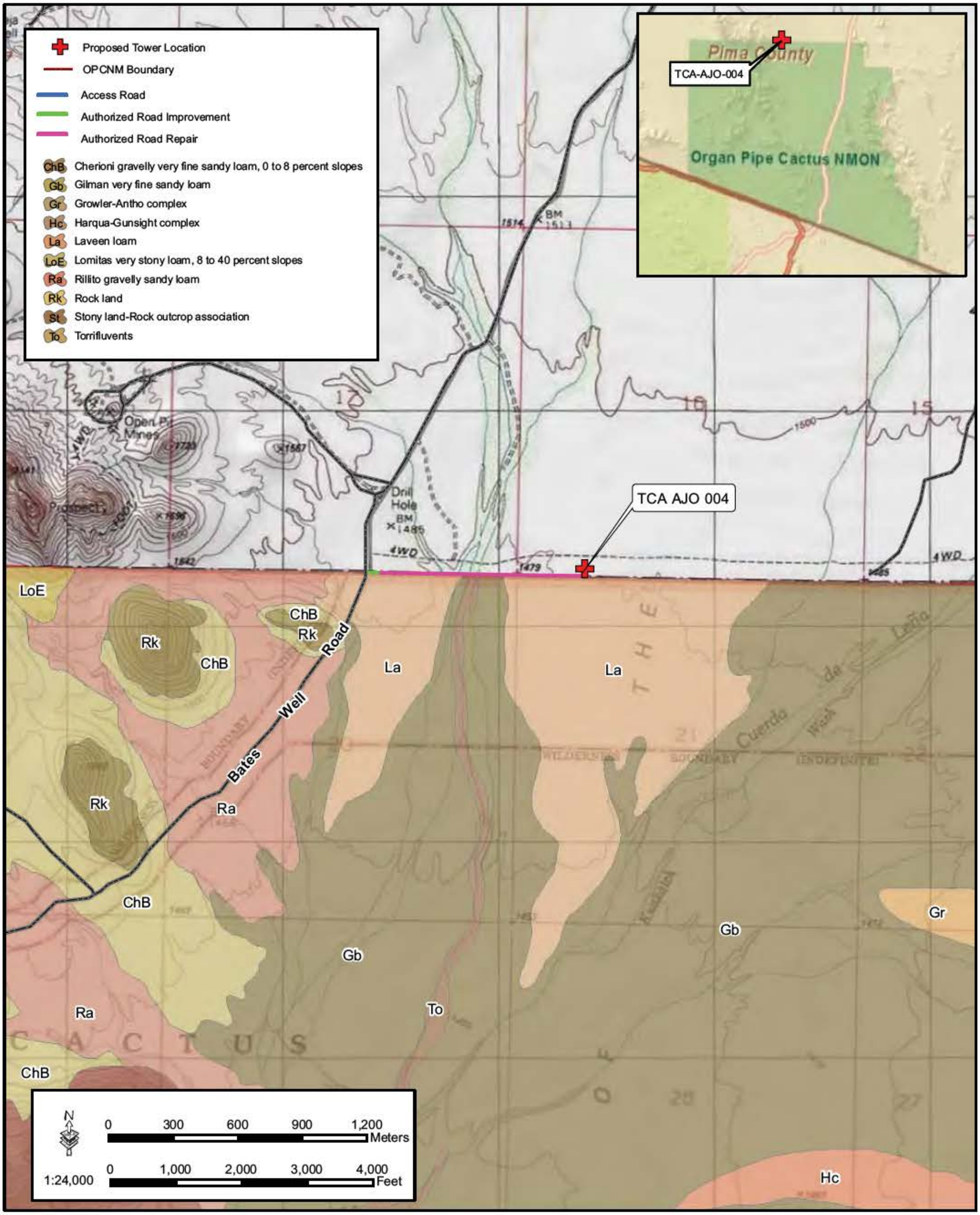
August 2009

APPENDIX F
SOIL MAPS



TCA-AJO-003 Tower Soil Survey Map

July 2009



TCA-AJO-004 Tower and Approach Road Soil Survey Map

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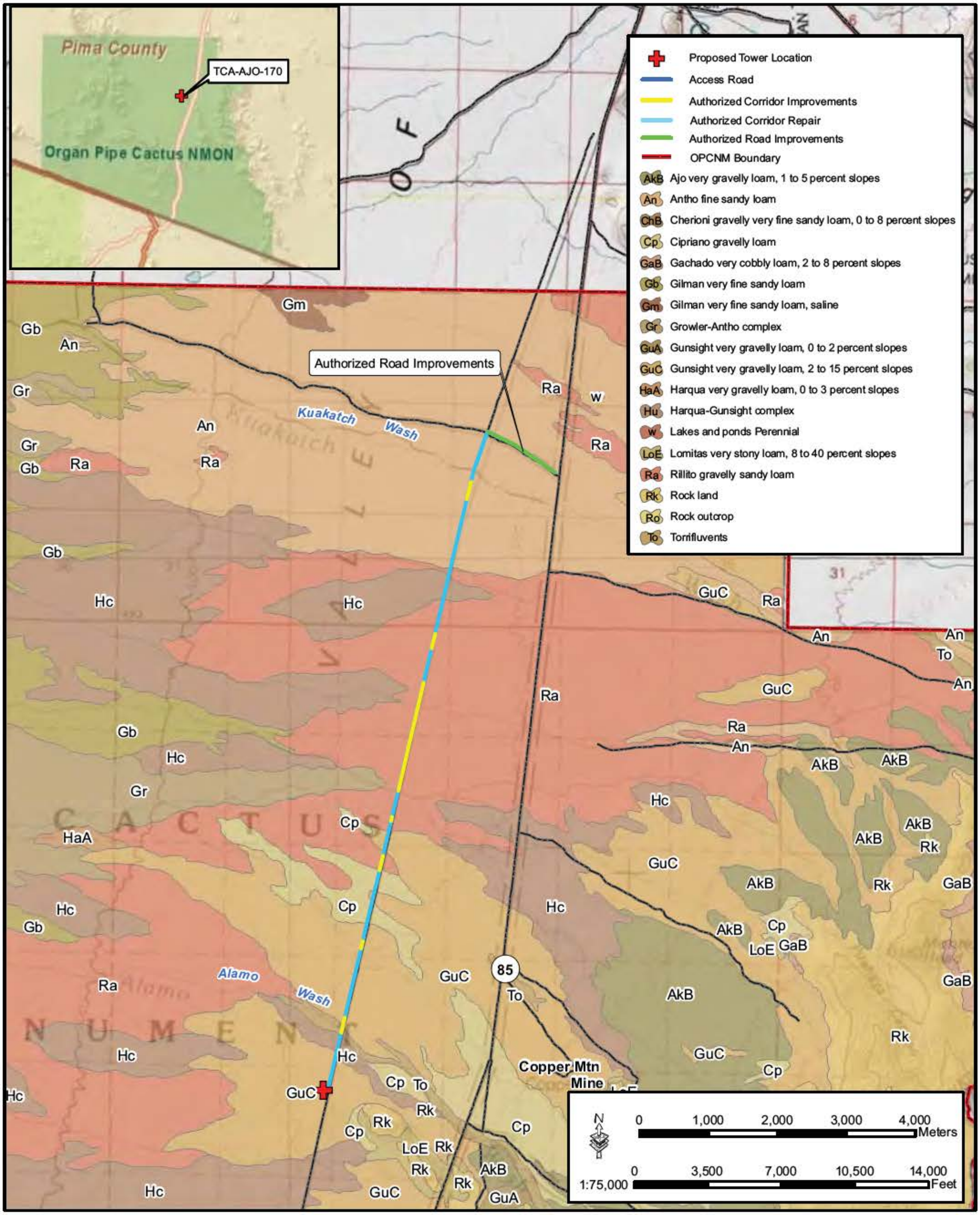

TCA-AJO-170 Tower and Approach Road Soil Survey Map

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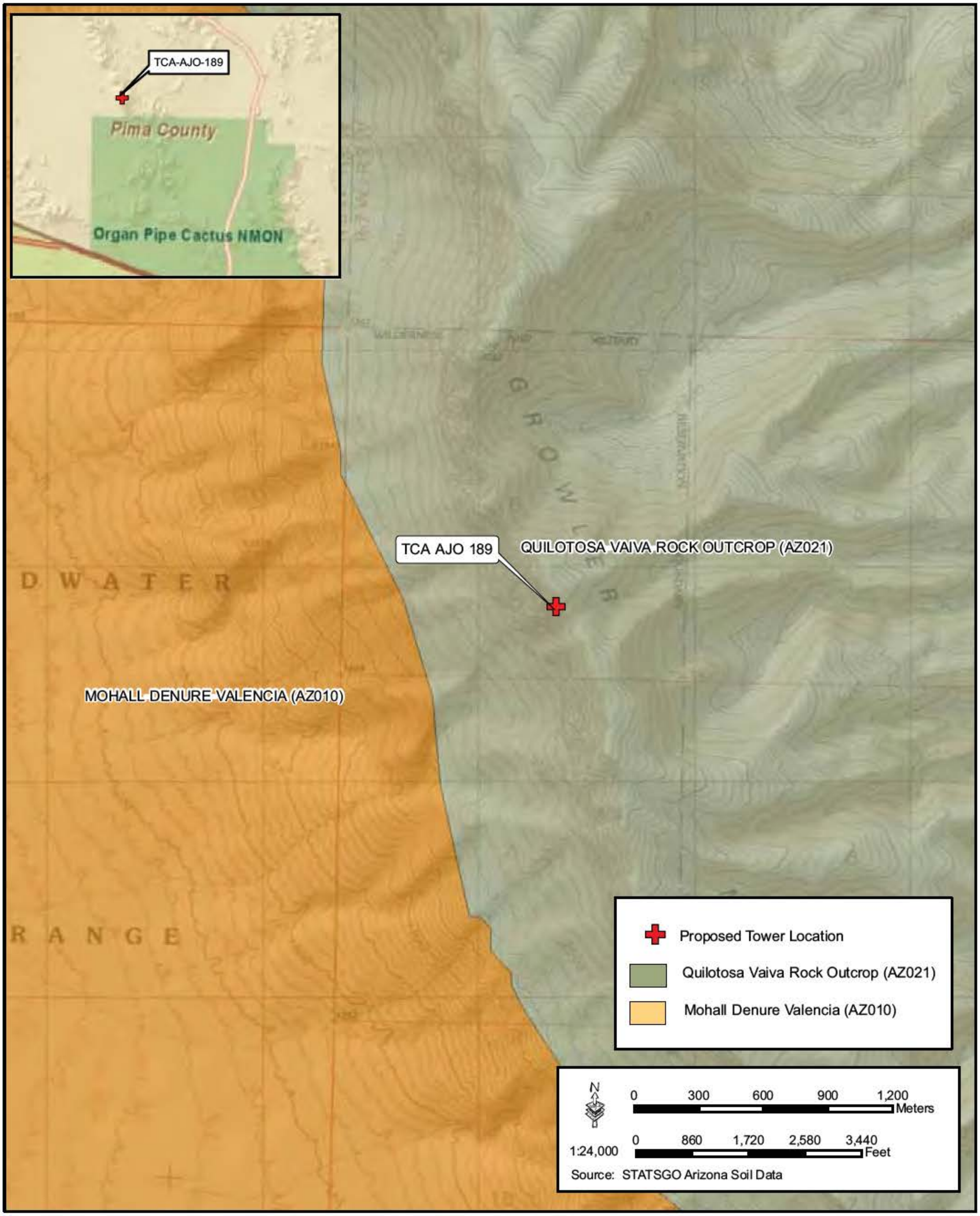
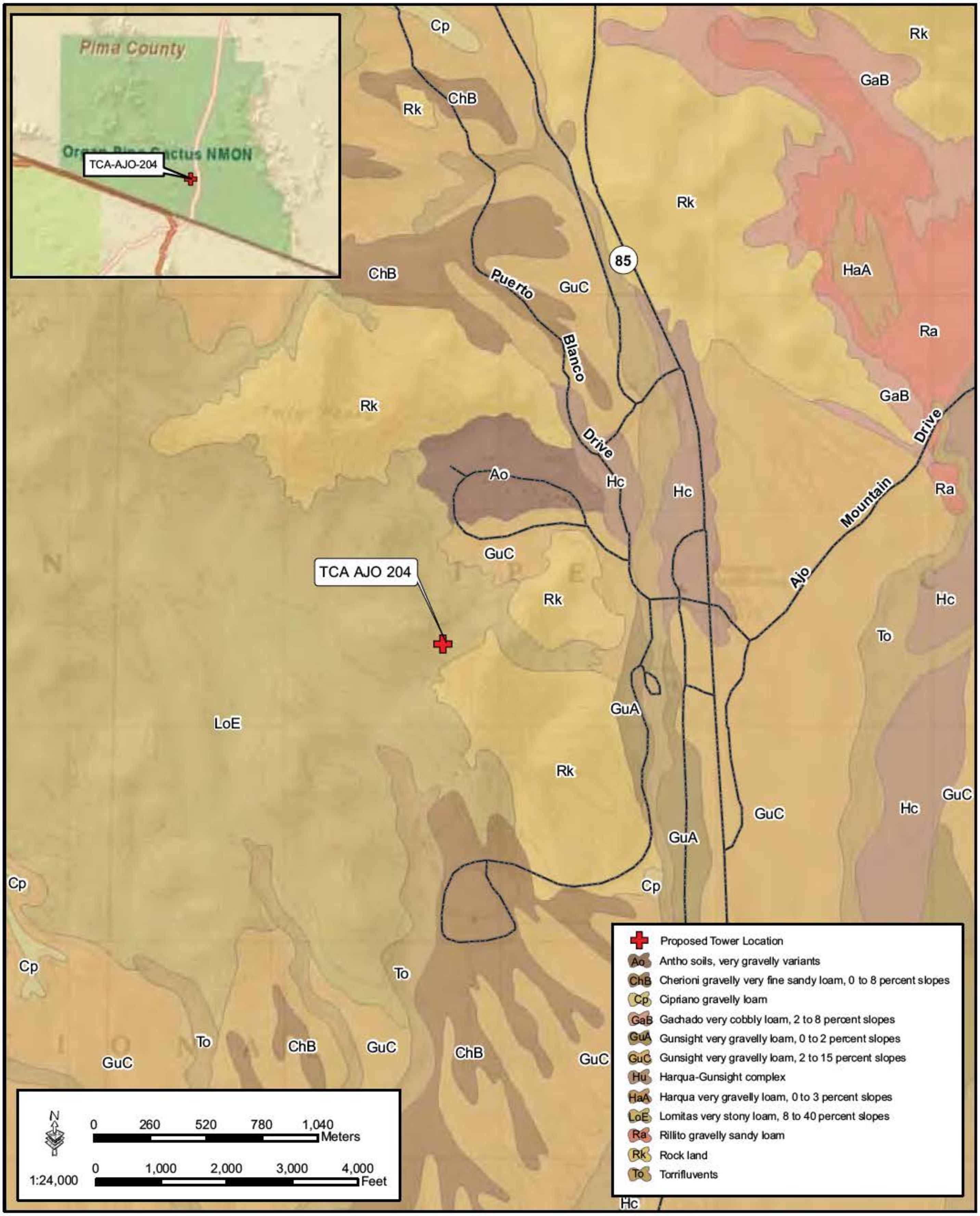


TCA-AJO-189 Tower Soil Survey Map

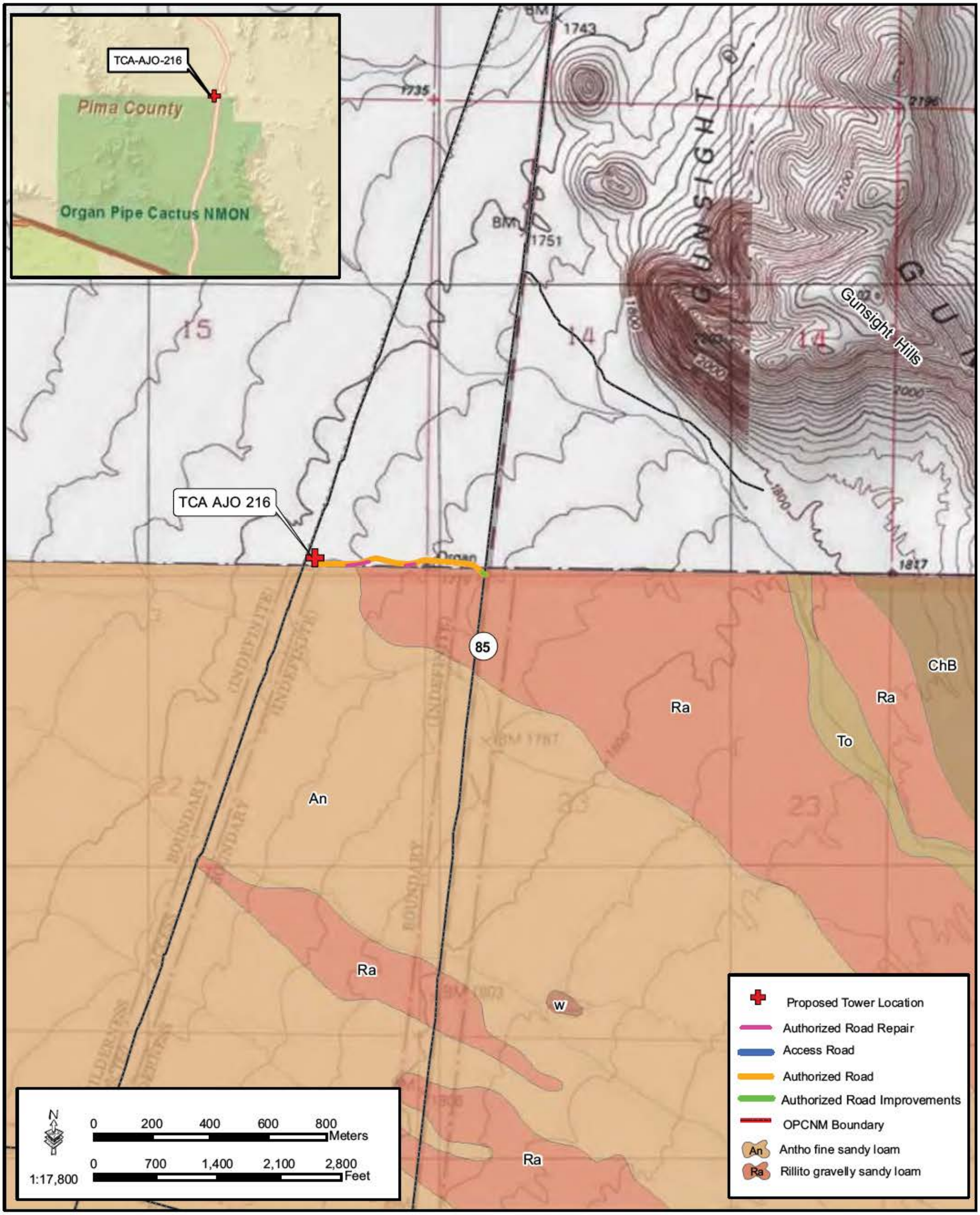
July 2009



TCA-AJO-204 Tower Soil Survey Map

GSRC

July 2009

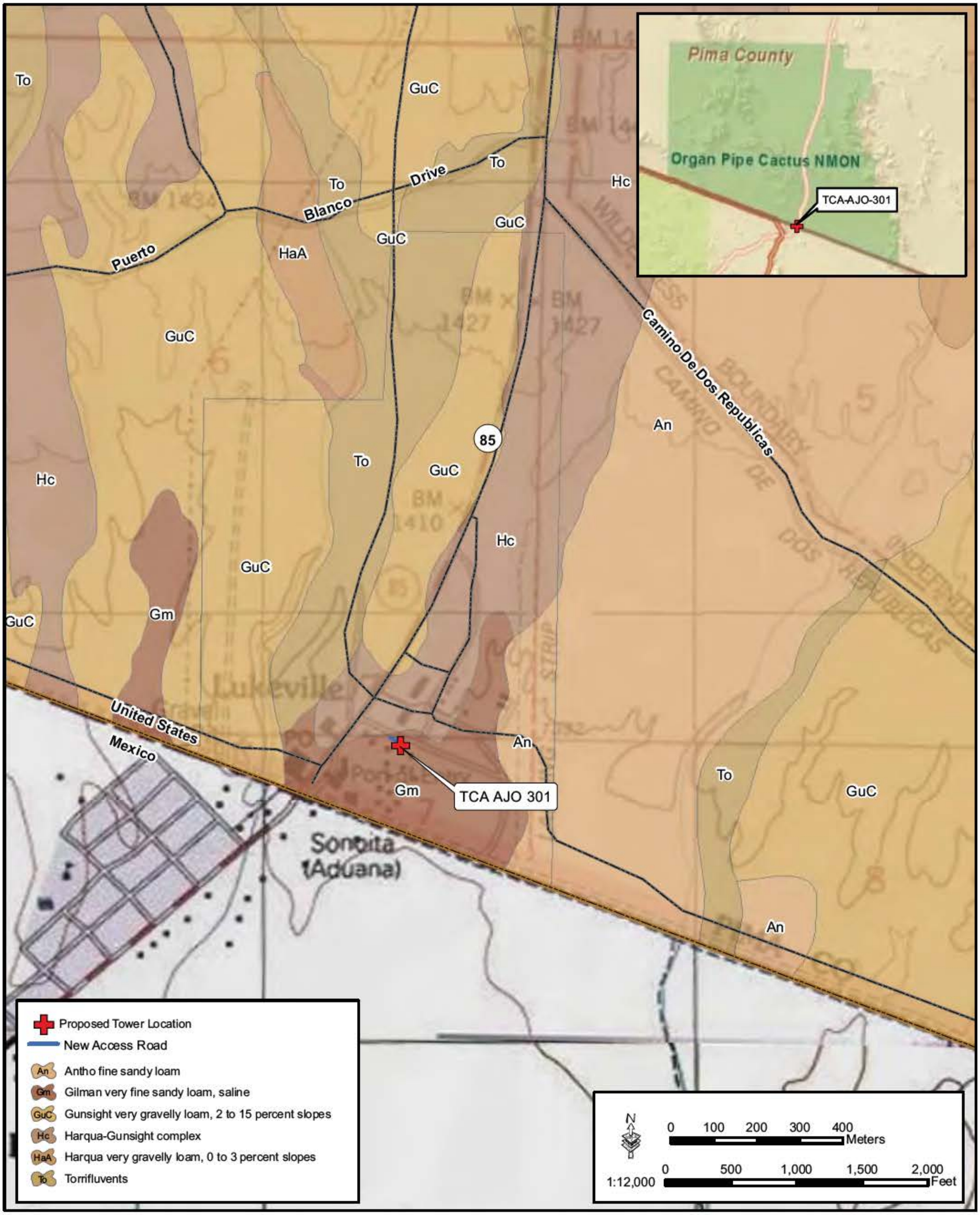


TCA-AJO-216 Tower and Approach Road Soil Survey Map

GSRC

August 2009

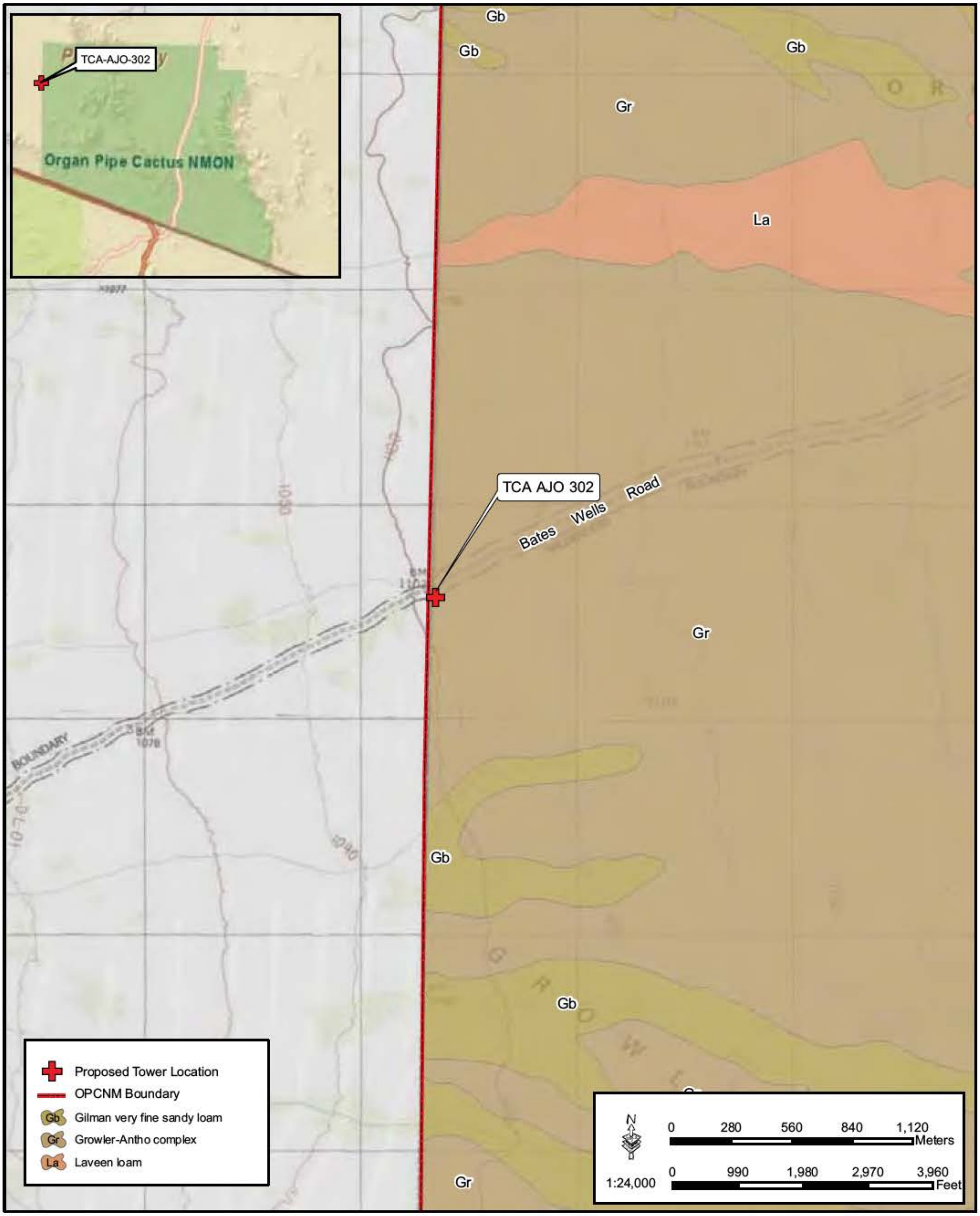
BW1 FOIA CBP 003139



TCA-AJO-301 Tower and Access Road Soil Survey Map

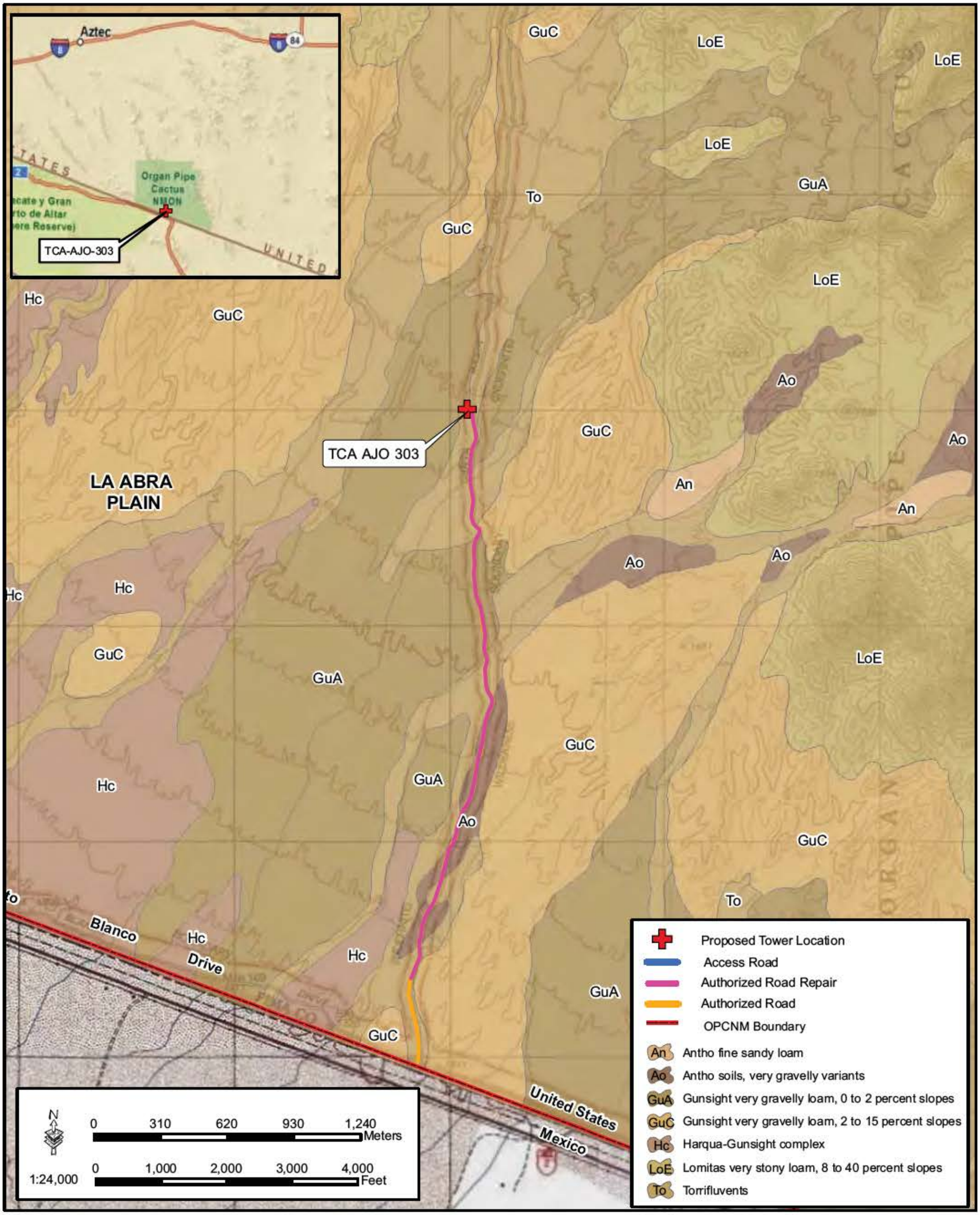
GSRC

August 2009



TCA-AJO-302 Tower Soil Survey Map

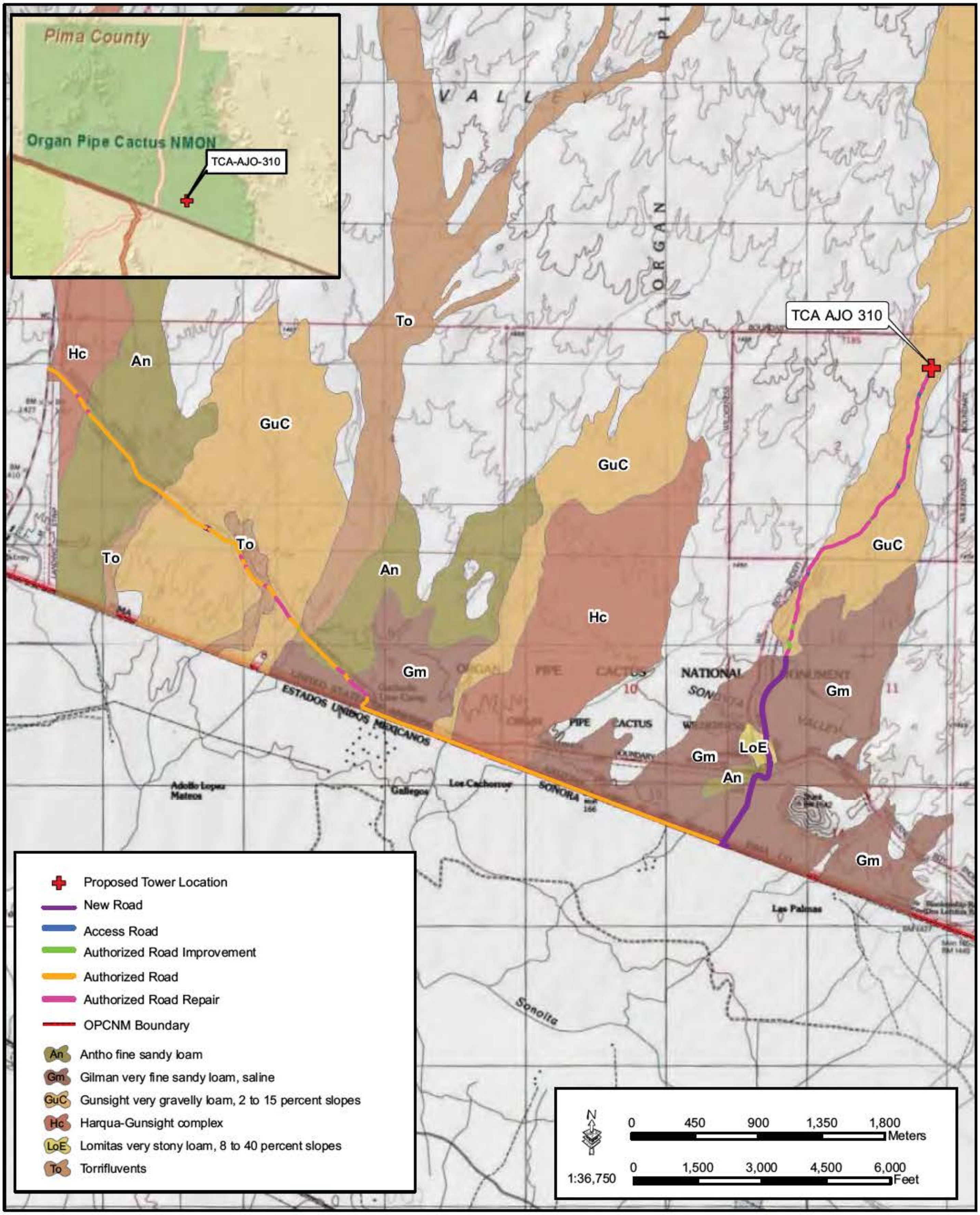
July 2009



TCA-AJO-303 Tower and Approach Road Soil Survey Map

GSRC

September 2009



TCA-AJO-310 Tower and Access Road Soil Survey Map

GSRC

August 2009

APPENDIX G
WATERS OF THE U.S.

Waters of the U.S. Associated with the Proposed Tower Sites and Approach and Access Roads						
Tower ID	**Drainage Type**	**Periodicity**	**Width of Channel (ft)**	**Width of Road (feet)**	**Proposed Action**	**Impact (acre)**
TCA-AJO-004	Wash	Ephemeral	8	16	Grading	0.003
TCA-AJO-004	Wash	Ephemeral	8	16	Grading	0.003
TCA-AJO-004	Wash	Ephemeral	54	16	Grading	0.020
TCA-AJO-004	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-004	Wash	Ephemeral	75	16	Grading	0.028
TCA-AJO-004	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-004	Wash	Ephemeral	21	16	Grading	0.008
TCA-AJO-004	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-004	Wash	Ephemeral	9	16	Grading	0.003
TCA-AJO-004	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-004	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-004	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-004	Wash	Ephemeral	20	16	Grading	0.007
TCA-AJO-004	Wash	Ephemeral	45	16	Grading	0.017
TCA-AJO-004	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-004	Wash	Ephemeral	30	16	Grading	0.011
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	60	16	Grading	0.022
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	18	16	Grading	0.007
TCA-AJO-170	Wash	Ephemeral	42	16	Grading	0.015
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	9	16	Grading	0.003
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	8	16	Grading	0.003
TCA-AJO-170	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-170	Wash	Ephemeral	14	16	Grading	0.005
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-301	Wash	Ephemeral	30	16	Grading	0.011
TCA-AJO-301	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-301	Wash	Ephemeral	24	16	Grading	0.009
TCA-AJO-301	Wash	Ephemeral	18	16	Grading	0.007
TCA-AJO-301	Wash	Ephemeral	24	16	Grading	0.009
TCA-AJO-301	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-301	Wash	Ephemeral	18	16	Grading	0.007
TCA-AJO-301	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-301	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-301	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-301	Wash	Ephemeral	10	16	Grading	0.004
TCA-AJO-204	Wash	Ephemeral	10	16	Grading	0.004
TCA-AJO-204	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-204	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-204	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-305	Wash	Ephemeral	3	16	Grading	0.001

APPENDIX H
FEDERAL AND STATE PROTECTED SPECIES LISTS

Pima County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Large, adults have white head and tail. Height 28-38 inches; wingspan 66-96 inches. Dark with varying degrees of mottled brown plumage. Feet bare of feathers.	Apache, Cochise, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Some birds are nesting residents while a larger number winters along rivers and reservoirs. An estimated 200 to 300 birds winter in Arizona. Once endangered (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) because of reproductive failures from pesticide poisoning and loss of habitat, this species was down listed to threatened on August 11, 1995. Illegal shooting, disturbance, and loss of habitat continues to be a problem. Species has been proposed for delisting (64 FR 36454) but still receives full protection under the ESA.
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	Endangered	Small (Approx. 7inches), diurnal owl reddish brown overall with cream-colored belly streaked with reddish brown. Some individuals are grayish brown.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	<4000 ft	Mature cottonwood/willow, mesquite bosques, and Sonoran desertscrub.	Historical distribution in Arizona is from New River (North) to Gila Box (East) to Cabeza Prieta Mountains (West). Only a few documented sites where this species persists are known, additional surveys are needed. Species has been proposed for delisting (70 FR 44547) but still receives full protection under the ESA.
California Brown pelican	*Pelecanus occidentalis californicus*	Endangered	Large dark gray-brown water bird with a pouch underneath long bill and webbed feet. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Coastal land and islands; species found around many Arizona lakes and rivers.	Subspecies is found on Pacific Coast and is endangered due to pesticides. It is an uncommon transient in Arizona on many Arizona lakes and rivers. Individuals wander up from Mexico in summer and fall. No breeding records in Arizona.
Chiricahua leopard frog	*Rana chiricahuensis*	Threatened	Cream colored tubercules (spots) on a dark background on the rear of the thigh, dorsolateral folds that are interrupted and deflected medially, and a call given out of water distinguish this spotted frog from other leopard frogs.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	3300-8900 ft	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs.	Require permanent or nearly permanent water sources. Populations north of the Gila River may be a closely-related, but distinct, undescribed species. A special rule allows take of frogs due to operation and maintenance of livestock tanks on State and private lands.

BW1 FOIA CBP 003161

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Desert pupfish	*Cyprinodon macularius*	Endangered	Small (2 inches) smoothly rounded body shape with narrow vertical bars on the sides. Breeding males blue on head and sides with yellow on tail. Females and juveniles tan to olive colored back and silvery sides.	Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 5,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California. Two subspeices are recognized: Desert Pupfish (C.m.macularis) and Quitobaquito Pupfish (C.m.eremus).
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	2,000 - 5,500 ft	Pools, springs, cienegas, and streams.	Found on multiple private lands, including the Nature Conservancy, the Audubon Society, and others. Also occurs on Federal and state lands and in Sonora, Mexico. Critical habitat occurs in Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz and Yavapai counties.
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically occurred in backwaters of large rivers but is currently isolated to small streams and springs.
Huachuca water umbel	*Lilaeopsis schaffneriana ssp. recurva*	Endangered	Herbaceous, semi-aquatic perennial in the parsley family (Umbelliferae) with slender erect, hollow, leaves that grow from the nodes of creeping rhizomes. Flower: 3 to 10 flowered umbels arise from root nodes.	Cochise, Pima, Santa Cruz	3500-6500 ft	Cienegas, perennial low gradient streams, wetlands.	Species also occurs in adjacent Sonora, Mexico, west of the continental divide. Critical habitat in Cochise and Santa Cruz counties (64 FR 37441, July 12, 1999).
Jaguar	*Panthera onca*	Endangered	Largest species of cat native to Southwest. Muscular, with relatively short, massive limbs, and a deep-chested body. Usually cinnamon-buff in color with many black spots. Weights ranges from 40-135 kg (90-300 lbs).	Cochise, Santa Cruz, Pima	1,600 - >9,000 ft	Found in Sonoran desertscrub up through subalpine conifer forest.	Also occurs in New Mexico. A Jaguar conservation team is being formed that is being led by Arizona and New Mexico state entities along with private organizations.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Kearney blue star	*Amsonia kearneyana*	Endangered	A herbaceous perennial about 2 feet tall in the dogbane family (Apocynaceae). Thickened woody root and many pubescent (hairy) stems that rarely branch. Flowers: white terminal inflorescence in April and May.	Pima	3600-3800 ft	West-facing drainages in the Baboquivari Mountains.	Plants grow in stable, partially shaded, coarse alluvium along a dry wash in the Baboquivari Mountains. Range is extremely limited. Protected by Arizona Native Plant Law.
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	Elongated muzzle, small leaf nose, and long tongue. Yellowish brown or gray above and cinnamon brown below. Tail minute and appears to be lacking. Easily disturbed.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Maricopa, Santa Cruz	< 6000 ft	Desert scrub habitat with agave and columnar cacti present as food plants.	Day roosts in caves and abandoned tunnels. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti. This species is migratory and is present in Arizona usually from April to September and south of the border the remainder of the year.
Masked bobwhite	*Colinus virginianus ridgewayi*	Endangered	Males brick-red breast and black head and throat. Females are generally nondescript but resemble other races such as the Texas bobwhite.	Pima	1000-4000 ft	Desert grasslands with diversity of dense native grasses, forbs, and brush.	Species is closely associated with Acacia angustissima. Formerly occurred in Altar and Santa Cruz valleys, as well as Sonora, Mexico. Presently only known from reintroduced populations on Buenos Aires NWR.
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4100-9000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182). Critical habitat in Arizona occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.
Nichol Turk's head cactus	*Echinocactus horizonthalonius var. nicholii*	Endangered	Blue-green to yellowish-green, columnar, 18 inches tall, 8 inches in diameter. Spine clusters have 5 radial and 3 central spines; one downward short; 2 spines upward and red or vasally gray. Flower: pink fruit: woolly white.	Pima, Pinal	2400-4100 ft	Sonoran desertscrub.	Found in unshaded microsites in Sonoran desertscrub on dissected alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountain sides.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Ocelot	*Leopardus (=Felis) pardalis*	Endangered	Medium-sized spotted cat whose tail is about 1/2 the length of head and body. Yellowish with black streaks and stripes running from front to back. Tail is spotted and face is less heavily streaked than the back and sides.	Cochise, Pima, Santa Cruz	< 8000 ft	Humid tropical and sub-tropical forests, savannahs, and semi-arid thornscrub.	May persist in partly-cleared forests, second-growth woodland, and abandoned cultivated areas reverted to brush. Universal component is presence of dense cover. Unconfirmed reports of individuals in the southern part of the State continue to be received.
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	Endangered	Hemispherical stems 4-7 inches tall 3-4 inches diameter. Central spine 1 inch long straw colored hooked surrounded by 6-15 radial spines. Flower: yellow, salmon, or rarely white narrow floral tube..	Pima, Santa Cruz	2300-5000 ft	Sonoran desertscrub or semi-desert grassland communities.	Occurs in alluvial valleys or on hillsides in rocky to sandy or silty soils. This species can be confused with juvenile barrel cactus (Ferocactus). However, the spines of the later are flattened, in contrast with the round cross-section of the Coryphanta spines. 80-90% of individuals on state or private land.
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered	Buff on back and white below, hoofed with slightly curved black horns having a single prong. Smallest and palest of the pronghorn subspecies	Maricopa, Pima, Yuma	500 - 2,000 ft	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	Typically, bajadas are used as fawning areas and sandy dune areas provide food seasonally. Historical range was probably larger than exists today. This subspecies also occurs in Mexico.
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	<8500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Migratory riparian-obligate species that occupies breeding habitat from late April to September. Distribution within its range is restricted to riparian corridors. Difficult to distinguish from other members of the Empidonax complex by sight alone. Training seminar required for those conducting flycatcher surveys. Critical habitat was finalized on October 19, 2005 (50 CFR 60886) and can be viewed at http://arizonaes.fws.gov. In Arizona there are critical habitat segments in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	Candidate	<12 inches high; spine clusters borne on tubercles, each with a groove on the upper surface. 2-3 central spines and 12 radial spines. Flowers pink to purple.	Pima, Pinal	1300-2000 ft	Well drained knolls and gravel ridges in Sonoran desertscrub.	Immature plants distinctly different from mature plants. They are disc-shaped or spherical and have no central spines until they are about 1.5 inches. Radial spines are dirty white with maroon tips.
Sonoyta mud turtle	*Kinosternon sonoriense longifemorale*	Candidate	Primarily a pond turtle, prefers mud or sandy bottoms. Body 3 1/2 to 6 1/2 inches. Head and neck mottled with contrasting light and dark markings. Found in Quitobaquito Springs.	Pima	1,100 ft	Ponds and streams.	Species also found in Rio Sonoyta, Sonora, Mexico.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill, which is blue-black with yellow on the lower half of the bill. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riperain woodlands (cottonwood, willow, or tamarisk galleries).	Listing was found warranted, but precluded as a distinct vertebrate population segment in the western U.S. on July 25, 2001. This finding indicates that the Service has sufficient information to list the bird, but other, higher priority listing actions prevent the Service from addressing the listing of the cuckoo at this time.
Gooddings onion	*Allium gooddingii*	Conservation Agreement	Herbaceous perenial plant; broad, flat, rather blunt leaves; flowering stalk 14-17 inches tall, flattened, and narrowly winged toward apex; fruit is broader than long; seeds are short and thick.	Apache, Greenlee, Pima	> 7,500 ft	Forested drainage bottoms and on moist north facing slopes of mixed conifer and spruce fir forests.	Conservation agreement between the Service and the Forest Service signed in February 1998. In New Mexico on the Lincoln and Gila National Forests.
San Xavier talussnail	*Sonorella eremita*	Conservation Agreement	Land snail, less than one inch in diameter (about .75 inches), 4.5 whorls, round shell, white to pinkish tint.	Pima	3,850-3,920 ft	Deep, limestone rockslide with outcrops of limestone and decomposed granite.	Conservation agreement signed by the Service, Arizona Game and Fish Department, El Paso Natural Gas Company, and Arizona Electric Power Cooperative, Inc. in September 1998.

Yuma County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Large, adults have white head and tail. Height 28-38 inches; wingspan 66-96 inches. Dark with varying degrees of mottled brown plumage. Feet bare of feathers.	Apache, Cochise, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Some birds are nesting residents while a larger number winters along rivers and reservoirs. An estimated 200 to 300 birds winter in Arizona. Once endangered (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) because of reproductive failures from pesticide poisoning and loss of habitat, this species was down listed to threatened on August 11, 1995. Illegal shooting, disturbance, and loss of habitat continues to be a problem. Species has been proposed for delisting (64 FR 36454) but still receives full protection under the ESA.
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	Endangered	Small (Approx. 7inches), diurnal owl reddish brown overall with cream-colored belly streaked with reddish brown. Some individuals are grayish brown.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	<4000 ft	Mature cottonwood/willow, mesquite bosques, and Sonoran desertscrub.	Historical distribution in Arizona is from New River (North) to Gila Box (East) to Cabeza Prieta Mountains (West). Only a few documented sites where this species persists are known, additional surveys are needed. Species has been proposed for delisting (70 FR 44547) but still receives full protection under the ESA.
California Brown pelican	*Pelecanus occidentalis californicus*	Endangered	Large dark gray-brown water bird with a pouch underneath long bill and webbed feet. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Coastal land and islands; species found around many Arizona lakes and rivers.	Subspecies is found on Pacific Coast and is endangered due to pesticides. It is an uncommon transient in Arizona on many Arizona lakes and rivers. Individuals wander up from Mexico in summer and fall. No breeding records in Arizona.

BW1 FOIA CBP 003166

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Razorback sucker	*Xyrauchen texanus*	Endangered	Large, up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, Yuma	< 6000 ft	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Species is also found in Horseshoe reservoir (Maricopa County). Critical habitat includes the 100-year floodplain of the river through the Grand Canyon from confluence with Paria River to Hoover Dam; Hoover Dam to Davis Dam; Parker Dam to Imperial Dam. Also Gila River from Arizon/New Mexico border to Coolidge Dam; and Salt River from Hwy 60/SR77 Bridge to Roosevelt Dam; Verde River from FS boundary to Horseshoe Lake.
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered	Buff on back and white below, hoofed with slightly curved black horns having a single prong. Smallest and palest of the pronghorn subspecies	Maricopa, Pima, Yuma	500 - 2,000 ft	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	Typically, bajadas are used as fawning areas and sandy dune areas provide food seasonally. Historical range was probably larger than exists today. This subspecies also occurs in Mexico.
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	<8500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Migratory riparian-obligate species that occupies breeding habitat from late April to September. Distribution within its range is restricted to riparian corridors. Difficult to distinguish from other members of the Empidonax complex by sight alone. Training seminar required for those conducting flycatcher surveys. Critical habitat was finalized on October 19, 2005 (50 CFR 60886) and can be viewed at http://arizonaes.fws.gov. In Arizona there are critical habitat segments in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties.
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered	Water bird with long legs and short tail. Long, slender decurved bill. Mottled brown or gray on its rump. Flanks and undersides are dark gray with narrow vertical stripes producing a barring effect.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	< 4,500 ft	Fresh water and brackish marshes.	Species is associated with dense emergent riparian vegetation. Requires wet substrate (mudflat, sandbar) with dense herbaceous or woody vegetation for nesting and foraging. Channelization and marsh destruction are primary sources of habitat loss.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Flat-tailed horned lizard	*Phrynosoma mcallii*	Proposed	Typical flattened body shape of horned lizards; dark vertebral stripe; lacks external ear openings; color is cryptic ranging from pale gray to light rust brown; has two rows of fringed scales on each side of body.	Yuma	500 ft	Sandy flats or areas with fine, windblown sand; creosote-white bursage series of Sonoran Desert.	Proposed rule reinstated on August 30, 2005 (Tucson Herpetological Society v. Norton, 04-75 PHX NVW, D. Ariz). Conservation Agreement finalized in May 1997. Species also found in portions of San Diego County, central Riverside County, and Imperial County, California; also Sonora and Baja California, Mexico.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill, which is blue-black with yellow on the lower half of the bill. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparain woodlands (cottonwood, willow, or tamarisk galleries).	Listing was found warranted, but precluded as a distinct vertebrate population segment in the western U.S. on July 25, 2001. This finding indicates that the Service has sufficient information to list the bird, but other, higher priority listing actions prevent the Service from addressing the listing of the cuckoo at this time.

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Navajo	FISH	Catostomus sp. 3	Little Colorado Sucker	SC	S	S	WSC
Navajo	FISH	Gila robusta	Roundtail Chub	SC		S	WSC
Navajo	FISH	Lepidomeda vittata	Little Colorado Spinedace	LT		S	WSC
Navajo	FISH	Rhinichthys osculus	Speckled Dace	SC	S		
Navajo	INVERTEBRATE	Anodonta californiensis	California Floater	SC		S	
Navajo	INVERTEBRATE	Cicindela oregona maricopa	Maricopa Tiger Beetle	SC	S	S	
Navajo	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC			
Navajo	MAMMAL	Idionycteris phyllotis	Allen's Big-eared Bat	SC	S		
Navajo	MAMMAL	Microtus mexicanus navaho	Navajo Mexican Vole	SC		S	WSC
Navajo	MAMMAL	Myotis evotis	Long-eared Myotis	SC	S		
Navajo	MAMMAL	Myotis occultus	Arizona Myotis	SC	S		
Navajo	MAMMAL	Myotis thysanodes	Fringed Myotis	SC	S		
Navajo	MAMMAL	Myotis volans	Long-legged Myotis	SC	S		
Navajo	MAMMAL	Panthera onca	Jaguar	LE		S	WSC
Navajo	MAMMAL	Perognathus flavus goodpasteri	Springerville Pocket Mouse	SC		S	
Navajo	PLANT	Amsonia peeblesii	Peebles Blue Star		S		
Navajo	PLANT	Asclepias welshii	Welsh's Milkweed	LT			HS
Navajo	PLANT	Astragalus xiphoides	Gladiator Milk Vetch	SC			SR
Navajo	PLANT	Carex specuicola	Navajo Sedge	LT			HS
Navajo	PLANT	Chrysothamnus molestus	Tusayan Rabbitbrush	SC		S	
Navajo	PLANT	Errazurizia rotundata	Roundleaf Errazurizia		S		SR
Navajo	PLANT	Pediocactus papyracanthus	Paper-spined Cactus	SC			SR
Navajo	PLANT	Pediocactus peeblesianus var. peeblesianus	Peebles Navajo Cactus	LE			HS
Navajo	PLANT	Penstemon nudiflorus	Flagstaff Beardtongue			S	
Navajo	PLANT	Platanthera zothecina	Alcove Bog-orchid	SC			
Navajo	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	SC		S	WSC
Navajo	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC		S	WSC
Pima	AMPHIBIAN	Eleutherodactylus augusti cactorum	Western Barking Frog			S	WSC
Pima	AMPHIBIAN	Gastrophryne olivacea	Great Plains Narrow-mouthed Toad				WSC
Pima	AMPHIBIAN	Pternohyla fodiens	Lowland Burrowing Treefrog				WSC
Pima	AMPHIBIAN	Rana chiricahuensis	Chiricahua Leopard Frog	LT		S	WSC
Pima	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC		S	WSC
Pima	BIRD	Accipiter gentilis	Northern Goshawk	SC		S	WSC
Pima	BIRD	Ammodramus bairdii	Baird's Sparrow	SC			WSC
Pima	BIRD	Asturina nitida maxima	Northern Gray Hawk	SC	S	S	WSC
Pima	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		
Pima	BIRD	Buteogallus anthracinus	Common Black-Hawk			S	WSC

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Pima	BIRD	Caracara cheriway	Crested Caracara				WSC
Pima	BIRD	Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo	C		S	WSC
Pima	BIRD	Colinus virginianus ridgwayi	Masked Bobwhite	LE			WSC
Pima	BIRD	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
Pima	BIRD	Dendrocygna bicolor	Fulvous Whistling-Duck	SC	S		
Pima	BIRD	Empidonax fulvifrons pygmaeus	Northern Buff-breasted Flycatcher	SC			WSC
Pima	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		S	WSC
Pima	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC		S	WSC
Pima	BIRD	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	LE			WSC
Pima	BIRD	Pachyramphus aglaiae	Rose-throated Becard				WSC
Pima	BIRD	Pandion haliaetus	Osprey				WSC
Pima	BIRD	Polioptila nigriceps	Black-capped Gnatcatcher				WSC
Pima	BIRD	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
Pima	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		S	WSC
Pima	BIRD	Trogon elegans	Elegant Trogon				WSC
Pima	BIRD	Tyrannus crassirostris	Thick-billed Kingbird				WSC
Pima	BIRD	Tyrannus melancholicus	Tropical Kingbird				WSC
Pima	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		
Pima	FISH	Catostomus clarki	Desert Sucker	SC	S		
Pima	FISH	Cyprinodon eremus	Quitobaquito Desert Pupfish	LE			WSC
Pima	FISH	Cyprinodon macularius	Desert Pupfish	LE			WSC
Pima	FISH	Gila intermedia	Gila Chub	LE		S	WSC
Pima	FISH	Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE			WSC
Pima	INVERTEBRATE	Agathymus aryxna	Arizona Giant Skipper			S	
Pima	INVERTEBRATE	Agathymus polingi	Poling's Giant Skipper			S	
Pima	INVERTEBRATE	Anthocharis cethura	Felder's Orange Tip			S	
Pima	INVERTEBRATE	Argia sabino	Sabino Canyon Damselfly	SC		S	
Pima	INVERTEBRATE	Calephelis rawsoni arizonensis	Arizona Metalmark			S	
Pima	INVERTEBRATE	Limenitis archippus obsoleta	Obsolete Viceroy Butterfly			S	
Pima	INVERTEBRATE	Neophasia terlooii	Chiricahua Pine White			S	
Pima	INVERTEBRATE	Sonorella eremita	San Xavier Talussnail	SC			
Pima	INVERTEBRATE	Tryonia quitobaquitae	Quitobaquito Tryonia	SC		S	
Pima	MAMMAL	Antilocapra americana sonoriensis	Sonoran Pronghorn	LE		S	WSC
Pima	MAMMAL	Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S		WSC
Pima	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC			
Pima	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC			
Pima	MAMMAL	Eumops underwoodi	Underwood's Bonneted Bat	SC	S		

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Pima	MAMMAL	Lasiurus blossevillii	Western Red Bat				WSC
Pima	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				WSC
Pima	MAMMAL	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE		S	WSC
Pima	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		WSC
Pima	MAMMAL	Myotis occultus	Arizona Myotis	SC	S		
Pima	MAMMAL	Myotis velifer	Cave Myotis	SC	S		
Pima	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat		S		
Pima	MAMMAL	Nyctinomops macrotis	Big Free-tailed Bat	SC	S		
Pima	MAMMAL	Panthera onca	Jaguar	LE		S	WSC
Pima	MAMMAL	Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC			
Pima	PLANT	Abutilon parishii	Pima Indian Mallow	SC		S	SR
Pima	PLANT	Abutilon thurberi	Thurber Indian Mallow				SR
Pima	PLANT	Acacia farnesiana	Sweet Acacia			S	
Pima	PLANT	Agave parviflora ssp. parviflora	Santa Cruz Striped Agave	SC	S	S	HS
Pima	PLANT	Agave schottii var. treleasei	Trelease Agave	SC		S	HS
Pima	PLANT	Allium gooddingii	Goodding Onion	SC		S	HS
Pima	PLANT	Allium plummerae	Plummer Onion				SR
Pima	PLANT	Amoreuxia gonzalezii	Saiya	SC		S	HS
Pima	PLANT	Amsonia grandiflora	Large-flowered Blue Star	SC		S	
Pima	PLANT	Amsonia kearneyana	Kearney's Blue Star	LE			HS
Pima	PLANT	Asclepias lemmonii	Lemmon Milkweed			S	
Pima	PLANT	Asplenium dalhousiae	Dalhouse Spleenwort		S		
Pima	PLANT	Berberis harrisoniana	Kofa Barberry		S		
Pima	PLANT	Boerhavia megaptera	Tucson Mountain Spiderling			S	
Pima	PLANT	Capsicum annuum var. glabriusculum	Chiltepin			S	
Pima	PLANT	Cardiospermum corindum	Balloon Vine		S		
Pima	PLANT	Carex chihuahuensis	A Sedge			S	
Pima	PLANT	Carex ultra	Arizona Giant Sedge		S	S	
Pima	PLANT	Cathestecum erectum	False Grama		S		
Pima	PLANT	Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE			HS
Pima	PLANT	Dalea tentaculoides	Gentry Indigo Bush	SC	S	S	HS
Pima	PLANT	Desmanthus covillei	Coville Bundleflower			S	
Pima	PLANT	Echinocactus horizonthalonius var. nicholii	Nichol Turk's Head Cactus	LE			HS
Pima	PLANT	Echinocereus fasciculatus	Magenta-flower Hedgehog-cactus				SR
Pima	PLANT	Echinomastus erectocentrus var. acunensis	Acuna Cactus	C			HS
Pima	PLANT	Echinomastus erectocentrus var. erectocentrus	Needle-spined Pineapple Cactus	SC		S	SR
Pima	PLANT	Erigeron arisolius				S	

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Pima	PLANT	Eriogonum capillare	San Carlos Wild-buckwheat	SC			SR
Pima	PLANT	Eriogonum ericifolium var. ericifolium	Heathleaf Wild-buckwheat			S	
Pima	PLANT	Euphorbia gracillima	Mexican Broomspurge			S	
Pima	PLANT	Ferocactus cylindraceus var. eastwoodiae	Golden Barrel Cactus				SR
Pima	PLANT	Ferocactus emoryi	Emory's Barrel-cactus				SR
Pima	PLANT	Graptopetalum bartramii	Bartram Stonecrop	SC	S	S	SR
Pima	PLANT	Hackelia ursina	Chihuahuan Stickseed			S	
Pima	PLANT	Hedeoma dentatum	Mock-pennyroyal			S	
Pima	PLANT	Hermannia pauciflora	Sparseleaf Hermannia			S	
Pima	PLANT	Heterotheca rutteri	Huachuca Golden Aster	SC	S	S	
Pima	PLANT	Hexalectris revoluta	Chisos Coral-root		S	S	SR
Pima	PLANT	Hexalectris spicata	Crested Coral Root				SR
Pima	PLANT	Hieracium pringlei	Pringle Hawkweed	SC		S	
Pima	PLANT	Ibervillea tenuisecta	Texas Globe Berry		S		
Pima	PLANT	Lilaeopsis schaffneriana var. recurva	Huachuca Water Umbel	LE			HS
Pima	PLANT	Lilium parryi	Lemmon Lily	SC		S	SR
Pima	PLANT	Listera convallarioides	Broadleaf Twayblade				SR
Pima	PLANT	Lophocereus schottii	Senita				SR
Pima	PLANT	Lupinus huachucanus	Huachuca Mountain Lupine			S	
Pima	PLANT	Lysiloma watsonii	Littleleaf False Tamarind				SR
Pima	PLANT	Malaxis tenuis	Slender Adders Mouth				SR
Pima	PLANT	Mammillaria mainiae	Counter Clockwise Fishhook Cactus			S	SR
Pima	PLANT	Mammillaria thornberi	Thornber Fishhook Cactus				SR
Pima	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus				SR
Pima	PLANT	Manihot davisiae	Arizona Manihot			S	
Pima	PLANT	Matelea cordifolia	Sonoran Milkweed Vine			S	
Pima	PLANT	Metastelma mexicanum	Wiggins Milkweed Vine	SC		S	
Pima	PLANT	Muhlenbergia dubioides	Box Canyon Muhly			S	
Pima	PLANT	Muhlenbergia xerophila	Weeping Muhly			S	
Pima	PLANT	Notholaena lemmonii	Lemmon Cloak Fern	SC			
Pima	PLANT	Opuntia engelmannii var. flavispina					SR
Pima	PLANT	Opuntia versicolor	Stag-horn Cholla				SR
Pima	PLANT	Opuntia x kelvinensis	Kelvin Cholla				SR
Pima	PLANT	Passiflora foetida	Foetid Passionflower			S	
Pima	PLANT	Pectis imberbis	Beardless Chinch Weed	SC		S	
Pima	PLANT	Peniocereus greggii var. transmontanus	Desert Night-blooming Cereus				SR
Pima	PLANT	Peniocereus striatus	Dahlia Rooted Cereus				SR

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Pima	PLANT	Penstemon discolor	Catalina Beardtongue			S	HS
Pima	PLANT	Penstemon superbus	Superb Beardtongue			S	
Pima	PLANT	Perityle ajoensis	Ajo Rock Daisy				SR
Pima	PLANT	Petalonyx linearis	Longleaf Sandpaper Plant		S		
Pima	PLANT	Physalis latiphysa	Broad-leaf Ground-cherry			S	
Pima	PLANT	Platanthera limosa	Thurber's Bog Orchid				SR
Pima	PLANT	Psilotum nudum	Whisk Fern				HS
Pima	PLANT	Samolus vagans	Chiricahua Mountain Brookweed			S	
Pima	PLANT	Schiedeella arizonica	Fallen Ladies'-tresses				SR
Pima	PLANT	Senecio carlomasonii	Seemann Groundsel			S	
Pima	PLANT	Senecio neomexicanus var. toumeyi	Toumey Groundsel			S	
Pima	PLANT	Sisyrinchium cernuum	Nodding Blue-eyed Grass			S	
Pima	PLANT	Solanum lumholtzianum	Lumholtz Nightshade			S	
Pima	PLANT	Stenocereus thurberi	Organ Pipe Cactus		S		SR
Pima	PLANT	Stevia lemmonii	Lemmon's Stevia			S	
Pima	PLANT	Tephrosia thurberi	Thurber Hoary Pea			S	
Pima	PLANT	Thelypteris puberula var. sonorensis	Aravaipa Wood Fern		S		
Pima	PLANT	Tragia laciniata	Sonoran Noseburn			S	
Pima	PLANT	Triteleiopsis palmeri	Blue Sand Lily		S		SR
Pima	PLANT	Tumamoca macdougalii	Tumamoc Globeberry		S	S	SR
Pima	PLANT	Vauquelinia californica ssp. sonorensis	A Arizona Rosewood		S		
Pima	PLANT	Viola umbraticola	Shade Violet			S	
Pima	REPTILE	Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC	S	S	
Pima	REPTILE	Aspidoscelis burti xanthonota	Red-back Whiptail	SC	S	S	
Pima	REPTILE	Charina trivirgata gracia	Desert Rosy Boa	SC	S	S	
Pima	REPTILE	Charina trivirgata trivirgata	Mexican Rosy Boa	SC	S		
Pima	REPTILE	Chionactis palarostris organica	Organ Pipe Shovel-nosed Snake			S	
Pima	REPTILE	Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	SC			WSC
Pima	REPTILE	Kinosternon sonoriense longifemorale	Sonoyta Mud Turtle	C		S	
Pima	REPTILE	Masticophis bilineatus lineolatus	Ajo Mountain Whipsnake			S	
Pima	REPTILE	Oxybelis aeneus	Brown Vinesnake				WSC
Pima	REPTILE	Phrynosoma cornutum	Texas Horned Lizard	SC	S		
Pima	REPTILE	Phyllorhynchus browni lucidus	Maricopa Leaf-nosed Snake			S	
Pima	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	SC		S	WSC
Pima	REPTILE	Uma rufopunctata	Yuman Desert Fringe-toed Lizard	SC	S	S	WSC
Pinal	AMPHIBIAN	Gastrophryne olivacea	Great Plains Narrow-mouthed Toad				WSC
Pinal	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC		S	WSC

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Yavapai	PLANT	Carex ultra	Arizona Giant Sedge		S	S	
Yavapai	PLANT	Cymopterus megacephalus	Cameron Water-parsley	SC		S	
Yavapai	PLANT	Erigeron saxatilis	Rock Fleabane			S	
Yavapai	PLANT	Eriogonum apachense	Apache Wild-buckwheat	SC			SR
Yavapai	PLANT	Eriogonum ericifolium var. ericifolium	Heathleaf Wild-buckwheat			S	
Yavapai	PLANT	Eriogonum ripleyi	Ripley Wild-buckwheat	SC		S	SR
Yavapai	PLANT	Escobaria vivipara var. rosea	Viviparous Foxtail Cactus				SR
Yavapai	PLANT	Ferocactus cylindraceus var. eastwoodiae	Golden Barrel Cactus				SR
Yavapai	PLANT	Fremontodendron californicum	Flannel Bush		S		SR
Yavapai	PLANT	Hedeoma diffusum	Flagstaff Pennyroyal			S	SR
Yavapai	PLANT	Heuchera eastwoodiae	Eastwood Alum Root			S	
Yavapai	PLANT	Hexalectris spicata	Crested Coral Root				SR
Yavapai	PLANT	Lupinus latifolius ssp. leucanthus	Broadleaf Lupine			S	
Yavapai	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus				SR
Yavapai	PLANT	Penstemon nudiflorus	Flagstaff Beardtongue			S	
Yavapai	PLANT	Phlox amabilis	Arizona Phlox			S	
Yavapai	PLANT	Polygala rusbyi	Hualapai Milkwort			S	
Yavapai	PLANT	Puccinellia parishii	Parish Alkali Grass	SC			HS
Yavapai	PLANT	Purshia subintegra	Arizona Cliff Rose	LE			HS
Yavapai	PLANT	Salvia dorrii ssp. mearnsii	Verde Valley Sage	SC		S	SR
Yavapai	PLANT	Talinum validulum	Tusayan Flame Flower	SC			SR
Yavapai	PLANT	Thelypteris puberula var. sonorensis	Aravaipa Wood Fern		S		
Yavapai	PLANT	Triteleia lemmoniae	Mazatzal Triteleia				SR
Yavapai	PLANT	Washingtonia filifera	California Fan Palm				SR
Yavapai	REPTILE	Charina trivirgata gracia	Desert Rosy Boa	SC	S	S	
Yavapai	REPTILE	Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	SC			WSC
Yavapai	REPTILE	Heloderma suspectum cinctum	Banded Gila Monster	SC	P		
Yavapai	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	SC		S	WSC
Yavapai	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC		S	WSC
Yavapai	REPTILE	Xantusia arizonae	Arizona Night Lizard			S	
Yuma	BIRD	Ardea alba	Great Egret				WSC
Yuma	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		
Yuma	BIRD	Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo	C		S	WSC
Yuma	BIRD	Egretta thula	Snowy Egret				WSC
Yuma	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		S	WSC
Yuma	BIRD	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	LE			WSC
Yuma	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle	LT,PDL		S	WSC

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Yuma	BIRD	Ixobrychus exilis	Least Bittern				WSC
Yuma	BIRD	Lanius ludovicianus	Loggerhead Shrike	SC	S		
Yuma	BIRD	Laterallus jamaicensis coturniculus	California Black Rail	SC		S	WSC
Yuma	BIRD	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
Yuma	FISH	Xyrauchen texanus	Razorback Sucker	LE		S	WSC
Yuma	MAMMAL	Antilocapra americana sonoriensis	Sonoran Pronghorn	LE		S	WSC
Yuma	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC			
Yuma	MAMMAL	Euderma maculatum	Spotted Bat	SC	S		WSC
Yuma	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC			
Yuma	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				WSC
Yuma	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		WSC
Yuma	MAMMAL	Myotis yumanensis	Yuma Myotis	SC			
Yuma	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat		S		
Yuma	MAMMAL	Sigmodon hispidus eremicus	Yuma Hispid Cotton Rat	SC			
Yuma	PLANT	Allium parishii	Parish Onion		S		SR
Yuma	PLANT	Berberis harrisoniana	Kofa Barberry		S		
Yuma	PLANT	Cryptantha ganderi	Gander's Cryptantha	SC			

APPENDIX I
AIR QUALITY CALCULATIONS

CALCULATION SHEET-COMBUSTIBLE EMISSIONS

Assumptions for Combustible Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	1	100	8	40	32000
Diesel Dump Truck	1	300	8	90	216000
Diesel Excavator	1	300	8	90	216000
Diesel Hole Trenchers	1	175	8	90	126000
Diesel Bore/Drill Rigs	1	300	8	90	216000
Diesel Cement & Mortar Mixers	1	300	8	90	216000
Diesel Cranes	2	175	8	90	252000
Diesel Graders	1	300	8	90	216000
Diesel Tractors/Loaders/Backhoes	1	100	8	180	144000
Diesel Bull Dozers	1	300	8	40	96000
Diesel Front End Loaders	1	300	8	40	96000
Diesel Fork Lifts	2	100	8	40	64000
Diesel Generator Set	6	40	8	40	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTIBLE EMISSIONS

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	0.013	0.052	0.173	0.012	0.012	0.026	18.909
Diesel Dump Truck	0.105	0.493	1.307	0.098	0.095	0.176	127.585
Diesel Excavator	0.081	0.309	1.095	0.076	0.074	0.176	127.657
Diesel Hole Cleaners\Trenchers	0.071	0.339	0.807	0.064	0.061	0.103	74.397
Diesel Bore/Drill Rigs	0.143	0.545	1.702	0.119	0.117	0.174	126.086
Diesel Cement & Mortar Mixers	0.145	0.552	1.733	0.114	0.112	0.174	126.086
Diesel Cranes	0.122	0.361	1.588	0.094	0.092	0.203	147.239
Diesel Graders	0.083	0.324	1.126	0.079	0.076	0.176	127.657
Diesel Tractors/Loaders/Backhoes	0.294	1.303	1.146	0.217	0.211	0.151	109.669
Diesel Bull Dozers	0.038	0.146	0.504	0.035	0.034	0.078	56.736
Diesel Front End Loaders	0.040	0.164	0.529	0.037	0.036	0.078	56.726
Diesel Aerial Lifts	0.140	0.547	0.604	0.098	0.095	0.067	48.721
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**1.656**	**6.767**	**16.302**	**1.365**	**1.328**	**2.120**	**1537.398**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	15	15	0.32	0.38	0.71
CO	12.4	15.7	60	240	15	15	2.95	3.74	6.69
NOx	0.95	1.22	60	240	15	15	0.23	0.29	0.52
PM-10	0.0052	0.0065	60	240	15	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	15	15	0.00	0.00	0.00
							-		

Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02

Daily Commute New Residents									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	15	240	126	127	0.68	0.81	1.49
CO	12.4	15.7	15	240	126	127	6.20	7.91	14.11
NOx	0.95	1.22	15	240	126	127	0.47	0.61	1.09
PM-10	0.0052	0.0065	15	240	126	127	0.00	0.00	0.01
PM 2.5	0.0049	0.006	15	240	126	127	0.00	0.00	0.01

Truck Emission Factor Source: USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway vehicle emission factor model.

ONGOING EMISSIONS FROM PROPANE GENERATOR

Assumptions for Combustible Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Propane Generator Set	8	40	4	365	467200

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Propane Generator Set	2.03	31.91	9.93	0.06	0.06	0.01	653.9

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Propane Generator Set	1.047	16.432	5.111	0.029	0.029	0.007	336.640
Total Emissions	**1.047**	**16.432**	**5.111**	**0.029**	**0.029**	**0.007**	**336.640**

Conversion factors	
Grams to tons	1.102E-06

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Road Upgrade and General Construction Area (0.19 ton PM10/acre-month)

Duration of Construction Project	12	months
Length	0	miles
Length (converted)	0	feet
Width	0	feet
Area	16.00	acres

Conversion Factors

0.000022957	acres per feet
5280	feet per mile

New Roads (0.42 ton PM/acre-month)

Duration of Construction Project	3	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.26	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Road Upgrade and General Constru	36.48	18.24	3.65	1.82
New Roads (0.42 ton PM/acre-month	0.33	0.16	0.03	0.02
Total	**36.81**	**18.40**	**3.68**	**1.84**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/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 PM10/acre month for sites without large scale cut/fill operations. A worst case emission factor of 0.42 ton PM10/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 PM10/acre month emission factor by applying 25% of the large scale earthmoving emission factor (0.42 ton PM10/acre month) and 75% of the average emission factor (0.11 ton PM10/acre month).

The 0.19 ton PM10/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 PM10/acre month emission factor represents a refinement of EPA's original AP 42 area based total suspended particle (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 and 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 PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/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 PM10/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).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

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.

CALCULATION SHEET-SUMMARY OF EMISSIONS

Proposed Action Construction Emissions for Criteria Pollutants (tons per year)						
Emission source	VOC	CO	NOx	PM 10	PM 2.5	SO2
Combustible Emissions	1.66	6.77	16.30	1.37	1.33	2.12
Construction Site-fugitive PM-10	NA	NA	NA	18.40	1.84	NA
Construction Workers Commuter & Trucking	0.73	6.83	1.07	0.02	0.02	NA
Total emissions	**2.39**	**13.60**	**17.38**	**19.79**	**3.19**	**2.12**
De minimis threshold (1)	NA	100.00	NA	100.00	NA	100.00
Annual Auto Emissions from bi-monthly maintenance	1.49	14.11	1.09	0.01	0.01	NA
Propane Generator-power source for towers	1.05	16.43	5.11	0.03	0.03	0.01
Total Ongoing Emission/yr	2.54	30.54	6.20	0.03	0.03	0.01

1. De-minimis thresholds for County.

Final

ENVIRONMENTAL ASSESSMENT
FOR
THE PROPOSED SBI*net* TUCSON WEST PROJECT
AJO, TUCSON, CASA GRANDE, NOGALES, AND SONOITA STATIONS
AREAS OF OPERATION, U.S. BORDER PATROL,
TUCSON SECTOR, ARIZONA

U.S. Department of Homeland Security
U.S. Customs and Border Protection
SBI*net*
Washington, D.C

September 2008

FINDING OF NO SIGNIFICANT IMPACT
Environmental Assessment
for the Proposed SBI*net* Tucson West Project
Ajo, Tucson, Casa Grande, Nogales, and Sonoita Stations Areas of Responsibility,
U.S. Border Patrol, Tucson Sector, Arizona

PROJECT HISTORY: The Secure Border Initiative (SBI) is a comprehensive, multi-year plan established by the Department of Homeland Security (DHS) in November 2005 to secure America's borders and reduce illegal immigration. SBI was created to bring clarity of mission, effective coordination of DHS assets, and greater accountability in securing the Nation's borders. The SBI mission is to promote border security strategies that protect against and prevent terrorist attacks and other transnational crimes. Additionally, SBI will coordinate DHS efforts to ensure the legal entry and exit of people and goods moving across our borders, and improve the enforcement of immigration, customs, and agriculture laws at our borders, within the country, and abroad.

SBI*net* is the component of SBI charged with developing and installing technology and tactical infrastructure (TI) solutions to gain operational control of our Nation's borders. The goal of SBI*net* is to field the most effective, proven technology, infrastructure, personnel, and response platforms, and integrate them into a single, comprehensive border security system for DHS. United States (U.S.) Customs and Border Protection (CBP) is the agent for SBI*net*, carrying out the program to better execute this vital mission

CBP would deploy a mix of technology, TI, and personnel based on operational need to gain control of each diverse mile of the U.S. border. Operational control exists when CBP is consistently able to: (1) detect illegal entries in to the U.S.; (2) identify and classify these entries to determine the level of threat involved; (3) efficiently and effectively respond to these entries; and, (4) bring each event to an appropriate law enforcement resolution.

The Environmental Assessment (EA) was prepared in compliance with provisions of the National Environmental Policy Act (NEPA) of 1969 as amended (42 U.S. Code [U.S.C.] 4332 *et seq*.), the Council on Environmental Quality's (CEQ) NEPA implementing regulations at 40 Code of Federal Regulations (CFR) Part 1500, and the DHS *Management Directive 5100.1, Environmental Planning Program* (71 *Federal Register* [FR] 16790).

The EA analyzes various aspects of a proposed project that would be carried out under SBI and be implemented as a part of the SBI*net* program. It addresses the potential direct and indirect effects, beneficial and adverse, of the proposed construction, installation, operation, and maintenance of a system of sensor and communication towers, which include associated access roads, communications components, and a combination of sensor and communication components on towers within the U.S. Border Patrol (USBP) Ajo, Casa Grande, Tucson, Nogales and Sonoita stations' Areas of Responsibility (AOR) in southwest Arizona.

PROJECT LOCATION: The proposed project area generally lies within a corridor south of Tucson, Arizona with towers located east and west of Interstate (I)-19. Several proposed towers also lie to the east of the Cabeza Prieta National Wildlife Refuge and Wilderness Area and a few can be found near the towns of Casa Grande, Sasabe, and Sierra Vista, Arizona and near the City of Tucson. All proposed towers are within the counties of Cochise, Pima, Maricopa, Pinal, and Santa Cruz, Arizona.

PURPOSE AND NEED: The purpose of the proposed project is to employ technological infrastructure capable of providing a more efficient and effective means of assessing all border activities including; rapid detection, accurate characterization of the potential threat, coordinated tracking, and deployment of appropriate resources in the apprehension of ICs. Meeting this purpose would establish and maintain operational control of the U.S. border along approximately 81 miles of border in the Tucson Sector, encompassing border zones within the AOR of Tucson, Nogales, Sonoita, Ajo and Casa Grande stations.

This SBI*net* Tucson West project is proposed to meet the stated purpose and need by:

- Installing and upgrading technology and infrastructure components to give USBP agents ability to gain, maintain, and strengthen control of the border within proximity of the international boundary;
- Including improved surveillance technology solutions to enhance border enforcement capabilities;
- Applying surveillance technologies that would refine detection, interception, and apprehension of ICs, smugglers, and terrorists;
- Reducing crime in border communities by detecting, apprehending, and deterring smugglers of humans, drugs, and other contraband.

ALTERNATIVES: Two alternatives were considered: No Action Alternative, and Proposed Action Alternative. Other alternatives considered but rejected and not further analyzed in this EA were the use of:

- Unmanned aircraft systems;
- Remote sensing satellites;
- Unattended ground sensor;
- Increased CBP workforce; and
- Increased aerial reconnaissance/operations.

No Action Alternative: The No Action Alternative describes future circumstances if the proposed communications and sensor tower installation does not take place, and can be characterized as the continuation of current practices and procedures. While the No Action Alternative does not satisfy the stated purpose and need, its inclusion in this EA is required by NEPA regulations as a basis of comparison to the anticipated effects of the Proposed Action.

Proposed Action Alternative: The Proposed Action includes the construction, upgrade, operation, and maintenance of 54 sensor and communication towers and associated access roads, which creates a communications network in support of a Common Operating Picture (COP) among components of CBP and other Federal, state, and local partners outside CBP. Of the proposed 54 towers, 12 are upgrades to existing towers (seven existing USBP towers, one tower located at the new proposed Ajo Station, and four existing commercial towers). Impacts resulting from the construction of the 42 new towers and the retrofit/replacement of the 12 existing towers were fully assessed in the attached EA; however, upgrades to the existing towers are considered to be environmentally benign due to the fact the areas are currently disturbed and no further ground disturbance would occur. One of the 12 towers is actually a replacement tower, which would be located at the new Ajo Station that is currently under construction. This tower would be located within an area, which has already been fully analyzed under a previous EA. The remaining 11 towers would only receive retrofits or upgrades to the current tower communications hardware arrays. Three vehicle mobile surveillance systems per station and Unattended Ground Sensors (UGS) are also proposed under this SBI*net* project, but are not analyzed as a part of the Proposed Action because their potential impacts are considered to be environmentally benign due to the fact the areas are currently disturbed and no further ground disturbance would occur. They are an integral part of the overall COP border environment and, as such, are briefly discussed herein. Existing USBP vehicles will be retrofitted with technologies to allow USBP agents to acquire/send information via the new surveillance and communication towers. The UGS would be placed in disturbed areas where no vegetation would have to be removed for deployment. The intent of the upgraded vehicles, combined with the towers and UGS is to make USBP enforcement actions more efficient and effective. If this is reached, fewer vehicle trips should be required.

In general, a typical new tower in the Tucson West SBI*net* tower project would:

- be 80 to 200 feet 6 inches high;
- be up to 100- X 100-foot, including the 50- X 50-foot or 80- X 80-foot tower site and a maintained fire buffer. The fire buffer would be maintained free of vegetation;
- have an equipment shelter with an approximately 8-foot X 12-foot footprint;
- have perimeter fencing;
- not have guy wires; and
- have commercial grid power where available, or a propane-solar hybrid generator system and a 1,000-gallon propane fuel tank.

Three types of tower structures are proposed for this project: self standing towers (SST), rapidly deployed towers (RDT), and a third type of tower design called a Ravens Butte (RB). The RB tower is proposed to be utilized at one tower site (TCA-NGL-109) and is a small skid-mounted tower which would require helicopter deployment. RDT and RB towers are temporary structures than can be disassembled if necessary.

Access roads would need to be improved or constructed in order to install, operate, and maintain the proposed towers. The new access roads would be constructed to provide a 12-foot wide driving surface with 2-foot shoulders on each side (16 feet total). Additionally, some of the new roads may require cut and fill while others may require a v-ditch on one side of the new road. If cut-and-fill would be required the construction impact could extend as much as 22 feet on either side of new roads (yielding an impact corridor 56 feet wide). Road repair would include minor grading, leveling, and installation of nuisance drainage structures while road improvements would include reconstruction of the existing road, and installation of major drainage structures.

Proposed tower, TCA-SON-062 would be located at the National Park Service (NPS) overlook and would also require that the park overlook restroom be relocated. The restroom would be very near where it currently exists and within a previously disturbed site. No flushing or running water would be required as it would be a composting facility as it is currently.

As part of the Proposed Action, the towers would require bi-monthly maintenance; although some communication towers may require less maintenance visits. This necessitates vehicle travel to each of the proposed tower sites for propane delivery, maintenance, and operations of the towers. For the proposed towers which may be installed by helicopter, they would require maintenance activities via helicopter.

Based on discussions with various resource agencies, SBI*net* has agreed that, if after 12 months any tower in the proposed project is not determined to be functional SBI*net* will remove the tower or towers and remediate any impacts caused by the tower construction, operation, and removal.

ENVIRONMENTAL CONSEQUENCES: Implementation of the Proposed Action would permanently disturb approximately 41 acres for the construction of all towers and roads. Additionally, approximately 73 acres would be temporarily disturbed during construction activities for all proposed towers and access roads. No impacts to prime farmland would occur. The proposed tower sites are located predominately in rangeland, agricultural lands and Federally-owned lands.

The Proposed Action would have adverse impacts on cultural resources at two newly recorded sites; however, the implementation of avoidance methods would ensure that these impacts would be below the threshold of adverse effect. Aesthetic resources would be permanently impacted, and these resources are currently impacted by existing structures, or are in remote areas. One tower site on National Park Service land is at a developed site, which would have minor impacts. All other tower and road impacts would be considered insignificant.

CBP is coordinating with the National Park Service to minimize impacts in association with the National Park Service tower site. In addition, CBP is coordinating with U.S. Fish and Wildlife Services (USFWS) regarding five tower sites that are proposed for the Buenos Aires National Wildlife Refuge (BANWR). Construction of these five sites is contingent upon a USFWS determination that they are appropriate and compatible uses in the BANWR. Although the BANWR sites add value to the operational capabilities of the Proposed Action, the Proposed Action can function without the BANWR sites if USFWS ultimately determines that the towers are not an appropriate and compatible use.

Ten proposed tower sites are within the critical habitat for the Mexican spotted owl and TCA-SON-056 is within critical habitat for the Huachuca water umbel. CBP has determined that the Proposed Action may affect but not likely to adversely affect six species; however, the Proposed Action may affect and is likely to adversely affect the Chiricahua leopard frog (*Lithobates chiricahuensis*), Mexican spotted owl (*Strix occidentalis lucida*), jaguar (*Panthera onca*), lesser long-nosed bat (*Leptonycteris yerbabuenae*), and Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*). Consultation with USFWS is ongoing. No impacts to floodplains from access roads would occur with implementation of the Proposed Action. Additionally, the Proposed Action would have temporary and minor impacts to air, roadways and traffic, and ambient noise levels during construction activities. A total of 37 potential Waters of the U.S. would be impacted as a result of the Proposed Action. Construction and other road improvements within these washes are authorized under a Nationwide Permit 14. Commercial grid power would not be impacted as a result of the Proposed Action although long-term benefits to socioeconomics could occur. Illumination of the night sky and impacts to ambient lighting would be considered insignificant upon the implementation of lighting mitigations.

Additionally, the proposed project would result in overall beneficial impacts within the region through a reduction in illegal activities. IC traffic tramples vegetation and wildlife habitat and disturbs soils and previously unknown cultural resources. The proposed project would reduce IC traffic, thereby reducing erosion and compaction in soils resulting in protection to unstable soils from wind and water erosion. With smaller amounts of IC traffic there would also be a reduction in garbage and abandoned cars throughout the surrounding desert region and fewer impacts to vegetation and wildlife habitat would occur. Also, a decrease in border area crime rates and fewer impacts to previously unknown cultural resources would be expected from the reduction in illegal activities.

No significant adverse effects to the natural or human environment, as defined in 40 CFR Section 1508.27 of the CEQ's Regulations for Implementing NEPA, are expected upon implementation of the Proposed Action.

MITIGATION: Mitigation measures are identified for each resource category that could be potentially affected. Many of these measures have been incorporated as standard operating procedures by CBP in similar past projects. Conservation measures are identified in the Biological Opinion from USFWS (Consultation #22410-F-2008-0373) and are also identified in the EA in Section 5.

Soils

Vehicular traffic associated with the tower and access road construction activities and operational support activities will remain on established roads to the maximum extent practicable. Areas with highly erodible soils will be given special consideration when designing the proposed project towers and access roads to ensure incorporation of various erosion control techniques such as, straw bales, silt fencing, aggregate materials, wetting compounds, and rehabilitation, where possible, to decrease erosion. Site rehabilitation will include re-vegetating or the distribution of organic and geological materials (*i.e.*, boulders and rocks) over the disturbed area to reduce erosion while allowing the area to naturally vegetate. Additionally, erosion control measures and appropriate best management practices (BMP), as required and outlined in the Storm Water Pollution Prevention Plan (SWPPP) and engineering designs, will be implemented before, during, and after construction activities.

Road repair or improvements shall avoid, to the greatest extent practicable, creating wind rows with the soils once grading activities are completed. Excess soils from construction activities will be used on-site to raise and shape proposed tower sites and road surfaces.

Vegetation Resources

Native seeds or plants, which are compatible with the enhancement of protected species, will be used to the extent practicable, as required under Section 7(a)(1) of the ESA to revegetate staging areas and other temporarily disturbed areas.

CBP will use materials free of non-native plant seeds and other plant parts to limit potential for infestation for on-site erosion control in uninfested native habitats. Since natural materials cannot be certified as completely weed-free, if such materials are used, there will be follow-up monitoring to document establishment of non-native plants and appropriate control measures will be implemented for a period of time to be determined in the site restoration plan.

CBP fill material brought in from outside the project area will be identified as to source location and will be weed free.

CBP will remove invasive plants that appear on the tower sites, along sections of repaired and new road. Removal will be done in ways that eliminate the entire plant and remove all plant parts to a disposal area. Herbicides can be used according to label directions if they are not toxic to Federally listed species that may be in the area. Training to identify non-native invasive plants will be provided for CBP personnel or contractors as necessary.

Construction equipment will be cleaned at the temporary staging areas, in accordance with BMPs, prior to entering and departing the project corridor to minimize the spread and establishment of non-native invasive plant species.

CBP will avoid removal of riparian vegetation within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.

Wildlife Resources
The Migratory Bird Treaty Act (16 U.S.C. 703-712, [1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986 and 1989]) requires that Federal agencies coordinate with the USFWS if a construction activity would result in the take of a migratory bird. If construction or clearing activities are scheduled during nesting seasons (February 15 through August 31); surveys will be performed to identify active nests. If construction activities will result in the take of a migratory bird; then coordination with the USFWS, Federal Aviation Administration (FAA), and Arizona Game and Fish Department (AGFD) will be required and applicable permits would be obtained prior to construction or clearing activities. Another mitigation measure that would be considered is to schedule all construction activities outside nesting seasons negating the requirement for nesting bird surveys. The proposed sensor and communication towers would also comply with USFWS guidelines for reducing fatal bird strikes on communication towers to the greatest extent practicable. Guidelines recommend co-locating new antennae arrays on existing towers whenever possible and to build towers as short as possible, without guy wires or lighting, and use white strobe lights whenever lights are necessary for aviation safety.

Helicopter deployment would occur at one tower and may potentially occur at two other proposed tower sites. To reduce any possible impacts to wildlife, helicopter use should be limited to daylight hours and hovering should be avoided, to the greatest extent possible.

CBP will avoid or minimize the potential for entrapment of surface flows within the roadbed due to grading. CBP will minimize the depth of any pits created so animals do not become trapped.

Protected Species
BMPs have been identified to decrease any potential impacts to Federal and state protected species and can be found in the Biological Opinion and in the EA in Section 5.0 Protected Species. Conservation measures have been identified as part of Section 7 consultation (Consultation #22410-F-2008-0373) and CBP would adhere to those measures identified in the Biological Opinion.

Post Construction – General
For construction and maintenance projects that involve land-disturbing activities (*e.g.*, fences, towers, stations, facilities), CBP will provide a report to the USFWS within three months of project completion detailing the BMPs that were implemented, how well the BMPs worked, ways that BMPs could be improved for either protection of species and

habitats or implementation efficiency, and any Federally listed species observed at or near the project site. Implementation of the restoration plan and any follow-up monitoring will be included. CBP will provide a form-based report generated from documentation requirements of the Endangered Species Act for each specific project to ensure compliance. This report will be part of the project management plan.

During follow-up monitoring, CBP will remove non-native invasive plants found on the site. Removal will be done in ways that eliminate the entire plant and remove all plant parts to a disposal area. All chemical applications on refuges must be in coordination with the refuge manager to ensure accurate reporting. Herbicides can be used according to label directions. The monitoring period will be defined in the site restoration plan. Training to identify non-native invasive plants will be provided for CBP contractor personnel or contractors, as necessary. Lehman lovegrass (*Eragrostis lehmanniana*) and buffelgrass (*Pennisetum ciliare*) are particularly important to control for promoting cactus, including Pima pineapple cactus, and agave re-establishment.

CBP will conduct follow-up monitoring for those projects that use natural materials. The purpose is to document establishment of non-native plants, appropriate control measures implemented, and results of implementation.

CBP will close roads no longer needed after construction and will restore them to natural surface and topography using appropriate techniques. The Global Positioning System (GPS) coordinates of roads that are thus closed will be recorded and integrated into the USBP GIS database. A record of acreage or miles of roads taken out of use, restored, and revegetated will be maintained and included in Project Reports.

Where improved or new roads may increase use of sensitive areas, CBP will prevent access through gating, physical barriers, *etc.* in coordination with landowners and/or management agencies.

CBP will close and/or restore unauthorized roads at a ratio of 1:1 (1 mile of road closed and/or restored for every 1 mile of road created or repaired) to help offset the anticipated increase in public use of a) repaired or new roads and b) nearby habitat as a result of the proposed action. Road closures must benefit listed species, be approved by the landowners, be on unauthorized roads receiving use, and be designed properly to prevent access. CBP, USFWS, and the Forest Service will evaluate the potential increase in public use of repaired and new roads through the Forest Service's Travel Management program and BANWR management planning within six months of the date of this project's Biological Opinion. Most Forest Service roads to be repaired are classified as Level 2 roads, which are defined as 4WD roads. CBP will quantify a) the post-construction number of miles of new and repaired roads, b) area of new and repaired roads, and c) area of cut and fill. CBP will prepare a road closure/restoration plan in coordination with landowners and/or land management agencies within six months of the date of this project's Biological Opinion. CBP will assist the Forest Service in implementing its Travel Management Plan.

a. For every mile of new or repaired road, CBP will close and/or restore the same length of unauthorized road through gating, physical barriers, discing, revegetating, *etc.* the same length of road.

b. For every new or improved cut and fill area, CBP will restore the same amount of square footage converted to length of road.

CBP will prepare monitoring and mitigation plans as described in the species-specific conservation BMPs. CBP and USFWS will evaluate effectiveness of monitoring and mitigation methods annually. If monitoring and mitigation methods or implementation are ineffective in reaching desired goals, CBP and USFWS will work together to alter methods or implementation.

Species Specific Conservation Measures

Various site specific conservation measures will be undertaken during separate stages of the overall project implementation and include project planning, project planning/documentation, construction /maintenance, and post construction. Post Construction conservation measures are identified herein, while all conservation measures for other project stages are identified in the Biological Opinion and in Section 5 of the EA.

Chiricahua Leopard Frog - Post Construction

CBP will complete a fencing, monitoring, and mitigation plan within six months of the date of this project's Biological Opinion for review and approval by landowners and/or land management agencies and USFWS. This plan will include methods and a schedule for fencing, bullfrog control, monitoring; the process for repair of fence, tank, and roads; and content and schedule for annual reports. The results of annual monitoring will be reported to USFWS annually in a written report due March 1. CBP will develop an Memorandum of Understanding (MOU) with the landowners and/or land management agencies to implement mitigation. CBP will complete the plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's Biological Opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies. Mitigation will be completed within five years of completion of tower construction. CBP will complete an annual report that summarize the implementation of all of the proposed actions, any incidental take that occurred, monitoring results, an analysis of the effectiveness of the Conservation BMPs, and work plan for the following year.

CBP will monitor Upper Turner and Summit tanks for sedimentation and erosion for three years following construction.

CBP will monitor Upper Turner Tank for dead and dying frogs that may be killed by Bd or other amphibian diseases for three years following construction and once a year in February.

CBP will remove the fence barrier after all construction on TCA-TUS-040 is completed to maintain connectivity between the Upper Turner Tank and Turner Tank populations.

CBP will control non-native species, especially bullfrogs, at five aquatic sites west of I-19 for three years following construction to help offset the anticipated increase in access to occupied habitat in coordination with USFWS and landowners and/or land management agencies. The primary threat to Chiricahua leopard frogs in this area is predation by introduced American bullfrogs, which have well-established populations at Peña Blanca Lake, Ruby Lake, Arivaca Lake, and several other permanent waters. CBP will focus mitigation efforts from Peña Blanca Lake west to Sycamore Canyon, where non-native control will benefit Chiricahua leopard frog populations. Where consistent with livestock operations, CBP will selectively fence ponds vulnerable to bullfrog invasion to exclude bullfrogs while allowing leopard frogs to leave the ponds. Where needed, a portion of each pond will be fenced to exclude livestock and allow for development of frog habitat. Monitor fenced habitat and take corrective actions if fences are breached and bullfrogs reinvade. CBP will coordinate a meeting with USFWS, landowners, and/or land management agencies within two months of the date of this project's Biological Opinion to determine where fencing and bullfrog control are needed.

CBP will install pipe-rail wildlife-friendly fence and cattle guards to reduce public vehicle and cattle trespass in southwestern and northeastern corners of BANWR where frog habitat is likely to be impacted, as per refuge recommendations. CBP will monitor fence and repair fence if needed in cooperation with BANWR. CBP will complete a fencing plan within four months of the date of this project's Biological Opinion in cooperation with BANWR that includes design plans, installation schedule, monitoring plan, and a repair schedule.

Sonora Tiger Salamander – Post Construction

Site restoration is not anticipated, but if impacts to salamander habitat occur, CBP will work with the landowner and/or land management agency to plan and implement restoration.

CBP will implement other conservation measures for pesticides in and near salamander habitats .

Mexican Spotted Owl – Post Construction

CBP will complete a Mexican spotted owl monitoring and mitigation plan within six months of the date of this project's Biological Opinion for review and approval by landowners and/or land management agencies and USFWS. This monitoring and mitigation plan will include, methods to determine effects, potential corrective actions to be taken (*e.g.* road closures, fencing, gating, site restoration), schedules for monitoring and mitigation, and schedule and content of annual reports. This plan will be completed in coordination with the landowner and/or land management agencies. CBP will develop an MOU with the landowners and/or land management agencies to implement mitigation. CBP will complete the monitoring and mitigation plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's Biological Opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies and mitigation will be completed within three years from the date construction is completed and towers are fully operational. CBP will complete an annual report for a minimum of three years that summarizes the implementation of all of the proposed actions, monitoring results, mitigation progress, an analysis of the effectiveness of the Conservation BMPs, and work plan for the following year.

CBP will monitor affected Mexican spotted owl Protected Activity Center (PAC) annually for three years (field seasons) from the date construction is completed and towers are fully operational. CBP will develop an MOU with the landowners and/or land management agencies to conduct spotted owl monitoring USFWS will provide these PAC locations to CBP. Corrective actions should be developed and implemented in coordination with USFWS and landowner and/or land management agencies, if effects are detected. Corrective actions may include road closures, fencing, gating, and/or site restoration. Monitoring will be conducted by an experienced and Federally permitted spotted owl surveyor.

CBP will provide sufficient funds to close unauthorized roads and restore habitat near affected Mexican spotted owl PACs in conjunction with Forest Service travel management planning. For every road repaired or created within 0.25 mile of a Mexican spotted owl PAC, CBP will close and/or restore the same length of road. CBP will update maps showing where improved or new roads were completed. CBP will complete a road closure/restoration plan. Mitigation will be completed within three years of the completion of construction.

Jaguar - Post Construction

CBP will complete a road closure/restoration plan for review and approval by landowners and/or land management agencies and USFWS that:

a) identifies and maps new roads where barriers will be placed to prevent public access,

b) identifies and maps unauthorized roads near potential jaguar movement corridors,

c) specifies that USFWS will use jaguar monitoring results to assist CBP in determining which unauthorized roads to close,

d) specifies potential road closure methods,

e) specifies potential restoration methods for closed roads,

f) includes a schedule for closure, and

g) includes a schedule and content of annual reporting.

CBP will complete the road closure/restoration plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's Biological Opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies and will be completed within six years of completion of the Tucson West tower project. CBP will complete an annual report until all Conservation BMPs for jaguars are completed. This report will summarize the implementation of the proposed actions; number of miles closed and/or restored, restoration methods, effectiveness of road closures and restoration, camera monitoring results, and work plan for the following year.

CBP will provide $312,000 to monitor the effects of the proposed tower project on the jaguar. CBP will transfer this funding to the AGFD within six months of the completion of this project's Biological Opinion, if it is determined that AGFD is the appropriate recipient for this purpose; otherwise the funding will be transferred to the USFWS. Funding will be used to monitor jaguar presence and movement along the border, and in additional mountain ranges and corridors within the action area. Funding will be used for camera traps, vehicles, supplies, and personnel. The results of this monitoring will be used to determine which unauthorized roads to close and to guide future project design.

CBP will prevent public access of new roads through gating, physical barriers, fencing, *etc.*, in combination with appropriate signage and in coordination with the landowner and/or land management agencies. CBP will work with the land management agencies to determine the best method to prevent public access on new roads needing barriers. Blocking access will be achieved in a way that does not increase the probability that unauthorized roads will be created nearby.

CBP will close and/or restore unauthorized roads in or near jaguar movement corridors to help offset the increase in improved or new roads at a ratio of 2:1 (two miles of road closed and/or restored for every one mile of road created or repaired). This will require post-construction quantification of (a) the number of miles of roads repaired and created, and (b) the area of new and repaired cut and fill. CBP will work with the land management agencies and USFWS to identify unauthorized roads for closure and determine the method most likely to prevent future access. Some road closures will require discing and seeding (using native species), in addition to placement of barriers. Closures will be achieved in a way that does not increase the probability that unauthorized roads will be created nearby.

Lesser long-nosed Bat - Post Construction

CBP will prepare a lesser long-nosed bat monitoring and mitigation plan for review and approval by landowners and/or land management agencies and USFWS that includes bat telemetry study plan, bat roosts to be surveyed, roosts to be monitored for effects, survey and monitoring schedule, roosts to be protected, method of roost protection, schedule for roost protection completion, tower site monitoring methods, potential corrective actions at tower or roost sites if effects are detected, number of agave and cacti salvaged and transplanted or to be mitigated, and annual report content and schedule. CBP will complete the plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's Biological Opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies and will be completed for a minimum of five years from the date all towers within the project area are fully operational or until negative effects from the proposed action are no longer detected. This annual report will summarize the implementation of all of the proposed actions; roost; and tower monitoring results; bat survey results; telemetry study results; salvage, transplant, and restoration results; corrective actions needed or taken (*e.g.* gating, signing, fencing); any incidental take that occurred; an analysis of the effectiveness of the Conservation BMPs; and work plan for the following year.

CBP will conduct annual bat surveys at bat roosts within one mile of tower sites for two years from the date towers are fully operational. CBP will compare results with previous years' surveys. If negative effects of the proposed action are documented, CBP will take corrective action (*e.g.* gating, signing, fencing) and will continue to survey annually until negative effects are no longer detected. Tower TCA-SON-062 is less than a mile from a primary roost (State of Texas Mine) occupied by tens of thousands of bats. The Coronado National Memorial has collected years of pre-tower bat surveys using a standardized protocol. This same protocol will be used for future bat surveys at State of Texas Mine. Surveys will be conducted throughout the season by a lesser long-nosed bat expert.

CBP will monitor roosts within one mile of tower sites for direct or indirect effects of the action for two years from the date towers are fully operational. CBP will install Hobo data loggers in lesser long-nosed bat roosts most prone to human use to detect changes in temperature, humidity, *etc.* CBP will take corrective actions in coordination with USFWS and/or the landowners/land management agencies if such effects are detected. This may include road closures, gating, signing, fencing, *etc.*

CBP will conduct a telemetry study to locate bat roosts and foraging areas used by those bats found in the vicinity of towers. This study will be conducted for five years. If occupied mines or caves are found within a mile of towers, they will be monitored with Hobo data loggers. CBP will telemeter 15 bats per year in early August and will track bats through mid October. CBP will telemeter up to five bats at a time; transmitters have a two to three week lifespan. CBP will hire five field biologists to conduct the study. The Patagonia Mountains is covered with hundreds of abandoned mines that may be used by lesser long-nosed bats. Tracking bats telemetered near towers in the Patagonia Mountains will determine where these bats are foraging and roosting. If negative effects are found in foraging or roosting areas as a result of this proposed action, CBP will take corrective action. This may include road closures, gating, signing, fencing, *etc.*

CBP will conduct monitoring to document and assess tower related mortality of lesser long-nosed bats beginning once tower construction is completed and continuing for five years after the towers are fully operational. Monitoring will include systematic lesser long-nosed bat searches and use of radar, GPS, infrared, thermal imagery, and/or acoustical monitoring equipment to assess and verify bat movements and to gain information on the impacts of various tower sizes, configurations, and lighting systems. If lesser long-nosed bat mortality is documented at tower or wind turbine sites, CBP will: a) immediately notify USFWS in writing. b) work with USFWS to develop site-specific measures to reduce that mortality, and c) continue monitoring beyond the five years until mortality is no longer occurring. Information gained from monitoring will be used to develop tower retrofits to reduce lesser long-nosed bat mortality, if collisions are documented. CBP will incorporate the bat mortality monitoring associated with the proposed action into an annual report for a minimum of five years.

Where improved or new roads may increase human use of bat roosts occupied or potentially occupied by lesser long-nosed bats, CBP will prevent access through gating, fencing, other physical barriers, *etc.* This includes the State of Texas mine roost. Patagonia Mountains abandoned mines, and other lesser long-nosed bat roosts. Close coordination with USFWS and landowners and/or land management agencies will be necessary, as the design and season of installation is critical to ensure bat gates benefit lesser long-nosed bats.

CBP will water transplanted agave and columnar cacti if needed and according to site conditions to ensure survival. CBP will monitor annually for survival for five years and will replace dead or dying plants.

CBP will replace agaves and columnar cacti removed for construction at a 2:1 ratio. CBP will work with landowners and/or land management agencies to determine location for replacement plants. CBP will water plants according to site conditions to ensure survival. CBP will monitor annually for survival for five years and will replace dead or dying plants.

Pima Pineapple Cactus - Post Construction

CBP will prepare a Pima pineapple cactus monitoring and mitigation plan for review and approval by landowners and/or land management agencies and USFWS that includes a map of Pima pineapple cactus habitat to be monitored, a map of Pima pineapple cactus habitat destroyed or compromised, number of acres of Pima pineapple cactus habitat destroyed or compromised, pre-construction cactus survey results, method and schedule to monitor the amount of ongoing disturbance from public use and CBP activities, potential corrective actions such as road closures and fencing, amount of habitat to be mitigated, schedule for mitigation banking completion, and content and schedule of annual reports. CBP will complete the plan, in coordination with landowners and/or land management agencies and USFWS, within six months of the date of this project's Biological Opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies and will be completed within three years from the date all towers within the project area are fully operational. CBP will complete an annual report for a minimum of three years that summarize the implementation of all of the proposed actions, monitoring results, mitigation banking, corrective actions taken, an analysis of the effectiveness of the Conservation BMPs, and work plan for the following year.

CBP will fund monitoring in suitable cactus habitat within 50 feet of tower sites, repaired roads, and new roads annually for three years. CBP will take corrective action, in coordination with the landowners and/or land management agencies, if Pima pineapple cactus habitat is degraded as a result of the proposed action and increased public use. This includes control of non-native invasive species such as buffelgrass and Lehmann lovegrass.

CBP will compensate for habitat degradation or loss on a 1:1 basis in a conservation bank on private land in Altar Valley within one year of construction of towers.

Cultural Resources

The results of the survey and recommendations are noted in Section 3.10 of this report. A site testing plan for those sites that have unknown eligibility status has been developed through consultation with CBP, the land manager and Arizona State Historical Preservation Officer (SHPO) to ascertain eligibility status for National Register of Historic Places (NRHP). In addition, avoidance assurance measures will be utilized; these have been developed jointly in consultation with CBP, the land manager and Arizona SHPO. Through current design plans and avoidance measures, sites will not be adversely affected by the project. Archaeological monitoring for NRHP-eligible sites adjacent to the access roads and compound areas will be conducted during construction. Archaeologists will delineate all NRHP eligible sites to ensure no adverse effects would occur to those significant resources through the development of an Memorandum of Agreement (MOA) for data recovery, if necessary. Archaeologists will delineate all NRHP-eligible sites to assure no adverse impacts would occur to those significant resources. Archaeologists will also provide in-field awareness training to construction personnel to ensure avoidance. All construction will be restricted to previously surveyed areas. If any cultural material is discovered during construction, Arizona SHPO, and the land manager, as appropriate, will be notified immediately and all activities halted in that area until a qualified archeologist assesses the cultural remains. Additionally, SBI*net* will complete the Section 106 process prior to the start of any construction activities.

Water Resources

Standard construction procedures will be implemented to minimize potential for erosion and sedimentation during construction. All work shall cease during heavy rains and would not resume until conditions are suitable for the movement of equipment and material. All fuels, waste oils, and solvents will be collected and stored in tanks or drums within secondary containment areas consisting of an impervious floor and bermed sidewalls capable of holding the volume of the largest container stored therein. The refueling of machinery will be completed following accepted guidelines, and all vehicles will have drip pans during storage to contain minor spills and drips. No refueling or storage will take place within 100 feet of drainages.

A Construction Stormwater General Permit will be obtained prior to construction, and this would require approval of a site-specific SWPPP and Notice of Intent (NOI). A site-specific SPCCP will also be in place prior to the start of construction. Other environmental design measures will be implemented such as straw bales, silt fencing, aggregate materials, wetting compounds, and re-vegetation with native plant species, where possible, to decrease erosion and sedimentation.

Prior to the start of construction activities, the construction contractor will review the most up-to-date version of the Arizona Department of Environmental Quality (ADEQ) 305(b) and 303(d) report. Additionally, road repair or improvement activities in wash or drainage crossings shall not impede the flow of affected water courses.

Air Quality

Mitigation measures will be incorporated to ensure that fugitive dust emission levels do not rise above the minimum threshold as required per 40 CFR 51.853(b)(1). Measures will include dust suppression methods such as road watering to minimize airborne particulate matter created during construction activities. Standard construction BMPs such as routine watering of the construction site as well as access roads to the site will be used to control fugitive dust and thereby assist in limiting potential particulate matter greater than 10 microns (PM-10) excursions during the construction phase of the proposed project. Additionally, all construction equipment and vehicles will be required to be maintained in good operating condition to minimize exhaust emissions.

Noise

During the construction phase, short-term noise impacts are anticipated. All applicable Occupational Safety and Health Administration regulations and requirements will be followed. On-site activities would be restricted to daylight hours to the greatest extent practicable although night-time construction could occur if CBP schedules are constrained. Construction equipment will possess properly working mufflers and would be kept properly tuned to reduce backfires. Implementation of these measures will reduce the expected short-term noise impacts to an insignificant level in and around tower construction sites.

Utilities

Lighting

To reduce the illumination of the night sky and ambient lighting, CBP will follow USFWS (2000) *Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers* to reduce potential adverse effects of night-time lighting to migratory bird and nocturnal flying species, and astronomical observatories. Any infrared lighting installed on the proposed towers would be compatible with night vision goggle usage. The tower site lighting proposed for CBP security purposes would: utilize low sodium bulbs, be shielded to avoid illumination outside the footprint of the tower site, and when possible, be activated by motion detectors. Additionally, Pima County lighting ordinances will be utilized to the greatest extent possible.

Currently, it not anticipated that night-time construction would occur; however if night-time construction becomes necessary its use would be minimized and the lights would be shielded and follow light ordinances.

Hazardous Materials

BMPs will be implemented as standard operating procedures during all construction activities, and will include proper handling, storage, and/or disposal of hazardous and/or regulated materials. To minimize potential impacts from hazardous and regulated materials, all fuels, waste oils and solvents will be collected and stored in tanks or 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. The refueling of machinery will be completed in accordance with accepted industry and regulatory guidelines, and all vehicles will have drip pans during storage to contain minor spills and drips. Although it is unlikely that a major spill would occur, any spill of reportable quantities will be contained immediately within an earthen dike, and the application of an absorbent (*e.g.*, granular, pillow, sock, *etc.*) will be used to absorb and contain the spill. To ensure, oil pollution prevention, a SPCCP will be in place prior to the start of construction activities and all personnel will be briefed on the implementation and responsibilities of this plan as is typical in CBP/SBI projects. All spills will be reported to the designated USBP point of contact for the project. Furthermore, a spill of any petroleum liquids (*e.g.*, fuel) or material listed in 40 CFR 302 Table 302.4 of a reportable quantity must be cleaned up and reported to the appropriate Federal and state agencies.

All waste oil and solvents will be recycled. All non-recyclable hazardous and regulated wastes will be collected, characterized, labeled, stored, transported, and disposed of in accordance with all applicable Federal, state, and local regulations, including proper waste manifesting procedures.

Solid waste receptacles will be maintained at construction staging areas. Non-hazardous solid waste (trash and waste construction materials) will be collected and deposited in on-site receptacles. Solid waste will be collected and disposed of by a local waste disposal contractor.

Disposal of used batteries or other small quantities of hazardous waste will be handled, managed, maintained, stored, and disposed of in accordance with applicable Federal and state rules and regulations for the management, storage, and disposal of hazardous materials, hazardous waste and universal waste. Additionally, to the extent practicable, all batteries will be recycled, locally.

Where handling of hazardous and regulated materials does occur, CBP will collect and store all fuels, waste oils and solvents in clearly labeled tanks or 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.

FINDING: Based upon the analyses of the EA and the mitigation measures to be incorporated as part of the Proposed Action, it has been concluded that the Proposed Action will not result in any significant effects to the environment. Therefore, no further environmental impact analysis is warranted.

9/15/08

Robert W. Gilbert
Chief Patrol Agent
U.S. Border Patrol
Tucson Sector

Date

9/17/08

Robert F. Janson
Acting Executive Director
Facilities Management and Engineering
U.S. Customs and Border Protection

Date

Final

ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED SBI*net* TUCSON WEST PROJECT AJO, TUCSON, CASA GRANDE, NOGALES, AND SONOITA STATIONS AREAS OF RESPONSIBILITY, U. S. BORDER PATROL, TUCSON SECTOR, ARIZONA

September 2008

Lead Agency: U.S. Department of Homeland Security
U.S. Customs & Border Protection
SBI*net*
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EXECUTIVE SUMMARY

INTRODUCTION

The Secure Border Initiative (SBI) is a comprehensive, multi-year plan established by the Department of Homeland Security (DHS) in November 2005 to secure America's borders and reduce illegal immigration. The SBI mission is to promote border security strategies that protect against and prevent terrorist attacks and other transnational crimes. Additionally, the SBI initiative will coordinate DHS efforts to ensure the legal entry and exit of people and goods moving across our borders and improve the enforcement of immigration, customs, and agriculture laws at our borders, within the country, and abroad.

SBI*net* is the component of SBI charged with developing and installing technology and tactical infrastructure (TI) solutions to gain operational control of our Nation's borders. The goal of SBI*net* is to employ the most effective, proven technology, infrastructure, personnel, and response platforms and integrate them into a single comprehensive border security suite for the DHS.

DHS, U.S. Customs and Border Protection (CBP) will deploy a mix of technology, TI, and personnel based on operational need to gain control of each diverse mile of the border. Operational control exists when CBP is consistently able to: (1) detect illegal entries into the U.S.; (2) identify and classify these entries to determine the level of threat involved; (3) efficiently and effectively respond to these entries; and (4) bring each event to a satisfactory law enforcement resolution.

This Environmental Assessment (EA) addresses proposed project alternatives developed to assist CBP in their mission to control and deter cross-border violators.

PURPOSE AND NEED

The purpose of the proposed project is to improve CBP's efficiency and probability of detection, identification, and apprehension of illegal border crossers. Achieving operational control of the borders of the U.S is a key mission of CBP. The objective of this SBI*net* project would establish and maintain operational control of approximately 81 miles of the U.S. border in the Tucson Sector, within Ajo, Tucson, Casa Grande, Nogales and Sonoita stations' Areas of Responsibility (AOR), which defines the geographic scope of this project.

The proposed project is needed to:

1) Install and upgrade technology and infrastructure components to give CBP agents the ability to gain, maintain, and strengthen control of the border within proximity of the international boundary;
2) Improve surveillance technology solutions to enhance border enforcement capabilities;

3) Apply surveillance technologies that would refine detection, interception, and apprehension of illegal crossers (IC), smugglers, and terrorists; and
4) Reduce crime in border communities by detecting, apprehending, and deterring smugglers of humans, drugs, and other contraband.

DESCRIPTION OF PROPOSED ACTION

The Proposed Action includes the construction, upgrade, operation, and maintenance of 54 sensor and communication towers and associated access roads, which creates a communications network in support of a Common Operating Picture (COP) among components of CBP and other Federal, state, and local partners outside CBP. Of the proposed 54 towers, 12 are upgrades to existing towers (seven existing CBP towers, one tower located at the new proposed Ajo Station and four existing commercial towers). Impacts resulting from the construction of the 42 new towers and the retrofit/replacement of the 12 existing towers are fully assessed in this EA; however, upgrades to the existing towers are considered to be environmentally benign due to the fact the areas are currently disturbed and no further ground disturbance would occur. One of the 12 towers is actually a replacement tower, which would be located at the new Ajo Station that is currently under construction. This tower would be located within an area, which has already been fully analyzed under a previous EA. The remaining 11 towers would only receive retrofits or upgrades to the current tower communications hardware arrays. Three vehicle mobile surveillance systems per station and Unattended Ground Sensors (UGS) are also proposed under this SBI*net* project, but are not analyzed as a part of the Proposed Action because their potential impacts are benign. They are an integral part of the overall COP border environment and, as such, are briefly discussed herein. The existing CBP vehicles would be retrofitted with technologies to allow CBP agents to acquire/send information via the new surveillance and communication towers. The UGS would be placed in disturbed areas where no vegetation would have to be removed for deployment. The intent of the upgraded vehicles, combined with the towers and UGS is to make CBP enforcement actions more efficient and effective. If this is reached, fewer vehicle trips should be required.

In general, a typical new tower in the Tucson West SBI*net* tower project would:

- be 80 to 200 feet 6 inches high;
- be up to 100- X 100-foot, including the 50- X 50-foot or 80- X 80-foot tower site and a maintained fire buffer. The fire buffer would be maintained free of vegetation;
- have an equipment shelter with an approximately 8-foot X 12-foot footprint;
- have perimeter fencing;
- not have guy wires; and
- have commercial grid power where available, or a propane-solar hybrid generator system and a 1,000 gallon propane fuel tank.

Proposed tower, TCA-SON-062, would be located at the National Park Service (NPS) overlook and would also require that the park overlook restroom be relocated. The restroom would be very near where it currently exists and within a previously disturbed site. No flushing or running water would be required as it would be a composting facility as it is currently.

As part of the Proposed Action, the towers would require bi-monthly maintenance, although some communication towers may require less maintenance visits. This necessitates vehicle travel to each of the proposed tower sites for propane delivery, maintenance, and operations of the towers. For the proposed towers, which may be installed by helicopter, maintenance activities via helicopter would be required.

Based on discussions with various resource agencies, SBI*net* has agreed that 12 months after any tower in the proposed project is not determined to be functional, SBI*net* would remove the tower(s) and remediate any impacts caused by the tower construction, operation, and removal.

PROPOSED ACTION AND ALTERNATIVES CONSIDERED

There are two alternatives analyzed: (1) No Action Alternative, and (2) Proposed Action, which is described above.

Under the No Action Alternative, no towers would be constructed within the Ajo, Casa Grande, Tucson, Nogales and Sonoita stations AORs. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action are evaluated.

ENVIRONMENTAL CONSEQUENCES

Implementation of the Proposed Action would permanently disturb approximately 41 acres for the construction of all towers and roads. Additionally, approximately 73 acres would be temporarily disturbed during construction activities for all proposed towers and access roads. However, no impacts to prime farmland would occur. The proposed tower sites are located predominately in rangeland, agricultural lands and Federally owned lands. The Proposed Action would have adverse impacts on cultural resources at two newly recorded sites; however, the implementation of avoidance methods would assure these impacts would be below the threshold of adverse effect. Aesthetic resources would be permanently impacted, and these resources are currently impacted by existing structures, or are in remote areas. One tower site on NPS land is at a developed site and would have minor to moderate impacts on the area's aesthetic quality. CBP is coordinating with NPS to minimize impacts in association with this tower site. Ten proposed tower sites are within the critical habitat for the Mexican spotted owl and one tower is within critical habitat for the Huachuca water umbel. CBP has determined that the Proposed Action may affect but not likely to adversely affect seven species; however, the Proposed Action may affect and is likely to adversely affect the Mexican spotted owl, Chiricahua leopard frog, jaguar, and Pima pineapple cactus. Consultation with U.S. Fish and Wildlife Services (USFWS) has been completed.

Additionally, the Proposed Action would have temporary and minor impacts to air, roadways and traffic, and ambient noise levels during construction activities. A total of 37 potential Waters of the U.S. would be impacted as a result of the Proposed Action. Construction and other road improvements within these washes are authorized under a Nationwide Permit 14. No impacts to floodplains from access roads would occur with implementation of the Proposed Action. Commercial grid power would not be impacted as a result of the Proposed Action; however, long term benefits to socioeconomics could occur. Illumination of the night sky and impacts to ambient lighting would be considered insignificant upon the implementation of lighting mitigations.

Additionally, the proposed project would result in overall beneficial impacts within the region through a reduction in illegal activities. IC traffic tramples vegetation and wildlife habitat and disturbs soils and previously unknown cultural resources. The proposed project would reduce IC traffic, thereby reducing erosion and compaction in soils resulting in protection to unstable soils from wind and water erosion. With decreased amounts of IC traffic there would be also be a reduction in garbage and abandoned cars throughout the surrounding desert region and less impacts to vegetation and wildlife habitat. Also, a decrease in border area crime rates and fewer impacts to previously unknown cultural resources would be expected from the reduction in illegal activities.

No significant adverse effects to the natural or human environment, as defined in 40 Code of Federal Regulations (CFR) Section 1508.27 of the Council on Environmental Quality's (CEQ) Regulations for Implementing National Environmental Policy Act (NEPA), are expected upon implementation of the Proposed Action.

FINDINGS AND CONCLUSIONS

Based upon the analyses of the EA and the environmental design and mitigation measures to be implemented, the Proposed Action would not have a significant effect on the environment. Therefore, no additional environmental evaluation is warranted.

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BACKGROUND

1.0 BACKGROUND

1.1 INTRODUCTION

This Environmental Assessment (EA) analyzes various aspects of a proposed project that would be carried out under the Secure Border Initiative (SBI) and be implemented as a part of the SBI*net* program. It addresses the potential direct and indirect effects, beneficial and adverse, of the proposed construction, installation, operation, and maintenance of a system of sensor and communication towers, which include access roads, communications components, and a combination of sensor and communication components on towers within the United States (U.S.) of Border Patrol's (USBP) Ajo, Casa Grande, Tucson, Nogales and Sonoita stations' Areas of Responsibility (AOR) in southwest Arizona (Figure 1-1). Because the proposed project would be located in the western portion of the USBP's Tucson Sector, it is known as the SBI*net* Tucson West project.

This EA was prepared in compliance with provisions of the National Environmental Policy Act (NEPA) of 1969 as amended (42 U.S. Code [U.S.C.]. 4332 *et seq*.), the Council on Environmental Quality's (CEQ) NEPA implementing regulations at 40 Code of Federal Regulations (CFR) Part 1500, and the U.S. Department of Homeland Security's (DHS) *Management Directive 5100.1, Environmental Planning Program* (71 *Federal Register* [FR] 16790).

Consistent with 40 CFR 1508.28, this EA analyzes direct and indirect site-specific and cumulative environmental impacts of the proposed project. The affected area for this EA covers approximately 30,000 square miles of southern Arizona generally bounded by the cities of Ajo, Phoenix, and Sierra Vista. In connection with earlier border infrastructure projects, much of this area was analyzed in previous NEPA documents prepared by CBP and the legacy Immigration and Naturalization Service (INS).

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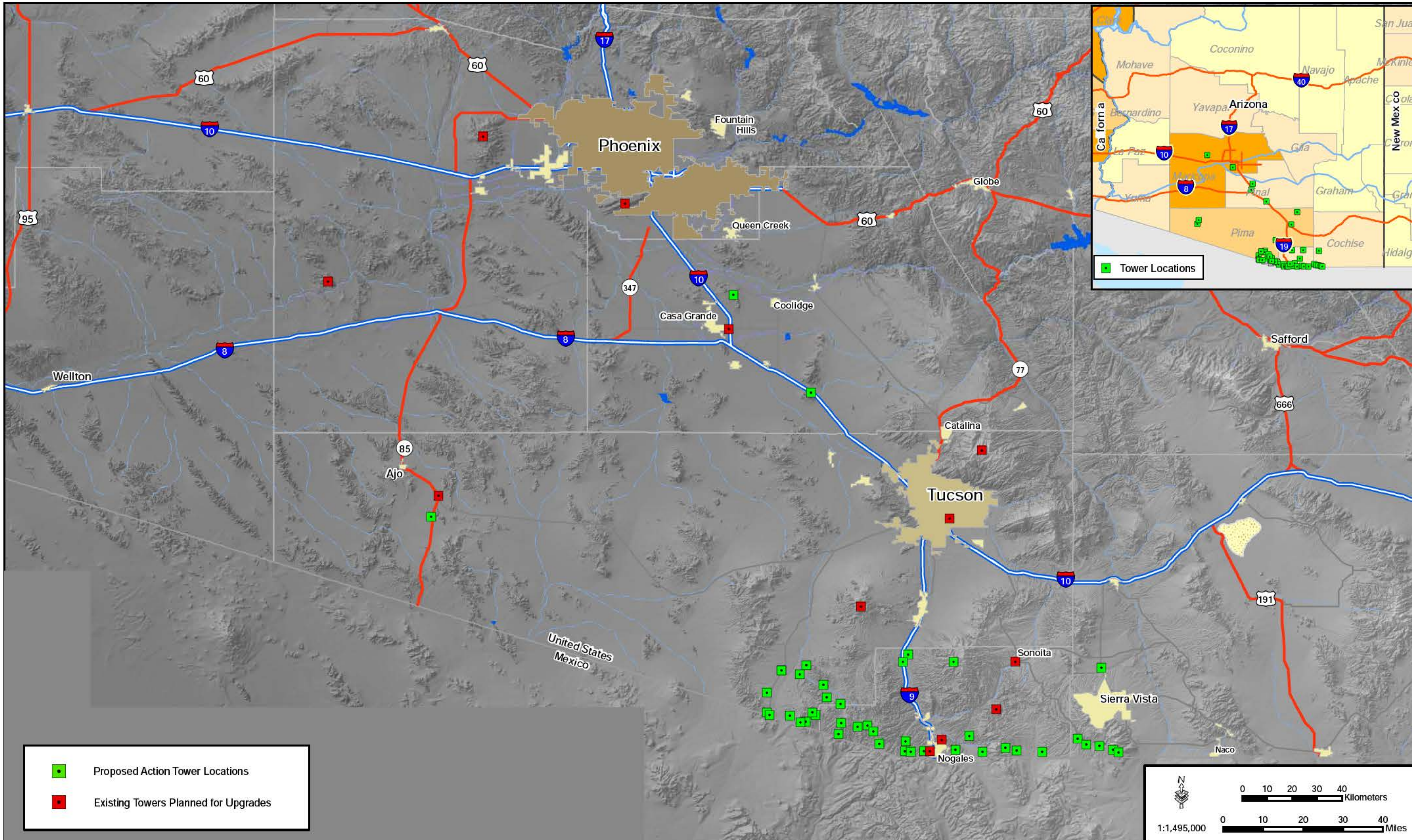

Figure 1-1: Vicinity Map

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Accordingly, this EA tiers from a July 2001 INS and Joint Task Force Six (JTF-6) NEPA document entitled, *Supplemental Programmatic Environmental Impact Statement (PEIS), INS and JTF-6 Activities on the Southwest U.S.-Mexico Border* (INS 2001) and the *Programmatic Environmental Assessment for the Proposed Installation and Operation of Remote Video Surveillance Systems in the Western Region of the Immigration and Naturalization Service* (INS 2003). Where the EA incorporates previously documented information, the appropriate NEPA document is cited and the incorporated content is summarized in this EA, such as from the 2007 CBP document entitled, *Environmental Assessment SBInet Project 28, Pima County, Arizona* (CBP 2007a). Where previous NEPA documents do not provide sufficient information for the analysis required in this EA, new surveys for sensitive resources and tower site characterization were completed and this information is updated in this EA.

USBP Tucson Sector provides law enforcement support for the Arizona counties of Maricopa, Pima, Santa Cruz, Pinal, and Cochise. There are five USBP stations (Ajo, Casa Grande, Tucson, Nogales and Sonoita), which would be affected by the proposed project. CBP proposes to design, develop, and deploy technology-based solutions to decrease illegal cross-border activities and deter and detect illegal entries in the west corridor of Tucson Sector. This project would support the CBP's mission by strengthening national security between ports of entry (POE) to prevent illegal entry of terrorists, terrorist weapons, contraband, and illegal crossers (ICs) into the U.S.

The SBI*net* project described and analyzed in this EA is anticipated to achieve CBP operational requirements and their mission of improving land border security. This EA describes the project goals that SBI*net* is required to support and analyzes the potential environmental impacts posed by the siting, construction, upgrade, operation, and deployment of its component structures, facilities, and mobile resources.

1.1.1 Program Background

The U.S. experiences a substantial influx of ICs, illegal drugs, and other contraband across its borders every year. These illegal activities cost U.S. citizens billions of dollars annually, directly from criminal activities, including the costs of apprehension, detention, and incarceration of criminals, and indirectly by loss of property, illegal participation in government programs, and increased insurance costs.

SBI is a comprehensive, multi-year plan established by DHS in November 2005 to secure America's borders and reduce illegal immigration. SBI was created to bring clarity of mission, effective coordination of DHS assets, and greater accountability in securing the Nation's borders. The SBI mission is to promote border security strategies that protect against and prevent terrorist attacks and other transnational crimes. Additionally, the SBI initiative will coordinate DHS efforts to ensure the legal entry and exit of people and goods moving across our borders, and improve the enforcement of immigration, customs, and agriculture laws at our borders, within the country, and abroad.

SBI*net* is the component of SBI charged with developing and installing technology and tactical infrastructure (TI) solutions to gain operational control of our Nation's borders. The goal of SBI*net* is to field the most effective, proven technology, infrastructure, personnel, and response platforms, and integrate them into a single, comprehensive border security system for DHS. CBP is the agent for SBI*net*, carrying out the program to better execute this vital mission

CBP would deploy a mix of technology, TI, and personnel based on operational need to gain control of each diverse mile of the U.S. border. Operational control exists when CBP is consistently able to: (1) detect illegal entries in to the U.S.; (2) identify and classify these entries to determine the level of threat involved; (3) efficiently and effectively respond to these entries; and, (4) bring each event to an appropriate law enforcement resolution.

1.1.2 Legislative Background

Among its many functions, DHS is charged with enforcing the Immigration and Naturalization Act (INA), which includes the power and duty to control and guard the boundaries and borders of the U. S. against the illegal entry of aliens (8 U.S.C. 1103). Pursuant to Section 1502 of the Homeland Security Act, the President's reorganization plan of January 30, 2003, established CBP, which has responsibility for the resources and missions of the legacy Customs Service and INS relating to borders and POEs. CBP's core mission is to defend U.S. borders against all threats while facilitating legitimate trade and travel.

As a component of DHS that is responsible for border security, CBP shares DHS's mandate from Congress to achieve and maintain operational control of the U.S. borders (8 U.S.C. 1701). Pursuant to Section 102 of the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA), as amended, Congress has provided DHS with a number of authorities necessary to accomplish this mandate. Section 102(a) provides that the Secretary of Homeland of Security shall take such actions as may be necessary to install additional physical barriers and roads in the vicinity of the U.S. borders to deter illegal crossings in areas of high illegal entry. Under the Secure Fence Act of 2006, Congress called on DHS to install not less than 700 miles of fencing on the southwest border and to provide for the installation of additional physical barriers, roads, lighting, cameras, and sensors to gain operational control of the southwest border. SBI*net* is working to design, develop, and deploy the technology-based solutions that will help DHS meet Congress' mandate to achieve and maintain operational control of the U.S. borders.

1.2 PURPOSE AND NEED

The purpose of the proposed project is to employ technological infrastructure capable of providing a more efficient and effective means of assessing all border activities including; rapid detection, accurate characterization of the potential threat, coordinated tracking, and deployment of appropriate resources in the apprehension of ICs. Meeting this purpose would establish and maintain operational control of the U.S. border along approximately 81 miles of border in the Tucson Sector, encompassing border zones in and around Tucson, Nogales, and Sonoita stations, as well as portions of Ajo and Casa Grande stations.

The implementation of this proposed project would support CBP's mission and activities of predicting, detecting, identifying, classifying, tracking, and responding to illegal cross-border activities at and between POEs and within the Ajo, Casa Grande, Tucson, Nogales and Sonoita stations' AORs. The project would provide necessary decision support information to assist CBP officers and agents in the resolution of all border incursions.

Due to the frequency and nature of illegal border activities and the vast geographic area over which these activities occur, there is a need for a technology based solution that can collect, resolve, and distribute the information necessary to provide a Common Operating Picture (COP) among enforcement agencies. The COP will provide connectivity with various CBP components, and inter-operability with other Federal, state, and local partners outside of CBP. The SBI*net* system is expected to allow the CBP to spend less time locating and pursuing violators, and more time apprehending and seizing those involved in illegal border activities.

This SBI*net* Tucson West project is proposed to meet the stated purpose and need by:

1) Installing and upgrading technology and infrastructure components to give CBP agents ability to gain, maintain, and strengthen control of the border within proximity of the international boundary;
2) Including improved surveillance technology solutions to enhance border enforcement capabilities;
3) Applying surveillance technologies that would refine detection, interception, and apprehension of ICs, smugglers, and terrorists;
4) Reducing crime in border communities by detecting, apprehending, and deterring smugglers of humans, drugs, and other contraband.

1.3 PUBLIC INVOLVEMENT

1.3.1 Public Review

SBI*net* initiated public involvement and scoping activities as directed by 40 CFR Section 1501.7, 1503, and 1506.6 to identify any significant issues related to this proposed project. This process began in June 2007 through the issuance of 47 agency coordination letters to affected Federal, state and local agencies and affected Indian tribes, inviting their participation and input regarding this proposed project. Six responses were received. These letters and responses are included in Appendix A.

A public scoping meeting was held on July 17, 2007, in Tucson to present and discuss plans for this proposed project and to explain how this action would be analyzed in this EA. Members of the public in attendance were invited to provide comments and questions about the proposed project after the presentation. A transcript of this public scoping meeting is included in Appendix B.

A draft EA was released for a 30 day public review period beginning on June 5, 2008. A Notice of Availability (NOA) was published in both English and Spanish in the *Casa Grande Dispatch, Nogales International, Sierra Vista Herald, and the Arizona Daily Star* to announce the public comment period and the availability of the Draft EA. Copies of the various proofs of publication are contained in Appendix C. Comments received during the 30 day public review and comment period and SBI*net*'s responses are included in Appendix A. During the 30-day public comment period, 24 letters and emails were received: four from Federal agencies, two from state agencies, four from non-governmental organizations, and 14 from private citizens. Most of these comments expressed concerns about the location of the towers; other comments referenced radio frequency and lighting affects on astronomical observatories and potential effects to wildlife, landscape, and threatened or endangered species. Where appropriate, the final EA has been revised to incorporate these comments into the analyses. A NOA for this final EA will be published in the *Casa Grande Dispatch, Nogales International*, *Sierra Vista Herald,* and *Arizona Daily Star* newspapers.

1.3.2 Agency Coordination

Coordination and consultation with stakeholder agencies and other potentially affected parties occurred at the initial preparation stages of this EA. This began in June 2007 through the issuance of agency coordination letters to affected Federal, state, and local agencies and affected Indian tribes, inviting their participation and input regarding the proposed project. Copies of correspondence generated during the preparation of this EA are presented in Appendix A. Formal and informal coordination was conducted with the following agencies:

- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (USEPA)
- U.S. Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS)
- Arizona Game and Fish Department (AGFD)
- Arizona State Historic Preservation Officer (SHPO)
- Arizona Department of Environmental Quality (ADEQ)
- Arizona Department of Transportation (ADOT)
- U.S. Section, International Boundary and Water Commission (USIBWC)
- U.S. Army Corps of Engineers (USACE)

1.4 COOPERATING AGENCIES

U.S. Department of the Interior (DOI) is a cooperating agency on SBI projects including the SBI*net* proposed project included in this EA. A Memorandum of Agreement (MOA) was established between the DOI and CBP. A copy of the MOA is included in Appendix C.

1.5 FRAMEWORK FOR ANALYSIS

NEPA is the Federal statute that requires agencies to identify and analyze the potential environmental impacts of proposed Federal actions before those actions are taken. NEPA also established the CEQ as the executive agency charged with administering and interpreting NEPA's regulations (40 CFR 1500) and ensuring agencies' compliance with NEPA. The NEPA regulations mandate that all Federal agencies use a systematic interdisciplinary approach to environmental planning and the evaluation of actions that might affect the environment. The NEPA 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 decision-making.

The process for implementing NEPA is codified in 40 CFR 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*, and DHS's *Management Directive 5100.1, Environmental Planning Program* (71 *FR* 16790). CEQ was established under NEPA to implement and oversee Federal policy in this process. The NEPA regulations specify that the following must be accomplished 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; and
- Facilitate preparation of an EIS when one is necessary.

To comply with NEPA, the planning and decision-making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of this EA which enables the decision-maker to make a comprehensive analysis of potentially significant environmental issues and other environmental requirements associated with the proposed action, and to determine whether this proposed action has the potential to cause significant environmental effects in accordance with 40 CFR 1508.9.

As noted earlier, NEPA requires an inter-disciplinary approach to environmental analysis. To that end, Table 1-1 summarizes some of the applicable laws and regulations that guided the development of this EA. An inter-disciplinary team of environmental scientists, biologists, planners, economists, engineers, archaeologists, and historians, has analyzed the Proposed Action and alternative, in light of the existing conditions of the region and specific tower sites, and has identified relevant beneficial and adverse effects associated with the action. In addressing these effects, numerous guidelines, regulations, and Executive Orders (EO) were considered.

Table 1-1. Applicable Environmental Statutes and Regulations

Federal Statutes
Archaeological and Historical Preservation Act of 1974, as amended
Archaeological Resources Protection Act of 1979
Clean Air Act of 1955, as amended
Clean Water Act of 1977, as amended
Endangered Species Act of 1973, as amended
Migratory Bird Treaty Act of 1972
National Historic Preservation Act of 1966, as amended
National Environmental Policy Act of 1969, as amended
National Wildlife Refuge System Improvement Act of 1997
Watershed Protection and Flood Prevention Act of 1954
Wild and Scenic Rivers Act of 1968, as amended
Farmland Protection Policy Act of 1980
Native American Graves Protection and Repatriation Act of 1990
Executive Orders (EO), Memorandums, *etc.*
Floodplain Management (EO 11988) of 1977
Protection of Wetlands (EO 11990) of 1977
Federal Actions to Address Environmental Justice to Minority Populations and Low-Income Populations (EO 12898) of 1994
Protection of Children from Environmental Health Risks (EO 13045) of 1997
Protection of Migratory Birds & Game Mammals (EO 11629) of 2001
Indian Sacred Sites (EO 13007) of 1996
Consultation and Coordination with Indian Tribal Governments (EO 13175) of 2000
Government-to-Government Relations with Native American Tribal Governments (Presidential Memorandum) of 1994

SECTION 2.0
PROPOSED ACTION AND ALTERNATIVES

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 ALTERNATIVES AND ALTERNATIVES SELECTION

As the proponent agency preparing this EA, CBP developed a range of alternatives with consideration of the purpose and need outlined above and of the potential effects to the environment. The purpose of this project is to support CBP's mission through enhancing technological capabilities in support of a COP capable of assessing a high frequency and volume of illegal activities over a vast area of the border region. To this end, CBP considered various technological systems and equipment capable of providing spatially and temporally continuous surveillance across the entire 81-mile border region of this project. Each of these alternatives was fully evaluated in terms of the purpose and need, as well as costs, operability, and potential impacts to the environment. Alternatives which did not fully meet the purpose of this project, or which presented environmental concerns, were eliminated from further analysis and are discussed in Section 2.5, below. The Proposed Action, described in Section 2.3, is the only alternative which fully meets the purpose of this project within the constraints of environmental and operational considerations and is the only action alternative assessed in this EA. The No Action Alternative, described in Section 2.4, is assessed as required by CEQ.

2.2 CRITERIA FOR TOWER SITE SELECTION

The sensor and communications tower site selection process identifies potential suitable site locations and their alternatives. Key tower site evaluation considerations take into account constructability, operability, and environmental factors. The site selection process began with a conceptual field laydown, where maximum surveillance capability is achieved with a minimal number of tower sites established using mapping programs and a modeling and analysis process. Operationally preferred site locations were then selected by CBP personnel based on their knowledge of the terrain, environment, land ownership, and operations. Selected tower sites were then screened for constructability, operability, and environmental constraints. The selection process was then iterated until full surveillance and communications were provided in areas where screening eliminated tower sites.

The site selection team first employed a Wide Area Surveillance Sensor Placement Tool (WASSPT) which is a four-stage, integrated analysis, and visualization tool for cost-effective placement of towers across areas of interest. The WASSPT helps determine the minimum number of towers needed for maximum coverage of a given area. After a conceptual field laydown of prospective tower sites is agreed to by CBP, the project's environmental, construction, and operational team personnel conducted site visits and completed site visit reports with site ranking matrices for each site. During site visits, project team personnel used site ranking criteria to establish whether sites exhibit exclusionary, restrictive, and/or selective characteristics from constructability, operability, and/or environmental criteria perspectives.

The SBI*net* Tucson West project preliminary site surveys were conducted in July 2007, following an intensive mapping exercise in with CBP and DHS personnel. Detailed environmental and cultural surveys followed beginning in October 2007. During those surveys, over 74 sites were initially evaluated by additional team personnel for both sensor and communication efficiencies and included overall compatibility with SBI*net* network design and connectivity. Of the sites surveyed, 52 sites were eliminated as unsuitable for tower construction due to terrain or access considerations, the presence of cultural and/or sensitive resources, or technical requirements that could not be met in a particular location. These sites are summarized in Table 2-1. The reasons for their elimination as proposed tower sites are provided. Additional biological and cultural surveys were performed in late 2007 and early 2008 to ensure all additional proposed tower sites were evaluated as required.

Table 2-1. Alternate Sites Proposed but Rejected

Tower ID	Station	Reason for Rejection*
TCA-AJO-005	Ajo	O
TCA-AJO-007	Ajo	T
TCA-AJO-089	Ajo	O
TCA-AJO-090	Ajo	C
TCA-CAG-171	Casa Grande	T
TCA-TUS-030	Tucson	O,T
TCA-TUS-031	Tucson	E
TCA-TUS-033	Tucson	O
TCA-TUS-034	Tucson	O
TCA-TUS-039	Tucson	O,T
TCA-TUS-104	Tucson	O, T
TCA-TUS-105	Tucson	O, T
TCA-TUS-106	Tucson	O
TCA-TUS-107	Tucson	O, T
TCA-TUS-183	Tucson	T
TCA-TUS-186	Tucson	T
TCA-TUS-196	Tucson	T
TCA-TUS-221	Tucson	O, T
TCA-TUS-222	Tucson	O, T
TCA-TUS-288	Tucson	O,T
TCA-TUS-289	Tucson	O,T
TCA-TUS-292	Tucson	O,T
TCA-TUS-293	Tucson	O,T
TCA-TUS-297	Tucson	O,T
TCA-TUS-306	Tucson	O,C, E
TCA-TUS-307	Tucson	O,C, E
TCA-NGL-051	Nogales	O,T
TCA-NGL-053	Nogales	C
TCA-NGL-110	Nogales	O,T, E
TCA-NGL-111	Nogales	O
TCA-NGL-114	Nogales	O,T
TCA-NGL-137	Nogales	O, T
TCA-NGL-138	Nogales	O, T
TCA-NGL-139	Nogales	O, T
TCA-NGL-140	Nogales	O, T
TCA-NGL-141	Nogales	O, T
TCA-NGL-142	Nogales	O, T
TCA-NGL-194	Nogales	O, T
TCA-SON-116	Sonoita	O, T, C, E
TCA-SON-118	Sonoita	O,T,E
TCA-SON-119	Sonoita	T
TCA-SON-143	Sonoita	O, T
TCA-SON-144	Sonoita	O,T
TCA-SON-145	Sonoita	O,T,E
TCA-SON-182	Sonoita	O,T,C
TCA-SON-206	Sonoita	O,T
TCA-SON-207	Sonoita	T
TCA-SON-208	Sonoita	O, T, C, E
TCA-SON-219	Sonoita	T
TCA-SON-223	Sonoita	T
TCA-SON-224	Sonoita	T

O—operational, T—technical, C—constructability, E—environmental

2.3 PROPOSED ACTION

The Proposed Action analyzed in this EA is an USBP sector-based project and component of the SBI*net* program known as the SBI*net* Tucson West project. The Proposed Action includes the construction, upgrade, operation, and maintenance of 54 sensor and communication towers and associated access roads, which creates a communications network in support of a COP among components of CBP and other Federal, state, and local partners outside CBP. Information gathered as part of CBP operations, including vehicles upgraded with COP connectivity and placement of unattended ground sensors, would further contribute to the COP. The COP would also provide mechanisms to communicate comprehensive situational awareness, including information to incorporate intelligence-driven capabilities at all operational levels and locations.

Three vehicle mobile surveillance systems per station and Unattended Ground Sensors (UGS) are also proposed under this SBI*net* project, but are not analyzed as a part of the Proposed Action because their potential impacts are benign. They are an integral part of the overall COP border environment and, as such, are briefly discussed herein. The existing CBP vehicles will be retrofitted with technologies to allow CBP agents to acquire/send information via the new surveillance and communication towers. The UGS would be placed in disturbed areas where no vegetation would have to be removed for deployment. The intent of the upgraded vehicles, combined with the towers and UGS is to make CBP enforcement actions more efficient and effective. If this is reached, fewer vehicle trips should be required.

The Proposed Action described in this EA represents the current view CBP's plan to develop technology, infrastructure, transportation assets, and deployment of CBP personnel to achieve operational control of 81 miles of border in the Tucson Sector. Technology to be considered in the design includes: sensors and other surveillance assets; and communications, command and control systems along the border, within command centers, within vehicles, and among CBP personnel. Infrastructure to be considered within this plan includes roadways along the border and to/from surveillance assets, communications and sensor towers, and utilities.

As part of the COP, the 54 towers would be able to communicate with the network, with the station that they operate under (*i.e.*, Ajo, Casa Grande, Tucson, Nogales and Sonoita stations), and with Tucson Sector Headquarters, providing a overall network system of communications and surveillance along the entire 81-mile border area (Figure 2-1a and b).

The 54 towers included in the Proposed Action contain upgrades to 12 existing towers (seven existing CBP towers, one tower located at the new proposed Ajo Station, and four existing commercial towers). Impacts resulting from the construction of the 42 new towers and the retrofit/replacement of the 12 existing towers are fully assessed in this EA; however, upgrades to the existing towers are considered to be environmentally benign due to the fact the areas are currently disturbed and no further ground disturbance would occur. One of the 12 towers is actually a replacement tower, which would be located at the new Ajo Station that is currently under construction. This tower would be located within an area, which has already been fully analyzed under a previous EA (CBP 2007b). The remaining 11 towers would only receive retrofits or upgrades to the current tower communications hardware arrays.

The 12 existing towers (including the one proposed Ajo Station tower) are summarized below in Table 2-2. The four commercial towers have been utilized by CBP for several years for land mobile radio (LMR) communication needs and have communications hardware arrays on the commercial tower structure. These towers have been referred to as P25 towers by CBP. Two P25 towers, TCA-CAG-195 and TCA-TUS-291 would require access road repair, or new approach road construction; therefore, the ground disturbing activities are analyzed for these towers as well as for the other 42 towers in this EA.

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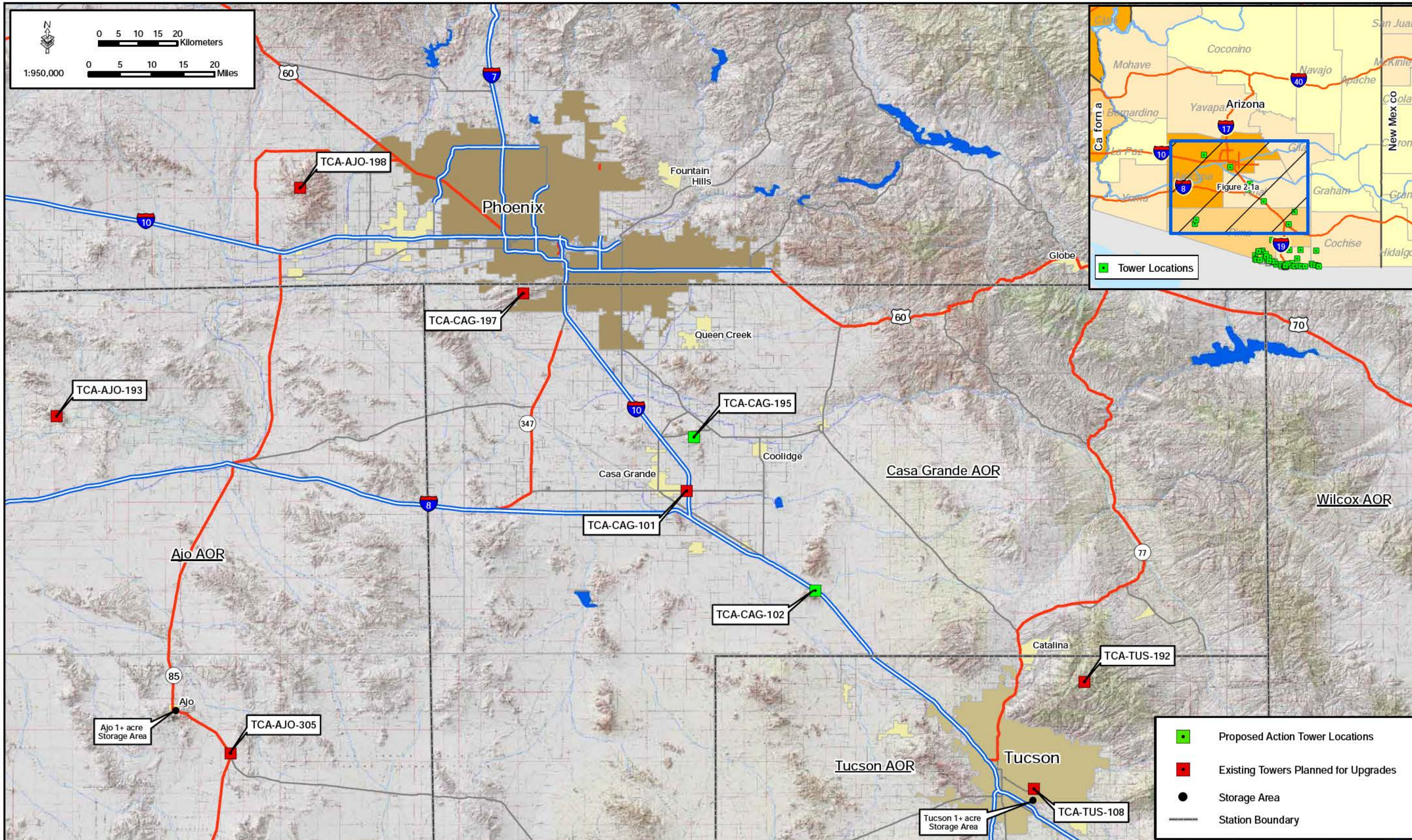

Figure 2-1a: Project Location Map

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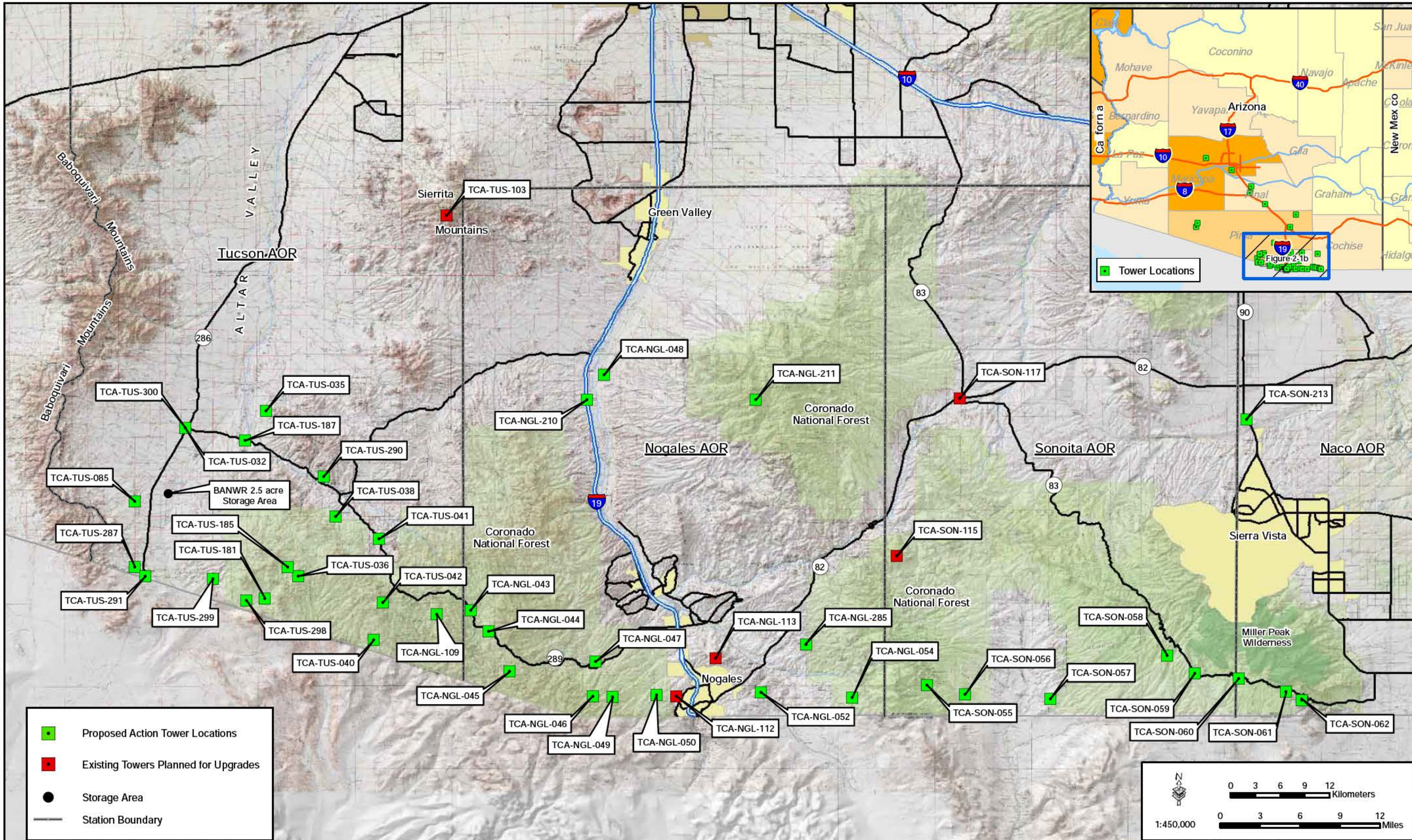

Figure 2-1b: Project Location Map

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Table 2-2. Existing or Proposed Towers Planned for Upgrades

Tower ID	Type	Station	Status
TCA-AJO-193	P25	Ajo	Commercial
TCA-AJO-198	P25	Ajo	Commercial
TCA-AJO-305	Tower on new proposed station*	Ajo	CBP
TCA-CAG-101	Casa Grande Station relay tower	Casa Grande	CBP
TCA-CAG-197	P25	Casa Grande	Commercial
TCA-TUS-103	Repeater sector tower	Tucson	CBP
TCA-TUS-108	Tucson Station relay tower	Tucson	CBP
TCA-TUS-192	P25	Tucson	Commercial
TCA-NGL-112	Nogales Station relay tower	Nogales	CBP
TCA-NGL-113	Existing sector tower	Nogales	CBP
TCA-SON-115	Existing sector tower	Sonoita	CBP
TCA-SON-117	Sonoita Station relay tower	Sonoita	CBP

*New tower will be upgraded. The tower and station construction were addressed in a separate EA.

Impacts resulting from the construction, operation, and maintenance of the remaining 42 proposed tower sites and their associated access roads, and utility needs will be the focus of this EA. The 42 proposed towers, separated by station, are as follows:

Casa Grande Station AOR (2 proposed tower sites)	**Tucson Station AOR (17 proposed tower sites)**	**Nogales Station AOR (14 proposed tower sites)**	**Sonoita Station AOR (9 proposed tower sites)**
TCA-CAG-102	TCA-TUS-032	TCA-NGL-043	TCA-SON-055
TCA-CAG-195	TCA-TUS-035	TCA-NGL-044	TCA-SON-056
	TCA-TUS-036	TCA-NGL-045	TCA-SON-057
	TCA-TUS-038	TCA-NGL-046	TCA-SON-058
	TCA-TUS-040	TCA-NGL-047	TCA-SON-059
	TCA-TUS-041	TCA-NGL-048	TCA-SON-060
	TCA-TUS-042	TCA-NGL-049	TCA-SON-061
	TCA-TUS-085	TCA-NGL-050	TCA-SON-062
	TCA-TUS-181	TCA-NGL-052	TCA-SON-213
	TCA-TUS-185	TCA-NGL-054	
	TCA-TUS-187	TCA-NGL-109	
	TCA-TUS-287	TCA-NGL-210	
	TCA-TUS-290	TCA-NGL-211	
	TCA-TUS-291	TCA-NGL-285	
	TCA-TUS-298		
	TCA-TUS-299		
	TCA-TUS-300		

In order to construct the proposed towers and access roads, CBP plans to purchase or lease private, state, or county lands; or employ special use permits on public lands, as necessary. In general, three types of tower structures are proposed for this project: self standing towers (SST), rapidly deployed towers (RDT), and a third type of tower design called a Ravens Butte (RB). The RB tower is proposed to be utilized at one tower site (TCA-NGL-109) and is a small skid-mounted tower which would require helicopter deployment. RDT and RB towers are temporary structures than can be disassembled if necessary.

Access roads would need to be improved or constructed in order to install, operate, and maintain the proposed towers. The new access roads would be constructed to provide a 12-foot wide driving surface with 2-foot shoulders on each side (16 feet total). Additionally, some of the new roads may require cut and fill while others may require a v-ditch on one side of the new road. If cut-and-fill would be required the construction impact could extend as much as 22 feet on either side of new roads (yielding an impact corridor 56 feet wide). Road repair would include minor grading, leveling, and installation of nuisance drainage structures, while road improvements would include reconstruction, widening, or straightening of the existing road, and installation of major drainage structures.

As mentioned above proposed tower TCA-NGL-109 would require helicopter deployment. Two other proposed towers, could also require helicopter deployment; although, the possibility exists that they may not be installed by helicopter but instead by vehicle via access roads. Both installation methods will be analyzed in this EA.

Currently the three main storage areas, as well as the individual staging areas at each proposed tower site would be utilized for tower and associated access road work (see Figure 2-1a and b). The three main storage areas are located:

- at an existing 1-acre industrial warehouse facility in south Tucson near Interstate 10 (I-10), and would facilitate the construction of the proposed towers;
- at an existing 2.5-acre maintenance and construction facility on the Buenos Aires National Wildlife Refuge (BANWR), and will facilitate the construction of the proposed towers located in and around the BANWR; and,
- at an existing 1-acre warehouse facility in northeast Ajo near State Route (SR) 85.

Each tower would have the subsequent design, power requirements, and site and fence enclosure footprint, unless otherwise noted in the following detailed proposed tower site discussions:

- Tower height – approximately 80 to 120 feet high, although SSTs can be higher than 120 feet without guy wires and RB towers would be much shorter;
- Power source – commercial grid power (where available) or a propane hybrid generator system with solar capabilities; and a 1,000 gallon propane fuel tank;
- Commercial grid power – all power lines would be installed either overhead or in buried cables from the main trunk line to the tower site shelter and then on an elevated cable tray to the tower[1]. If commercial power is utilized then the installation of overhead or buried lines would be placed within surveyed road construction buffer areas, all of which would need to be verified to not impact biological and cultural resources along access roads;
- A 10- X 12-foot equipment shelter would be within the perimeter fencing of each proposed tower site. The shelter would be installed on a precast concrete pad;
- Site permanent footprint –- could be up to 100- X 100-foot, including the 50- X 50-foot or 80- X 80-foot tower site and a maintained fire buffer. The fire buffer would be maintained free of vegetation;
- Site construction footprint – 100- X 100-foot; and
- Fence enclosure footprint: 50- X 50-foot X 8-foot or 80- X 80-foot X 8-foot chainlink with 3 strands of barbed wire at the top of the perimeter security fence enclosure surrounding the tower and its associated equipment shelter.

The 100- X 100-foot construction footprint for each proposed tower would be cleared and grubbed, although prior to any land disturbance, measures outlined in Section 5.0 will be in place to control erosion and minimize potential environmental effects. Individual tower staging areas will be within this construction footprint. The construction time for each proposed tower site is expected to be approximately 60 days and, in

[1] Although 9 new or replacement SBI*net* Tucson West towers are currently planned to be powered by commercial grid power there may be instances when commercial power may not be available immediately upon tower deployment. In that case, the power source would be supplied by a 35 kilowatt (kW) generator hybrid system until the commercial power infrastructure is in place. All 9 of these towers which are currently planned to be powered from commercial grid power are 3 miles or less from power service connections.

general, would occur during daylight hours; however, it is possible due to construction schedule constraints that some night-time construction could occur.

Typical designs for the sensor and communications towers consist of the following components: sensor towers equipped with multiple cameras (electro-optical/infrared sensors, video cameras), radio-frequency radar, and data receiving antennas. Each communications tower is expected to be equipped with one or more of the following communications components: parabolic dishes, microwave relays, and/or data receiving antennas. Combination sensor and communication towers would have the following components: multiple cameras (electro-optical/infrared sensors, video cameras), radio-frequency radar, parabolic dishes and microwave relays, and data receiving antennas.

Components would be mounted on each tower between approximately 20 to 200 feet above ground level, depending on the local terrain. The exact number and type of equipment would depend on the number and types of cameras used, the area to be monitored, and other design variables. Additionally, one or more solid parabolic antennas would be mounted on platform railings or on a separate antenna mount (not to exceed 13 feet). Cameras would be installed at heights that would ensure satisfactory views and provide clear pathways for transmission of information to relay stations and CBP stations. Towers generally require line-of-sight (LOS) to ensure clear microwave transmission signals from tower to tower.

Federal Aviation Administration (FAA) permits are necessary for all towers which exceed 200 feet. Additionally, FAA required lighting would be installed on towers that exceed 200 feet. Currently, only one proposed tower, TCA-SON-213 will be over 200 feet high. Lighting will be installed in accordance with FAA regulations, standards, and guidelines for the lighting of tower structures found in 14 CFR Section 77 and FAA Advisory Circulars AC 150/5345-43f and AC 70/7460-1K. Any infrared lighting installed on the proposed towers would be compatible with night vision goggle usage.

When tower facility lighting is deemed necessary to meet FAA regulations or CBP operational needs, such as infrared lighting, USFWS (2000) *Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers* would be implemented to reduce night-time atmospheric lighting and the potential adverse effects of night-time lighting to migratory birds, nocturnal flying species, and nearby astronomical observatories. If the tower sites are illuminated for CBP security purposes then lighting would: utilize low sodium bulbs, prevent illumination trespass outside the footprint of the tower site, and when possible, be activated by motion detectors.

SSTs are steel, lattice-style structures which have three circular concrete pilings approximately 4 feet in diameter, and would be placed at each site to anchor the tower legs in the ground (Figure 2-2). Depth of the pilings is dependent on tower height and geotechnical characteristics at each tower site, but would not go deeper than 30 feet below ground surface (bgs).

RDTs are lattice style structures which use pre-cast modular stacked slabs for the foundation and are typically 8- X 8-foot X 6 inches and 10- X 10-foot X 6 inches depending upon tower height (Figure 2-3). The lowermost foundation slab rests on top of approximately 2 feet of crushed stone at the base of the excavated area. The depth of each tower foundation is dependent on tower height and geotechnical characteristics at each tower site. Tower foundations could be placed to a depth of 12 to 15 feet bgs depending on tower height and geotechnical characteristics at each tower site. The uppermost tower foundation slab may potentially extend from 7 inches to 26 inches above the existing surface grade.

Proposed tower, TCA-SON-062 would be located at the National Park Service (NPS) Coronado National Memorial Montezuma Pass overlook and would also require that the park overlook restroom be relocated. The restroom would be very near where it currently exists and within a previously disturbed site. No flushing or running water would be required as it would be a composting facility as it is currently.

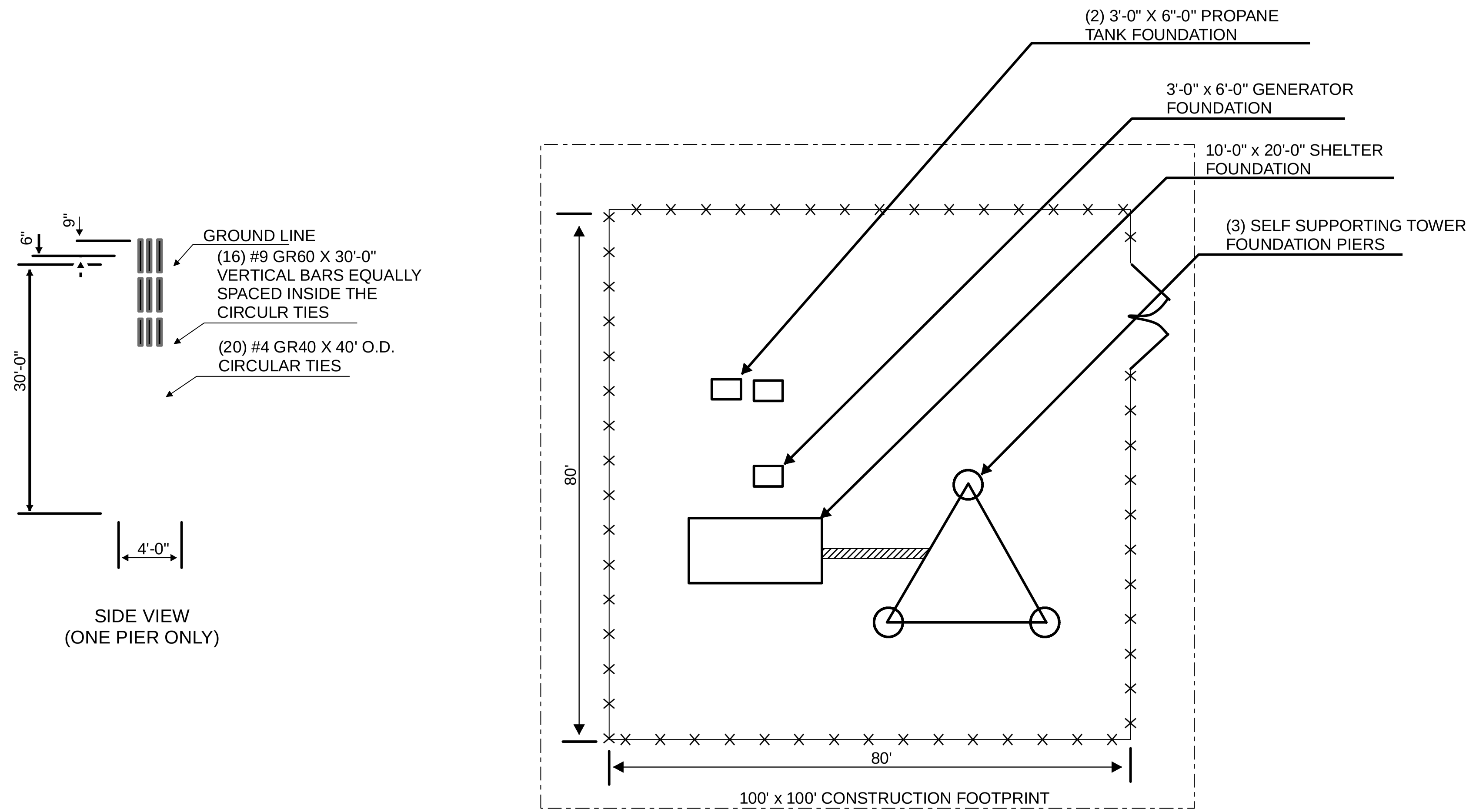

Figure 2-2: Self Standing Tower Foundation Schematic

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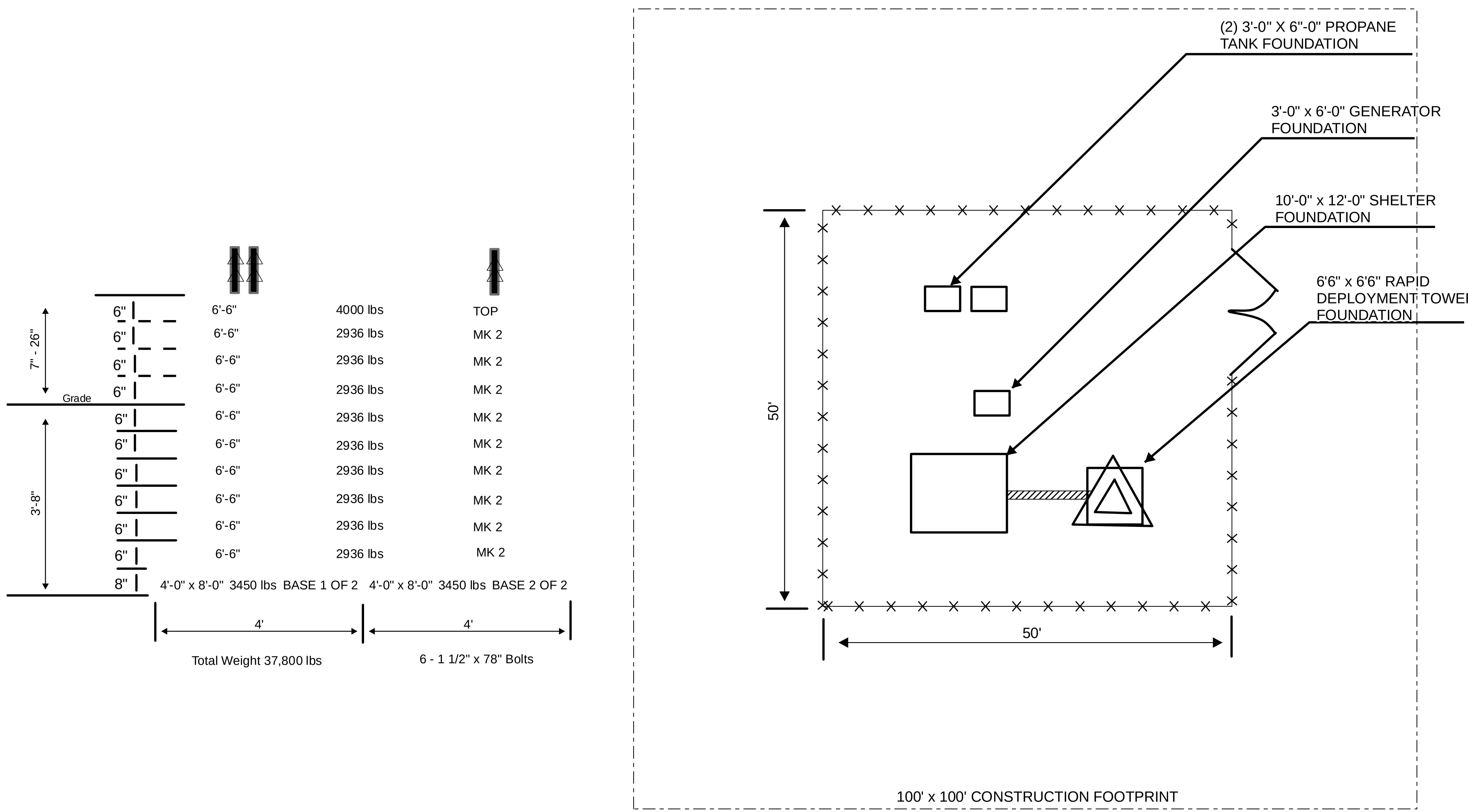

Figure 2-3: RDT Stacking Slab Tower Foundation Schematic

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As part of the Proposed Action, the towers would require bi-monthly maintenance for the RRVS towers, while communication towers would require monthly maintenance visits. This necessitates vehicle travel to each of the proposed tower sites for propane delivery, maintenance, and operations of the towers. For the proposed towers that may be installed by helicopter, they would require maintenance activities via helicopter.

CBP is coordinating with USFWS regarding five tower sites that are proposed for the BANWR. Construction of these five sites is contingent upon a USFWS determination that they are appropriate and compatible uses in the BANWR.

Based on discussions with various resource agencies, SBI*net* has agreed that 12 months after any tower in the proposed project is not determined to be functional SBI*net* will remove the tower(s) and remediate any impacts caused by the tower construction, operation, and removal.

The following discussion is a detailed description of each of the proposed new or replacement towers, excluding the 12 existing towers included in Table 2-2. A summary table of pertinent information on each tower site and its configuration is provided in Appendix D. Within the following proposed tower descriptions, new roads would consist of blading of in situ materials, tower access road improvements would include reconstruction of the existing road, and installation of major drainage structures, and road repair would include minor grading, leveling, and installation of nuisance drainage structures.

2.3.1 Casa Grande AOR Proposed Tower Descriptions

Tower ID:	**TCA-CAG-102**
Type of Tower:	CRT
Tower Foundation:	SST
Tower Height:	Approximately 120 feet
Station:	Casa Grande
Location:	Pinal County
Land Use:	Privately-owned land
Location Description:	The proposed tower site for TCA-CAG-102 is located approximately 35 miles northwest of Tucson, Arizona (Figure 2-4).
Tower Access:	Access to the proposed site is via an existing road called East Camino Adelante Road. No improvements or repair to the existing access road are needed.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

Tower ID:	**TCA-CAG-195**
Type of Tower:	CRT
Tower Foundation:	Existing SST, lattice
Tower Height:	Approximately 100 feet
Station:	Casa Grande
Location:	Pinal County
Land Use:	Gila Indian Reservation
Location Description:	The proposed tower site for TCA-CAG-195 is located approximately 70 miles northwest of Tucson, Arizona and is directly accessed from SR 387 (see Figure 2-4).
Tower Access:	Access road repair (3,570 feet) are required to facilitate tower installation and maintenance.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

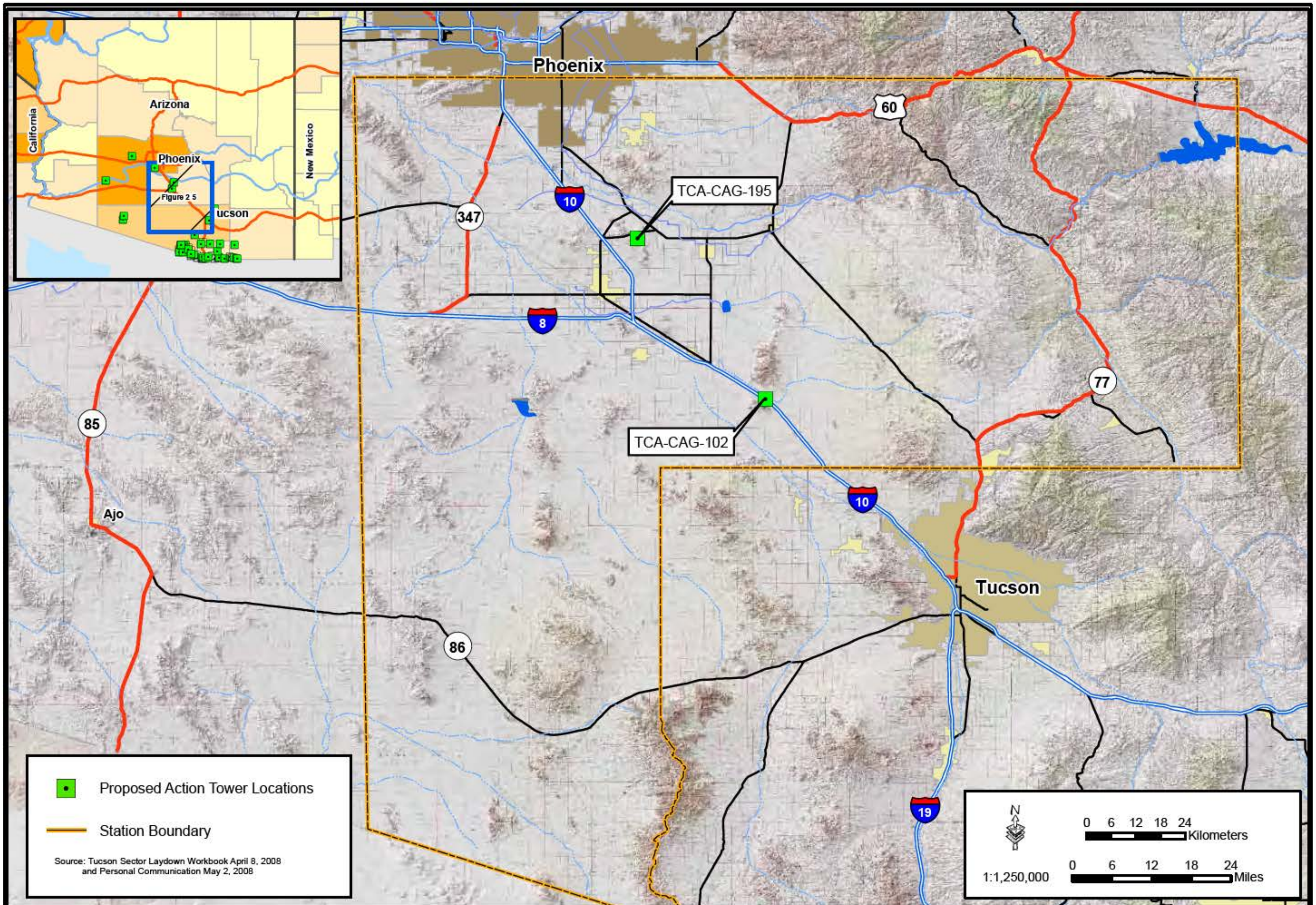

Figure 2-4: Casa Grande AO Proposed Towers

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2.3.2 Tucson AOR Proposed Tower Descriptions

Tower ID:	**TCA-TUS-032**
Type of Tower:	RRVS or an RRVS-CRT
Tower Foundation:	RDT or a SST
Tower Height:	Up to 120 feet for RDT, or up to 180 feet if a SST
Station:	Tucson
Location:	Pima County
Land Use:	Pima County land - BANWR
Location Description:	The proposed tower site for TCA-TUS-032 is approximately 453 feet west of SR 286, also known as South Sasabe Road (Figure 2-5).
Tower Access:	Access to the site is via an existing unimproved BANWR access road. No improvements or repair to the existing access road would be needed.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

Tower ID:	**TCA-TUS-035**
Type of Tower:	RRVS-CRT
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	BANWR
Location Description:	The proposed tower site for TCA-TUS-035 is approximately 33 miles south of Three Points, Pima County, Arizona on the BANWR (see Figure 2-5).
Tower Access:	Access to the site from West Arivaca-Sasabe Road is via an existing unimproved BANWR access road. A small amount of new access road construction (42 feet) would be needed to facilitate tower installation and maintenance. Approximately 52 cubic yards of fill would need to be brought on-site for tower site grading at a site identified by and agreed to be BANWR land management plans and personnel.
Type of Primary Power:	Generator-solar hybrid

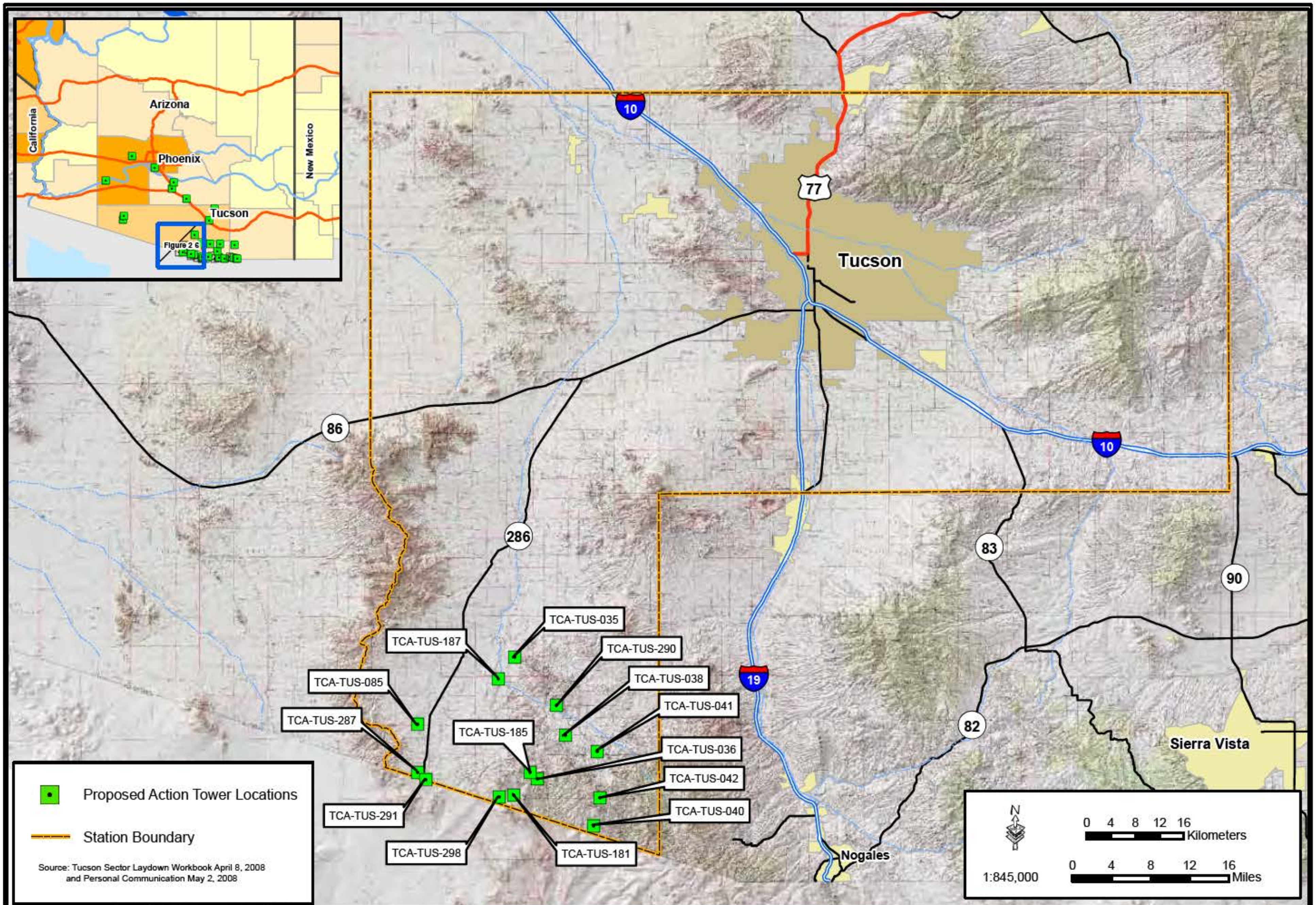

Figure 2-5: Tucson AO Proposed Towers

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Tower ID:	**TCA-TUS-036**
Type of Tower:	RRVS-CRT
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	Coronado National Forest (CNF)
Location Description:	The proposed tower site for TCA-TUS-036 is approximately 262 feet west of Tres Boleros Road (see Figure 2-5) and is along a low ridge south of Black Mesa.
Tower Access:	Access to the site from the maintained Tres Bellotas is via an existing unimproved U.S. Forest Service (USFS) access road. A small amount of access road improvements (55 feet) would be necessary for tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-038**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	CNF near an existing P28 mobile tower site
Location Description:	The proposed tower site for TCA-TUS-038 is approximately 76 feet east of Tres Bellotas Road (see Figure 2-5). The proposed site is predominately undeveloped and has high and dense grass cover.
Tower Access:	Access to the site is from the USFS-maintained Tres Bellotas Road access road. A small amount of access road repair (25 feet) would be necessary for tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-040**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Santa Cruz County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-TUS-040 is approximately 11 miles south of Arivaca, Arizona, on the CNF between Bonita Canyon and Holden Canyon and the International Border is approximately 3.9 miles to the south (see Figure 2-5).
Tower Access:	Currently, it has not been determined if tower installation would be via access roads or helicopter airlift therefore this document will analyze impacts for both deployment method. Road access to the site is from Tres Bellotas Road via Dead Horse Ridge Road. Access road repair (13,995 feet) and some new road construction (1,138 feet) may be necessary for tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-041**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	CNF - Cattle grazing
Location Description:	The proposed tower site for TCA-TUS-041 is approximately 156 feet east of SR 289 also known as South Ruby Road.
Tower Access:	Access to the site from South Ruby Road is via an existing unimproved jeep trail. Access road improvements (128 feet) would be necessary for tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-042**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Santa Cruz County
Land Use:	CNF - Undeveloped
Location Description:	The proposed tower site for TCA-TUS-042 is approximately 1.1 miles southwest of SR 289 also known as South Ruby Road and situated on the northeastern slope of the Cobre Mountain (see Figure 2-5).
Tower Access:	Access to the site from South Ruby Road is via Warsaw Canyon Road and Forest Service Road (FSR) 4175 (Cobre Road). Currently, it has not been determined if tower installation would be via access roads or helicopter airlift therefore this document will analyze impacts for both deployment method. Access road repair (6,155 feet) and a very small amount of new road construction (3 feet) within the tower compound may be necessary for tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-085**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	BANWR land - Undeveloped
Location Description:	The proposed tower site for TCA-TUS-085 is approximately 1 mile west of SR 286, also known as South Sasabe Road, situated on a low grassy ridge with dense grass coverage.
Tower Access:	Access to the site from South Sasabe Road is via an existing BANWR maintained access road. Access road repair (825 feet) and a small amount of new road construction (33 feet) would be necessary to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-181**
Type of Tower:	CRT
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-TUS-181 is approximately 64 miles southwest of Tucson (see Figure 2-5).
Tower Access:	Access road repair (2,107 feet) and a small amount of new road construction (48 feet) would be necessary to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-185**
Type of Tower:	CRT
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	CNF - Recreational use
Location Description:	The proposed tower site for TCA-TUS-185 is approximately 63 miles southwest of Tucson (see Figure 2-5).
Tower Access:	Access road repair (4,519 feet) and a small amount of new road construction (49 feet) would be necessary to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-187**
Type of Tower:	CRT
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	BANWR
Location Description:	The proposed tower site for TCA-TUS-187 is approximately 55 miles southeast of Tucson (see Figure 2-5) and can be accessed from Arivaca Road.
Tower Access:	New access road construction (136 feet) would be necessary to facilitate tower installation and maintenance from Arivaca Road to the tower site. Additionally, a 16 foot wide gate would be installed at an existing fence.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-287**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	BANWR
Location Description:	The proposed tower site for TCA-TUS-287 is located 1 mile northwest of the Sasabe POE and approximately 0.5 miles north of the International Border (see Figure 2-5).
Tower Access:	A small amount of road improvements (98 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

Tower ID:	**TCA-TUS-290**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use :	Privately-owned land
Location Description:	The proposed tower site for TCA-TUS-290 is located 1.8 miles northwest of Arivaca approximately 12 miles north of the International Border (see Figure 2-5).
Tower Access:	New access road construction (58 feet) and road repair (50 feet) would be needed to facilitate tower installation and maintenance. Additionally, an irrigation or livestock water line may be buried underground and encased in concrete.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

Tower ID:	**TCA-TUS-291**
Type of Tower:	CRT
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use :	CBP
Location Description:	The proposed tower site for TCA-TUS-291 is located within the Sasabe POE and access to the site would be off of SR 286 (South Sasabe Road) (see Figure 2-5).
Tower Access:	New access road construction (70 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

Tower ID:	**TCA-TUS-298**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-TUS-298 is located north of Tres Boleros Road and is approximately 0.7 mile north of the International Border (see Figure 2-5).
Tower Access:	New access road construction (1,872 feet) would be needed to facilitate tower installation and maintenance. Additionally, a 16 foot wide gate will be installed.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-TUS-299**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Tucson
Location:	Pima County
Land Use:	BANWR
Location Description:	The proposed tower site for TCA-TUS-299 is located 1.6 miles north of the International Border (see Figure 2-5).
Tower Access:	New access road construction (50 feet) would be required to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCS-TUS-300**
Type of Tower:	CRT
Tower Foundation:	Existing SST
Tower Height:	NA
Station:	Tucson
Location:	Pima County
Land Use:	Pima County land – BANWR near an existing USFWS tower
Location Description:	TCA-TUS-300 is located northwest of SR 286 and Arivaca Sasabe Road and is directly southwest approximately 550 feet from proposed tower TCA-TUS 306 (see Figure 2-5).
Tower Access:	No access road construction, repair, or improvements would be required to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

2.3.3 Nogales AOR Proposed Tower Descriptions

Tower ID:	**TCA-NGL-043**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF - Undeveloped
Location Description:	The proposed tower site for TCA-NGL-043 is approximately 19 miles west of Nogales, Arizona (Figure 2-6).
Tower Access:	Access to the site is from the existing access road, Ruby Road or SR 289. New access road construction (439 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

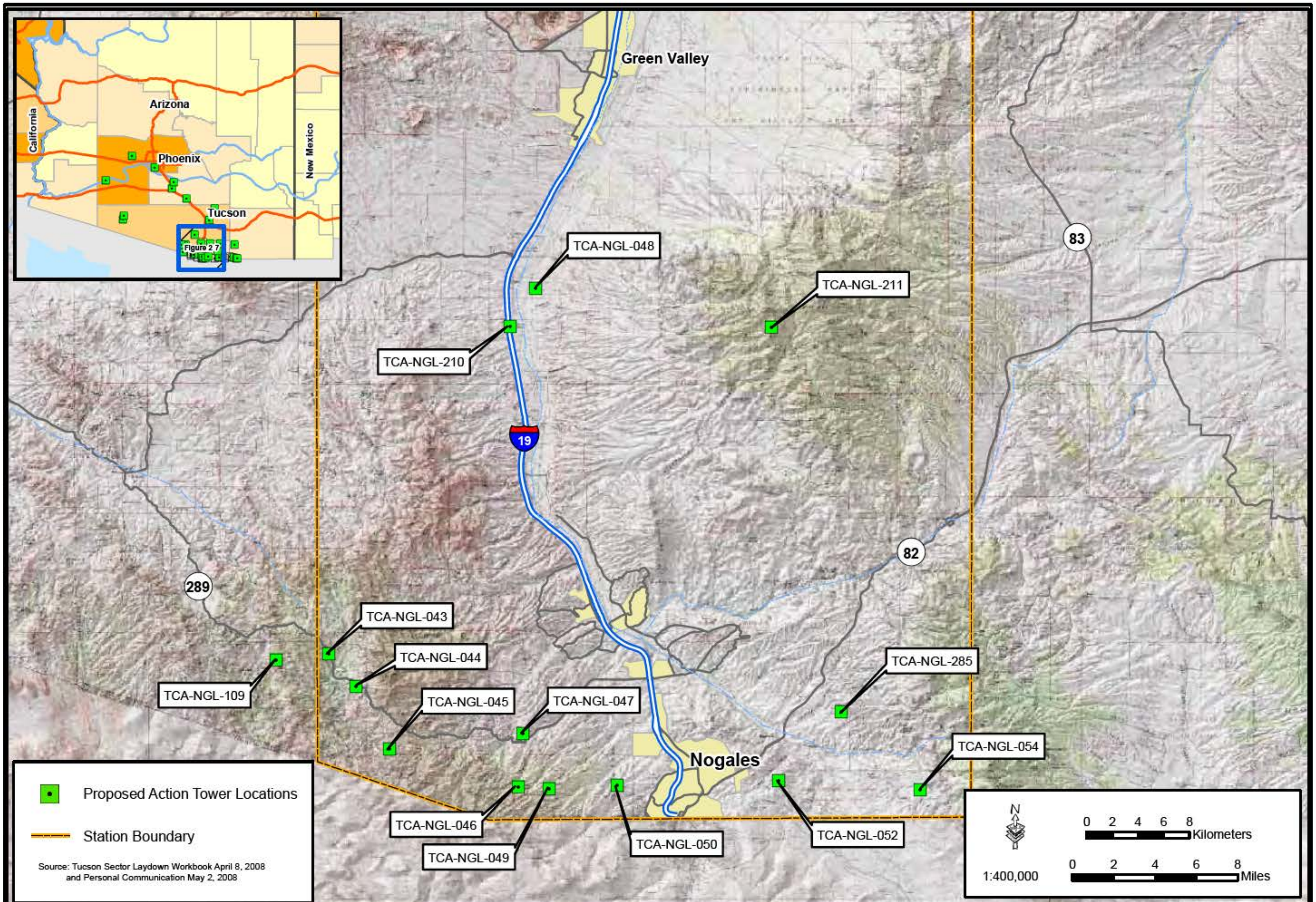

Figure 2-6: Nogales AO Proposed Towers

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Tower ID:	**TCA-NGL-044**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF - Undeveloped
Location Description:	The proposed tower site for TCA-NGL-044 is approximately 18.5 miles west of Nogales, Arizona (see Figure 2-6).
Tower Access:	Access to the site is from the existing access road, Ruby Road or SR 289. New access road construction (274 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-045**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF - Undeveloped
Location Description:	The proposed tower site for TCA-NGL-045 is approximately 16 miles west of Nogales, Arizona (see Figure 2-6).
Tower Access:	Access to the site is from an existing access road, Summit Motor Way. New access road construction (409 feet) and the installation of a gate at an existing fence would be required to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-046**
Type of Tower:	RRVS
Tower Foundation:	SST
Tower Height:	Approximately 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF - Disturbed old tower
Location Description:	The proposed tower site for TCA-NGL-046 is approximately 10 miles west of Nogales, Arizona (see Figure 2-6).
Tower Access:	Access road repair (1,486 feet) and a very small amount of new road (14 feet) would be needed to facilitate tower installation and maintenance. Additionally, 85 cubic yards of fill would be needed for site grading which are obtained on-site or on CNF at a site identified by land management plans and personnel.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-047**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF - Undeveloped
Location Description:	The proposed tower site for TCA-NGL-047 is approximately 6.4 miles west of the town of Nogales, Arizona (see Figure 2-6).
Tower Access:	Access to the site is from an existing USFS road off of Ruby Road or SR 289. Access road repair (3,803 feet) would be needed to facilitate tower installation and maintenance. Three hundred cubic yards of fill would be needed for site grading which are obtained on-site or on the CNF at a site identified by and agreed to be CNF land management plans and personnel.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-048**
Type of Tower:	RRVS-CRT
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	Privately-owned land, undeveloped and used as open rangeland for cattle grazing.
Location Description:	The site is approximately 24 miles north of Nogales, Arizona and 1.25 miles east of Interstate 19 (see Figure 2-6).
Tower Access:	The current access road would not require any repair, or improvements.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-049**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF - Rangeland
Location Description:	The proposed tower site for TCA-NGL-049 is approximately 7 miles southwest to the intersection of Interstate 19 (I-19 business route) and Country Club Drive near the outskirts of Nogales, Arizona (see Figure 2-6).
Tower Access:	Access road repair (3,035 feet) and a small amount of new road construction (88 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-050**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-NGL-050 is approximately 3.5 miles west of the intersection of I-19 and Mariposa Road Interchange near the outskirts of Nogales, Arizona (see Figure 2-6).
Tower Access:	Access to the site is from an existing USFS road, FSR 4213, directly off of Mariposa Ranch Road. Access road repair (1,476 feet) and a small amount of new road construction (37 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-052**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	Privately-owned land
Location Description:	The proposed tower site for TCA-NGL-052 is approximately 4 miles east northeast of Nogales, Arizona (see Figure 2-6).
Tower Access:	Access to the site is on an existing access road directly off of North Royal Road. The current access road does not require any improvements, although a small amount of new road construction (68 feet) would be needed.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-054**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF - Undeveloped
Location Description:	The proposed tower site for TCA-NGL-054 is approximately 9.5 miles east of Nogales, Arizona (see Figure 2-6).
Tower Access:	The existing access road is FSR 20 directly off of Duquesne Road and in places the access road slope exceeds 20 percent. Access road repair (8,285 feet) and a small amount of new road construction (185 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-109**
Type of Tower:	CRT
Tower Foundation:	RB
Tower Height:	Approximately 30 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF land - Disturbed
Location Description:	The proposed tower site is approximately 18 miles northwest of Nogales, Arizona (see Figure 2-6).
Tower Access:	This particular design is intended for use in areas which are inaccessible and need an alternative transportation method for installation. The proposed tower, TCA-NGL-109 is currently planned to be installed via helicopter airlift.
Type of Primary Power:	Power to the tower will be provided by four solar panels and a wind turbine.

Tower ID:	**TCA-NGL-210**
Type of Tower:	CRT
Tower Foundation:	SST
Tower Height:	Approximately 100 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	ADOT land - Disturbed
Location Description:	The proposed tower site for TCA-NGL-210 is approximately 25 miles north of Nogales, Arizona area at the I-19 CBP Checkpoint between the I-19 exit from Nogales and East Frontage Road (see Figure 2-6).
Tower Access:	A small amount of new road construction (78 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-211**
Type of Tower:	CRT
Tower Foundation:	SST
Tower Height:	Approximately 100 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-NGL-211 is approximately 10 miles east of the community of Amado (see Figure 2-6); near an existing tower site.
Tower Access:	A small amount of new road construction (132 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-NGL-285**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Nogales
Location:	Santa Cruz County
Land Use:	Privately-owned land
Location Description:	The proposed tower site for TCA-NGL-285 is on CNF within the Patagonia Mountains and is approximately 1.5 miles northwest of the Nogales International Airport within Santa Cruz County (see Figure 2-6); near an existing tower site.
Tower Access:	Approximately, 22 feet of new approved road construction, along with the installation of one gate would need to occur to facilitate tower installation and maintenance.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

2.3.4 Sonoita AOR Proposed Tower Descriptions

Tower ID:	**TCA-SON-055**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Santa Cruz County
Land Use:	Privately-owned land - Undeveloped
Location Description:	The tower site for TCA-SON-055 is approximately 22 miles south of the intersection of SR 82 and 83 in Sonoita, Arizona within the CNF (Figure 2-7).
Tower Access:	Access to the tower is from FSR 7015 via several FSRs (128, 61, 813, and 58) and Harshaw Road. Road repair to FSR 7015 would be needed (4,014 feet) and new access road construction (286 feet) would be required to facilitate tower installation and maintenance. A gate would be required for security purposes.
Type of Primary Power:	Generator-solar hybrid

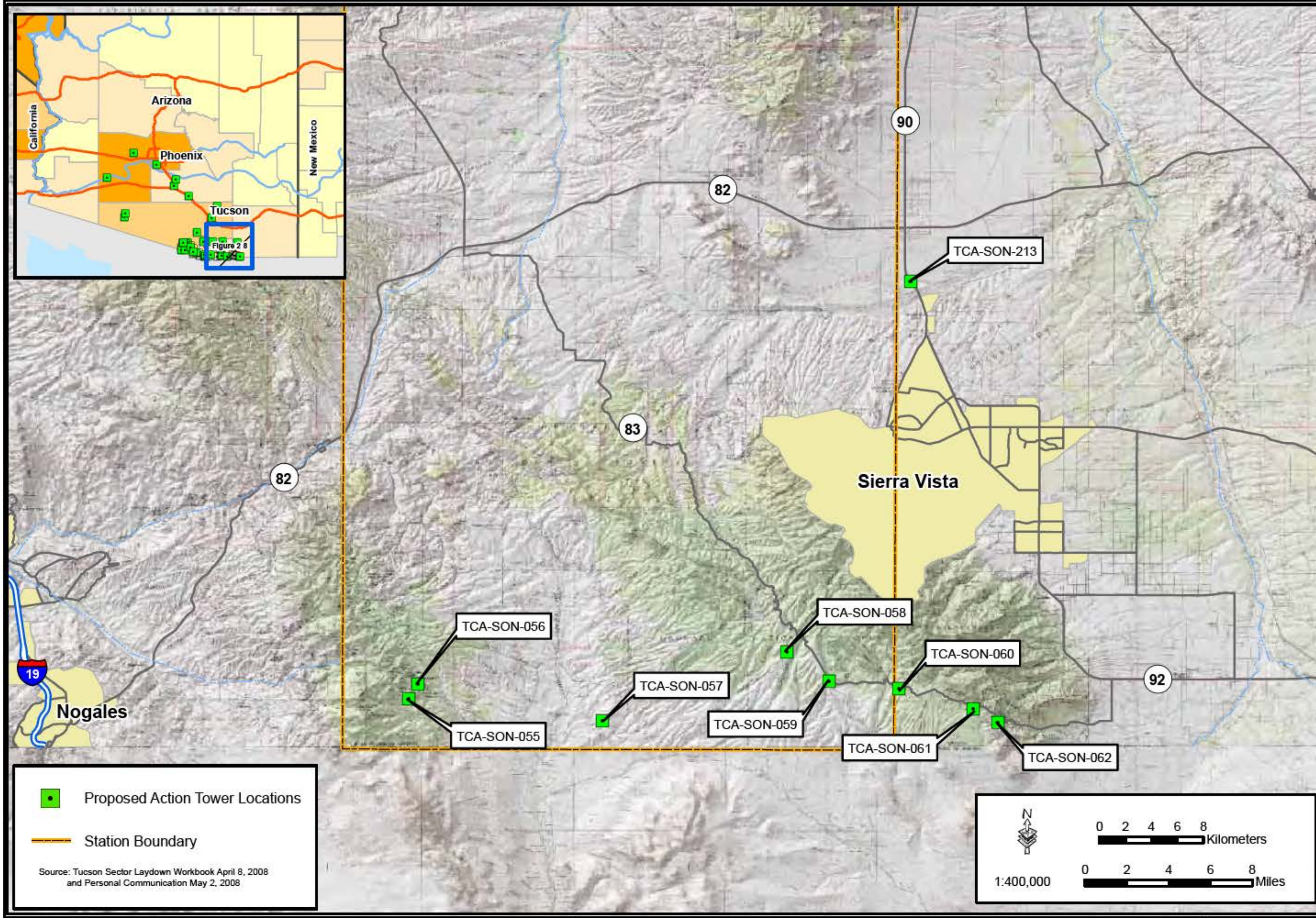

Figure 2-7: Sonoita AO Proposed Towers

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Tower ID:	**TCA-SON-056**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Santa Cruz County
Land Use:	CNF - Privately leased
Location Description:	Access to the tower is from FSR 4911 via several USFS access roads (FSR 58, 813, and 61) and Harshaw Road (see Figure 2-7).
Tower Access:	The current access road (FSR 4911) would not require any repair or improvements.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

Tower ID:	**TCA-SON-057**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Santa Cruz County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-SON-057 is approximately 23 miles south of the intersection of SR 82 and 83 near Sonoita, Arizona (see Figure 2-7).
Tower Access:	Access to the tower is from an un-named existing access road via several USFS access roads (FSR 61, 813, and 58) and Harshaw Road. Repair to the un-named road (3,656 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-SON-058**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Cochise County
Land Use:	CNF - Privately leased
Location Description:	The proposed tower site for TCA-SON-058 is approximately 23 miles south of the intersection of SR 82 and 83 near Sonoita, Arizona (see Figure 2-7).
Tower Access:	Access to the tower is from FSR 227 via several USFS access roads (FSR61, 813, and 58) and Harshaw Road. Additionally, approximately 106 feet of new access road with a gate and a cattle guard would be required to facilitate access to the proposed tower.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-SON-059**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Cochise County
Land Use:	CNF - Privately leased
Location Description:	The proposed tower site for TCA-SON-059 is approximately 26 miles south of the intersection of SR 82 and 83 (see Figure 2-7).
Tower Access:	Access to the tower is from FSR 61 via several USFS access roads (FSR 813 and 58) and Harshaw Road. New access road construction from FSR 61 (225 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-SON-060**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Cochise County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-SON-060 is approximately 28 miles south of the intersection of SR 82 and 83 near Sonoita, Arizona (see Figure 2-7).
Tower Access:	Access to the tower is from FSR 61 via several USFS access roads (FSR 813 and 58) and Harshaw Road. The existing access road (FSR 61) to the tower becomes narrow and winding as it traverses Montezuma Pass. Some road repair to FSR 61 (200 feet) would be required to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-SON-061**
Type of Tower:	RRVS
Tower Foundation:	RDT
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Cochise County
Land Use:	CNF
Location Description:	The proposed tower site for TCA-SON-061 is approximately 30 miles south of the intersection of SR 82 and 83 near Sonoita, Arizona (see Figure 2-7).
Tower Access:	Access to the tower is from FSR 4781 via several USFS access roads (FSR 61, 813 and 58) and Harshaw Road. The existing access road (FSR 4781) to the tower becomes narrow and winding as it traverses Montezuma Pass. A small amount of new access road construction (95 feet) would be needed to facilitate tower installation and maintenance.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-SON-062**
Type of Tower:	RRVS-CRT
Tower Foundation:	SST
Tower Height:	Up to 120 feet
Station:	Sonoita
Location:	Cochise County
Land Use:	Coronado National Memorial - Park Services Land overlook
Location Description:	The proposed tower site for TCA-SON-062 is approximately 32 miles south of the intersection of SR 82 and 83 near Sonoita, Arizona (see Figure 2-7).
Tower Access:	Approach to the Montezuma Pass Overlook is from FSR 61 via several USFS access roads (FSR 813 and 58) and Harshaw Road. The current access road does not require any repair or improvements.
Type of Primary Power:	Generator-solar hybrid

Tower ID:	**TCA-SON-213**
Type of Tower:	CRT
Tower Foundation:	SST
Tower Height:	200 feet 6 inches
Station:	Sonoita
Location:	Cochise County
Land Use:	Privately-owned land
Location Description:	The proposed tower site for TCA-SON-213 is approximately 7.5 miles north of Sierra Vista, Arizona (see Figure 2-7).
Tower Access:	New access road construction (491 feet) would be needed to facilitate tower installation and maintenance. One drainage culvert would be installed at the entrance road.
Type of Primary Power:	Accessible to nearby commercial grid power (within 3 miles).

2.3.5 Existing or Proposed Towers Planned for Upgrades

Eleven existing towers currently have communications hardware arrays which would be upgraded or retrofit based on the Tucson West project COP. These towers are located at CBP facilities or commercial properties that have been previously developed. Only one P25 tower location would require any additional ground disturbance or change in the footprint and operational activities at the tower site. As mentioned above, TCA-CAG-195 would require repair to its access road. Upgrades of the 11 existing towers would consist of installing communications and sensor hardware on the existing towers (Figure 2-8). Additionally, TCA-AJO-305 would be a new tower constructed at the new Ajo Station to replace the existing communication tower at the old Ajo Station (see Figure 2-8). This tower was addressed in the 2007 EA prepared for the proposed construction of the new station entitled *Environmental Assessment for the Ajo Border Patrol Station Expansion, Office of Border Patrol, Tucson Sector, Arizona, Why Arizona* (CBP 2007b).

2.4 NO ACTION ALTERNATIVE

The No Action Alternative describes future circumstances if the proposed communications and sensor tower installation does not take place, and can be characterized as the continuation of current practices and procedures. While the No Action Alternative does not satisfy the stated purpose and need, its inclusion in this EA is required by NEPA regulations as a basis of comparison to the anticipated effects of the Proposed Action.

2.5 ALTERNATIVES ELIMINATED FROM ANALYSIS

Several project elements that included other technology and infrastructure considerations such as unmanned aircraft systems (UAS) and imaging satellites were considered as alternatives to this Proposed Action, but were eliminated from further review. Although these alternatives or a combination of these alternatives can be valuable tools which CBP may employ in other instances, they were eliminated because of logistical restrictions, environmental considerations, and/or functional deficiencies that would fail to meet the purpose and need for this project. These alternatives and reasons for their exclusion from further analysis are discussed below.

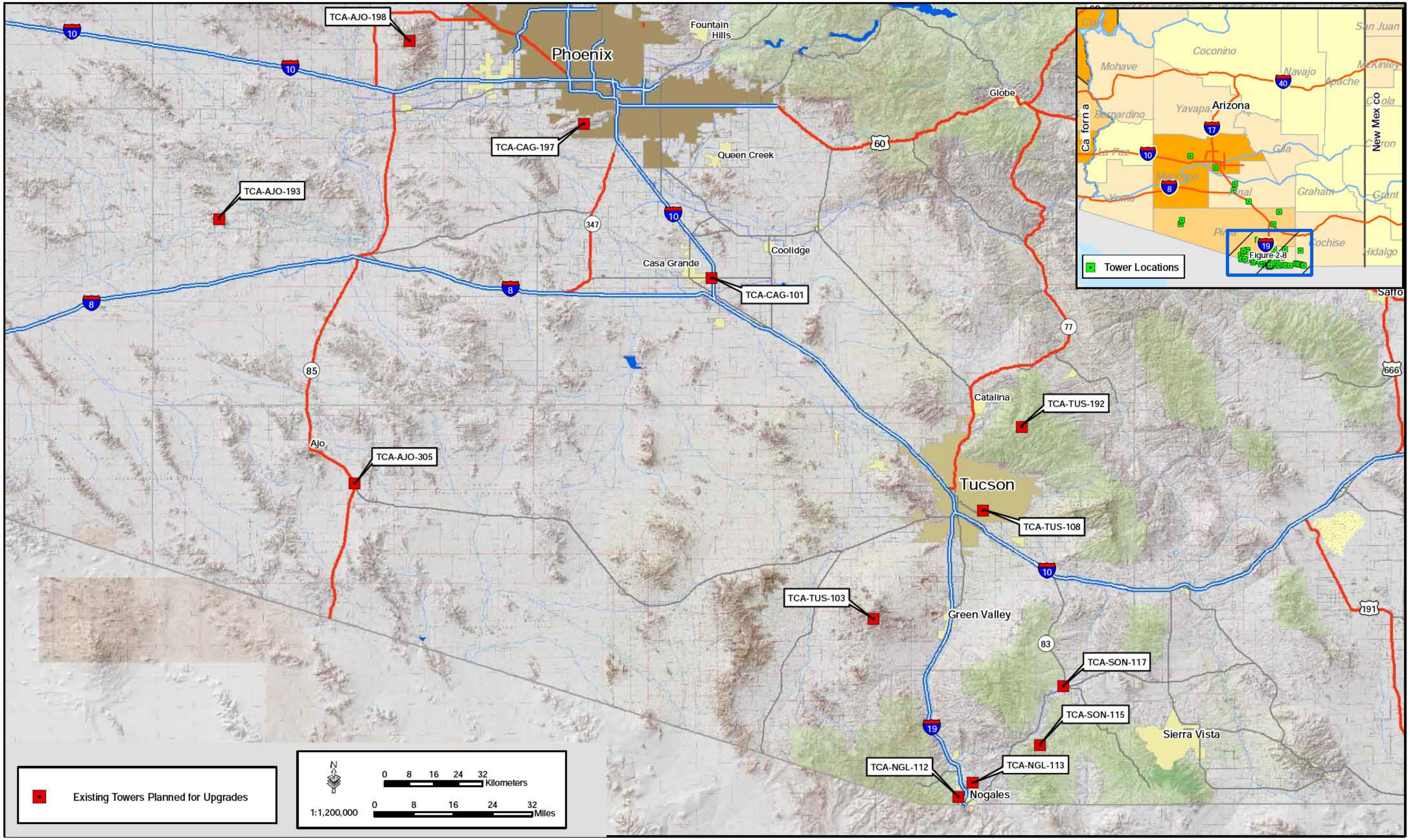

Figure 2-8: Towers Planned For Upgrades

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2.5.1 Unmanned Aircraft Systems (UAS)

As a stand-alone alternative, the use of UASs in lieu of towers was not further evaluated for feasibility or potential impacts because they present an unacceptable level of reliability and would require extraordinary design, operation, and maintenance considerations that would fail to achieve the goals of SBI*net*, and enhanced surveillance and protection of the U.S.-Mexico border. Additionally, the use of UASs would not provide 24 hours per day coverage.

2.5.2 Remote Sensing Satellites

Use of remote sensing satellites was not further evaluated for feasibility or potential impacts because they present an unacceptable level of reliability and would present extraordinary design, operation, and maintenance considerations that would fail to achieve the goals of SBI*net*, and enhanced surveillance and protection of the U.S.-Mexico border. Remote sensing satellites would not provide full-time coverage or acceptable visual resolution of the border areas under consideration for this project. Additionally, immediate data-sharing requirements could not be met with satellite imagery.

2.5.3 Unattended Ground Sensors (UGS)

Another alternative that was considered, but eliminated from further evaluation involved UGS fields only. The expanse of area required for UGS fields to effectively cover a similar area that a single tower surveillance system provides, would have been too wide-spread. Also, since each UGS needs to be buried and periodically relocated, the environmental damage would be too great to be further considered as a reasonable alternative. Additionally, the number of UGSs needed and their battery replacement rate would be too extensive and generate an unnecessarily large volume of spent waste batteries and further consume extensive CBP agent labor hours in UGS relocation and battery replacement. As mentioned previously, UGS will be deployed, as they currently are, in disturbed sites within high traffic areas. However, the use of UGS in this manner, is vastly different than a matrix/field deployment approach described above.

2.5.4 Increased CBP Workforce Alternative

Another alternative considered during the preparation of this EA was to have no towers, but instead, to simply increase the number of CBP agents to patrol (via vehicles) the areas that a tower communication and sensor system would cover. The sites selected for tower installation are considered high intensity areas for illegal entries. Thus, an alternative to the tower system would be to station additional CBP agents at each of these sites to observe activities and detect any potential cross border violations. CBP agents would have to be stationed at these sites 24-hours per day, 7 days a week, and due to local topography and vegetation, would not provide the same level of detection capabilities as the tower systems. Consequently, additional observation points would have to be established to provide the same coverage as the proposed tower systems, which would disturb additional areas along the border. Such efforts would require an enormous commitment of human resources and would require an increase of 72 agents per 8-hour shift (assuming it would require approximately six agents to monitor an area equal to what one tower system could monitor) to obtain an equal level of effectiveness. Agents would be assigned to these observation points and would provide minimal additional strength to the stations' apprehension capabilities. Additionally, new facilities would have to be constructed to accommodate the number of additional staff needed to patrol a given tower coverage area. The human resource and vehicular maintenance, coupled with the resulting depletion of resources, represented too great an environmental impact to be further considered as a reasonable alternative.

2.5.5 Increased Aerial Reconnaissance/Operations

Under this alternative, increased aerial reconnaissance would be used for surveillance in support of the stations. CBP would use fixed-wing aircraft and helicopters to perform reconnaissance and detection operations as well as to support ground patrols.

This alternative was eliminated from further consideration because it does not satisfy the purpose and need of the project. The purpose and need calls for a 24-hour, all-weather system for detection of illegal activities. Aerial reconnaissance/operations require highly skilled pilots, cannot be used on a 24-hour per day basis, and cannot operate under all weather conditions. Aerial reconnaissance/operations also have limited detection capabilities in areas such as deep ravines, at night-time, and in thick vegetation.

Aerial reconnaissance/operations are also limited over or near military installations, National parks and monuments, wilderness areas, and near commercial airports. The FAA and/or the Department of Defense impose flight restrictions on CBP operations missions over or near their facilities. Aerial reconnaissance/operations have also restricted flight patterns near endangered species or other sensitive wildlife habitats, at night-time, and over Indian reservations or other sacred cultural sites.

Aerial reconnaissance/operations have proven to be an effective border enforcement strategy in some regions of the border. For example, aerial operations have proven highly effective in areas where the open terrain, low growing vegetation, and sandy soils allow ICs and signs of other illegal border traffic to be easily recognized from aircraft. Additionally, aerial reconnaissance/operations have become invaluable to CBP agents for performing search and rescue missions and during vehicle pursuits. Due to their effectiveness in given situations and specific areas of the border, increasing aerial reconnaissance/operations may be an effective solution in other areas or to meet the purpose and need of other DHS activities. However, aerial reconnaissance as a stand alone alternative does not satisfy the current purpose and need as stated herein, and thus, for this assessment, it was eliminated from further consideration.

2.6 SUMMARY

The two alternatives selected for further analysis are the No Action Alternative and the Proposed Action. An alternative matrix (Table 2-3) shows how each of these alternatives satisfies the stated purpose and need. Table 2-4 presents a summary matrix of the impacts from the two alternatives analyzed and how they affect the environment and environmental resources in the tower areas.

Table 2-3. Alternative Matrix of Purpose and Need to Alternatives

Purpose and Need	No Action Alternative	Proposed Action
Installing and upgrading technology and infrastructure components to give CBP agents ability to gain, maintain, and strengthen control of the border within proximity of the international;	No	Yes
Including improved surveillance technology solutions to enhance border enforcement capabilities;	No	Yes
Applying surveillance technologies that would refine detection, interception, and apprehension of undocumented aliens, smugglers, and terrorists;	No	Yes
Reducing crime in border communities by detecting, apprehending, and deterring smugglers of humans, drugs, and other contraband.	Partial*	Yes

* The No Action Alternative would still partially meet the purpose and need of reducing crime due to the continued use of CBP agents in the field.

Table 2-4. Summary Matrix

Affected Environment	No Action Alternative	Proposed Action
Land Use (Section 3.2)	No construction of towers and roads would occur so no direct impacts would occur. Illegal traffic would continue to impact and disturb existing land uses within the station AORs.	The Proposed Action would temporarily impact approximately 73 acres and permanently impact approximately 41 acres of rangeland, agricultural, and state and Federal land to CBP enforcement land use. Implementation of the Proposed Action would protect existing land uses from continued and potentially increasing disruption by IC traffic, providing a beneficial impact relative to the No Action Alternative.
Geology and Soils (Section 3.3)	No construction of towers and roads would occur so no direct impacts on geologic or soil resources would occur. Illegal traffic would continue to impact and disturb soils within the station AORs.	Under the Proposed Action, geology would not be significantly impacted by the construction of towers and access roads. Approximately 41 acres of soils would be permanently impacted; although these impacts are long term they would be minor as compared to large amounts of these soils regionally. Additionally, there would be no impacts on prime farmland.
Hydrology and Groundwater (Section 3.4)	The No Action Alternative would have no impacts on surface or groundwater availability.	The Proposed Action would not significantly alter natural drainage patterns. Groundwater usage for construction of the towers would be approximately 554,000 gallons for the construction of new access roads and 325,841 gallons for the improvement of existing access roads. The basins in and around these areas are overtaxed so even minimal usage would add to the water deficit. Therefore, any water required for construction activities within the upper San Pedro Basin, (TCA-SON-231), would need to be trucked in from other nearby groundwater basins to avoid adverse impacts. Groundwater use from all other regional basins would be insignificant when compared to overall regional use.
Surface Waters and Waters of the U.S. (Section 3.5)	No construction of towers and roads would occur so no direct impacts would occur.	Short term temporary effects would occur during the proposed construction activities. A total of 37 potential Waters of the U.S. (WUS) would be impacted by the construction of new access roads, repair, or improvements. Construction and roadwork activities within these washes is authorized under a Nationwide Permit 14. No potential jurisdictional wetlands were observed at the proposed tower sites or within the footprint of existing approach and access roads or the proposed footprint of any new roads.
Floodplains (Section 3.6)	The No Action Alternative would have no impacts on the 100-year flood zone.	The Proposed Action would not cause direct impacts to jurisdictional floodplains by new and improved access roads. Additionally, no proposed tower sites are located within the 100-year flood zone.

Table 2-4, continued

Affected Environment	No Action Alternative	Proposed Action
Vegetative Habitat (Section 3.7)	No construction of towers and roads would occur so no direct impacts would occur. However, IC activity damages vegetation, promotes the dispersal and establishment of invasive species, and can result in catastrophic wildfires.	Under the Proposed Action, a total of 41 acres of vegetative habitat would be removed and includes; 2 acres of Sonoran Desertscrub (Arizona Upland and Lower Colorado River Subdivisions); 2.5 acres of Plains Grassland; 21 acres of Semidesert Grasslands; 1 acre of Chihuahuan Desert Scrub; and 15 acres of Madrean Evergreen Woodland. Additionally, 73 acres would be temporarily impacted within these same communities. The Proposed Action would result in indirect benefits to project area vegetation communities through the reduction of IC activity.
Wildlife and Aquatic Resources (Section 3.8)	Under the No Action Alternative, no direct impacts to wildlife habitats would occur. However, IC activity would continue to impact vegetation communities resulting in the degradation of wildlife habitat.	The Proposed Action would cause the permanent loss and degradation of 41 acres of wildlife habitat. No sensitive or rare wildlife species would be directly impacted; however, sedentary animals could be lost during construction activities. Mitigation measures would ensure there would be no significant impacts on birds. Several of the proposed tower sites are void of vegetation as a result of previous impacts, while many others have been impacted by cattle grazing. However, there would be indirect beneficial impacts on wildlife by reducing the adverse impacts of IC activity.
Protected Species and Critical Habitat (Section 3.9)	No construction of towers and roads would occur so no direct impacts would occur. However, the impacts of IC activity on habitats throughout the project area would continue to threaten endangered species and their habitats.	Under the Proposed Action, a total of 41 acres of potential habitat would be lost. Fourteen protected species may be potentially affected by the Proposed Action but not likely to affect. Additionally, 10 proposed tower sites and associated access roads are within the critical habitat for the Mexican spotted owl. The Proposed Action may affect and is likely to adversely affect the Mexican spotted owl and its critical habitat, Chiricahua leopard frog, jaguar, lesser long nose bat and Pima pineapple cactus. Consultation with USFWS is completed.
Cultural Resources (Section 3.10)	Under the No Action Alternative, no direct impacts to cultural resources would occur. However, IC traffic would continue to impact cultural resources within the area.	Under the Proposed Action two newly recorded NRHP-eligible sites would be adversely impacted, an additional four previously recorded sights would not be adversely impacted due to mitigation measures. The creation and employment of a site testing plan along with avoidance assurance measures would ensure data recovery or avoidance. Potential, unidentified cultural resource sites located within the study area and regionally would receive increased protection from disturbance by IC traffic.
Air Quality (Section 3.11)	No construction of towers and roads would occur so no direct impacts would occur.	Under the Proposed Action, temporary and minor increases in air pollution would occur during construction activities. However, air quality emissions resulting from the Proposed Action do not exceed *de minimis* thresholds for National Ambient Air Quality Standards pollutants. Therefore, a general conformity analysis would not be required for the Proposed Action.

Table 2-4, continued

Affected Environment	No Action Alternative	Proposed Action
Noise (Section 3.12)	Under the No Action Alternative, the noise receptors near the tower installations would not experience additional noise events; however, they would continue to experience ambient noise disturbances in from trains, trucks, and cars traveling in the area.	Under the Proposed Action, noise emissions are expected to be minor and short term in duration.
Radio Frequency Environment (Section 3.13)	Under the No Action Alternative, no direct impacts on humans, wildlife or communications would occur.	Radio and microwave transmissions associated with the operation of the proposed towers would not have a significant adverse impact on humans, wildlife, or other communication systems. All transmitters and sensors associated with this project would operate below 30 gigahertz. Compliance and coordination with National Telecommunications and Information Administration (NTIA) and Federal Communications Commission (FCC) regulations and guidelines would ensure there would be no significant adverse impacts to observatories, human safety, or the natural and biological environment.
Utilities and Infrastructure (Section 3.14)	No construction of towers and roads would occur so no direct impacts on utilities and infrastructure would occur. Ambient lighting conditions would continue to be problematic near large urban areas such as Tucson.	The Proposed Action would cause negligible demands to local power grids, when assessed against electrical power consumption from the overall regional power grids. With implementation of the Proposed Actions, lights would be shielded and follow Pima County light ordinances to the greatest extent possible. Therefore, using these measures no significant long term impact to the night sky and ambient lighting would occur.
Roadways and Traffic (Section 3.15)	No construction of towers and roads would occur so no direct impacts would occur.	Under the Proposed Action, construction and staging for the access roads, foundations, and towers would create minor short term impacts to roadways and traffic within the project corridor. However, traffic patterns would return to normal conditions upon completion of construction.

Table 2-4, continued

Affected Environment	No Action Alternative	Proposed Action
Aesthetics (Section 3.16)	Under the No Action Alternative, no direct impacts on aesthetics would occur. However, IC traffic would continue to degrade overall aesthetics within the area.	The installation of communication and sensor towers would detract from the aesthetic resources of the proposed corridor. However, most of these infrastructure components would be located within rangeland areas and near existing stations and within fairly rural and remote areas. Being a common visual feature upon U.S. landscapes, especially along major transportation routes, and given their distances from each other, the visual impacts would be minimal. However, one tower site is located on the Coronado National Memorial (CNM) and there would be minor to moderate impacts to aesthetic and visual resources. This impact is higher than others in the area; therefore, CBP would coordinate with the NPS to minimize these impacts to the extent practicable. Most of the new access road work is very near the proposed tower sites and near existing access roads; therefore the visual and aesthetic impacts from road work would be minor. Overall impacts on the aesthetic quality of the area would be less than significant.
Hazardous Waste (Section 3.17)	Under the No Action Alternative, no direct impacts on solid and hazardous waste would occur. However, IC traffic would continue to impact cultural resources within the area.	The Proposed Action would not result in a significant exposure of the environment or public to any hazardous materials. However, the potential exists for petroleum, oil, and lubricants (POL) contamination during construction or operational activities. Best management practices would be put in place to minimize any potential contamination at the proposed sites during construction activities and operation.
Socioeconomics (Section 3.18)	Under the No Action Alternative, no direct impacts on socioeconomics would occur.	The Proposed Action would not cause any changes to local employment rates, poverty levels, or local incomes. Long term beneficial, socioeconomic impacts could be realized from the purchasing of propane.
Environmental Justice (Section 3.19)	Under the No Action Alternative, no direct impacts on environmental justice would occur.	Implementation of the Proposed Action would cause no direct impacts on environmental justice concerns.
Sustainability and Greening (Section 3.20)	No construction of towers and roads would occur so no direct impacts would occur.	Under the Proposed Action, applicable Federal sustainability and greening practices would be implemented to the greatest extent practicable.

SECTION 3.0
AFFECTED ENVIRONMENT AND CONSEQUENCES

3.0 AFFECTED ENVIRONMENT AND CONSEQUENCES

3.1 PRELIMINARY IMPACT SCOPING

This section of the EA describes the natural and human environment that exists within the project corridor and Region of Influence (ROI); and the potential impacts of the No Action and Proposed Action as outlined in Section 2.0 of this document. The ROI for the tower project is Maricopa, Pima, Santa Cruz, Pinal and Cochise counties, Arizona. Only those parameters with the potential to be affected by the Proposed Action are described, per CEQ regulations (40 CFR 1501.7 [3]). Impacts can vary in magnitude from a slight to a total change in the environment. The impact analysis presented in this EA is based upon existing regulatory standards, scientific and environmental knowledge and best professional opinions. The impacts on each resource are described as significant, moderate, minor (minimal), insignificant or no impact. Some topics are limited in scope due to the lack of direct effect from the proposed project on the resource, or because that particular resource is not located within the project corridor. Resources such as climate and wild and scenic rivers are not addressed for the following reasons:

- <u>Climate</u>

  The climate would not be impacted by the construction and operation of the Proposed Action.
- <u>Wild and Scenic Rivers</u>

  The Proposed Action would not affect any designated Wild and Scenic Rivers (16 U.S.C. 551, 1278[c], 1281[d]) because no rivers designated as such are located within or near the study corridor.

Impacts (consequence or effect) can be either beneficial or adverse, and can be either directly related to the action or indirectly caused by the action. Direct impacts are those effects that are caused by the action and occur at the same time and place (40 CFR 1508.8[a]). Indirect impacts are those effects that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR 1508.8[b]). As discussed in this section, the No Action and Proposed Action may create temporary (lasting the duration of the project), short term (up to 3 years), long term (3 to 10 years following construction), or permanent impacts or effects.

Impacts can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. Significant impacts are those effects that would result in substantial changes to the environment (40 CFR 1508.27) and should receive the greatest attention in the decision-making process. Insignificant impacts are those that would result in minimal changes to the environment. The following discussions describe and, where possible, quantify the potential effects of each alternative on the resources within or near the project area. All impacts described below are considered to be adverse unless stated otherwise.

Table 3-1 presents the permanent and temporary (construction) impacts for the construction of proposed towers, improved access roads, and new access roads. Figure 3-1 illustrates how these impacts would occur or were calculated. Additionally, three main storage areas as well as smaller individual staging areas at each proposed tower site would be utilized for tower and associated access road work. The three main storage areas are all located at existing private and Federal properties which have been previously disturbed and either currently serves as warehouse facilities, maintenance facilities, and/or parking/laydown areas. As such these areas will not have further environmental consequences to the human or natural resources and will not be further analyzed in this EA.

To ensure that wildfire concerns are accounted for in the EA, an area beyond the 50- X 50-foot or 80- X 80-foot tower site footprint but no further than the 100- X 100-foot construction footprint would be maintained as a fire buffer. The fire buffer would be maintained free of vegetation. This fire buffer is fully analyzed in the EA and is shown in Table 3-1 under the permanent tower impacts as the same value as the temporary tower impacts.

Table 3-1. Temporary and Permanent Impacts from the Proposed Action

Tower ID	Temporary Impacts (in acres)	Permanent Impacts (in acres)	Tower ID	Temporary Impacts (in acres)	Permanent Impacts (in acres)
Casa Grande Station AO Towers					
TCA-CAG-102	0.23	0.23	**TCA-CAG-195**	0.23	0.23
Access Road	0.00	0.00	Access Road	3.28	1.31
Subtotal	0.23	0.23	Subtotal	3.51	1.54
Tuscon Station AO Towers					
TCA-TUS-032	0.23	0.23	**TCA-TUS-187**	0.23	0.23
Access Road	0.05	0.02	Access Road	0.08	0.11
Subtotal	0.28	0.25	Subtotal	0.31	0.34
TCA-TUS-035	0.23	0.23	**TCA-TUS-287**	0.23	0.23
Access Road	0.04	0.05	Access Road	0.00	0.00
Subtotal	0.27	0.28	Subtotal	0.23	0.23
TCA-TUS-036	0.23	0.23	**TCA-TUS-290**	0.23	0.23
Access Road	0.05	0.02	Access Road	0.10	0.09
Subtotal	0.28	0.25	Subtotal	0.33	0.32
TCA-TUS-038	0.23	0.23	**TCA-TUS-291**	0.23	0.23
Access Road	0.02	0.03	Access Road	0.06	0.09
Subtotal	0.25	0.26	Subtotal	0.29	0.32
TCA-TUS-040	0.23	0.23	**TCA-TUS-298**	0.23	0.23
Access Road	13.90	6.60	Access Road	1.72	2.41
Subtotal	14.13	6.83	Subtotal	1.95	2.64
TCA-TUS-041	0.23	0.23	**TCA-TUS-299**	0.23	0.23
Access Road	0.12	0.05	Access Road	0.00	0.00
Subtotal	0.35	0.28	Subtotal	0.23	0.23
TCA-TUS-042	0.23	0.23	**TCA-TUS-300**	0.23	0.23
Access Road	5.65	2.26	Access Road	0.00	0.00
Subtotal	5.88	2.49	Subtotal	0.23	0.23
TCA-TUS-085	0.23	0.23	-	-	-
Access Road	0.79	0.35	-	-	-
Subtotal	1.02	0.58	-	-	-
TCA-TUS-181	0.23	0.23			
Access Road	8.94	3.62	-	-	-
Subtotal	9.17	3.85	-	-	-

Table 3-1, continued

Tower ID	Temporary Impacts (in acres)	Permanent Impacts (in acres)	Tower ID	Temporary Impacts (in acres)	Permanent Impacts (in acres)
TCA-TUS-185	0.23	0.23	-	-	-
Access Road	0.10	0.84	-	-	-
Subtotal	0.33	1.07	-	-	-
Nogales Station AO Towers					
TCA-NGM-043	0.23	0.23	**TCA-NGL-050**	0.23	0.23
Access Road	0.40	0.56	Access Road	1.39	0.59
Subtotal	0.63	0.79	Subtotal	1.62	0.82
TCA-NGL-044	0.23	0.23	**TCA-NGL-052**	0.23	0.23
Access Road	0.25	0.35	Access Road	0.06	0.09
Subtotal	0.48	0.58	Subtotal	0.29	0.32
TCA-NGL-045	0.23	0.23	**TCA-NGL-054**	0.23	0.23
Access Road	0.38	0.53	Access Road	7.78	3.28
Subtotal	0.61	0.76	Subtotal	8.01	3.51
TCA-NGL-046	0.23	0.23	**TCA-NGL-109**	0.23	0.23
Access Road	1.38	0.56	Access Road	0.00	0.00
Subtotal	1.61	0.79	Subtotal	0.23	0.23
TCA-NGL-047	0.23	0.23	**TCA-NGL-210**	0.23	0.23
Access Road	3.49	0.23	Access Road	0.07	0.10
Subtotal	3.72	0.46	Subtotal	0.30	0.33
TCA-NGL-048	0.23	0.23	**TCA-NGL-211**	0.23	0.23
Access Road	0.00	0.00	Access Road	0.12	0.17
Subtotal	0.23	0.23	Subtotal	0.35	0.40
TCA-NGL-049	0.23	0.23	**TCA-NGL-285**	0.23	0.23
Access Road	2.87	1.23	Access Road	0.02	0.03
Subtotal	3.10	1.46	Subtotal	0.25	0.26
Sonoita Station AO Towers					
TCA-SON-055	0.23	0.23	**TCA-SON-060**	0.23	0.23
Access Road	3.95	1.84	Access Road	0.18	0.07
Subtotal	4.18	2.07	Subtotal	0.41	0.30
TCA-SON-056	0.23	0.23	**TCA-SON-061**	0.23	0.23
Access Road	0.00	0.00	Access Road	0.09	0.12
Subtotal	0.23	0.23	Subtotal	0.32	0.35
TCA-SON-057	0.23	0.23	**TCA-SON-062**	0.23	0.23
Access Road	3.36	1.34	Access Road	0.00	0.00
Subtotal	3.59	1.57	Subtotal	0.23	0.23

Table 3-1, continued

Tower ID	Temporary Impacts (in acres)	Permanent Impacts (in acres)	Tower ID	Temporary Impacts (in acres)	Permanent Impacts (in acres)
TCA-SON-058	0.23	0.23	**TCA-SON-213**	0.23	0.23
Access Road	0.10	0.14	Access Road	0.45	0.63
Subtotal	0.33	0.37	Subtotal	0.68	0.86
TCA-SON-059	0.23	0.23	-	-	-
Access Road	0.21	0.29	-	-	-
Subtotal	0.44	0.52	-	-	-
Total Impacts to All Tucson				**Temporary:**	**73.23**
Sector Stations (in area)				**Permanent:**	**41.11**

Note: Includes previously disturbed areas

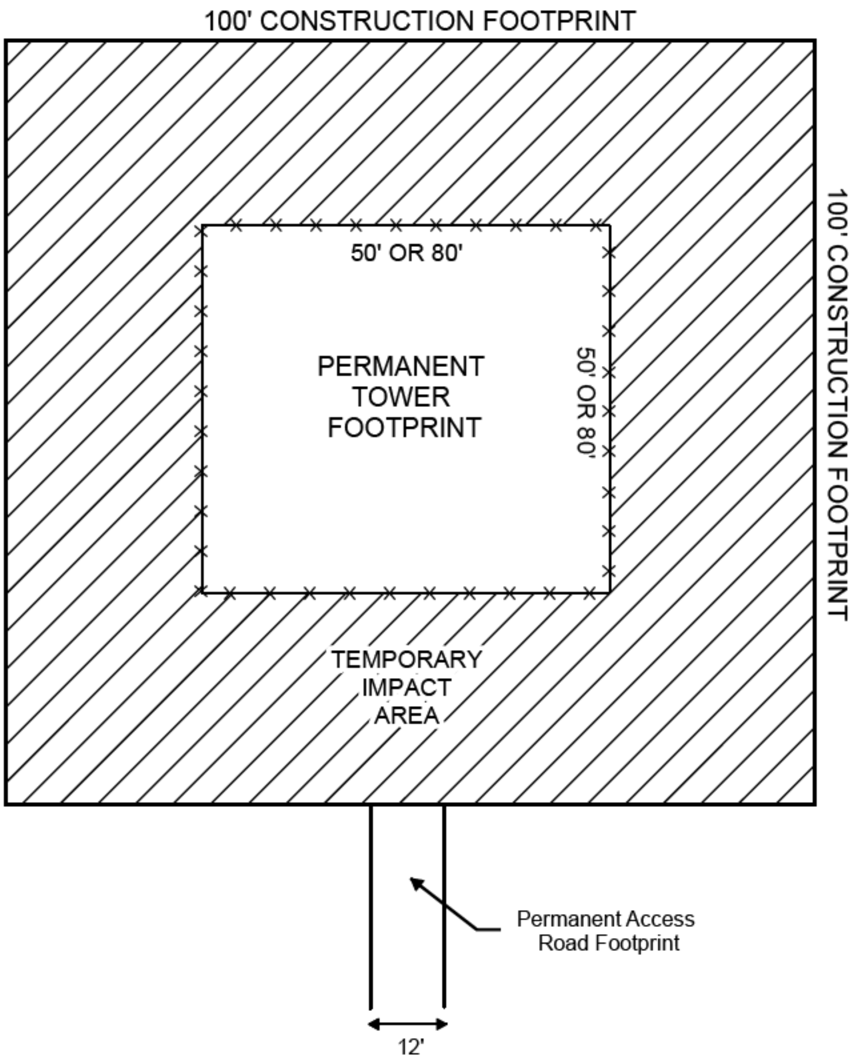
3.2 LAND USE

3.2.1 Affected Environment

Maricopa County covers 9,222 square miles in southwestern Arizona (Arizona Department of Commerce [AZDC] 2008a). Mostly desert, land use is dependent upon soil characteristics and water availability. Government, tourism, and commercial business are the county’s principal land uses.

On the southwestern border of Arizona, lies Pima County which covers 9,184 square miles (AZDC 2008b). Government, tourism, commercial, and Indian reservations are the county’s principal land uses. The land use in the mostly desert region of Pima County is dependent upon soil characteristics and water availability.

Cochise County covers 6,219 square miles in southwestern Arizona (AZDC 2008c). Mostly desert, land use is dependent upon soil characteristics and water availability. Government (including military), agriculture, grazing land, and commercial, are the county’s principal land uses. Cochise County is one of three counties in Arizona that does not have an Indian reservation.



NOT TO SCALE

Figure 3-1: Typical Tower Impact Footprint

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Pinal County encompasses 5,374 square miles in southwestern Arizona (AZDC 2008d). Government, agriculture, commercial, and Indian reservations are the county's principal land uses. Mostly desert, land use is dependent upon soil characteristics and water availability.

Santa Cruz County can also be found on the southwestern border of Arizona and covers 1,236 square miles (AZDC 2008e). Land use in this desert region is generally dependant upon soil characteristics and water availability. Government, tourism, and commercial are the county's principal land uses.

Land ownership distribution within the ROI is shown in Table 3-2.

Table 3-2. Land Ownership Distribution by County

County	Entity (percentage)					
	BLM	USFS	Indian Reservations	State of Arizona	Private	Other Public Lands
Maricopa	28	11	5	11	29	16
Pima	12.1		42.1	14.9	13.8	17.1
Cochise	22		0	35	40	3
Pinal	14		23	35	22	6
Santa Cruz	54.6		0	7.8	37.5	0

Source: AADC 2008a-e
NOTE: Data available for all five counties, except Maricopa, combined BLM and USFS land ownership into one category.

The proposed tower sites are located on the Gila River Reservation, wildlife refuge, state, private, and USFS lands. CBP would obtain a special use permit, lease agreement, easement, or purchase land to install the SBI*net* tower system. Table 3-3 provides a brief description of each of the proposed tower sites and nearby land use. Some proposed towers have new and improved access road work associated with the new towers, Table 3-4 indicates when access roads requiring new construction, road repair, or improvements would impact specific landowners or land managers.

Table 3-3. Proposed Tower Land Use

Tower ID	Landowner or Land Manager	Adjacent Land Use	Tower ID	Landowner or Land Manager	Adjacent Land Use
Casa Grande Station AOR Towers					
TCA-CAG-102	Private land	Near I-10 frontage; existing tower area	**TCA-CAG-195**	Gila Indian Reservation	Near existing commercial tower site
Tucson Station AOR Towers					
TCA-TUS-032	Pima County	Near an existing mobile tower facility; BANWR undeveloped elsewhere	**TCA-TUS-185**	USFS in the CNF	Undeveloped
TCA-TUS-035	BANWR	Undeveloped	**TCA-TUS-187**	BANWR	Undeveloped
TCA-TUS-036	USFS in the CNF	Undeveloped	**TCA-TUS-287**	BANWR	Undeveloped with some residential
TCA-TUS-038	USFS in the CNF	Undeveloped	**TCA-TUS-290**	Privately owned land	Residential and grazing land
TCA-TUS-040	USFS in the CNF	Undeveloped	**TCA-TUS-291**	CBP	Undeveloped but on an existing CBP facility (Sasabe POE)
TCA-TUS-041	USFS in the CNF	Cattle grazing	**TCA-TUS-298**	USFS in the CNF	Undeveloped
TCA-TUS-042	USFS in the CNF	Undeveloped	**TCA-TUS-299**	BANWR	Undeveloped
TCA-TUS-085	BANWR in Pima County	Undeveloped	**TCA-TUS-300**	Pima County	Undeveloped BANWR but at an existing tower site
TCA-TUS-181	USFS in the CNF	Undeveloped	-	-	-
Nogales Station AOR Towers					
TCA-NGL-043	USFS in the CNF	Undeveloped	**TCA-NGL-050**	USFS in the CNF	Mostly undeveloped; some nearby commercial development occurring
TCA-NGL-044	USFS in the CNF	Undeveloped	**TCA-NGL-052**	Private land	Undeveloped
TCA-NGL-045	USFS in the CNF	Undeveloped	**TCA-NGL-054**	USFS in the CNF	Undeveloped
TCA-NGL-046	USFS in the CNF	disturbed old radio tower site; near undeveloped land	**TCA-NGL-109**	USFS in the CNF	Site contains existing CBP antennae's and a helipad
TCA-NGL-047	USFS in the CNF	Undeveloped, nearby recreation areas	**TCA-NGL-210**	Arizona Department of Transportation; between I-19 exit ramp	Disturbed checkpoint area or agricultural
TCA-NGL-048	Private land	Existing tower facility; mix of undeveloped land, agriculture, and private with residential	**TCA-NGL-211**	USFS in the CNF	Near existing tower facility, nearby areas undeveloped

Table 3-3, continued

Tower ID	Landowner or Land Manager	Adjacent Land Use	Tower ID	Landowner or Land Manager	Adjacent Land Use
TCA-NGL-049	USFS in the CNF	Cattle grazing	**TCA-NGL-285**	Private land	Near existing tower facility, nearby areas undeveloped grazing land
Sonoita Station AOR Towers					
TCA-SON-055	Private land	Undeveloped; although, many mining shafts still exist	**TCA-SON-060**	USFS in the CNF	Undeveloped
TCA-SON-056	USFS in the CNF	Undeveloped	**TCA-SON-061**	USFS on the CNF	Undeveloped
TCA-SON-057	USFS in the CNF	Undeveloped	**TCA-SON-062**	CNM Park Service; paved overlook	Undeveloped
TCA-SON-058	Privately leased USFS in the CNF	Undeveloped	**TCA-SON-213**	Private land	Proposed industrial park site
TCA-SON-059	Privately leased USFS in the CNF	Undeveloped	**-**	-	-

Table 3-4. Proposed Tower Access Road Land Use

Tower ID	Landowner or Land Manager	Tower ID	Landowner or Land Manager
Casa Grande Station Tower Roads			
TCA-CAG-102	NA	**TCA-CAG-195**	Gila Indian Reservation
Tucson Station Tower Roads			
TCA-TUS-032	BANWR	**TCA-TUS-185**	USFS in the CNF
TCA-TUS-035	BANWR	**TCA-TUS-187**	BANWR
TCA-TUS-036	USFS in the CNF	**TCA-TUS-287**	BANWR
TCA-TUS-038	State, Private and USFS land	**TCA-TUS-290**	Arizona State Land Department (ASLD) and Private land
TCA-TUS-040	USFS in the CNF	**TCA-TUS-291**	CBP (Sasabe POE)
TCA-TUS-041	ASLD near the CNF	**TCA-TUS-298**	USFS in the CNF
TCA-TUS-042	USFS in the CNF	**TCA-TUS-299**	BANWR
TCA-TUS-085	BANWR	**TCA-TUS-300**	BANWR
TCA-TUS-181	USFS in the CNF	**-**	-
Nogales Station Tower Roads			
TCA-NGL-043	USFS in the CNF	**TCA-NGL-050**	USFS in the CNF, and Private land
TCA-NGL-044	USFS in the CNF	**TCA-NGL-052**	Private land
TCA-NGL-045	USFS in the CNF	**TCA-NGL-054**	USFS in the CNF
TCA-NGL-046	USFS in the CNF; disturbed old radio tower site	**TCA-NGL-109**	NA
TCA-NGL-047	USFS in the CNF	**TCA-NGL-210**	ADOT land
TCA-NGL-048	NA	**TCA-NGL-211**	USFS in the CNF
TCA-NGL-049	USFS in the CNF, and Private land	**TCA-NGL-285**	Private land

Table 3-4, continued

Tower ID	Landowner or Land Manager	Tower ID	Landowner or Land Manager
Sonoita Station Tower Roads			
TCA-SON-055	USFS in the CNF and Private land	**TCA-SON-060**	USFS in the CNF
TCA-SON-056	NA	**TCA-SON-061**	USFS on the CNM
TCA-SON-057	USFS in the CNF and Private land	**TCA-SON-062**	NA
TCA-SON-058	USFS in the CNF and Private land	**TCA-SON-213**	Private land
TCA-SON-059	USFS in the CNF	-	-

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

Under the No Action Alternative, illegal traffic would continue to impact and disturb existing land uses within the project area. Due to IC pedestrian and vehicle traffic, urbanized areas and natural desert areas currently experience increased crime and damage to native vegetation, respectively. The impact of illegal activities (especially drug trafficking) within the project area, has a negative impact on residential and commercial land uses. The trampling and destruction of native vegetation from IC pedestrian and vehicular traffic would continue to have an adverse impact on the desert in the project area.

3.2.2.2 Proposed Action

Construction of the proposed towers and access roads would permanently convert approximately 41 acres from their current use to CBP enforcement activities. Table 3-5 classifies temporary and permanent impacts from towers and associated access roads according to land ownership. More than half of the proposed towers in this project would occur on or near undeveloped areas (within BANWR and CNF lands) or on rural rangeland. The proposed tower access roads is also located within these relatively undeveloped areas on existing roads or in the case of new access roads; are adjacent to existing roads.

The remaining towers and roads are in or near developed areas (*i.e.*, adjacent to the community of Amado, near the Town of Arivaca, near the City of Nogales, along existing roads, and near the Duquesne Mine). CBP is coordinating with USFWS regarding five tower sites that are proposed for the BANWR. Construction of these five sites is contingent upon a USFWS determination that they are appropriate and compatible uses in the BANWR. Special use permits which may be necessary from certain resource agencies would be applied for prior to commencement of construction activities.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one proposed Ajo Station tower). Therefore, there would be no impacts on land use. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Implementation of the Proposed Action would protect existing land uses from continued and potentially increasing disruption by IC traffic, providing a beneficial impact relative to the No Action Alternative.

Table 3-5. Proposed Tower Land Use Impact Distribution

Land Ownership	Impact (acres)	
	Temporary	Permanent
USFS	63.98	34.06
Wildlife Refuge	2.85	2.45
Indian Reservation	3.51	1.54
Private	1.78	1.99
ADOT	0.30	0.33
Park Service	0.23	0.23
Arizona State Lands	0.58	0.51
Total	**73**	**41**

3.3 GEOLOGY AND SOILS

3.3.1 Affected Environment

3.3.1.1 Geology

The project area is part of the Basin and Range Physiographic Province as delineated by the U.S. Geological Survey (USGS 2000). This province stretches from southeastern Oregon southward through Nevada and terminates south of the project area in Sonora, Mexico. Most landforms within this province are the result of tectonic and alluvial processes, and the province is characterized by low mountains and deep valleys filled with alluvium.

3.3.1.2 Soils

Soils associated with the proposed tower locations are presented in Figures 3-2a-c. There are 42 Soil Survey Geographic Database (SSURGO) soil associations listed in Table 3-6. This table provides specific information on the soils that would be impacted by each proposed tower site and access roads. The majority of the soil associations range from excessively drained to well drained. Erosion hazards for each soil association estimate the potential for soil loss or erosion due to wind or water. Soils (especially those with high erosion hazards) must rely heavily on best management practices (BMPs) as described by the Stormwater Pollution Prevention Plan (SWPPP) and in Section 5.0 of this document during construction activities to avoid significant soil loss.

Hydric soils are defined by the National Technical Committee for Hydric Soils as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. These criteria are used to identify map unit components that normally are associated with wetlands (USDA 2006). There are no hydric soils among the soil associations within the project area.

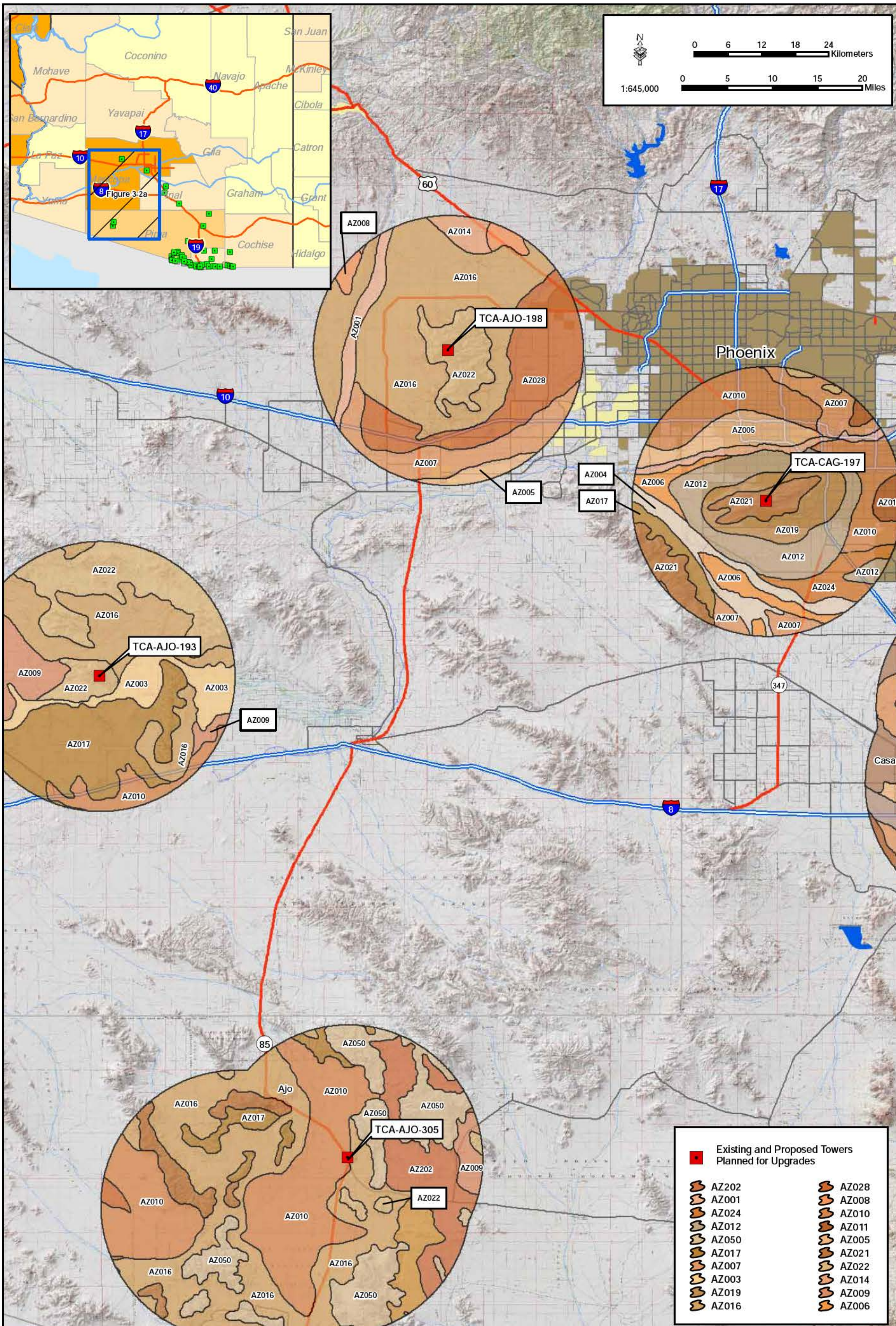

Figure 3-2a: Soil Survey within 15 Miles of Tower Locations

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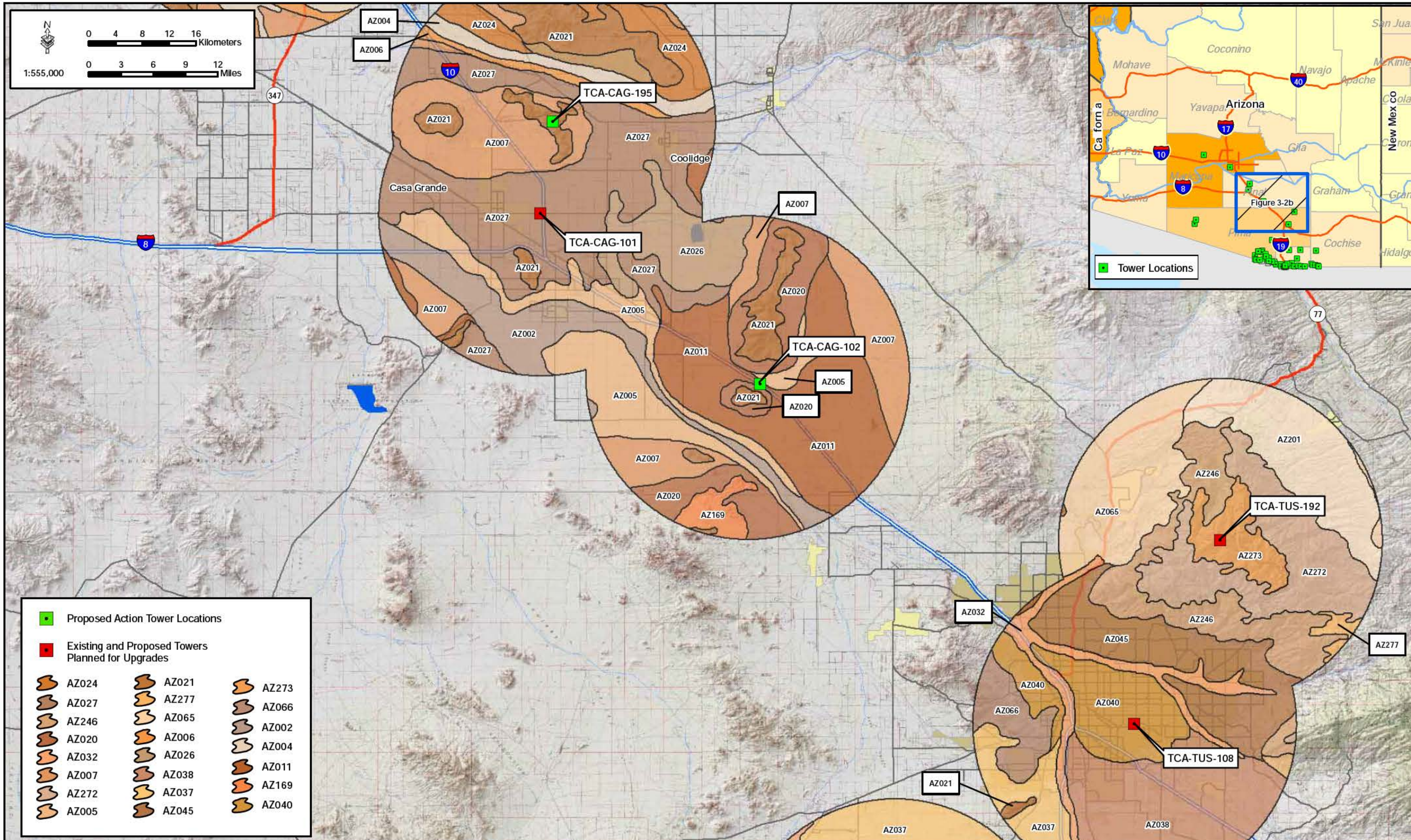

Figure 3-2b: Soil Survey within 15 Miles of Tower Locations

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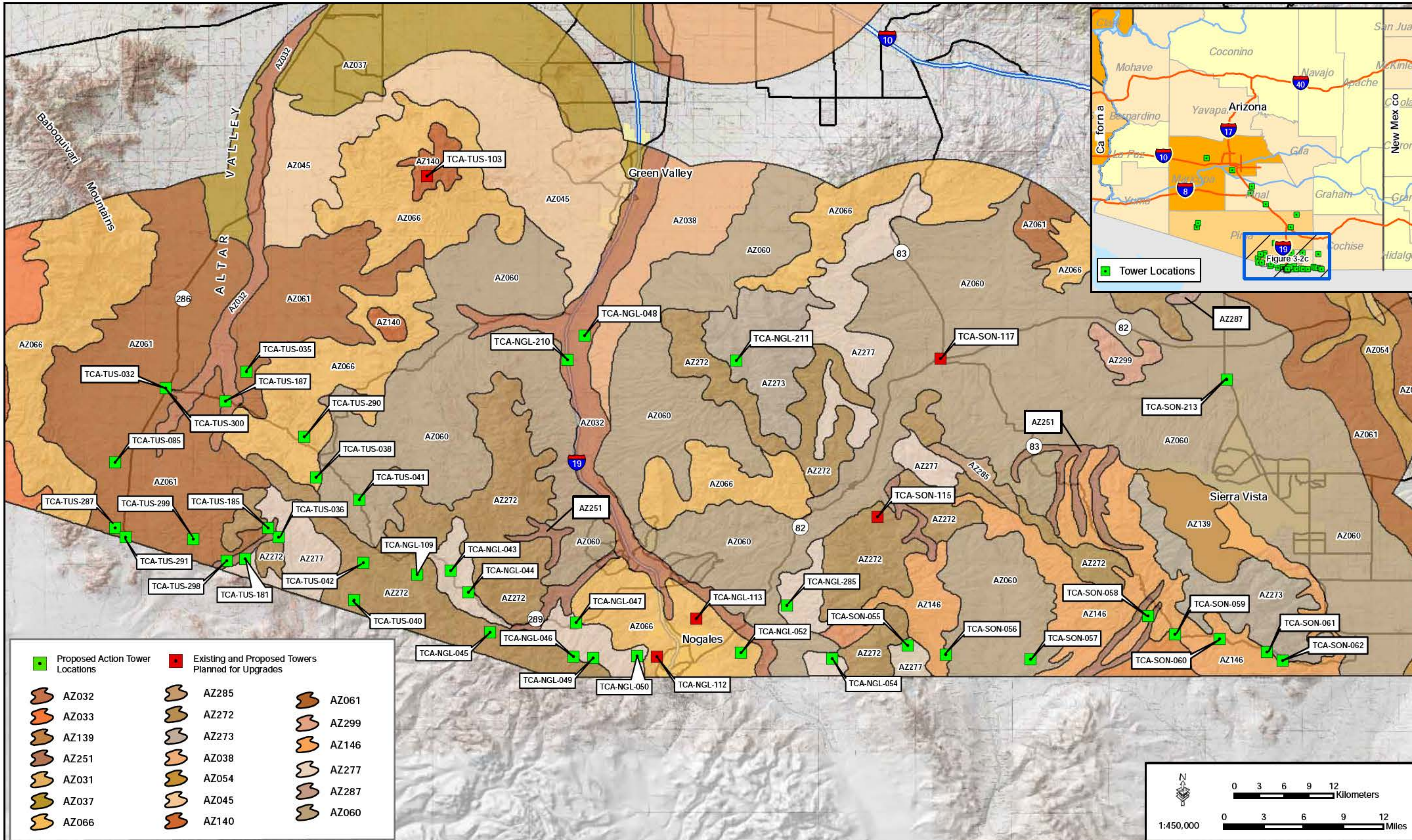

Figure 3-2c: Soil Survey within 15 Miles of Tower Locations

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Table 3-6. SSURGO Soil Data for Tower Sites and Associated New and Improved Access Roads

STATSGO Number	SSURGO Association	Slope (%)	Erosion Hazard	Drainage Class*	Permanent Impacts
AZ060	White House gravelly loam	1-8	Slight to Moderate	WD	0.3262
AZ061	White House-Caralampi Complex	5-25	Moderate	WD	4.701
AZ032	Sasabe-Caralampi complex	1-15	Slight to Moderate	WD	0.024
AZ032	Altar-Sasabe Complex	1-8	Slight to Moderate	WD	0.01157
AZ140	Cortoro Rock Outcrop-Faraway Complex	15-45	Slight	WD	0.4353
AZ061	Nolam-Tombstone Complex	8-30	Slight	WD	0.0138
AZ061	Bernardino-Tombstone Association	5-16	Slight to Moderate	ED to WD	2.727
AZ061	Chiracahua-Lampshire Complex	5-15	Moderate	WD	2.659
AZ011	Denure sandy loam	1-3	Slight	ED	2.7515
AZ010	Denure-Rilito-Why complex	1-5	Slight to Moderate	SED	0.0273
AZ251 AZ272 AZ066	Lampshire-Chiracahua association, steep	10-50	Slight to High	WD	2.076
AZ277 AZ032	Comoro soils	0-5	Slight	WD	0.0298
AZ061 AZ277	White House–Hathaway association, steep	5-45	Moderate	WD	0.0069
AZ061	Bernardino-White House Complex	1-15	Slight to Moderate	WD to ED	
AZ277 AZ061	Caralampi, gravelly sandy loam	10-40	High	WD	0.1209
AZ066	Schrap very shaly clay loam	5-20	Moderate	WD	0.0755
AZ066	Schrap very channery loam	5-30	Moderate	WD	0.5258
AZ066	Schrap cobbly clay loam	20-50	Moderate to High	WD	0.0738
AZ272	Lampshire-Graham-Rock outcrop association, steep	5-50	Moderate	WD	0.9289
AZ277	Atascosa very gravely sandy loam	30-50	Slight	WD	0.0187
AZ277	Lampshire very gravely sandy loam	0-25	Moderate	WD	0.6810
AZ272 AZ277	Lampshire very gravely sandy loam	25-50	Moderate	WD	0.3617
AZ277	Caralampi, gravelly sandy loam,eroded	10-60	High	WD	0.0912
AZ032	Continental Rellino complex, eroded	1-40	High	WD	0.0551
AZ273 AZ277	Barkervile-Gaddes complex, steep	30-60	Moderate	WD	0.8551
AZ277	Chiracahua cobbly sandy loam	10-45	Moderate	WD	0.0262
AZ032	White House gravelly loam	0-10	Slight	WD	0.2920
AZ146 AZ060	White House gravelly loam	10-35	Moderate	WD	0.1353
AZ146 AZ189	Martinez gravelly loam	0-3	Slight	MWD	1.3339
AZ146	Fanno-Luzena, rolling	5-60	Moderate	WD	1.5039
AZ021	Quilitosa, Rock outcrop, Vaiva complex	20-65	Moderate to Severe	SED to WD	0.1284
AZ146	Casto very gravelly sandy loam	10-40	Moderate	WD	0.1997
AZ277	Tortugas-Rock Outcrop Complex	25-60	Moderate	WD	0.0689
AZ060	Libby Gulch complex	0-10		WD	0.3262
AZ273	Faraway-Tortugas-rock outcrop association, steep	20-60	Moderate	WD	4.701

Table 3-6, continued

STATSGO Number	SSURGO Association	Slope (%)	Erosion Hazard	Drainage Class*	Permanent Impacts
AZ061 AZ277	Chiracahua-Lampshire Association. rolling	10-45	Moderate	WD	0.024
AZ277	Sonoita gravelly sandy loam	1-8	Slight to Moderate	SED	0.01157
AZ021	Christobal-Gunsight Complex	3-15	Moderate to High	WD	0.4353
AZ277	Grabe soils	0-3	Slight to Moderate	WD	0.0138
AZ277	Grabe-Comoro Complex	0-5	Slight to Moderate	WD	2.727
AZ032	Riveroad and Comoro soils	0-2	Slight	WD	2.659
AZ061	Graham soils	5-20	Moderate to High	WD	2.7515

*Drainage Class: WD=Well Drained, ED=Excessively Drained, SED=Somewhat Excessively Drained, MWD=Moderately Well Drained
Source: USDA 2008 and 1994

Prime Farmland

Prime farmland is protected under the Farmland Protection Policy Act of 1980 and 1995 (FPPA). The FPPA's purpose is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. As required by Section 1541(b) of Act, 7 USC 4202(b), Federal agencies are, (a) to use the criteria to identify and take into account the adverse effects of their programs on the preservation of farmland; (b) to consider alternative actions, as appropriate, that could lessen adverse effects; and (c) to ensure that their programs, to the extent practicable, are compatible with state and local governments and private programs and policies to protect farmland.

Prime farmland exists within the proposed tower areas for Comoro soils, Grabe-Comoro Complex, Grabe soils, Denure sandy loam, Sonoita fine sandy loam, Rilito soils, and Caralampi, gravelly sandy loam, but only if these soils are irrigated. The soils in this region are not typically irrigated so these soils would fail to meet prime farmland criteria.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Geology

Under the No Action Alternative, there would be no construction of access roads and towers, foundations, and associated buildings. Therefore, there would be no impacts on the geologic resources of the area.

Soils

Under the No Action Alternative, there would be no construction of access roads, towers, foundations, and associated buildings would not occur. Therefore, there would be no direct impacts on soils, although soil erosion associated with illegal trails and roads would continue to occur in this area.

3.3.2.2 Proposed Action

Geology

The Proposed Action involves only disturbances to the topsoil layers, or somewhat deeper in the case of SST. During construction activities, any holes or excavations for either perimeter fence posts or towers, would impact an area no larger than approximately 38 square feet for the three piers on the larger SST, and would not substantially alter soils in the project area. Each pier would be no deeper than approximately 30 feet bgs, and only seven of the proposed towers are anticipated to be SSTs. Additionally, all roads proposed would be located in predominately alluvial material and would, therefore, not require substantial modifications to the area's topography (*i.e.*, road cuts).

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on geologic resources. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Soils

Construction of the towers and access roads would permanently impact approximately 41 acres and temporarily impact approximately 73 acres of soils. However, all road repair or improvements would occur on existing roads; therefore, these soils have been previously disturbed. Road work for new and improved roads accounts approximately 63 acres of the 73 acres being impacted and therefore comprises the majority of all temporary impacts for all proposed towers and roads. Although these impacts are long term, they would be minor when examined on a regional scale, due to the small amount of soils lost relative to the quantity of the same soils regionally. The loss of these soils would not affect any unique or sensitive plant or wildlife habitats. Additionally, BMPs to reduce soil erosion would be utilized during construction activities as outlined in Section 5 and the SWPPP which would be prepared prior to construction. No hydric soils would be impacted.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on soils. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Per NRCS data, soils designated as prime farmland if irrigated are located within the tower project area; however these soils are not irrigated, therefore, there would be no impacts on prime farmland (USDA 2008).

3.4 HYDROLOGY AND GROUNDWATER

3.4.1 Affected Environment

The proposed tower sites are located in five Arizona Department of Water Resources (ADWR) groundwater basins: San Rafael, Santa Cruz Active Management Area (AMA), Tucson AMA, Pinal AMA and Upper San Pedro. The Santa Cruz AMA is within the Upper Santa Cruz Valley River Basin and encompasses 716 square miles that is primarily concentrated around a 45-mile reach of the Santa Cruz River from the International Border to the Continental gaging station, a few miles north of the Santa Cruz/Pima County line (ADWR 2006). The San Rafael Basin encompasses 172 square miles in southeastern Arizona and the main drainage is from the Santa Cruz River and its tributaries. All other drainages in the basin are ephemeral (ADWR 2008). The Tucson AMA consists of the Avra Valley Sub-basin and the Upper Santa Cruz Sub-basin and includes portions of Pima, Pinal and Santa Cruz counties. The Tucson AMA encompasses 3,866 square miles in southern Arizona. The Upper San Pedro Basin encompasses approximately 1,875 square miles of southeastern Arizona and the main drainage is from the San Pedro River. The San Pedro River is ephemeral and mostly flows during major rainfall episodes. The area of the Pinal AMA Basin is approximately 4,000 square miles in central Arizona. The Gila and Santa Cruz rivers acts a source of surface water recharge. These rivers are typically dry except for storm events and during use as flood control (ADWR 2008).

Some areas of the State of Arizona have relatively deep alluvial aquifers with substantial amounts of groundwater in storage. In other areas, however, such as the Upper San Pedro Basin and the Pinal AMA, hydrologic conditions are less favorable. Aquifers may experience an overdraft; Pinal AMA is currently experiencing an overdraft and the Upper San Pedro basin is currently very close to an overdraft. With the exception of the Lower Colorado River Planning Area, groundwater is the primary water supply utilized for municipal uses. In 2003, groundwater was the primary water supply utilized in every AMA (ADWR 2006). Table 3-7 presents the groundwater storage and recharge in each of the four basins in project corridor.

Table 3-7. Groundwater Basins Municipal, Industrial, and Agricultural Use and Recharge Rate

Groundwater Basin	Recharge Rate (acre-feet)	Municipal* Water Use (acre-feet)
San Rafel	5,000	300
Santa Cruz AMA	35,500 - 160,300	56,000 – 62,000
Pinal AMA	370,264	492,712
Tuscon AMA	258,000 – 272,000	225,400 – 236,000
Upper San Pedro	35,750	34,600

Source: ADWR 2006
*Includes industrial and agricultural water use as well.

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

The No Action Alternative would not require the use of water because there would be no construction. Therefore, the No Action Alternative would have no impacts on hydrology or groundwater availability or quality.

3.4.2.2 Proposed Action

Under the Proposed Action, water would be required for the concrete tower foundations, watering of new access road surfaces and fugitive dust suppression during construction activities. The water used to compact and construct new access roads typically averages 1.7 acre-foot per mile (554,000 gallons) of new road construction (Miranda 2006). Widening and resurfacing existing roads requires approximately 1 acre-foot per mile (325,841 gallons). Table 3-8 segregates the road construction projects into groundwater basins and estimates the total water use planned for each groundwater basins.

Table 3-8. Road Construction Water Use Segregated by Groundwater Basins

Groundwater Basin	New Road and Construction (miles)	Road Repair or Improvements (miles)	Water Use (acre-feet)
San Rafel	0.1	1.5	1.72
Santa Cruz AMA	0.2	3.4	3.75
Tuscon AMA	0.7	6.7	7.89
Pinal AMA	0.0	0.7	0.68
Upper San Pedro	0.1	0.0	0.16
Total	1.1	10.9	14.21

Source: Miranda 2006

The Upper San Pedro and Pinal AMA Basins experience an overdraft of groundwater resources; although the water needs are less than 1 acre-foot in the Upper San Pedro Basin and Tucson AMA, water would need to be trucked in from other basins as these basins are so overtaxed that even minimal water usage would add to the water deficit in these basins. The other basins are experiencing surpluses and the water needs for the proposed project are insignificant compared to the volume used annually for municipal, agricultural, and industrial purposes.

The water used in association with the Proposed Action, which is not lost to evaporation during watering of access road surfaces during construction, would potentially contribute to aquifer recharge through downward seepage. The construction of towers and access roads would not substantially alter natural drainage patterns. The access roads are surfaced with gravel and would not create impermeable surfaces. The construction of the access roads would not interfere with groundwater recharge. Therefore, the Proposed Action would not result in significant impact on groundwater basins and hydrology in the project area.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on groundwater resources. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.5 SURFACE WATERS AND WATERS OF THE U.S.

3.5.1 Affected Environment

All but one of the proposed towers sites and associated access roads are located in the Santa Cruz-Rio Magdalena-Rio Sonoyta (Santa Cruz) watershed. The Santa Cruz watershed is composed of a number of hydrological features: 1) the Santa Cruz River which flows north to the Gila River, and 2) a series of streams that flow south and eventually into the Rio Magdalena and Rio Sonoyta in Mexico. Elevations range from 9,156 feet above sea level at Mount Lemmon to about 1,100 feet at the Gila River. Except for a string of high mountains in the east, most of the watershed is below 5,000 feet, with low Sonoran desert flora and fauna and warmwater aquatic communities where perennial waters exist. The Santa Cruz watershed receives about 15 inches of rain and up to 1 inch of snow per year. Groundwater pumping has eliminated natural perennial flow in most of the mainstream Santa Cruz River. Treated wastewater effluent provides perennial flow below discharges from the cities of Nogales and Tucson. One of the towers sites, TCA-SON-213, is located in the San Pedro River watershed. This watershed encompasses three hydrological areas adjacent to the San Pedro River, which begins in the mountains near Cananea Sonora, Mexico, and flows north about 100 miles through the southeast corner of Arizona to join the Gila River near Winkelman, Arizona. Willcox Playa is a 7,015 square mile watershed which is lightly populated with only 130,000 people (2000 Census). Elevation varies from 4,000 feet above sea level, with desert grassland and warmwater aquatic communities, to 10,700 feet at Mount Graham, with alpine forest. Areas above 5,000 feet typically support coldwater aquatic communities where perennial waters exist. The area gets little precipitation, with 10 to 15 inches of rain and 0 to 5 inches of snow (ADEQ 2007).

3.5.1.1 Surface Waters

Section 303(d)(1)(A) of the Clean Water Act (CWA) requires that "Each State shall identify those waters within its boundaries for which the effluent limitations...are not stringent enough to implement any water quality standard applicable to such waters." ADEQ publishes a report on the status of surface water and groundwater quality in

Arizona every 2 years (in accordance with section 305(b) of the CWA) and from this report derives the "Impaired Waters" or "303(d) List". The 2006 305(b) and 303(d) report by ADEQ assessed 32 stream reaches and seven lakes within the watershed and found three stream reaches to be impaired. Table 3-9 provides information on the impaired stream sections in the Santa Cruz watershed as listed in the 2006 ADEQ 303(d) List. None of the proposed tower and access road construction sites are located near the impaired stream reaches listed in Table 3-9.

Table 3-9. List of ADEQ Impaired Streams in Santa Cruz Watershed

Sub-watershed Name & ADEQ ID	Location	Suspected Causes of Impairment	Suspected Sources of Impairment
Nogales Wash 15050301-011	From Mexico border to Potrero Creek	Copper, ammonia, *Escherichia coli* and Chlorine	Abandon mines Mexico
Santa Cruz River 15050301-010	New Mexico border to Nogales	*E. coli*	Natural background and Mexico
Sonoita Creek 15050301-013C	Patagonia Waste Treatment Plant to Santa Cruz River	Zinc and low dissolved oxygen	Abandon mines

Source: ADEQ 2004 303 (d) Water Quality Inventory Integrated Report List of Impaired Watersheds [303 (d) list]

3.5.1.2 Waters of the U.S. and Wetlands

Section 404 of the CWA of 1977 (Public Law [P.L.] 95-217) authorizes the Secretary of the Army, acting through the USACE, to issue permits for the discharge of dredged or fill material into Waters of the U.S. (WUS), including wetlands. WUS (Section 328.3(2) of the CWA) are those waters used in interstate or foreign commerce, subject to ebb and flow of tide, and all interstate waters including interstate wetlands. WUS are further defined and may include waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, or impoundments of waters, tributaries of waters, and territorial seas. Jurisdictional boundaries for WUS are defined in the field as the ordinary high water marks which is that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural lines impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Wetlands are those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Although no wetlands exist within the project corridor, the unvegetated WUS would be subject to regulations under Section 404 of the CWA.

Activities that result in the dredging and/or filling of WUS are regulated under Section 404 of the CWA. The USACE has established Nationwide Permits (NWP) to efficiently authorize common activities, which do not significantly impact WUS, including wetlands. The NWPs were modified and reissued by the USACE in the *Federal Register* on March 12, 2007, with an effective date of March 19, 2007. All NWPs have an expiration date of March 19, 2012. The USACE authorizes permitting under a NWP, or requires an Individual Permit. All waterbodies flowing into the U.S. from Mexico or flowing from the U.S. into Mexico are within USACE jurisdiction due to their potential use in foreign commerce. Activities required for the construction, expansion, modification, or improvement of linear transportation crossings (*e.g.* highways, railways, trails *etc.*) in WUS, including wetlands are authorized under a NWP 14 if meet the appropriate criteria established for this NWP. The limitation criteria for an NWP 14 are impacts equal to or less than 1/2 acre of non-tidal waters or not greater than 1/3 acres in tidal waters.

There were 62 WUS observed crossing either the access or approach roads associated with 16 of the proposed tower sites. The majority of the washes observed are located at existing low water crossings along existing roads. All washes observed are classified as ephemeral streams and are considered jurisdictional under the CWA for the purpose of this EA. A list of WUS observed during hydrologic surveys of the access and approach roads are presented in Table 3-10.

No potential jurisdictional wetlands or perennial pools were observed at the proposed tower sites, within the footprint of existing approach and access roads, or the proposed footprint of any new roads.

Table 3-10. Waters of the U.S. Associated with the Proposed Tower Sites and Approach and Access Roads

Tower ID	Drainage Type	Periodicity	Width of Channel (feet)	Width of Road (feet)	Proposed Action	Impact (acre)
TCA-TUS-185	Wash	Ephemeral	3	12	Grading	< 0.1
TCA-TUS-185	Wash	Ephemeral	3	12	Grading	< 0.1
TCA-TUS-185	Wash	Ephemeral	2	12	Grading	< 0.1
TCA-TUS-185	Wash	Ephemeral	10	12	Grading	< 0.1
TCA-TUS-185	Wash	Ephemeral	12	12	Grading	< 0.1
TCA-TUS-185	Wash	Ephemeral	1	12	Grading	< 0.1
TCA-TUS-040	Gully	Ephemeral	1	12	Road Construction	< 0.1
TCA-TUS-040	Gully	Ephemeral	3	12	Road Construction	< 0.1
TCA-TUS-040	Wash	Ephemeral	10	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	8	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	10	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	14	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	10	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	12	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	3	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	16	12	Grading	< 0.1
TCA-TUS-040	Wash	Ephemeral	6	12	Grading	< 0.1
TCA-TUS-042	Gully	Ephemeral	1	12	Grading	< 0.1
TCA-TUS-042	Gully	Ephemeral	1	12	Grading	< 0.1
TCA-TUS-042	Wash	Ephemeral	2	12	Grading	< 0.1
TCA-TUS-042	Wash	Ephemeral	2	12	Grading	< 0.1
TCA-TUS-042	Gully	Ephemeral	2	12	Grading	< 0.1
TCA-TUS-042	Gully	Ephemeral	1	12	Grading	< 0.1
TCA-TUS-042	Gully	Ephemeral	1	12	Grading	< 0.1
TCA-TUS-042	Wash	Ephemeral	2	12	Grading	< 0.1
TCA-TUS-287	Depression	Ephemeral	6	12	None	0
TCA-TUS-181	Wash	Ephemeral	5	12	None	0
TCA-TUS-181	Wash	Ephemeral	5	12	None	0
TCA-TUS-181	Wash	Ephemeral	40	12	None	0
TCA-TUS-181	Wash	Ephemeral	3	12	None	0
TCA-TUS-181	Stream	Ephemeral	10	12	None	0
TCA-TUS-181	Stream	Ephemeral	4	12	Grading	< 0.1
TCA-TUS-181	Wash	Ephemeral	1	12	Grading	< 0.1
TCA-TUS-181	Stream	Ephemeral	10	12	Grading	< 0.1
TCA-TUS-181	Stream	Ephemeral	4	12	Grading	< 0.1
TCA-TUS-181	Wash	Ephemeral	1	12	None	0
TCA-CAG-102	Wash	Ephemeral	5	12	None	0
TCA-SON-055	Gully	Ephemeral	12	12	Grading	<0.1
TCA-SON-055	Wash	Ephemeral	10	12	Grading	<0.1
TCA-SON-055	Gully	Ephemeral	7	12	Grading	<0.1
TCA-NGL-054	Wash	Ephemeral	75	12	Grading	<0.1
TCA-NGL-054	Wash	Ephemeral	12	12	Grading	<0.1
TCA-NGL-054	Wash	Ephemeral	35	12	Grading	<0.1
TCA-NGL-049	Wash	Ephemeral	4	12	None	0
TCA-NGL-049	Wash	Ephemeral	14	12	Grading	<0.1

Table 3-10, continued

Tower ID	Drainage Type	Periodicity	Width of Channel (feet)	Width of Road (feet)	Proposed Action	Impact (acre)
TCA-SON-060	Wash	Ephemeral	20	12	None	0
TCA-TUS-035	Wash	Ephemeral	5	12	None	0
TCA-TUS-035	Wash	Ephemeral	9	12	None	0
TCA-TUS-035	Gully	Ephemeral	2	12	None	0
TCA-TUS-035	Gully	Ephemeral	2	12	None	0
TCA-TUS-035	Wash	Ephemeral	15	12	None	0
TCA-TUS-035	Gully	Ephemeral	1	12	None	0
TCA-TUS-035	Gully	Ephemeral	1	12	None	0
TCA-TUS-035	Gully	Ephemeral	2	12	None	0
TCA-TUS-035	Gully	Ephemeral	1	12	None	0
TCA-TUS-035	Wash	Ephemeral	5	12	None	0
TCA-TUS-035	Wash	Ephemeral	5	12	None	0
TCA-SON-058	Wash	Ephemeral	20	12	None	0
TCA-TUS-290	Gully	Ephemeral	2	12	None	0
TCA-CAG-195	Gully	Ephemeral	8	12	None	0
TCA-TUS-298	Depression	Ephemeral	1	12	Road Crossing	<0.1

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

Under the No Action Alternative, WUS and wetlands would not be directly impacted, since no construction would occur.

3.5.2.2 Proposed Action

Surface waters could be temporarily affected by the proposed construction actions. Short term effects could include a temporary increase in erosion and sedimentation during periods of construction. Disturbed soils and hazardous substances (*i.e.*, anti-freeze, fuels, oils, and lubricants) could directly impact water quality during a rain event. These effects would be minimized through the use of BMPs. A Construction Stormwater General Permit would be obtained prior to construction, and this would require approval of a site-specific SWPPP and Notice of Intent (NOI). A site-specific Spill Prevention, Control and Countermeasure Plan (SPCCP) would also be in place prior to the start of construction. BMPs outlined in these plans would reduce potential migration of soils, oil and grease, and construction debris into local watersheds. Once the construction project is complete, the tower project sites will be re-vegetated with native vegetation, as outlined in the SWPPP, which would mitigate the potential of non-point source pollution to enter local surface waters.

The implementation of the Proposed Action would require re-grading of existing low-water crossings or the construction of new low-water crossings using in situ material. A total of 37 potential WUS, out of the 62 observed crossings, would be impacted as a result of implementing the Proposed Action. No drainage structures (*e.g.*, concrete low-water crossings) would be constructed as part of the Proposed Action. A Section 404 Permit from the USACE Los Angeles District Regulatory Division would be required to place fill or operate mechanized equipment in jurisdictional WUS. However, because the USACE Los Angeles District typically considers separate utility for each crossing, a NWP 14 would be used for each low-water crossing. All impacts to affected WUS would be less than the 0.1 acre maximum threshold established for reporting requirements under NWP 14. Consequently, all road repair (*i.e.*, grading) or improvements and construction in WUS would be authorized under a NWP 14 and a preconstruction notice would not be required.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on surface waters or WUS. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.6 FLOODPLAINS

3.6.1 Affected Environment

Pursuant to the National Flood Insurance Act of 1968, as amended (42 U.S.C. 4001, *et seq.*), and the Flood Disaster Protection Act of 1973 (P.L. 93-234, 87 Statute 975), EO 11988, Floodplain Management, requires that each Federal agency take actions to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and preserve the beneficial values which floodplains serve. EO 11988 requires that agencies evaluate the potential effects of actions within a floodplain and to avoid floodplains unless the agency determines there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a planning process is followed to ensure compliance with EO 11988. In summary, this process includes the following steps:

- Determination of whether or not the action is in the regulatory floodplain;
- Conduct early public notice;
- Identify and evaluate practicable alternatives, if any;
- Identify impacts of the action;
- Minimize the impacts;
- Reevaluate alternatives;
- Present the findings and a public explanation; and
- Implementation of the action.

This process is further outlined on the Federal Emergency Management Agency's (FEMA), Environmental Planning and Historic Preservation Program web site (FEMA 2006). As a planning tool, the NEPA process incorporates floodplain management through analysis and public coordination, ensuring that the floodplain management planning process is followed. In addition, floodplains are managed at the local municipal level with the assistance and oversight of FEMA. Therefore, any action within these areas would require appropriate coordination and evaluation of the potential effects.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

The No Action Alternative would not result in direct impacts on floodplains or be inconsistent with EO 11988, as no new construction would occur.

3.6.2.2 Proposed Action

Although none of the proposed towers or new and improved access roads are located in the 100-year floodplains as delineated by FEMA, some existing access roads cross the floodplains. Table 3-11 lists the existing access roads and their associated towers that transect the FEMA 100-year floodplains.

Table 3-11. Existing Access Roads Located in FEMA 100-Year Floodplain

Length of Access Road in FEMA 100-year Flood Plain				
Tower Site	**Length (feet)**	**Width (feet)**	**Area (square feet)**	**Acres**
TCA-NGL-049	2,775	12	33,300	0.76
TCA-NGL-050	75	12	900	0.02
TCA-TUS-038	248	12	2,976	0.07
TCA-TUS 035	4,492	12	53,904	1.24
TCA-AJO-193	1,330	12	15,960	0.37
Total	**8,920**		**107,8040**	**2.46**

Source: CBP access road shape files.
Note: No new or improved access roads intersect floodplains

The development, issuance, and analysis provided by this EA constitutes compliance of EO 11988 as outlined by the 8-part process described above. Additionally, no structures would impede the conveyance of flood waters, decrease floodplain capacity, increase flood elevations, frequencies, or durations. The implementation of the Proposed Action would have no significant effect on floodplain management.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on floodplains. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.7 VEGETATIVE HABITAT

3.7.1 Affected Environment

Biological surveys of the proposed tower sites were conducted by Harris Environmental Group, Incorporated (Harris) during October, November, and December 2007 and then in March, April, and May of 2008 for additional towers (CBP 2008a). A 1-acre site encompassing the proposed tower site was surveyed at each proposed tower site. The vegetative habitats within the project corridor are part of the Sonoran Desertscrub (Arizona Upland and Lower Colorado River Subdivisions), Plains and Semidesert Grasslands, and Madrean Evergreen Woodland (Brown 1994, CBP 2008a). Common plant species associated with these vegetative habitats are discussed below, and sensitive or rare plant species are discussed below in Sections 3.9.

The Sonoran Desertscrub – Arizona Upland Subdivision occurs on the upper bajadas of mountains between Ajo and the Baboquivari Mountains. This vegetative habitat extends northward from the international border to near Phoenix at its western extent and just north of the Baboquivari Mountains at its eastern extent. Areas of this vegetative habitat can also be found between the Baboquivari Mountains and Tucson and in a narrow band extending northwest from Tucson towards Needles, Arizona. The Arizona Upland Subdivision of Sonoran Desertscrub is characterized by a low and moderately dense cover of shrubs and large cacti with scattered small cacti, grasses, and herbs. Common species include saguaro (*Carnegiea gigantea*), organ pipe (*Stenocereus thurberi*), paloverde (*Parkinsonia* spp.), and several species of cholla (*Cylindropuntia* spp.), nipple cactus (*Mammillaria* spp.), and beehive cactus (*Coryphantha* spp.). Among the wettest of the desert vegetative habitats, the Arizona Upland Subdivision supports a relatively high diversity of plants and animals. Although cattle grazing and urban development have impacted some areas, much of this vegetative habitat is found on the OPCNM and remains relatively undisturbed and intact. However, few of the plant species in this vegetative habitat are fire tolerant and buffelgrass (*Pennisetum ciliare*) has invaded many areas, especially near major roads. Four tower sites are located in this vegetative habitat: TCA-AJO-198, TCA-CAG-102, TUS-CAG-195, and TCA-TUS-108.

The Lower Colorado River Subdivision of Sonoran Desert Scrub occurs on the lower bajadas and vast basin areas west of Ajo. Vast areas of this vegetative habitat occur on the Barry M. Goldwater Range and remain relatively undeveloped. This vegetative habitat is characterized by a low, sparse, and uniform cover of shrub with few cacti, grasses, or herbs. The dominant plants are typically creosote bush (*Larrea tridentata*) and various species of bursage (*Ambrosia* spp.). Mesquite (*Prosopis glandulosa*) and other desert shrubs are often found along wash margins. Cacti are scattered and include barrel cactus (*Ferocactus* spp.), cholla and hedgehog cactus (*Echinocereus* spp.). This vegetative habitat is the driest of the vegetative habitats in the project area and does not provide adequate amounts of palatable forage for cattle grazing. The species diversity of this vegetative habitat is typically very low and non-native species have has less impact. Four tower sites are located in this vegetative habitat: TCA-AJO-193, TCA- AJO-305, TCA-CAG-101, and TCA-CAG-197.

The Plains Grasslands in the project area occur only in the San Rafael Valley and the Sonoita/Eglin Valley and represent the southeastern most extent of this vegetative habitat in the U.S. This vegetative habitat is characterized by a dense cover of grasses, including multiple grama species (*Bouteloua ssp*.), galleta grass (*Hilaria jamesii*), and plains lovegrass (*Eragrostis intermedia*), and herbs. Other plant groups, such as shrubs and cacti, are characteristically absent. This vegetative habitat in the project area has been previously disturbed by cattle grazing, fire suppression, roads, and invasive species. Five tower sites are located in this vegetative habitat: TCA-SON-057, TCA-SON-058, TCA-SON-059, and TCA-SON-117.

The Semidesert Grassland vegetative habitat occurs in a complex mosaic interspersed among other vegetative habitats throughout southeastern Arizona. This vegetative habitat is characterized by perennial bunch grasses and scattered shrubs and cacti with bare ground in the intervening spaces. Cattle grazing and fire suppression have significantly affected this vegetative habitat resulting in the replacement of bunch grasses with low growing sod grasses, leaf succulents, shrubs, and most notably by extensive stands of mesquite. Typical perennial grasses include several gramma grasses, three-awn (*Aristida* spp.), bush muhly (*Muhlenbergia porteri*), Arizona cottontop (*Trichachne californica*), and others. Common grasses in heavily grazed areas includes hairy tridens (*Tridens pilosus*), fluffgrass (*T. pulchellus*), the invasive Lehmann Lovegrass (*Eragrostis lehmanniania*), and other less palatable grasses. Yuccas (*Yucca* spp.), beargrass (*Nolina* spp.), and agaves (*Agave* spp.) are also common where fire suppression occurs. A total of 18 tower sites are located in this vegetative habitat: TCA-NGL-052, TCA-NGL-054, TCA-NGL-113, TCA-NGL-210, TCA-NGL-285, TCA-SON-213, TCA-TUS-032, TCA-TUS-035, TCA-TUS-040, TCA-TUS-085,

TCA-TUS-181, TCA-TUS-187, TCA-TUS-287, TCA-TUS-290, TCA-TUS-291, TCA-TUS-298, TCA-TUS-299, and TCA-TUS-300.

The Madrean Evergreen Woodland habitat occurs on mountain slopes throughout southeast Arizona, including the Huachuca Mountains. This vegetative habitat is characterized by a moderate cover of oaks (*Quercus* spp.), pines (*Pinus* spp.), and junipers (*Juniperus* spp.). At lower elevations within this vegetative habitat, the tree canopy is typically more open, and a savannah-like habitat is observed with grasses and cacti being more common. The predominant trees in this vegetative habitat are Arizona white oak (*Quercus arizonica*), Mexican blue oak (*Q. oblongifolia*), and Emory Oak (*Q. emoryi*), and manzanita is a common shrub (*Arctostaphylos pungens*). Although substantial portions of this vegetative habitat are found within CNF, the mild climate of this vegetative habitat makes it highly suitable for settlement by humans and residential development has affected many areas. Although many of the plant species in this vegetative habitat are fire tolerant, cattle grazing and fire suppression have led to conditions which favor stand replacing, catastrophic fires and large portions of this vegetative habitat have been significantly impacted in recent years. A total of 22 tower sites are located in this vegetative habitat: TCA-NGL-043, TCA-NGL-044, TCA-NGL-045, TCA-NGL-046, TCA-NGL-047, TCA-NGL-050, TCA-NGL-109, TCA-NGL-112, TCA-NGL-211, TCA-SON-055, TCA-SON-056, TCA-SON-060, TCA-SON-061, TCA-SON-062, TCA-SON-115, TCA-TUS-036, TCA-TUS-038, TCA-TUS-041, TCA-TUS-042, TCA-TUS-103, TCA-TUS-185, and TCA-TUS-192.

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

No direct impacts would occur as a result of the No Action Alternative. However, vegetation communities would continue to be impacted by IC activity that creates trails, damages vegetation, promotes the dispersal and establishment of invasive species, and results in conditions that favor catastrophic wildfires. No direct impact from the project would occur under the No Action Alternative.

3.7.2.2 Proposed Action

Construction of proposed tower sites would degrade or remove 1.8 acres of Sonoran Desertscrub – Arizona Upland Subdivision, 0.3 acre of Sonoran Desert Scrub - Lower Colorado River Subdivision, 2.5 acres of Plains Grassland, 21 acres of Semidesert Grassland, and 0.9 of Chihuanhuan Desert Scrub, and 15 acres of Madrean Evergreen Woodland vegetative habitats. Each of these vegetative habitats have been affected by development, cattle grazing, fire suppression, timber harvesting, mining, and the invasion of exotic species over the last century. All of these habitats are locally and regionally abundant; therefore the Proposed Action would not cause the loss of any one of the above mentioned habitats and would not have significant adverse impacts to vegetation communities. Mitigation measures outlined in Section 5 would minimize the spread and establishment of invasive species within the project area.

Many of the roads which lead to tower sites are infrequently used due to poor road conditions; and repair and/or improvements to roads, as well as new road construction, would likely lead to increased recreational use of these vegetative habitats. Increased use by humans, both directly in association with construction and operation of towers and indirectly in association with increased recreational access, is likely to favor invasive species already established and result in the spread of invasive species to new areas. However, the indirect reduction of IC activity would benefit these habitats through the reduction of similar impacts over a much greater area. Furthermore, improved and new roads would serve as fire breaks which would aid efforts to control wildfires and to manage vegetative habitats through the use of controlled burns.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on vegetation resources. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.8 WILDLIFE AND AQUATIC RESOURCES

3.8.1 Affected Environment

Biological surveys of the proposed tower sites were conducted by Harris during October, November, and December 2007 and then in March, April, and May of 2008 for additional towers (CBP 2008a). A 1-acre site encompassing the proposed tower site was surveyed at each proposed tower site. Wildlife species observed, heard, or for which signs were observed during the tower biological surveys are marked by an asterisk in the following discussions (CBP 2008a). Sensitive or rare wildlife species are discussed below in Sections 3.9.

Many of the animals found in Sonoran Desertscrub vegetative habitats are found throughout the warmer and drier regions of the southwestern U.S. Due to a lack of available forage and extreme temperatures, all of the mammals of these vegetative habitats are small and most are nocturnal. The common mammals include several species of bats, coyote (*Canis latrans*), black-tailed jack-rabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), Merriam's kangaroo rat (*Dipodomys merriami*), white-throated woodrat (*Neotoma albigula*), and desert pocket mouse (*Chaetodipus penicillatus*). Other mammals, such as the desert kangaroo rat (*Dipodomys deserti*), Bailey's pocket mouse (*Chaetodipus baileyi*), and round-tailed ground squirrel (*Spermophilus tereticaudus*) are more limited in there distribution and, as such, are more characteristic of Sonoran Desertscrub vegetative habitats.

Birds in these vegetative habitats are typically seed-eaters or are insectivorous. Similar to the mammals, many birds are common throughout the desert regions, including the roadrunner (*Geococcyx californianus*), mourning dove (*Zenaida macroura*), lesser nighthawk (*Chordeiles acutipennis*), cactus wren (*Campylorhynchus brunneicapillus*), black-tailed gnatcatcher (*Polioptila melanura*), phainopepla (*Phainopepla nitens*), and black-throated sparrow (*Amphispiza bilineata*). Some birds more characteristic of Sonoran Desertscrub include Gambel's quail (*Callipepla gambelii*), gilded flicker (*Colaptes chrysoides*), and Gila woodpecker (*Melanerpes uropygialis*).

Reptiles are the most diverse animal group in this vegetative habitat, and many reptiles are also widespread, including the desert tortoise (*Gopherus agassizii*), chuckwalla (*Sauromalus ater*), desert iguana (*Dipsosaurus dorsalis*), rosy boa (*Charina trivirgata*), and western shovel-nosed snake (*Chionactis occipitalis*). Reptiles which are common throughout the desert regions, but have Sonoran Desertscrub subspecies include the banded gecko (*Coleonyx varigatus*), desert spiny lizard (*Sceloporus magister*), glossy snake (*Arizona elegans*), western groundsnake (*Sonora semiannulata*), and western diamondback (*Crotalus atrox*).

The Plains Grassland and Semidesert Grassland vegetative habitats provide more forage than other vegetative habitats in the project area. The climate of these habitats is typically more temperate and rainfall is greater in comparison to the Sonoran Desert Scrub habitats. The pronghorn (*Antilocapra americana*) and bison (*Bison bison*) were once widespread throughout all grassland habitats of the U.S.; however, hunting pressure has affected both species. Although the pronghorn has recolonized many areas, the bison is now restricted to commercial ranches and a few Federally managed lands such as Yellowstone National Park in Wyoming and the Konza Tallgrass Prairie Preserve in Oklahoma. Mule deer (*Odocoileus hemionus crooki*) and javelina (*Pecari tajacu*) have benefited from the expansion of woody species into these vegetative habitats following the introduction of cattle grazing over the last century. Grassland vegetative habitats typically support a high diversity of small mammals. Some characteristic small mammals of the Plains Grassland include the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), swift fox (*Vulpes velox*), plains pocket gopher (*Geomys bursarius*), and plains harvest mouse (*Reithrodontomys montanus*), each of which has adapted to spending most of their time underground. Mammals of the Semidesert Grassland are somewhat more diverse and include the black-tailed jackrabbit, skunk (*Mephitis mephitis*), spotted ground squirrel (*Spermophilus spilosoma*), and several species of mouse and rat, such as hispid pocket mouse (*Chaetodipus hispidus*), three species of kangaroo rats (*Dipodomys* spp.), two species of cotton rats (*Sigmodon* spp.), two species of woodrat (*Neotoma* spp.). The abundance of small mammals in these vegetative habitats supports ubiquitous populations of coyote.

Because the project area is on the edge of the Plains Grassland distribution in the U.S. many of the grassland birds species found in the area are also at the periphery of their range, including the mountain plover (*Charadrius montana*), lark bunting (*Calamospiza melanocorys*), Gambel's quail, grasshopper sparrow (*Ammodramus savannarum*), and the long-billed curlew (*Numenius americanus*). Other birds are common throughout grassland vegetative habitats and include the turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), meadowlark (*Sturnella neglecta*), prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), Swainson's hawk (*Buteo swainsoni*), scaled quail (*Callipepla squamata*), ladder-backed woodpecker (*Picoides scalaris*), roadrunner, western kingbird (*Tyrannus verticalis*), ash-throated flycatcher (*Myiarchus cinerascens*), barn swallow (*Hirundo rustica*), cactus wren, white-winged dove (*Zenaida asiatica*), mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), pyrrhuloxia (*Cardinalis sinuatus*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), and lark sparrow (*Chondestes grammacus*).

The many burrowing mammals in these vegetative habitats provide habitat for a diverse assemblage of snakes including the bullsnake (*Pituophis catenifer sayi*), cornsnake (*Elaphe guttata*), western coachwhip (*Masticophis flagellum testaceus*), and western plains milksnake (*Lampropeltis triangulum celaenops*). Some characteristic reptiles of the Semidesert Grasslands include the western yellow box turtle (*Terrapene ornata luteola*), western hook-nosed snake (*Gyalopion canum*), desert grassland whiptail (*Aspidoscelis uniparens*), canyon spotted whiptail (*Aspidoscelis burti*), ornate tree lizard (*Urosaurus ornatus*), and the southwestern earless lizard (*Cophosaurus texanus scitulus*). Plains Grassland reptiles include the plains spadefoot (*Spea bombifrons*) and lesser earless lizard (*Holbrookia maculata*).

The Madrean Evergreen Woodland vegetative habitat provides abundant forage and mast for white-tailed deer (*Odocoileus virginianus*), which is common throughout these habitats in the southwest. Other common mammals in this vegetative habitat include bobcat (*Lynx rufus*), yellow-nosed cotton rat (*Sigmodon ochrognathus*), southern pocket gopher (*Thomomys umbrinus*), apache squirrel (*Sciurus nayaritensis*), Bailey's pocket mouse, and the eastern cottontail (*Sylvagus floridanus*). Characteristic nesting birds include Montezuma quail (*Cyrtonyx montezumae*), whiskered owl (*Megascops trichopsis*), Arizona woodpecker (*Picoides arizonae*), buff-breasted flycatcher (*Empidonax fulvifrons*), Mexican jay (*Aphelocoma ultramarina*), and bridled titmouse (*Baeolophus wollweberi*). Other common or characteristic birds include the ravens (*Corvus* spp.), black vulture (Coragyps atratus), gray hawk (*Buteo nitidus*), acorn woodpecker (*Melanerpes formicivorus*), Hutton's vireo (*Vireo huttoni*), bushtit (*Psaltriparus minimus*), and black-throated gray warbler (*Dendroica nigrescens*). Woodland habitats also support a variety of reptiles including rock, twin-spotted, ridge-nosed, and black-tailed rattlesnakes (*Crotalus lepidus*, *C. pricei*, and *C. willardi, C. molossus*), horned lizards (*Phrynosoma* spp.), ornate tree lizard, green ratsnake (*Senticolis triapsis*), mountain skink (*Eumeces callicephalus*), Mexican garter snake (*Thamnophis eques*), and several others.

Concern about the effects of towers to migratory birds and other birds has been studied for the last 10 years. Oftentimes avian mortality is caused by tower guy wires, other concerns deal with tower lighting as an avian attractant. One recent study by Evans, *et al* (2007), indicates that flashing versus non-flashing light may have more of an influence on attracting birds than the actual color of the light. However, the study also found that there are no differences between darkness and red static, red strobe, or white lights strobe as an attractant.

Other studies have been conducted, which provide information on lighting; but overall these studies lacked peer review and were not transparent (Woodlot Alternatives, Inc. 2007). However, all studies including Evan (*et al.* 2007) indicate that more research is needed to better understand the effects of tower lighting on night-migrating birds.

3.8.2 Environmental Consequences

3.8.2.1 No Action Alternative

Under the No Action Alternative, no direct impacts to wildlife habitats would occur. However, IC activity would continue to degrade vegetative habitats resulting in decreased suitability for wildlife.

3.8.2.2 Proposed Action

The permanent loss of up to 41 acres and temporary degradation of up to 73 acres of Sonoran Desert habitats would have a minimal impact on wildlife. Although a few sedentary animals could be lost during construction activities, most wildlife would avoid any harm by utilizing the abundance of surrounding habitat. There is a possibility that the proposed surveillance and communication towers could pose hazards to migratory birds; however, since neither RDT nor SST use guy wires, the potential for adverse impacts is greatly reduced. Furthermore, tower construction would adhere to the USFWS interim guidelines and FAA guidelines designed to reduce impacts to migratory birds such as installation of white or red strobe lights and limiting heights of towers (USFWS 2000). Therefore, the Proposed Action is not anticipated to have a significant impact to the sustainability of the wildlife or migratory bird population in the region. The electromagnetic field (EMF) associated with radars could disorient migratory species, thus increasing the potential for bird strikes (Nichols and Racey 2007). Mitigations measures as outlined in Section 5 would ensure there would be no significant impacts on migratory birds.

Repair of access roads and maintenance of towers would cause temporary, short term disturbances to wildlife. However, no significant losses of wildlife population due to operation and maintenance of the towers would be expected. The Proposed Action could result in indirect beneficial impacts to wildlife by reducing the adverse impacts of IC activity on the regional wildlife habitat.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed

Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on wildlife resources. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.9 THREATENED AND ENDANGERED SPECIES AND CRITICAL HABITAT

3.9.1 Affected Environment

The Endangered Species Act (ESA) was enacted to provide a program for the preservation of endangered and threatened species and to provide protection for the ecosystems upon which these species depend for their survival. All Federal agencies are required to implement protection programs for designated species and to use their authorities to further the purposes of the act. Responsibility for the identification of a threatened or endangered species and development of any potential recovery plans lie with the Secretary of the Interior and the Secretary of Commerce (marine species).

USFWS is the primary agency responsible for implementing the ESA and is responsible for birds and other terrestrial and freshwater species. The USFWS's responsibilities under the ESA include: (1) the identification of threatened and endangered species; (2) the identification of critical habitats for listed species; (3) implementation of research on, and recovery efforts for, these species; and (4) consultation with other Federal agencies concerning measures to avoid harm to listed species.

An endangered species is a species officially recognized by the USFWS as being in danger of extinction throughout all or a significant portion of its range. A threatened species is a species recognized as likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those that have been formally submitted to the Secretary of the Interior for official listing as threatened or endangered. Species may be considered for listing as endangered or threatened when any of the five following criteria occurs: (1) current/imminent destruction, modification, or curtailment of their habitat or range; (2) overuse of the species for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; and (5) other natural or human-induced factors that affect continued existence.

In addition, the USFWS has identified species that are candidates for listing as a result of identified threats to their continued existence. The candidate designation includes those species for which the USFWS has sufficient information to support proposals to list as endangered or threatened under the ESA. However, proposed rules have not yet been issued because such actions are precluded at present by other listing activity. Although not afforded protection by the ESA, candidate species may be protected under other Federal or state laws.

In 2006, CBP and the SBI*net* program established an on-going relationship with DOI and USFWS to enhance environmental coordination between the agencies. USFWS recognized that the number and scope of CBP projects required a streamlined, project-focused approach to environmental impacts evaluation. To achieve this, USFWS established the Information, Planning, and Consultation (IPAC) system which provides CBP and SBI*net* project planners with information about sensitive resources within the vicinity of a proposed project. The IPAC system provides the following types of information: USFWS trust resources, including threatened and endangered species, designated Critical Habitat, and USFWS refuges that occur in identified project areas, or areas that may be affected by proposed CBP and SBI*net* activities. IPAC also provides USFWS-recommended BMPs that detail how project planners can avoid, minimize, and mitigate adverse effects that could result from project activities. From the beginning of the SBI*net* program, the planners of this Tucson West EA project have routinely consulted with and received guidance from USFWS on various aspects of the project that may potentially affect natural and biological resources in the AORs, and are identifying BMPs and mitigations of potential adverse project impacts to natural and biological resources. Additionally, in October 2007, CBP and DOI jointly established an Identification Interim Assistance Team (IDIAT) to continue to build on the developing cooperative relationship between these agencies. The purpose of the IDIAT is to exchange information to better understand each others' missions, regulatory restrictions, and to mutually plan a way forward for both agencies' programs.

Biological surveys of the proposed tower sites were conducted by Harris during October, November, and December 2007 and in March, April, and May of 2008 for additional towers (CBP 2008a). Their investigation included surveys for all Federally and state protected species potentially occurring in the project region.

3.9.1.1 Federal

As listed by the Arizona Ecological Field Services Office (AESFO), four candidate species, four threatened species, 31 endangered species and 10 Critical Habitat designations occur within Cochise, Maricopa, Pima, Pinal, or Santa Cruz County, Arizona (AESFO 2007). However, 28 of these species and seven Critical Habitat designations occur outside the range of potential impacts, adverse or beneficial, and would not be affected. The proposed towers would not affect the pronghorn. The remaining 11 species and three designated Critical Habitats, which could be potentially impacted include the, Sonora chub (*Gila ditaenia*) and Critical Habitat, Chiricahua leopard frog (*Rana chiricahuensis*), Sonoran tiger salamander (*Ambystoma tigrinum stebbinsi*), masked bobwhite (*Colinus virginianus ridgwayi*), jaguar (*Panthera onca*), ocelot (*Leopardus pardalis*), Mexican spotted owl (*Strix occidentalis lucida*) and Critical Habitat, western yellow-billed cuckoo (*Coccyzus americanus*), lesser long-nosed bat (*Leptonycteris yerbabuenae*), Huachuca water umbel (*Lilaeopsis schaffneriana recurva*) and Critical Habitat, and the Pima pineapple cactus (*Coryphantha scheeri robustispina*) (Tables 3-12 and 3-13).

Table 3-12. Tower Sites or Access Roads Within or Near Aquatic Habitats Potentially Occupied or Utilized by Sensitive Species

Geographic Area	Tower ID	Sonoran Chub	Critical Habitat	Chiricahua Leopard Frog	Sonoran Tiger Salamander	Huachuca Water Umbel	Critical Habitat	New Tower	New Road (feet)	Roadwork Needed (feet)
Ajo	TCA-AJO-305					X		Y	-	0
Altar Valley	TCA-TUS-032							Y	-	0
	TCA-TUS-035							Y	42	0
	TCA-TUS-085							Y	33	825
	TCA-TUS-187							Y	86	50
	TCA-TUS-287							Y	98	0
	TCA-TUS-291							Y	60	0
	TCA-TUS-299							Y	-	0
	TCA-TUS-300							Y	-	0
Arivaca Creek Basin	TCA-TUS-038							Y	25	0
	TCA-TUS-041							Y	-	178
	TCA-TUS-042			X				Y	3	6155
	TCA-TUS-290							Y	58	50
Black Mesa Area	TCA-TUS-036							Y	-	55
	TCA-TUS-040			X				Y	1,138	13,995
	TCA-TUS-181			X				Y	48	2,107
	TCA-TUS-185			X				Y	49	4,519
	TCA-TUS-298							Y	1,276	0
Sycamore Creek Basin	TCA-NGL-043	X	X					Y	439	0
	TCA-NGL-044	X	X					Y	274	0
	TCA-NGL-045	X	X	X				Y	409	0
	TCA-NGL-109	X	X					Y	-	0
Santa Rita	TCA-NGL-211							Y	132	0
Santa Catalina	TCA-TUS-192							N	-	0
Sierra Rita	TCA-TUS-103							N	-	0
Santa Cruz River Basin	TCA-NGL-046			X				Y	14	1,486
	TCA-NGL-047			X				Y	-	3,803
	TCA-NGL-048							Y	-	0
	TCA-NGL-049			X				Y	88	3,035
	TCA-NGL-050			X				Y	37	1,476
	TCA-NGL-052							Y	68	0
	TCA-NGL-054							Y	185	8,825
	TCA-NGL-112							N	-	0
	TCA-NGL-113							N	-	0
	TCA-NGL-210							Y	78	0
	TCA-NGL-285							Y	22	0
Sonoita Creek Basin	TCA-SON-115							N	-	0
	TCA-SON-117					X	X	N	-	0

Table 3-12, continued

Geographic Area	Tower ID	Sonoran Chub	Critical Habitat	Chiricahua Leopard Frog	Sonoran Tiger Salamander	Huachuca Water Umbel	Critical Habitat	New Tower	New Road (feet)	Roadwork Needed (feet)
San Rafael Valley	TCA-SON-055			X				Y	286	4,014
	TCA-SON-056			X	X			Y	-	0
	TCA-SON-057					X	X	Y	-	3,656
Huachuca Mountains	TCA-SON-058			X	X			Y	106	0
	TCA-SON-059					X		Y	225	0
	TCA-SON-060					X	X	Y	-	0
	TCA-SON-061							Y	95	0
	TCA-SON-062							Y	-	0
Sierra Vista	TCA-SON-213					X		Y		
Totals		4	4	12	2	4	3	44	5,915	54,527

Table 3-13. Tower Sites or Access Roads Within or Near Terrestrial Habitats Potentially Occupied or Utilized by Sensitive Species

Geographic Area	Tower ID	Masked Bobwhite	Mexican Spotted Owl	Critical Habitat	Yellow-billed Cuckoo	Jaguar	Lesser Long-Nosed Bat Roosts	Lesser Long-Nosed Bat Foraging Area	Ocelot	Pima Pineapple Cactus	New Tower	New Road (feet)	Roadwork Needed (feet)
Ajo	TCA-AJO-305							X			Y	-	0
Altar Valley	TCA-TUS-032	X				X	X	X			Y	-	0
	TCA-TUS-035	X			X	X		X		X	Y	42	0
	TCA-TUS-085	X				X	X	X		X	Y	33	825
	TCA-TUS-187	X			X	X		X		X	Y	86	50
	TCA-TUS-287					X	X	X			Y	98	0
	TCA-TUS-291					X	X	X			Y	60	0
	TCA-TUS-299	X			X	X	X	X		X	Y	-	0
	TCA-TUS-300	X				X	X	X			Y	-	0
Arivaca Creek Basin	TCA-TUS-038				X	X		X		X	Y	25	0
Arivaca Creek Basin, continued	TCA-TUS-041				X	X		X		X	Y	-	178
	TCA-TUS-042				X	X		X			Y	3	6,155
	TCA-TUS-290				X	X		X		X	Y	58	50
Black Mesa Area	TCA-TUS-036				X	X		X			Y	-	55
	TCA-TUS-040				X	X		X			Y	1,138	13,995
	TCA-TUS-181				X	X		X			Y	48	2,107
	TCA-TUS-185				X	X		X			Y	49	4,519
	TCA-TUS-298				X	X		X		X	Y	1,276	0

Table 3-13, continued

Geographic Area	Tower ID	Masked Bobwhite	Mexican Spotted Owl	Critical Habitat	Yellow-billed Cuckoo	Jaguar	Lesser Long-Nosed Bat Roosts	Lesser Long-Nosed Bat Foraging Area	Ocelot	Pima Pineapple Cactus	New Tower	New Road (feet)	Roadwork Needed (feet)
Sycamore Creek Basin	TCA-NGL-043			X	X	X		X			Y	439	0
	TCA-NGL-044			X	X	X		X			Y	274	0
	TCA-NGL-045			X	X	X	X	X			Y	409	0
	TCA-NGL-109			X	X	X		X			Y	-	0
Santa Rita	TCA-NGL-211		X	X		X	X	X			Y	132	0
Santa Catalina	TCA-TUS-192		X	X				X			N	-	0
Sierra Rita	TCA-TUS-103					X		X			N	-	0
Santa Cruz River Basin	TCA-NGL-046			X	X	X	X	X		X	Y	14	1,486
	TCA-NGL-047		X		X	X	X	X		X	Y	-	3,803
	TCA-NGL-048				X	X		X		X	Y	-	0
	TCA-NGL-049			X		X	X	X		X	Y	88	3,035
	TCA-NGL-050		X			X	X	X		X	Y	37	1,476
	TCA-NGL-052				X	X		X		X	Y	68	0
	TCA-NGL-054			X		X		X		X	Y	185	8,825
	TCA-NGL-112					X		X		X	N	-	0
Santa Cruz River Basin	TCA-NGL-113				X	X		X		X	N	-	0
	TCA-NGL-210				X	X		X		X	Y	78	0
	TCA-NGL-285				X	X		X		X	Y	22	0
Sonoita Creek Basin	TCA-SON-115		X	X	X	X	X	X			N	-	0
	TCA-SON-117				X	X		X			N	-	0
San Rafael Valley	TCA-SON-055		X			X		X			Y	286	4,014
	TCA-SON-056		X			X		X			Y	-	0
	TCA-SON-057					X		X			Y	-	3,656
Huachuca Mountains	TCA-SON-058					X		X			Y	106	0
	TCA-SON-059					X		X			Y	225	0
	TCA-SON-060					X		X			Y	-	0
	TCA-SON-061					X		X			Y	95	0
	TCA-SON-062					X		X			Y	-	0
Sierra Vista	TCA-SON-213							X			Y	491	0
Totals		8	7	10	25	15		50	19		44	5,915	54,527

Gila Topminnow

The Gila topminnow is native to the Gila River basin of the U.S. and Mexico, and the Río de la Concepción and Rio Sonora basins of northern Mexico (USFWS 1998). The species is tolerant of a broad range of habitat conditions in both lotic and lentic systems, but prefers shallow, warm, fairly quiet waters. Gila topminnow are live bearers and highly fecund, so populations can rebound quickly, which is probably part of this species' strategy for dealing with periodic droughts that are common in the southwestern U.S. Although current populations are typically found in headwater systems, they have likely been displaced from preferred habitats at lower elevations through competition with non-native fishes. The majority of the existing natural populations occur within the Santa Cruz River basin including sites on upper and lower Sonoita Creek, the Santa Cruz River north of Nogales, upper Cienega Creek, and in the San Rafael Valley. Populations in the upper Gila River basin are primarily introduced.

Sonora Chub

The Sonora chub inhabits intermittent streams of the Rios de la Concepcion Basin in southern Arizona and northern Sonora Mexico, where it occurs in pools near cliffs, boulders, or other cover in the channel (USFWS 1992). In Sycamore Creek, the only reach of the Rios de la Concepcion in the U.S., the Sonora chub is typically found in the largest, deepest, most permanent pools. Sonora chub is adapted to survival in extreme desert conditions and is adept at exploiting small marginal habitats.

Sonora Chub Critical Habitat

In 1986, Critical Habitat was designated for Sonora chub in Sycamore drainage (USFWS 1986) to include the riparian zone of Sycamore Creek, starting from and including Yank's Spring, downstream to the U.S.-Mexico border; the riparian zone of lower Penasco Creek, and a short length of the channel of an unnamed stream that enters Sycamore Creek from the west. Primary constituent elements include clean permanent water with pools, intermediate riffle areas, intermittent pools maintained by bedrock or by subsurface flows, and areas shaded by canyon walls.

Chiricahua Leopard Frog

The Chiricahua leopard frog is a habitat generalist and historically was found in a variety of aquatic habitat types in the Salt, Verde, Gila, San Pedro, Santa Cruz, Yaqui/Bavispe, Magdalena, and Little Colorado River basins (USFWS 2007a). Competition with non-native predators (*e.g.,* American bullfrogs [*Rana catesbeiana*], fishes, and crayfishes) has restricted the Chiricahua leopard frog to marginal habitats where these competitors are absent. It is currently known from cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,300 to 8,900 feet. Although many Chiricahua leopard frogs have not been recently observed at many previously occupied sites, the general distribution of occurrences includes mountainous areas from between the crests of the Huachuca and Patagonia Mountains, the Santa Rita Mountains, and the Atacosta Mountains west to the Baboquivari Mountains, and Sierrita Mountains. The species requires permanent or semi-permanent pools for breeding, water characterized by low levels of contaminants and moderate pH, and may be excluded or exhibit periodic die-offs where a pathogenic fungus is present.

Sonoran Tiger Salamander

Sonoran tiger salamanders are primarily restricted to stock tanks of the San Rafael Valley (USFWS 2005a, 2007b). Populations could be found in suitable habitats 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 CNM. Sonoran tiger salamanders require standing water from January through June for breeding and larval growth. Adult, metamorphosed salamanders inhabit adjacent grassland and oak woodland terrestrial habitat when not in ponds.

Masked Bobwhite

Masked bobwhite was historically associated with the Santa Cruz and Altar Valleys and northern Sonora, Mexico. Currently, populations in the U.S. are sustained through a captive breeding and release program on BANWR (USFWS 1995). Masked bobwhite utilize a variety of habitats associated with open savanna grasslands, such as weedy bottom lands, grassy and herb-strewn valleys, and forb-rich plains. Approximately 80 percent of BANWR provides suitable habitat and masked bobwhite have been observed in suitable habitats adjacent to the refuge (USFWS 2005b).

Breeding, nesting, and hatching cycles are timed to exploit the availability of forage, cover, and invertebrate prey produced in response to summer rains (USFWS 1995). Breeding normally begins in July following summer rains. Nests are built on the ground where cover is essential to conceal the nest. Hatching begins in late July, peaks between September 5 and 20, and ends by late October to early November.

Jaguar

The historic range of the jaguar included a wide belt from central U.S. to central Mexico (USFWS 1997a). Although the greatest abundance of jaguars occurs in tropical environments of Mexico, the range of northern populations extends into the more arid environments of the southwestern U.S. The general distribution of past sightings in the U.S. and the habitat associated with these sightings includes areas of forest, woodland, and grassland vegetation types in the Baboquivari Mountains, the southern portion of the Altar Valley, a southern portion of the Santa Cruz River basin, and the San Pedro River basin south of Aravaipa Creek (Hatten *et al.* 2002, USFWS 2007d).

Recent sightings of jaguar in Arizona have occurred in the Baboquivari Mountains, but are extremely rare. The jaguar may transiently use a wide variety of habitats in the project area. Potential habitats in the U.S. are as extensive as those occupied by the population of jaguars in northern Sonora, Mexico. Thus, habitats in the U.S. could become increasingly important as threats continue in Mexico. Development of infrastructure projects (*i.e.*, pedestrian fences) along the U.S. border may impede movement of jaguars across the border. Because jaguars in Arizona are believed to be part of a population in northern Mexico, preventing jaguar movement and exchange between the U.S. and Mexico will likely have deleterious effects on jaguars, particularly those in Arizona and New Mexico.

Ocelot

The ocelot's range historically included the southern U.S. and northern Mexico (USFWS 1990, AFGD 2004b). Although the greatest abundance of ocelots occurs in tropical environments of Mexico, the range of northern populations extends into the more arid environments of the southwestern U.S including remnant populations in Texas and transient populations in Arizona. In its northern range the ocelot occurs in subtropical thorn forest, thorn scrub and dense brushy thickets, often in riparian bottomland where it prefers areas of dense ground cover. The ocelot is more adaptable than the jaguar and may persist in partly cleared forests, dense cover near large towns, second growth woodland, and abandoned cultivation, which have gone back to bush. Ocelots are primarily crepuscular and nocturnal, spending the day in heavy brush. Their prey consists of small to medium-sized mammals and birds, but may also include reptiles, fish and invertebrates.

The most recent sighting of ocelot near any of the towers project area occurred 30 miles south of the U.S. border. Recent occurrence of ocelot in the project area has not been confirmed.

Mexican Spotted Owl

In the U.S., the Mexican spotted owl occupies warm-temperate and cold-temperate forests from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah southward through Arizona and New Mexico (USFWS 1993). A discontinuous population also occurs in Mexico with a range extending from the Sierra Madre Occidental and Oriental mountains southward to the southern end of the Mexican Plateau. In southeast Arizona, the species typically occurs in mixed-conifer forests, but the species utilizes a variety of habitat types throughout its range. Habitat characteristics which favor the Mexican spotted owl are usually found in old growth forests at least 200 years of age. These characteristics include a dense multi-layered canopy with numerous snags and downed woody matter. Nesting habitat is commonly associated with at least some old-growth trees, steep slopes at elevations from 6,000 to 8,000 feet, and a northern or eastern aspect.

Nesting pairs typically establish a home range of about 1,000 acres which provides year-round access to nesting, roosting, and foraging areas (USFWS 1993). Nesting has been observed on a variety of substrates including artificial platforms, tree cavities, and cliff ledges. Male and female owls begin roosting together in February and the female begins laying eggs as early as March. Incubation lasts 30 days and most eggs are hatched by the end of May. Fledging occurs from May through October when young owls become fully independent. Mexican spotted owls prey on a variety of small animals hunting from perches and attacking over short distances.

Mexican Spotted Owl Critical Habitat

The structural characteristics of habitat occupied by the Mexican spotted owl vary depending upon the subspecies use of the habitat and changes in plant communities over the subspecies range (USFWS 2004). However, life history requirements of the Mexican spotted owl are met by similar conditions throughout its range. In order to support a breeding pair on a year-round basis, sufficient habitat must occur within the home range and in an appropriate configuration to provide for foraging, roosting, sheltering, nesting, and rearing. Primary constituent elements are grouped by forest and canyon habitats to reflect differences in elements of these habitats which meet life history requirements and by elements related to maintenance of adequate prey species (USFWS 2001a).

Primary constituent elements related to forest structure include:

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with a trunk diameter of 12 inches or more when measured at 4.5 feet from the ground;
- A shade canopy created by the tree branches covering 40 percent or more of the ground; and
- Large dead trees (snags) with a trunk diameter of at least 12 inches when measured at 4.5 feet from the ground.

Primary constituent elements related to canyon habitat include one or more of the following:

- Presence of water (often providing cooler and often higher humidity than the surrounding areas);

- Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;
- Canyon wall containing crevices, ledges, or caves; and
- High percent of ground litter and woody debris.

Primary constituent elements related to maintenance of adequate prey species include:

- High volumes of fallen trees and other woody debris;
- A wide range of tree and plant species, including hardwoods; and
- Adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.

Designated critical habitat areas include the majority of known Mexican spotted owl breeding sites. However, several areas of potential habitat were excluded from designation as critical habitat. These excluded lands include Wildlife Urban Interface areas were the risk of catastrophic wildfires is high, the Penasco Vegetation Management Area which provides valuable research related to forest thinning projects, lands managed by Mescalero Apache, San Carlos Apache, or Navajo Nation, and military lands managed under an Integrated Natural Resource Management Plan, which include Camp Navajo Army Depot, U.S. Naval Observatory Flagstaff Station, and Forts Carson and Huachuca. Five units of Critical Habitat are found in south central Arizona.

Yellow-billed Cuckoo

Yellow-billed cuckoos west of the continental divide are a distinct population segment (DPS) that is a significant component of the total population (USFWS 2001b, AGFD 2002). Breeding populations are scattered throughout much of southeastern Arizona and important areas of habitat are found in Phoenix area rivers (Gila, Hassayampa, Agua Fria, Salt, and Verde), and Tucson area rivers and creeks (Altar Valley; Santa Cruz and San Pedro River; and Sonoita, Arivapa, and Cienega Creeks) (USFWS 2008, AGFD 2004). The western yellow-billed cuckoo is a neotropical migrant and breeds from June 1 to September 30 in riparian vegetation throughout the western U.S. as far north as Washington and Montana. In Arizona, preferred habitats include cottonwood-willow forests and larger mesquite bosques. Nests are built in willow or mesquite thickets, and egg laying is timed to coincide with outbreaks of insects, especially caterpillars. Fledglings develop quickly and begin the migration back to Mexico.

Lesser Long-nosed Bat

The lesser long-nosed bat's (LLNB) range extends from southern Arizona and extreme southwestern New Mexico, through western Mexico, south to El Salvador (USFWS 1997b). The LLNB primarily utilizes natural caves and abandoned mines for roosting, but can transiently roost among overhanging rocks and other shelters. Occupied roosts have been documented from eastern portions of the Cabeza Prieta National Wildlife Refuge (CPNWR), north as far as Phoenix, and east as far as the Animas Valley in New Mexico (Cockrum and Petryszyn 1991). Use of roosting sites may vary depending upon seasonal fluctuations in the timing of forage availability. Thus, some roosts may be occupied or unoccupied through parts or all of a breeding season.

Female LLNBs arrive at known maternity roosts in southwest Arizona as early as April continuing through mid-July (USFWS 1997b). These maternity colonies begin to disband by September. Both males and females can be found in transient or maternity roosts from September to as late as early November. The bats eat nectar and fruits of columnar cacti and nectar of paniculate agaves, as such, they are considered to be an important dispersal and pollination vector for these species. LLNB are known to travel 30 miles to reach suitable concentrations of forage.

Huachuca Water Umbel

The Huachuca water umbel is found in mid-elevation wetland communities in southern Arizona and northern Sonora, Mexico (USFWS 1999). Known populations occur along the Santa Cruz River and its tributaries in the in the San Rafael Valley, along Sonoita Creek, along the San Pedro River near the U.S.-Mexico border, and in eastern Cochise County. Huachuca water umbel is typically associated with perennial springs and stream headwaters that have permanently or seasonally saturated and highly organic soils. The Huachuca water umbel requires refugial sites where it is free from scouring caused by flooding. Following a flood event the species is capable of rapidly colonizing disturbed areas from these refugial populations. Although Huachuca water umbel can persist in dense mats where scouring is absent, populations within flooded areas typically become less dominant as competition with other aquatic plants exceeds its tolerance.

Huachuca Water Umbel Critical Habitat

Critical Habitat for the Huachuca water umbel was designated at seven locations in Santa Cruz and Cochise counties, Arizona (USFWS 1999). Critical Habitat units in Santa Cruz County are located along Sonoita Creek east of State Highway 82, along the Santa Cruz River and an adjacent tributary in the San Rafael Valley, and in Scotia, Sunyside, Gardner and Bear Canyons in the Huachuca Mountains.

The primary constituent elements of Huachuca water umbel Critical Habitat include, but are not limited to, the habitat components that provide:

- Sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction;
- A stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for expansion;
- A riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for growth and reproduction; and
- In streams and rivers, refugial sites in each watershed and in each reach, including but not limited to springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas.

Pima Pineapple Cactus

The Pima pineapple cactus is found in association with alluvial substrates at elevations below 4,000 feet between the Baboquivari and Santa Rita Mountains, and in low densities in the northern areas of Sonora, Mexico (USFWS 2007c). The Pima pineapple cactus appears to have very general habitat requirements. Several habitat characteristics have been associated with occurrence and abundance of the species, but are not good predictors of population locations. These associated habitat characteristics are presence of coppice mounds, litter, gravel, moderate cover of herbs and forbs, and presence of the following shrub species: desert zinnia (*Zinnia* sp.), snakeweed (*Gutierrezia sarothrae*), burroweed (*Isocoma tenuisectus*), and buckwheat (*Eriogonum* spp.).

3.9.1.2 State

AGFD Natural Heritage Program maintains lists of wildlife of special concern (WSC) in Arizona. This list includes fauna whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines (AGFD 2007). These species are not necessarily the same as those protected under the ESA. A list of these species is presented in Appendix E.

The Arizona Department of Agriculture (ADA) maintains a list of protected plant species within Arizona. The 1999 Arizona Native Plant Law defined five categories of protection within the state; 1) Highly Safeguarded, no collection allowed; 2) Salvage Restricted, collection only with permit; 3) Export Restricted, transport out of state prohibited; 4) Salvage Assessed, permit required to remove live trees; and 5)Harvest Restricted, permit required to remove plant by-products (ADA 2007). A list of native plants protected by the ADA is included in Appendix E. Only those plants with HS and SR status are discussed here, as other regulated activities would not occur.

Of the 133 highly safeguarded or salvage restricted status species, only two are likely to occur in habitats similar to those found in or near the proposed tower sites: Huachua water umbel and Pima pineapple cactus. Table 3-14 lists the AGFD and ADA listed species with the potential to exist within or near the proposed tower sites.

Table 3-14. Arizona Listed Species Potentially Occurring Within the Footprint of Proposed New Towers

Species	Status	Preferred Habitat	Potential to Affect Habitat
American peregrine falcon *Falco peregrinus anatum*	WSC	Steep, sheer cliffs overlooking riparian areas or other habitats supporting prey species.	Low
Baird's Sparrow *Ammodramus bairdii*	WSC	Short-grass prairies with scattered low bushes and matted vegetation.	Moderate
Cactus ferruginous pygmy-owl *Glaucidium brasilianum cactorum*	WSC	Mesquite bosques and Sonoran riparian deciduous woodlands.	Low
Northern buff-breasted flycatcher *Empidonax fulvifrons pygmaeus*	WSC	Open stands of pine or sycamore with bare, weedy, or grassy under story areas.	None
Northern Goshawk *Accipiter gentilis*	WSC	High, forested mountains and plateaus usually above 6,000ft.	Low
Arizona shrew *Sorex arizonae*	WSC	Montane conifer forest and oak-pine woodlands with substantial understory vegetation and debris.	Moderate
Desert tortoise - Sonoran subpopulation (*Gopherus agassizii*)	WSC	Primarily on rocky slopes and bajadas of Sonoran Desert habitats; caliche caves in incised, cut banks of washes (arroyos) are used for shelter sites.	Moderate
Lowland leopard frog *Rana yavapaiensis*	WSC	Aquatic systems in desert grasslands to pinyon-juniper.	Low
Northern Mexican gartersnake *Thamnophis eques megalops*	WSC	Densely vegetative habitat surrounding cienegas, cienega-streams, and stock tanks.	None

Key: WSC = wildlife of special concern;
Source: AGFD 2007 and ADA 2007

3.9.2 Environmental Consequences

3.9.2.1 Federal

No Action Alternative

Under the No Action Alternative, there would be no direct impacts on threatened or endangered species or their habitats. However, the impacts of IC activity on habitats throughout the project region and surrounding areas would continue to disturb threatened or endangered species and their habitats. IC activity creates trails, damages vegetation, promotes the dispersal and establishment of invasive species, and can result in catastrophic wild fires. These actions have an indirect adverse impact on threatened and endangered species by causing harm to individuals and degrading habitats occupied by these species.

Proposed Action

Direct effects of the proposed action on Federally listed species include degradation or loss of potential habitat as a result of tower site construction and operation. Additionally, direct effects to Federally listed species would occur from electromagnetic (EM) fields associated with operation of radars. The majority of these effects would be avoided or substantially minimized through the implementation of standard BMPs and other conservation measures such as the training of construction project managers, use of biological monitors, avoidance of disturbance in sensitive habitats or during breeding seasons, and efforts to minimize the spread of invasive species. Indirect effects resulting from the SBI*net* Tucson West project would be primarily limited to changes in IC activity and subsequent CBP interdiction and apprehension efforts. As the level of deterrence increases within areas affected by the proposed action, IC activity is likely to shift to areas where the level of deterrence is lower. Although shifts in illegal activity are reasonably certain to occur, they could occur at nearly any location along the U.S.-Mexico border. Localized shifts in IC activity are also likely to occur. The location of sensor towers is likely to affect patterns of IC movement within the action area as ICs seek new routes through the landscape. The location of towers is also likely to affect the areas in which interdiction and apprehension activities occur. Where ICs activity and subsequent apprehension shifts into habitats occupied by protected species substantial effects could occur; this would include loss and degradation of habitats, loss or damage to protected species, and avoidance of the area. However, the exact location of these effects is difficult to predict.

The construction of new roads, repair, and improvements made to impassible roads would increase access to habitat occupied or potentially occupied by sensitive species. However, the reduction of similar impacts related to ICs activity would benefit these species within the project area.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including one Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on sensitive species. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Sonora Chub and Critical Habitat

Four tower sites and a total of 1,122 feet of new roads would be constructed within the Sycamore Creek basin approximately 1 mile upstream of Sonora Chub Critical Habitat.

Chiricahua Leopard Frog

A total of 12 tower sites and access roads are within 0.3 miles of potential Chiricahua leopard frog habitat. These include two sites in the Black Mesa area, three sites in the Santa Cruz River basin, one site in the San Rafael Valley, and one site in the Huachuca Mountains. Proposed tower site TCA-TUS-185 and the access roads to TCA-NGL-046, TCA-NGL-049, and TCA-SON-56 are within 0.1 mile of potential habitat.

Sonoran Tiger Salamander

The access road to proposed tower site TCA-SON-059 is within 0.3 miles of potential Sonoran tiger salamander habitat. The access road to TCA-SON-056 is within 0.1 mile of potential habitat. Mitigation measures described in Section 5.0 would be implemented as part of the Proposed Action to reduce impacts to the Sonoran tiger salamander.

Masked Bobwhite

A total of eight tower sites and five access roads would be constructed within potential masked bobwhite habitat. A total of 161 feet of new road would be constructed and a total of approximately 1,637 feet of access road would be repaired at these locations.

Jaguar

A total of 47 towers sites would be located in habitats identified as potentially suitable for jaguar based on extrapolation from a limited number of past occurrences. Construction of tower sites, new road construction, and repairs to approach roads would result in a temporary increase of noise and human related activity within the affected region. Due to the limited duration and limited area over which these effects would occur relative to the assumed range of the jaguar, the potential for adverse effects to occur would be discountable. Construction related noise effects would not extend more than 1,000 feet from construction activities. Due to the vast amount of equally suitable habitat between tower sites, the potential for noise related effects to result in significant changes in behavior such that the health of individual jaguars would be affected is unlikely. Helicopter deployment would result in noise related effects up to 15,000 feet from the source; however, these effects would also be limited to a maximum of three towers and would also be temporary. Operational related noise, any required maintenance, and post construction monitoring would have similar effects, but would be more limited in extent and duration. Implementation of conservation measures identified during the ESA Section 7 consultation with USFWS would minimize the effects of noise, light, and human presence during construction and operation.

Ocelot

The potential effects of the Proposed Action on the ocelot would be similar to those described for the jaguar. Ocelots are not known to occur in the project area; therefore, construction activities would not affect the species. However, future operation of the tower sites would result in increased noise and human presence in the potential range of ocelot in the future.

Mexican Spotted Owl and Critical Habitat

A total of three sites and associated access roads would be located within 1 mile of a Mexican spotted owl Primary Activity Center (PAC). Two of these sites (TCA-TUS 192 and TCA-SON-115) are existing tower sites with adequate access roads and would not require any ground disturbance or removal of vegetation. The construction of a new tower site and 132 feet of new road would be required in the Santa Rita Mountains (TCA-NGL-211) and would result in habitat loss and potential isolation of resources for the Mexican spotted owl. Three additional tower sites (TCA-SON-061, TCAS-SON-062, and TCA-SON-115) are within 1 mile of occupied habitat.

A total of 13 tower sites and access roads are located within Mexican spotted owl Critical Habitat (see Table 4-2). These include the three sites already discussed; four new tower sites and 1,122 feet of new roads in the Sycamore Creek basin; two new tower sites, 492 feet of new road construction, and 18,625 feet of road repair in the Santa Cruz River basin, and one existing tower site and access road in the Sonoita Creek basin. The existing towers and access roads would not affect any primary constituent elements of Critical Habitat.

Impacts related to increased noise levels associated with the construction of the proposed towers and access roads, and the operation of the towers would be greater for those towers located in designated critical habitat and/or near a PAC. Studies have shown that spotted owls generally flush at noise levels greater than 92 dBA (Defenders of Wildlife comment letter 2008). However, the exact noise levels that causes a response by Mexican spotted owl is varies on the type of equipment. As shown in Section 3.12, none of the equipment proposed for use would approach or exceed 92 dBA. A combination of equipment operating at the same during construction would combine to create noise levels up to approximately 123 dBA at 50 feet. However, vegetation and topography would be expected to reduce noise levels to 92 dBA within

180 feet. Mitigation measures presented in Section 5.0 would reduce or minimize potential impacts to Mexican spotted owl from increased noise levels.

Yellow-billed Cuckoo

Three tower sites and their associated access roads (TCA-TUS-040, TCA-TUS-181, TCA-CAG-185) within the Black Mesa are within or near potential yellow-billed cuckoo habitat. Habitats at TCA-TUS-040 and TCA-CAG-195 consist of small patches (*i.e.*, generally less than 2 acres) of riparian habitat which include cottonwoods and mesquite. Habitat at TCA-TUS-181 includes over 45 acres of cottonwood and mesquite. One additional tower site (TCA-NGL-048) occurs within 500 feet of a large mesquite bosque. The mesquite bosque near TCA-NGL-048 is surrounded by agricultural fields and is likely to also be affected by periodic noise increases in the area. The three tower sites already discussed and three sites in the Altar Valley, four sites in the Arivaca Creek basin, two additional sites in the Black Mesa area, four sites in the Sycamore Creek basin, seven sites in the Santa Cruz River basin, and two sites in the Sonoita Creek basin are within the potential distribution of migrating yellow-billed cuckoos.

Lesser Long-nosed Bat

A total of 15 tower sites and access roads are within 5 miles of known lesser long-nosed bat roosts. One of these sites, TCA-NGL-115, is an existing tower with adequate access and would not affect the lesser long-nosed bat. However, construction of 14 new tower sites, construction of 871 feet of new roads, and 12,387 feet of road repair would be conducted within 5 miles of known roosts.

A total of 50 tower sites and access roads occur within the range of foraging lesser long-nosed bats. Road repair or improvements would not impact potential foraging areas; however, a total of 5,915 feet of new road construction would occur within 30 miles of known roosts. The extent of foraging habitat within the footprint of new tower sites and road construction is unknown. In order to mitigate for loss of potential forage habitat, each agave plant within the disturbance footprint would be transplanted and replaced with three new plants.

The presence of the proposed towers is not expected to have an effect on LLNB. Bats would be able to avoid the physical structures at the tower site. However, there is a potential for foraging or transient LLNB to collide with wind turbines associated with the tower structure. Specifically, the wind turbine associated with TCA-NGL-109 could disorient LLNB in flight, thus causing an individual to collide with the blades of the turbine and possibly resulting in fatal injury.

The EM fields associated with radar equipment may affect lesser long-nosed bats by causing increasing surface and deep body temperatures, if exposed for prolonged periods or by avoiding foraging habitat areas. Studies have shown that bat activity is reduced in habitats exposed to electromagnetic radiation when compared to site with no such detectable radiation (Nicholls and Racey 2007). Lesser long-nosed bats would be particularly susceptible to EM field strengths greater than 2 volts/meter (Nicholls and Racey 2007). Therefore, it has been determined that the Proposed Action may affect and is likely to adversely affect lesser long-nosed bat. Mitigation measures outlined in Section 5.0 and conservation measures developed during Section 7 consultation would reduce potential impacts to lesser long-nosed bat.

Huachuca Water Umbel

Six proposed tower sites and access roads are upstream of habitat potentially occupied by Huachuca water umbel. Three of these sites, TCA-SON-055, TCA-SON-056, and TCA-SON-117, are more than 2 miles upstream of potential habitats and would not affect the species. Tower site TCA-SON-059 and 225 feet of new roads would be constructed upstream of potentially occupied habitat in the Huachuca Mountains. Tower site TCA-SON-057 and approximately 1,250 feet of access road repair are located upstream of Critical Habitat, and the remaining 2,406 feet of access road repair at this site is upstream of potentially occupied habitat. Tower site TCA-SON-60 and its associated access road are upstream of potentially occupied habitat and Critical Habitat. No road repair or improvements would be required at TCA-SON-060, and that portion of the road which crosses Critical Habitat has an existing bridge.

Pima Pineapple Cactus

A total of 18 new tower sites would be constructed within potential Pima pineapple cactus habitat. This species was observed at two of these new tower sites (TCA-NGL-048 and TCA-TUS-038) and construction activity would likely result in take of any individuals present. However, if possible these individuals would be flagged and avoided. If avoidance is not possible, these individuals would be transplanted outside of the disturbance footprint. The loss of potential habitat would occur at the remaining 16 new tower sites and 2,012 feet of new road construction within the distribution of this species.

With the implementation of standard BMPs and other conservation measures, most adverse affects to sensitive species would be avoided. Species for which the implementation of conservation measures would completely avoid any adverse effect, or would minimize the potential for effect to a insignificant or discountable level, include the Gila topminnow, Sonoran chub and Critical Habitat, Chiricahua leopard frog, Sonoran tiger salamander, masked bobwhite, yellow-billed cuckoo, and Huachuca water umbel and Critical Habitat. Therefore, CBP has determined that the SBI*net* Tucson West project may affect, but is not likely to adversely affect these species.

Construction of tower site TCA-NGL-211 would occur within 1 mile of a Mexican spotted owl PAC; therefore, the adverse affects of habitat loss would not be avoided at this site. Furthermore, some primary constituent elements of Mexican spotted owl Critical Habitat would be affected by new tower sites and access roads. Therefore, CBP has determined that the SBI*net* Tucson West project is likely to adversely affect the Mexican spotted owl and result in adverse modifications to its Critical Habitat.

Pima pineapple cactus was observed at two tower sites and impacts are likely to be unavoidable. Therefore, CBP has determined that the SBInet Tucson West project is likely to adversely affect the pima pineapple cactus and result in adverse modification its Critical Habitat.

Potential measures to offset these adverse impacts to these two species are included in the Biological Opinion (BO) and can be found in the Section 5. Mitigation Measures.

3.9.2.2 State

No Action Alternative

Under the No Action Alternative, there would be no direct impacts on threatened or endangered species or their habitats. However, the impacts of IC activity on habitats throughout the project and surrounding areas would continue to disturb threatened or endangered species and their habitats. IC activity creates trails, damages vegetation, promotes the dispersal and establishment of invasive species, and can result in catastrophic wild fires. These actions have an indirect adverse impact on threatened and endangered species by causing harm to individuals and degrading habitats occupied by these species.

Proposed Action

Of the 154 State WSC known to occur in Cochise, Maricopa, Pima, Pinal and Santa Cruz counties, 20 species are likely to occur within communities found at proposed tower sites. Although habitat for the 20 potentially occurring species exists, the area of disturbance for each tower is minor and, therefore, would not significantly impact habitat for these species. Additionally, no occurrences of these species have been documented in the proposed tower sites during field surveys.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on threatened or endangered species or their habitats. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.10 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

3.10.1 Affected Environment

The process of identifying and evaluating potential impacts to cultural resources was described in detail in several documents. Those discussions are incorporated herein by reference (CBP 2007a, INS 2001). Briefly, the National Historic Preservation Act (NHPA) of 1966 established the Advisory Council on Historic Preservation (ACHP) to advocate full consideration of historic values in Federal decision-making and ensure consistency in national policies. Additionally, the NHPA also established the SHPO to administer National historic preservation programs on a state level, and Tribal Historic Preservation Officer (THPO) on tribal lands, where appropriate. The NHPA also established the National Register of Historic Places (NRHP), which is the Nation's official list of cultural resources worthy of preservation and protection. The historic preservation review process mandated by Section 106 of the NHPA is outlined in the ACHP regulations, "Protection of Historic Properties" (36 CFR 800), which were revised and became effective on January 11, 2001.

The cultural overview of the project region was described in various environmental documents and is incorporated by reference (INS 2001). Briefly, the cultural history of southwestern Arizona is usually discussed in periods: Paleo-Indian (circa 11,500 to 8,000 before present [BP]), Archaic (circa 8,000 to 1,400 BP) which is generally divided into the Early, Middle and Late Archaic periods, Formative Period (1,400 to 550 BP) which is generally divided into the Pioneer Period, Colonial Period, Sedentary Period, and Classic Period, Protohistoric and Early Historic Periods (A.D. 1540 to 1860), and Late Historic Period (A.D. 1860 to 1950).

3.10.1.1 Previous Archaeological Investigations

Prior to conducting cultural resource surveys of the proposed and existing tower sites, an archaeological site records search was conducted on the AZSITE Cultural Resource Inventory. Additionally, General Land Office (GLO) maps and patent records were also examined at the BLM and on the GLO records website. This research identified 140 previous cultural resources surveys as having some portion of their survey area within a 1-mile radius of all proposed tower site locations and their associated access roads. The surveys were conducted in support of construction, utility installation, road improvements, land sales, fiber optic installations, cell towers, and drainage infrastructure construction. Additionally, 85 previously-recorded archaeological sites were within a 1-mile radius of the various tower locations and their associated access roads. These sites include prehistoric and historic artifact scatters, an intaglio, a petroglyph, rock features, a folk art site, historic canals and related features, a bridge, a transmission line, a railroad, and trails. Four previously recorded archaeological sites (AZ DD:11:6[ASM], AZ DD:11:9[ASM], AR03-05-03-0220[FS], and AZ DD:10:8[ASM]) intersect the area of potential effect of the surveyed access roads. All four archaeological sites are considered eligible for listing on the NRHP and are considered significant cultural resources.

3.10.1.2 Current Investigations

Cultural resources surveys were conducted by Harris at proposed tower and alternate tower location and along their associated access roads (CBP 2008b; CBP 2008c; CBP 2008d). Fourteen tower locations were excluded from cultural resources surveys because they were located within existing CBP facilities or existing microwave tower facilities where there was no potential to effect cultural resources. A 1-acre area was surveyed at each proposed tower locations to facilitate tower construction and associated construction activities. A 120-foot wide corridor was surveyed in association with access roads where improvements would be required to install or maintain the proposed towers. A total of nine archaeological sites (AZ DD:6:68[ASM], AZ DD:11:7[ASM], AZ DD:11:8[ASM]. AZ DD:11:10[ASM], AZ DD:11:11[ASM], AZ EE:5:47[ASM], AZ EE:8:245[ASM], AZ FF:12:56[ASM], and AZ Z:5:81[ASM]) were recorded during the survey of the proposed tower locations and their associated access roads. All of the sites recorded are considered eligible for the NRHP and historic properties. As a result, all the archaeological sites recorded during the survey of these are considered significant cultural resources.

3.10.2 Environmental Consequences

3.10.2.1 No Action Alternative

Implementation of the No Action Alternative would have no effect, either beneficial or adverse, on cultural resources, since construction activities associated with towers would not occur.

3.10.2.2 Proposed Action

Under the Proposed Action, four of the NRHP-eligible previously recorded sites (AZ DD:10:8[ASM], AZ DD:11:6[ASM], AZ DD:11:9[ASM], and AR0305030220[FS]) and seven of the newly recorded NRHP-eligible sites (AZ DD:6:68[ASM], AZ DD:11:7[ASM], AZ DD:11:8[ASM]. AZ DD:11:10[ASM], AZ DD:11:11[ASM], AZ EE:5:47[ASM], and AZ Z:5:81[ASM]) would not be adversely affected by the proposed construction. These sites would be avoided through the current design plan along with avoidance assurance measures outlined in Section 5 of this document. Two newly recorded NRHP-eligible archaeological sites (AZ EE:9:245[ASM] and AZ FF:12:56[ASM]) would be adversely impacted from the implementation of the Proposed Action. Potential avoidance assurance measures are outlined in Section 5 of this document. With the implementation of these measures, adverse impacts to the sites would be kept below the threshold of adverse effect. No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing (including the proposed Ajo Station tower – TCA-AJO-305) towers.

Beneficial impacts in the form of increased knowledge of the past may be realized as a result of surveys conducted under the Proposed Action. Additionally, potential unidentified cultural resource sites located within the study area and regionally would receive increased protection from disturbance through the deterrence of illegal foot and vehicle traffic from ICs moving through surrounding areas.

3.11 AIR QUALITY

3.11.1 Affected Environment

USEPA established National Ambient Air Quality Standards (NAAQS) for specific pollutants. The NAAQS standards are classified as either "primary" or "secondary" standards. The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM-10), and lead (Pb). NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. The NAAQS are included in Table 3-15.

Table 3-15. National Ambient Air Quality Standards

POLLUTANT	STANDARD VALUE	STANDARD TYPE
Carbon Monoxide (CO)		
8-hour average	9ppm (10mg/m^3)	P
1-hour average	35ppm (40mg/m^3)	P
Nitrogen Dioxide (NO_2)		
Annual arithmetic mean	0.053ppm (100μ/m^3)	P and S
Ozone (O_3)		
8-hour average*	0.08ppm (157μg/m^3)	P and S
1-hour average*	0.12ppm (235μg/m^3)	P and S
Lead (Pb)		
Quarterly average	1.5μg/m^3	P and S
Particulate<10 micrometers (PM-10)		
Annual arithmetic mean	50μg/m^3	P and S
24-hour average	150μg/m^3	P and S
Particulate<2.5 micrometers (PM-2.5)		
Annual arithmetic mean	15μg/m^3	P and S
24-hour average	65μg/m^3	P and S
Sulfur Dioxide (SO_2)		
Annual average mean	0.03ppm (80μg/m^3)	P
24-hour average	0.14ppm (365μg/m^3)	P
3-hour average	0.50ppm (1300μg/m^3)	S

Legend: P= Primary
S= Secondary
Source: USEPA 2006
ppm = parts per million
mg/m^3 = milligrams per cubic meter of air
μg/m^3 = micrograms per cubic meter of air
* Parenthetical value is an approximate equivalent concentration

Areas that do not meet these NAAQS standards are called non-attainment areas or maintenance areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects. The Federal Conformity Rule was first promulgated in 1993 by the USEPA, following the passage of Amendments to the Clean Air Act (CAA) in 1990. The rule mandates that a conformity analysis must be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS.

A conformity analysis is the process used to determine whether a Federal action meets the requirements of general conformity rule. It requires the responsible Federal agency to evaluate the nature of the Proposed Action and associated air pollutant emissions, calculate emissions as a result of the Proposed Action, and mitigate emissions if *de minimis* thresholds are exceeded.

Pima County

The Pima County Department of Environmental Quality (PDEQ) monitors ambient air quality in Pima County, which includes the Tucson metropolitan area. The USEPA considers Pima County as a moderate non-attainment area for PM-10 and a maintenance area for CO and SO_2 (USEPA 2008). However, the PDEQ (2008) claims that the entire county is in attainment for all NAAQS.

Santa Cruz County

Santa Cruz County is designated as a moderate non-attainment area for PM-10 (USEPA 2008). The sources of PM-10 include natural wind storms, wind blown dust from agricultural operations and emissions from the combustion of hydrocarbons in cars, trucks, generators and industrial equipment.

Pinal County

Pinal County is designated as a serious non-attainment area for PM-10 and a moderate non-attainment area for O_3 and SO_2. The non-attainment areas do not encompass the entire county but are located in the northern section of the county which is southeast of the urban areas of Phoenix and Tempe (USEPA 2008). Air emissions from internal combustion engines produce volatile organic compounds (VOC) and nitrogen oxides (NO_x), which are precursor molecules that react with oxygen in the atmosphere to create O_3.

Cochise County

Cochise County is designated as a moderate non-attainment area for PM-10. The sources of PM-10 include natural wind storms, wind blown dust from agricultural operations and emissions from the combustion of hydrocarbons in cars, trucks, generators and industrial equipment.

Maricopa County

Maricopa County is designated as a serious non-attainment area for PM-10 and a marginal non-attainment area for O_3. It is designated as a serious maintenance area for CO. The non-attainment areas do not encompass the entire county but are limited to the southeastern section of the county where the metropolitan areas of Phoenix and Tempe are located.

3.11.2 Environmental Consequences

3.11.2.1 No Action Alternative

The No Action Alternative would not result in any impacts on air quality because there would be no construction activities.

3.11.2.2 Proposed Action Alternative

Temporary and minor increases in air pollution would occur from the use of construction equipment (combustible emissions) and soil disturbance (fugitive dust), during construction of the communications and sensor towers and repair and construction of roads.

Combustible emission calculations were made for standard construction equipment, such as bulldozers, excavators, pole trucks, front end loaders, backhoes, cranes, and dump trucks, using emission factors from USEPA approved emission model

NONROAD6.2 (USEPA 2001). Assumptions were made regarding the type of equipment, duration of the total number of days each piece of equipment would be used, and the number of hours per day each type of equipment would be used.

Construction workers and delivery trucks would temporarily increase the combustible emissions in the air shed during their daily commute to and from the project area. Emissions from commuter and delivery trucks were calculated using emission factors generated by the USEPA approved emission factor model MOBILE6.2. Their emissions were calculated in the air emission analysis and are included in the totals in Table 3-16.

Table 3-16. Total Emissions (tons/year) from Construction Activities verses *De minimis* Thresholds, by County

Airshed	**Pollutant (tons/year)**					
County	**CO**	**VOCs**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**
Pima	42.72	9.26	81.06	8.95	6.96	10.09
de minimis	100	NA	NA	100	NA	100
Santa Cruz	51.64	10.21	81.75	14.09	7.99	10.09
de minimis	NA	NA	NA	100	NA	NA
Pinal	22.91	4.80	37.12	3.83	3.29	4.72
de minimis	NA	100	100	70	NA	100
Cochise	41.08	8.91	76.70	9.23	6.76	9.50
de minimis	NA*	NA	NA	100	NA	NA
Maricopa**	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
de minimis	**100**	**100**	**100**	**70**	**NA**	**NA**

*NA = Not Applicable
** Only one tower is located in Maricopa County in the proposed action. This tower is already existing and was not further analyzed in this EA
Source: Gulf South Research Corporation (GSRC) model projections (Appendix F)

Fugitive dust calculations were made for disturbing the soils while excavating, and grading and constructing the roads and structures. Fugitive dust emissions were calculated using emission factors recommended in USEPA's National Emission Inventory (USEPA 2001) which were the result of field studies conducted by Midwest Research Institute (MRI) (1996).

The total air quality emissions were calculated to determine the applicability of the General Conformity Rule and are provided in Appendix F. A summary of the total emissions, including fugitive dust, heavy equipment operation, and commuter vehicle emissions, are presented in Table 3-16. As can be seen from this table, the proposed construction activities do not exceed *de minimis* thresholds in the respective counties and, thus, do not require a Conformity Determination.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on air quality. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Several sources of air pollutants contribute to the over all air impacts of the construction project, includes the following:

1. Combustible engines of construction equipment
2. Construction workers commute to and from work
3. Supply trucks delivering materials to construction site
4. Fugitive dust from job site ground disturbances
5. Bi-monthly commute to towers site for maintenance

Air emissions would be produced after the towers have been installed and are operating. A maintenance crew and a propane truck would have to visit the tower site bi-monthly to insure that the equipment is operating properly. The emissions generated during maintenance trips were summarized and included in Table 3-16, above. The USEPA approved air emission model MOBILE6.2 was used to produce emission factors for the calculations. Calculations and assumptions for bi-monthly emissions are presented in Appendix F.

As can be seen from the tables above, the proposed construction activities do not exceed *de minimis* thresholds in each of the counties and, thus, do not require a Conformity Determination. As there are no violations of air quality standards and no conflicts with the state implementation plans, there would be no significant impacts to air quality from the implementation of the Proposed Action.

During the construction of the proposed project, proper and routine maintenance of all vehicles and other construction equipment would be implemented to ensure that emissions are within the design standards of all construction equipment. Dust suppression methods would be implemented to minimize fugitive dust. In particular, wetting solutions would be applied to construction area to minimize the emissions of fugitive dust. By using these environmental design measures, air emissions from the Proposed Action would be temporary and should not significantly impair air quality in the region.

3.12 NOISE

3.12.1 Affected Environment

Noise is generally described as unwanted sound, which can be based either on objective effects (*i.e.*, hearing loss, damage to structures, *etc.*) or subjective judgments (*e.g.*, community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels occurring at night generally produce a greater annoyance than do the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA (A-weighted decibel is a measure of noise at a given, maximum level or constant state level) louder than the same level of intrusive noise during the day, at least in terms of its potential for causing community annoyance. This perception is largely because background environmental sound levels at night in most areas are also about 10 dBA lower than those during the day.

Acceptable noise levels have been established by the U.S. Department of Housing and Urban Development (HUD) for construction activities in residential areas (HUD 1984):

Acceptable (not exceeding 65 dBA) – The noise exposure may be of some concern but common building construction will make the indoor environment acceptable and the outdoor environment will be reasonably pleasant for recreation and play.

Normally Unacceptable (above 65 but not greater than 75 dBA) – The noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building constructions may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.

Unacceptable (greater than 75 dBA) – The noise exposure at the site is so severe that the construction costs to make the indoor noise environment acceptable may be prohibitive and the outdoor environment would still be unacceptable.

As a general rule of thumb, noise generated by a stationary noise source, or "point source," will decrease by approximately 6 dBA over hard surfaces and 9 dBA over soft surfaces for each doubling of the distance. For example, if a noise source produces a noise level of 85 dBA at a reference distance of 50 feet over a hard surface, then the noise level would be 79 dBA at a distance of 100 feet from the noise source, 73 dBA at a distance of 200 feet, and so on. To estimate the attenuation of the noise over a given distance the following relationship is utilized:

$$\text{Equation 1: } dBA_2 = dBA_1 - 20 \log^{(d2/d1)}$$

Where:

dBA_2 = dBA at distance 2 from source (predicted)

dBA_1 = dBA at distance 1 from source (measured)

d_2 = Distance to location 2 from the source

d_1 = Distance to location 1 from the source

Source: California Department of Transportation 1998.

3.12.2 Environmental Consequences

3.12.2.1 No Action Alternative

Under the No Action Alternative, the noise receptors near the tower installations would not experience additional noise events.

3.12.2.2 Proposed Action

The Proposed Action tower sites analyzed in this EA are located in rural areas with no residential noise receptors nearby or with no sensitive residential noise receptors within 1,000 feet. Elevated noise levels would also have the potential to impact wildlife and protected species as discussed in Sections 3.8.2.2 and 3.9.1.2. Sensitive receptors within the BANWR or National Park land, who occupy land on which serenity and quiet are of significance, require less than a maximum noise threshold of 57 dBA (23 CFR 772 Table 1). Prior to the start of construction, CBP would coordinate with BANWR and NPS on the issuance of special use permits during the 10 to 60 day construction period for the proposed tower locations in these sensitive areas. The proposed towers would not require the use of auger drills but would require the use of conventional construction equipment, which produces noise emissions up to 81 dBA. The proposed tower sites have the potential to expose sensitive receptors to emissions that are normally unacceptable at the urban installation sites. Table 3-17 describes noise emission levels for construction equipment which range from 76 dBA to 84 dBA (Federal Highway Administration [FHWA] 2007).

Table 3-17. A-Weighted (dBA) Sound Levels of Construction Equipment and Modeled Attenuation at Various Distances[1]

Noise Source	50 feet	100 feet	200 feet	500 feet	1000 feet
Backhoe	78	72	68	58	52
Crane	81	75	69	61	55
Dump truck	76	70	64	56	50
Excavator	81	75	69	61	55
Front end loader	79	73	67	59	53
Concrete mixer truck	79	73	67	59	53
Pneumatic tools	81	75	69	61	55
Auger drill rig	84	78	72	64	58
Bull dozer	82	76	70	62	56
Generator	81	75	69	61	55

Source: FHWA 2007 and GSRC

1. The dBA at 50 feet is a measured noise emission (FHWA 2007). The 100 to 1,000 foot results are GSRC modeled estimates.

Assuming the worst case scenario of 81 dBA and, the noise model projected that noises levels of 81 dBA from the construction equipment would have to travel 300 feet before they would attenuated to acceptable levels of 65 dBA. To achieve an attenuation of 81 dBA to a normally unacceptable level of 75 dBA, the distance from the noise source to the receptor is 100 feet. In summary, construction equipment noise emissions would have to travel 300 feet to attenuate to normally acceptable levels of 65 dBA.

One of the towers (TCA-NGL-109) will require the use of a helicopter to install and maintain and two others (TCA-NGL-040 and TCA-TUS-042) may require a helicopter to install and maintain. Noise generated by helicopters is largely dependant on the size and weight of the machine. Helicopter noise levels range from 90 dBA for small helicopters to 110 dBA for large helicopters (FAA 2007) within the immediate vicinity of take-off and landing areas. Assuming that an average helicopter is used, with a noise emission of 100 dBA, the noise model projected that noise emissions from a helicopter flying at 50 feet above ground and takeoff would have to travel 2,700 feet before they would attenuate to acceptable levels of 65 dBA. To achieve an attenuation of 100 dBA to a normally unacceptable level of 75 dBA, the distance from the noise source to the receptor is 900 feet. The three tower sites are located in remote rural areas. The closest sensitive noise receptor to any of the tower sites that may be visited by helicopter is 18 miles away. The impact of the helicopters on the noise environment, used to install and maintain the towers mentioned above, would be insignificant.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on noise. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.13 RADIO FREQUENCY ENVIRONMENT

3.13.1 Affected Environment

The radio frequency (RF) environment refers to the presence of electromagnetic (EM) radiation emitted by radiowaves and microwaves on the human and biological environment. EM radiations are self propagating waves of electric and magnetic energy that move through space via radio waves and microwaves emitted by transmitting antennas. RF is a frequency or rate of oscillation within the range of about 3 Hertz (Hz) and 300 Giga-Hz (GHz). This range corresponds to frequency of alternating current and electrical signals used to produce and detect radio waves. The EM radiation produced by radio waves and microwaves carry energy and momentum, and can interact with matter.

As part of the overall spectrum management process, the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) have developed radio rules and regulations to help ensure that the various radio services operate compatibly in the same environment without unacceptable levels of radio frequency interference and emissions (U.S. Department of Commerce 2008). While the communication systems and the frequencies in which they would be operated are considered law enforcement sensitive and cannot be provided to the public, compliance with FCC and NTIA regulations would be required, and would ensure that recognized safety guidelines are not exceeded. All frequencies used by CBP would be coordinated through the FCC and NTIA as required in 40 CFR Part 2 Sections 2.103 Federal Use of non-Federal Frequencies and Section 2.107 Radio Astronomy. Additionally, transmitters and sensors associated with the SBI*net* Tucson West project would operate below 30 GHz.

The FCC is responsible for licensing frequencies and ensuring that the approved uses would not interfere with television or radio broadcasts or substantially affect the natural or human environment. The FCC adopted recognized safety guidelines for evaluating RF exposure in the mid 1980s (Office of Engineering and Technology [OET] 1999). Specifically, in 1985, the FCC adopted the 1982 American National Standards Institute (ANSI) guidelines to evaluate exposure due to RF transmitters that are licensed and authorized by the FCC (OET 1999). In 1992, ANSI adopted the 1991 Institute of Electrical and Electronics Engineers (IEEE) standard as an American National Standard (a revision of its 1982 standard) and designated it as ANSI/IEEE C95.1-1992 (OET

1999). The FCC proposed to update its rules and adopt the new ANSI/IEEE guidelines in 1993, and in 1996, the FCC adopted a modified version of the original proposal.

In addition to ANSI/IEEE standards, the FCC's guidelines are also based on the National Council of Radiation Protection and Measurements (NCRP) exposure guidelines. The NRCP and ANSI/IEEE exposure criteria identify the same threshold levels at which harmful biological effects may occur. The whole body human absorption of RF energy varies with the frequency of the RF signal. The most restrictive limits on exposure are in the frequency range of 30 to 300 Mega-Hz (MHz) where the human body absorbs RF energy most efficiently when exposed in the air field of an RF transmitting source (ANSI/IEEE C95.1-1992).

There are two tiers or exposure limits; occupational or "controlled" and general or "uncontrolled". Operational exposure is when a person is exposed to RF fields as a part of their employment and the persons have been made fully aware of the potential exposure and can exercise control over their exposure. Uncontrolled exposure is when the general public is exposed or when persons employed are not made fully aware of the potential for exposure or cannot exercise control over their exposure.

In order for a transmitting facility or operation to be out of compliance with the FCC's RF guidelines in an area where levels exceed Maximum Permissible Exposure (MPE) limits, it must first be accessible to the public. The MPE limits indicate levels above which people may not be safely exposed regardless of the location where those levels occur.

Adverse biological effects associated with RF energy are typically related to the heating of tissue by RF energy. This is typically referred to as a "thermal" effect, where the EM radiation emitted by an RF antenna, passes through and rapidly heats biological tissue, similar to the way a microwave oven cooks food. The Health Physics Society indicates that numerous studies have shown that environmental levels of RF energy routinely encountered by the general public are typically far below levels necessary to produce significant heating and increased body temperature and is generally only associated with workplace environments near high-powered RF sources used for molding plastics or processing food products. In such cases, exposure of human beings to RF energy could be exceeded thus requiring restrictive measures or actions to ensure their safety (Kelly 2007).

There is also some concern that signals from some RF devices could interfere with pacemakers or other implanted medical devices. However, it has never been demonstrated that signals from a microwave oven are strong enough to cause such interference (OET 1999). Furthermore, electromagnetic shielding has been incorporated into the design of modern pacemakers to prevent RF signals from interfering with the electronic circuitry in the pacemaker (OET 1999).

Other non-thermal adverse effects such as disorientation of passing birds by RF waves are also of concern. Past studies on effects of communication towers were noted by Robert Beason (1999) during the 1999 Workshop on Avian Mortality at Communication Towers (Evans and Manville 2000). During this workshop, Beason (1999) noted that most research on RF signals produced by communication towers have no general disorientation effects on migratory birds. However, more research is needed to better understand the effects of RF energy on the avian brain.

3.13.2 Environmental Consequences

3.13.2.1 No Action Alternative

Under the No Action Alternative, the proposed tower sites would not be installed or operated. There would be no impacts to existing RF environment or effect the human or natural environment.

3.13.2.2 Proposed Action

With the implementation of the Proposed Action, the 54 towers equipped with radio wave and microwave communication systems, as well as radar systems, would be installed for use by CBP in maintaining a secure border. As with any RF transmitter, all of these systems would emit RF energy and EM radiation; therefore, a potential for adverse effects could occur. However, any adverse effects to human safety and wildlife would likely be negligible due to the minimal exposure limits associated with both the type of equipment used and the elevated locations in which they would be positioned on the towers. The tower sites would also be fenced for security, making exposure to RF emitting equipment even less likely.

All frequencies used by CBP would be coordinated through the FCC and NTIA as required by NTIA regulations. Additionally, transmitters and sensors associated with the SBI*net* Tucson West project would operate below 30 GHz. Therefore, the RF environment created by the installation, operation and maintenance of the communication and radar systems on the proposed towers would not result in significant adverse impacts to observatories, human safety or the natural and biological environment.

The potential to exceed MPE limits of RF energy such as those described by Kelly (1999) are far outside the capability limits of data and communications systems in the Proposed Action. Furthermore, communication and radar systems installed on the proposed towers would be a minimum of 20 feet off the ground and would not exceed the safe operating distance for these systems (*i.e.*, 17 feet). Thus, maintenance and operational personnel working within the secure tower site would not be exposed to any RF energy that exceeds MPE limits set by the FCC.

Though greater research is required to have a better understanding of the effects of RF energy on the avian brain, the potential effects on passing birds is expected to be negligible as well. Any disorientating effect, if experienced, would be short term and would occur only at close distances from the antennas.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts to existing

RF environment or effect the human or natural environment. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.14 UTILITIES AND INFRASTRUCTURE

3.14.1 Affected Environment

13.14.1.1 Utility Commercial Grid Power

Several commercial utility power companies service the Arizona cities and counties in southeastern Arizona and are shown in Table 3-18.

Table 3-18. Power Company Service Areas

City and or County	Power Company
City of Ajo	Arizona Public Service Company (APS) and Ajo Improvement Company
City of Casa Grande	APS, San Carlos Irrigation, and Electrical District #2
Cochise County (includes Sierra Vista and Huachuca City)	APS and Sulphur Springs Valley Electric Coop
Maricopa County	APS, San Carlos Irrigation, and Salt River Project
Pima County	Tucson Electric Power and San Carlos Irrigation
Pinal County	APS, Salt River Project, San Carlos Irrigation, Santa Cruz Water and Power, Electric District #2 and 4, and Bureau of Indian Affairs
Santa Cruz County (includes Nogales and Sonoita)	Citizens Utilities Company

Source: AZDC 2008c and 2008d, APS 2008, Salt River Project 2008, All Business Newsletter 2006 and Tucson Electric Power Company 2008

Preferred power to the towers within the proposed SBI*net* Tucson West project area is from nearby commercial power grids; however, few of the proposed tower sites are within less than 3 miles to commercial power lines to be economically viable. Currently, only nine of the proposed towers will potentially derive their power from the local power grid. As required by the Proposed Action, power would be extended from the service or secondary pole to each proposed tower utilizing overhead lines. Although power line corridors have not been defined as of yet, coordination is currently underway with the local utility provider within the service area for proposed towers TCA-CAG-102, TCA-

CAG-195, TCA-TUS-287, TCA-TUS-290, TCA-TUS-291, TCA-NGL-285, TCA-SON-056 and TCA-SON-213.

It is assumed that new power lines would be installed adjacent to surveyed new or existing access roads. If it is necessary to deviate from access road locations, then biological and archaeological monitors would be utilized to ensure NHPA Section 106 and environmental compliance. In addition, supplemental NEPA documentation might be required. Due to the large distances to commercial grid power, the majority of the towers within the proposed Tucson West project area would typically be powered by a propane fueled hybrid generator system which consists of a common generator system with supplemental photovoltaic capabilities consisting of 18 solar panels, an energy storage battery system, an inverter, and direct current power subsystems. One proposed tower, TCA-NGL-109 would employ a generator system which would utilize only four solar panels but would also use a wind turbine for the energy storage battery system. The wind turbine would be attached to the roof of the equipment shelter and the blades would be approximately 10 feet in diameter. Consequently, the blade tip would be no higher than 40 feet above the ground.

Each proposed tower is not expected to utilize more than 3,650 kW-hours per month from commercial grid power, generator-solar hybrid, or wind.

The propane fuel source for the generator at each tower would be supplied by local propane dealers. It is anticipated that refueling of each 1,000-gallon propane tank would be required approximately twice a month. For the nine towers in which commercial power may be utilized, there may be instances when commercial power may not be available immediately upon tower deployment. If this should occur, the 35 kW hybrid propane solar generator system would be utilized until commercial power infrastructure can be deployed.

13.14.1.2 Ambient and Artificial Lighting

Ambient or atmospheric light is of concern to many including, most notably, astronomical observatories (International Dark Sky Association 2008). The reduction of man-made or artificial light sources is generally what astronomers would like to see in the southwest and there are light ordinances in place in some cities in the southwest to minimize sky brightness in large population centers. Tucson and Pima County first adopted outdoor lighting ordinances in 1972, to provide standards so that artificial (man-made) lighting did not interfere with nearby astronomical observatories and preserved the relationship of the residents of City of Tucson/Pima County to their unique desert environment through protection of access to the dark night sky (Pima County 2006). Within this ordinance, is a mean lumens threshold per net acre within the county.

Currently, there are four main astronomical observatories complexes within the project area which house various types of astronomical equipment. The complexes include: Kitt Peak National Observatory, Mt. Graham International Observatory, Mt. Hopkins - Fred Lawrence Whipple Observatory, and the Observatories in the Catalinas. There are 32 proposed towers which would be less than 30 miles from any astronomical observatory complex and are listed below in Table 3-19. There are no proposed towers within approximately 30 miles from Mt. Graham International Observatory. Two proposed towers, TCA-TUS-192 and TCA-NGL-211 would be within approximately 1 mile from two different astronomical observatories complex; TCA-TUS-192 to Observatories in the Catalinas and TCA-NGL-211 to Mt. Hopkins - Fred Lawrence Whipple Observatory. One proposed tower, TCA-NGL-048 is 10 miles from Mt. Hopkins - Fred Lawrence Whipple Observatory, while the remaining 31 towers are greater than 10 miles but less than 30 miles away from various astronomical observatory complexes. Two proposed towers would be within less than 30 miles from two astronomical observatory complexes, TCA-TUS-103 and TCA-TUS-290. TCA-TUS-103 would be approximately 23 miles from both Kitt Peak National Observatory and Mt. Hopkins - Fred Lawrence Whipple Observatory, while TCA-TUS-290 would be approximately 28 miles from Mt. Hopkins - Fred Lawrence Whipple Observatory and 29 miles from Kitt Peak National Observatory.

It would be necessary to install FAA required lighting on towers that exceed 200 feet in accordance with FAA regulations, standards, and guidelines for the lighting of tower structures found in 14 CFR Section 77 and FAA Advisory Circulars AC 150/5345-43f and AC 70/7460-1K. Currently, one proposed tower would exceed 200 feet. Additionally, when tower facility lighting is deemed necessary due to CBP operational needs, such as the installation of infrared lighting, USFWS (2000) *Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers* would be implemented to reduce night-time atmospheric lighting and the potential adverse effects of night-time lighting to migratory bird and nocturnal flying species, and astronomical observatories. Any infrared lighting installed on the proposed towers would be compatible with night vision goggle usage. When the tower sites are lighted for CBP security purposes then lighting would: utilize low sodium bulbs, be shielded to avoid illumination outside the footprint of the tower site, and when possible, be activated by motion detectors.

Table 3-19. Proposed Towers Proximity less than approximately 30 miles from Specific Observatory Complexes

Tower ID	Kitt Peak National Observatory (miles)	Mt. Graham International Observatory (miles)	Mt. Hopkins - Fred Lawrence Whipple Observatory (miles)	Observatories in the Catalinas (miles)
TCA-TUS-032	22 miles	NA	NA	NA
TCA-TUS-035	23 miles	NA	NA	NA
TCA-TUS-038	NA	NA	28 miles	NA
TCA-TUS-041	NA	NA	26 miles	NA
TCA-TUS-042	NA	NA	28 miles	NA
TCA-TUS-085	28 miles	NA	NA	NA
TCA-TUS-103	23 miles	NA	23 miles	NA
TCA-TUS-108	NA	NA	NA	18 miles
TCA-TUS-187	25 miles	NA	NA	NA
TCA-TUS-192	NA	NA	NA	1 mile
TCA-TUS-290	29 miles	NA	28 miles	NA
TCA-TUS-300	22 miles	NA	NA	NA
TCA-NGL-043	NA	NA	NA	NA
TCA-NGL-044	NA	NA	24 miles	NA
TCA-NGL-045	NA	NA	26 miles	NA
TCA-NGL-046	NA	NA	25 miles	NA
TCA-NGL-047	NA	NA	23 miles	NA
TCA-NGL-048	NA	NA	10 miles	NA
TCA-NGL-049	NA	NA	25 miles	NA
TCA-NGL-050	NA	NA	24 miles	NA

Table 3-19, continued

Tower ID	Kitt Peak National Observatory (miles)	Mt. Graham International Observatory (miles)	Mt. Hopkins - Fred Lawrence Whipple Observatory (miles)	Observatories in the Catalinas (miles)
TCA-NGL-052	NA	NA	23 miles	NA
TCA-NGL-054	NA	NA	24 miles	NA
TCA-NGL-109	NA	NA	26 miles	NA
TCA-NGL-112	NA	NA	23 miles	NA
TCA-NGL-113	NA	NA	20 miles	NA
TCA-NGL-210	NA	NA	11 miles	NA
TCA-NGL-211	NA	NA	1 mile	NA
TCA-NGL-285	NA	NA	19 miles	NA
TCA-SON-055	NA	NA	25 miles	NA
TCA-SON-056	NA	NA	27 miles	NA
TCA-SON-115	NA	NA	16 miles	NA
TCA-SON-117	NA	NA	13 miles	NA

Currently, it is not anticipated that night-time construction would occur; however if nighttime construction becomes necessary its use would be minimized and the lights would be shielded and follow county ordinances to the greatest extent practicable.

3.14.2 Environmental Consequences

3.14.2.1 No Action Alternative

Under the No Action Alternative, the proposed towers would not be installed and operated. There would be no impacts on local utilities because no additional power would be needed in the area. Ambient lighting conditions would continue to be problematic near large urban areas such as Tucson.

3.14.2.2 Proposed Action

Negligible demands on power utilities would be required as the result of the Proposed Action. Potentially, nine of the proposed towers would utilize the local commercial power grid. Instead, more renewable sources of power would be employed which allows the generator batteries to be charged during daylight hours, or in the case of TCA-NGL-109 via wind, and once exhausted would switch to propane fuel, a non-renewable resource.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on power utilities. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Of the 54 proposed towers, 23 are greater than approximately 30 miles from any astronomical observatories within the Tucson West Project area; however, approximately 60 percent of the proposed towers are within 30 miles from observatories. Only one tower within the Proposed Action would be over 200 feet in height and as such would be required to follow FAA lighting regulations (TCA-SON-213). However, this tower is greater than 30 miles to any of the known astronomical observatories. The two towers which are within 1 mile from the Kitt Peak National Observatory and the Mt. Hopkins – Fred Lawrence Whipple Observatory complexes would only potentially be lighted for CBP security purposes and would only have small, low sodium light on the equipment shed which would be activated by motion detectors.
All other towers do not require FAA lighting and if it is necessary for these towers to be lighted for CBP operational need, such as infrared lighting, then USFWS (2000) *Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers* would be implemented to reduce night-time atmospheric lighting and the potential adverse effects of night-time lighting to migratory birds, nocturnal flying species, and nearby astronomical observatories.

Lighting would be necessary for CBP security purposes within the tower perimeter; these lights would utilize low sodium bulbs, be shielded to avoid illumination outside the footprint of the tower site, and when possible, be activated by motion detectors. Such security lights would be similar to a residential porch light and would be situated on the equipment shelter.

Additionally, should night-time construction occur, CBP would ensure that all construction lighting would be shielded to minimize ambient lighting issues and would follow Pima County lighting ordinances to the greatest extent possible. Based on these measures no significant long term impact to the night sky and ambient lighting would occur from the implementation of the Proposed Action.

3.15 ROADWAYS/TRAFFIC

3.15.1 Affected Environment

The tower project sites are located in Maricopa, Pima, Pinal, Cochise, and Santa Cruz counties. The main transportation routes in these areas are four major interstate highways: U.S. Interstate 8 (I-8), I-10, Interstate 17 (I-17) and I-19. I-8 and I-10 run parallel with the Mexican border. I-19 runs north south starting in Tucson, Arizona and ending in Nogales, Arizona. State Highways/SR within the project corridor include SR 85, SR 87, SR 89, SR 90, SR 187, SR 286, SR 289, and SR 387. Table 3-20 shows the highway routes.

Table 3-20. Transportation Routes within the Project Area

Highway	Transportation Route
I-8	Runs parallel with the U.S.-Mexico border
I-10	Runs parallel with the U.S.-Mexico border
I-17	Entirely within Arizona, north terminus in Flagstaff, southern terminus in Phoenix
I-19	Entirely within Arizona, starts in Nogales, southern end at U.S.-Mexico border
SR 82	Western terminus Business Loop I-19, eastern terminus SR 80
SR 83	Northern terminus I-10 near Vail, to Parker Canyon Lake
SR 85	Northern terminus at I-10 in Buckeye, southern terminus near Lukeville
SR 86	Western terminus in Why, eastern terminus at Business Interstate 19 in Tucson
SR 87	Northern terminus in northern Arizona, crosses through Coolidge, Tucson, and Casa Grande
SR 89	Northern terminus at Interstate-40 in Ash Fork, southern terminus where it meets SR 93 near Wickenberg
SR 90	Starts in Bisbee, ends where it meets I-10 near Benson
SR 187	Northern terminus at SR 87, southern terminus at SR 387 near Sacaton
SR 286	Northern terminus at SR 86 (Three Points, Arizona) and southern terminus at Sasabe, Arizona, at the U.S.-Mexico border
SR 289	10 mile road intersecting I-19 and old U.S. Route 89
SR 387	Junction SR 87 to junction SR 84/SR 287 at Casa Grande

Many of the project sites are located in rural, undeveloped areas with agriculture and ranching as the main land uses for the region. Traffic flow is usually low on these roads because most vehicular movement in the region occurs on the interstates. I-19 and SR 82 and 83 have been affected by increases in the volume of international truck and tourist traffic that have occurred with the passage of the North American Free Trade Agreement.

3.15.2 Environmental Consequences

3.15.2.1 No Action Alternative

Under the No Action Alternative, the proposed tower sites would not be used. Construction of access roads, towers, foundations, and associated buildings would not occur. There would be no impacts on local vehicular traffic because no construction equipment, materials or construction crews would be needed in the area.

3.15.2.2 Proposed Action

With the implementation of the Proposed Action Alternative, 54 towers would be installed or improved for use by CBP in maintaining a secure border. Construction and staging for the access roads, foundations, towers and associated equipment shelters would create a minor short term impact on roadways and traffic within the project corridor. The increase of vehicular traffic would occur to supply materials and work crews at each tower site for a short amount of time. The towers would be installed within a 60-day work period. The initial construction phase would include creation of a staging area for materials and equipment. Once a staging area is established, traffic near the construction site would be from the influx of construction workers and new materials. Staging areas would be set off the main roads and would not disrupt the flow of traffic.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one Ajo Station tower – TCA-AJO-305). Therefore, there would be no impacts on roadways and traffic. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

There are no anticipated long term impacts on traffic from the installation of the towers. Once construction work is completed, occasional maintenance visits to each site would be required twice a month and potentially only once every 3 to 4 months for certain types of towers. These visits would not increase normal traffic activity locally or regionally.

3.16 AESTHETIC AND VISUAL RESOURCES

3.16.1 Affected Environment

Towers currently exist within the project area and are generally commercial or CBP communications towers. Roads within the CNF, BANWR, and private lands exist and may be maintained by these various entities depending upon land management strategies or plans.

Of the 54 towers, 24 are located on USFS lands in the CNF; TCA-TUS-036, TCA-TUS-038, TCA-TUS-040, TCA-TUS-041, TCA-TUS-042, TCA-TUS-181, TCA-TUS-185, TCA-TUS-298, TCA-NGL-043, TCA-NGL-044, TCA-NGL-045, TCA-NGL-046, TCA-NGL-047, TCA-NGL-049, TCA-NGL-050, TCA-NGL-054, TCA-NGL-109, TCA-NGL-211, TCA-SON-056, TCA-SON-057, TCA-SON-058, TCA-SON-059, TCA-SON-060, and TCA-SON-061. Several of these proposed towers in the CNF already have towers either at the current site or very near to the current site such TCA-TUS-181, TCA-NGL-046, TCA-NGL-109, and TCA-NGL-211 and should not change the present visual resources. For the remaining 20 towers there may be visual resources management requirements.

Additionally, in 1974 the USFS developed the Visual Management System which set standards for evaluating landscape aesthetics. In 1996, the Forest Service developed the Scenery Management System (SMS) which builds upon the Visual Management System. The SMS provides:

- definitions of existing and desired aesthetic conditions of the landscape;
- estimating relative importance of the landscapes based on "sense of place" or "place attachment" mapping;

- a classification index to evaluate aesthetics versus other resource values,, and;
- aesthetic, along with ecological, sustainability.

The USFS has received coordination letters at the inception of the proposed SBI*net* Tucson West project and coordination will continue during the NEPA process. This document will address any visual resource classification or restrictions from USFS upon receipt, if prior to the issuance of the Final EA.

Five towers are located on BANWR: TCA-TUS-035, TCA-TUS-085, TCA-TUS-187, TCA-TUS-287, and TCA-TUS-299. Proposed tower site, TCA-TUS-187, is located on areas with existing towers so there will be no new affect to the present visual resources. CBP is coordinating with USFWS regarding five tower sites that are proposed for the BANWR. Construction of these five sites is contingent upon a USFWS determination that they are appropriate and compatible uses in the BANWR.

TCA-SON-062 is located at the Montezuma Pass Overlook on the CNM. The overlook is a developed tourist site with paved parking and restrooms. Additionally, proposed tower site TCA-TUS-291 is very near the BANWR but is actually within the Sasabe POE.

3.16.2 Environmental Consequences

3.16.2.1 No Action Alternative

Under the No Action Alternative, the aesthetics of the project region would not be directly affected by installation of towers. However, trash, graffiti, and general vandalism resulting from IC traffic would be expected to continue to detract from the visual quality of area. It has been estimated that each IC leaves an average 8 pounds of trash on U.S. soil per entry (Davis 2005).

3.16.2.2 Proposed Action

The installation of towers would detract from the aesthetic resources of the proposed corridor. However, these infrastructure components would be located primarily within

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undeveloped or agricultural areas and near existing stations. The proposed towers are a common component structure along major U.S. routes. That, combined with the fact that the towers would be 6 to 10 miles apart would mean minimal visual impacts to the regional landscape. Although, TCA-SON-062 is located in the CNM on NPS land, the impacts would be minor to moderate as the area is developed for tourism and includes a rest area and bathroom facility. Therefore, overall impacts on aesthetic quality of the area would be insignificant except for the proposed tower in the CNM which would have minor impacts.

Tower TCN-SON-062 is located within the CNM visitor overlook parking lot, and this location would be the most unobtrusive for park visitors, since the overlook location was placed according to NPS guidelines to result in minimum intrusion on the visual qualities of the park according to the NPS Management Policies (NPS 2006). CBP will consult with the superintendent of the CNM regarding placement of the tower, and will obtain a use permit from the NPS in accordance with GSA Bulletin FPMR D-242 and NPS Management Policies, Section 8.6.4.3 (NPS 2006).

Approximately 1.2 miles of new access road and 11.9 miles of access road repair and/or improvements are proposed in conjunction with the installation of the proposed new towers. The largest new access road which would be constructed is associated with TCA-TUS-298 at 0.35 mile (1,872 feet) of new road, while the second largest amount of new access road (0.22 miles) and the largest road repair would be associated with TCA-TUS-040 with approximately 2.65 miles (13,995 feet). All other new and repaired access roads are well below these amounts and range from 3 feet to 491 feet while road repair or improvements range from less than 0.01 mile (50 feet) to 1.83 miles (9,684 feet). Most of the new access road work is very near the proposed tower site and near existing access roads. Therefore, the visual and aesthetic impacts from road work would be minor.

One proposed tower site (TCA-SON-055) is within 1 mile of the historic town site of Washington Camp and 0.5 mile west of Duquesne Mine. There would not be any impact to the aesthetic appeal of the town site with the implementation of the Proposed Action. Ultimately, the Proposed Action, by deterring IC activity, would provide protection for those resources (native ecosystems and cultural sites) which add to the aesthetic value of the proposed tower corridor.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one Ajo Station tower – TCA-AJO-305). All of the towers currently impact aesthetics and visual resources by virtue of the tower presence within the areas. The upgrades to the towers strictly occur to the existing communication hardware arrays, which would be similar in appearance to the general public. Therefore, there would be no additional impacts on aesthetic and visual resources. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.17 HAZARDOUS MATERIALS

3.17.1 Affected Environment

Solid and hazardous wastes are regulated in Arizona by a combination of laws promulgated by the Federal, state and regional Councils of Government. Typically, CBP performs a Phase I Environmental Site Assessment for all state and private properties that are being considered for lease or purchase. A Phase I Environmental Site Assessment allows CBP to know if a property is likely to have any recognized environmental conditions which would indicate the possibility of soil, surface water or groundwater contamination within the properties' boundaries. All proposed tower sites in which no Phase I Environmental Site Assessment was performed had a search conducted on the USEPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). In addition, GSRC contracted Environmental Data Resources to produce radius reports which examine Federal and state environmental databases that track activities associated with hazardous waste and incidents that have resulted in major environmental impairment. These databases are prepared and maintained by various Federal and state environmental agencies, such as the USEPA and the Arizona Department of Environmental Quality (AZDEQ). CERCLIS contains information on hazardous waste sites, potential hazardous waste sites, and remedial activities, including sites that are on the National Priorities List (NPL) or being considered for the NPL.

CERCLIS and radius reports search found no active NPL sites within a 1-mile radius of any of the proposed tower sites located in Maricopa, Pima, Santa Cruz, Pinal, and Cochise counties, Arizona. However, the radius reports did show a Leaking Underground Storage Tank (LUST) site within 0.5 miles of proposed tower TCA-NGL-210 and a solid waste transfer station site within 700 feet from proposed tower site TCA-TUS-300. The LUST site would not impact the proposed tower as the leaking tanks have been removed and the contaminated soil has been removed since 1990. No groundwater concerns were noted with this LUST site. Odors and noise are generally the issues of concern with solid waste transfer stations. CBP should coordinate with the owner and operator of the transfer station prior to the start of construction to ensure that there would be no impact to transfer station operations during installation of the tower.

One site, TCA-CAG-195, is on the Gila Indian Reservation and as such would need coordination with the Tribal Council to ensure compliance with any environmental practices are regulations that the Tribal Council may administer.

Field pedestrian site surveys for the Phase I Environmental Site Assessments were preformed for the five proposed tower sites by Harris from October 2007 to November 2007 and include proposed tower sites: TCA-CAG-102, TCA-NGL-048, TCA-NGL-052, TCA-SON-055, TCA-TUS-290, and TCA-SON-213 (CBP 2008c, d, e, f, g, and h). An additional Phase I survey was done for TCA-NGL-285 by Harris in June 2008 and GSRC performed two Phase I survys for TCA-TUS-290 and TUS-041 also in June 2008. Site reconnaissance was conducted according to the American Society for Testing and Materials (ASTM) guidelines (ASTM E1527-05), which define good commercial and customary practices in the U.S. for conducting a Phase I Environmental Site Assessment of a parcel of commercial real estate. ASTM E1527-05 pertains to a range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act 42 U.S.C. 9601 (CERCLA) and petroleum products (ASTM 2008).

Included in these Phase I investigations were searches of a number of different environmental regulatory databases. As part of the Phase I Environmental Site Assessment, Harris performed a CERCLIS search within 1 mile radius from each tower site for each of the 5 proposed towers. No tower sites had any NPL sites listed within the 1 mile radius (CBP 2008e, f, g, h, i, and j). All environmental databases and field surveys yielded no issues of environmental concern, with the exception of the three towers listed below, TCA-CAG-102, TCA-SON-05, and TCA-NGL-048. These proposed tower sites had the following issues noted in the Phase I Environmental Site Assessments, but had no evidence of recognized environmental conditions.

TCA-CAG-102

Two convenience stores leaking underground storage tanks (LUSTs), identified by the State of Arizona as LUST and UST (underground storage tanks) sites, were located within 0.25 miles from proposed tower site TCA-CAG-102. Tanks at both of these sites were removed and the sites were closed in 1995 and 1996, respectively. One of the convenience stores currently has USTs in place, but there is no indication of any release of tank contents (CBP 2008e).

TCA-SON-055

Mining activity historically occurred on and near the proposed tower site. Mine air vents, a closed mine shaft, and other mining excavations are within the surveyed proposed tower site area, although no other issues or concerns were noted with the property (CBP 2008h).

TCA-NGL-048

De minimis conditions in regard to stained soils were observed on the tower site near existing CBP mobile observation tower equipment apparently due to leaking diesel or hydraulic fuel (CBP 2008f).

TCA-TUS-290

No issues or concerns were noted with the property (CBP 2008k).

TCA-TUS-041

No issues or concerns were noted with the property (CBP 2008l).

TCA-NGL-285

No issues or concerns were noted with the property (CBP 2008m).

In summary, the Phase I Environmental Site Assessments for the proposed tower sites: TCA-CAG-102, TCA-SON-055, TCA-SON-213, TCA-NGL-048, TCA-NGL-052, TCA-TUS-290, TCA-TUS-041 and TCA-NGL-285 found no historical or current information that would indicate the possible presence of a *recognized environmental condition* at each of the sites assessed. Additionally, no further investigations were recommended at any of these tower sites (CBP 2008e, f, g, h, i, j, k, l, and m).

3.17.2 Environmental Consequences

3.17.2.1 No Action Alternative

The No Action Alternative would not contribute any hazardous waste or materials to the project areas, as no construction of towers or access roads would take place.

3.17.2.2 Proposed Action

Construction Activities

During construction of new towers and access roads, the potential exists for POL contamination at the construction site due to storage of POL material for maintenance and refueling of vehicles and fuel storage tanks. However, these activities would include primary and secondary containment measures. Clean-up materials (*e.g.*, oil mops) would be maintained at each site for appropriate spill response and cleanup in case an accidental spill occurs. Drip pans would be provided for the power generators and other stationary equipment to capture any POL that is accidentally spilled during maintenance activities or leaks from equipment. To ensure, oil pollution prevention, a SPCCP would be in place prior to the start of construction activities as outlined in Section 5.

Portable sanitary facilities would be provided during construction activities and waste products would be collected and disposed of by licensed contractors. Disposal contractors would use only established roads to transport equipment and supplies, and all waste would be disposed of in compliance with Federal, state, and local regulations, in accordance with contractors' permits.

Proposed tower site TCA-SON-055 could potentially have mine tailings and soils which may contain contaminants within the property area. Depending on the type of mining that was performed at the site, specific heavy metals may be present as contaminants of concern in soils and groundwater from mining activities. Although the Phase I Environmental Site Assessment did not state that further investigation is warranted, it would be prudent to check historic mine records, to ensure that no mine tailings are present which may have contamination above specific state levels of concern.

With implementation of these practices, or in the case of TCA-SON-055 a historical check, the Proposed Action would not result in a significant environmental or public exposure on any hazardous materials.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one proposed Ajo Station tower). Therefore, there would be no impacts on hazardous materials. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Maintenance and Operations Activities

All solid and hazardous wastes and materials, including universal waste (such as batteries, fluorescent light bulbs, *etc.*), would be handled in accordance with applicable Federal and state laws and guidelines governing these items.

The Proposed Action may result in indirect beneficial impacts on solid and hazardous waste. As illegal vehicle and pedestrian traffic is reduced or eliminated within the project corridor, fewer abandoned vehicles and other solid or hazardous waste associated with illegal cross border activities would be expected.

3.18 SOCIOECONOMICS

3.18.1 Population and Demographics

The ROI of the proposed action consists of a five-county area along the southern border in Arizona, including Cochise, Maricopa, Pima, Pinal, and Santa Cruz counties. The population and racial mixes of the different counties are presented in Table 3-21. Population in each of the counties ranges from 3,768,123 in Maricopa County in 2006 (U.S. Census Bureau [USCB] 2006c) to an estimated 43,080 in Santa Cruz County (USCB 2000). There was positive population growth in all counties within the ROI. This growth, between 1990 and 2006, ranged from 42 percent in Pima County to 132 percent in Maricopa and Pinal counties (USCB 2006f, g, h, i and j). The racial mix of the area is predominated by Caucasians in all counties ranging from 70 percent in Pima County to 80 percent in Maricopa County. Both Santa Cruz County and Pima County have the majority of the population claiming to be of Hispanic origin, 81 percent and 33 percent respectively.

Table 3-21. Population and Race Estimates within the Area of Operations

Location	White (percent)	African American (percent)	Asian (percent)	Native American (percent)	Some Other Race (percent)	Hispanic Origin (percent	Total Population (percent)
Arizona (2006)	4,741,310 (76.9)	207,837 (3.4)	144,858 (2.3)	NR	1.072.313 (17.4)	1,803,377 (29.2%)	6,166,318
Cochise (2006)	106,528 (83.4)	5,442 (4.3)	1,800 (1.4)	NR	13,987 (10.9)	40,331 (31.6%)	127,757
Maricopa (2006)	3,019,221 (80)	154,746 (4)	108,661 (3)	6,761 (0.2%)	478,734 (12.8)	1,129,556 (30%)	3,768,123
Pima (2006)	662,127 (70)	29,119 (3.1)	22,866 (2.4)	1,528 (0.2%)	230,182 (24.3)	307,625 (32.5%)	946,362
Pinal (2006)	190,445 (70.3)	9,166 (3.4)	3,442 (1.3)	NR	68,006 (25)	80,035 (25.1%)	271,059
Santa Cruz (2000)	29,168 (76.0)	145 (0.4)	201 (0.5)	NR	8,867 (23.1)	31,005 (80.8%)	38,381

Source: USCB 2000, USCB 2006a, b, c, d, and e
NR = None reported

3.18.2 Employment and Income

Table 3-22 summarizes the total number of jobs in the study area split by county. Maricopa County had the largest numbers of jobs in the ROI while Santa Cruz had the lowest. Santa Cruz County had the highest unemployment rate (7.7 percent) followed by Pinal County (5.0 percent). Maricopa County (3.5 percent) and Pima County (4.0 percent) were both below the state unemployment rate (Arizona Department of Economic Security (ADES) 2006).

Table 3-22. Total Number of Jobs and Unemployment Rate within the Area of Operations

Location	1995	2005	Percent Change (percent)	Unemployment Rate[1] (percent)
Arizona	**2,275,033**	**3,237,202**	**42**	**4.1**
Cochise	45,316	58,141	28	4.5
Maricopa	1,469,468	2,188,301	29	3.5
Pima	384,604	486,165	36	4.0
Pinal	50,455	59,809	18	5.0
Santa Cruz	14,507	17,398	31	7.7

Source: Bureau of Economic Analysis (BEA) 1995a,b,c, d, e, and f and BEA 2005a, b, c, d, e, and f; ADES 2006
[1] for the year 2006

Table 3-23 summarizes the total personal income (TPI) for the ROI. TPI ranged from to $839 million in Santa Cruz County $57 billion in Maricopa County. The average annual growth rate over the past 10 years ranged from 9.3 percent in Pinal County to 5.8

percent in Santa Cruz County. The average annual growth rate of TPI for the U.S. was 5.3 percent (USCB 2005). Two counties within the ROI were below the average annual growth rate for TPI within Arizona (Bureau of Economic Analysis [BEA] 2005f, g, h, i, and j).

Table 3-23. Total Personal Income for the Region of Influence

Location	1995 TPI (rank) (in $ billions)	2005 TPI (rank) (in $ billions)	Percent State Total (percent)	Average Annual Growth Rate (percent)
Arizona	**$88 (23rd)**	**$181 (21st)**	**100**	**7.4**
Cochise	$1.7 (8th)	$3.4 (8th)	1.9	6.8
Maricopa	$57 (1st)	$121 (1st)	67.6	7.7
Pima	$14.8 (2nd)	$26.7 (2nd)	14.9	6.1
Pinal	$2.1 (5th)	$5.0 (3rd)	2.8	9.3
Santa Cruz	$0.48 (12th)	$0.84 (12th)	0.5	5.8

Source: BEA 2005g, h, i, j, k, l

Per capita personal income (PCPI) data for the ROI is located in Table 3-24. PCPI ranged from $33,178 in Maricopa County, Arizona to $19,967 in Santa Cruz County. All the counties were below the National average of $34,471 with Maricopa County being the closest at 96 percent of the National average PCPI. The average annual growth rate of PCPI ranged from 4.1 percent in Maricopa and Pima counties to 3.9 percent in Pinal and Santa Cruz counties. The annual average growth rate of PCPI in Pinal and Santa Cruz counties were below the average annual growth rate of the Nation (4.1 percent). The annual average growth rate across the ROI, except in Cochise County, was below the average annual growth rate of the state (4.3 percent) (BEA 2005f).

Table 3-24. Per Capita Personal Income for the Region of Influence

Location	1995 PCPI (rank)	2005 PCPI (rank)	Percent of State Average (percent)	Percent National Average (percent)	Average Annual Growth Rate (percent)
Arizona	**$19,929 (36th)**	**$30,384 (38th)**	**--**	**88**	**4.3**
Cochise	15,582 (8th)	$26,866 (4th)	90	78	5.6
Maricopa	$22,107 (1st)	$33,178 (1st)	111	96	4.1
Pima	$19,275 (2nd)	$28,869 (2nd)	96	84	4.1
Pinal	$14,109 (10th)	$20,835 (10th)	69	60	3.9
Santa Cruz	$13,597 (12th)	$19,967 (12th)	67	58	3.9

Source: BEA 2005g, h, i, j, k, and l

3.18.3 Housing

The total number of housing units in the ROI in 2006 was 1,983,973 (assuming the number of Santa Cruz housing units did not decrease since 2000). Table 3-25 summarizes the total number of housing units by county. The largest number of housing units is located in Maricopa County while the smallest is located in Santa Cruz County. Santa Cruz and Pima counties have the smallest percentage of vacant units, while Pinal County has the largest percentage of vacant housing units.

Table 3-25. Housing Units by County (2006)

Location	Vacant Housing Units (percent)	Occupied Housing Units		Total Housing Units (percent)
		Owner (percent)	Renter (percent)	
Arizona	**380,103 (15)**	**1,523,041 (68)**	**701,951 (32)**	**1,983,973**
Cochise	7,517 (13.4)	34,226 (70)	14,492 (30)	56,235 (2)
Maricopa	174,125 (12)	898,278 (68)	423,826 (32)	1,496,229 (57)
Pima	46,843 (11)	244,915 (66)	126,455 (34)	418,213 (16)
Pinal	21,701 (17)	81,036 (77)	23,968 (23)	126,705 (5)
Santa Cruz*	1,227 (9)	8,026 (68)	3783 (32)	13,306 (NA)

Source: USCB 2000, USCB 2006a, b, c, d, and e
* For the year 2000
NA – Because Santa Cruz data is from 2000, it is not compared to 2006 Arizona total housing units.

3.18.4 Environmental Consequences

3.18.4.1 No Action Alternative

Under the No Action Alternative, construction of towers would not take place. As a result, no direct impacts would be anticipated under the No Action Alternative. However, the current illegal pedestrian and vehicle traffic and other illegal activities would continue and probably increase, likely resulting in an increase in insurance costs, property losses, law enforcement expenses, and other social costs (*e.g.*, drug rehabilitation, medical expenses, and labor opportunities). The No Action Alternative would continue to endanger the lives and increase health risks to ICs attempting to cross the southern border and the safety of CBP agents who attempt to apprehend them.

Population and Demographics

No changes would occur to population and demographics from the No Action Alternative.

Employment and Income

Employment and income would not be affected by No Action Alternative.

Housing

No displacement of residential or commercial properties would result under the No Action Alternative.

3.18.4.2 Proposed Action

In general, all construction activities, regardless of the area, would be limited to daylight hours only, to the maximum extent practicable. Overall, only minor direct impacts on housing or employment in the project areas would result from temporary, short term increases in the tower construction workforce that would last for the approximate 10- to 60-day construction work schedule. No changes to local employment rates, poverty levels, or local incomes would occur as a result of this program. Long term, but minor, beneficial socioeconomic impacts would be realized from the purchasing of liquid propane gas locally to power up to 54 towers and future maintenance of tower projects.

The increased surveillance and improved CBP response times to apprehend ICs would reduce illegal traffic in the project area. ICs have been associated with increased reports of car thefts, prowlers, break-ins, and other illegal activities (Orrenius P.M. and Coronado R. 2005). Reductions in IC traffic resulting from increased surveillance from the implementation of the towers are expected to reduce crimes in the Casa Grande, Nogales, Phoenix, Sasabe, Sierra Vista, Sonoita, and Tucson areas and enhance the safety of U.S. residents.

Population and Demographics

The labor for the Proposed Action would be provided by private contractors, resulting in only temporary increases in the population of the project area.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one proposed Ajo Station tower). Therefore, there would be no impacts on population. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Employment and Income

When possible, materials and other project expenditures would predominantly be obtained through merchants in the local community resulting in minor, temporary economic benefits.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one proposed Ajo Station tower). Therefore, there would be no impacts on the economy. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

Housing

No displacement of residential or commercial properties would result from this action. Adequate housing and contracting resources are available in the ROI for private contractor involvement in constructing the proposed towers.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the proposed Ajo Station tower). Therefore, there would be no impacts on housing. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.19 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

3.19.1 Affected Environment

3.19.1.1 Executive Order 12898, Environmental Justice

The fair treatment of all races has been assuming an increasingly prominent role in environmental legislation and implementation of environmental statutes. In February 1994, President Clinton signed EO 12898 titled, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This action requires all Federal agencies to identify and address disproportionately high and adverse effect of its programs, policies, and activities on minority and low-income populations. Cochise, Maricopa, Pima, and Pinal counties have approximately 30 percent of their population claiming Hispanic or Latino origin (see Table 3-17). About 81 percent of Santa Cruz County claims to be of Hispanic or Latino origin (see Table 3-17). Furthermore, each of the counties is below both the National and respective state median household income and also has a greater percentage of all their populations in poverty relative to both Arizona and the Nation, except for Maricopa County (Table 3-26).

Table 3-26. Poverty and Median Income Data for the Nation, Arizona, and Across the ROI

Location	All Ages in Poverty, (percent)	Under Age 18 in Poverty, (percent)	Median Household Income
United States	13.3	18.5	$46,242
Arizona	14.4	20.9	$44,402
Cochise	16.9	24.3	$36,296
Maricopa	12.6	18.3	$48,752
Pima	14.9	21.5	$41,484
Pinal	15.7	20.8	$41,177
Santa Cruz	20.4	29.2	$33,491

Source: USCB 2005

3.19.1.2 Executive Order 13045, Protection of Children

EO 13045 requires each Federal agency “to identify and assess environmental health risks and safety risks that may disproportionately affect children”; and “ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. In Cochise County, 7,587 individuals, or 24.3 percent of the population are children under the age of 18 that are at or below the poverty level (USCB 2005). In Maricopa County, 178,681, or 18.3 percent of the population are children under the age of 18 that are at or below poverty level (USCB 2005, see Table 3-24). Additionally, in Pima County, 47,294 individuals, or 21.5 percent of the population are children under the age of 18 that are at or below the poverty level (USCB 2005). In Pinal County, 11,524 individuals, or 20.8 percent of the population are children under the age of 18 living at or below the poverty level (USCB 2005). About 29 percent of the population of Santa Cruz County is children under the age of 18 living at or below poverty level (USCB 2005). The potential for impacts to the health and safety of children would be greater where projects are located near residential areas.

3.19.2 Environmental Consequences

3.19.2.1 No Action Alternative

Under the No Action Alternative, construction of towers would not take place. As a result, no impacts would be anticipated under the No Action Alternative for environmental justice issues.

3.19.2.2 Proposed Action

The Proposed Action would beneficially affect the five counties across the ROI, regardless of race and income level. The Proposed Action would not result in disproportionately high or adverse environmental health or safety impacts on minority or low-income populations or children. This conclusion is based on the fact that the analyses in this EA have identified no significant adverse environmental effects for any resource area or population (minority, low-income, children, or otherwise) as a results of implementing the Proposed Action.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one proposed Ajo Station tower). Therefore, there would be no impacts on environmental health or safety impacts on minority or low-income populations or children. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

3.20 SUSTAINABILITY AND GREENING

3.20.1 Affected Environment

In accordance with EO 13423 – Strengthening Federal Environmental, Energy, and Transportation Management (72 FR 3919 [2007]), CBP would incorporate practices in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient and sustainable manner in support of their mission. CBP implements practices throughout the agency to: 1) improve energy efficiency and reduce greenhouse emissions, 2) implement renewable energy projects, 3) reduce water consumption, 4) incorporate sustainable environmental practices such as recycling and the purchase of recycled-content products, and 5) reduce the quantity of toxic and hazardous materials used and disposed of by the agency. Additionally, new facility construction would comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* set forth in the *Federal Leadership in High Performance and Sustainable Memorandum of Understanding*. DHS will also reduce total consumption of petroleum products as set forth in the EO and use environmentally sound practices with respect to the purchase and disposition of electronic equipment.

3.20.2 Environmental Consequences

3.20.2.1 No Action Alternative

The No Action Alternative would not result in any direct or indirect impacts, as no construction activities would take place.

3.20.2.2 Proposed Action

Under the Proposed Action, the Federal sustainability and greening practices would be implemented to the greatest extent practicable.

No construction of access roads and towers, foundations, and associated buildings are required for the retrofits or upgrades to the 12 existing towers (including the one proposed Ajo Station tower). Therefore, there would be no impacts on sustainability or greening. In the case of TCA-AJO-305, it has been previously analyzed as having no significant impacts (CBP 2007b).

CBP intends to obtain the goal of reducing petroleum-based product use with a Fleet Management Plan facilitated through CBP's Asset Management Division. This project would adhere to this management plan.

SECTION 4.0
CUMULATIVE IMPACTS

4.0 CUMULATIVE IMPACTS

The NEPA regulations define cumulative impacts as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time by various agencies (Federal, state, and local) or individuals. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

This cumulative impacts analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future projects within the Proposed Action areas. Projects were identified for this analysis by reviewing CBP documents, news/press releases and published media reports, and through consultation with planning and engineering departments of local governments, and state and Federal agencies, including DHS/CBP/SBI and SBI*net* project proponents. Projects not planned in proximity to the proposed tower sites would not contribute to cumulative impacts within the project area and were not considered. Since the ROI for the proposed tower locations is Maricopa, Pima, Santa Cruz, Pinal, and Cochise counties, Arizona, the following analyses will address cumulative impacts only within the western portion of Tucson Sector.

4.1 REASONABLY FORESEEABLE CBP PROJECTS WITHIN AND NEAR THE TUCSON SECTOR

CBP has been conducting law enforcement actions along the U.S.-Mexico border since its inception in 1924, and has continually transformed its methods as new missions, IC modes of operations, agent needs, and National enforcement strategies have evolved. Development and maintenance of training ranges, station and sector facilities, detention facilities, and roads and fences have affected thousands of acres with synergistic and cumulative impacts on soil, wildlife habitats, water quality, and noise. Beneficial effects have resulted from the construction and use of these roads and fences, including but not limited to: increased employment and income for border regions and surrounding communities, protection and enhancement of sensitive resources north of the border; reduction in crime within urban areas near the border; increased land value in areas where border security has increased; and increased knowledge of the biological communities and pre-history of the region through numerous biological and cultural resources surveys and studies.

With continued funding and implementation of CBP's environmental conservation measures, including environmental education and training of its agents, use of biological and archaeological monitors, wildlife water systems, wildlife forage plots, and restoration activities, adverse impacts of future and on-going projects would be prevented or minimized. However, recent, on-going, and reasonably foreseeable proposed projects will result in cumulative impacts. In particular, within the year, 225 miles of primary pedestrian fence are scheduled to be completed along the southwest border. The first phase of construction occurred in areas that had already been developed (*e.g.,* currently contain permanent or temporary vehicle barrier); thus, little or no additional environmental impact was incurred. The second phase of construction is planned in more remote areas and will inevitably result in cumulative impacts. Construction for the primary pedestrian fence has been completed or is on-going in Texas, New Mexico, Arizona, and California. A list of the past, on-going, and other proposed CBP projects within the ROI surrounding the Tucson Sector is presented in Table 4-1.

Another CBP initiative, entitled Vehicle Fence 300 (VF 300), is planned at locations (as much as 300 miles) along the southwestern border where vehicle fence is the preferred fence design. While still in the planning stages, areas within the Tucson Sector that have been identified as potential projects include the Poza Verde Mountains to the west of the ROI, portions of the CNF east and west of Nogales and areas in eastern Arizona near the Arizona-New Mexico state line.

Table 4-1. Recently Completed or Reasonably Foreseeable CBP Projects within and near the Tucson Sector

Project	Approximate Acres Permanently Impacted
Leased an 80-acre parcel of land near the Mariposa POE for CBP operations (portable lights and maintenance of roads), Nogales Station	80
Installation of a total of 7 miles of pedestrian fence and maintenance road east and west of the Sasabe, Arizona POE.	51
Installation of an underground fiber optic cable within the maintenance road footprint which parallels the U.S.-Mexico border near Sasabe, Pima County, Arizona.	0
Proposed construction and maintenance of approximately 11.7 miles of all-weather roads, which includes 8.5 miles of drag roads, low-water crossings, and drainage structures on either side of Nogales	40
Restoration of Ephraim Ridge near Nogales	1
Construction and improvement of 3 miles of new patrol road, including 0.3 mile of drag road, low-water crossings, and drainage structures west of the Mariposa commercial Port of Entry (POE) in the Tucson Sector, Nogales Station's AOR.	37
Expansion of CBP checkpoint facilities near Three-Points	5
Construction of 2.4 miles of primary fence, starting approximately 0.5 mile west of the Mariposa POE at the west end of the existing primary fence, and extending 2.4 miles westward. A maintenance road would be constructed for fence construction and maintenance.	18
Proposed placement of temporary vehicle barrier at up to 21 different locations (approximately 37 miles) along the U.S.-Mexico border within the Tucson, Nogales, and Sonoita Stations' AOR	0
Relocation of Nogales Interstate 19 (I-19) checkpoint	1
Construction of primary pedestrian and vehicle fence starting 1 mile east of the DeConcini POE and extending eastward for a total of 7.6 miles. An approximate 1.34 miles long road will be constructed along the border to allow installation and maintenance of this fence.	116
Installation of 15 remote video surveillance systems in the Nogales Station's AOR	2
Installation of a relay tower at Crawford Hill in the Nogales Station's AOR	0.1
Construction and improvements to 3 miles of CBP patrol roads and drag roads west of the Mariposa POE	37

Table 4-1, continued

Construction of 2.4 miles of primary fence and maintenance road west of the Mariposa POE in Nogales, Arizona	18
Realignment of 0.25 miles of patrol road over Limestone Ridge and construction of 3 miles of primary fence near Limestone Ridge	52
Realignments to 0.34 mile of all-weather patrol road and relocation of 55 permanent lights east of the DeConcini POE	24
Proposed tower construction and access roads for SBInet Tucson East project	5*
Proposed tower construction and access roads for SBInet Organ Pipe Cactus National Monument project	20*
Proposed tower construction and access roads for SBInet T'Ohno Odham project	3*

* These are only initial planning estimates based on tower impacts and currently does not include roads.

Other SBInet tower projects are currently in the planning phase for Arizona and would include tower construction and access roads in the Naco, Douglas and Willcox AORs (Tucson East, 29 towers proposed), Organ Pipe Cactus National Monument (12 proposed towers), and Tohono O'odham Nation (17 proposed towers). The number of proposed towers for these projects may change based on the development of final planning and analysis designs.

In addition to these phased projects, CBP might be required to implement other activities and operations that are currently not foreseen or not within the ROI and therefore not discussed in this document. These actions could be in response to national emergencies or security events like the terrorist attacks on September 11, 2001, or to changes in the mode of operations of potential ICs.

4.2 OTHER AGENCY/ORGANIZATIONS PROJECTS

Plans by other agencies that would also affect the region's natural and human environment include various road improvements by ADOT and/or Santa Cruz County. The majority of these projects would be expected to occur along existing corridors and/or within previously disturbed sites. The magnitude of the impacts would depend upon the length and width of the road right of way (ROW) and the extant conditions within and adjacent to the ROW.

Several ADOT projects were identified for the next 5 years. The details of these projects are incorporated herein by reference. Following is a summary of the types of ADOT projects currently in the planning stage:

- Country Club Road-Ruby Road – design of frontage roads
- U.S.-Mexico border – Business I-19 roadway improvements
- Junction of State Route-189 and I-19 – roadway improvements
- Doe Street to Baffert Drive – retrofit, sidewalks, landscaping
- Patagonia Lake/Sonoita Creek – design planning
- State Route-82 between Mileposts 38 and 39.5 – slope flattening
- State Route-189 at Milepost 0.095 – drainage improvements
- Mariposa POE – parking lot and road improvements

ADOT planned improvements for Cochise, Pima, Santa Cruz, and Maricopa counties, through 2009 are:

- SR 90 to Ocotillo TI reconstruct and lane addition (ADOT 2007);
- Tombstone Courthouse State Park construct parking (ADOT 2007);
- Central Avenue to Moson Road, East of Sierra Vista widen to 4 lanes (ADOT 2007);
- Carr Canyon Road to Hunter Canyon widen to 4 lanes (ADOT 2007);
- Ideal Draw Stream # 5098 bridge scour project (ADOT 2007);
- Cochise SPRR bridge Replacement (ADOT 2007);
- I-10 Prince Road to 29th Street reconstruct and widen roadway (ADOT 2007);
- I-10 Pinal Air Park Road to Tangerine Road widening (ADOT 2007); and
- I-10 Picacho Peak Road to Pinal Air Park Road widening (ADOT 2007).

In addition, projects are currently being planned by other Federal entities which could affect areas in use by CBP. CBP should maintain close coordination with these agencies to ensure that CBP activities do not conflict with other agencies' policies or management plans. CBP would consult with applicable state and Federal agencies prior to performing any construction activities and would coordinate operations so that they do not inappropriately impact the mission of other agencies. The 2007 Ajo Station EA provided an extensive list of past or foreseeable Federal projects within the region. These projects are also incorporated herein by reference (CBP 2007b). Other agencies, such as BLM, U.S. Air Force, NPS, and USFS, routinely prepare or update Resource Management Plans for the resources they manage. USFS has the responsibility of managing approximately half of all lands within Santa Cruz County. In addition to general rangeland management, the types of projects conducted by USFS include:

- lake maintenance projects;
- pasture divisions and grazing allotment management plans;
- fuelwood/hazardous fuel reduction plans;
- specific habitat improvement projects;
- facility planning;
- invasive exotic plant management programs;
- land exchanges;
- pipeline/transmission ROWs; and
- mechanical brush control plans.

Nogales is the designated gateway from and to Mexico on the CANAMEX Trade Corridor. The name “CANAMEX” is derived from the country names of Canada, America, and Mexico, where a western trade corridor of 1,700 miles of existing highway and interstate systems connects the three countries. The CANAMEX corridor would likely become one of the most important north/south trade corridors in North America. The state governments of Arizona and Nevada are committed to obtaining funds to construct a four-lane divided highway in anticipation of the CANAMEX Trade Corridor. The completion of these projects would create an uninterrupted north/south highway system down the spine of the CANAMEX Trade Corridor. This project is in the planning stage, and potential impacts are unknown at this time.

CBP activities have had many positive cumulative impacts. For example, construction and maintenance activities resulting in reductions in illegal drug smuggling have had cumulative positive impacts on socioeconomic resources within the border area. INS (now CBP) activities completed from 1994 to 1999 have provided information on over 100 new cultural resources sites potentially eligible for NRHP listing.

A summary of the anticipated cumulative impacts of the Proposed Action (*i.e.*, construction of 54 towers in the western portion of the Tucson Sector) is presented in the following sections. Discussions are presented for each of the resources described previously.

4.3 IDENTIFICATION OF CUMULATIVE EFFECTS ISSUES

4.3.1 Water, Soils, and Air

The pollution of water, soils, and air resulting from independently small actions can have additive and synergistic effects on single resources, ecosystems, and human communities when combined with the cumulative effects of similar actions in a region.

The effects of water pollution on wildlife, sensitive fish, migratory birds, Santa Cruz, San Pedro, and Gila River riparian communities and the Sonoran Desert ecosystem have been significant. Water quality in the river basins is affected by agricultural development. Planned and existing improvements to agricultural practices can reduce pollutants and reduce effects on resources ecosystems, and human communities. The Proposed Action and other similar development actions would most likely occur on agricultural lands or government managed lands, primarily because the majority of the project corridor is either under agricultural production or Federal management.

Each new residential or commercial development action in the southeastern Arizona river basins would likely implement mitigation measures to reduce the potential effects of pollutants associated with the handling of POLs, VOCs, and hazardous materials. Each new development would also likely comply with wastewater treatment regulations, and most would probably connect to the existing wastewater treatment system. Therefore, the point- and non-point sources of pollution created by the Proposed Action and other similar developments would not result in cumulative effects.

The topography of southeastern Arizona creates the potential for increased soil loss; however, each new development would likely be incorporated into local and regional

SWPPPs. The pollution of soils, which can synergistically affect other resources and ecosystems, would also be mitigated through use of a SWPPP and associated BMPs. Therefore, the cumulative effects of the Proposed Action, when combined with other similar developments, would be minimal.

4.3.2 Floodplains

Most of the 100-year floodplain in Cochise, Maricopa, Pima, and Santa Cruz counties is occupied by rangeland, agricultural lands, and Federal and state lands; and minimal development has occurred within the floodplain. The Proposed Action and other developments are not expected to result in substantial impacts to the 100-year floodplain. Federal and local laws governing floodplains limit development within the 100-year floodplain. Therefore, there is no potential for the Proposed Action, when combined with other similar developments, to cumulatively affect floodplains, wildlife, or wildlife habitats.

4.3.3 Vegetation Communities and Wildlife

Much of the tower sites are located in Arizona Upland and Lower Colorado River Subdivisions, Plains and Great Basin and Semidesert Grasslands, and Madrean Evergreen Woodland vegetation communities. The Proposed Action and other similar developments are not expected to result in substantial new development of previously undisturbed lands. The majority of the project area is currently undisturbed. The Proposed Action would have negligible effect on vegetation and wildlife (41 acres total) and would not create additional opportunities for the spread of invasive plants and noxious weeds. Therefore, there is a minimal potential for the Proposed Action, when combined with other similar developments, to cumulatively affect vegetation or wildlife habitats.

4.3.4 Sensitive Species

The Proposed Action would permanently affect 41 acres, therefore, there is a minimal potential for the Proposed Action, when combined with other similar developments, to cumulatively affect sensitive species. With the implementation of mitigation measures described in Section 5, most adverse affects to sensitive species would be avoided. Species for which the implementation of conservation measures would completely avoid any adverse effect, or would minimize the potential for effect to an insignificant discountable level, include the Gila topminnow, Sonoran chub and Critical Habitat, Chiricahua leopard frog, Sonoran tiger salamander, masked bobwhite, yellow-billed cuckoo, and Huachuca water umbel and Critical Habitat. Therefore, the Proposed Action would not have a cumulative impact on these species when compared with other projects in the region.

Construction of tower site TCA-NGL-211 would occur within 1 mile of a Mexican spotted owl PAC; therefore, the adverse effects of habitat loss would not be avoided at this site. Furthermore, some primary constituent elements of Mexican spotted owl Critical Habitat would be affected by new tower sites and access roads. Other land disturbing projects in the region, that remove primary constituent elements of Mexican spotted owl Critical Habitat would be expected to have a cumulative impact on the Mexican spotted owl and designated Critical habitat. As all of the designated Critical Habitat for the Mexican spotted owl is on USFS lands, projects on these lands would have to be coordinated under Section 7 of the ESA. Potential adverse impacts to the Mexican spotted owl and its designated Critical Habitat would be reduced through the development of conservation measures during Section 7 consultation.

Pima pineapple cactus was observed at two tower sites and impacts are likely to be unavoidable. Other land disturbing projects in the region would be expected to have a cumulative impact on the Pima pineapple cactus. As most of the land in the region is Federally owned land, projects on these lands would have to be coordinated under Section 7 of the ESA. Potential adverse impacts to the Pima pineapple cactus has been reduced through the development of conservation measures during Section 7 consultation.

4.3.5 Cultural Resources

Much of the land within the immediate vicinity of the tower sites and access roads is located on Federal lands and all actions on these lands will require NEPA compliance and Section 106 compliance. Consequently the impacts to cultural resources would be avoided and or impacts to cultural resources would be mitigated through appropriate measures. Future developments are expected to conduct surveys and assess the potential for impacts to cultural resources if a Federal action (including financial aid or assistance, permits, or land) is required.

4.3.6 Land Use and Socioeconomics

Although the Proposed Action would affect only 41 acres, other future developments could cumulatively affect increase affects to agricultural lands, and rangelands within the ROI. As the cities of Nogales, Casa Grande and Tucson continue to grow, there is limited expansion potential to the south (due to the International Border), to the west (due to the Tohono O'odham Nation, OPCNM, and CPNWR). Consequently, the only real opportunity for future development in Nogales and Sonoita is to the east and for Tucson and Casa Grande to the east and south. Both could affect agricultural and rangelands that comprise the majority of the project region. Therefore, land use was analyzed.

As additional development and expansion occur, demands on transportation routes are expected. New highways or increased capacity (*i.e.*, widening) of existing highways would be required. These highways would be planned, designed and constructed to accommodate existing and future traffic demands, in accordance with ADOT and FHWA standards. The Proposed Action would add only about two vehicle trips per month to these demands and therefore, would not be a cumulative impact issue for further analysis.

Other socioeconomic/human resources, including noise, aesthetics, local economy, and housing have been impacted by past and on-going development. Future development would result in cumulative adverse and beneficial impacts to these conditions.

However, the Proposed Action would have only temporary and negligible impacts on the human environment.

4.4 DEFINING CUMULATIVE EFFECTS ASSESSMENT GOALS

Three cumulative effects issues, two resource related (cultural and aesthetics) and one related to human communities (land use), have been identified as potentially substantial. These issues are inter-dependent since cultural resources, aesthetics and land use will be affected primarily by urban development. Ultimately, the construction, upgrade, operation and maintenance of the proposed towers represent a minimal proportion of the planned and reasonably foreseeable growth in southern Arizona, which would occur regardless of the action implemented by CBP. Therefore, relative to the baseline conditions (*i.e*., No Action Alternative), implementation of the Proposed Action would have a minimal cumulative effect on air quality, cultural resources or land use.

4.5 SUMMARY OF OTHER PROJECTS CONTRIBUTING TO CUMULATIVE EFFECTS ISSUES

The following sections describe current and proposed actions by CBP and other entities which, when combined with the Proposed Action, could result in cumulative impacts to the natural and human environment.

4.6 CUMULATIVE ENVIRONMENTAL EFFECTS

4.6.1 Proposed Action

A summary of the anticipated cumulative impacts relative to the Proposed Action (*i.e.*, construction, upgrade, operation and maintenance of 54 tower sites) is presented below. These discussions are presented for each of the resources described previously.

4.6.2 Land Use

The Proposed Action would affect approximately 41 acres of undeveloped land and developed/disturbed lands. The construction and operation of the towers would not conflict with any known land use plans, and would not substantially alter the availability of farm or rangelands in the region. The Proposed Action will also not conflict with resource management plans on CNF or BANWR. To ensure no conflicts exist, Federal land managers are required to complete an appropriate use test or compatibility assessment for the proposed project to occur on their lands. CBP will coordinate with the appropriate resource agencies to assist in such assessments or tests. CBP is coordinating with USFWS regarding the tower sites that are proposed for the BANWR. Additionally, construction of the BANWR tower sites is contingent upon a USFWS determination that they are appropriate and compatible uses for the BANWR. This action, therefore, is not expected to result in significant cumulative adverse effects when considered with other potential changes of land use.

4.6.3 Air Quality

Emissions generated during and after construction of the towers and access roads would be short term and minor. Although maintenance of the towers and repair and improvements of access roads would result in minor cumulative impacts to the region's air shed, these impacts would not be considered significant even when combined with other proposed developments in the border region of Arizona. Liquid propane gas generators would be used only sporadically and emissions from these generators would be negligible. Deterrence of, and improved response time to, ICs created by the operation of the towers are anticipated to reduce off-road enforcement actions currently required by CBP agents.

4.6.4 Aesthetics

No major cumulative impacts to visual resources would occur from implementing the Proposed Action, due in part to the small footprint of the towers and access roads, and the large amount of agriculture, rangeland, evergreen forestland, and border infrastructure that exists within vicinity of the proposed project area. The tower site selection process placed as many towers as possible in previously disturbed or developed areas, at existing communications or remote video surveillance tower locations (also called RVS towers), or at existing CBP facilities. The relatively low tower heights and the lack of guy wires could also alleviate the potential for the proposed project to obstruct aesthetic vistas or otherwise impact visual resources of the project area. Additionally, the proposed towers would be constructed at least 5 to 10 miles apart. So, depending on topography, no single viewshed would be impacted by more than one or two towers. As much of the tower area is within Federal lands, the proposed project will also comply with Federal agency guidelines. Construction, upgrade, operation, and maintenance of the proposed towers, when considered with existing and proposed developments in the surrounding area, would not result in significant cumulative impacts to the visual quality of the region.

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SECTION 5.0
MITIGATION MEASURES

5.0 MITIGATION MEASURES

It is CBP's policy to reduce impacts through a sequence of avoidance, minimization, mitigation, and compensation. This chapter describes those measures that would be implemented to reduce or eliminate potential adverse impacts to the human and natural environment. Many of these measures have been incorporated as standard operating procedures by CBP on past projects. Environmental design measures are presented for each resource category potentially affected. These are general mitigation measures; development of specific mitigation measures would be required for certain activities implemented under the Proposed Action. The specific mitigation measures would be coordinated through appropriate agencies and land managers or administrators, as required. Mitigations vary and include activities such as restoration of habitat in other areas, acquisition of lands, implementation of BMPs, and are typically coordinated with the USFWS and other appropriate Federal and state resource agencies.

5.1 PROJECT PLANNING/DESIGN COMMUNICATION AND WIND TOWERS

The following measures were adapted from our *Interim Guidance on Siting, Construction, Operation, and Decommissioning of Communication Towers* (U.S. Fish and Wildlife Service 2000), *Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Tu*rbines (U.S. Fish and Wildlife Service 2003) and the Arizona Game and Fish Department's (AGFD) *Wind Energy Development Guidelines* (AGFD 2006).

- CBP will minimize bird perching and nesting opportunities for new towers.
- CBP will not site towers in or near wetlands, other known bird concentration areas (*e.g.,* state or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. If this is not an option, mitigation will be required.
- Where CBP will be constructing taller (>199 feet above ground level) towers requiring lights for aviation safety, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA will be used (FAA 2000). Unless otherwise required by the FAA, CBP will use only white (preferable) or

red strobe lights at night, and these will be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. CBP will not use solid red or pulsating red warning lights at night.

- CBP will not use guy wires for tower support to reduce the probability of bird and bat collisions.
- CBP will use security lighting for on-ground facilities and equipment that is down-shielded to keep light within the boundaries of the site.
- CBP will site, design, and construct towers and appendant facilities to avoid or minimize habitat loss within and adjacent to the tower "footprint." CBP will minimize road access and fencing to reduce or prevent habitat fragmentation and disturbance, and to reduce above-ground obstacles to birds in flight.
- When ridges, canyons, cliffs, and fissures are within the project vicinity, CBP will offset wind turbines at least 150 feet from the geologic features. If turbine placement cannot be offset, CBP will mitigate effects. Ridges, steep slopes, valleys, canyons, cliffs, and fissures are usually areas of concentrated wildlife, generally birds and bats.
- Unless site-specific key species behavioral observations indicate more optimal tower and blade dimensions, CBP will place turbines inside the site perimeter fence with lower blade reaches at least 10 feet above ground and upper blade reaches no more than 40 feet high.
- CBP will use the minimum wind turbine blade rpm and will consider reducing the blade rpm during spring and fall bird migration, and nights. If the minimum turbine blade rpm cannot be used, CBP will mitigate effects.
- CBP will paint the ends of the wind turbine blades to minimize motion smear.
- Where feasible, CBP will place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds and bats. CBP will use recommendations of the Avian Power Line Interaction Committee (1994, 1996) for any required above-ground lines, transformers, or conductors. CBP will use raptor protective devices on above ground wires.
- When upgrading or retrofitting turbines, CBP will follow the above guidelines as closely as possible. If studies indicate high mortality at specific turbines, CBP will relocate or retrofit turbines.
- CBP will control noxious weeds using approved herbicides.
- If rodent populations on the perimeter of the facility are to be controlled, CBP will not use rodenticides.
- CBP will develop a Fire Management Plan as part of tower construction and in coordination with the landowner and/or land management agency.
- CBP will develop and fund implementation of a long-term monitoring plan to document and assess tower related mortality of lesser long-nosed bats. This

monitoring plan, to be approved by USFWS, will be completed within six months of the biological opinion date. It will include systematic lesser long-nosed bat searches and use of radar, Global Positioning System (GPS), infrared, thermal imagery, and/or acoustical monitoring equipment to assess and verify bat movements and to gain information on the impacts of various tower sizes, configurations, and lighting systems. Information gained from implementation of this monitoring plan will be used to develop tower retrofits to reduce lesser long-nosed bat mortality, if collisions are documented.

- Once CBP has determined that towers are no longer needed, CBP will remove them within 12 months of cessation of use. CBP will restore footprint of towers and associated facilities to natural habitat.

5.2 PROJECT PLANNING/DESIGN – GENERAL

For each project, CBP will either assume presence of a Federally-listed species based on suitable habitat or known presence, and implement appropriate measures or will, as part of project design and planning, perform pre-construction surveys according to established standardized protocols.

CBP will develop (in coordination with USFWS) a training plan regarding Trust Resources for construction personnel. At a minimum, the program will include the following topics: occurrence of the listed and sensitive species in the area, their general ecology, sensitivity of the species to human activities, legal protection afforded these species, penalties for violations of Federal and state laws, reporting requirements, and project features designed to reduce the impacts to these species and promote continued successful occupation of the project area environs.

Included in this program will be color photos of the listed species, which will be shown to the employees. CBP will provide maps of Federally listed species habitats. Following the education program, the photos will be posted in the contractor and resident engineer office, where they will remain through the duration of the project. The selected construction manager will be responsible for ensuring that employees are aware of the listed species.

CBP will use disturbed areas or areas that will be used later in the construction period for staging, parking, and equipment storage.

CBP will give particular importance to proper design and locating roads such that the potential for road bed erosion into Federally listed species' habitat will be avoided or minimized.

CBP will give particular importance to proper design and locating roads such that the potential for entrapment of surface flows within the roadbed due to grading will be avoided or minimized. Depth of any pits created will be minimized so animals do not become trapped.

CBP will give particular importance to proper design and locating roads such that the widening of existing or created roadbeds beyond the design parameters due to improper maintenance and use will be avoided or minimized.

CBP will give particular importance to proper design and locating roads such that excessive use of unimproved roads that results in their deterioration such that it affects the surrounding Federally listed species habitat areas will be monitored, corrective maintenance provided, and documented in the Project Report.

CBP will give particular importance to proper design and locating roads such that the fewest roads needed for proposed actions will be constructed to proper standards. In concurrence with the landowners and/or land management agency, once CBP determines that access roads constructed as part of this proposed action are no longer needed for the purpose of this project, CBP will close and restore access roads to natural surface and topography using appropriate techniques. The GPS coordinates of roads that are thus closed will be recorded and integrated into the CBP Geographic Information System (GIS) database. A record of acreage or miles of roads taken out of use, restored, and revegetated will be maintained.

CBP will implement a strategy, to offset its agencies' use of groundwater for construction and maintenance of towers, on a gallon-for-gallon basis, within the Sierra Vista sub-watershed. This strategy will include, but is not limited to participation in or coordination with, the Upper San Pedro Partnership and/or its member agencies.

CBP will develop and implement a stormwater management plan (SWMP or stormwater pollution prevention plan [SWPPP]). Erosion control measures and appropriate Best Management Practices (BMP), as required and promulgated through the SWMP and engineering designs, will be implemented before, during, and after soil disturbing activities. Areas with highly erodible soils will be given special consideration when preparing the SWMP to ensure incorporation of various erosion control techniques such as straw bales, silt fencing, aggregate materials, wetting compounds, and rehabilitation, where possible, to decrease erosion.

CBP will prepare a site restoration plan, to be approved by USFWS. This site restoration plan will be developed within four months of the date of this project's biological opinion and will provide an achievement goal to be met by the restoration activity. If seeding with native plants is identified as appropriate, seeding will take place at the proper season, and with seeds from nearby stocks if available. It is understood that some sites cannot be restored, and the project planning documents will acknowledge this.

Rehabilitation conducted by CBP will include re-vegetating or the distribution of organic and geological materials (*i.e.*, boulders and rocks) over the disturbed area to reduce erosion while allowing the area to naturally vegetate. Native seeds or plants, which are compatible with the enhancement of protected species, will be used to revegetate staging areas and other temporarily disturbed areas. Native seed mix will be reviewed by a qualified botanist as part of project planning. In addition, organic material will be collected and stockpiled during construction to be used for erosion control after construction while the areas naturally re-vegetate. Materials used for on-site erosion control will be free of non-native plant seeds and other plant parts to limit potential for infestation. Because natural materials cannot be certified as completely weed-free, CBP will follow up with the use of such materials by monitoring the rehabilitated site.

CBP will document any establishment of non-native plants and will implement appropriate control measures.

For placement of in-ground monitoring or sensor arrays, CBP will limit ground disturbance to existing disturbed areas, and use of hand tools will be used. CBP will avoid cacti and agave during the placement of in-ground monitoring. No cacti or agaves will be removed. Vehicles carrying UGS will stay on authorized roads. UGS will be hand carried to deployment location.

CBP will ensure that all construction will follow DHS Environmental Planning Management Directive 5100 for waste management.

A CBP-approved spill protection plan (or SPCCP) will be developed and implemented at construction and maintenance sites to ensure that any toxic substances are properly handled and that escape into the environment is prevented. Agency standard protocols will be used. Drip pans underneath equipment, containment zones used when refueling vehicles or equipment, and other measures are to be included.

CBP will incorporate BMPs relating to project area delineation, water sources, waste management, and site restoration into project planning and implementation for road construction and maintenance.

CBP security lighting at facilities will be designed to minimize light pollution beyond the designated security zone while achieving light levels needed for operational purposes. Because directed lighting for security zones can extend ambient light levels well over 900 feet away from the source, the effects of lighting extend beyond the immediate area. Security lights will not shine onto habitat areas at a level greater than 1.5 foot-candles. All lights will be shielded from the top to prevent uplighting.

5.3 GENERAL CONSTRUCTION ACTIVITIES

CBP will clearly demarcate the perimeter of all areas to be disturbed during construction or maintenance activities using flagging or temporary construction fence, and no disturbance outside that perimeter will be authorized.

CBP will construct and maintain the fewest roads needed, using proper standards.

The width of all roads that are created or maintained by CBP will be measured and recorded using GPS coordinates and integrated into the CBP GIS database. Maintenance actions will not increase the width of the 12-foot road bed or the amount of disturbed area beyond the 12-foot road bed.

CBP will obtain materials such as gravel or topsoil from existing developed or previously used sources, not from undisturbed areas adjacent to the project area.

Within the designated disturbance area, CBP will minimize the area to be disturbed by limiting deliveries of materials and equipment to only those needed for effective project implementation.

CBP will use water for construction from wells at the discretion of the landowner (depending on water rights). If local groundwater pumping is an adverse effect to aquatic, marsh, or riparian dwelling Federally listed species, treated water from outside the immediate area will be utilized.

CBP will not use surface water from aquatic or marsh habitats for construction purposes if that site supports aquatic Federally listed species or if it contains non-native invasive species or disease vectors and there is any opportunity to contaminate a Federally listed species habitat through use of the water at the project site.

CBP will not use surface water from untreated sources, including water used for irrigation purposes, for construction or maintenance 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 close to such habitats. This is to prevent the transfer of invasive animals or disease pathogens between habitats if water on the construction site was to reach the Federally listed species habitats.

CBP water tankers that convey untreated surface water will not discard unused water within two miles of any aquatic or marsh habitat.

CBP storage tanks containing untreated water will be of a size that if a rainfall event were to occur, the tank (assuming open), will not be overtopped and cause a release of water into the adjacent drainages. Water storage on the project area will be in on-ground containers located on upland areas not in washes.

CBP pumps, hoses, tanks and other water storage devices will be cleaned and disinfected with a 10 percent bleach solution at an appropriate facility and before use at another site (this water is not to enter any surface water area). If a new water source is used that is not from a treated or groundwater source, the equipment will require additional cleaning. This is important to kill any residual disease organisms or early life stages of invasive species that may affect local populations of Federally listed species.

CBP will contain nonhazardous waste materials and other discarded materials, such as construction waste until removed from the construction and maintenance sites. This will assist in keeping the project area and surroundings free of litter and reduce the amount of disturbed area needed for waste storage.

To eliminate attracting predators of protected animals, CBP will dispose of all food related trash items such as wrappers, cans, bottles, and food scraps in closed containers and remove them daily from the project site.

Waste water is water used for project purposes that is contaminated with construction materials or from cleaning equipment and thus carries oils or other toxic materials or other contaminants as defined in state regulations. CBP will store waste water in closed containers on site until removed for disposal. Concrete wash water will not be dumped on the ground, but is to be collected and moved offsite for disposal. This wash water is toxic to aquatic life.

CBP will minimize the number of vehicles traveling to and from the project site and the number of trips per day to reduce the likelihood of disturbing animals in the area or injuring an animal on the road.

CBP construction speed limits will not exceed 35 miles per hour (mph) on major unpaved roads (graded with ditches on both sides) and 25 mph on all other unpaved roads. Night time travel speeds will not exceed 25 mph, and may be less based on visibility and other safety considerations. Construction at night will be minimized.

If CBP construction or maintenance activities continue at night, all lights will be shielded to direct light only onto the work site and the area necessary to ensure the safety of the workers, the minimum foot-candles needed will be used, and the number of lights will be minimized. Any light extending beyond the construction or maintenance area will be no greater than 1.5 foot candles.

CBP will minimize noise levels for day or night construction and maintenance. All 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.

5.4 SOILS

Vehicular traffic associated with the tower and access road construction activities and operational support activities will remain on established roads to the maximum extent practicable. Areas with highly erodible soils will be given special consideration when designing the proposed project towers and access roads to ensure incorporation of various erosion control techniques such as, straw bales, silt fencing, aggregate materials, wetting compounds, and rehabilitation, where possible, to decrease erosion. Site rehabilitation will include re-vegetating or the distribution of organic and geological materials (*i.e.*, boulders and rocks) over the disturbed area to reduce erosion while allowing the area to naturally vegetate. Additionally, erosion control measures and appropriate BMPs, as required and promulgated through the SWPPP and engineering designs, will be implemented before, during, and after construction activities.

Road repair or improvements shall avoid, to the greatest extent practicable, creating wind rows with the soils once grading activities are completed. Excess soils from construction activities will be used on-site to raise and shape proposed tower sites and road surfaces.

5.5 VEGETATION

Native seeds or plants, which are compatible with the enhancement of protected species, will be used to the extent practicable, as required under Section 7(a)(1) of the ESA to revegetate staging areas and other temporarily disturbed areas.

CBP will use materials free of non-native plant seeds and other plant parts to limit potential for infestation for on-site erosion control in uninfested native habitats. Since natural materials cannot be certified as completely weed-free, if such materials are used, there will be follow-up monitoring to document establishment of non-native plants and appropriate control measures will be implemented for a period of time to be determined in the site restoration plan.

CBP fill material brought in from outside the project area will be identified as to source location and will be weed-free.

CBP will remove invasive plants that appear on the tower sites, along sections of repaired and new road. Removal will be done in ways that eliminate the entire plant and remove all plant parts to a disposal area. Herbicides can be used according to label directions if they are not toxic to Federally listed species that may be in the area. Training to identify non-native invasive plants will be provided for CBP personnel or contractors as necessary.

Construction equipment will be cleaned at the temporary staging areas, in accordance with BMPs, prior to entering and departing the project corridor to minimize the spread and establishment of non-native invasive plant species.

CBP will avoid removal of riparian vegetation within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.

5.6 WILDLIFE RESOURCES

The Migratory Bird Treaty Act (16 U.S.C. 703-712, [1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986 and 1989]) requires that Federal agencies coordinate with the USFWS if a construction activity would result in the take of a migratory bird. If construction or clearing activities are scheduled during nesting seasons (February 15 through August 31); surveys will be performed to identify active nests. If construction activities will result in the take of a migratory bird; then coordination with the USFWS, FAA, and AGFD will be required and applicable permits would be obtained prior to construction or clearing activities. Another mitigation measure that would be considered is to schedule all construction activities outside nesting seasons negating the requirement for nesting bird surveys. The proposed sensor and communication towers would also comply with USFWS guidelines for reducing fatal bird strikes on communication towers (USFWS 2000) to the greatest extent practicable. Guidelines recommend co-locating new antennae arrays on existing towers whenever possible and to build towers as short as possible, without guy wires or lighting, and use white strobe lights whenever lights are necessary for aviation safety.

Helicopter deployment would occur at one tower and may potentially occur at two other proposed tower sites. To reduce any possible impacts to wildlife, helicopter use should be limited to daylight hours and hovering should be avoided, to the greatest extent possible.

CBP will avoid or minimize the potential for entrapment of surface flows within the roadbed due to grading. CBP will minimize the depth of any pits created so animals do not become trapped.

5.7 PROTECTED SPECIES

Several BMPs have been identified to decrease any potential impacts to Federal and state protected species. Additional conservation measures and BMP are being developed as part of Section 7 consultation and CBP would adhere to those measures identified in the Biological Opinion:

- CBP will provide a designated biological monitor on site during the work activities for all construction and maintenance projects in Federally listed species habitats. The biological monitor will be in charge of implementing and documenting construction-related BMPs as designed for the project to reduce the potential for adverse effects to the species or their habitats. CBP will use the reports from the biological monitor will be used for development of the post construction report. The designated biological monitor will notify the construction manager of any activities that may harm or harass an individual of a Federally listed species. Upon such notification, the construction manager will temporarily suspend all subject activities and notify the Contracting Officer, the Administrative Contracting Officer, and the Contracting Officer's Representative of the suspense so that the key personnel may be notified, apprised of the situation, and the potential conflict resolved.
- Where, based on species location maps and/or results of surveys, individuals of a Federally listed species could be present on or near the project site, CBP will have a designated, qualified biological monitor (a person having experience with the species involved and if the task requires handling or species surveys, appropriate Federal and state permits) to be present during the activity to protect individuals of the species from harm. Duties of the biological monitor will include ensuring that activities stay within designated project areas, evaluating the response of individuals that come near the project site, and implementing the appropriate BMP. For some species, there may only be a seasonal need for the

biological monitor to be present. This category includes at least the following species for those roads and towers near occupied habitat: Mexican spotted owl, Chiricahua leopard frog and lesser long-nosed bat.

- Where a project could be located within one mile of occupied species habitats but the individuals of the species are not likely to move into the project area, a biological monitor is not needed during construction. However, the construction manager will be aware of the species location and ensure that BMPs designed to minimize habitat impacts are implemented and maintained as planned. This category includes the following species: all aquatic species.
- If an individual of a Federally listed species is found in the designated project area and is in danger of being harmed (*e.g.* in path of vehicles or foot traffic), work will cease in the area of the species until either a qualified biological monitor can safely remove the individual, or it moves away on its own.
- Individual animals found in the project area in danger of being harmed will be relocated by a CBP biologist to a nearby safe location in accordance with accepted species handling protocols in Federal and state permits. This includes Chiricahua leopard frogs and Sonoran tiger salamanders.
- Construction equipment will be cleaned prior to entering and departing the project area to minimize the spread and establishment of non-native invasive plant species.
- Soil disturbances in temporary impact areas will be re-vegetated with native vegetation from nursery stock or seed.
- Within the designated disturbance area, CBP will limit grading or topsoil removal to areas where this activity is needed to provide the ground conditions for construction or maintenance activities. Minimizing disturbance to soils will enhance the ability to restore the disturbed area after the project is complete. In Pima pineapple cactus habitat, removal of topsoil is a permanent impact.
- Within the designated disturbance area, CBP will limit removal of trees and brush in Federally listed species habitats to the smallest amount needed to meet the objectives of the project. This type of clearing will likely be a permanent impact on habitat.
- CBP will confine vehicular traffic associated with construction activities to established roads (with the exception of new roads being constructed).
- CBP's road maintenance shall avoid making wind rows with the soils once grading activities are completed, and any excess soils will be used on-site to raise and shape the tower site and/or road surface.
- New roads created or improved by CBP will be located such that the potential for road bed erosion into Federally listed species habitat will be avoided or minimized.

- CBP will monitor, provide corrective maintenance, and document excessive use of unimproved roads that results in their deterioration such that it affects the surrounding Federally listed species habitat in the CBP Project Report.
- Facilities, including new roads, will maintain a distance of 0.5 mile from cienegas containing water umbel habitat.
- CBP actions with the potential to impact topminnow habitat will include coordination with involved land management agencies, landowners, and the AGFD and USFWS.
- CBP activities will maintain a distance of at least 0.5 mile away from known Gila topminnow and Sonora chub habitat.
- CBP activities including land clearing and tower implementation, will maintain a distance of 1,650 feet away from aquatic salamander habitat including stock tanks.
- New access roads to proposed tower sites will avoid routes which cross occupied threatened and endangered aquatic habitats.
- CBP will use established roads within the BANWR when executing activities which have the potential to impact areas occupied by masked bobwhite quail, or areas deemed to be high quality habitat.
- CBP activities occurring in suitable jaguar habitat will use existing roads to avoid further fragmentation of habitat, avoid constructing physical barriers that are impenetrable by jaguars in potential movement corridors.
- All contractors, work crews (including National Guard and military personnel), and CBP personnel in the field performing construction and maintenance activities will receive training. Training would provide information on the habitat and behavior of the specific sensitive species found in the area, including information on how to avoid impacts to these species resulting from construction and operational activities. It will be the responsibility of the construction project manager(s) to ensure that their personnel are familiar with general BMPs, the specific conservation measures presented here, and other limitations and constraints. In addition, training in identification of non-native invasive plants and animals should be provided for contracted personnel engaged in follow-up monitoring of construction sites.
- Road improvements would not widen any driving surface;
    - ➢ The removal of roadside vegetation would be limited to only those portions of plants necessary to allow the passage of vehicles, material, and equipment;
    - ➢ All access routes into and out of the disturbance area should be flagged, and no travel outside of those boundaries should be authorized;
    - ➢ Road repair or improvements shall avoid, to the extent practicable, making wind rows with the soils once grading activities are completed,

and any excess soils will be used on-site to raise and shape the tower site and/or road surface;

- ➢ To the extent practicable, areas already disturbed by past activities or those that will be used later in the construction period should be used for staging, parking, and equipment storage;
- ➢ The perimeter of all areas to be disturbed during construction should be clearly demarcated using flagging, and no disturbance outside that perimeter should be authorized;
- ➢ The area to be disturbed should be minimized by limiting deliveries of materials and equipment to only those needed for effective project implementation;
- ➢ Within the designated disturbance area, grading or topsoil removal should be limited to areas where this activity is needed to provide the ground conditions necessary for construction or maintenance activities;
- ➢ Any vegetation removal outside the actual tower site should be minimized, and vegetation should be removed using hand tools or controlled by mowing; and

- The number of construction vehicles traveling to and from the project site and the number of trips per day will be minimized to reduce the likelihood of disturbing animals in the area or injuring an animal on the road. Construction speed limits should not exceed 35 mph on major unpaved roads (graded with ditches on both sides) and 25 mph on all other unpaved roads. Night-time travel speeds should not exceed 25 mph, or less based on visibility and other safety considerations.
- Transmission of disease vectors and invasive non-native aquatic species can occur if vehicles cross infected or infested streams or other waters and water or mud remains on the vehicle. If these vehicles subsequently cross or enter uninfected or noninfested waters, the disease or invasive species may be introduced to the new area. Between the Baboquivari Mountains and I-19, where the frog fungal skin disease, chytridomycosis (or Bd), is known to occur in Chiricahua leopard frog populations, CBP will take necessary precautions to minimize the likelihood of spreading Bd. In this area, CBP and its contractors will avoid contact with wetted areas. However, if vehicles or other equipment use will occur in wetted areas west of I-19 (including ponds, impoundments, or ephemeral or permanent streams) that equipment will be a) cleaned of mud and debris and then sprayed with a 10 percent bleach, 70 percent ethanol, or one percent quaternary ammonium solution, or b) allowed to dry completely, before moving to another wetted area. Treatments as just described will not be required for travel along Ruby Road or paved routes through the action area, as these routes are heavily traveled by the public and cleaning/sterilization of project vehicles will do little to prevent movement of disease via vehicular travel.

Species Specific Conservation Measures and BMPs

Chiricahua Leopard Frog - Project Planning

- CBP will design roads to minimize animal collisions and fragmentation of Federally listed populations. Exclusion fencing may be appropriate where road kill is likely or to direct species to underpasses or other passageways. Coordination with landowners and/or land management agencies will be necessary.
- CBP will investigate alternate routes to the TCA-TUS-040 tower site that do not pass by Upper Turner Tank or other occupied frog localities in the area. If such routes exist and are reasonable and appropriate to use, then the current proposed route that skirts Upper Turner Tank will not be used. If no alternate route is feasible or reasonable, then CBP will, prior to commencement of construction activities, erect a temporary frog barrier fence on the road shoulder between the access road and Upper Turner Tank, and extending 300 feet above and below the tank. The barrier will be temporary, and will be removed after all construction on TCA-TUS-040 and its associated access routes is completed. Although road mortality is anticipated after removal of the fence due to maintenance access and public use of the road, removal of the barrier is necessary to maintain connectivity between the Upper Turner Tank and Turner Tank populations.
- If new routes, or maintenance or improvement of existing routes will facilitate public movement towards, or access to, suitable breeding sites and such facilitation cannot be avoided, CBP will close them to the public and will post signs at nearby suitable breeding sites with pertinent regulations that protect the frog. Route closures and signs will be negotiated with landowners and/or land management agencies. CBP will monitor the effects to the frog's terrestrial and aquatic habitat. CBP will post and maintain a sign for the life of the proposed action at Upper Turner Tank that informs the public that fishing and stocking of non-native species at Upper Turner Tank is prohibited. CBP will coordinate with USFWS on the text and design of the sign.
- CBP will design all new roads to minimize the risk of erosion or adverse effects to aquatic habitats of the frog. Routes that cross seasonally or perennially flowing streams will be avoided. If not avoidable, crossings will be designed to minimize effects to streams through use of culverts or other design features that protect natural substrates and flows. New routes or improvement of routes leading to or near stock tanks and cienegas that provide suitable breeding habitat for frogs will be avoided, or they will be closed for administrative use only.

Chiricahua Leopard Frog - Construction/Maintenance

- Individual animals found in the project area and in danger of being harmed (*e.g.*, in the path of vehicles or foot traffic) will be relocated by a biologist to a nearby safe location in accordance with USFWS Endangered Species Permit requirements.

- No handling, storage, or disposal of hazardous and regulated materials will occur within 0.3 mile of habitats potentially occupied by Chiricahua leopard frog.
- CBP will monitor Upper Turner and Summit Tanks for sedimentation and erosion from road use and repair during construction (TCA-TUS-40, TCA-NGL-045). Tank and road repair will be conducted in coordination with USFWS and landowner and/or land management agencies, if sedimentation or related effects are detected. CBP will use standardized methods for monitoring sedimentation.
- The on-site biological monitor will periodically check for mortality at and near Upper Turner Tank during construction activities. Results will be reported to USFWS in a written report no later than 90 days after completion of construction at tower TCA-TUS-040.

Chiricahua Leopard Frog - Post Construction

- CBP will complete a fencing, monitoring, and mitigation plan within six months of the date of this project's biological opinion for review and approval by landowners and/or land management agencies and USFWS. This plan will include methods and a schedule for fencing, bullfrog control, monitoring; the process for repair of fence, tank, and roads; and content and schedule for annual reports. The results of annual monitoring will be reported to USFWS annually in a written report due March 1. CBP will develop an Memorandum of Understanding (MOU) with the landowners and/or land management agencies to implement mitigation. CBP will complete the plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's biological opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies. Mitigation will be completed within five years of completion of tower construction. CBP will complete an annual report that summarize the implementation of all of the proposed actions, any incidental take that occurred, monitoring results, an analysis of the effectiveness of the Conservation BMPs, and work plan for the following year.
- CBP will monitor Upper Turner and Summit tanks for sedimentation and erosion for three years following construction.
- CBP will monitor Upper Turner Tank for dead and dying frogs that may be killed by Bd or other amphibian diseases for three years following construction and once a year in February.
- CBP will remove the fence barrier after all construction on TCA-TUS-040 is completed to maintain connectivity between the Upper Turner Tank and Turner Tank populations.
- CBP will control non-native species, especially bullfrogs, at five aquatic sites west of I-19 for three years following construction to help offset the anticipated increase in access to occupied habitat in coordination with USFWS and landowners and/or land management agencies. The primary threat to Chiricahua leopard frogs in this area is predation by introduced American bullfrogs, which have well-established populations at Peña Blanca Lake, Ruby Lake, Arivaca

Lake, and several other permanent waters. CBP will focus mitigation efforts from Peña Blanca Lake west to Sycamore Canyon, where non-native control will benefit Chiricahua leopard frog populations. Where consistent with livestock operations, CBP will selectively fence ponds vulnerable to bullfrog invasion to exclude bullfrogs while allowing leopard frogs to leave the ponds. Where needed, a portion of each pond will be fenced to exclude livestock and allow for development of frog habitat. Monitor fenced habitat and take corrective actions if fences are breached and bullfrogs reinvade. CBP will coordinate a meeting with USFWS, landowners, and/or land management agencies within two months of the date of this project's biological opinion to determine where fencing and bullfrog control are needed.

- CBP will install pipe-rail wildlife-friendly fence and cattle guards to reduce public vehicle and cattle trespass in southwestern and northeastern corners of BANWR where frog habitat is likely to be impacted, as per refuge recommendations. CBP will monitor fence and repair fence if needed in cooperation with BANWR. CBP will complete a fencing plan within four months of the date of this project's biological opinion in cooperation with BANWR that includes design plans, installation schedule, monitoring plan, and a repair schedule.

Sonora Tiger Salamander - Project Planning

- CBP will design all new roads to minimize the risk of erosion or adverse effects to aquatic habitats of the salamander. Routes that cross seasonally or perennially flowing streams will be avoided. If not avoidable, crossings will be designed to minimize effects to streams through use of culverts or other design features that protect natural substrates and flows. New routes or improvement of routes leading to or near stock tanks that provide suitable breeding habitat for salamanders will be avoided, or they will be closed for administrative use only.

Sonora Tiger Salamander - During Construction/Maintenance

- Individual animals found in the project area and in danger of being harmed (*e.g.*, in the path of vehicles or foot traffic) will be relocated by a biologist to a nearby safe location in accordance with USFWS Endangered Species Permit requirements.
- No construction or maintenance activities will occur within 0.1 mile of Sonora tiger salamander occupied habitat.
- Any use or storage of chemicals or fuels at construction sites or staging areas will be kept well away from suitable salamander sites. No storage of such chemicals or fuels will occur within 0.3 mile of salamander sites.
- No pumping of water from suitable breeding sites will occur for road maintenance, dust control, mixing concrete or other purposes. No transfer of water or mud among aquatic sites will occur.

Sonora Tiger Salamander – Post Construction

- Site restoration is not anticipated, but if impacts to salamander habitat occur, CBP will work with the landowner and/or land management agency to plan and implement restoration.
- CBP will implement other conservation measures for pesticides in and near salamander habitats (White 2004).

Mexican Spotted Owl - Project Planning/Documentation

- Roads, fences, security zones, surveillance sites, staging areas including tower sites, and other facilities that will require land clearing and will have associated noise and artificial light components will be at least 0.25 mile from any known PAC or CBP will mitigate (See *Post Construction* below). Firebreaks, fuels reduction, or other improved access for fire suppression will be incorporated, as appropriate in the placement of facilities. Facilities will not be located between nests and important forage areas such that movement between the two is compromised, or CBP will mitigate impacts.
- CBP will avoid new roads in the vicinity of PACs and other important habitat areas to reduce effects of human activity near PACs or CBP will mitigate impacts (See *Post Construction* below). Existing roads used by CBP to access new or existing facilities may need to be closed to other access to protect important owl habitat.

Mexican Spotted Owl - During Construction/Maintenance

- CBP will monitor:

  a) construction activities for towers, new roads, and road improvements, between March 1 and August 31, which are closer than 0.25 mile to an owl PAC. Construction activities will be monitored by a qualified biologist provided by CBP.

  b) Mexican spotted owl PACs where towers and increased human use may potentially affect owls and other areas where tower sites are within or less than 0.25 mile from a PAC.

- CBP will develop an MOU with the landowners and/or land management agencies to conduct spotted owl monitoring. USFWS will provide these PAC locations to CBP. Monitoring will be conducted by an experienced and Federally permitted spotted owl surveyor. All Mexican spotted owl disturbances will be documented in the CBP project reports. Corrective actions will be developed and implemented in coordination with USFWS and landowner and/or land management agencies, if effects are detected. The following tower sites or associated new access are inside of a PAC:
  - TCA-SON-062 (Joes Canyon PAC, Coronado National Memorial)
  - TCA-TUS-192 (Ski Valley PAC, Santa Catalina Mountains)

    - TCA-NGL-211 (Cottonwood Canyon PAC, Santa Rita Mountains)

- CBP may conduct maintenance activities for facilities at any time; however, for major work on roads or fences where significant amount of equipment will be required, the September to February period is preferred.

Mexican Spotted Owl – Post Construction

- CBP will complete a Mexican spotted owl monitoring and mitigation plan within six months of the date of this project's biological opinion for review and approval by landowners and/or land management agencies and USFWS. This monitoring and mitigation plan will include, methods to determine effects, potential corrective actions to be taken (*e.g.*, road closures, fencing, gating, site restoration), schedules for monitoring and mitigation, and schedule and content of annual reports. PACs subject to monitoring and mitigation are listed in the bullets above. This plan will be completed in coordination with the landowner and/or land management agencies. CBP will develop an MOU with the landowners and/or land management agencies to implement mitigation. CBP will complete the monitoring and mitigation plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's BO (September 4, 2008). Implementation of this plan will begin once approved by USFWS and the land management agencies and mitigation will be completed within three years from the date construction is completed and towers are fully operational. CBP will complete an annual report for a minimum of three years that summarizes the implementation of all of the proposed actions, monitoring results, mitigation progress, an analysis of the effectiveness of the Conservation BMPs, and work plan for the following year.
- CBP will monitor affected Mexican spotted owl PACs annually for three years (field seasons) from the date construction is completed and towers are fully operational. CBP will develop an MOU with the landowners and/or land management agencies to conduct spotted owl monitoring USFWS will provide these PAC locations to CBP. Corrective actions should be developed and implemented in coordination with USFWS and landowner and/or land management agencies, if effects are detected. Corrective actions may include road closures, fencing, gating, and/or site restoration. Monitoring will be conducted by an experienced and Federally permitted spotted owl surveyor.
- CBP will provide sufficient funds to close unauthorized roads and restore habitat near affected Mexican spotted owl PACs in conjunction with USFS travel management planning. For every road repaired or created within 0.25 mile of a Mexican spotted owl PAC, CBP will close and/or restore the same length of road. CBP will update maps showing where improved or new roads were completed. CBP will complete a road closure/restoration plan. Mitigation will be completed within three years of the completion of construction.

Masked Bobwhite - Construction/Maintenance

- CBP may perform maintenance activities for facilities at any time; however, for major work on roads or fences where significant amount of equipment will be required in masked bobwhite habitat (BANWR), the November through July period is preferred.

Sonora Chub - Project Planning/Documentation

- Pre-construction surveys are not required for the Sonora chub. The species has been reliably and repeatedly detected within the Sycamore Canyon and California Gulch watersheds and its presence need not be confirmed.
- The minimum amount of vegetation will be cleared, and measures to control erosion off the construction site put into place. Roads, fences, and other facilities that will require land clearing, will be designed to avoid areas within 0.5 mile of Sycamore Canyon and California Gulch.

Jaguar - Project Planning/Documentation

- CBP will design roads to minimize animal collisions and fragmentation of jaguar habitat.

Jaguar - Post Construction

- CBP will complete a road closure/restoration plan for review and approval by landowners and/or land management agencies and USFWS that:
  a) identifies and maps new roads where barriers will be placed to prevent public access,
  b) identifies and maps unauthorized roads near potential jaguar movement corridors,
  c) specifies that USFWS will use jaguar monitoring results to assist CBP in determining which unauthorized roads to close,
  d) specifies potential road closure methods,
  e) specifies potential restoration methods for closed roads,
  f) includes a schedule for closure, and
  g) includes a schedule and content of annual reporting.
- CBP will complete the road closure/restoration plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's biological opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies and will be completed within six years of completion of the Tucson West tower project. CBP will complete an annual report until all Conservation BMPs for jaguars are completed. This report will summarize the implementation of the proposed

actions, number of miles closed and/or restored, restoration methods, effectiveness of road closures and restoration, camera monitoring results, and work plan for the following year.

- CBP will provide $312,000 to monitor the effects of the proposed tower project on the jaguar. CBP will transfer this funding to the AGFD within six months of the completion of this project's BO, if it is determined that AGFD is the appropriate recipient for this purpose; otherwise the funding will be transferred to the USFWS. Funding will be used to monitor jaguar presence and movement along the border, and in additional mountain ranges and corridors within the action area. Funding will be used for camera traps, vehicles, supplies, and personnel. The results of this monitoring will be used to determine which unauthorized roads to close and to guide future project design.
- CBP will prevent public access of <u>new roads</u> through gating, physical barriers, fencing, *etc.*, in combination with appropriate signage and in coordination with the landowner and/or land management agencies. CBP will work with the land management agencies to determine the best method to prevent public access on new roads needing barriers. Blocking access will be achieved in a way that does not increase the probability that unauthorized roads will be created nearby.
- CBP will close and/or restore <u>unauthorized roads</u> (if approved by landowner) in or near jaguar movement corridors to help offset the increase in improved or new roads at a ratio of 2:1 (two miles of road closed and/or restored for every one mile of road created or repaired). This will require post construction quantification of (a) the number of miles of roads repaired and created, and (b) the area of new and repaired cut and fill. CBP will work with the land management agencies and USFWS to identify unauthorized roads for closure and determine the method most likely to prevent future access. Some road closures will require discing and seeding (using native species), in addition to placement of barriers. Closures will be achieved in a way that does not increase the probability that unauthorized roads will be created nearby.

Ocelot - Project Planning/Documentation

- See jaguar above under *Project Planning.* Although no monitoring or mitigation will be conducted for ocelots, camera traps for jaguars may also document ocelots.

Lesser long-nosed Bat - Project Planning/Documentation

- CBP roads, fences, security zones, surveillance sites, staging areas including tower sites, and other facilities that will require land clearing and have associated noise and high intensity artificial light components, will be located at least one mile from any known roost site or will be mitigated (see Post Construction below). The location of the facility will not be located between roosts and known foraging sites such that access between the two is compromised.

- CBP will avoid areas containing columnar cacti (saguaro, organ pipe) or agaves that provide the forage base for the bat or will mitigate effects (see *Post – Construction* below).
- During construction or maintenance activities in or within one mile of bat maternity roosts or known summer roosts (or such distance that noise, light, or other effects reach the habitat), a construction monitor with authority to halt construction at any time the appropriate Conservation BMPs are not being properly implemented as agreed to will be present on site.

Lesser long-nosed Bat - During Construction/Maintenance

- Construction activities for towers, new roads, and road improvements that are within one mile of a bat roost and occur between May 1 and September 30 will be monitored by a qualified biologist. In some years, bats may arrive earlier and leave later in the year than the May to September time frame. For maternity roosts this will be March through August. For summer roosts, this will be July through October. Any occurrences and/or disturbances of lesser long-nosed bats will be documented and mitigated (see *Post – Construction* below).
- CBP may perform maintenance activities for facilities at any time; however, for major work on roads or fences where significant amount of equipment will be required, the October to April period is the minimum period for avoidance.
- CBP will salvage and transplant agaves if they are less than 18 inches in diameter and columnar cacti less than six feet tall. Agaves that have flower stalks will not be salvaged/transplanted. A minimum of 12 to 18 inches of agave and cacti roots will be salvaged. Prior to removal, CBP will mark the orientation on each cactus to be transplanted. CBP will transplant columnar cacti in the same orientation they were removed to increase probability of survival. CBP will relocate plants at least 75 feet from the construction limits. CBP will not plant agaves or columnar cacti in active wash channels. CBP will follow guidelines identified in the Salvage Plan for CNM, dated May 22, 2008 (Coronado National Memorial 2008) and guidelines for salvage and transplanting columnar cacti available at http://cals.arizona.edu/pubs/garden/az1376.pdf (University of Arizona 2008) and http://dbg.org/index.php/gardening/growingguides/ground/transplantingcactus (Desert Botanical Gardens 2008). Plants will be watered according to site conditions.
- CBP will count agaves and columnar cacti removed for construction and will replace agaves and columnar cacti at a 2:1 ratio (for every plant removed, two will be replaced).

Lesser long-nosed Bat - Post Construction

- CBP will prepare a lesser long-nosed bat monitoring and mitigation plan for review and approval by landowners and/or land management agencies and

USFWS that includes bat telemetry study plan, bat roosts to be surveyed, roosts to be monitored for effects, survey and monitoring schedule, roosts to be protected, method of roost protection, schedule for roost protection completion, tower site monitoring methods, potential corrective actions at tower or roost sites if effects are detected, number of agave and cacti salvaged and transplanted or to be mitigated, and annual report content and schedule. CBP will complete the plan, in coordination with landowners and/or management agencies and USFWS, within six months of the date of this project's BO. Implementation of this plan will begin once approved by USFWS and the land management agencies and will be completed for a minimum of five years from the date all towers within the project area are fully operational or until negative effects from the proposed action are no longer detected. This annual report will summarize the implementation of all of the proposed actions; roost; and tower monitoring results; bat survey results; telemetry study results; salvage, transplant, and restoration results; corrective actions needed or taken (*e.g.* gating, signing, fencing); any incidental take that occurred; an analysis of the effectiveness of the Conservation BMPs; and work plan for the following year.

- CBP will conduct annual bat surveys at bat roosts within one mile of tower sites for two years from the date towers are fully operational. CBP will compare results with previous years' surveys. If negative effects of the proposed action are documented, CBP will take corrective action (*e.g.* gating, signing, fencing) and will continue to survey annually until negative effects are no longer detected. Tower TCA-SON-062 is less than a mile from a primary roost (State of Texas Mine) occupied by tens of thousands of bats. The CNM has collected years of pre-tower bat surveys using a standardized protocol. This same protocol will be used for future bat surveys at State of Texas Mine. Surveys will be conducted throughout the season by a lesser long-nosed bat expert.
- CBP will monitor roosts within one mile of tower sites for direct or indirect effects of the action for two years from the date towers are fully operational. CBP will install Hobo data loggers in lesser long-nosed bat roosts most prone to human use to detect changes in temperature, humidity, *etc.* CBP will take corrective actions in coordination with USFWS and/or the landowners/land management agencies if such effects are detected. This may include road closures, gating, signing, fencing, *etc.*
- CBP will conduct a telemetry study to locate bat roosts and foraging areas used by those bats found in the vicinity of towers. This study will be conducted for five years. If occupied mines or caves are found within a mile of towers, they will be monitored with Hobo data loggers. CBP will telemeter 15 bats per year in early August and will track bats through mid October. CBP will telemeter up to five bats at a time; transmitters have a two to three week lifespan. CBP will hire five field biologists to conduct the study. The Patagonia Mountains is covered with hundreds of abandoned mines that may be used by lesser long-nosed bats. Tracking bats telemetered near towers in the Patagonia Mountains will determine where these bats are foraging and roosting. If negative effects are found in

foraging or roosting areas as a result of this proposed action, CBP will take corrective action. This may include road closures, gating, signing, fencing, *etc.*

- CBP will conduct monitoring to document and assess tower related mortality of lesser long-nosed bats beginning once tower construction is completed and continuing for five years after the towers are fully operational. Monitoring will include systematic lesser long-nosed bat searches and use of radar, GPS, infrared, thermal imagery, and/or acoustical monitoring equipment to assess and verify bat movements and to gain information on the impacts of various tower sizes, configurations, and lighting systems. If lesser long-nosed bat mortality is documented at tower or wind turbine sites, CBP will: a) immediately notify USFWS in writing. b) work with USFWS to develop site-specific measures to reduce that mortality, and c) continue monitoring beyond the five years until mortality is no longer occurring. Information gained from monitoring will be used to develop tower retrofits to reduce lesser long-nosed bat mortality, if collisions are documented. CBP will incorporate the bat mortality monitoring associated with the proposed action into an annual report for a minimum of five years.
- Where improved or new roads may increase human use of bat roosts occupied or potentially occupied by lesser long-nosed bats, CBP will prevent access through gating, fencing, other physical barriers, *etc.* This includes the State of Texas mine roost. Patagonia Mountains abandoned mines, and other lesser long-nosed bat roosts. Close coordination with USFWS and landowners and/or land management agencies will be necessary, as the design and season of installation is critical to ensure bat gates benefit lesser long-nosed bats.
- CBP will water transplanted agave and columnar cacti if needed and according to site conditions to ensure survival. CBP will monitor annually for survival for five years and will replace dead or dying plants.
- CBP will replace agaves and columnar cacti removed for construction at a 2:1 ratio. CBP will work with landowners and/or land management agencies to determine location for replacement plants. CBP will water plants according to site conditions to ensure survival. CBP will monitor annually for survival for five years and will replace dead or dying plants.

Huachuca Water Umbel - Project Planning/Documentation

- Relocation of individuals of Federally listed plants found in the project area is generally not a suitable activity. Relocation of aquatic species such as the water umbel is not appropriate. For particular actions, the USFWS will determine if relocation of plants will be undertaken.
- Because loss of habitat is a significant risk to the water umbel, CBP will not place roads, fences, structures, or other on-ground facilities within 0.5 mile of occupied or potentially suitable habitat.
- Pre-construction surveys are not required as long as projects are located at least 0.5 mile from occupied habitat areas such that watershed effects will not reach the umbel habitat.

- CBP road construction and maintenance will not improve or create new available access to umbel habitats.

Pima Pineapple Cactus - Project Planning/Documentation

- CBP will conduct surveys according to protocol (Roller 1996) by a qualified Pima pineapple cactus expert along new and improved road segments and tower sites where Harris Environmental did not survey. CBP will avoid impacts to Pima pineapple cactus to the extent practicable.
- Salvage of Pima pineapple cactus has shown very limited success with transplanted individuals experiencing high first-year mortality. CBP will compensate for the loss of habitat through mitigation banking on private land in the Altar Valley.
- CBP road construction and maintenance will not improve or create new available access to cactus habitats.
- CBP will maximize use of existing roads and trails in areas of suitable habitat for the cactus.

Pima Pineapple Cactus - During Construction/Maintenance in Cactus Habitat

- CBP will map and quantify the amount of cactus habitat destroyed or compromised. Removal of topsoil is considered a permanent impact.
- CBP maintenance activities in cactus habitat will not increase the existing disturbed areas.

Pima Pineapple Cactus - Post Construction

- CBP will prepare a Pima pineapple cactus monitoring and mitigation plan for review and approval by landowners and/or land management agencies and USFWS that includes a map of Pima pineapple cactus habitat to be monitored, a map of Pima pineapple cactus habitat destroyed or compromised, number of acres of Pima pineapple cactus habitat destroyed or compromised, pre-construction cactus survey results, method and schedule to monitor the amount of ongoing disturbance from public use and CBP activities, potential corrective actions such as road closures and fencing, amount of habitat to be mitigated, schedule for mitigation banking completion, and content and schedule of annual reports. CBP will complete the plan, in coordination with landowners and/or land management agencies and USFWS, within six months of the date of this project's biological opinion. Implementation of this plan will begin once approved by USFWS and the land management agencies and will be completed within three years from the date all towers within the project area are fully operational. CBP will complete an annual report for a minimum of three years that summarize the implementation of all of the proposed actions, monitoring results, mitigation banking, corrective actions taken, an analysis of the effectiveness of the Conservation BMPs, and work plan for the following year.

- CBP will fund monitoring in suitable cactus habitat within 50 feet of tower sites, repaired roads, and new roads annually for three years. CBP will take corrective action, in coordination with the landowners and/or land management agencies, if Pima pineapple cactus habitat is degraded as a result of the proposed action and increased public use. This includes control of non-native invasive species such as buffelgrass (*Pennisetum ciliare*) and Lehmann lovegrass (*Eragrostis lehmanniana*).
- CBP will compensate for habitat degradation or loss on a 1:1 basis in a conservation bank on private land in Altar Valley within one year of construction of towers.

5.8 CULTURAL RESOURCES

The results of the survey and recommendations are noted in Section 3.10 of this report. A site testing plan for those sites that have unknown eligibility status has been developed through consultation with CBP, the land manager and Arizona State Historical Preservation Officer (SHPO) to ascertain eligibility status for National Register of Historic Places (NRHP). In addition, avoidance assurance measures will be utilized; these have been developed jointly in consultation with CBP, the land manager and Arizona SHPO. Through current design plans and avoidance measures, sites will not be adversely affected by the project. Archaeological monitoring for NRHP-eligible sites adjacent to the access roads and compound areas will be conducted during construction. Archaeologists will delineate all NRHP eligible sites to ensure no adverse effects would occur to those significant resources through the development of an Memorandum of Agreement (MOA) for data recovery, if necessary. Archaeologists will delineate all NRHP-eligible sites to assure no adverse impacts would occur to those significant resources. Archaeologists will also provide in-field awareness training to construction personnel to ensure avoidance. All construction will be restricted to previously surveyed areas. If any cultural material is discovered during construction, Arizona SHPO, and the land manager, as appropriate, will be notified immediately and all activities halted in that area until a qualified archeologist assesses the cultural remains. Additionally, SBInet will complete the Section 106 process prior to the start of any construction activities.

5.9 WATER RESOURCES

Standard construction procedures will be implemented to minimize potential for erosion and sedimentation during construction. All work shall cease during heavy rains and would not resume until conditions are suitable for the movement of equipment and material. All fuels, waste oils, and solvents will be collected and stored in tanks or drums within secondary containment areas consisting of an impervious floor and bermed sidewalls capable of holding the volume of the largest container stored therein. The refueling of machinery will be completed following accepted guidelines, and all vehicles will have drip pans during storage to contain minor spills and drips. No refueling or storage will take place within 100 feet of drainages.

A Construction Stormwater General Permit will be obtained prior to construction, and this would require approval of a site-specific SWPPP and Notice of Intent (NOI). A site-specific SPCCP will also be in place prior to the start of construction. Other environmental design measures will be implemented such as straw bales, silt fencing, aggregate materials, wetting compounds, and re-vegetation with native plant species, where possible, to decrease erosion and sedimentation.

Prior to the start of construction activities, the construction contractor will review the most up-to-date version of the ADEQ 305(b) and 303(d) report. Additionally, road repair or improvement activities in wash or drainage crossings shall not impede the flow of affected water courses.

5.10 AIR QUALITY

Mitigation measures will be incorporated to ensure that fugitive dust emission levels do not rise above the minimum threshold as required per 40 CFR 51.853(b)(1). Measures will include dust suppression methods such as road watering to minimize airborne particulate matter created during construction activities. Standard construction BMPs such as routine watering of the construction site as well as access roads to the site will be used to control fugitive dust and thereby assist in limiting potential PM-10 excursions during the construction phase of the proposed project. Additionally, all construction equipment and vehicles will be required to be maintained in good operating condition to minimize exhaust emissions.

5.11 NOISE

During the construction phase, short-term noise impacts are anticipated. All applicable Occupational Safety and Health Administration regulations and requirements will be followed. On-site activities would be restricted to daylight hours to the greatest extent practicable although night-time construction could occur if CBP schedules are constrained. Construction equipment will possess properly working mufflers and would be kept properly tuned to reduce backfires. Implementation of these measures will reduce the expected short-term noise impacts to an insignificant level in and around tower construction sites.

5.12 UTILITIES

Lighting

To reduce the illumination of the night sky and ambient lighting, CBP will follow USFWS (2000) *Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers* to reduce potential adverse effects of night-time lighting to migratory bird and nocturnal flying species, and astronomical observatories. Any infrared lighting installed on the proposed towers would be compatible with night vision goggle usage. The tower site lighting proposed for CBP security purposes would: utilize low sodium bulbs, be shielded to avoid illumination outside the footprint of the tower site, and when possible, be activated by motion detectors. Additionally, Pima County lighting ordinances will be utilized to the greatest extent possible.

Currently, it is not anticipated that night-time construction would occur; however if night-time construction becomes necessary its use would be minimized and the lights would be shielded and follow light ordinances.

5.13 HAZARDOUS MATERIALS

BMPs will be implemented as standard operating procedures during all construction activities, and will include proper handling, storage, and/or disposal of hazardous and/or regulated materials. To minimize potential impacts from hazardous and regulated materials, all fuels, waste oils and solvents will be collected and stored in tanks or 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. The refueling of machinery will be completed in accordance with accepted industry and regulatory guidelines, and all vehicles will have drip pans during storage to contain minor spills and drips. Although it is unlikely that a major spill would occur, any spill of reportable quantities will be contained immediately within an earthen dike, and the application of an absorbent (*e.g.*, granular, pillow, sock, *etc.*) will be used to absorb and contain the spill. To ensure, oil pollution prevention, a SPCCP will be in place prior to the start of construction activities and all personnel will be briefed on the implementation and responsibilities of this plan as is typical in CBP/SBI projects. All spills will be reported to the designated USBP point of contact for the project. Furthermore, a spill of any petroleum liquids (*e.g.*, fuel) or material listed in 40 CFR 302 Table 302.4 of a reportable quantity must be cleaned up and reported to the appropriate Federal and state agencies.

All waste oil and solvents will be recycled. All non-recyclable hazardous and regulated wastes will be collected, characterized, labeled, stored, transported, and disposed of in accordance with all applicable Federal, state, and local regulations, including proper waste manifesting procedures.

Solid waste receptacles will be maintained at construction staging areas. Non-hazardous solid waste (trash and waste construction materials) will be collected and deposited in on-site receptacles. Solid waste will be collected and disposed of by a local waste disposal contractor.

Disposal of used batteries or other small quantities of hazardous waste will be handled, managed, maintained, stored, and disposed of in accordance with applicable Federal and state rules and regulations for the management, storage, and disposal of hazardous materials, hazardous waste and universal waste. Additionally, to the extent practicable, all batteries will be recycled, locally.

Where handling of hazardous and regulated materials does occur, CBP will collect and store all fuels, waste oils and solvents in clearly labeled tanks or 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.

5.14 POST CONSTRUCTION – GENERAL

For construction and maintenance projects that involve land-disturbing activities (*e.g.*, fences, towers, stations, facilities), CBP will provide a report to the USFWS within three months of project completion detailing the BMPs that were implemented, how well the BMPs worked, ways that BMPs could be improved for either protection of species and habitats or implementation efficiency, and any Federally listed species observed at or near the project site. Implementation of the restoration plan and any follow-up monitoring will be included. CBP will provide a form-based report generated from documentation requirements of the Act for each specific project to ensure compliance. This report will be part of the project management plan.

During follow-up monitoring, CBP will remove non-native invasive plants found on the site. Removal will be done in ways that eliminate the entire plant and remove all plant parts to a disposal area. All chemical applications on refuges must be in coordination with refuge manager to ensure accurate reporting. Herbicides can be used according to label directions. The monitoring period will be defined in the site restoration plan. Training to identify non-native invasive plants will be provided for CBP contractor personnel or contractors, as necessary. Lehman lovegrass and buffelgrass are particularly important to control for promoting cactus, including Pima pineapple cactus, and agave re-establishment.

CBP will conduct follow-up monitoring for those projects that use natural materials. The purpose is to document establishment of non-native plants, appropriate control measures implemented, and results of implementation.

CBP will close roads no longer needed after construction and will restore them to natural surface and topography using appropriate techniques. The GPS coordinates of roads that are thus closed will be recorded and integrated into the USBP GIS database. A record of acreage or miles of roads taken out of use, restored, and revegetated will be maintained and included in Project Reports.

Where improved or new roads may increase use of sensitive areas, CBP will prevent access through gating, physical barriers, *etc.* in coordination with landowners and/or management agencies.

CBP will close and/or restore unauthorized roads at a ratio of 1:1 (one mile of road closed and/or restored for every one mile of road created or repaired) to help offset the anticipated increase in public use of a) repaired or new roads and b) nearby habitat as a result of the proposed action. Roads closures must benefit listed species, be approved by the landowners, be on unauthorized roads receiving use, and be designed properly to prevent access. CBP, USFWS, and the USFS will evaluate the potential increase in public use of repaired and new roads through the USFS's Travel Management program and BANWR management planning within 6 months of the date of this project's BO. Most Forest Service roads to be repaired are classified as Level 2 roads, which are defined as 4WD roads. CBP will quantify a) the post construction number of miles of new and repaired roads, b) area of new and repaired roads, and c) area of cut and fill. CBP will prepare a road closure/restoration plan in coordination with landowners and/or land management agencies within six months of the date of this project's biological opinion. CBP will assist the USFS in implementing its Travel Management Plan.

a. For every mile of new or repaired road, CBP will close and/or restore the same length of unauthorized road through gating, physical barriers, discing, revegetating, *etc.* the same length of road.

b. For every new or improved cut and fill area, CBP will restore the same amount of square footage converted to length of road.

CBP will prepare monitoring and mitigation plans as described in the species-specific conservation BMPs. CBP and USFWS will evaluate effectiveness of monitoring and mitigation methods annually. If monitoring and mitigation methods or implementation are ineffective in reaching desired goals, CBP and USFWS will work together to alter methods or implementation.

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SECTION 6.0
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6.0 REFERENCES

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SECTION 7.0
ACRONYMS AND ABBREVIATIONS

7.0 ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ADA	Arizona Department of Agriculture
ADES	Arizona Department of Economic Security
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AEFSO	Arizona Ecological Field Services Office
AGFD	Arizona Game and Fish Department
AMA	active management area
ANSI	American National Standards Institute
AOR	area of responsibility
APS	Arizona Public Service Company
ASLD	Arizona State Land Department
ASTM	American Society for Testing and Materials
AZDC	Arizona Department of Commerce
BANWR	Buenos Aires National Wildlife Refuge
BEA	Bureau of Economic Analysis
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
BP	before present
CAA	Clean Air Act
CBP	U.S. Customs and Border Protection
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CNF	Coronado National Forest
CNM	Coronado National Memorial
CO	carbon monoxide
COP	Common Operating Picture
CPNWR	Cabeza Prieta National Wildlife Refuge
CRT	communications relay tower
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DHS	Department of Homeland Security
DOI	Department of Interior
DPS	distinct population segment

EA	Environmental Assessment
EIS	Environmental Impact Statement
EM	electromagnetic
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act of 1980 and 1995
FR	Federal Register
FSR	forest service road
GHz	giga Hertz
GIS	Geographic Information System
GLO	General Land Office
GSRC	Gulf South Research Corporation
Harris	Harris Environmental Group Incorporated
Hz	hertz
HUD	Department of Housing and Urban Development
I-8	Interstate 8
I-10	Interstate 10
I-17	Interstate 17
I-19	Interstate 19
IDIAT	Identification Interim Assistance Team
IC	illegal crosser
IEEE	Institute of Electrical and Electronics Engineers
INA	Immigation and Naturalization Act
INS	Immigration and Naturalization Service
IPAC	Information, Planning, and Consultation
IIRIRA	Illegal Immigration Reform and Immigrant Responsibility Act of 1996
JTF-6	Joint Task Force Six
kW	kilowatt
LLNB	lesser long-nosed bat
LMR	land mobile radio
LOS	line-of-sight
LUST	leaking underground storage tank
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPE	Maximum Permissible Exposure
mph	miles per hour
MRI	Midwest Research Institute
MHz	mega hertz
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOA	Notice of Availability

NCRP	National Council of Radiation Protection and Measurements
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrous oxides
NOI	Notice of Intent
NPL	National Priorities List
NPS	National Park Service
NRHP	National Register of Historic Places
NRCS	Natural Resource Conservation Service
NTIA	National Telecommunications and Information Administration
NWP	Nationwide Permits
O_3	ozone
OET	Office of Engineering and Technology
OPCNM	Organ Pipe Cactus National Monument
PAC	primary activity center
PCPI	per capita personal income
PDEQ	Pima County Department of Environmental Quality
PEIS	Programmatic Environmental Impact Statement
Pb	lead
PM-10	particulate matter measuring less than 10 microns
PM-2.5	particulate matter measuring less than 2.5 microns
P.L.	Public Law
POE	port of entry
POL	petroleum, oil, and lubricants
ppm	parts per million
RB	Ravens Butte
RF	radio frequency
RDT	rapidly deployed tower
ROI	region of influence
ROW	right-of-way
RRVS	radar and remote video system
SBI	Secure Border Initiative
SHPO	State Historic Preservation Office
SMS	Scenery Management System
SO_2	sulfur dioxide
SPCCP	Spill Prevention, Control and Countermeasures Plan
SR	State Road or State Highway
STATSGO	State Soil Geographic Database
SST	self standing tower
SSURGO	Soil Survey Geographic Database
SWMP	stormwater management plan
SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
TI	tactical infrastructure
TPI	total personal income
UAS	unmanned aircraft systems

UGS	unattended ground sensors
U.S.	United States
USACE	U.S. Army Corps of Engineers
USBP	U.S. Border Patrol
U.S.C.	U.S. Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
USIBWC	U.S. Section, International Boundary and Water Commission
UST	underground storage tanks
VOC	volatile organic compound
WASSPT	Wide Area Surveillance Sensor Placement Tool
WSC	wildlife of special concern
WUS	Waters of the U.S.

SECTION 8.0
LIST OF PREPARERS

8.0 LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Assessment.

NAME	AGENCY/ORGANIZATION	DISCIPLINE/EXPERTISE	EXPERIENCE	ROLE IN PREPARING EA
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Chris Ingram	Gulf South Research Corporation	Biology/Ecology	30 years EA/EIS studies	EA review
Howard Nass	Gulf South Research Corporation	Forestry/Wildlife	18 years of natural resources studies and NEPA	Project Coordinator (EA preparation and review)
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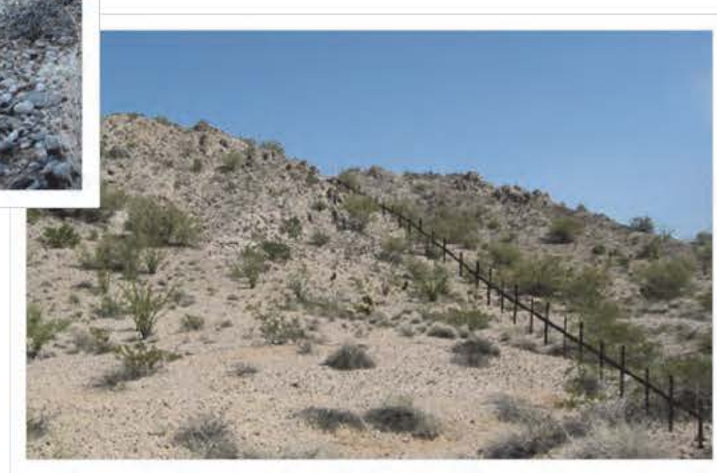
FINAL

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

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

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.

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

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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

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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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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

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1. INTRODUCTION

The Department of Homeland Security (DHS) and U.S. Customs and Border Protection (CBP), propose to maintain and repair certain existing tactical infrastructure along the U.S./Mexico international border in 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.

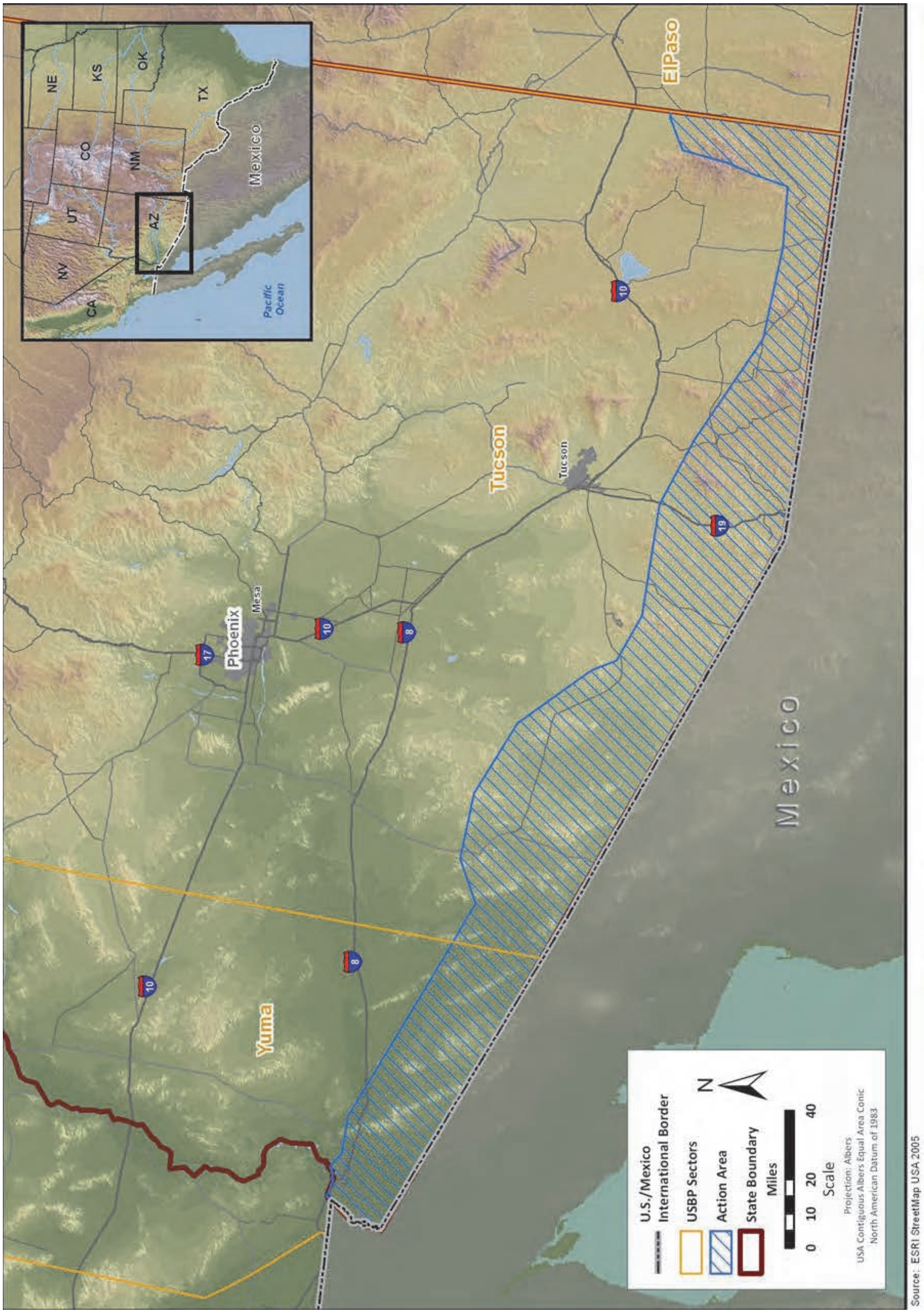


Figure 1-1. Region of Analysis for Proposed Tactical Infrastructure Maintenance and Repair Activities in Arizona

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:
    - o *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	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
CO	Nonattainment/ maintenance	All	100
PM_{10}	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not Applicable	100
$PM_{2.5}$ (measured directly, as SO_2, or as NO_x)	Nonattainment/ maintenance	All	100
SO_2	Nonattainment/ maintenance	All	100
NO_x	Nonattainment/ maintenance	All	100

Source: 40 CFR 93.153

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

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

3.10.3.1 Alternative 1: Proposed Action

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

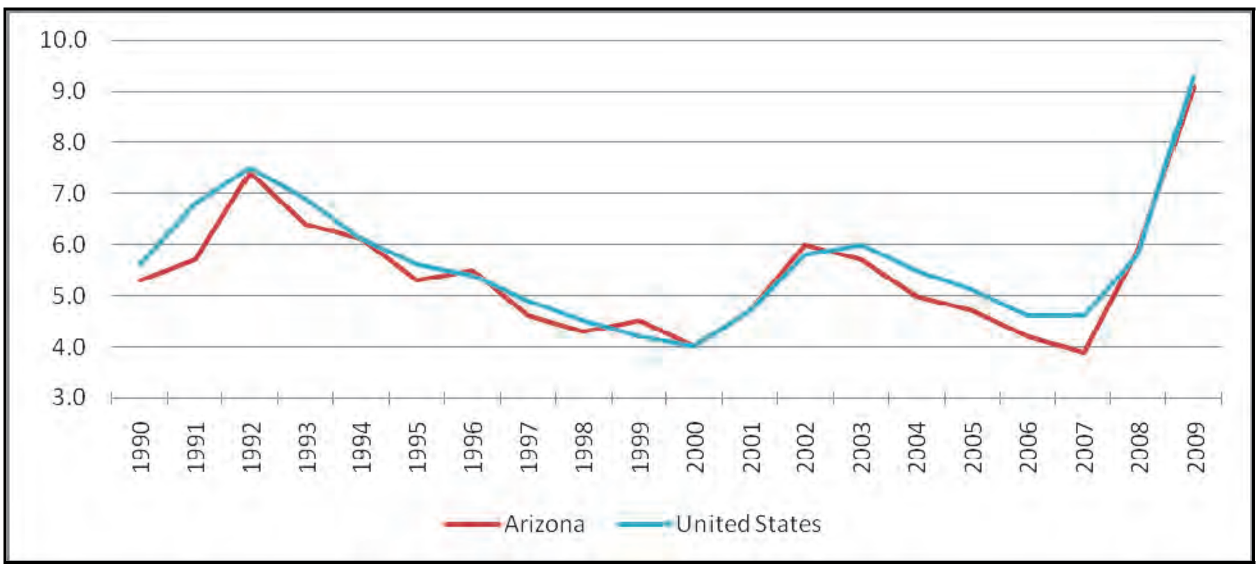
Employment Characteristics. The largest percentage of people employed by industry in Arizona and the United States is in the educational services, and health care and social assistance industry, composing approximately 19 and 22 percent respectively of all employed positions for these regions. The second 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:

Mr. Lee Baiza
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The Honorable Sherry Cordova
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Cocopah Indian Tribe
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Somerton, AZ 85344

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Ak Chin Indian Community
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Tucson, AZ 85746

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Mr. Don Klima
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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

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 fences and gates, roads and bridges/crossovers, drainage structures and grates, observation zones, boat 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 waiver authority granted to 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 in 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://cbp.gov/xp/cgov/border_security/ti/ti_docs/timr/* or can be requested by emailing *AZcomments@TIMR-NEPA.com*. Hard copies of the Draft EA can be reviewed at the following libraries:

- 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

Pursuant to the CEQ's regulations, CBP invites public participation in the NEPA process through its 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 September, 23, 2011. Please provide comments using only one of the following methods:

(a) Attendance and submission of comments at the public information sessions
(b) Electronically through the Web site: *www.TIMR-NEPA.com*
(c) By email to: *AZcomments@TIMR-NEPA.com*
(d) By mail to: Arizona Tactical Infrastructure Maintenance and Repair EA, c/o HDR, 2600 Park Tower Drive, Suite 100, Vienna, Virginia 22180
(e) By Fax to: (240) 554-2511

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.

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.

A6 YUMA SUN FRIDAY 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

Share your comments on any local story at YumaSun.com

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 JAMES GILBERT/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.

ECONOMY

Notice of Availability

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The Draft EA complies with NEPA, the Council on Environmental Quality (CEQ) regulations in 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/ti/ti_docs/tmr/ or can be requested by emailing AZcomments@TIMR-NEPA.com. Hard copies of the Draft EA can be reviewed at the following libraries:

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- Sierra Vista Public Library, 2600 East Tacoma Street, Sierra Vista, Arizona 85635
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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.

Find out what's happening locally, nationally and internationally. Keep up with the latest news at YumaSun.com

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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Pursuant to the CEQ's regulations, CBP invites public participation in the NEPA process through its 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, 30, 2011. Please provide comments using only one of the following methods:

(a) Attendance and submission of comments at the public information sessions
(b) Electronically through the Web site: www.TIMR-NEPA.com
(c) By email to: AZcomments@TIMR-NEPA.com
(d) By mail to: Arizona Tactical Infrastructure Maintenance and Repair EA, c/o HDR, 2600 Park Tower Drive,Suite 100, Vienna, Virginia 22180
(e) By Fax to: (240) 554-2511

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.

Publish September 30, 2011 • Arizona Daily Star

BW1 FOIA CBP 003646

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:

- 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 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.

YUMA SUN, FRIDAY, SEPTEMBER 30, 2011 A5

STATE GLANCE

Wildfire in northern Arizona burns 6,000 acres

Security breach delays flights at Mesa airport

Remains ID'd as Phoenix man missing since 2004

Northern Arizona man arrested in custodial interference

Man accused in ATM skimming case

CHIEF

FUNERAL NOTICES

Lucia Isagawa

Bryn 'Brenda' Wilson

Kenneth R. Rogers

Linda Flores

RUN

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

Obituary

Judy Autrey Dyson

COUNCIL

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

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

ESTATE AUCTION

Friday & Saturday, September 30th & October 1st, 2011 10AM

4330 W. Riverside Drive Yuma, AZ (A Smart Auction site)

Signs: on North Avenue C & Riverside Drive

Viewing: Thursday, September 29th 9AM-5PM

A SMART AUCTION

Larry Smart 928-210-1794

Phil Seward Jr. 928-210-7529

Check out asmartauction.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 máas 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 veces cálidas y a veces complicadas.

El reparto de "Modern Family se compone de: Ed O'Neill como Jay, Julie Bowen como Claire, Ty Burrell como Phil, Sofía Vergara como Gloria, Jesse Tyler Ferguson en el papel de Mitchell, Eric 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/ti/ti_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.

HDR

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,

J Wessels

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,

Jean A Calhoun
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.

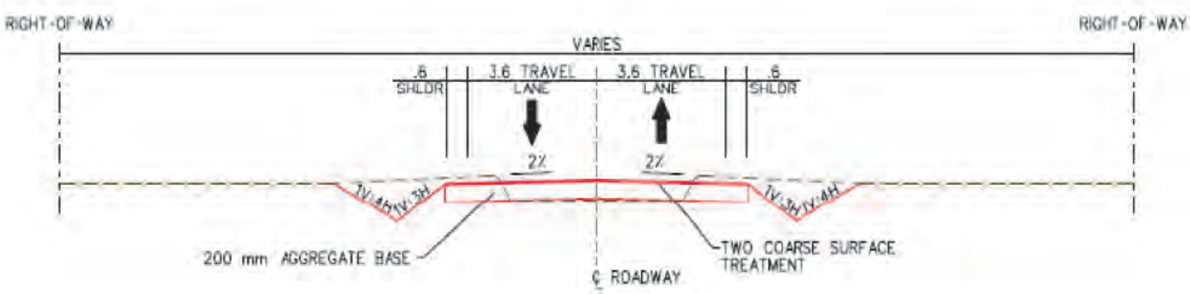

Figure C-2. FC-1 Paved Road (Diagram)

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

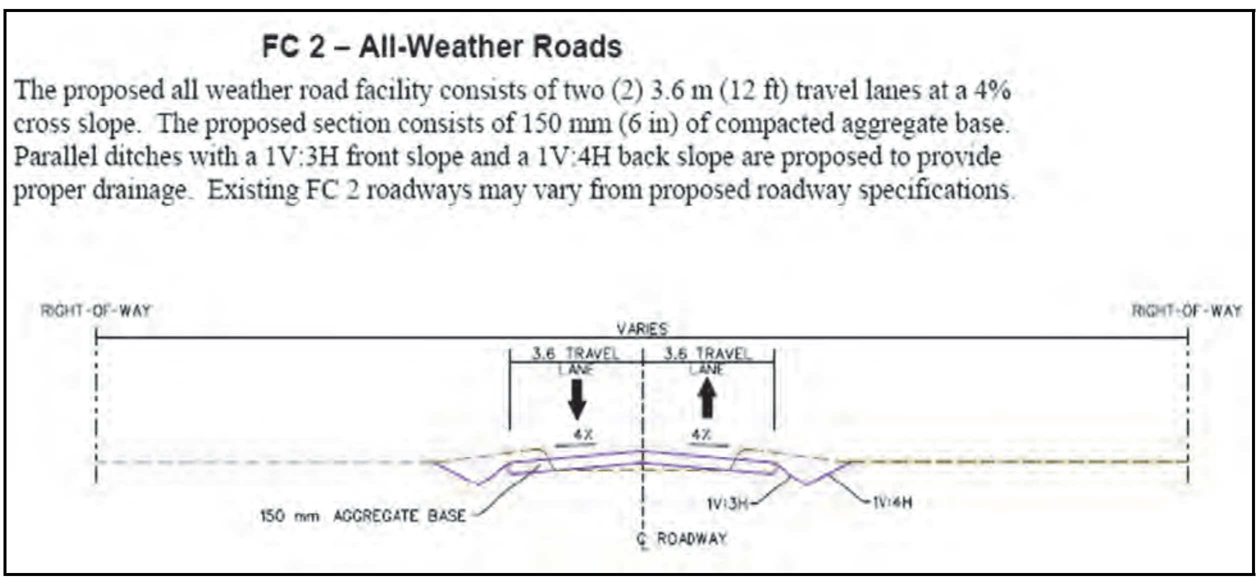

Figure C-4. FC-2 All-Weather Road (Diagram)

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

FC 3 – Graded Earth Roads

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

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

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

FC 4 – Two-Track

The proposed two track road facility consists of one (1) 3.0 m (10 ft) travel lane at a 0% cross slope. The proposed section consists of natural ground. Ditches are not proposed for this facility. Existing FC 4 roadways may vary from proposed roadway specifications.

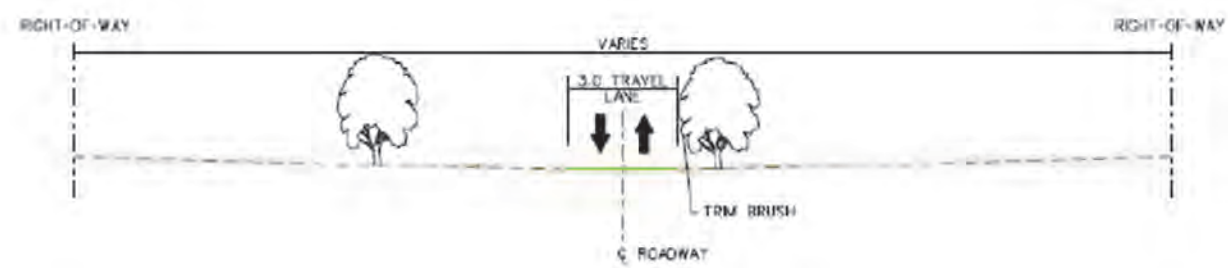

Figure C-8. FC-4 Two-Track Road (Diagram)

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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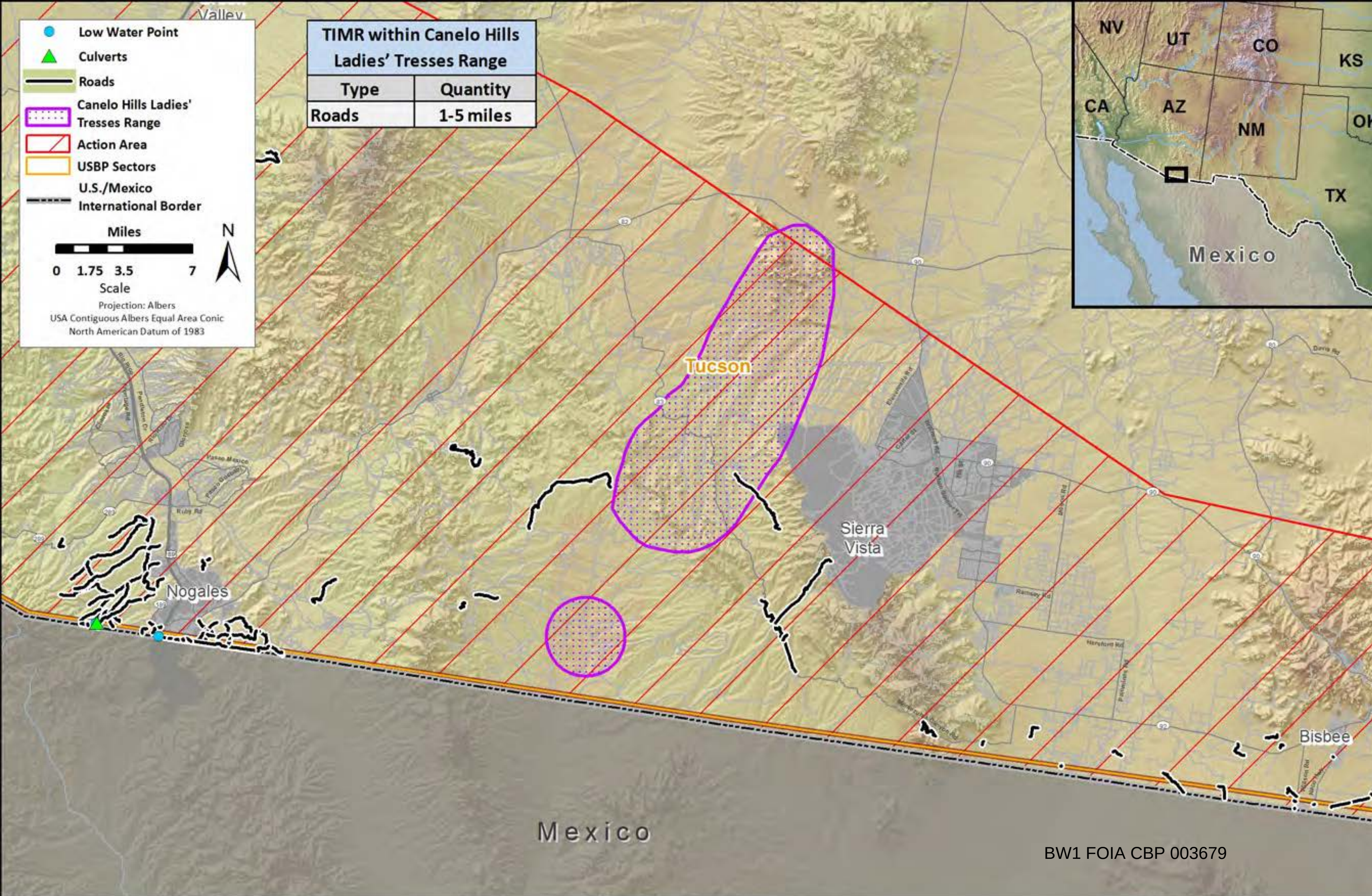
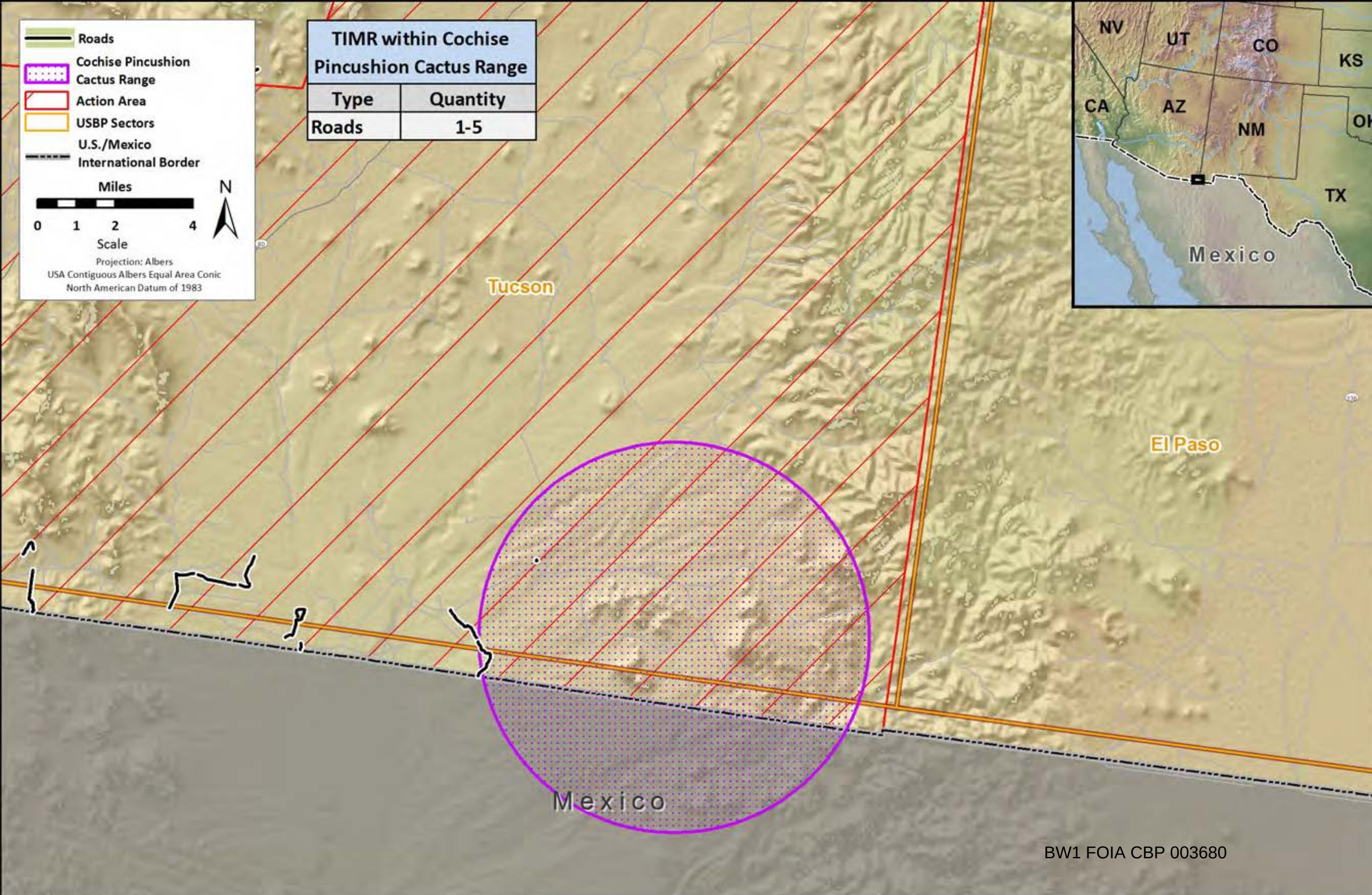


Source: ESRI StreetMap USA 2010



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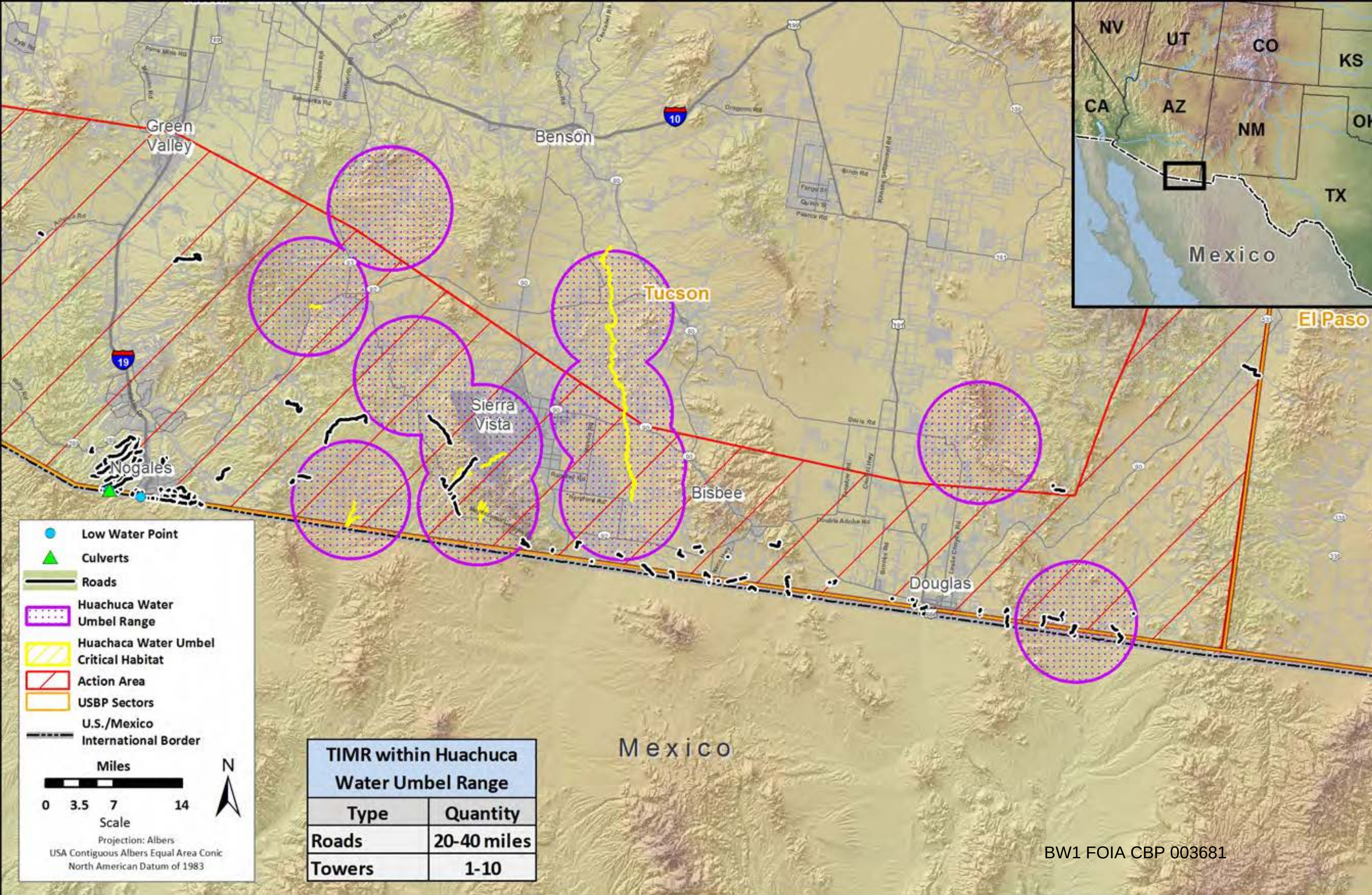
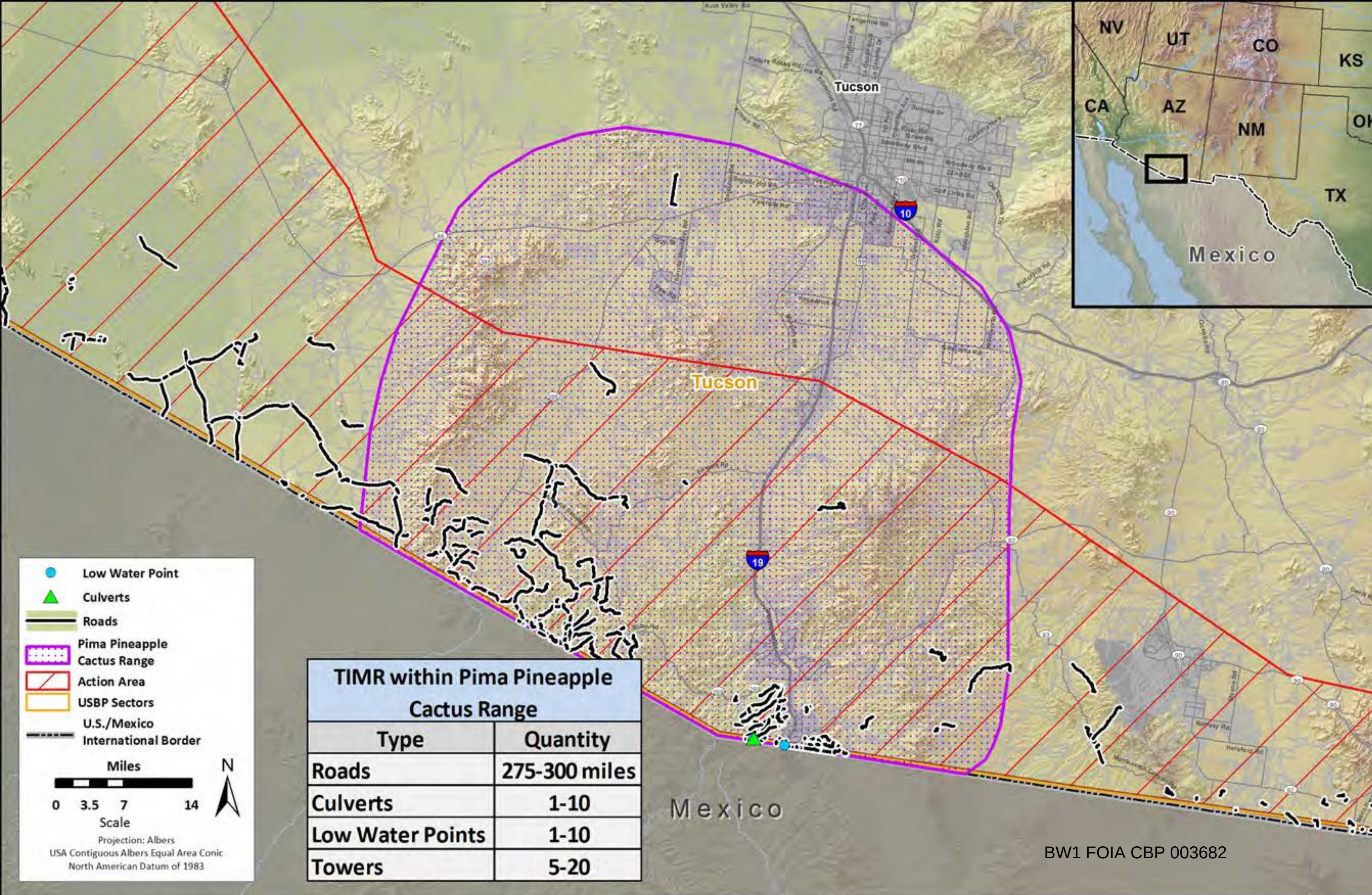
Source: ESRI StreetMap USA 2010



TIMR within Huachuca Water Umbel Range

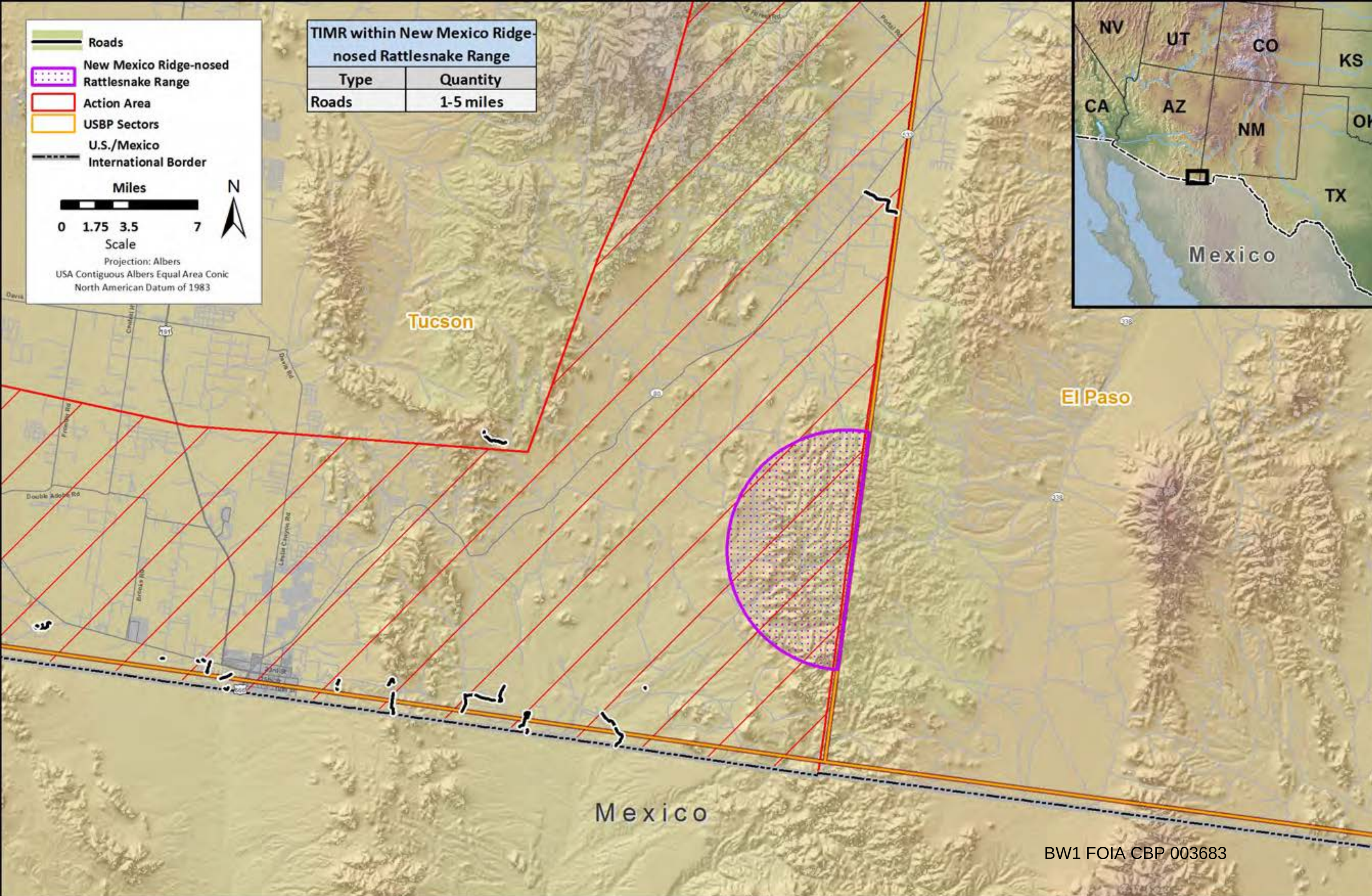
Type	Quantity
Roads	20-40 miles
Towers	1-10

Source: ESRI StreetMap USA 2010

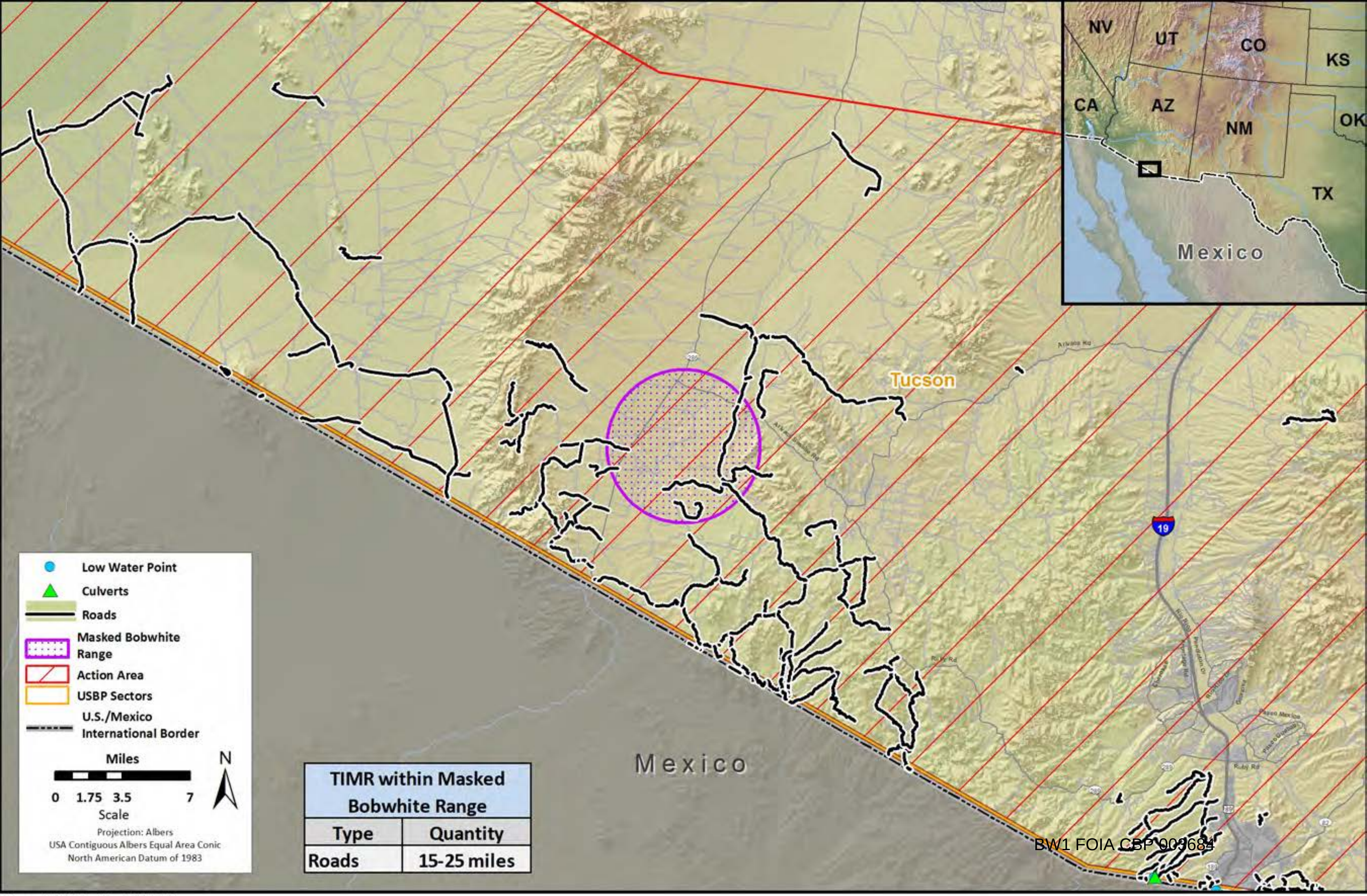


TIMR within Pima Pineapple Cactus Range	
Type	**Quantity**
Roads	275-300 miles
Culverts	1-10
Low Water Points	1-10
Towers	5-20

Source: ESRI StreetMap USA 2010

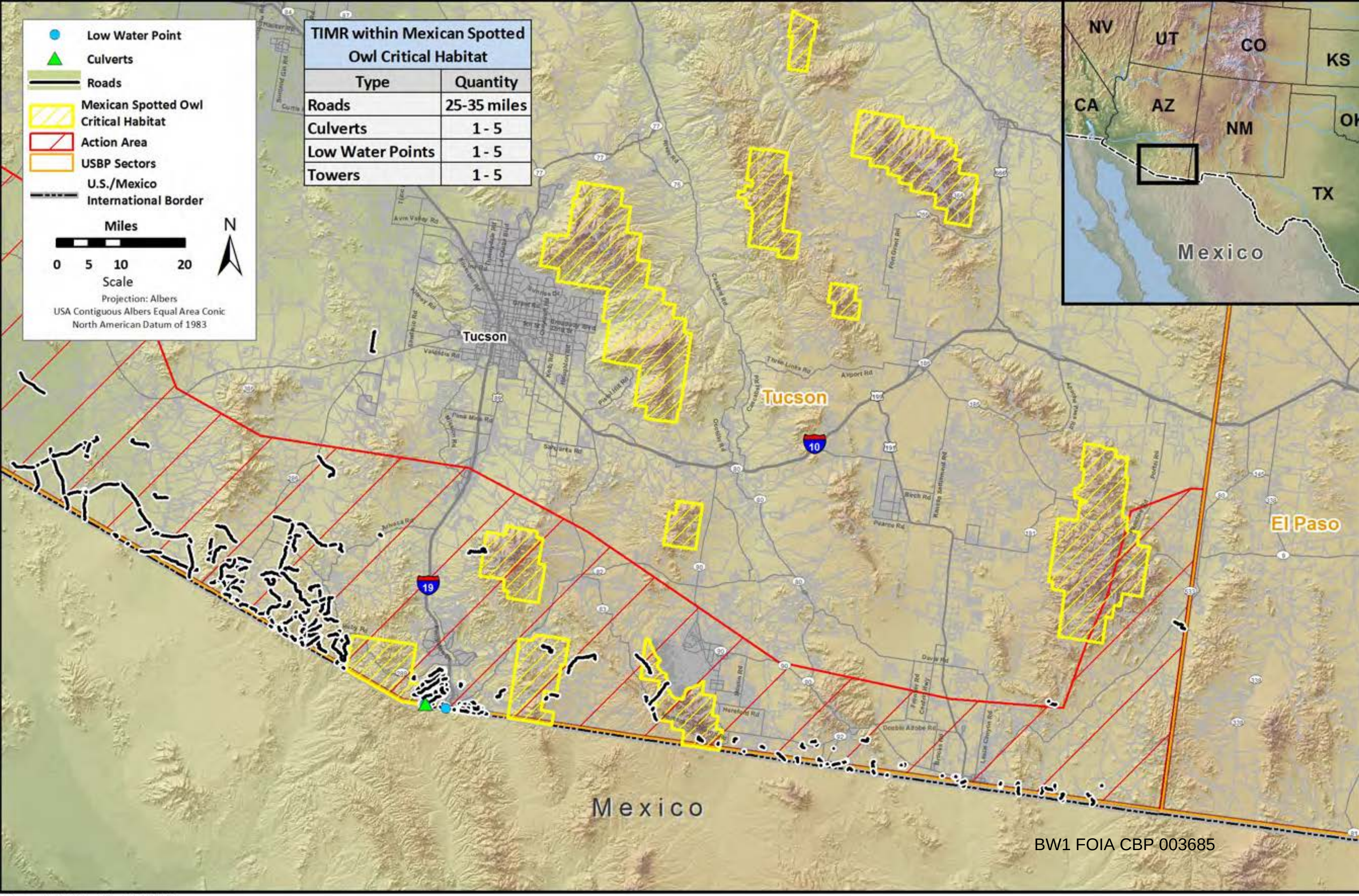


Source: ESRI StreetMap USA 2010



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

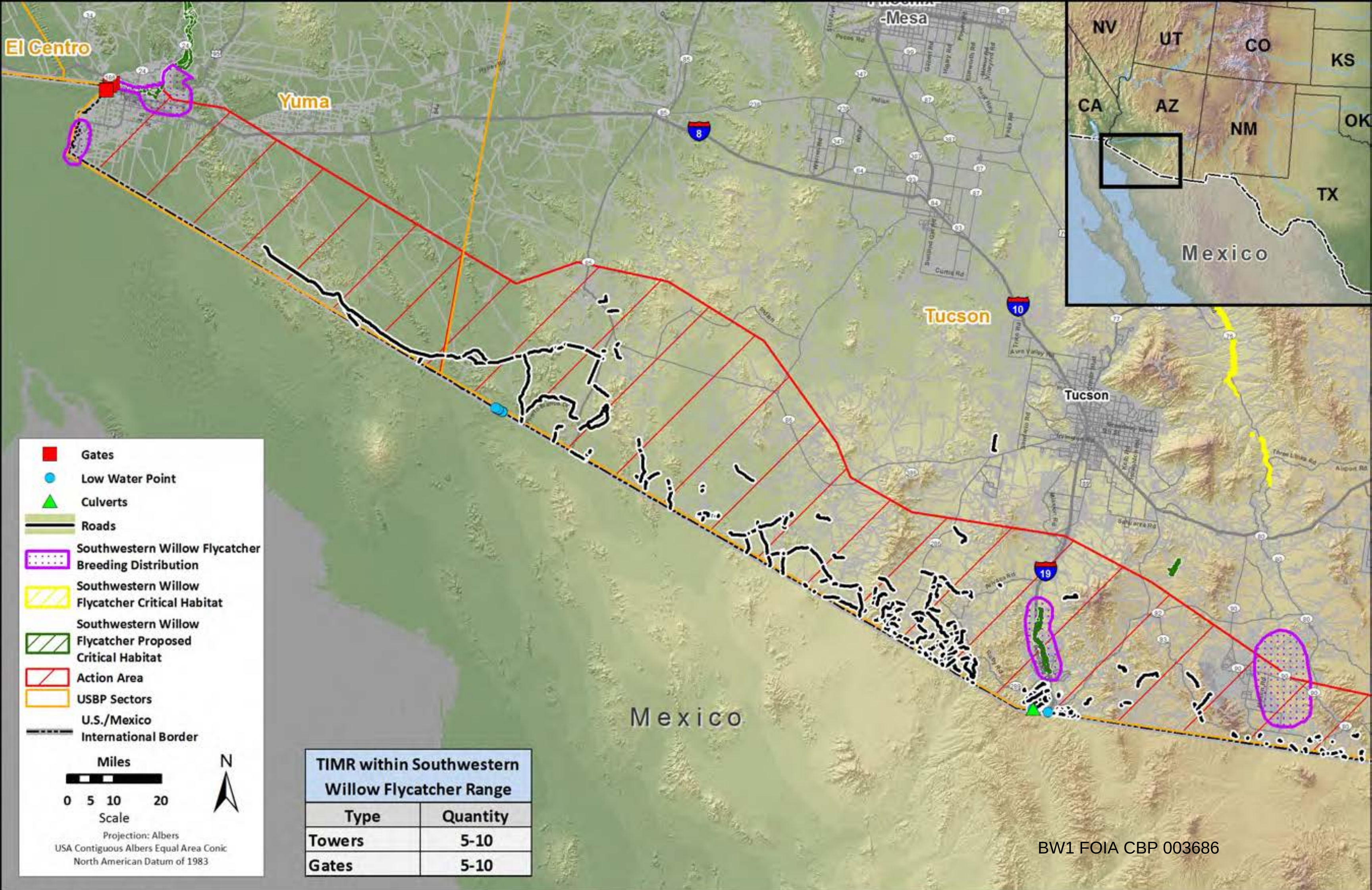
Source: ESRI StreetMap USA 2010



TIMR within Mexican Spotted Owl Critical Habitat	
Type	Quantity
Roads	25-35 miles
Culverts	1 - 5
Low Water Points	1 - 5
Towers	1 - 5

BW1 FOIA CBP 003685

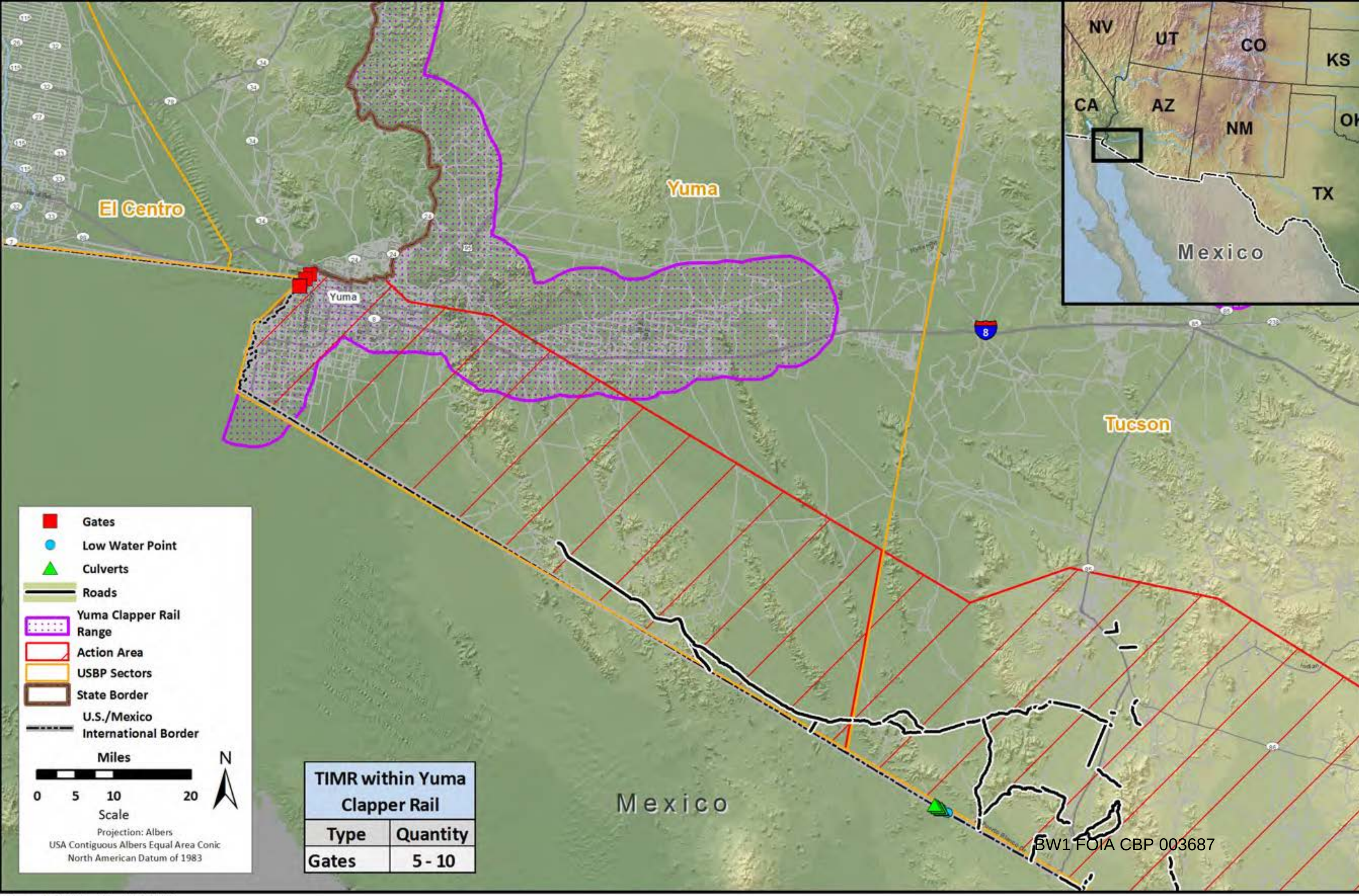
Source: ESRI StreetMap USA 2010



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

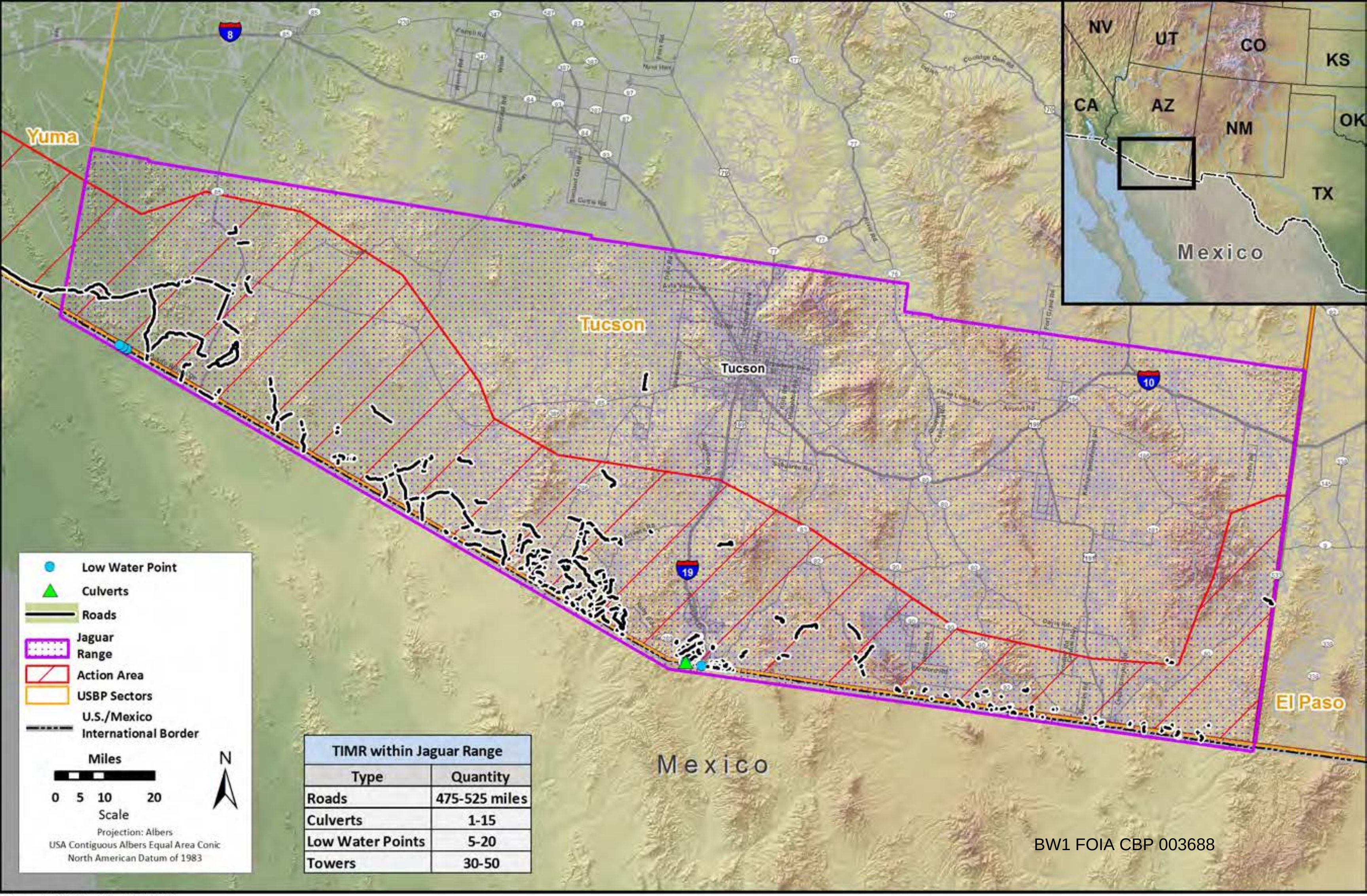
BW1 FOIA CBP 003686

Source: ESRI StreetMap USA 2010



TIMR within Yuma Clapper Rail	
Type	Quantity
Gates	5 - 10

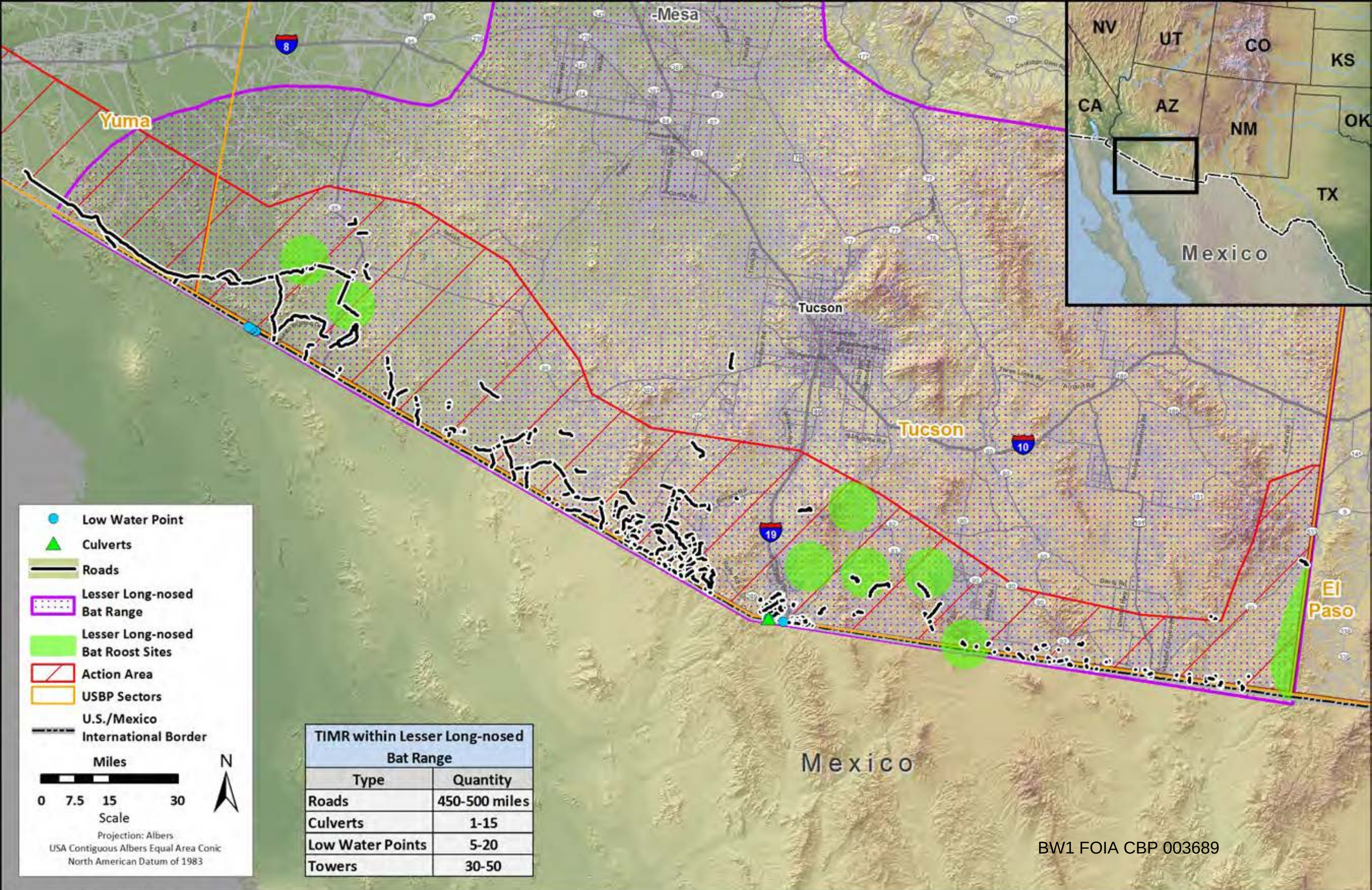
Source: ESRI StreetMap USA 2010



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

BW1 FOIA CBP 003688

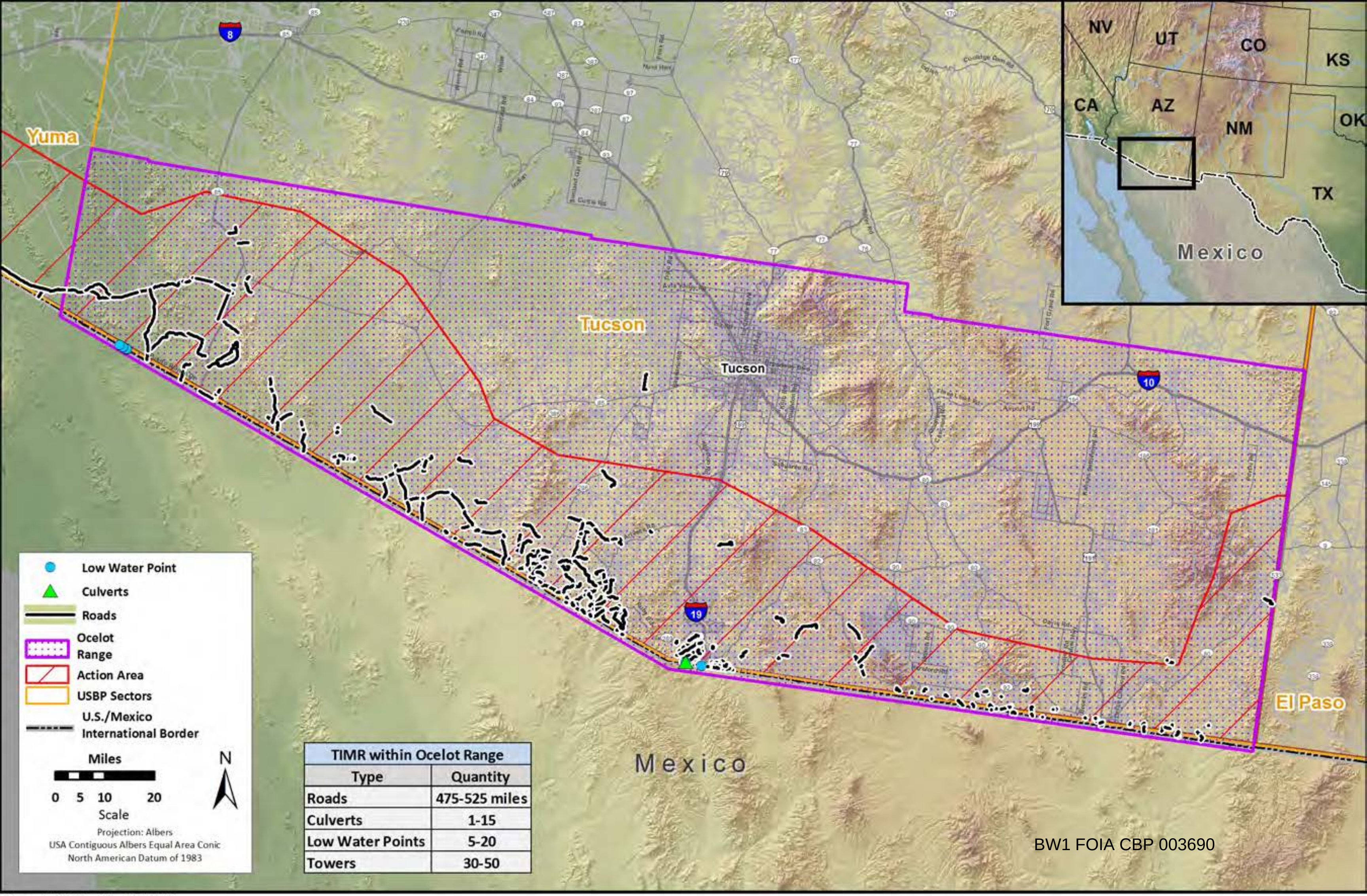
Source: ESRI StreetMap USA 2010



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

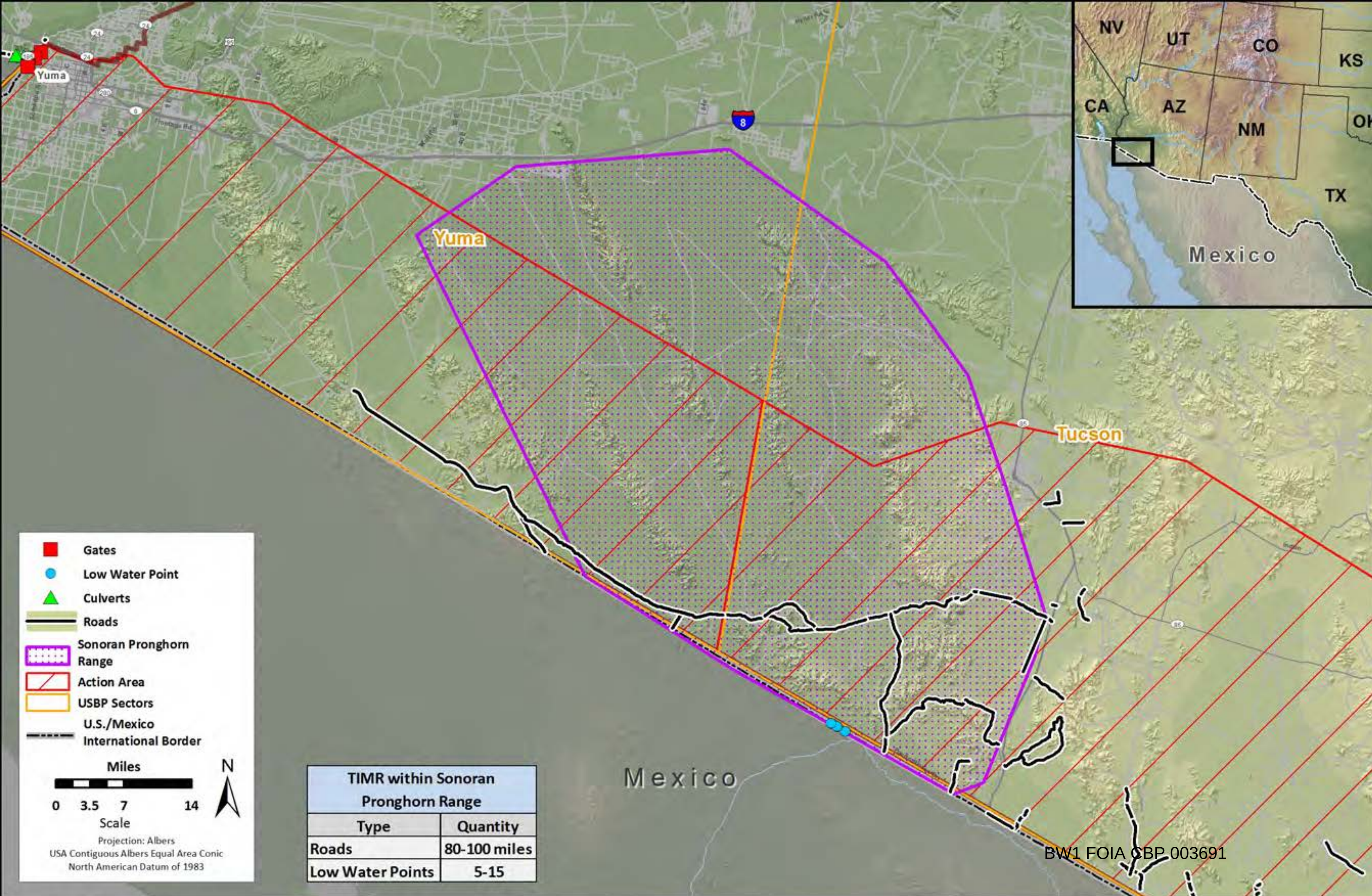
BW1 FOIA CBP 003689

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

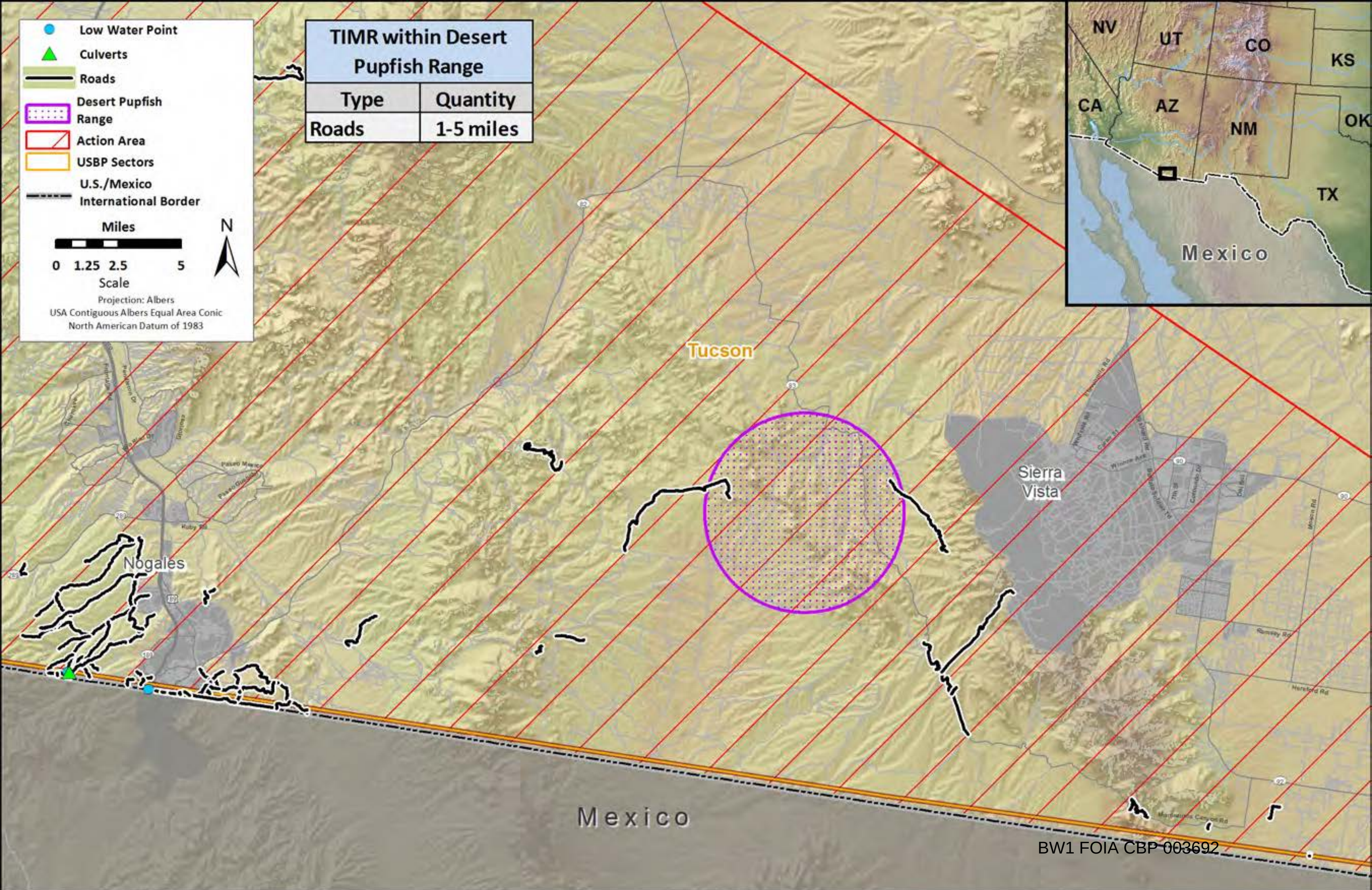
Source: ESRI StreetMap USA 2010



TIMR within Sonoran Pronghorn Range

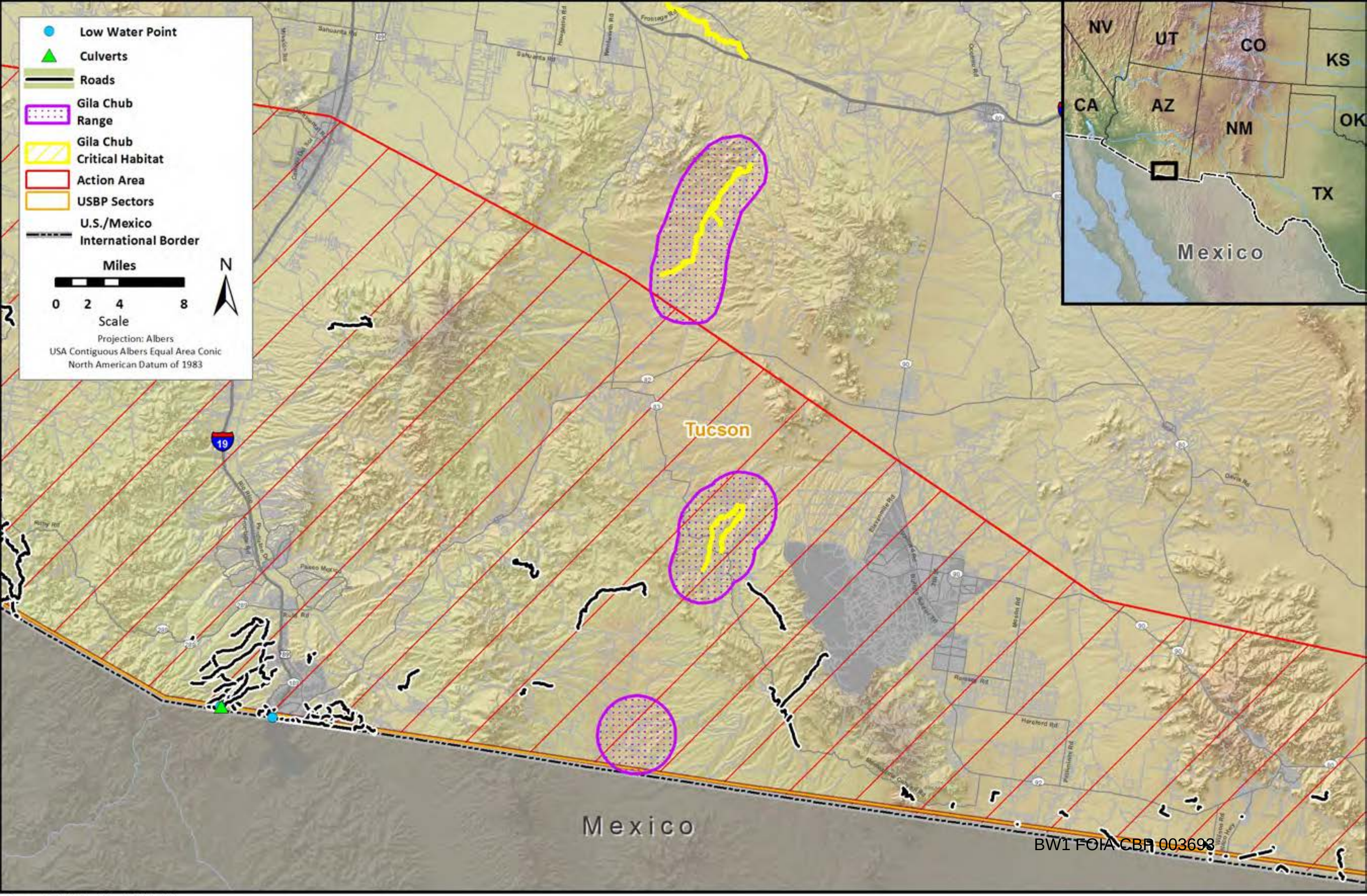
Type	Quantity
Roads	80-100 miles
Low Water Points	5-15

Source: ESRI StreetMap USA 2010



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

Source: ESRI StreetMap USA 2010



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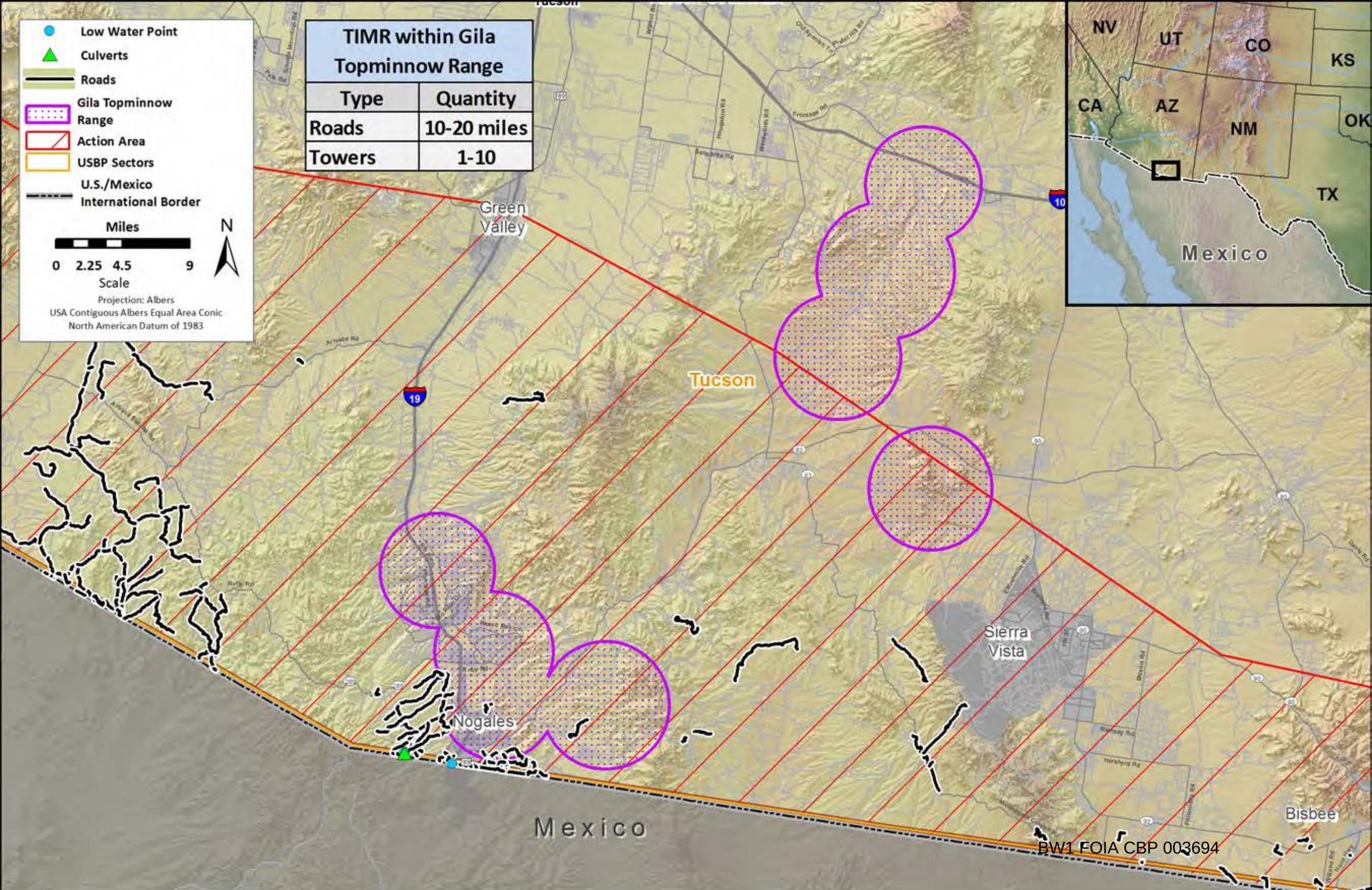

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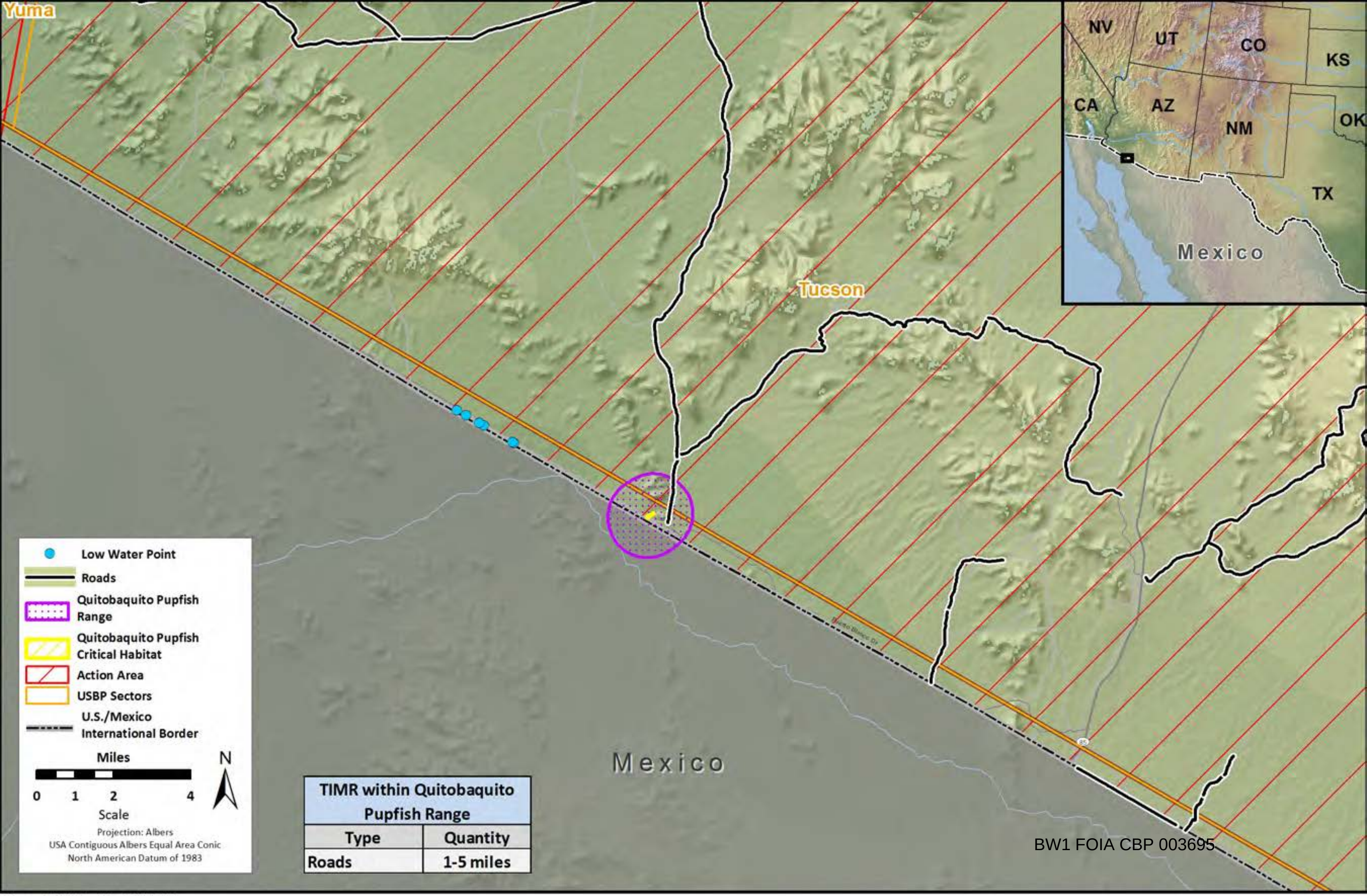

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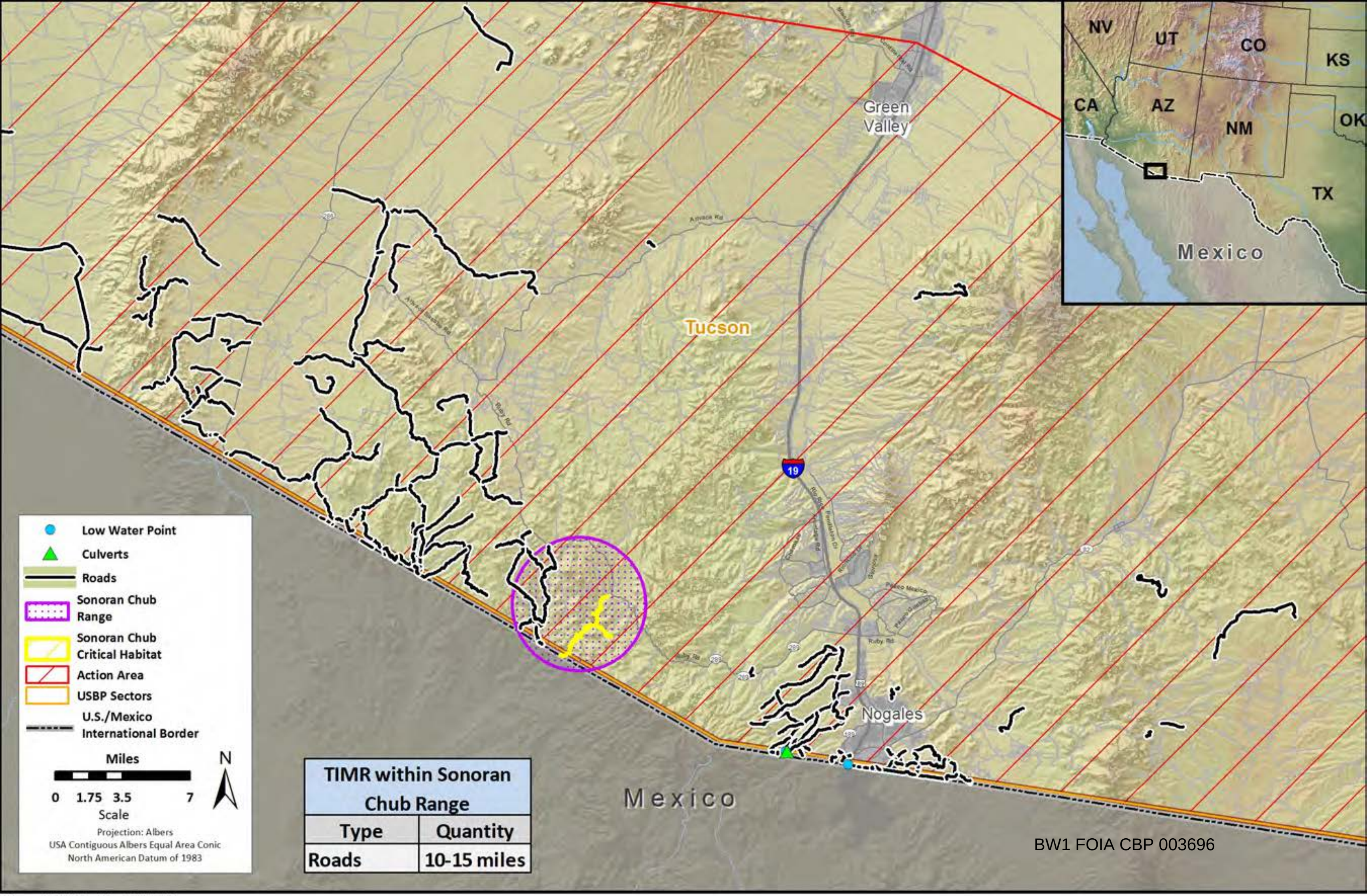
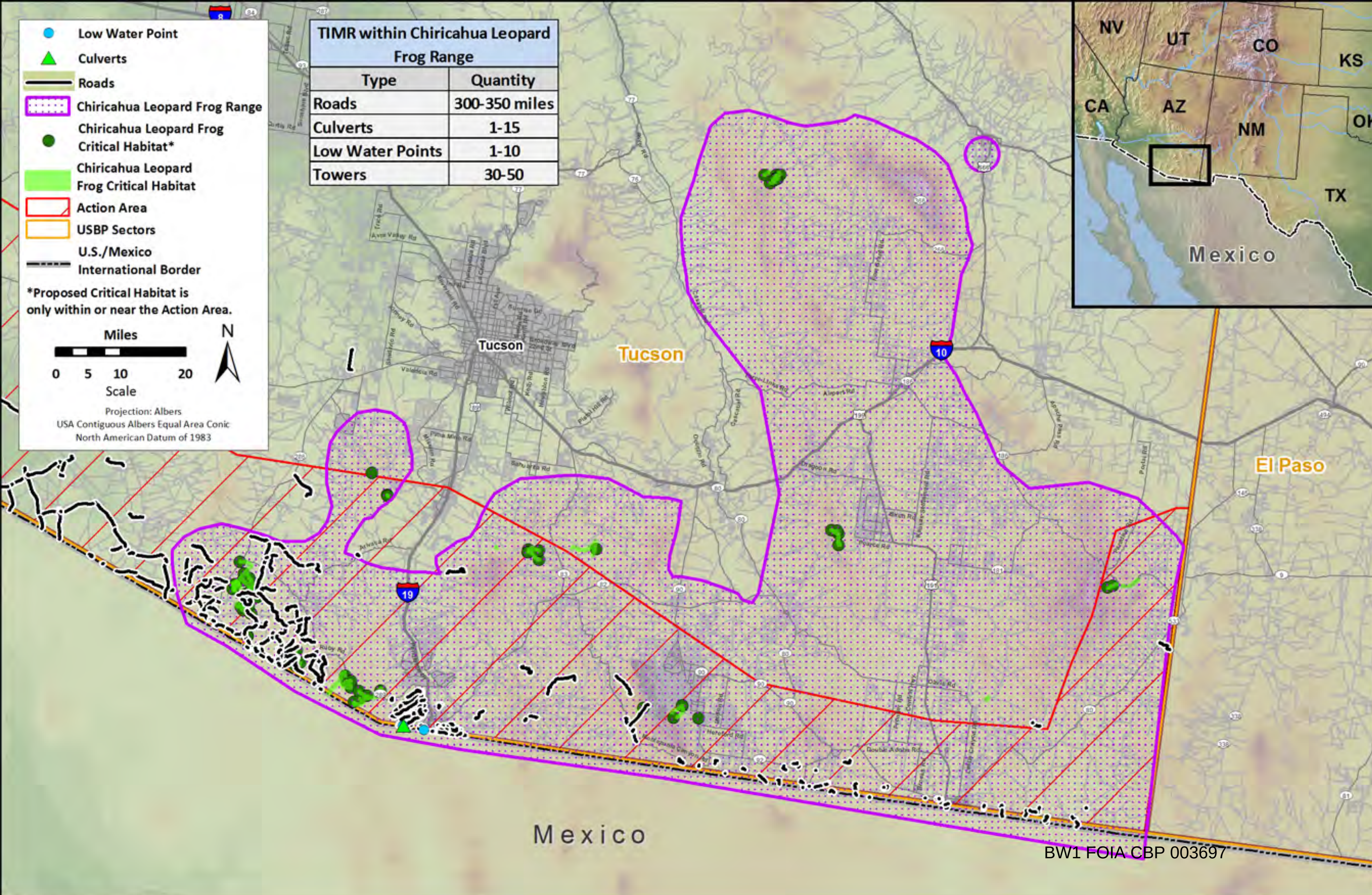
Source: ESRI StreetMap USA 2010



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

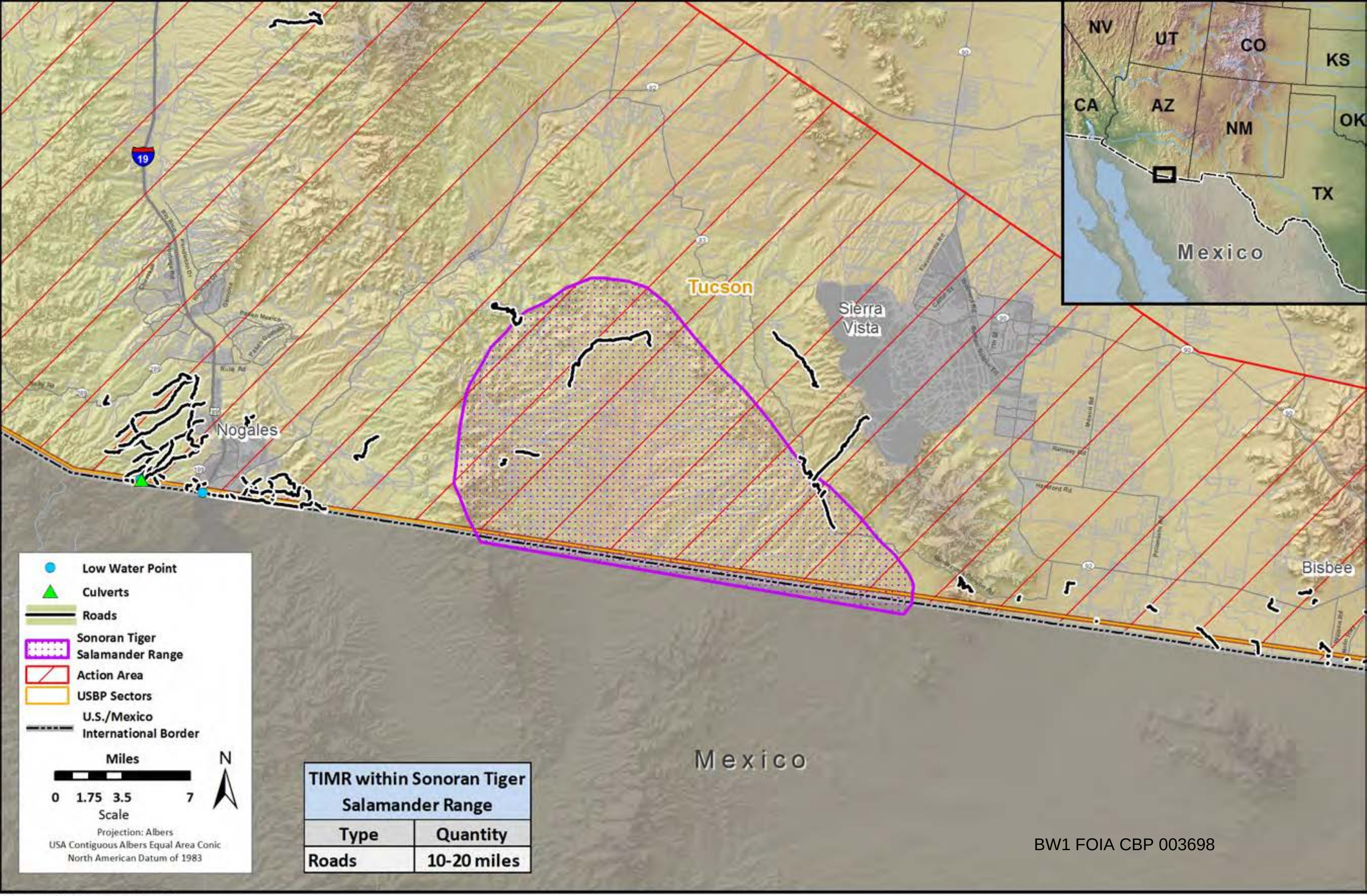
BW1 FOIA CBP 003696

Source: ESRI StreetMap USA 2010



TIMR within Chiricahua Leopard Frog Range	
Type	Quantity
Roads	300-350 miles
Culverts	1-15
Low Water Points	1-10
Towers	30-50

Source: ESRI StreetMap USA 2010



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 traillii 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

FINAL

ENVIRONMENTAL ASSESSMENT

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

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

AUGUST 2014

FINAL

FINDING OF NO SIGNIFICANT IMPACT

Addressing Proposed Tactical Infrastructure Maintenance and Repair Along the U.S./Mexico International Border in Texas

Introduction

Pursuant to the National Environmental Policy Act (NEPA), U.S. Customs and Border Protection (CBP), a component of the Department of Homeland Security (DHS), has prepared an Environmental Assessment (EA), which is attached hereto and incorporated herein by reference, to document its consideration of the potential environmental impacts of a proposal to maintain and repair certain existing tactical infrastructure along the U.S./Mexico international border in the State of Texas. The tactical infrastructure proposed to be maintained and repaired consists of existing fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and communication and surveillance tower components (including Remote Video Surveillance System [RVSS] or Secure Border Initiative [SBInet] towers [henceforth referred to as towers]). The existing tactical infrastructure occurs in five U.S. Border Patrol (USBP) sectors: El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley. The Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors are entirely within Texas, while the majority of the El Paso Sector is in New Mexico. Most of the maintenance and repair activities associated with the Proposed Action will occur within 25 miles of the U.S./Mexico international border in Texas. The portion of El Paso Sector in New Mexico is covered in a separate EA that is currently being analyzed and will be available to the public at a later date.

CBP is charged with the dual mission of securing the United States' borders while facilitating legitimate trade and travel. In supporting CBP's mission the USBP has multiple missions; to apprehend terrorists and terrorist weapons illegally entering the United States, deter illegal entries through improved enforcement and to detect, apprehend and deter smugglers of humans, drugs, and other contraband.

Proposed Action

This Proposed Action will include the maintenance and repair of tactical infrastructure along the U.S./Mexico international border in Texas in the El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors. The tactical infrastructure included in this analysis crosses multiple privately owned land parcels, tribal lands, and public lands managed by the National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), Texas Parks and Wildlife Department (TPWD), International Boundary and Water Commission (IBWC), 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 and bridges/crossovers, drainage structures, boat ramps, lights, and communications and surveillance towers) to support CBP border security requirements.

Purpose and Need

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

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

Description of the Proposed Action

Under the Proposed Action, the scope of the tactical infrastructure maintenance and repair program will 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 preventative maintenance and repair will 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 will determine maintenance and repair schedules. This alternative will allow for changes in tactical infrastructure maintenance and repair requirements. Maintenance and repair requirements could change over time based on changes in usage or location, but will not exceed the scope of this EA. If the scope of this EA is exceeded, new NEPA analysis would be required. Tactical infrastructure covered by previous waivers issued by the Secretary of Homeland Security (Secretary) waiver or prior NEPA analyses (e.g., staging areas) are not within the scope of the Proposed Action.

Fences and Gates. Maintenance and repair of fences and gates consist of welding of metal fence components, replacement of damaged or structurally compromised members, reinforcing or bracing of foundations, repairing burrowing activities under fences and gates, repairing weather-related damages, and the removal of vegetation and accumulated debris. The Proposed Action will also include the repair or replacement of gate-operating equipment (e.g., locks, opening/closing devices, motors, and power supplies). There are approximately 135 miles of fence and 120 gates within the action area in Texas. 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 Texas action area are not waived or previously covered and are therefore analyzed in this EA.

Access Roads and Integrated Bridges/Crossovers. Maintenance and repair activities will consist of filling in potholes, regrading road surfaces, implementing improved water drainage measures (ensure road crowns shed water and establish 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. CBP currently uses approximately 2,500 miles of road within the action area. Approximately 2,100 miles (5 percent) of local roadways within 25 miles of the U.S./Mexico international border in Texas consequently have not been subject to analysis after deducting the roads analyzed in previous NEPA documents or covered by a Secretary's waiver (i.e., out of scope of this EA). The exact number of miles of roads maintained and repaired by CBP within Texas could change over time to accommodate CBP needs. Therefore, the number of miles of roads associated with the Proposed Action should be considered somewhat flexible and not constrained by a quantifiable number. Bridges will be inspected on a routine basis and their structural integrity maintained.

Drainage Management Structures. Maintenance and repair of drainage systems will consist of cleaning blocked culverts and grates of trash and general debris and repairing or replacing nonfunctional or damaged drainages when necessary. In addition, maintenance and repair of riprap and low-water crossings will occur when necessary to maintain proper functionality. There are an estimated 90 drainage management structures within the action area in Texas and 90 percent of those structures have not been waived or previously analyzed and are, therefore, considered in this EA.

Vegetation Control to Maintain Road Visibility. Vegetation encroaching upon roads and bridges will be maintained to ensure visibility and to sustain safe driving conditions for USBP agents during travel. Vegetation control will be achieved by trimming, mowing, and applying selective herbicides. Application of terrestrial and aquatic herbicide will be made with products approved by the USEPA and the relevant Federal land management agency, where appropriate. Certified USBP sector or contract support personnel will use all herbicides in accordance with label requirements. Herbicide use will be part of an integrated approach that uses minimal quantities of herbicide. Vegetation control will not be conducted in designated critical habitat, suitable habitat, or in areas where threatened or endangered species occur unless a survey is conducted to ensure that the species are not present. If threatened and endangered species are present, consultation with the USFWS will be required. Any vegetation-clearing activities will only be undertaken with the permission of the landowner.

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

Lighting and Ancillary Power Systems. The maintenance and repair of lighting and ancillary power systems will consist of the replacement of burned-out light bulbs, restoring or 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. Approximately 95 percent of CBP's approximately 750 lighting and ancillary power systems are within the action area in Texas have not been waived or previously analyzed and are, therefore, considered in this EA.

Communications and Surveillance Towers. Communications and surveillance towers and components are mounted on combination of monopoles, water towers, radio towers, telephone poles, and buildings. The physical structures of the tower components will 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 will consist of replacing burned-out light bulbs, restoring and replacing damaged power lines, repairing and replacing associated electrical components, and, where necessary, controlling vegetation and removing debris. Between 100 and 120 of the total towers used by CBP in the Texas action area are analyzed in this EA under the Proposed Action.

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

Equipment Storage. The maintenance and repair of the existing tactical infrastructure as previously described requires the use of various types of equipment and support vehicles. Such equipment could include graders, backhoes, tractor mowers, dump trucks, 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 staging areas, and, in turn, the activities occurring therein, that will be used by CBP as a part of the Proposed Action have either already been analyzed in previous NEPA documents or are covered by a Secretary's waiver.

Alternatives

Two alternatives were considered: Alternative 1: Proposed Action and Alternative 2: No Action Alternative.

Alternative 1: Proposed Action. Under the Proposed Action, the scope of the tactical infrastructure maintenance and repair program will be incorporated as part of the proposed maintenance and repair activities to minimize potential impacts. Maintenance and repair will occur via a periodic work plan based on anticipated situations within each sector and funding availability. Maintenance and repair requirements could change over time based on changes in usage or location, but will not exceed the scope of the EA. If the scope of the EA is exceeded, new NEPA analysis will be required. Through the use of a periodic work plan, FM&E and sector managers will still be committed to a preventative maintenance strategy and performing repairs to specified standards where necessary, but will not be subject to applying all standards to all tactical infrastructures on a fixed schedule. FM&E and the sectors will ensure the sustainability of tactical infrastructure to support mission requirements.

Alternative 2: No Action Alternative. Under the No Action Alternative, the tactical infrastructure will be maintained on an as-needed basis and will be considered primarily reactive maintenance. There will be no centralized planning process for maintenance and repair. In addition, there will be no established design or performance specifications, and not all best management practices (BMPs) intended to reduce impacts will be implemented. Consequently, as-needed repairs could be required more often and evaluation of potential environmental impacts will occur on a case-by-case basis.

The tactical infrastructure breakdowns that have already occurred or are imminent will 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 will 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 Proposed Action and No Action Alternative have been reviewed in accordance with NEPA as implemented by the regulations of the Council on Environmental Quality (CEQ). No significant impacts on any environmental resources will be expected from the implementation of the Proposed Action. Any potential adverse impacts will be expected to be negligible to minor. Details of the environmental consequences can be found in the EA, which is hereby incorporated by reference.

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) Region 6, USFWS Southwest Region, Texas Commission on Environmental Quality (TCEQ), Texas Department of Transportation, Texas Historical Commission, TPWD, appropriate Native American Tribes and Nations, and local agencies. Agency responses will be incorporated into the analysis of potential environmental impacts.

CBP hosted eight open house scoping meetings in February 2014: one each in El Paso, Big Bend, and Laredo sectors; two in Del Rio Sector; and three in Rio Grande Valley Sector. The purpose of the open houses was to foster open communication between the interested parties, including members of the public, and the project representatives. The open house scoping meetings also provided an idea of the range of individuals, organizations, and agencies interested in the project. Attendees to the open house meetings were provided with comment cards, fact sheets, and visual displays. Court reporters were available to individuals who wished to record a comment verbally rather than submit a written comment. Spanish language interpreters were available in the event that participants wishing to make a comment used Spanish as their primary language.

A Notice of Availability (NOA) for the EA and draft FONSI was published in representative newspapers of regional distribution. 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 other Federal, state, and local agencies will be incorporated into the Final EA. The following is a list of newspapers that will be used for publishing the NOA.

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

During the 45-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.

Environmental Consequences

CBP prepared a Biological Assessment (BA) in accordance with the legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (50 Code of Federal Regulations [CFR] 402; 16 United States Code [U.S.C.] 1536[c]). The purpose of this BA was to review the Proposed Action in sufficient detail to determine if it could affect any federally threatened or endangered species or their critical habitat.

CBP obtained a list of federally listed species from the USFWS online database of threatened, endangered, and proposed species that occur within the 20 Texas counties within the action area. Based on NatureServe data, species listings, recovery-planning documents, and other information, CBP determined that 24 federally-listed species are known to occur within or near the action area. Further, CBP has concluded that the Proposed Action will have no effect on an additional 34 federally-listed species or their critical habitat. CBP also determined that over 250 state species of concern listed by the TPWD have the potential to occur within the project area. BMPs will be implemented to avoid or minimize impacts on federally-listed species and will also apply to state species of concern.

Based on the description of the Proposed Action, the descriptions of the 24 species and their habitat, the environmental baseline, the evaluation of potential effects of the Proposed Action, and BMPs developed to avoid or minimize impacts, CBP concluded that implementation of the Proposed Action is not likely to adversely affect the 24 species considered in the BA, or any designated critical habitat of those species. These determinations were based primarily on the following factors:

- The program involves the maintenance and repair of existing tactical infrastructure. Program activities will be conducted within and immediately adjacent to the footprint of that infrastructure.

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

BMPs were also developed for the following resource areas:

- Migratory Birds
- Wildlife
- Vegetation
- Land Use
- Water Resources
- Air Quality
- Geology and Soil Resources
- Noise
- Cultural Resources
- Roadways and Traffic
- Hazardous Materials and Waste Management.

A complete detailed description of BMPs can be found in **Appendix E** of the EA and are incorporated here by reference. Impacts on the previously listed resources under the Proposed Action and No Action Alternative are listed below in **Table 1**.

CBP will comply with all regulatory procedures pursuant to the National Historic Preservation Act in the implementation of the Proposed Action. CBP is currently developing a Programmatic Agreement with appropriate parties for the undertakings as specified in the Proposed Action.

Table 1. Summary of Anticipated Environmental Impacts by Alternative

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Land Use	No effects.	No effects.
Geology and Soils	Short- and long-term, minor, adverse effects.	Short- and long-term, minor, adverse effects.

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Vegetation	Short- and long-term, negligible to moderate, adverse effects.	Short- and long-term, minor to moderate, adverse effects.
Terrestrial and Aquatic Wildlife Resources	Short- and long-term, negligible to minor, adverse effects.	Short- and long-term, minor to moderate, adverse effects.
Threatened and Endangered Species	Short- and long-term, negligible to minor, adverse effects.	Short- and long-term, minor to moderate, adverse effects.
Hydrology and Groundwater	Short- and long-term, negligible to minor, adverse effects.	Short- and long-term, minor to moderate, adverse effects.
Surface Waters and Waters of the United States	Short- and long-term, negligible to minor, adverse effects.	Short- and long-term, minor to major, adverse effects.
Floodplains	Short-term, negligible to minor, adverse effects.	Short- and long-term, minor, adverse effects.
Air Quality	Short-term, negligible to minor, adverse effects.	No effects.
Noise	Long-term, negligible to minor, adverse effects.	Long-term, negligible to minor, adverse effects.
Cultural Resources	Long-term, negligible to minor, adverse effects.	Long-term, negligible, adverse effects.
Roadways and Traffic	Short-term, negligible to minor, adverse effects.	Short- and long-term, negligible to minor, adverse effects.
Hazardous Materials and Waste Management	Long-term, negligible to minor, adverse effects.	Long-term, negligible to minor, adverse effects.
Socioeconomic Resources, Environmental Justice, and Protection of Children	Short- and long-term, negligible, beneficial effects.	No effects.
Sustainability and Greening	No effects.	No effects.
Aesthetics and Visual Resources	No effects.	No effects.
Climate Change	No effects.	No effects.
Human Health and Safety	No effects.	No effects.
Utilities and Infrastructure	No effects.	No effects.

Finding

Based upon the results of the EA and the environmental design measures to be implemented, the Preferred Alternative is not expected to have a significant effect on the environment. Therefore, no additional environmental documentation under NEPA is warranted, and the preparation of an Environmental Impact Statement is not required.

9/3/2014

Date

for Richard Barlow
Chief
Strategic Planning Policy and Analysis Division
U.S. Customs and Border Protection

9/28/14

Date

for Karl H. Calvo
Executive Director
Facilities Management and Engineering
U.S. Customs and Border Protection

ABBREVIATIONS AND ACRONYMS

$\mu g/m^3$	microgram per cubic meter
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing materials
AIRFA	American Indian Religious Freedom Act
ARHA	Archeological and Historic Preservation Act
AST	aboveground storage tank
AQCR	air quality control region
BMP	best management practice
CAA	Clean Air Act
CBP	U.S. Customs and Border Protection
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
dBA	a-weighted decibel
DHS	Department of Homeland Security
DOD	U.S. Department of Defense
DVD	digital video disc
EA	Environmental Assessment
EIA	Energy Information Agency
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESCP	Erosion-and-sediment-control plans
ESP	Environmental Stewardship Plan
ESSR	Environmental Stewardship Summary Report
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRM	Flood Insurance Rate Map
FM&E	Facilities Management and Engineering
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FR	Federal Register
FY	Fiscal Year
GHG	greenhouse gas
HAP	hazardous air pollutant
HUC	hydrologic unit code
I	Interstate
IIRIRA	Illegal Immigration Reform and Immigrant Responsibility Act
LBP	lead-based paint
mg/m3	milligrams per cubic meter
mm/year	millimeters per year
mph	miles per hour
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act

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

COVER SHEET

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

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

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

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

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

Report Designation: Final Environmental Assessment (EA).

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

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

Throughout the National Environmental Policy Act (NEPA) process, the public may obtain information concerning the status and progress of the Proposed Action and the EA via the project Web site at *http://www.cbp.gov/about/environmental-cultural-stewardship/nepa-documents/docs-review*; by emailing TX_TIMR_EA@cbp.dhs.gov; by written request to Texas TIMR EA, c/o Nicolas Frederick at HDR, 3733 National Drive, Suite 207, Raleigh, NC 27612; or by fax to (919) 785-1187.

FINAL

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

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

AUGUST 2014

This document printed on paper that contains at least 30 percent postconsumer fiber.

EXECUTIVE SUMMARY

INTRODUCTION

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

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

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

CBP prepared this EA through coordination with Federal; state; and local agencies, and the public, to identify and assess the potential impacts associated with the proposed maintenance and repair of tactical infrastructure. This EA is being prepared to fulfill the requirements of the NEPA.

PURPOSE AND NEED

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

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

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

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

PUBLIC INVOLVEMENT

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

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

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

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

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

DESCRIPTION OF THE PROPOSED ACTION

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

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

Fences and Gates

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

Access Roads and Integrated Bridges/Crossovers

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

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

Drainage Management Structures

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

Vegetation Control to Maintain Road Visibility

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

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

Boat Ramps

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

Lighting and Ancillary Power Systems

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

Communications and Surveillance Towers

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

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

Equipment Storage

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

ALTERNATIVES ANALYSIS

Alternatives Considered

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

Alternative 2: No Action Alternative. Under the No Action Alternative, the tactical infrastructure along the U.S./Mexico international border in Texas would be maintained on an as-needed basis and would be considered primarily reactive maintenance. This approach would lack centralized standardization of maintenance and repair activities, and BMPs intended to reduce impacts might not be implemented. Such ad hoc maintenance would not address the overall maintenance requirements for tactical infrastructure and would not be considered sustainable in quality, resulting in the gradual degradation of the tactical infrastructure. Maintenance and repair activities planned on an ad hoc basis without uniform application of centralized standards would likely lead to inconsistent outcomes and greater risk to environmental resources, CBP personnel, and CBP needs if no BMPs could be implemented. The No Action Alternative would not meet CBP mission needs and does not address the Congressional mandates for gaining effective control of the U.S./Mexico international border in Texas. However, inclusion of the No Action Alternative is prescribed by the Council on Environmental Quality (CEQ) regulations and will be carried forward for analysis in the EA. The No Action Alternative also serves as a baseline against which to evaluate the impacts of the Proposed Action.

SUMMARY OF ENVIRONMENTAL IMPACTS

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

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

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Land Use	No new construction would occur; therefore, no effects on land use plans or policies would be expected.	The No Action Alternative would result in continuation of existing land uses. No effects on land use would be expected.
Geology and Soils	Short- and long-term, minor, adverse effects on soils, primarily from the control of vegetation and use of herbicides would be expected. Erosion-and-sediment-control plans (ESCPs) and BMPs would be implemented to reduce the potential for adverse effects associated with erosion and sedimentation. No prime farmland soils exist within the action area, therefore, no impacts on prime farmland soils would occur.	Short- and long-term, minor, direct and indirect, adverse effects on soils would be expected under this alternative. CBP would continue current maintenance and repair activities and tactical infrastructure would be maintained on an as-needed basis.
Vegetation	Short- and long-term, negligible to moderate, direct, adverse effects on terrestrial and aquatic vegetation would occur. BMPs would be used to avoid or minimize these effects. In-water maintenance and repair activities could result in direct and indirect impacts on aquatic plants and their habitat.	Short- and long-term, minor to moderate, direct, adverse effects on terrestrial and aquatic vegetation could occur from the No Action Alternative. In-water maintenance and repair activities could result in direct and indirect impacts on aquatic plants and their habitat.

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

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

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

Resource Area	Alternative 1: Proposed Action	Alternative 2: No Action Alternative
Sustainability and Greening	No effects.	No effects.
Aesthetics and Visual Resources	No effects.	No effects.
Climate Change	No effects.	No effects.
Human Health and Safety	No effects.	No effects.
Utilities and Infrastructure	No effects.	No effects.

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

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1. INTRODUCTION

The Department of Homeland Security (DHS) and U.S. Customs and Border Protection (CBP), propose to maintain and repair certain existing tactical infrastructure along the U.S./Mexico international border in Texas. The tactical infrastructure proposed to be maintained and repaired consists of fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, communications and surveillance tower components (including Remote Video Surveillance System [RVSS] or Secure Border Initiative [SBInet] towers, henceforth referred to as towers). Although the majority of anticipated tactical infrastructure can be found within the geographic areas show in **Figure 1-1**, the exact extent could change over time to accommodate CBP needs. The existing tactical infrastructure in Texas occurs in five U.S. Border Patrol (USBP) sectors: El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley. The Big Bend, Del Rio, Laredo, and Rio Grande Valley sectors are entirely within Texas, while the majority of the El Paso Sector is in New Mexico.

The tactical infrastructure included in this analysis crosses multiple privately owned land parcels, tribal lands, and public lands managed by the National Park Service (NPS) U.S. Fish and Wildlife Service (USFWS), Texas Parks and Wildlife Department (TPWD), U.S. Department of Defense (DOD), the U.S. Section of the International Boundary and Water Commission (USIBWC), and the Texas Department of Transportation (TXDOT). The CBP Facilities Management and Engineering (FM&E) Office is responsible for maintenance and repair of tactical infrastructure (e.g., fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and tower components) to support CBP border security requirements.

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

The Secretary's waiver authority is derived from Section 102 of the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) of 1996, as amended. Under Section 102 of IIRIRA, the U.S. Congress gave the Secretary the authority to waive such legal requirements as the Secretary deems necessary to ensure the expeditious construction of tactical infrastructure. Since 2005, the Secretary has issued five separate waivers: San Diego Border Infrastructure System waiver (70 Federal Register [FR] 55622), the Barry M, Goldwater Range waiver (72 FR 2535), the San Pedro National Riparian Conservation Area (72 FR 60870) waiver, and the April 1, 2008, waivers for construction of Pedestrian fence (73 FR 19077) and Vehicular fence (73 FR 19078). Although the Secretary's waivers meant that CBP no longer had any specific legal obligation under the laws that were included in the waivers, both DHS and CBP remained committed to responsible environmental stewardship. For example, CBP prepared Environmental Stewardship Plans (ESPs) in lieu of NEPA documents for the tactical infrastructure that was constructed under the April 2008 waivers.

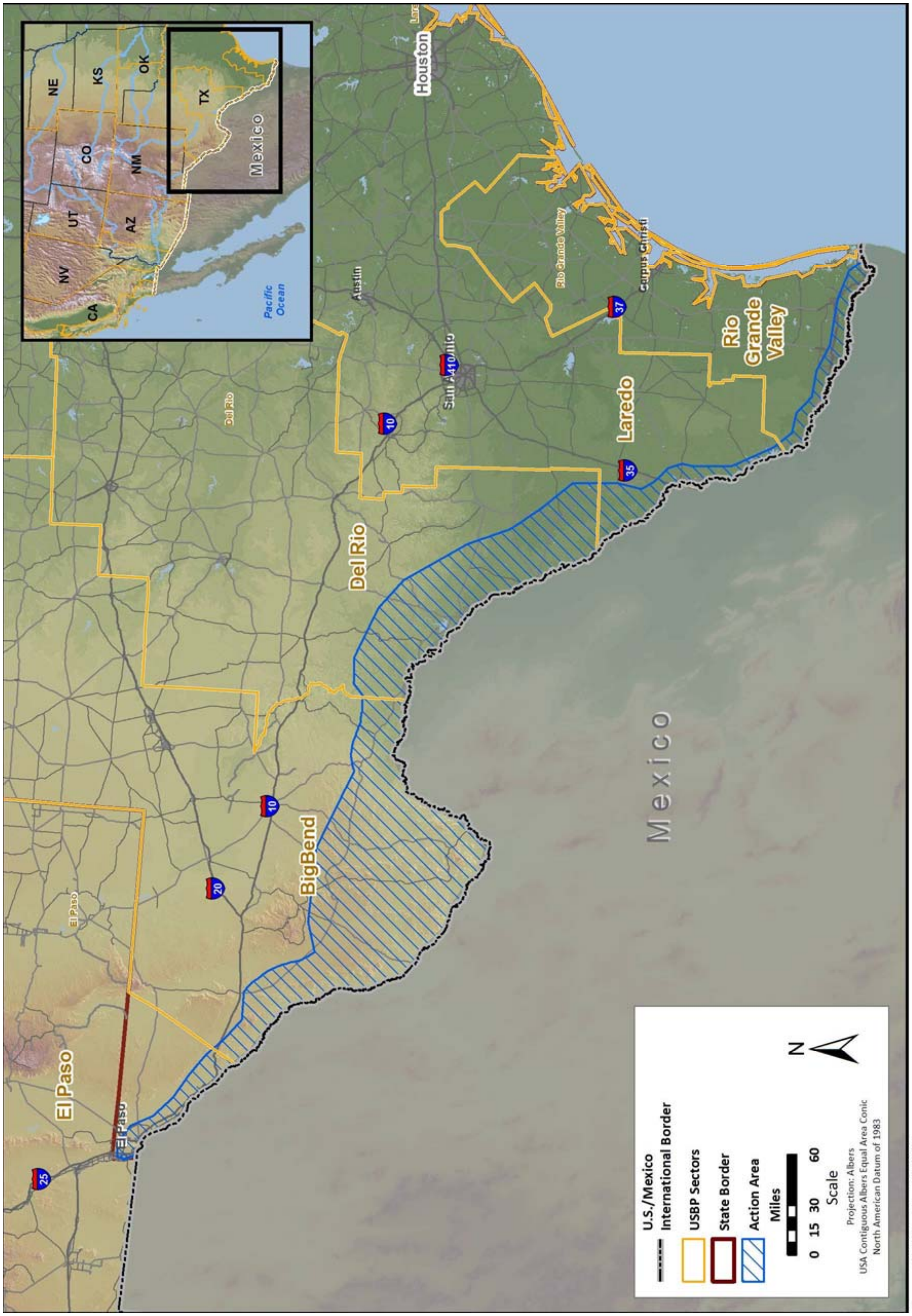

Figure 1-1. Action Area for Proposed Tactical Infrastructure Maintenance and Repair Activities in Texas

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

In furtherance of the Secretary's commitment to environmental stewardship, CBP continues to work in a collaborative manner with local government, state, and Federal land managers and the interested public to identify environmentally sensitive resources and develop appropriate best management practices (BMPs) to avoid or minimize adverse impacts resulting from tactical infrastructure projects. This EA addresses the cumulative impacts of all CBP maintenance and repair activities within the action area including the tactical infrastructure analyzed in previous NEPA documents or ESPs. This comprehensive and integrated environmental impacts analysis of all tactical infrastructure assets within the action area reflects CBP's environmental stewardship by better understanding the cumulative impacts and its commitments to minimize the potential negative impacts. This EA also discusses tactical infrastructure maintenance and repair activities and their attributes that will enhance positive environmental benefits.

This EA is organized into six sections plus appendices. **Section 1** provides background information on USBP missions, identifies the purpose of and need for the Proposed Action, describes the area in which the Proposed Action would occur, and explains the public involvement process. **Section 2** provides a detailed description of the Proposed Action, alternatives considered, and the No Action Alternative. **Section 3** describes existing environmental conditions in the areas where the Proposed Action would occur, and identifies potential environmental impacts that could occur within each resource area under the alternatives evaluated in detail. **Section 4** discusses potential cumulative impacts and other impacts that might result from implementation of the Proposed Action, combined with foreseeable future actions. **Sections 5** and **6** provide lists of references and preparers for the EA.

1.1 USBP BACKGROUND

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

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

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

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

1.2 PURPOSE AND NEED

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

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

1.3 FRAMEWORK FOR ANALYSIS

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

The process for implementing NEPA is codified in 40 Code of Federal Regulations (CFR) 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*, and DHS Directive 023-01 *Environmental Planning Program*, and CBP policies and procedures. The CEQ was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations specify that an EA may be prepared to:

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

To comply with NEPA, the planning and decisionmaking process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

Within the framework of environmental impact analysis under NEPA, additional authorities that might be applicable include the Clean Air Act (CAA), Clean Water Act (CWA) (including a National Pollutant Discharge Elimination System [NPDES] storm water discharge permit and Section 404 permit), Section 10 of the Rivers and Harbors Act of 1899, Noise Control Act, Endangered Species Act (ESA), Migratory Bird Treaty Act, National Historic Preservation Act (NHPA), Archaeological Resources Protection Act, Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), and various Executive Orders (EOs). A summary of laws, regulations, and EOs that might be applicable to the Proposed Action is presented in **Appendix A.**

1.4 PUBLIC INVOLVEMENT

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

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

Through the public involvement process, CBP notified relevant Federal, state, and local agencies of the Proposed Action and requested input on environmental concerns they might have regarding the Proposed Action. The public involvement process provides CBP with the opportunity to cooperate with and consider state and local views in its decision regarding implementing this Federal proposal. As part of the EA process, CBP hosted eight open house scoping meetings in February 2014: one each in El Paso, Big Bend, and Laredo sectors; two in Del Rio Sector; and three in Rio Grande Valley Sector. The purpose of the open houses was to foster open communication between the interested parties, including members of the public, and the project representatives. The open house scoping meetings also provided an idea of the range of individuals, organizations, and agencies interested in the project. Attendees to the open house meetings were provided with comment cards, fact sheets, and visual displays. Court reporters were available to individuals who wished to record a comment verbally rather than submit a written comment. Spanish language interpreters were available in the event that participants wishing to make a comment used Spanish as their primary language. Comments received during the scoping process were incorporated into this EA.

CBP coordinated with agencies such as the U.S. Environmental Protection Agency (USEPA) Region 6, USFWS Southwest Region, Texas Commission on Environmental Quality (TCEQ), Texas Department of Transportation, Texas Historical Commission, Texas Parks and Wildlife, appropriate Native American Tribes and Nations, and local agencies.

Agency responses were incorporated into the analysis of potential environmental impacts. The following is a list of Federal and state agencies and stakeholder groups that were coordinated with during the NEPA process.

- **Federal Agencies**
  - USEPA Region 6
  - USFWS Southwest Region
  - USACE Fort Worth District
  - BLM Amarillo Field Office
  - USIBWC
- **State Agencies**
  - TCEQ
  - Texas Department of Transportation
  - Texas Historical Commission
  - Texas Parks and Wildlife
- **Stakeholders**
  - Federally Recognized Native American Tribes and Nations.

A Notice of Availability (NOA) for this EA and draft FONSI was published in representative newspapers of regional distribution between April 21 and 25, 2014. 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 other Federal, state, and local agencies have been incorporated into the Final EA and are included in **Appendix B**. The following is a list of newspapers that were used for publishing the NOA.

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

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

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2. PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This section describes the Proposed Action and the alternatives considered. As discussed in **Section 1.3**, the NEPA process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for a proposed action, which are defined in **Section 1.2**. CEQ regulations specify the inclusion of a No Action Alternative against which potential effects can be compared.

2.2 SCREENING CRITERIA TO DEVELOP THE ALTERNATIVES

Each alternative to the Proposed Action considered in the EA must be reasonable and meet CBP's purpose and need (as described in **Section 1.2**). Such alternatives must also meet essential technical, engineering, and economic threshold requirements to ensure that each is practical, environmentally sound, economically viable, and complies with governing standards and regulations. CBP uses an optimal mix of tactical infrastructure development, application of remote surveillance technologies, and deployment of USBP agents to achieve border security objectives. The following screening criteria were used to develop the Proposed Action and evaluate potential alternatives.

- ***Protecting Persistent Impedance Requirements.*** Tactical infrastructure must support CBP mission needs by its capability to hinder or delay individuals illegally crossing the U.S./Mexico international border in Texas, either on foot or by vehicle. The continuous maintenance and repair of the fences and gates, roads and bridges/crossovers, drainage structures and grates, boat ramps, lighting and ancillary power systems, and communications and surveillance tower components are imperative to the safe and rapid response capabilities of USBP agents.
- ***Maintain Remote Surveillance Capability.*** Proposed maintenance and repair activities must ensure tower infrastructure sites are accessible on an as-needed basis and ensure continued functionality of the supporting components, foundation footers/pads, perimeter fencing, tower structures, and designated work/storage areas.
- ***Minimize Potential Negative Environmental Impacts.*** Proposed maintenance and repair activities should be evaluated for their potential environmental impacts and BMPs would be planned or implemented in proportion to the risk in consultation with the appropriate regulatory and resource agencies. Particular management focus should be devoted to protecting the following sensitive environmental resources.
    - *Threatened or Endangered Species and Critical Habitat*. The maintenance and repair of tactical infrastructure should be conducted in such a manner as to have negligible to minor impacts on threatened or endangered species and their critical habitat. BMPs would be implemented so that a determination of No Effect, or at most, a determination of May Affect, but Not Likely to Adversely Affect, would be achieved. Any maintenance and repair activities that could not be mitigated to a determination of May Affect, but Not Likely to Adversely Affect using BMPs

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

- *Wetlands and Floodplains*. The maintenance and repair of tactical infrastructure should be conducted in such a manner as to have negligible impacts on waters of the United States, including wetlands and floodplain resources to the maximum extent practical. CBP is consulting with the USACE to minimize wetland and floodplain impacts and identify potential avoidance, minimization, and conservation measures. During the planning process for such activities, appropriate coordination with the USACE would occur and appropriate permits would be acquired, if necessary.
- *Cultural and Historic Resources*. The maintenance and repair of tactical infrastructure should be conducted in such a manner as to have negligible impacts on cultural and historic resources to the maximum extent practical. CBP is consulting with the Texas Historical Commission to develop a Programmatic Agreement (PA). Under the Proposed Action, undertakings with the potential to cause effects on historic properties would be covered by a PA between CBP, the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Officers (SHPOs), Federal agencies, and tribes. If the undertaking is not covered under the PA, CBP would be required to conduct the applicable Section 106 review for those activities that are not covered. If the EA and FONSI are issued prior to approval of the PA, CBP would be required to conduct the standard Section 106 review process for these activities until they are covered by an executed PA. Therefore, CBP is required to comply with Section 106 of the NHPA, as amended, and its implementing regulations (36 CFR 800) before conducting maintenance and repair activities.

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

2.3 ALTERNATIVE 1: PROPOSED ACTION

Under the Proposed Action, the scope of the tactical infrastructure maintenance and repair program would include reactive maintenance and repair activities (e.g., resolving damage from intentional sabotage or severe weather events) and preventive/scheduled maintenance and repair activities designed to ensure environmental sustainability (e.g., culvert replacement, drainage and grate cleaning, preventive soil erosion measures). All maintenance and repair would occur via a periodic work plan based on anticipated situations within each sector and funding availability. Although centrally managed by FM&E, prioritization of projects based upon evolving local requirements within each sector would determine maintenance and repair schedules. This alternative would allow for changes in tactical infrastructure maintenance and repair requirements. Maintenance and repair requirements could change over time based on changes in usage or location, but would not exceed the scope of this EA. If the scope of this EA is exceeded, new NEPA analysis would be required. Tactical infrastructure covered by the

Secretary's waiver or prior NEPA analyses (e.g., staging areas) is not within the scope of the Proposed Action.

The USBP sectors along the U.S./Mexico international border in Texas have identified a need for tactical infrastructure maintenance and repair to ensure their continued utility in securing the border. The CBP FM&E Sector TI Coordinator would work closely with the sector for all maintenance and repair activities. Proposed activities would be managed by the Project Management Office's (PMO) Maintenance and Repair Supervisor. CBP proposes to conduct the following forms of tactical infrastructure maintenance and repair. Although a majority of anticipated tactical infrastructure can be found within the geographic areas shown in **Figure 1-1**, the exact extent, location, and amount of tactical infrastructure to be maintained could change over time to accommodate CBP needs.

2.3.1 Tactical Infrastructure Assets

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.3.2 Location of Tactical Infrastructure to be Maintained and Repaired

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

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

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

Tactical Infrastructure Assets on Tribal Land. As stated previously, the maintenance and repair of tactical infrastructure assets on tribal lands is analyzed in this EA. For maintenance and repair of tactical infrastructure assets on tribal land, CBP would formally seek consultations with the representatives of federally recognized Native American tribes that own or manage land along the U.S./Mexico international border or whose religious sites and practices may be affected by project activities to undertake the necessary maintenance and repair of tactical infrastructure assets on tribal land (DHS undated). CBP would seek the appropriate resolutions and abide by the internal governing rules and regulations for obtaining the necessary permits to perform the maintenance and repair.

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

2.3.2.1 Tactical Infrastructure Mapped within the Action Area in Texas

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

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

Depending on the number and nature of resources that could be impacted, a graduated series of BMPs would be identified to reduce impacts to less than significant levels. The BMPs are presented in **Appendix E** categorized by the affected resources. The combination of the informative maps and the relevant BMPs would provide CBP with a visual framework for applying appropriate maintenance and repair solutions in sensitive areas.

2.3.3 Maintenance and Repair Program

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

As part of the Proposed Action, fences and gates would be inspected on a routine basis to ensure gate mechanisms operate correctly and fence components are in good working condition. Maintenance and repair of fences and gates would occur as required. As part of preventative maintenance and repair of access roads, maintenance and repair activities would occur, as needed, based on quarterly inspections, and reactive maintenance and repair would occur upon discovery of damage due to intentional sabotages or weather events. During maintenance and repair of access roads, integrated bridges/crossovers would be inspected, maintained, and repaired as required. Drainage management structures would be inspected regularly during the rainy season and preventative maintenance and repair would occur to ensure operability. After storm events, reactive maintenance and repair would occur to ensure the structures are clear of debris and blockages. Preventative maintenance and repair of light systems would occur approximately every 2 to 3 years and all lights would be replaced. Maintenance and repair of towers would occur on an as-needed basis following regular inspections. Maintenance and repair of ancillary power systems would occur according to manufacturer specifications. Maintenance and repair would be scheduled to avoid migratory bird nesting seasons, or surveys would be conducted to determine if bird nests are present that must be avoided.

Under the Proposed Action, centralized maintenance and repair planning would be conducted by FM&E. In addition, FM&E would have complete program management responsibility for implementing maintenance and repair activities. For example, FM&E would formulate standard design specifications, which would consider BMPs and the environmental context of the tactical infrastructure to determine the priority and type of maintenance and repair needed.

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

- ***Step 1.*** USBP Sectors and Border Patrol Facilities and Tactical Infrastructure field maintenance and repair representatives identify maintenance and repair needs.
- ***Step 2.*** A team of CBP PMO interdisciplinary subject matter experts, including environmental staff, would decide on the best technical approach for ensuring desired specifications and standards and implementing applicable BMPs.
- ***Step 3.*** A cost estimate for the proposed maintenance and repair Work Plan would be prepared and submitted to the CBP chain-of-command for approval. Maintenance and repair actions are prioritized in coordination with USBP Sector management.
- ***Step 4.*** Coordination with appropriate landowners and regulatory agencies would occur on an as-needed basis. Portions of this step might be accomplished informally before Step 3.
- ***Step 5.*** Work Plan maintenance and repair activities would be performed by fully trained and qualified personnel (both CBP in-house and contractor personnel) and their work progress would be monitored by trained and experienced CBP personnel.
- ***Step 6.*** CBP representatives would review the completed maintenance and repair work and ensure it was completed to the prescribed specifications and standards and the corresponding BMPs were followed.
- ***Step 7.*** CBP and contractor personnel would provide suggestions for future Work Plans based on the execution and outcomes of tactical infrastructure maintenance and repair and would support the interdisciplinary technical team in developing improved maintenance and repair solutions in the future.

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

2.4 ALTERNATIVE 2: NO ACTION ALTERNATIVE

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

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

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

Table 2-1. Summary of Alternatives Identified

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

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER DETAILED ANALYSIS

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

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

2.5.2 No Maintenance and Repair of Tactical Infrastructure

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

2.5.3 Maintenance and Repair Program Using Only Mandatory BMPs

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

2.6 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

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

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3. AFFECTED ENVIRONMENT AND CONSEQUENCES

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

The following discussion elaborates on the nature of the characteristics that might relate to impacts on resources.

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

effects, or unique or unknown risks; if there are precedent-setting effects; and their cumulative effects (see **Section 4**).

3.1 PRELIMINARY IMPACT SCOPING

In accordance with NEPA, CEQ regulations, and DHS Directive 023-01, the following evaluation of environmental effects focuses on those resources and conditions potentially subject to effects and potentially significant environmental issues deserving of study, and deemphasizes insignificant issues. Some environmental resources and issues that are often analyzed in an EA have been omitted from detailed analysis. The following provides the basis for such exclusions.

Aesthetics and Visual Resources

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

Human Health and Safety

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

Personnel are exposed to safety risks from the inherent dangers at any maintenance and repair site. Contractors would be required to establish and maintain safety programs at the maintenance and repair site. The proposed maintenance and repair would not expose members of the general public to increased safety risks. Therefore, because the Proposed Action would not introduce new or unusual safety risks, and assuming appropriate protocols are followed and implemented, detailed examination of safety is not included in this EA.

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

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

Sustainability and Greening

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

A number of policies, statutes, EOs, and supplemental agency policies and guidance exist to shape the Federal government's policies on sustainability. EO 13423 (January 24, 2007), *Strengthening Federal Environmental, Energy, and Transportation Management*, promotes environmental practices, including acquisition of bio-based, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and maintenance of cost-effective waste prevention and recycling programs at Federal facilities. EO 13514 (October 5, 2009), *Federal Leadership in Environmental, Energy, and Economic Performance*, sets sustainability goals for Federal agencies and focuses on making improvements in agency environmental, energy, and economic performance. EO 13514 does not rescind or eliminate the requirements of EO 13423. Instead, it expands on the energy reduction and environmental performance requirements for Federal agencies identified in EO 13423 (FedCenter 2010). In addition to these EOs, DHS Directive 025-01, *Sustainable Practices for Environmental, Energy and Transportation Management*, establishes a policy to develop and implement sustainable practices and programs to help ensure that operations and actions are carried out in an environmentally, economically, and fiscally sound manner.

Implementation of the Proposed Action for the maintenance and repair of tactical infrastructure would use negligible amounts of resources. The adaptive management process would further the use of CBP's Environmental Management System in accordance with EO 13423, EO 13514, and DHS Directive 025-01. Therefore, beneficial effects on sustainability and greening would be expected.

Utilities and Infrastructure

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

3.2 LAND USE

3.2.1 Definition of the Resource

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

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

3.2.2 Affected Environment

Land use classifications along the U.S./Mexico international border in Texas include agriculture, rangeland, and urban, with extensive areas of recreation and wildlife management activities. Developed land, which makes up approximately 3 percent of the Texas action area, is highly modified and characterized by permanent or semi-permanent structures, pavement, or unvegetated areas. This land occurs throughout the action area with the highest concentrations occurring in the urban areas of El Paso, Del Rio, Eagle Pass, and Laredo; and the metropolitan region of the Rio Grande Valley that includes McAllen and Brownsville.

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

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

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

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

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

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

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

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

Additional Natural Areas. There are several state parks and natural areas within the action area, which include:

- Chinati Mountains State Natural Area
- Fort Leaton State Historic Site
- Big Bend Ranch State Park
- Seminole Canyon State Historic Site
- Lake Casa Blanca State Park
- Falcon State Park
- World Birding Center – Bensten-Rio Grande State Park
- World Birding Center – Estero Llano Grande State Park
- World Birding Center – Resaca de la Palma State Park
- Boca Chica State Park

3.2.3 Environmental Consequences

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

- Was inconsistent or in noncompliance with existing land use plans or policies

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

3.2.3.1 Alternative 1: Proposed Action

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

3.2.3.2 Alternative 2: No Action Alternative

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

3.3 GEOLOGY AND SOILS

3.3.1 Definition of the Resource

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

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

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (i.e., the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Natural Resources Conservation Service (NRCS) is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (see 7 CFR Part 658, 5 July 1984).

3.3.2 Affected Environment

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

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

The Edwards Plateau primarily occurs in central Texas and extends westward to include the border region of the Pecos River. This province includes the hill country and a broad plateau with entrenched streams, box canyons, and springs. The Edwards Plateau is capped by hard Cretaceous limestone that is susceptible to sinkholes and cavern formations. The Stockton Plateau is a mesa-like land formation in the far western extent of the Edwards Plateau province. The Pecos Canyons divide the Edwards and Stockton plateaus and are formed by the Pecos River and its contributing streams that form blind canyons with nearly vertical walls (University of Texas 1996).

The Gulf Coastal Plain includes three subprovinces from west to east along the border region: the Blackland Prairies, the Interior Coastal Plains, and the Coastal Prairies. The Blackland Prairies have a gently undulating surface with deep, black, fertile clay soils. These soils transition to thin red and tan sandy and clay soils in the Interior Coastal Plains subprovince, near Eagle Pass. This sandy region composes the vast majority of the Gulf Coastal Plain within the action area. The Coastal Prairies of the Gulf Coastal Plains occur within Hidalgo and Cameron counties and continue to the coastline of the Gulf of Mexico. This subprovince consists of young deltaic sands, silts, and clays that erode to nearly flat grasslands. Broad sand sheets with low dunes and blowouts dominate the landscape around Brownsville (University of Texas 1996). Rivers in this area are mature with broad low relief valleys. Remnant sand dunes from previous shorelines, now superseded by progressively younger shorelines, locally form small rounded hills (USACE 1994c).

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

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

Soils along the eastern portion of the action area are primarily well-drained, and composed of gravelly to fine sandy loams. However, there are areas of clays and silts (e.g., Tigua-Harkey-Glendale-Gila) and rock land. Poorly drained clayey and loamy soils and deep sandy soils (e.g., Lomalta-Galveston-Sejita) are mapped within the coastal area from Brownsville to Baffin Bay. Loamy soils and cracking clayey soils of the Rio Grande plain (e.g., Rio Grande-Camargo-Matamoros soils) are mapped along the Rio Grande from Brownsville to the Falcon Reservoir, while the Harlingen-Laredo-Lagloria soil association forms the Rio Grande terraces in Cameron and parts of Hidalgo counties. The remainder of the Rio Grande terraces consists of the loamy McAllen-Brennan soils in the eastern part of Hidalgo County. Cracking and crumbling loamy clayey soils (e.g., Catarina-Montell-Jimenez) are shallow to moderately deep over indurated caliche from Falcon Reservoir to south of Eagle Pass. These soils dominate much of the area. From Eagle Pass to Del Rio, the same type of soil exists but is represented by the Uvalde-Montell-Zapata association (USACE 1994c).

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

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

Geologic Hazards. The 2008 Texas Seismic Hazard Map shows that the seismic hazard for the Texas portion of the U.S./Mexico international border ranges from 0 to 2 percent of the force of gravity (percent g) along the Gulf of Mexico coast to up to 30 percent g along the western boundary with Mexico, south of El Paso. This indicates that, during a seismic event, little damage would occur towards the coast, but major damage could occur south of El Paso (USEPA 2011c).

Approximately 10 faults have been identified within 30 miles of the Texas portion of the U.S./Mexico international border. Each of the faults has an estimated slip rate of less than 0.2 millimeters per year (mm/year), with the last major ruptures ranging from less than

130,000 years to less than 1.6 million years ago (USGS 2009). Therefore, movement along faults within the action area is unlikely to occur.

3.3.3 Environmental Consequences

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

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

3.3.3.1 Alternative 1: Proposed Action

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

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

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

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

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

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

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

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

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

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

3.3.3.2 Alternative 2: No Action Alternative

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

3.4 VEGETATION

3.4.1 Definition of the Resource

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

Bailey's multi-tiered classification of ecoregions contained in the *Descriptions of the Ecoregions of the United States* was used to provide general descriptions of the ecology within the action area (Bailey 1995). An ecoregion contains geographically distinct environmental communities and conditions. Because ecoregions are defined by their shared biotic and abiotic characteristics, they represent practical units on which to base conservation planning. Domains are defined by climate and split into divisions, which are defined according to climate and vegetation. Divisions are subsequently split into provinces that are typically defined by their major plant formations (USFS 2010).

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

3.4.2 Affected Environment

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

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

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

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

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

Chihuahuan Mixed Desert and Thornscrub. This ecological system, which makes up approximately 18 percent of the action area, is a widespread desert scrub that occurs on foothills, alluvial fans (i.e., fan-shaped sediments deposited by a river or stream), and bajadas (i.e., lower slopes of mountains characterized by loose alluvial sediments and poor soil development) in the Chihuahuan Desert of west Texas. It generally occurs above desert plains and extends up to the transition of dense shrubs and trees. Soils are typically well-drained, non-saline gravelly loams. Vegetation is characterized by the presence of creosote bush, typically mixed with thornscrub or other desert scrub such as lechuguilla, Wright's beebrush (*Aloysia wrightii*), yerba de pasmo (*Baccharis pteronioides*), amargosa, green sotol (*Dasylirion leiophyllum*), catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*), Rio Grande saddlebush (*Mortonia scabrella*), cactus apple (*Opuntia engelmannii*), and honey mesquite, with littleleaf sumac (*Rhus microphylla*) occurring in or near drainages. Stands of acacia (*Acacia* spp.) or acacia-dominated thornscrub are included in this system. This system also includes upper piedmont deposits at the base of mountains derived from the weathering of the mountains and the transport and deposition of the weathered materials by streams. Stands of desert scrub within this system are strongly dominated by creosote bush. Grasses are common but generally have lower cover than shrubs (NatureServe 2010a).

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

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

Chihuahuan Creosotebush Desert Scrub. This ecological system, which makes up approximately 11 percent of the action area, is a common lower elevation desert scrub that occurs throughout much of the Chihuahuan Desert of west Texas. Stands typically occur in flat to gently sloping desert basins and on alluvial plains, extending up into lower to mid positions of bajadas. Substrates range from coarse-textured loams on gravelly plains to finer-textured silt and clay soils in basins. Soils are alluvial (deposited by water), typically loamy and non-saline, and frequently calcareous (calcium-rich). The vegetation is characterized by a moderate to sparse shrub layer (less than 10 percent cover on extremely xeric [dry] sites) that is typically strongly dominated by creosote bush and American tarwort (*Flourensia cernua*). A few scattered shrubs or succulents can also be present, such as lechuguilla, mariola (*Parthenium incanum*), leatherstem (*Jatropha dioica*), crown of thorns (*Koeberlinia spinosa*), desert-thorn (*Lycium* spp.), and yucca. Additionally, American tarwort often strongly dominate in silty basins. In general, shrub diversity is low in this system. Herbaceous cover is usually low and composed of grasses (NatureServe 2010a).

Chihuahuan Succulent Desert Scrub. This ecological system, which makes up approximately 8 percent of the action area, is found in the Chihuahuan Desert of west Texas on colluvial slopes (loose gravity deposited slopes), upper bajadas, canyons, hills, and mesas. Sites are hot and dry, typically with southerly aspects. The vegetation is characterized by the relatively high cover of succulent species such as lechuguilla, candelilla (*Euphorbia antisyphilitica*), ocotillo (*Fouquieria splendens*), barrel cacti (*Ferocactus* spp.), prickly-pear cacti, yucca, and many others. Perennial grass cover is generally low. The abundance of succulents is diagnostic of this desert scrub system, but desert shrubs are usually present (NatureServe 2010a).

Apacherian-Chihuahuan Semi-Desert Grassland and Steppe. This ecological system, which makes up approximately 8 percent of the action area, is a broadly defined desert grassland, mixed shrub-succulent, or xeromorphic oak savanna. This system is typical of the borderlands of Arizona, New Mexico, and northern Mexico, but it also extends west to the Sonoran Desert and throughout much of the Chihuahuan Desert, including parts of west Texas. It is found on slopes up to 5,479 feet in elevation in the Chihuahuan Desert. It is characterized by typically diverse perennial grasses. Common species include various types of grama (*Bouteloua* spp.), plains lovegrass (*Eragrostis intermedia*), bullgrass (*Muhlenbergia emersleyi*), muhly, curlyleaf muhly, and James' galleta (*Pleuraphis jamesii*); succulent species such as agave (*Agave* spp.) and yucca; short-shrub species of stickpea (*Calliandra* spp.), mimosa (*Mimosa* spp.), and feverfew (*Parthenium* spp.); and tall-shrub/short-tree species of acacia, mesquite, and various oaks (*Quercus* spp.) (NatureServe 2010a).

Tamaulipan Calcareous Thornscrub. This arid thornscrub ecological system, which makes up approximately 6 percent of the action area, is restricted to limestone and calcareous sandstone hills and caliche substrates in south Texas. This system has an open shrub canopy that is usually less than 6.6 feet tall; however, shrub cover is generally greater than 70 percent and often greater than 85 percent of total vegetative cover. Dominant species include Texas barometer bush, guajillo, sweet acacia, and other shrub species that can be locally dominant including blackbrush acacia, mountain torchwood, Texas torchwood, amargosa, spiny hackberry, Texas kidneywood (*Eysenhardtia texana*), barreta (*Helietta parvifolia*), crown of thorns, Texas paloverde, mescal bean (*Sophora secundiflora*), or yucca. The sparse to moderately dense herbaceous layer is dominated by perennial grasses (NatureServe 2010a).

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

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

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

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

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

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

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

North American Warm Desert Riparian Woodland and Shrubland. This ecological system, which makes up less than 1 percent of the action area, consists of low-elevation (i.e., less than 3,937 feet) riparian corridors along medium to large perennial streams throughout canyons and desert valleys of the southwestern United States and adjacent Mexico. Rivers include the lower Colorado (into the Grand Canyon), Gila, Santa Cruz, Salt, lower Rio Grande, and the lower Pecos. The vegetation is a mix of riparian woodlands and shrublands. Dominant trees include boxelder, velvet ash (*Fraxinus velutina*), Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), netleaf hackberry (*Celtis laevigata* var. *reticulata*), California sycamore (*Platanus racemosa*), and Arizona walnut (*Juglans major*). Dominant shrubs include Geyer willow (*Salix geyeriana*), silver buffaloberry (*Shepherdia argentea*), and narrowleaf willow (*Salix exigua*). Vegetation is dependent upon annual or periodic flooding and associated sediment scour and annual rise in the water table for growth and reproduction (NatureServe 2010a).

Pasture/Hay and Cultivated Cropland. These are agricultural lands that typically have either a perennial herbaceous cover in the case of Pasture/Hay, or have seasonal fluctuations in annual or perennial plant cover in the case of cultivated croplands (NatureServe 2010a). Together these lands make up approximately 3 percent of the action area. Both systems typically do not contain significant cover from native plant species. In general, grading, fertilizer application, and irrigation have converted these areas to a completely different community type than what was originally present. Agriculture can also include ordinary pasture maintenance and renovation, and dry land farming operations consistent with rangeland management and soil disturbance activities. These lands occur at varying densities throughout the action area with the largest concentration occurring in the Rio Grande Valley of south Texas (Holland 1986).

Developed. This is a system composed of areas of intensive use with much of the land constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported (Oberbauer et al. 2008). Developed land, which makes up approximately 3 percent of the action area, is highly modified and characterized by permanent or semi-permanent structures, pavement, or unvegetated areas. This land occurs throughout the action area with the highest concentrations occurring in the urban areas of El Paso, Del Rio, Eagle Pass, and Laredo; and the metropolitan region of the Rio Grande Valley that includes McAllen and Brownsville.

3.4.3 Environmental Consequences

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

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

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

3.4.3.1 Alternative 1: Proposed Action

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

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

Degradation of plant communities would also occur if petroleum products or other hazardous materials are accidently released during operation or storage of maintenance and repair vehicles and other equipment. All regulatory requirements for handling and storage of fuels, oils, and other hazardous materials, such as the development of spill prevention plans, would be implemented.

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

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

- If vegetation must be cut back, allow natural regeneration of native plants by cutting vegetation with hand tools, mowing, trimming, or other vegetation-control methods that allow root systems to remain intact.
- Vegetation targeted for retention would be flagged to reduce the likelihood of being treated.
- Vegetation control would be timed to avoid the migration, breeding, and nesting timeframe of migratory birds (March 15 through September 15). Herbicide retreatments could occur throughout the year. If initial mechanical and chemical vegetation control or subsequent mechanical vegetation control needs to be implemented during March 15 through September 15, a survey for nesting migratory birds would be conducted immediately prior to the start of activities. Cutting of riparian vegetation would be avoided within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.
- The method of vegetation control used on a levee would ensure that the integrity of the levee is maintained.
- A fire prevention and suppression plan would be developed and implemented for all maintenance and repair activities that require welding or otherwise have a risk of starting a wildfire.

- Fill material, sandbags, hay bales, and mulch brought in from outside the project area by its source location would be identified and sources that are sterile or weed-free would be used.
- Project operations including both initial treatment and subsequent maintenance and repair would be timed to avoid the migration, breeding, and nesting timeframe of special status species. In general, mechanical vegetation treatment and retreatment would occur between October 1 and March 31. Herbicide retreatments would occur throughout the year.
- Control of riparian vegetation within 100 feet of aquatic habitats would be avoided to provide a buffer area to protect the habitat from sedimentation.
- For all in-water work in streams, sediment barriers would be used to avoid downstream effects of turbidity and sedimentation.

3.4.3.2 Alternative 2: No Action Alternative

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

3.5 TERRESTRIAL AND AQUATIC WILDLIFE RESOURCES

3.5.1 Definition of the Resource

This section provides a description of the wildlife and aquatic resources expected to occur within the action area. Terrestrial wildlife resources include native or naturalized terrestrial animals and the habitats in which they exist. Aquatic wildlife resources include native or naturalized aquatic animals and the habitats in which they exist. Species addressed in this section include those that are not listed as threatened or endangered by the Federal government. Federal threatened and endangered species, other sensitive wildlife species, and migratory birds are addressed in **Section 3.6.**

3.5.2 Affected Environment

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

Trans-Pecos. The Chihuahuan Desert covers the vast area of far west Texas known as the Trans-Pecos. Pronghorn antelope (*Antilocapra americana*) and southern mule deer (*Odocoileus hemionus*) are the most widely distributed large game animals within this area. The javelina (*Pecari tajacu*) is also a common species. The black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kangaroo rat *(Dipodomys* spp.), wood rat (*Neotoma floridana*), and numerous smaller rodents compete with domestic and wild herbivores. Mammalian predators include the coyote (*Canis latrans*) and bobcat (*Lynx rufus*). Common mammals in the shrublands east of the Trans-Pecos include nine-banded armadillo (*Dasypus novemcinctus*), fox squirrel (*Sciurus niger*), white-footed mouse (*Peromyscus leucopus*), black rat (*Rattus rattus*), house mouse (*Mus musculus*), raccoon (*Procyon lotor*), coyote, white-tailed deer (*Odocoileus virginianus*), and cottontail (*Sylvilagus* spp.).

The black-throated sparrow is one of the most abundant birds of the Trans-Pecos. Greater roadrunner (*Geococcyx californianus*), curve-billed thrasher (*Toxostoma curvirostre*), and Chihuahuan raven (*Corvus cryptoleucus*) are also common. Scaled quail (*Callipepla squamata*) and Gambel's quail (*Callipepla gambelii*) occupy most of the area, and northern bobwhite (*Colinus virginianus*) populations are also present. Raptors include the golden eagle (*Aquila chrysaetos*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), and the rare zone-tailed hawk (*Buteo albonotatus*). Common avian species in the shrublands east of the Trans-Pecos include mourning dove, yellow-billed cuckoo (*Coccyzus americanus*), chimney swift (*Chaetura pelagica*), black-chinned hummingbird (*Archilochus alexandri*), red-bellied woodpecker (*Melanerpes carolinus*), purple martin (*Progne subis*), cliff swallow *(Petrochelidon pyrrhonota*), blue jay (*Cyanocitta cristata*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Parus bicolor*), Carolina wren (*Thryothorus ludovicianus*), Bewick's wren (*Thryomanes bewickii*), northern mockingbird (*Mimus polyglottos*), white-eyed vireo (*Vireo griseus*), black-and-white warbler (*Mniotilta varia*), northern cardinal (*Cardinalis cardinalis*), rufous-crowned sparrow (*Aimophila ruficeps*), lark sparrow (*Chondestes grammacus*), great-tailed grackle (*Quiscalus mexicanus*), and house sparrow (*Passer domesticus*) (Bailey 1995). Migratory bird nesting occurs from March 15 through September 15 in the action area

The Trans-Pecos is characterized by many reptiles, including the common chuckwalla, Texas horned lizard (*Phrynosoma cornutum*), desert spiny lizard (*Sceloporus magister*), and various species of rattlesnakes (*Crotalus* spp.) (Bailey 1995). Common species of amphibians east of the Trans-Pecos include spadefoot toads (*Scaphiopus* spp.), chorus frogs (*Pseudacris* spp.), true toads *(Bufo* spp.), and true frogs (*Rana* spp.). Common snakes include rat snakes (*Elaphe* spp.), water snakes (*Nerodia* spp.), western diamondback rattlesnakes (*Crotalus atrox*), and Texas coral snakes (*Micrurus fulvius tener*). Common turtles of southern Texas include eastern river cooter (*Pseudemys concinna*), ornate box turtle (*Terrapene ornata*), yellow mud turtle (*Kinosternon flavescens*), Texas tortoise (*Gopherus berlandieri*), smooth softshell (*Apalone mutica),* and spiny softshell (*A. spinifera*) (Bailey 1995).

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

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

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

Reptiles and amphibians observed during the surveys in 2008 include the blue spiny lizard (*Sceloporus serrifer*), Laredo striped whiptail (*Cnemidophorus laredoensis*), prairie racerunner (*Cnemidophorus sexlineata viridis*), Texas horned lizard, Texas spiny softshell turtle (*Apalone spinifera emoryi*), Rio Grande cooter (*Pseudemys gorzugi*), Rio Grande leopard frog (*Lithobates berlandieri*), Rio Grande chirping frog (*Eleutherodactylus cystignathoides*), Mexican treefrog (*Smilisca baudinii*), Gulf Coast toad (*Incilius valliceps*), and the giant (marine) toad (*Rhinella marina*) (CBP 2008a).

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

3.5.3 Environmental Consequences

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

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

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

3.5.3.1 Alternative 1: Proposed Action

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

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

Localized degradation of habitat would also occur if petroleum products or other hazardous materials are accidently released during operation or storage of maintenance vehicles and other equipment. All regulatory requirements for handling and storage of fuels, oils, and other hazardous materials, such as the development of spill prevention plans, would be implemented. Thus, habitat degradation resulting from accidental releases of hazardous materials would be negligible.

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

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

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

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

- Vegetation control including both initial treatment and subsequent maintenance would be timed to avoid the migration, breeding, and nesting timeframe of special status species. In general, mechanical vegetation treatment and retreatment would occur between October 1 and March 31. Herbicide retreatments would occur throughout the year.
- Ensure temporary light poles and other pole-like structures used for maintenance activities have anti-perch devices to discourage roosting by birds.
- Minimize animal collisions during maintenance and repair activities by not exceeding speed limits of 35 miles per hour (mph) on major unpaved roads (i.e., graded with ditches on both sides) and 25 mph on all other unpaved roads. During periods of decreased visibility (e.g., night, poor weather, curves), do not exceed speeds of 25 mph.
- To prevent entrapment of wildlife species, ensure excavated, steep-walled holes or trenches are either completely covered by plywood or metal caps at the close of each work day or provided with one or more escape ramps (at no greater than 1,000-foot intervals and sloped less than 45 degrees) constructed of earth fill or wooden planks.
- Each morning before the start of maintenance activities and before such holes or trenches are filled, ensure they are thoroughly inspected for trapped animals. Ensure that any animals discovered are allowed to escape voluntarily (by escape ramps or temporary structures), without harassment, before maintenance activities resume; or are removed from the trench or hole by a qualified person and allowed to escape unimpeded.

3.5.3.2 Alternative 2: No Action Alternative

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

By completing maintenance and repair work on an as-needed basis, the potential exists for increased impacts on wildlife species. Without a centralized planning process, maintenance and repair specifications would not be established and standardized BMPs might not be implemented (e.g., without a standardized BMP requiring that the footprint of the maintenance area be flagged or marked, wildlife habitat immediately adjacent to the maintenance footprint could be impacted if maintenance activities went beyond the footprint). In addition, maintenance and repair activities planned on an ad hoc basis without uniform application of centralized standards would likely lead to inconsistent outcomes and greater risk to environmental resources such as wildlife.

For example, it might not allow the implementation of BMPs that require scheduling preventative maintenance around important seasons, such as the growing or active season when sensitive species might be vulnerable. Thus, some wildlife species and their habitat adjacent to tactical infrastructure could be degraded or destroyed. Therefore, it is possible that greater impacts would occur under the No Action Alternative than the Proposed Action, as the potential for habitat disturbances would be greater due to the lack of a proactive approach to maintenance and repair.

3.6 THREATENED AND ENDANGERED SPECIES

3.6.1 Definition of the Resource

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

3.6.2 Affected Environment

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

An additional 34 threatened or endangered species occur within the counties along the U.S./Mexico international border in Texas. These species would not be affected by the Proposed Action because they do not occur or are very rare in areas where tactical infrastructure is located, or because no activities would be conducted within or near habitat used by these species along or near the U.S./Mexico international border. Therefore, these 34 species are not discussed further. The species are Davis' green pitaya (*Echinocereus viridiflorus* var. *davisii*), little Aguja

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

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

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

Common Name	Habitat	Blooming Season
Ashy dogweed	Open areas on fine sandy-loam soils on level or rolling grasslands.	March–May
Bunched cory cactus	Bouquillas and Santa Elena limestone formation within Chihuahuan desert scrubland.	April–August
Chisos Mountain hedgehog cactus	Alluvial flats at elevations of 1,950 to 2,250 feet in Chihuahuan desert vegetation.	March–July
Hinckley's oak	Dry limestone slopes at elevations between 3,500 and 4,500 feet in Chihuahuan desert vegetation.	March–April
Johnston’s frankenia	Open or sparsely vegetated rocky gypsies hillsides, and saline flats.	year-round
Lloyd’s Mariposa cactus	Very open area with few shrubs in the Chihuahuan desert scrubland at elevations between 2,500 and 3,500 feet.	July–August
Tobusch fishhook cactus	Eastern Edwards Plateau of Texas on high stream banks.	April–September
Sneed pincushion cactus	Cracks on vertical limestone cliffs and ledges within semi-desert grasslands at elevations of 3,900 to 7,700 feet.	March–May
South Texas ambrosia	Subtropical woodland communities within coastal prairies and savannas with well-drained, heavy soils at low elevations from 23 to 66 feet.	year-round
Star cactus	Sparse open thorn shrub and grasslands with gravelly clay and loam soils.	late summer–early fall
Terlingua Creek cat’s-eye	Open or sparsely vegetated areas with impure silty limestone soils (Fizzle Flat lentil) at elevations between 3,150 and 3,450 feet.	March–May
Texas ayenia	Open ground, on the edges of thickets, or within thickets, and on dry, alluvial clay soils.	year-round
Texas snowbells	Edwards Plateau Vegetation Area. Lightly wooded areas with vertical limestone and dolomite cliffs.	March–May
Walker’s manioc	Endemic to the Tamaulipan biotic province. Grows among low shrubs, native grasses, and herbaceous plants, either in full sunlight or in the partial shade of shrubs.	April–September
Zapata bladderpod	Graveled to sandy-loam soils on upland terraces that are above the Rio Grande floodplain.	February–April

pondweed (*Potamogeton clystocarpus*), Nellie cory cactus (*Coryphantha minima*), Pecos sunflower (*Helianthus paradoxus*), Texas wild-rice (*Zizania texana*), Peck’s cave amphipod (*Stygobromus pecki*), Pecos assiminea (*Assiminea pecos*), Comal Springs drypoid beetle (*Stygoparnus comalensis*), Comal Springs riffle beetle (*Heterelmis comalensis*), Comanche Springs pupfish (*Cyprinodon elegans*), Diamond tryonia (*Pseudotryonia adamantine*), diminutive amphipod (*Gammarus hyalleloides*), fountain darter (*Etheostoma fonticola*), Gonzales tryonia (*Tryonia circumstriata*), Leon Springs pupfish (*Cyprinodon bovinus*), Pecos amphipod (*Gammarus pecos*), Pecos gambusia (*Gambusia nobilis*), Phantom springsnail (*Pyrgulopsis texana*), Phantom tyonia (*Tryonia cheatumi*), San Marcos salamander (*Eurycea nana*), Texas blind salamander (*Typhlomolge rathbuni*), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), golden-cheeked warbler (*Dendroica chrysoparia*), interior least tern (*Sterna antillarum*), Mexican spotted owl (*Strix occidentalis lucida*), northern aplomado falcon (*Falco femoralis septentrionalis*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*, Proposed), west Indian manatee (*Trichechus manatus*), and whooping crane (*Grus americana*).

3.6.2.1 Terrestrial Threatened and Endangered Species

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

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

Ashy dogweed requires unique soils that exist in south Texas. Existing populations are on sandy pockets of Maverick-Catarina, Copita-Zapata, and Nueces Comita soils (TPWD 2009). These sandy or sandy-loam soils that occur on level or rolling grasslands are often shrub-invaded with Mesquite-Acacia thorn brush (NatureServe 2010b). Ashy dogweed is known to occur in the south Texas counties of Starr, Webb, and Zapata (TPWD 2009). However, this species has not been observed in Starr County since 1932. At the time the recovery plan was published (USFWS 1987a), the total population occupied approximately 25 acres and was estimated at 1,300 individual plants on a right-of-way (ROW) owned by the Texas Department of Transportation and an adjacent private tract of land (USFWS 1987a). NatureServe data indicate one elemental occurrence of approximately 1,000 ashy dogweed plants within Zapata County and USGS topographic quadrangle maps O'Keefe Lake and Arroyo Salado West within the action area (NatureServe 2010b).

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

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

The bunched cory cactus is restricted to the Bouquillas and Santa Elena limestone formation and is distributed along cracks in rock ledges at edges of canyons and on hilltops in the lechuguilla shrublands of the Chihuahuan Desert (USFWS 1979). In the northern part of its range, this species is mostly confined to rocky, well-drained, and fully sunlit sites on steep canyon sides and hill summits along the canyons of the Rio Grande. The elevation range for bunched cory cactus is between 2,500 and 3,500 feet. This species is found in Texas near the Rio Grande in Brewster and southern Terrell counties, and south into the adjacent state of Coahuila, Mexico (NatureServe 2010a). It is known from about 25 sites, many within Big Bend National Park (TPWD 2007). It is found primarily as widely scattered populations or individuals occurring in canyons along the Rio Grande from Mariscal Canyon in Brewster County, downriver to Sanderson Canyon in Terrell County (USFWS 1989a). Five new sites recently accessed on privately owned land south of Sanderson, Texas, suggest that plant populations might extend even farther east than previously believed (CPC 2010). NatureServe data indicate that there are 23 records of elemental occurrence of bunched cory cactus within Brewster and Terrell counties, Texas, and USGS topographic quadrangle maps Solis, San Vincente, Boquillas, Stillwell Crossing, Bourland Canyon, Black Gap, Cupola Mountain, Las Vegas De Los Ladrones, Yellow House Peak, Dove Mountain, Taylor Canyon, McCain Canyon, and Sanderson within the action area (NatureServe 2010b).

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

Chisos Mountain hedgehog cactus (*Echinocereus chisoensis* var. *chisoensis*). This is a short, cylindrical cactus, reddish-maroon in color, that becomes greener in summer. The stems are often singular, though they occasionally form clumps. Spines are relatively sparse and do not completely obscure the stem. The flowers, colored various shades of pink, are quite distinctive and appear from March to July (USFWS 1993a).

The Chisos Mountain hedgehog cactus can be found in low-elevation desert grasslands or sparsely vegetated shrublands within the Chihuahuan Desert on alluvial flats at elevations between 1,950 to 2,250 feet. It frequently grows on bare soil at the base of creosote bushes, and also among the stems of dog cholla (*Opuntia schotti*). There are 11 known occurrences of Chisos Mountain hedgehog cactus, consisting of fewer than 1,000 individuals (USFWS 1993a). The overall range of this plant is limited to a very small area on the southeastern side of Big Bend National Park in extreme southwestern Texas (NatureServe 2010a). Individual plants are widely scattered over the desert floor, sometimes hundreds of yards apart, and well hidden at the bases of creosote bushes and dog cholla (USFWS 1993a). The populations at Big Bend National Park are extremely scattered, both between and among groups. Within the action area, NatureServe provides records of 12 elemental occurrences of Chisos Mountain hedgehog cactus within Brewster County and USGS topographic quadrangle maps San Vicente, Boquillas, Glen Springs, Roy's Peak, and Panther Junction (NatureServe 2010b).

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

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

Hinckley's oak is found at middle elevations in Chihuahuan Desert scrub vegetation. It grows on dry limestone slopes between 3,500 to 4,500 feet in elevation, in habitat that receives an average of 10 inches of rain per year (CPC 2010). Hinckley's oak is found in desert shrublands in Brewster and Presidio counties. Currently only 10 populations are known. Nine of these are in Big Bend Ranch State Park and the other is near Shafter, Texas (NatureServe 2010a, TPWD 2007). Most populations consist of less than 100 individuals and cover an area of less than 5 acres. The development of more arid climates is thought to have restricted the species to a few sites within its old range of distribution, resulting in a patchy distribution of a few populations with relatively few individuals (USFWS 1992). Within the action area, NatureServe provides a record for 10 elemental occurrences of Hinckley's oak within USGS topographic quadrangle maps of Ernst Valley, Sue Peaks, McKinney Springs, Dagger Flat, Boquillas, The Solitairio and Shafter. Nine of the occurrences are within Presidio County, and one is in Brewster County (NatureServe 2010b).

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

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

Johnston's frankenia generally grows on open or sparsely vegetated, rocky, gypseous hillsides or saline flats. In Texas, this species is endemic to Webb, Zapata, and Starr counties, which all occur within the action area. Johnston's frankenia populations have a clumped distribution, occurring in openings of the Tamaulipan thorn scrub where the plant thrives in a setting of high light intensity (CBP 2008b). NatureServe provides a record for eight elemental occurrences of Johnston's frankenia within USGS topographic quadrangle maps Roma-Los Saenz West, Roma-Los Saenz East, Saline no, Arroyo Clarion, Beckwith Arm, Arroyo Salad West, Blanca's Creek North, and Laredo South (NatureServe 2010b).

Threats include a severely restricted distribution, low numbers of individual plants, road construction, residential development, and oil- and natural gas-related activities. This species also has a very low reproductive potential (CBP 2008b).

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

Lloyd's Mariposa cactus can be found in arid, gravelly, limestone-derived soils on gentle slopes, primarily on the Boquillas Formation in the Chihuahua Desert between 2,500 to 3,500 feet (NatureServe 2010a). Lloyd's Mariposa cactus occurs as scattered individuals or occasionally as dense concentrations on hills and ridges in three parts of the Big Bend Region of Texas. One area occupies the southeastern corner of Brewster County, another area occupies the northeastern portion of Big Bend National Park, and a third area occupies the eastern portion of Brewster County north of Black Gap WMA (USFWS 1989b). Within the action area, NatureServe provides a record for 23 elemental occurrences of Lloyd's Mariposa cactus within Brewster County and USGS topographic quadrangle maps Ernst Valley, Boquillas, Roy's Peak, Amarilla Mountain, McKinney Springs, Black Gap, Bourland Canyon, Dagger Flat, Bone Spring NE, Las Vegas De Los Landrones, Stillwell Mountain, Dove Mountain, Yellow House Peak, and Pine Mountain West (NatureServe 2010b).

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

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

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

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

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

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

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

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

The star cactus occurs among sparse, low shrubs, grasses, and halophytic (salt-tolerant) plants on dry upland sites. Soils are usually gravelly clays or loams, and typically contain high levels of gypsum, salt, or other alkaline minerals. The star cactus can occur in full sun, or beneath the partial shade of low grasses and sub-shrubs, such as red grama (*Bouteloua trifida*), saladillo (*Varilla texana*), and calderona (*Krameria ramosissima*). However, it does not tolerate the dense shade of taller shrubs and trees. In the United States, 13 small populations are currently known in Starr County, Texas, on Catahoula and Frio soils. Reliable historic records include similar habitat types in Zapata and Jim Hogg counties. Other reports of star cactus from Hidalgo and Cameron counties can be misleading; these anecdotal accounts do not indicate specific locations, nor were voucher specimens deposited in any herbaria (USFWS 2003). Within the action area, NatureServe provides a record for two elemental occurrences of star cactus within Starr County and USGS topographic quadrangle maps Rio Grande City North and El Suaz (NatureServe 2010b).

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

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

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

Plants are limited to an area of slightly greater than 100 square miles in the drainage of upper Terlingua Creek in Brewster County. There are approximately 5,000 individuals in 10 unprotected populations on privately owned land. All of these populations are within a 100-square-mile area near Big Bend National Park, but not on park land. Populations occupy sites from 5 to 500 acres (averaging about 100 acres), and numbers of individuals within populations vary from 50 to approximately 2,000 (with an average of 450 individuals) (USFWS 1993b). Within the action area, NatureServe provides a record for eight elemental occurrences of Terlingua Creek cat's-eye within Brewster County and USGS topographic quadrangle maps Packsaddle Mountain and Agua Fria Mountain (NatureServe 2010b).

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

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

Texas ayenia occupies dense subtropical woodland communities at low elevations. The current population occupies a Texas Ebony-Anaqua (*Pithecellobium ebano-Ehretia anacua*) plant community. This plant community occurs on well-drained riparian terraces with canopy cover close to 95 percent. Species found in this community include la coma *(Bumelia celastrina),* brasil *(Condalia hookeri),* granjeno (*Celtis pallida),* and snake-eyes *(Phaulothamnus spinescens).* This plant is an endemic species of southern Texas and northern Mexico whose historical range included Cameron and Hidalgo counties, Texas, and the states of Coahuila, Nuevo Leon, and Tamaulipas in Mexico. The only known populations of Texas ayenia in the

United States are within Cameron, Hidalgo, and Willacy counties (USFWS 1994a). Within the action area, NatureServe provides a record for six elemental occurrences of Texas ayenia within Cameron County and USGS topographic quadrangle maps East Brownsville, West Brownsville, Olmito, along with Hidalgo County and within quadrangle maps Progreso and Mercedes (NatureServe 2010b).

Habitat loss and degradation from agriculture or urban development have reduced the Texas Ebony-Anaqua vegetation community by greater than 95 percent. Texas ayenia has been reduced to one known population of 20 individuals that is extremely vulnerable to extinction (USFWS 2010b).

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

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

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

At the time of listing, there were less than 200 individual documented Tobusch fishhook cacti in Bandera and Kerr counties. By 1985, new populations were discovered in Real, Kimble and Uvalde counties. By 1999, the total known number of individual Tobusch fishhook cactus had grown to 3,395 within Bandera, Edwards, Kerr, Kimble, Kinney, Real Uvalde and Val Verde counties (USFWS 2010c). Within the action area, NatureServe provides a record for seven elemental occurrences of Tobusch fishhook cactus within USGS topographic quadrangle maps Anacacho, Odlaw, Clark Waterhole, Dolan Springs, and Telephone Canyon (NatureServe 2010a). Threats to the Tobusch fishhook cactus include real estate development, which limits the possibility of prescribed burns and alters natural habitat (USFWS 2010c).

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

Walker's manioc usually grows among low shrubs, native grasses, and herbaceous plants, either in full sunlight or in the partial shade of shrubs. Currently, 10 populations (five in Starr County and five in Hidalgo County) of Walker's manioc exist in Texas. These populations occur on private and public lands. Within the action area, NatureServe provides a historical record of five elemental occurrences of Walker's manioc occurring within Starr and Hidalgo counties. Two occurrences exist in Starr County within USGS topographic quadrangle maps La Grula and Rio Grande City North. Three occurrences exist in Hidalgo County within USGS topographic quadrangle map Mission (NatureServe 2010b).

More than 95 percent of Walker's manioc native brush habitat has been cleared in the United States for agriculture, urban development, and recreation. The United States population has been reduced to a few scattered plants, making the species vulnerable to extinction (USFWS 1993c).

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

The Zapata bladderpod occurs on graveled to sandy-loam upland terraces above the Rio Grande floodplain. It is associated with highly calcareous sandstones and clays. The bladderpod is a component of an open Texas sage–guajillo (*Leucophyllum frutescens – Acacia berlandieri)* shrubland alliance. The shrublands are sparsely vegetated and include the following species: blackbrush acacia (*Acacia rigidula)*, mesquite (*Prosopis* sp.), desert hackberry (*Celtis pallid)*, Spanish dagger (*Yucca treculeana)*, lotebush (*Ziziphus obtusifolia)*, and Texas lignum-vitae (*Guaiacum angustifolium*). This plant is endemic to southern Texas and possibly northern Mexico. Four populations are known in Starr County: two populations are found on the Lower Rio Grande Valley NWR and two occur on private land. Three populations are known from Zapata County: two are on highway ROWs between the towns of Zapata and Falcon, and another lies near Falcon Lake (USFWS 2004). Critical habitat has been designated for Zapata bladderpod (65 FR 81181–81212) and occurs within the action area. Within the action area, NatureServe provides a record for five elemental occurrences of Zapata bladderpod within Starr County and USGS topographic quadrangle maps Roma-Los Saenz West and Falcon Village. NatureServe also provides one record of Zapata bladderpod within Zapata County and USGS topographic quadrangle Zapata SE (NatureServe 2010b).

Habitat modification and destruction from increased road and highway construction and urban development; increased oil and gas exploration and development; and conversion of plant communities to improve pastures, overgrazing, and vulnerability due to low population numbers are all threats to the Zapata bladderpod (USFWS 2004).

Big Bend gambusia (*Gambusia gaigei*). This is a relatively small, live-bearing fish from the Poeciliidae. It is approximately 2 inches long at maturity. This species is yellowish with a faint lateral stripe, a bar beneath the eye, and a faint chin bar. Currently, the only wild population exists in a protected pond in Big Bend National Park. Although this population exists in open water with depths in excess of 3.3 feet, the Big Bend gambusia was most abundant among vegetation near the shore (USFWS 1984). All present populations of Big Bend gambusia are descendants of three fish (two males and one female) taken from the declining Rio Grande Village population in 1956. Within the action area, NatureServe provides a record of one elemental occurrence in Brewster County and USGS topographic quadrangle map Boquillas (NatureServe 2010b).

The Big Bend gambusia is threatened by runoff and flooding of the Rio Grande after heavy rains, which increases sediment deposition in the habitat and increases the likelihood that competitors will invade. Water diversions and decreased groundwater levels have decreased the flow from the springs. In addition, the Big Bend gamubsia is also susceptible to cold winters (USFWS 1984).

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

The Devils River minnow is generally associated with channels of fast-flowing, spring-fed waters over gravel substrates. This species is most often found where spring flow enters a stream, as opposed to the spring outflow itself. The Devils River minnow is native to tributary streams of the Rio Grande within Val Verde and Kinney counties, Texas, and Coahuila, Mexico. Historically the species occupied the Devils River, San Felipe Creek, Sycamore Creek, Las Moras Creek, and two bodies of water in Mexico: Rio San Carlos and Rio Salado drainage. The Devils River minnow was first discovered in the late 1950s within Las Moras Creek in Bracketville, Texas. Today, the species is believed to have been extirpated from Las Moras Creek, Rio San Carlos, and lower portions of the Devils River. A new population of Devils River minnow was discovered in 2001 in the headwaters of Pinto Creek in Kinney County (USFWS 1995). Currently the Devils River minnow occurs in only three streams in Kinney and Val Verde counties: Devils River, San Felipe Creek, and Pinto Creek (USFWS 2008b). Critical habitat has been designated for Devils River minnow (73 FR 46987–47026); and occurs within the action area. Within the action area, NatureServe provides a record for four elemental occurrences of Devil's River minnow within Kinney County and USGS topographic quadrangle maps Del Rio SE and Bracketville. Records of occurrences also exist in Val Verde County, Texas, and within USGS topographic quadrangle maps Del Rio SW, Del Rio, NE Del Rio NW Counties, Bakers Crossing, Sycamore Canyon, Telephone Canyon, Dolan Springs, and Clark Waterhole (NatureServe 2010b).

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

Rio Grande silvery minnow (*Hybognathus amarus*). This is a small, heavy-bodied minnow with small eyes and a small, oblique mouth. Currently the only naturally occurring population is located in New Mexico. The Rio Grande silvery minnow was introduced into the Rio Grande in Presidio, Brewster, and Terrell counties as a nonessential, experimental population in December 2008 (USFWS 2010d). The geographic boundaries of this population range from Little Box Canyon downstream of Fort Quitman (Hudspeth County) through Big Bend National Park and the Rio Grande Wild and Scenic River, to Amistad Dam (Val Verde County). In addition, this population was reintroduced on the Pecos River from the river's confluence with Independence Creek to its confluence with the Rio Grande. Due to the fact that this species occurs within a national park, this species would be treated as a threatened species, and Section 7 (a)(1) and the consultation requirements of Section 7(a)(2) of the ESA apply (USFWS 2008c). NatureServe data indicate that there are no records of elemental occurrence of Rio Grande silvery minnow in the action area (NatureServe 2010b).

Threats to the Rio Grande silvery minnow include destruction and modification of habitat due to diversion and dewatering, water impoundment, and channelization within the Rio Grande basin. In addition, competition and predation by introduced nonnative species and water pollution contribute to the decline of this species (USFWS 2010d).

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

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

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

1991). Currently, the known population size is more than 6,200 pairs, and total population size could be much larger than this (NatureServe 2010a).

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

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

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

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

NatureServe data do not indicate that there are any records of elemental occurrence of southwestern willow flycatcher in the action area (NatureServe 2010b). However, portions of the defined Recovery Unit for the southwestern willow flycatcher are within the action area. The Rio Grande Recovery Unit encompasses the Rio Grande watershed from its headwaters in southwestern Colorado to the Pecos River in southwestern Texas. This unit includes the Pecos River watershed and one site at Coyote Creek, in the upper Canadian River watershed (USFWS 2002).

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

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

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

The yellow-billed cuckoo breeds in both the eastern and western United States. The proposed rule to designate the distinct population segment of the yellow-billed cuckoo as a threatened species under the ESA only covers the western population. The geographical breeding range of the yellow-billed cuckoo in western North America includes suitable habitat within low- to moderate-elevation areas west of the crest of the Rocky Mountains in Canada and the United States. This breeding range includes the upper and middle Rio Grande, the Colorado River Basin, the Sacramento and San Joaquin River systems, the Columbia River system, and the Fraser River. Under the current proposed rule the separation of the western population segment of the yellow-billed cuckoo is considered the Continental Divide, south through Montana, Wyoming, and Colorado, and the watershed divide between the Pecos and Rio Grande rivers in New Mexico and Texas, south to Big Bend in southwestern Texas, and extending to the states of the west coast. This separation in Texas follows isolated mountain ranges that emerge from the high desert plateau of western Texas. These mountain ranges include the Guadalupe and Delaware mountains on the Texas-New Mexico border; the Davis, Del Norte, and Santiago Mountains in western Texas; and the Chisos Mountains in Big Bend National Park. The distance of separation between the yellow-billed cuckoos in the eastern and western United States varies from 160 miles to more than 400 miles, and consists of areas of unoccupied, unsuitable habitat for the breeding yellow-billed cuckoo. The one exception to this distance occurs in southwestern Texas in Brewster County. Here, eastern yellow-billed cuckoos breed as far west as Rio Grande Village in Big Bend National Park, whereas western yellow-billed cuckoos are found approximately 50 miles west, upstream along the Rio Grande. The current population of the western yellow-billed cuckoo in western Texas is likely fewer than 10 pairs (USFWS 2013a). Texas Natural Resource Diversity Database indicates that there are no records of elemental occurrence of yellow-billed cuckoo in the action area (TPWD 2014).

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

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

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

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

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

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

The migratory path and nature of this species is not well-known. There are no references in the literature of roosts that are occupied year round, or whether seasonally occupied roosts are occupied by the same colony when they return. A particular colony might use one or more winter roosts, several migratory roosts, and still other summer roosts. Food resource availability probably drives this bat's migratory nature. It is speculated that Mexican long-nosed bats are nomadic, taking advantage of peaking food sources as they travel to traditional sites. The sporadic use of Mount Emory Peak cave in Big Bend National Park could reflect use in years when flower production is low in Mexico. Conversely, bats might not move into Big Bend National Park if flower production in northern Mexico is abundant (USFWS 1994b). NatureServe data indicate there are two records of elemental occurrence of Mexican long-nosed bats within the Emory Peak and Center Peak USGS topographic quadrangle map (NatureServe 2010b).

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

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

The ocelot uses a wide range of habitat throughout its range in the Western Hemisphere, although they do not appear to be habitat generalist. The ocelot is found within the Tamaulipan biotic province, which includes several variations of subtropical thornscrub brush. Ocelots prefer dense thornscrub habitats with greater than 95 percent canopy cover (USFWS 2010e). The historical range of the ocelot in the United States was much more extensive than the cats currently known range. In Texas, the ocelot once inhabited southern and eastern Texas, north to Hedley, Texas and west to Marfa, Texas. Currently, the ocelot ranges from extreme southern Texas and southern Arizona through the coastal lowlands of Mexico to Central America, Ecuador and northern Argentina. The Texas ocelot is isolated from the Arizona ocelot by the Sierra Madre highlands and the Mexican Plateau. The two Texas populations occur on private ranches in Willacy and Kenedy counties and on the Laguna Atascosa NWR in eastern Cameron County. These populations and are isolated from each other by approximately 19 miles and occupy remnant habitat fragments outside of the action area (USFWS 2010e). NatureServe data indicate there are nine records of elemental occurrence of ocelot in the action area. These occurred within the boundaries of the Southmost, East Brownsville, Las Milpas, La Joya, Eagle Pass NE, Deadman's Hill, Quemado SE, and Brackettville USGS topographic quadrangle maps.

The most recent record of an elemental occurrence in the action area was in 1993 (NatureServe 2010b).

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

3.6.3 Environmental Consequences

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

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

3.6.3.1 Alternative 1: Proposed Action

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

Impact determinations were based on the following factors.

- The Proposed Action involves the maintenance and repair of existing tactical infrastructure. Those activities would be conducted within and adjacent to the footprint of that infrastructure.
- CBP would use a centralized maintenance and repair planning process to ensure that program activities are appropriately planned and implemented.
- CBP would implement design standards and BMPs to avoid harming or harassing protected species and to minimize other direct and indirect effects.
- When appropriate, surveys would be conducted prior to implementing maintenance and repair activities such as vegetation control within critical habitat, occupied habitat, or other suitable habitat.
- The program would result in no or very minor habitat degradation and other direct and indirect impacts on threatened and endangered species; therefore, any contribution to the

cumulative adverse effects of future non-Federal activities in the region would be negligible.

- CBP would seek approval or additional consultation from the USFWS for activities that have the potential to harm protected species or adversely modify their critical habitat.

Terrestrial Threatened and Endangered Species

Plant Species. Short-term, negligible, indirect, adverse effects on ashy dogweed, bunched cory cactus, Chisos Mountain hedgehog cactus, Lloyd's Mariposa cactus, Johnston's frankenia, Tobusch fishhook cactus, Sneed pincushion cactus, star cactus, Hinckley's oak, South Texas ambrosia, Terlingua Creek cat's eye, Texas ayenia, Texas snowbells, Walker's manioc, and Zapata bladderpod would be expected as a result of the Proposed Action. These species and suitable habitat for each species is known to occur within the action area. Vegetation control could result in conversion or degradation of habitat because of the establishment of different plant communities (including invasive species) and erosion and sedimentation. However, maintenance and repair activities would be conducted within and adjacent to the footprint of existing tactical infrastructure. For those activities conducted outside of disturbed areas or within disturbed areas where threatened and endangered plant species could occur, surveys would be conducted and other BMPs would be implemented to avoid directly harming plants and to minimize sedimentation and other indirect effects on these species. For example, all vegetation-control activities would avoid areas of known threatened and endangered plant species, suitable habitat (see **Table 3-2**), and critical habitat, unless a survey is conducted. If vegetation-control activities in areas of known occurrences of these species, suitable habitat, and critical habitat are unavoidable then a qualified biologist would conduct a survey during the appropriate blooming season (see **Table 3-2**). Individuals would be flagged and vegetation control would avoid flagged individuals. Pre-activity surveys would not be required in areas that have been previously surveyed, where no listed species were found, and that have been regularly maintained such that there is no reason to expect establishment of listed plant species.

Fish Species. Short-term, negligible, direct and indirect, adverse effects on Big Bend gambusia, Devils River minnow, and Rio Grande silvery minnow would be anticipated due to maintenance and repair activities. Direct effects such as disturbance or habitat degradation would be associated with in-water maintenance activities, and activities designed to maintain drainage structures and low-water crossings (e.g., cleaning blocked drainages, resizing and replacement of culverts, repairing or adding riprap, removing debris and trash, and repairing grates). Indirect effects, such as erosion and sedimentation, would be associated with the vegetation control and near-water activities. However, maintenance and repair activities would be conducted within and immediately adjacent to existing disturbances and BMPs would be implemented to minimize or avoid direct and indirect effects. For example, all vegetation-control activities would avoid riparian vegetation within 100 feet of known occurrences, suitable habitat for Big Bend gambusia (i.e., spring habitats in the vicinity of Boquillas Crossing and Rio Grande Village [Big Bend National Park]), Devils River minnow (i.e., channels of fast-flowing, spring-fed waters over gravel substrates in Val Verde and Kinney counties, Texas), and Rio Grande silvery minnow (i.e., areas of low to moderate water velocity in Big Bend National Park), or critical habitat, to provide a buffer area to protect the habitat from sedimentation. Additionally, herbicides would not be used within 100 feet of areas of known occurrences, suitable habitat, and critical habitat for the Big Bend gambusia, Devils River minnow, and Rio Grande silvery minnow unless approved by the USFWS.

Black-capped vireo. Short-term, negligible, direct and indirect, adverse effects on the black-capped vireos would be expected. Direct effects include habitat conversion or degradation from road maintenance and vegetation control, and disruption or modification of behavior (including nesting) resulting from noise or other disturbances during maintenance and repair activities. Indirect effects include habitat degradation from establishment of nonnative plant species and from erosion and sedimentation. However, activities would occur within or adjacent to existing footprints of tactical infrastructure. Additionally, BMPs would be implemented to minimize or avoid impacts on black-capped vireo and its habitat. For example, all vegetation control in defined black-capped vireo habitat would be avoided from March 15 to September 15. Black-capped vireo habitat is defined as areas of known occurrence or suitable habitat (i.e., low deciduous shrubland areas with 30 to 60 percent cover in the Edwards Plateau and eastern Trans-Pecos). If vegetation control is required near or adjacent to defined black-capped vireo habitat, qualified personnel with experience identifying black-capped vireo habitat would delineate and clearly mark the habitat to be avoided. High-impact maintenance and repair activities that require heavy equipment within defined black-capped vireo habitat should be conducted from October through February, outside the nesting season, to the extent possible. If it is not possible to avoid maintenance and repair activities within the breeding season, USFWS-permitted biologist would conduct a survey for black-capped vireo. If black-capped vireos are present, a USFWS-permitted biologist would survey for nests approximately once per week within 500 feet of the maintenance or repair area for the duration of the activity. If an active nest is located, a 300-foot, no-activity buffer would be established around the nest until the young have fledged.

Southwestern willow flycatcher and yellow-billed cuckoo. Short-term, negligible, direct and indirect, adverse effects on the southwestern willow flycatcher and yellow-billed cuckoo would be expected. Direct effects include habitat conversion or degradation from road maintenance and vegetation control, and disruption or modification of behavior (including nesting) resulting from noise or other disturbances during maintenance and repair activities. Indirect effects include habitat degradation from establishment of nonnative plant species and from erosion and sedimentation. However, activities would occur within or adjacent to existing footprints of tactical infrastructure. Additionally, BMPs would be implemented to minimize or avoid impacts on southwestern willow flycatcher and yellow-billed cuckoo and their habitat. If vegetation control is required near or adjacent to occupied southwestern willow flycatcher and yellow-billed cuckoo habitat, critical habitat, and suitable habitat (i.e., dense riparian habitats along streams, rivers, lakesides, and other wetlands), qualified personnel with experience identifying southwestern willow flycatcher and yellow-billed cuckoo habitat would delineate and clearly mark the habitat to be avoided. In addition, vegetation control would be conducted from September 16 through March 14, outside the southwestern willow flycatcher and yellow-billed cuckoo breeding season. All other maintenance activities would be avoided within occupied southwestern willow flycatcher and yellow-billed cuckoo habitat, critical habitat, and suitable habitat during the southwestern willow flycatcher breeding season (March 15 through September 15), if possible. If it is not possible to avoid maintenance activities within the breeding season, an USFWS-permitted biologist would conduct a survey for southwestern willow flycatchers and yellow-billed cuckoos prior to initiating maintenance or repair activities. If these birds are present, a USFWS-permitted biologist would survey for nests approximately once per week within 500 feet of the maintenance or repair area for the duration of the activity. If an active nest is found, a 300-foot, no- activity buffer would be established around the nest until the young have fledged.

Mexican long-nosed bat. Short-term, negligible, direct, adverse effects on lesser long-nosed bat are anticipated from the Proposed Action. Direct effects on Mexican long-nosed bats would be caused by vegetation control of forage plants (agaves) or potential disturbance caused by maintenance activities in close proximity to occupied roosts. However, maintenance and repair activities would occur within or adjacent to existing tactical infrastructure, and BMPs designed to minimize or avoid impacts on Mexican long-nosed bat would be implemented. For example, forage plants (agaves) would be protected, as all vegetation-control activities would avoid known areas containing agaves. If vegetation-control activities in areas where agaves occur are unavoidable then a qualified biologist would conduct a survey within the maintenance area. Individual plants would be flagged and vegetation-control activities would not disturb the demarcated individuals. In addition, no maintenance and repair activities, including vegetation control, noise, and night lighting within 5 miles of any potential Mexican long-nosed bat roost sites (i.e., Peloncillo Mountains and Animas Mountains) would be conducted between July and September. If maintenance and repair activities cannot be avoided during this season, noise and lighting impacts would be avoided during the night by conducting activities during daylight hours only. If night lighting is unavoidable, light would shine directly onto the work area to ensure worker safety and efficiency, and light would not exceed 1.5 foot-candles in Mexican long-nosed bat habitat.

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

3.6.3.2 Alternative 2: No Action Alternative

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

incidental trampling and crushing while accessing the sites; and increased erosion, turbidity, and sedimentation.

3.7 HYDROLOGY AND GROUNDWATER

3.7.1 Definition of the Resource

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

3.7.2 Affected Environment

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

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

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

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

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

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

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

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

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

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

3.7.3 Environmental Consequences

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

3.7.3.1 Alternative 1: Proposed Action

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

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

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

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

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

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

3.7.3.2 Alternative 2: No Action Alternative

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

3.8 SURFACE WATERS AND WATERS OF THE UNITED STATES

3.8.1 Definition of the Resource

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

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

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

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

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

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

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

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

Wetlands are protected as a subset of “the waters of the United States” under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill materials into the waters of the United States, including wetlands. In addition, Section 404 of the CWA also grants states with sufficient resources the right to assume these responsibilities. Section 401 of the CWA gives the state board and regional boards the authority to regulate through water quality certification any proposed federally permitted activity that could result in a discharge to water bodies, including wetlands. The state may issue certification, with or without conditions, or deny certification for activities that might result in a discharge to water bodies (USEPA 2010b).

3.8.2 Affected Environment

3.8.2.1 Surface Waters

3.8.2.2 Rio Grande Watershed

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

3.8.2.3 Rio Grande Watershed

The Rio Grande basin drains an area of more than 330,000 square miles in Colorado, New Mexico, and Texas in the United States and Chihuahua, Durango, Coahuila, Nuevo Leon, and Tamaulipas in Mexico. Within Texas, the Rio Grande drains an area of 86,720 square miles. The Texas portion of the Rio Grande forms the international border with Mexico for 1,254 miles. A total of seven pairs of sister cities are found along the Texas-Mexico border, which result in dense urban land use. The majority of the land within the Rio Grande basin in Texas is privately owned and used for agriculture and grazing activities. Some land parcels are owned by the Federal and state government and include Big Bend National Park in west Texas and a network of refuges owned by the USFWS and TPWD in south Texas (USIBWC 2013). Major impoundments in the Rio Grande watershed within Texas include Amistad and Falcon dams.

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

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

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

Rio Grande-Amistad Watershed. The Rio Grande-Amistad watershed is divided into 16 smaller subwatersheds, all of which occur within the action area. This watershed consists of 18,866,981 acres in west Texas and northern Mexico. Within Texas, this watershed occurs from El Paso to the dam at Amistad Reservoir, and includes much of the Trans-Pecos region and the Devils River (USGS 2014). The Devils River joins the Rio Grande at the Amistad Reservoir, forming a significant arm on the Texas side of the reservoir. This river drains 271,742 acres of relatively undisturbed land in Texas. The land conditions of this drainage area and the spring contributions within the Devils River define this high-quality stream (USIBWC 2013). Two segments of the

Rio Grande within this subwatershed are on the USEPA 303(d) list as impaired streams. One segment, which occurs from the Riverside Diversion Dam in El Paso County to the confluence of the Rio Conchos (Mexico) in Presidio County, is impaired due to bacteria, chloride, and total dissolved solids. The other segment, which occurs from the confluence with the Rio Conchos to a point 1.1 miles downstream of the confluence of Ramsey Canyon in Val Verde County, is impaired due to chloride, sulfate, and total dissolved solids (TCEQ 2012).

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

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

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

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

3.8.2.4 Texas Gulf Watershed

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

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

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

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

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

3.8.2.5 Wetlands

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

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

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

3.8.3 Environmental Consequences

3.8.3.1 Alternative 1: Proposed Action

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

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

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

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

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

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

3.8.3.2 Alternative 2: No Action Alternative

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

3.9 FLOODPLAINS

3.9.1 Definition of the Resource

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

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

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

3.9.2 Affected Environment

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

3.9.3 Environmental Consequences

3.9.3.1 Alternative 1: Proposed Action

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

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

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

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

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

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

3.9.3.2 Alternative 2: No Action Alternative

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

3.10 AIR QUALITY

3.10.1 Definition of the Resource

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

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

Attainment Versus Nonattainment and General Conformity. The USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria

Table 3-3. National Ambient Air Quality Standards

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

Source: ; USEPA 2012

Notes: Parenthetical values are approximate equivalent concentrations.

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

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

pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by USEPA means that there is not enough information to classify an AQCR appropriately, so the area is considered attainment. The USEPA has delegated the authority for ensuring compliance with the NAAQS in Texas to the TCEQ. In accordance with the CAA, each state must develop a State

Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS.

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

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

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

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

Greenhouse Gas Emissions. GHGs are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide (CO_2), methane, and nitrous oxide. GHGs are mainly produced by the burning of fossil fuels and through industrial and biological processes. On 22 September 2009, the USEPA issued a final rule for mandatory GHG reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on CO_2 and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of

CO_2 equivalent emissions per year but excludes mobile source emissions. The regulation of GHG emissions under the PSD and Title V permitting programs was initiated by a USEPA rulemaking issued on 3 June 2010 known as the GHG Tailoring Rule (75 FR 31514). GHG emissions thresholds for the permitting of stationary sources are an increase of 75,000 tpy of CO_2 at existing major sources and facility-wide emissions of 100,000 tpy of CO_2 for a new source or a modification of an existing minor source. The 100,000 tpy of CO_2 threshold defines a major GHG source for both construction (PSD) and operating (Title V) permitting, respectively.

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

3.10.2 Affected Environment

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

El Paso and Hudspeth counties are within the El Paso-Las Cruces-Alamogordo Interstate AQCR (40 CFR 81.82). The TCEQ oversees the implementation of the Federal CAA in the State of Texas. Therefore, all counties are subject to rules and regulations developed by the TCEQ. El Paso County has been characterized by the USEPA as a Federal moderate nonattainment area for PM_{10} and Federal moderate maintenance area for CO (for part of the county). The El Paso-Las Cruces-Alamogordo Interstate AQCR has been designated by the USEPA as unclassified/attainment for all other criteria pollutants (USEPA 2010e, USEPA 2010f).

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

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

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

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

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

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

3.10.3 Environmental Consequences

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

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

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

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

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

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

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

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

Source: 40 CFR 93.153

With respect to the General Conformity Rule, effects on air quality would be considered significant if the proposed Federal action would result in an increase of a nonattainment or maintenance area's emissions inventory above the *de minimis* threshold levels established in

40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area. 40 CFR 93.153(c) exempts certain Federal actions from a general conformity determination.

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

3.10.3.1 Alternative 1: Proposed Action

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

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

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

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

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

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

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

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

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

Assumptions for mileage included in air quality analysis:

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

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

El Paso-Las Cruces-Alamogordo Interstate AQCR

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

San Antonio Intrastate AQCR and Brownsville-Laredo Intrastate AQCR

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

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

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

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

3.10.3.2 Alternative 2: No Action Alternative

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

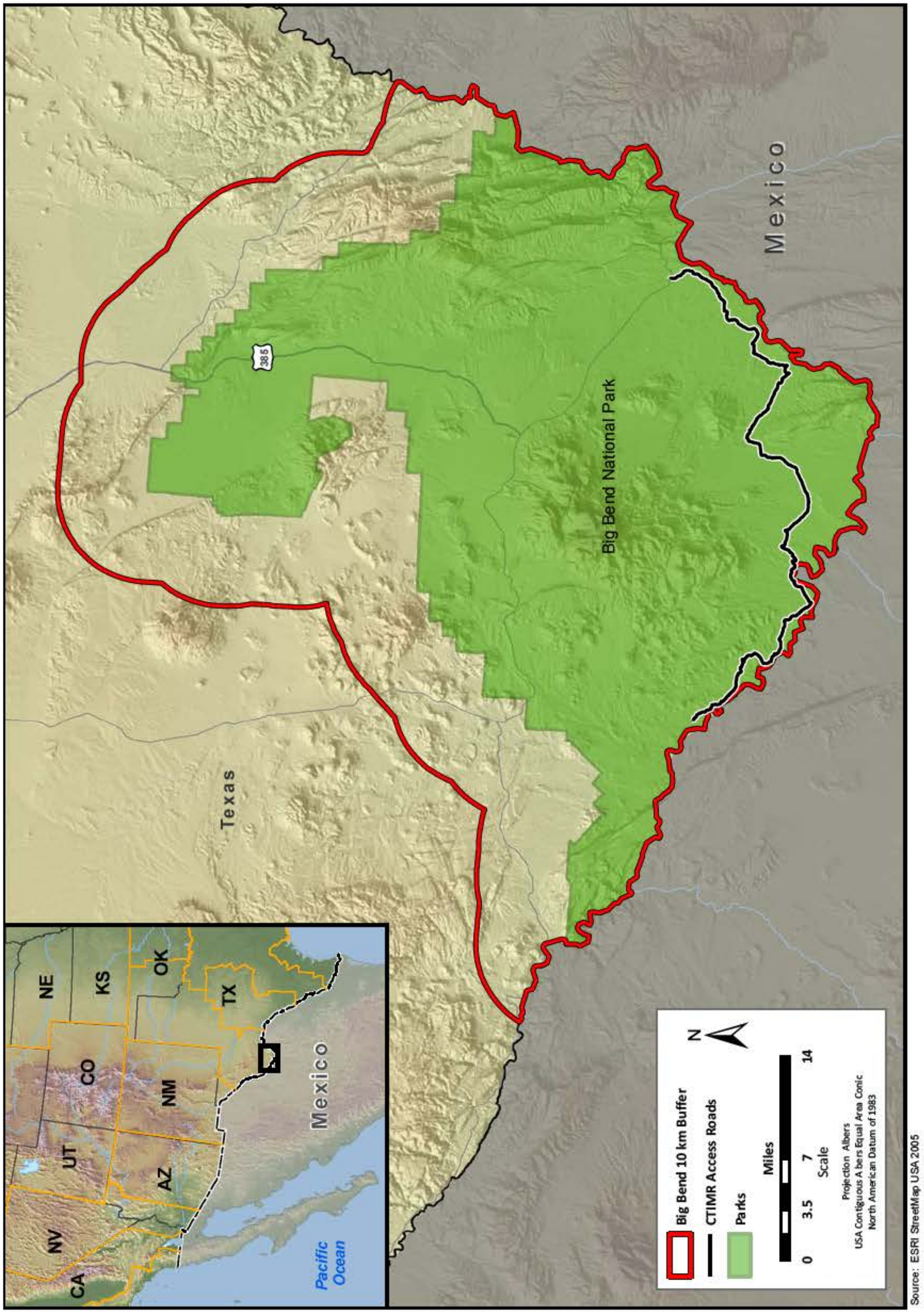


Figure 3-1. Big Bend National Park Class I Area

3.11 NOISE

3.11.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to one's ears or as annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad areas (e.g., nature preserves or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

Noise Metrics and Regulations. Although human response to noise varies, measurements can be calculated with instruments that record instantaneous sound levels in decibels. A-weighted decibel (dBA) is used to characterize sound levels that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at the upper boundary of audibility, which is normally in the region of 135 dBA (USEPA 1981a). **Table 3-7** compares common sounds and shows how they rank in terms of the effects on hearing. As shown, a

Table 3-7. Sound Levels and Human Response

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

Source: USEPA 1981b, *HDR extrapolation

whisper is normally 30 dBA and considered to be very quiet while an air conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10 dBA increase seems twice as loud (USEPA 1981b).

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

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

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

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

Source: USEPA 1971

3.11.2 Affected Environment

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

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

3.11.3 Environmental Consequences

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

3.11.3.1 Alternative 1: Proposed Action

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

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

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

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

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

3.11.3.2 Alternative 2: No Action Alternative

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

3.12 CULTURAL RESOURCES

3.12.1 Definition of the Resource

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

Places (NRHP). These resources are termed “historic properties” and are protected under the NHPA.

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

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

3.12.2 Affected Environment

3.12.2.1 Regional Prehistory

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

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

3.12.2.2 Regional History

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

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

3.12.2.3 Known Cultural Resources

In May 2010, HDR prepared a *Summary of Cultural Resources Management Reports from the Construction of Tactical Infrastructure, U.S.-Mexico International Border, California, Arizona, New Mexico, and Texas* (Church and Hokanson 2010). According to this study, 979.1 miles have been surveyed for cultural resources along the U.S./Mexico international border. A total of 458 archaeological sites, 164 historic structures, and one historic district were identified during these surveys.

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

3.12.3 Environmental Consequences

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

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

3.12.3.1 Alternative 1: Proposed Action

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

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

The potential exists for the unanticipated discovery of cultural resources or human remains during the maintenance and repair of tactical infrastructure. Consequently, CBP would develop appropriate measures that detail crewmember responsibilities for reporting in the event of a discovery during maintenance and repair activities. These measures would also include mitigation procedures to be implemented in the event of a significant unanticipated find. If human remains are discovered, CBP would adhere to the stipulations of Public Resources Code Section 5097.98 and Health and Safety Code 7050 and stop work within 50 feet of the discovery. CBP would then contact the county coroner and a professional archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in archaeology or history to determine the significance of the discovery. If appropriate, CBP would also adhere to NAGPRA and its implementing regulations (43 CFR 19). Depending on the recommendations of the coroner or the archaeologist, CBP would consult with the county to establish additional mitigation procedures. Potential mitigation procedures for unanticipated discoveries include avoidance, documentation, excavation, and curation. As a result, potential impacts on cultural resources discovered during the maintenance and repair of tactical infrastructure would be minor.

3.12.3.2 Alternative 2: No Action Alternative

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

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

3.13 ROADWAYS AND TRAFFIC

3.13.1 Definition of the Resource

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

3.13.2 Affected Environment

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

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

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

3.13.3 Environmental Consequences

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

3.13.3.1 Alternative 1: Proposed Action

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

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

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

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

3.13.3.2 Alternative 2: No Action Alternative

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

3.14 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

3.14.1 Definition of the Resource

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

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

Hazardous wastes are defined by RCRA at 42 U.S.C. §6903(5), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273.

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

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

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

Evaluation of hazardous materials and wastes focuses on the storage, transport, handling, and use of pesticides, herbicides, petroleum products, fuels, solvents, and other hazardous substances. Evaluation also extends to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of hazardous materials or wastes, the extent of contamination varies based on the type of soil, topography, and water resources.

Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs. Alternative means of waste disposal include waste-to-energy programs and incineration. In some localities, landfills are designed specifically for, and limited to, disposal of construction and demolition debris. Recycling programs for various waste categories (e.g., glass, metals, papers, asphalt, and concrete) reduce reliance on landfills for disposal.

3.14.2 Affected Environment

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

Likewise, the Federal government and state agencies also have regulations for the handling, disposal, and remediation of special hazards; however, the nature and age of the tactical infrastructure is such that the handling or disposal of these materials is unlikely for the activities associated with the Proposed Action.

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

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

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

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

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

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

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

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

Solid Wastes. The TCEQ is the state agency responsible for the oversight of any person that processes, stores, or disposes of, or arranges for transport to process, store, or dispose of; solid waste owned or possessed by the person or by any other person or entity.

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

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

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

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

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

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

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

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

3.14.3 Environmental Consequences

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

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

3.14.3.1 Alternative 1: Proposed Action

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

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

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

3.14.3.2 Alternative 2: No Action Alternative

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

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

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

3.15 SOCIOECONOMIC RESOURCES, ENVIRONMENTAL JUSTICE, AND PROTECTION OF CHILDREN

3.15.1 Definition of the Resource

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

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

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

3.15.2 Affected Environment

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

Socioeconomics

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

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

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

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

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

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

Geographic Area	1990	2000	2010	Percent Change		
				1990 to 2000	2000 to 2010	1990 to 2010
Angelina County	69,884	80,130	86,771	15%	8%	24%
Brewster County	8,681	8,866	9,232	2%	4%	6%
Cameron County	260,120	335,227	406,220	29%	21%	56%
Culberson County	3,407	2,975	2,398	-13%	-19%	-30%
Dimmit County	10,433	10,248	9,996	-2%	-2%	-4%
Edwards County	2,266	2,162	2,002	-5%	-7%	-12%
El Paso County	591,610	679,622	800,647	15%	18%	35%
Hidalgo County	383,545	569,463	774,769	48%	36%	102%
Hudspeth County	2,915	3,344	3,476	15%	4%	19%
Jeff Davis County	1,946	2,207	2,342	13%	6%	20%

Kinney County	3,119	3,379	3,598	8%	6%	15%
Maverick County	36,378	47,297	54,258	30%	15%	49%
Pecos County	14,675	16,809	15,507	15%	-8%	6%
Presidio County	6,637	7,304	7,818	10%	7%	18%
Starr County	40,518	53,597	60,968	32%	14%	50%
Terrell County	1,410	1,081	984	-23%	-9%	-30%
Uvalde County	23,340	25,926	26,405	11%	2%	13%
Val Verde County	38,721	44,856	48,879	16%	9%	26%
Webb County	133,239	193,117	250,304	45%	30%	88%
Zapata County	9,279	12,182	14,018	31%	15%	51%
Zavala County	12,162	11,600	11,677	-5%	1%	-4%
Texas	16,986,510	20,851,820	25,145,561	23%	21%	48%

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

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

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

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

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

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

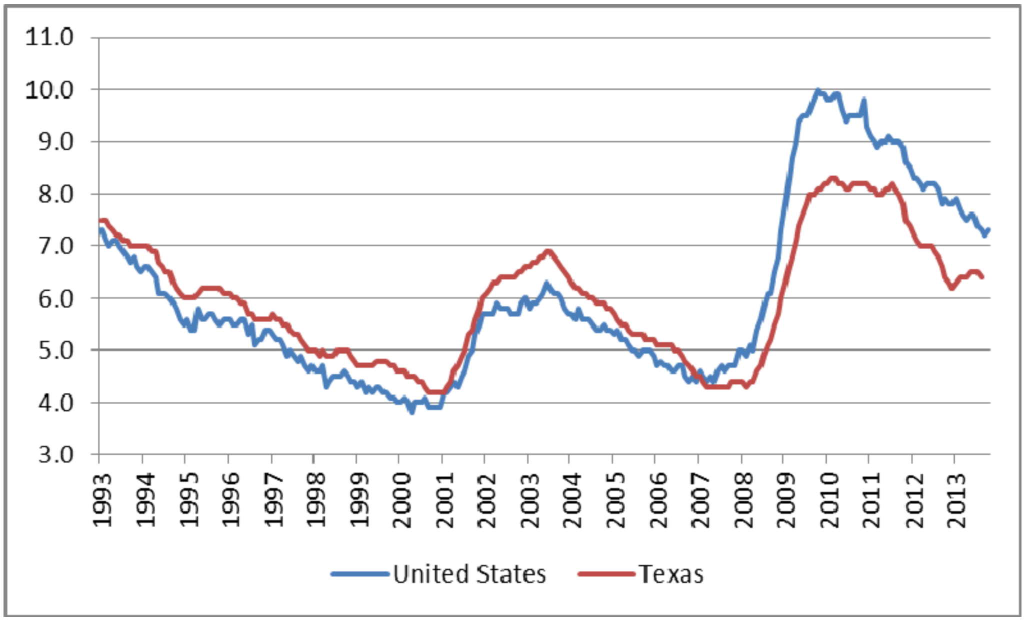
Industry	Texas	United States
Population 16 years and over in labor force	12,065,652	155,163,977
Population of employed persons in the civilian labor force	11,125,616	141,833,331
Agriculture, forestry, fishing and hunting, and mining	2.9	1.9
Construction	8.6	7.1
Manufacturing	9.7	11.0
Wholesale trade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

Source: U.S. Census Bureau 2010

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

Environmental Justice and Protection of Children

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



Source: BLS 2013

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

Table 3-13 presents the racial and ethnic characteristics of the populations in the Texas border region and the United States.

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

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

Source: U.S. Census Bureau 2010

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

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

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

Within the 21 counties along the U.S./Mexico international border in Texas, the percent of families whose income was below the poverty level ranged from 9 percent in Terrell County to 40 percent in Hudspeth County, while the percent of individuals whose income was below the poverty level ranged from 15 percent in Jeff Davis County to 43 percent in Zavala County. Of the 21 counties, only Terrell County had a lower percent of families below the poverty level (9 percent) than Texas (13 percent). Brewster, Jeff Davis, and Terrell counties are the only counties in which the percent of individuals below the poverty level was lower than the 17 percent for Texas. Median household income in these 21 counties ranged from a low of $21,707 to a high of $43,750, and no border county contained a median household income greater than the $49,646 reported for Texas. See **Table 3-15** for the percent of population below the poverty level for Texas and the 21 Texas border counties (U.S. Census Bureau 2010).

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.

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

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

Source: U.S. Census Bureau 2010

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

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

Source: U.S. Census Bureau 2010

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

3.15.3.1 Alternative 1: Proposed Action

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

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

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

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

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

3.15.3.2 Alternative 2: No Action Alternative

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

4. CUMULATIVE AND OTHER ADVERSE EFFECTS

Cumulative impacts can result from individually minor but collectively significant past, present, and foreseeable future actions. For the purposes of the analysis in this section, consideration was given to cumulative impacts of all CBP maintenance and repair of tactical infrastructure activities including maintenance and repair activities addressed under this EA, under previous NEPA documents, and activities which were covered by a Secretary's waiver. In this instance, the type of activity that is at issue in this EA—the maintenance and repair of tactical infrastructure—is unique to CBP. Thus, these activities are unlikely to be subjected to the compounding activity of other entities, particularly when they take place, as they often do, in isolated areas and on an infrequent basis. To that same end, where maintenance of roads occurs, it is complementary to, or in lieu of, maintenance performed by others. The geographic scope of the analysis varies by resource area.

4.1 CUMULATIVE IMPACTS OF THE CBP MAINTENANCE AND REPAIR PROGRAM

Past, Present, and Foreseeable Future Actions

Past and present actions are those CBP maintenance and repair actions that occurred within the geographic scope of cumulative effects prior to the development of this EA or are concurrently being undertaken by way of a Secretary's waiver or separate NEPA. Past actions have shaped the current environmental conditions in close proximity (i.e., within several miles) to existing tactical infrastructure. Therefore, the effects of identified past actions are now part of the existing environment, and are generally included in the affected environment described in **Section 3**. Present actions consist of the current ad hoc, as-needed approach to the maintenance and repair of existing tactical infrastructure and future actions would consist of the maintenance and repair of all current tactical infrastructure including tactical infrastructure analyzed in this EA.

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

Cumulative Tactical Infrastructure in Texas

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

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

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

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

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

Notes:

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

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

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

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

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

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

4.2 CUMULATIVE ANALYSIS BY RESOURCE AREA

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

4.2.1 Alternative 1: Proposed Action

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

4.2.2 Land Use

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

4.2.3 Geology and Soils

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

4.2.4 Vegetation

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

4.2.5 Terrestrial and Aquatic Wildlife Resources

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

4.2.6 Threatened and Endangered Species

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

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

There are 24 federally listed threatened or endangered species that are known to occur within the action area. **Section 3.6** presents detailed discussions for each of these species. Cumulatively, present and future activities are likely to continue to affect threatened and endangered species. Potential threats include habitat loss from urbanization and road construction, trampling of protected plants, corridor fragmentation, and noise from increasingly urban areas. The ESA will continue to protect threatened and endangered species with the goal of recovery.

The Proposed Action would generally be expected to have negligible effects on threatened or endangered species that have been identified as potentially occurring in the action area. Tactical infrastructure that was included under the waiver or previous NEPA documentation (see projects identified in **Table 4-1**) was constructed under the supervision of biological monitors to ensure that BMPs and approved mitigation measures were followed for the protection of threatened and endangered species. No direct, adverse effects on threatened and endangered species or takes were identified in the Environmental Stewardship Summary Reports (ESSRs) during construction of pedestrian and vehicle fence along the U.S./Mexico international border. Under the work plan, which would cover all CBP tactical infrastructure in the region of analyses, BMPs and conservation measures identified in both the Biological Assessment and this EA would ensure any impacts on threatened and endangered species would be minimized and, therefore, the cumulative impacts on species would not be significant.

4.2.7 Hydrology and Groundwater

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

4.2.8 Surface Waters and Waters of the United States

Surface water quality of subwatersheds within the action area has historically been significantly affected by various inputs, including urban, agricultural, and livestock runoff, and septic, wastewater, and industrial discharges. Some surface water bodies are consequently on USEPA’s 303(d) list of impaired waters, as discussed in **Section 3.8** (USEPA 2010d). Historically significant wetland losses have resulted from draining, dredging, filling, leveling, and flooding for agricultural and urban development. Texas has lost approximately half of its original wetlands (USGS 1996a).

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

4.2.9 Floodplains

Floodplain resources can be adversely impacted by development, increases in impervious areas, loss of vegetation, hydrological changes, and soil compaction. Historically, natural floodplains have been permanently altered by development activities and the construction of canals and reservoirs. The Proposed Action does not involve new development activities and would have no direct effects on floodplains. Vegetation control and debris removal could result in increased sedimentation into floodplains and drainage structures, but this would be a negligible, indirect effect. Maintenance of other existing tactical infrastructure would be expected to have similar effects on floodplains as those described in this EA (see **Section 3.9.3**). Cumulatively, effects on floodplains from the maintenance and repair of tactical infrastructure would be negligible.

4.2.10 Air Quality

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

4.2.11 Noise

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

The Proposed Action would have short-term, negligible to minor, localized, adverse effects as a result of the operation of heavy machinery to maintain and repair tactical infrastructure. Maintenance and repair of tactical infrastructure in remote areas would be distant from most other substantial noise-generating activities, so there is little potential for cumulative effects. Increased noise from the operation of machinery could combine with existing noise sources or other construction-type activities to produce a temporary cumulative effect on noise-sensitive receptors. The combined noise of several projects occurring simultaneously in proximity might be heard over a greater distance, but effects would be short-term and localized. Under the centralized work plan, the adoption of appropriate BMPs and proposed schedule for maintenance would ensure that noise would be minimized and noise-creating activities would be well dispersed throughout the region avoiding any pockets of intense activity. Consequently, existing noise sources would continue to dominate the noise environment and, cumulatively, effects on the noise environment from the maintenance and repair of all tactical infrastructure would be negligible to minor.

4.2.12 Cultural Resources

Historically, long-term, major, adverse effects on cultural resources have likely occurred from the destruction or alteration of resources before their significance was realized. The Proposed Action involves maintenance and repair of tactical infrastructure along existing corridors and roadways. Tactical infrastructure construction for those projects identified in **Table 4-1** was performed under the supervision of cultural resources specialists to ensure known cultural resources would be protected and that any unanticipated discoveries would be identified and coordinated with the appropriate Federal, state, or tribal parties. CBP prepared detailed cultural resources reports and surveyed areas prior to construction, and groundbreaking activities were subsequently monitored. No effects on cultural resources were identified in the ESSRs for construction of pedestrian and vehicle fence along the U.S./Mexico international border because cultural resources were appropriately identified and mitigated prior to construction. Cumulatively, effects on cultural resources from the maintenance and repair of tactical infrastructure would be negligible.

4.2.13 Roadways and Traffic

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

4.2.14 Hazardous Materials and Waste Management

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

The Proposed Action and other tactical infrastructure maintenance and repair activities would use small amounts of hazardous materials. Quantities of hazardous materials for individual projects would be relatively small, contained to areas associated with work areas, and handled in accordance with all Federal and Texas laws and regulations. Localized, adverse effects could occur in the event of a spill, but the potential for cumulative, adverse effects is minimal.

Cumulatively, effects on hazardous materials and waste management from the maintenance and repair of tactical infrastructure would be negligible.

4.2.15 Socioeconomic Resources, Environmental Justice, and Protection of Children

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

4.2.16 Alternative 2: No Action Alternative

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

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

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USGS 2014	USGS. 2010. "Boundary Descriptions and Names of Regions, Subregions, Accounting Units, and Cataloging Units". Available online: <*http://water.usgs.gov/GIS/huc_name.html*>. Accessed 10 March 2014.
USIBWC 2013	United States International Boundary and Water Commission. 2013. Rio Grande Basin Summary Report. 2013

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6. LIST OF PREPARERS

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

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Environmental and Energy Division
U.S. Customs & Border Protection

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Supervisory Environmental Protection Specialist
Border Patrol Facilities and Tactical Infrastructure
Program Management Office
Facilities Management and Engineering

Audra Upchurch, PMP (LMI)
Senior Environmental Program Management Specialst
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Joseph Zidron (CBP)
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This EA has been prepared by HDR under the direction of CBP. The individual contractor personnel that contributed to the preparation of this document are listed as follows.

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Years of Experience: 4

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B.A. History and Political Science
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B.S. Forestry and Natural Resources Management
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A.S. Wildlife Biology
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B.A. Geography
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Years of Experience: 19

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B.S. Environmental Science
Years of Experience: 10

APPENDIX A

Applicable Laws and Executive Orders

APPENDIX A

Applicable Laws and Executive Orders

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

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

Title, Citation	Summary
National Historic Preservation Act, 16 U.S.C. 470–470x-6	Requires Federal agencies to consider the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object eligible for inclusion, or listed in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through NRHP listing), and protection of significant historical and cultural properties.
Noise Control Act of 1972, 42 U.S.C. 4901–4918	Establishes a national policy to promote an environment free from noise that jeopardizes health and welfare. Authorizes the establishment of Federal noise emissions standards and provides relevant information to the public.
Occupational Safety and Health Act of 1970, 29 U.S.C. 651–678	Establishes standards to protect workers, including standards on industrial safety, noise, and health standards.
Resource Conservation and Recovery Act, 42 U.S.C. 6901–6992k	Establishes requirements for safely managing and disposing of solid and hazardous waste and underground storage tanks.
Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, July 14, 1982, 47 FR 30959 (6/16/82), as supplemented	Requires Federal agencies to consult with state and local governments when proposed Federal financial assistance or direct Federal development impacts interstate metropolitan urban centers or other interstate areas.
EO 12898, *Environmental Justice,* February 11, 1994, 59 FR 7629 (2/16/94), as amended	Requires certain Federal agencies, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, January 24, 2007, 72 FR 3919 (January 26, 2007)	Requires the head of each Federal agency to implement sustainable practices for energy efficiency, greenhouse gas emissions avoidance or reduction, and petroleum products use reduction; renewable energy, including bioenergy; water conservation; acquisition; pollution and waste prevention and recycling; reduction or elimination of acquisition and use of toxic or hazardous chemicals; high performance construction, lease, operation, and maintenance of buildings; vehicle fleet management; and electronic equipment. Requires more widespread use of Environmental Management Systems as the framework with which to manage and continually improve these sustainable practices.

Title, Citation	Summary
EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, October 5, 2009, 74 FR 52117 (October 8, 2009)	Directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation, and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas (GHG) emissions, water use, pollution prevention, regional development and transportation planning, and sustainable building design; and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings.
EO 13175, *Consultation and Coordination with Indian Tribal Governments*, November 6, 2000, 65 FR 67249 (11/09/00)	Requires Federal agencies to establish an accountable process that ensures meaningful and timely input from tribal officials in developing policies that have tribal implications.
EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, January 10, 2001, 66 FR 3853 (1/17/01)	Requires each agency to ensure that environmental analyses of Federal actions (required by the National Environmental Policy Act or other established environmental review processes) evaluate the effects of actions and agency plans on migratory birds, emphasizing species of concern. Agencies must support the conservation intent of migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities, and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.
EO 11593, *Protection and Enhancement of the Cultural Environment*, May 13, 1971, 36 FR 8921 (5/15/71)	Requires all Federal agencies to locate, identify, and record all cultural resources, including significant archeological, historical, or architectural sites.

Note:

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

Other laws and Executive Orders (EOs) potentially relevant to this EA include, but are not limited to, the following:

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

- Emergency Planning and Community Right-to-Know Act, 42 U.S.C. 11001–11050, et seq.
- Environmental Quality Improvement Act, P.L. 98-581, 42 U.S.C. 4371, et seq.
- Farmlands Protection Policy Act, P.L. 97-98, 7 U.S.C. 4201, et seq.
- Federal Insecticide, Fungicide, and Rodenticide Act, P.L. 86-139, 7 U.S.C. 135, et seq.
- Federal Records Act, 44 U.S.C. 2101-3324, et seq.
- Fish and Wildlife Act of 1956, P.L. 85-888, 16 U.S.C. 742, et seq.
- Flood Disaster Protection Act, 42 U.S.C. 4001, et seq.
- Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001, et seq.
- Pollution Prevention Act of 1990, 42 U.S.C. 13101-13109, et seq.
- Safe Drinking Water Act, P.L. 93-523, 42, U.S.C. 201, et seq.
- Toxic Substances Control Act, 7 U.S.C. 136, et seq.
- Wild and Scenic Rivers Act, P.L. 90-542, 16 U.S.C. 1271, et seq.
- EO 12114, dated January 9, 1979, *Environmental Effects Abroad of Major Federal Actions*, 44 FR 1957
- EO 12088, dated October 13, 1978, *Federal Compliance with Pollution Control Standards*, 43 FR 47707, as amended by EO 12580, dated January 23, 1987, and revoked (in part) by EO 13148, dated April 21, 2000
- EO 13132, dated August 4, 1999, *Federalism*, 64 FR 43255
- EO 11988, dated May 24, 1977, *Floodplain Management and Protection*, 42 FR 26951, as amended by EO 12148, dated July 20, 1979, 44 FR 43239
- EO 13007, dated May 24, 1996, *Historic Sites Act*, 16 U.S.C. 46, et seq.; Indian Sacred Sites, 61 FR 26771
- EO 12372, dated July 14, 1982, *Intergovernmental Review of Federal Programs*, 47 FR 30959, as amended by EO 12416, April 8, 1983, 48 FR 15587; supplemented by EO 13132, August 4, 1999, 64 FR 43255
- EO 13112, dated February 3, 1999, *Invasive Species*, 64 FR 6183, as amended by EO 13286, February 28, 2003, 68 FR 10619
- EO 11514, dated March 5, 1970, *Protection and Enhancement of Environmental Quality*, 35 FR 4247, as amended by EO 11541, July 1, 1970, 35 FR 10737 and EO 11991, May 24, 1977, 42 FR 26967
- EO 13045, dated April 21, 1997, *Protection of Children from Environmental Health and Safety Risks*, 62 FR 19885, as amended by EO 13229, October 9, 2001, 66 FR 52013 and EO 13296, April 18, 2003, 68 FR 19931
- EO 11990, dated May 24, 1977, *Protection of Wetlands*, 42 FR 26961, as amended by EO 12608, September 9, 1987, 52 FR 34617.

APPENDIX B

Public Involvement and Agency Coordination

APPENDIX B

Public Involvement and Agency Coordination

Interested Party List

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

Federal Agency Contacts

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

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

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

Commissioner Edward Drusina
Commissioner
International Boundary and Water Commission

Mr. Mike Snyder
Regional Director
National Park Service

Mary Orms
U.S. Fish and Wildlife Service

Ms. Ofelia Parra Amaro
International Boundary and Water Commission

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

Ms. Cathy Gilmore
Section Chief
U.S. Environmental Protection Agency

Mr. Richard E. Greene
Administrator
U.S. Environmental Protection Agency

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

Robert Jolley
Field Manager
BLM Amarillo Field Office

State Agency Contacts

Mr. John Davis
Director
Texas Parks and Wildlife, Wildlife Diversity Program

Ms. Jody Henneke
Deputy Commissioner
Texas General Land Office

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

Mr. F. Lawrence Oaks
State Historic Preservation Officer
Texas Historical Commission

Ms. Patty Reeh
Texas Commission on Environmental Quality

Mr. Carter Smith
Executive Director
Texas Parks and Wildlife

James M. Bass
Executive Director
Texas Dept. of Transportation

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

Ms. Kathy Boydson
Texas Parks and Wildlife

Mr. Archie Clouse
Regional Director
Texas Commission on Environmental Quality

Mr. Robert L. Cook
Executive Director
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Ms. Lorinda Gardner
Regional Director
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Governor's Policy Office

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Area Director
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Texas Commission on Environmental Quality

Ms. Lorinda Gardner
Regional Director
Texas Commission on Environmental Quality

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

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission

Environmental Policy Director
Governor's Policy Office

Tribal Contacts

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

The Honorable Wallace Coffey
Chairman
Comanche Nation

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

The Honorable Billy Evans Horse
Chairman
Kiowa Tribe of Oklahoma

The Honorable Frank Paiz
Governor
Ysleta del Sur Pueblo

Mr. Mark R. Chino
President
Mescalero Apache Tribe of the Mescalero Reservation

The Honorable Ron Twohatchet
Chairman
Kiowa Tribe of Oklahoma

Michael Burgess, Chairman
Comanche Nation of Oklahoma

Mrs Augustine Asbury
Alabama-Quassarte Tribal Town

Mr. Jimmy Arterberry
Comanche Nation of Oklahoma

Ms. Linda Langley
Coushatta Tribe of Louisiana

Ms. Tamara Francis-Fourkiller
Cultural Preservation Director
The Delaware Nation

Mr. Charles Coleman
Thlopthloco Tribal Town

Ms. Miranda "Nax'ce" Myer
Tonkawa Tribe of Oklahoma

Ms. Jean Ann Lambert
Quawpaw Tribe of Oklahoma

The Honorable Leslie Standing
Wichita and Affliated Tribes

Mr. Darren Cisco
Apache Tribe of Oklahoma

Local Contacts

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

Ms. Joyce A. Wilson
City Manager
City of El Paso

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

The Honorable Becky Dean-Walker
County Judge
Hudspeth County, Commissioners Court

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

The Honorable George E. Grubb
County Judge
Jeff Davis County, Commissioners Court

The Honorable Dan Dunlap
Mayor
City of Marfa

James R. Mustard
City Administrator
City of Marfa

Jim White
County Commissioner
Presidio County

The Honorable John Ferguson
Mayor
City of Presidio

Marco Baeza
City Administrator
City of Presidio

The Honorable Avinash Rangra
Mayor
City of Alpine

Margaret "Molly" Taylor
Interim City Manager
City of Alpine

Kathy Killingsworth
County Judge
Brewster County

The Honorable Joe Shuster
County Judge
Pecos County, Commissioners Court

The Honorable Santiago Flores
County Judge
Terrell County, Commissioners Court

The Honorable Roberto 'Bobby' Fernandez
Mayor
City of Del Rio

Robert Eads
City Manager
City of Del Rio

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

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

The Honorable Tim Ward
County Judge
Kinney County, Commissioners Court

The Honorable Ramsey English Cantu
Mayor
City of Eagle Pass

Gloria Barrientos
City Manager
City of Eagle Pass

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County Judge
Maverick County, Commissioners Court

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

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

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

The Honorable Raul G. Salinas
Mayor
City of Laredo

Carlos R. Villarreal
City Manager
City of Laredo

The Honorable Danny Valdez
County Judge
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The Honorable Joe Rathmell
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Zapata County, Commissioners Court

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Mayor
Rio Grande City

Matt Z. Ruszczak
City Manager
Rio Grande City

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Starr County, Commissioners Court

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Mayor
City of Roma

Crisanto Salinas
City Manager
City of Roma

The Honorable Jim Darling
Mayor
City of McAllen

Roy Rodriguez
Interim City Manager
City of McAllen

The Honorable Ramon Garcia
County Judge
Hidalgo County, Commissioners Court

The Honorable Tony Martinez
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Charlie Cabler
City Manager
City of Brownsville

The Honorable Chris Boswell
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City of Harlingen

Carlos R. Yerena
City Manager
City of Harlingen

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

Israel M Reyna
Barrio de Colores

Mr. Gabriel Perez
Environmental Manager
Union Pacific Railroad

Sample Interested Party Letter

April 24, 2014

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

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

Dear Mr. Blevens:

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

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

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

CBP invites public participation in the NEPA process through its solicitation of comments on the enclosed Draft EA and its associated Finding of No Significant Impact (FONSI). In order to be considered for inclusion in the Final EA, comments on the Draft EA and FONSI must be received by June 9, 2014. Please provide comments using only <u>one</u> of the following methods:

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

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

(c) By fax to (919) 785-1187.

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

Electronic copies of the Draft EA and FONSI are also available on the internet at http://www.cbp.gov/about/environmental-cultural-stewardship/nepa-documents/docs-review. Hard copies of the Draft EA and FONSI can also be reviewed at the El Paso Main Public Library, Fort Hancock ISD/Public Library, Marfa City Municipal Library, Alpine Public Library, City of Presidio Library, Val Verde County Library, Eagle Pass Public Library, Laredo Public Library, Rio Grande City Public Library, Speer Memorial Library, McAllen Public Library, Weslaco Public Library, Mercedes Memorial Library, Harlingen Public Library, San Benito Public Library, and Brownsville Public Library.

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

Sincerely,

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

Enclosure: Draft EA and FONSI

Letter received from Hudspeth County Judge Mike Doyal

THE OFFICE OF THE COUNTY JUDGE
MIKE DOYAL

April 29, 2014

Joseph Zidron
U.S. Customs and Border Protection
24000 Avila Rd. Suite 5020
Laguna Niguel, CA 92677

Ref: USBP TX TIMR FA and/or FONSI.

Dear Mr. Joseph Zidron,

I have received your letter in regards to the maintenance and repair of existing tactical infrastructure along the U.S./Mexico International Border in Texas. In regards to the drainage structures, the County feels it is in the best interest of the U.S. Customs and Border Protection along with the U.S. International Boundary & Water Commission to maintain the river channel as done in previous years.

Continous growth of brush, sanddrifts and other obstructions in the river channels between the levy roads in some places reduces the visibility. In times of heavy rain this would also be of great concern in regards to flooding issues. Your Consideration of these issues would be greatly appreciated.

Sincerely,

Mike Doyal

P.O. Box 68, Sierra Blanca, TX 79851| P:915.369.2321 | F:915.369.2361

04/30/2014 09:04 9153692361 HUDSPETH COUNTYJUDGE PAGE 01/01

Email received from Delaware Naiton

ZIDRON, JOSEPH

From:	Corey Smith <CSmith@delawarenation.com>
Sent:	Friday, May 09, 2014 1:01 PM
To:	TX_TIMR_EA
Subject:	Draft EA Addressing Proposed Tactical Infrastructure Maintenance and Repair
Follow Up Flag:	Follow up
Flag Status:	Flagged
Categories:	Red Category

Delaware Nation
Corey Smith
GIS/GPR Manager

Good Afternoon Mr. Enriquez,

This e-mail is in regards to the Notice of Availability for the Draft Environmental Assessment (EA) Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Border in Texas.

You sent the letter to the Delaware Nation, with Jason Ross as the Point of Contact. Can you please change the Point of Contact from Mr. Jason Ross to Mrs. Tamara Francis-Fourkiller, Cultural Preservation Director for the Delaware Nation.
Have a great
day.

Thank You,

Corey Smith
GIS/GPR Manager
Delaware Nation Cultural Preservation
P.O. Box 825
Anadarko, OK 73005
Phone: (405) 247-2448 Ext. 1405
Fax: (405) 247-8905

Letter Received from the U.S. Department of the Interior, National Park Service

United States Department of the Interior

NATIONAL PARK SERVICE
National Trails Intermountain Region
P.O. Box 728
Santa Fe, New Mexico 87504-0728

IN REPLY REFER TO: US Customs and Border Protection - Draft Environmental Assessment for Tactical Infrastructure Maintenance and Repair in Texas

May 19, 2014

Joseph Zidron
U.S. Customs and Border Protection
24000 Avila Road, Suite 5020
Laguna Niguel, CA 92677

Dear Mr. Zidron:

The National Park Service National Trails office in Santa Fe, New Mexico has reviewed the US Customs and Border Protection - Draft Environmental Assessment for Tactical Infrastructure Maintenance and Repair in Texas. The project map, Figure 1-1, shows an action area that encompasses portions of two National Historic Trails (NHT) that we administer, El Camino Real de los Tejas NHT, between Eagle Pass and Laredo, and El Camino Real de Tierra Adentro NHT, near El Paso. We request that the agency take the presence of these congressionally designated NHTs into account before approving any specific activities that have the potential to affect the trails, their settings, or associated resources. We would be happy to share geospatial data showing the locations of these trails if you need that information. Thank you for considering our comments. Please contact Michael Elliott at michael_elliott@nps.gov, or 505-988-6092 if you have any questions.

Sincerely,

Michael L. Elliott

Michael L. Elliott
Cultural Resources Specialist

Letter received from the Tonkawa Tribe of Oklahoma

TONKAWA TRIBE OF OKLAHOMA
NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT
• 1 RUSH BUFFALO ROAD, TONKAWA, OKLAHOMA 74653 •
• PHONE (580) 628-2561 • FAX: (580) 628-9903 •
WEB SITE: www.tonkawatribe.com

Dear Sir or Madam,

Regarding your proposed projects, the Tonkawa Tribe of Indians of Oklahoma submits the following:

The Tonkawa Tribe has no specifically designated historical or cultural sites identified in the above listed project area. However if any human remains, funerary objects, or other evidence of historical or cultural significance is inadvertently discovered then the Tonkawa Tribe would certainly be interested in proper disposition thereof.

We appreciate notification by your office of the many projects on-going, and as always the Tonkawa Tribe is willing to work with your representatives in any manner to uphold the provisions of NAGPRA to the extent of our capability.

Respectfully,

Miranda "Nax'ce" Myer
NAGPRA Representative

Letter received from Texas Parks and Wildlife Department

TEXAS PARKS & WILDLIFE

Life's better outside.®

Commissioners

Dan Allen Hughes, Jr.
Chairman
Beeville

Ralph H. Duggins
Vice-Chairman
Fort Worth

T. Dan Friedkin
Chairman-Emeritus
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Roberto De Hoyos
Austin

Bill Jones
Austin

James H. Lee
Houston

Margaret Martin
Boerne

S. Reed Morian
Houston

Dick Scott
Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

June 3, 2014

TX TIMR EA
c/o Mr. Joseph Zidron
U.S. Customs and Border Protection
24000 Avila Road – Suite 5020
Laguna Niguel, CA 92677

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

Dear Mr. Zidron:

Texas Parks and Wildlife Department (TPWD) has received the Draft Environmental Assessment (EA) for the above-referenced project. TPWD staff has reviewed the information provided and offers the following comments concerning this project.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project number ERCS-9005 in any return correspondence regarding this project.

Project Description

U.S. Customs and Border Protection (CBP) proposes to maintain and repair existing tactical infrastructure consisting of fences and gates, roads and bridges/crossovers, drainage structures and grates, designated open observation zones, boat ramps, lighting and ancillary power systems, and communications and surveillance tower components not directly associated with the tactical infrastructure covered by the Secretary's waiver and prior National Environmental Policy Act (NEPA) documentation. The maintenance and repair activities are necessary to repair damages caused by natural disasters, normal deterioration due to wear and tear, and intentional destruction or sabotage. The existing tactical infrastructure is along the U.S./Mexico international border in Texas and cuts across multiple land ownership categories including lands under CBP ownership, lands managed by other federal and state agencies, tribal lands, and private property. Most of the maintenance and repair activities associated with the proposed action

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would occur within 25 miles of the U.S./Mexico international border in Texas. CBP will develop a comprehensive protocol for coordinating the necessary maintenance and repair activities within the different classes of landownership. The maintenance and repair of tactical infrastructure assets that are already addressed in previous NEPA documents is not included in this EA. In addition, tactical infrastructure assets that are covered by a waiver issued by the Secretary are not included in this EA. Tribal land associated with the Kickapoo Tribe is present within the region of influence (ROI).

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

Previous Coordination

TPWD provided information and recommendations for the preparation of the draft EA for this project on June 16, 2011. TPWD also attended a series of open house scoping meetings where comments were requested and the public was informed of the preparation of the draft EA. TPWD provided comments and recommendations as a result of these meetings on March 6, 2014. These coordination letters are attached for your reference.

> **Recommendation:** Please review the previously submitted coordination letters and consider the recommendations provided, as they remain applicable to the project as currently proposed. TPWD also recommends including this previous coordination letters in Appendix B: Public Involvement and Agency Coordination.

Managed Areas

Section 3.2.2 of the draft EA states that Wildlife Management Areas (WMAs) in the project area are operated by the Wildlife Division of TPWD. The Las Palomas WMA Lower Rio Grande Valley Units, Black Gap WMA, and Elephant Mountain WMA are within the action area (TPWD 2010, TPWD 2005).

TPWD would also like to point out that there are several state parks/state natural areas in addition to the above-listed WMAs located within the action area as depicted on Figure 1–1 in the EA. The state parks/state natural areas located within the proposed action area include:

- Chinati Mountains State Natural Area
- Fort Leaton State Historic Site
- Big Bend Ranch State Park
- Seminole Canyon State Park and State Historic Site
- Devil's River State Park
- Devil's River State Natural Area
- Lake Casa Blanca State Park
- Falcon State Park
- World Birding Center – Bensten-Rio Grande Valley State Park
- World Birding Center – Estero Llano Grande State Park
- World Birding Center – Resaca de la Palma State Park
- Boca Chica State Park

Recommendations: TPWD recommends adding a discussion on state parks/state natural areas to Section 3.2.2 of the EA when discussing the different land uses in the action area. TPWD also recommends coordinating with the appropriate TPWD contact when the CBP is planning on performing maintenance or repairs within a TPWD-managed property. The appropriate contacts are listed below:

- Dennis Gissell (WMA Program Specialist) – (512) 389-4407
- David Riskind (State Parks – Natural Resources Program) – (512) 389-4897
- Ricky Meyers (South Texas State Parks) – (361) 790-0302
- Jimmy Stout (South Texas WMAs) – (956) 565-3919
- Deirdre Hisler (West Texas State Parks) – (432) 426-3533
- Mark Garrett (West Texas WMAs) – (830) 644-2252

Impacts to Vegetation/Wildlife Habitat

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

Section 3.4.3.1 of the draft EA states that short- and long-term, negligible to minor, direct and indirect, adverse effects on vegetation would occur from the proposed action due to vegetation control, crushing, accidental spills, and temporary increases in turbidity and sedimentation. Vegetation control would occur within existing footprints where vegetation is being maintained, and outside of the existing footprints for road setbacks. Vegetation control could include the selective removal of woody vegetation and could result in conversion or degradation of habitat. Vegetation control could also result in habitat disturbance resulting in the establishment of different plant communities, including invasive species, in the controlled area. The EA also states that cutting of riparian vegetation would be avoided within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.

Recommendation: TPWD recommends reducing the amount of vegetation proposed for clearing if at all possible. TPWD recommends minimizing clearing of native vegetation, particularly mature native trees, shrubs, and riparian vegetation to the greatest extent practicable. TPWD recommends in-kind on-site replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, particularly invasive grasses and weeds, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD also recommends using herbicides as a last resort when removing vegetation, especially in riparian areas, as herbicide use can have harmful effects on wildlife and wildlife habitat. If herbicides enter aquatic systems, they can be transported downstream and impact vegetation in non-target areas.

To minimize adverse effects, activities should be planned to preserve any mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation are high value to wildlife as food and cover. TPWD generally recommends that trees greater than 12 inches in diameter at breast height (dbh) to be removed be replaced at a ratio of three trees for every one (3:1) lost to the extent practicable, either on-site or off-site.

Trees less than 12-inches in dbh should be replaced at a 1:1 ratio. Replacement trees should be of equal or better wildlife quality than those removed and be regionally adapted native species. A three to five year maintenance plan that ensures an 85 percent survival rate should be developed for the replacement trees.

Rare and Protected Species

Section 3.6.2 of the draft EA states that the agencies that have primary responsibility for the conservation of plant and animal species in Texas are the U.S. Fish and Wildlife Service (USFWS) and TPWD. These agencies maintain lists of plant and animal species that have been classified, or are potential candidates for classification, as threatened or endangered in the State of Texas. Listed species for El Paso, Hudspeth, Culberson, Jeff Davis, Presidio, Brewster, Pecos, Terrell, Val Verde, Edwards, Kinney, Maverick, Dimmit, Zavala, Uvalde, Webb, Zapata, Starr, Hidalgo, and Cameron counties were obtained through USFWS. Data on species' occurrences and distributions were obtained from NatureServe, The Center for Plant Conservation, Texas Parks and Wildlife Endangered and Threatened Species database, and Biological Resources Plan for Construction, Operation and Maintenance of Tactical Infrastructure for Rio Grande Valley Sector, Texas.

Recommendation: TPWD recommends that the CBP obtain data from the Texas Natural Diversity Database (TXNDD) in addition to the data sources listed above when evaluating the potential presence of protected species and habitats that may be impacted by the proposed action. TPWD tracks rare and protected species, special features, natural communities, and rare resources in the TXNDD and TPWD actively promotes their conservation.

The TXNDD is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously based on new, updated and undigitized records; in order to request TXNDD data, please contact TexasNatural.DiversityDatabase@tpwd.texas.gov.

Section 3.6 in the draft EA addresses federally-listed species that may be impacted by the proposed action, but does not address state-listed species. Section 68.015 of the Parks and Wildlife Code regulates state-listed species. Please note that there is no provision for take (incidental or otherwise) of state-listed species. A copy of *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, is attached for your reference. For purposes of relocation, surveys, monitoring, and research, terrestrial state-listed species may only be handled by persons permitted through the TPWD Wildlife Permits Office. For activities that involve aquatic species please contact the TPWD Kills and Spills Team (KAST) for the appropriate authorization. For more information on Wildlife Permits please visit http://www.tpwd.state.tx.us/business/permits/land/wildlife/research/. For more information on KAST please visit http://www.tpwd.state.tx.us/landwater/water/environconcerns/kills_and_spills/regions/.

Recommendation: TPWD recommends that the CBP revise this section of the EA to include a discussion on potential impacts to state-listed and rare species that may be impacted as a result of the proposed action.

The references section in the draft EA states that the TPWD threatened and endangered species lists were accessed on December 27, 2010.

Recommendation: TPWD recommends the CBP review the most recent TPWD county lists as these lists and have been updated since 2010 and are consistently updated with new species and listing changes. These lists are available online at http://www.tpwd.state.tx.us/gis/ris/es/. If during construction, the project area is found to contain rare or protected species, natural plant communities, or special features, TPWD recommends that precautions be taken to avoid impacts to them.

Threatened and endangered species BMPs within Appendix E: Best Management Practices discusses potential impacts to federally-listed species and makes recommendations for contractors to contact USFWS if a protected species or their habitat may be impacted by the proposed action.

Recommendation: TPWD recommends that the CBP revise the threatened and endangered species BMPs within Appendix E to include state-listed and rare species with a recommendation to contact TPWD if state-listed or rare species and their habitat may be impacted by the proposed action.

I appreciate the opportunity to review and comment on the draft EA and look forward to receiving the final EA when available. Please contact me at (512) 389-8054 or by email at jessica.schmerler@tpwd.texas.gov if you have any questions.

Sincerely,

Jessica Schmerler

Jessica Schmerler
Wildlife Habitat Assessment Program
Wildlife Division

JES:gg.ERCS-9005

Attachments (3)

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

June 9, 2014

TX TIMR EA
c/o Joseph Zidron
U.S. Customs and Border Protection
24000 Avila Road, Suite 5020
Laguna Niguel, CA 92677

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

Dear Mr. Zidron:

Thank you for the Notice of Availability for the Draft Environmental Assessment Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Border in Texas (Draft TX TIMR EA). The International Boundary and Water Commission, United States Section (USIBWC) has reviewed the document regarding the preventive and scheduled maintenance and repair of existing tactical infrastructure and would like to provide the following comments.

The USIBWC owns and/or manages property along the U.S./Mexico international boundary along which this tactical infrastructure is located. USIBWC project areas along the Texas border/Action Area include the Rio Grande Canalization Project (RGCP), Rio Grande Rectification Project (RGRP), Presidio Flood Control Project (PFCP), Amistad Dam and Reservoir, Falcon Dam and Reservoir, and the Lower Rio Grande Flood Control Project (LRGFCP). Information regarding these project areas can be found on our website at http://www.ibwc.gov/home.html. Additionally, the USIBWC reviews projects along the entire international boundary to ensure compliance with agreements between the United States and Mexico.

Section 1 of the EA and the associated paragraph in the Executive Summary, as well as Section 2.3.2 under Tactical Infrastructure Assets on Land Managed by Other Federal and State Agencies, should include the USIBWC in the list of agencies with property through which this Action Area crosses and with which coordination will be required prior to conducting any maintenance or repair activities. Section 1 also indicates tribal land of the Kickapoo Tribe is within the region of influence but fails to mention the Ysleta del Sur Pueblo. The Ysleta del Sur Pueblo tribal lands are located within the El Paso Sector area and appear to be within the region of influence according to Figure 1-1.

Sections 2.2 and 3.12.3.1 mention the preparation of a Programmatic Agreement (PA) between Customs and Border Protection (CBP), the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Officer (SHPO), and Federal Agencies and federally recognized tribes that own or manage land along the U.S./Mexico international border. The USIBWC has not been included in the development or review of this PA. The USIBWC should be included in the PA process and requests to be a signatory to the PA as the agency owns and/or manages property along the international boundary.

Any maintenance or repair of tactical infrastructure located on USIBWC owned and/or managed property must be coordinated with the USIBWC prior to the action. The USIBWC maintains vegetation and levee roads within the aforementioned project areas. The USIBWC has specific requirements for levee road maintenance and vegetation management to include the established vegetative buffer for the jaguarondi and ocelot, also known as the cat corridor, within the LRGFCP.

Thank you for the opportunity to review and comment on the Draft TX TIMR EA. If you have any questions, please call me at (915) 832-4702.

Sincerely,

Gilbert Anaya

Gilbert Anaya
Division Chief
Environmental Management Division

Ysleta del Sur Pueblo

Tribal Council – Javier Loera (War Captain/Tribal Historic and Preservation Officer) E-mail jloera@ydsp-nsn.gov

117 South Old Pueblo Road * P.O. Box 17579 * El Paso, Texas 79917 * (915) 859-8053 * Cell (915) 497-3876

Date: 9 June 2014

Joseph Zidron
U.S. Customs and Border Protection
TX_TIMR_EA@cbp.dhs.gov

Re: Ysleta del Sur Pueblo's Comment on the Draft Environmental Assessment (EA) Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Border in Texas

My name is Javier Loera. I am the War Captain of Ysleta del Sur Pueblo, a federally recognized Indian tribe whose reservation is within the exterior boundaries of El Paso County, Texas. In fact, a portion of the Pueblo's reservation is on the United States Mexico border. I also serve the Pueblo as its Tribal Historic Preservation Officer. As such I am in receipt of the April 22, 2014 letter of Paul Enriquez, Environmental Branch Chief, Border Patrol Facilities and Tactical Infrastructure, Program Management Office, providing Notice of Availability for the Draft Environmental Assessment (EA) Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Border in Texas. We have reviewed the draft EA and Finding of No Significant Impact (FONSI). The following are the Pueblo's comments.

First, as an indigenous community, the Pueblo appreciates better than most the need to secure one borders. Second, the Pueblo supports incorporation of the repair and maintenance of tactical infrastructure within a general plan of prioritized and coordinated repair and maintenance. Third, the primary concern of the Pueblo is the protection of its most sacred site, the Rio Grande River and its environs from Fonseca Drive in the City of El Paso down river to the international bridge at Tornillo, Texas. While the Pueblo certainly has traditional ceremonial sites and gathering locations within that reach of the river, it is the river itself and its environs which are sacred. Fourth, the Pueblo seeks to assure that bona fide government to government consultations occur by the establishment of appropriate protocols.

Referencing the first paragraph of section 3.12.1 of the EA, we note with approval the citation of the American Indian Religious Freedom Act (AIRFA) as a defining source of heritage-related resources included in the EA's definition of "cultural resources." The AIRFA instructs federal agencies that American Indians enjoy the same First Amendment guarantees as all other people. It seeks to correct federal policies and practices that could (a) deny access to sacred sites required in traditional religions, (b) prohibit use and possession of sacred objects necessary for religious ceremonies, and (c) intrude upon or interfere with religious ceremonies. AIRFA focuses not just on religious places, but also on religious practices, directing agencies to consider both before doing things that could affect them. Presidential Executive Order 13007 reinforces the purposes of the AIRFA with regard to sacred sites. The executive order directs federal agencies to accommodate access to Indian sacred sites and ceremonial use of those sites by Indian religious practitioners. It also directs agencies to avoid adversely affecting the physical integrity of sacred sites to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions. (Both AIRFA and PEO13007 are mention in Footnote 1 accompanying Table A-1of the EA).

We further note that the draft Programmatic Agreement (PA) mentioned in the second paragraph of section 13.12.3.1 appears too limited to satisfy the requirements of AIRFA and POE 13007. The PA is to be between the CBP and "federally recognized tribes that own or manage land along the U.S./Mexico international border." The Pueblo is obviously a proper signatory to a PA as the Pueblo's reservation is along the international border, yet its protected interests extend far beyond the borders of its reservation. The Pueblo is a proper signatory because (1) the river and its environs is a Pueblo religious site and (2) the Pueblo conducts religious practices along the reach of the river as described above. The first sentence of the second paragraph should be rewritten to read in pertinent part "tribes that own or manage land along the U.S./Mexico international border or whose religious sites and practices may be affected by project activities." A similar change in wording should occur in the paragraph entitled "Tactical Infrastructure Assets on Tribal Lands", in section 3.3.2 of the EA.

In that federally recognized Indian tribes will be entering into PAs with CBP regarding any project activities, the EA should at the least contain a citation to the Department of Homeland Security's Tribal Consultation Policy, perhaps in the paragraph entitled "Tactical Infrastructure Assets on Tribal Lands." At present the Policy may be viewed over the Internet at www.dhs.gov/sites/default/files/publications/DHS%20Tribal%20Consulation%20Policy%20Final%20PDF.pdf. The Pueblo is pleased to note that the policy contains the following: "The steps listed above provide general principles to guide engagement; the specific manner in which DHS and the Indian Tribes engage in Consultation will be flexible in recognition of the uniqueness of each Indian Tribe and the wide range of Federal actions that may warrant Consultation. In many cases, Consultation will most appropriately occur between officials of Tribal Governments and DHS personnel at the local level." Like many tribes, the Pueblo has own consultation policy and a position paper on cultural affiliation with which local CB personnel are familiar. A copy of each accompanies this letter to impress upon the drafters of the EA the high regard Indian tribes place upon government to government consultation which far exceeds providing stakeholders an opportunity to download massive documents, digest same (while trying to run a government), and offer meaningful comments within a 45 day period.

A final note – the letter which I received was addressed to Albert Alvidrez, a former governor of the Pueblo. Mr. Alvidrez is listed in Appendix B as a tribal contact for the Pueblo. That information should be deleted. Frank Piaz is properly identified in Appendix B as a tribal contact for the Pueblo. I respectfully request that I also be listed as a tribal contact for the Pueblo.

Respectfully submitted,

Javier Loera

Javier Loera,
War Captain

CONSULTATION POLICY

Ysleta Del Sur Pueblo

Preface: This document formalizes the existing procedures for consultation (government to government, or otherwise) between the Pueblo of Ysleta del Sur and the United States federal government including any and all agencies/offices/departments/bureaus therein. This policy statement reflects completely the procedures followed and adhered to by this federally recognized Indian tribe during previous consultations and therefore the procedures to be followed and adhered to in future consultations.

Consultation: Consultation is the formal, bilateral process of negotiation, cooperation and policy-level decision-making between two sovereign entities: the Tigua Tribe of Ysleta del Sur Pueblo and the United States Government or its designate. Consultation, therefore, is a process that leads ultimately to a decision. Consultation is not just a process or a mean to an end. As such, it should not be viewed by others and is not viewed by the Pueblo of Ysleta del Sur as a mere formality during the stages of any project. Consultation is not notifying our Tribal Council that an action will occur, requesting written comments on the action or alternative actions, and then proceeding with the action or one of the a priori alternatives. Such authoritarian, top-down procedures do not constitute consultation because a decision is not affected bilaterally between two sovereign entities.

Consultation Objectives:

1) Assures that the Tribal Council and its designates understand fully the technical and legal issues, implications, and probable impacts involved in and resulting from an action or alternatives so that an informed policy-level decision can be made.

2) Improved policy-level decision-making of both the Tribal Council and the federal government.

3) Bilateral decision-making between and among sovereigns leading to co-managerial structure.

4) Protection of Ysleta del Sur Pueblo's cultural and natural resources, cultural tradition, economy and lifestyle.

5) Compliance with and respect for Tribal laws and Tribal integrity.

6) Full compliance with federal Indian law, federal statutes, and federal policy.

7) Develop and achieve mutual decisions through working relationships.

8) Improve the integrity and efficacy of decisions over time.

9) Recognition that the Tribe is both a stakeholder and regulator in projects that have potential or real impacts on tribal resources, culture, and lifestyle.

Consultation Procedures:

The consultation venue works or proceeds in much the same way that federal agencies typically operate. This means a series of technical meetings followed by a series of policy meetings. The technical meetings provide opportunities for consultation by and with the appropriate technical staff of both entities. The policy meetings provide opportunities for the resolution of those issues left unresolved at the technical level and for the resolution of those issues that are clearly policy grounded. The outcome of this procedure is the development of a common understanding of the technical and legal issues affecting or are affected by a decision. It is this common understanding in a democratized context that provides the basis for decision-making. The Tigua Tribal Council will address more cooperatively those issues with which they had been thoroughly consulted with prior to a decision.

Consultation requires that federal agencies and the Tribal Council fully understand their roles in the context of the federally-mandated government-to-government relationship and the responsibilities which devolve upon the federal government under the Trust doctrine. In this environment, both the Tribal Council and the federal agency will benefit from the perspectives each brings to the table. This means personal communication, which is one of the foundations for meaningful consultation. To make this process work, the following series of activities should guide consultation:

1. Federal agency contacts the Governor of the Pueblo of Ysleta del Sur to inform him of an impending project or to conduct an activity which may or may not impact a tribal resource or tribal concern.

2. The Governor, after meeting with the Tribal Council and/or it designates, responds back to the federal agency that this issue is or is not important. If it is important, the Governor will communicate to the federal agency that the Tribe will initiate consultation.

3. Consultation is initiated through technical staff meetings which will inform the respective staffs in a comprehensive way so that each can brief and/or make recommendations to their

respective policy level entities in an informed way.

4. After the technical staff has briefed the Tribal Council, the Council will define the consultation protocol it wishes to follow, which will typically entail additional technical and policy level meetings, research activities, and a final policy level meeting to make a decision. These are then transmitted in written form to the federal agency. The outcome here should be a memorandum of agreement to establish a working relationship between entities.

5. The consultation protocol is followed.

6. A decision couched in bilateral cooperation between the federal agency and the Tribal Council is formulated. This decision will be fully compliant with federal and tribal laws and policies. The decision will protect the resources to which the Tigua Tribe of Ysleta del Sur Pueblo has specific aboriginal and Spanish land grant reserved rights. The decision will protect the cultural tradition and the religious practices of the Tribe.

This consultation policy will insure that Tribal Council and the federal government have not only communicated but have developed mutual understanding and trust. Within this context, policy level decision-making can and must work.

Cultural Affiliation Position Paper: Ysleta del Sur Pueblo

Introduction

The following statement is the official position of Ysleta del Sur Pueblo regarding its cultural affiliation to so-called prehistoric and historic areas, sites, locales, monuments and/or traditions. Tribal Council approached this report as a way of expediting any and all consultations pursuant to NAGPRA, AIRFA, NEPA, and the NHPA. Archaeological and ethnographic data, oral tradition, historic documentation and linguistic evidence were collected and analyzed in the development of this statement.

Position

1. The Tigua Tribe of Ysleta del Sur Pueblo is a Federally-Recognized Indian Tribe.

The Tribe received federal recognition on 12 April 1968 when President Johnson signed Public Law 90-287. The law stated that "the Indians now living in El Paso County, Texas, who are the descendants of the Tiwa Indians of Ysleta (Isleta) del Sur Pueblo, settling in Texas at Ysleta in 1682, shall from and after the ratification of this act be known and designated as the Tiwa Indians of Ysleta, Texas…" The bill also transferred the Tribe to the jurisdiction of the State of Texas. In 1987, the Ysleta del Sur Restoration Act transferred the Tribe to the jurisdiction of the United States government, as a dependent sovereign nation.

2. The Tigua Tribe of Ysleta del Sur Pueblo is a Pueblo Indian Nation.

The Tigua are "Pueblo Indians." As the Spanish pushed northward during the 16th century, they encountered a vast majority of indigenous peoples who were living in sedentary communities characterized by compact, multi-chambered structures situated around central plazas. The Spanish called these villages or settlements *pueblos* and the people living there, "Pueblo Indians." An important distinction emerged for the Spanish and other colonial powers between agricultural, village dwelling Pueblo Indians and other "roving" or "hostile" Indians, such as the Apache, who lived a more nomadic, foraging way of life. Virtually all European colonial powers recognized settled indigenous groups as more "civilized" compared to those "dissident" groups with nomadic inclinations. Therefore, Ysleta del Sur is culturally affiliated with all known Puebloan groups including the 19 New Mexico Pueblos, the Hopi Tribe in Arizona, and all Ancestral Puebloan groups including so-called Anasazi peoples and sites.

3. The Tigua Tribe of Ysleta del Sur Pueblo is affiliated with all "Ancestral Pueblo" or so-called "Anasazi" sites.

Broadly speaking, all Pueblos have a basis for claiming cultural affiliation from all

Anasazi sites in the San Juan region. Clan migrations, intermarriage and regroupings of people into communities as they are known today makes this statement possible. As a Tanoan speaking group, Ysleta del Sur maintains the same oral tradition which states that Tanoan speaking groups lived in the Four Corners region prior to the arrival of Keresan speakers. This affiliation is probably more substantial among some Tiwa speakers more than others.

4. The Pueblo of Ysleta del Sur is affiliated with all Jornada Mogollon, Piro, Suma, Manso and Jumano sites.

Broadly speaking, this affiliation is based on the fact that the Pueblo has ancestral ties to the Saline Province of New Mexico, an area of overlap between "Anasazi" and "Jornada Mogollon" cultural areas. Ysleta del Sur Pueblo consists of people who are descendants of the Tiwa of Isleta Pueblo, New Mexico, and the pueblos of the New Mexico Saline Province which includes the Tiwa pueblos of Quarai, Chilili, Tajique and Tompiro-speaking pueblos of Abo, Las Humanas (Gran Quivira) and Tabira. Ysleta del Sur Pueblo also has descendants from and hence affiliation with all archaeologically and historically known Piro communities found south of Isleta, New Mexico. Subsequent to the 1680 relocation to the El Paso area, the Tigua intermarried with Piros, Manso and Suma Indians. The Manso and Suma were part of the Jumano tradition and like the Jumano, were Tanoan speakers. Over time, the Tigua absorbed all these cultural traditions and today represents the only federally-recognized tribe having cultural affiliation with Piro, Suma, Manso and Jumano traditions.

5. The Pueblo of Ysleta del Sur is culturally affiliated with all prehistoric, protohistoric, and historic indigenous cultural traditions found in the Tribe's Spanish Land Grant areas as well as its aboriginal claim area.

The aboriginal claim area, including the Ysleta and Socorro Grants, covers the Texas counties of El Paso, Hudspeth, Culberson, Jeff Davis, Presidio and Brewster. Within this vast area are a number of religious shrines, historic sites, spiritual activity areas and biotic cultural resources of continuing critical importance to the Tribe's well-being.

1300 Pennsylvania Avenue NW
Washington, DC 20229

U.S. Customs and
Border Protection

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APR 2 4 2014
TEXAS HISTOR...

Mr. F. Lawrence Oaks
State Historic Preservation Officer
Texas Historical Commission
1511 Colorado Street
Austin, TX 78701

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

Dear Mr. Oaks:

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

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

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

CBP invites public participation in the NEPA process through its solicitation of comments on the enclosed Draft EA and its associated Finding of No Significant Impact (FONSI). In order to be considered for inclusion in the Final EA, comments on the Draft EA and FONSI must be received by June 9, 2014. Please provide comments using only one of the following methods:

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

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

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

When submitting comments, please include your name and address, and identify your comments as for the TX TIMR EA. Your comments, along with your identifying information, will be made available to the public. Electronic copies of the Draft EA and FONSI are also available on the internet at:

http://www.cbp.gov/about/environmental-cultural-stewardship/nepa-documents/docs-review.

Hard copies of the Draft EA and FONSI can also be reviewed at the El Paso Main Public Library, Fort Hancock ISD/Public Library, Marfa City Municipal Library, Alpine Public Library, City of Presidio Library, Val Verde County Library, Eagle Pass Public Library, Laredo Public Library, Rio Grande City Public Library, Speer Memorial Library, McAllen Public Library, Weslaco Public Library, Mercedes Memorial Library, Harlingen Public Library, San Benito Public Library, and Brownsville Public Library.

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

Sincerely,

Paul Enriquez

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

Enclosure: Draft EA and FONSI

NO HISTORIC
PROPERTIES AFFECTED
PROJECT MAY PROCEED
by Mark H Denton
for Mark Wolfe
State Historic Preservation Officer
Date 5-20-14
Track#

Email from Texas Parks and Wildlife Department

ZIDRON, JOSEPH

From:	Doris King <Doris.King@tpwd.texas.gov>
Sent:	Friday, April 25, 2014 1:51 PM
To:	TX_TIMR_EA
Subject:	UPS package
Follow Up Flag:	Follow up
Flag Status:	Completed

A letter was sent to Mr. Tim Bone in Alpine, Texas at Texas Parks and Wildlife Department by UPS re: *Notice of Availability for the Draft Environmental Assessment (EA) Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Boarder of Texas.* This e-mail is to inform you that Mr. Tim Bone no longer works in the office or for Texas Parks and Wildlife for that matter.

Thank you,

Doris Ann King
Texas Parks & Wildlife Department
109 S. Cockrell St.
Alpine, TX 79830-5002
Phone: 432-837-2051
Fax: 432-837-5987

Comment Response Matrix for Letters Received during the Public Comment Period

COMMENT RESPONSE MATRIX

Public Draft Environmental Assessment Addressing Proposed Tactical Infrastructure Maintenance and Repair Along the U.S. Southwestern Border in Texas

#	Location			Comment	Reviewer	CBP's Response
	Page	Line	Section			
1				In regards to drainage structures, the County feels it is the best interest of the U.S. Custom and Border Protection (CBP) agency along with the U.S. International Boundary & Water Commission (USIBWC) to maintain the river channel as done in previous years. Continuous growth of brush, sand drifts and other obstructions in the river channels between the levy roads in some places reduces the visibility. In times of heavy rain this would also be of great concern in regards to the flooding issue.	MD	Thank you for your comment. CBP will consider this input when planning future maintenance activities.
2				Sent letter to incorrect recipient (Jason Ross). Change Point of Contact from Mr. Jason Ross to Mrs. Tamara Francis-Fourkiller, Cultural Preservation Director for the Delaware Nation.	CS	Text revised per comment.
3				The Project Map, Figure 1-1, shows an action area that encompasses portions of two National Historic Trails (NHT) that the National Park Service (NPS) administers, El Camino Real de los Tejas NHT, between Eagle Pass and Laredo, and El Camino Real de Tierra Adentro NHT, near El Paso. NPS requests that CBP take the presence of these congressionally designated NHTs into account before approving any specific activities that have the potential to affect the trails, their settings, or associated resources.	ME	Text added per comment. CBP will consider designated NHTs when planning future maintenance activities.
4				The Tonkawa Tribe has no specifically designated historical or cultural sites identified in the above listed project area. However, if any human remains, funerary objects, or other evidence of historical or cultural significance is inadvertently discovered then the Tonkawa Tribe would certainly be interested in proper disposition thereof.	MM	Thank you for your comment. CBP has developed best management practices (BMPs) that address inadvertent discoveries, including adhering to NAGPRA regulations.

5			3.2.2	TPWD would also like to point out that there are several state parks/natural areas in addition to the WMAs mentioned in Section 3.2.2 located within the action area as depicted on Figure 1-1 in the EA. The state parks/state natural areas located within the proposed action area include: • Chinati Mountains State Natural Area • Fort Leaton State Historic Site • Big Bend Ranch State Park • Seminole Canyon State Park and State Historic Site • Devil's River State Park • Devil's River State Natural Area • Lake Casa Blanca State Park • Falcon State Park • World Birding Center – Bensten-Rio Grande Valley State Park • World Birding Center – Estero Llano Grande State Park • World Birding Center – Resaca de la Palma State Park • Boca Chica State Park TPWD recommends adding a discussion on state parks/natural areas to Section 3.2.2 of the EA when discussing the different land uses in the action area. TPWD also recommends coordinating with the appropriate TPWD contact when the CBP is planning on performing maintenance or repairs within TPDW-managed property. Appropriate contacts are listed below: • Dennis Gissell (WMA Program Specialist) – (512) 389-4407 • David Riskind (State Parks – Natural Resources Program) – (512) 389-4897 • Ricky Meyers (South Texas State Parks) – (361) 790-0302 • Jimmy Stout (South Texas WMAs) – (956) 565-3919 • Deirdre Hisler (West Texas State Parks) – (432) 426-3533 • Mark Garrett (West Texas WMAs) – (830) 644-2252	JS	Text revised to include a list of additional natural parks/areas. CBP would establish mutually agreed upon processes for performing maintenance and repair activities on land managed by TPWD.

6				TPWD recommends reducing the amount of vegetation proposed for clearing if at all possible. TPWD recommends minimizing clearing of native vegetation, particularly mature native trees, shrubs, and riparian vegetation to the greatest extent practicable. TPWD recommends in-kind on-site replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, particularly invasive grasses and weeds, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. If herbicides enter aquatic systems, they can be transported downstream and impact vegetation in non-target areas.	JS	Vegetation clearing would be limited to providing visibility and ensuring safe driving conditions for USBP agents during travel, which is essential to the CBP mission. Per Appendix E, removal methods would be used to prevent disturbance that encourages establishment of invasive plants. Disturbed soils that will not otherwise be stabilized shall be reseeded using native species.
7				To minimize adverse effects, activities should be planned to preserve any mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation are high value to wildlife as food and cover. TPWD generally recommends that trees greater than 12 inches in diameter at breast height (dbh) to be removed be replaced at a ratio of three trees for every one (3:1) lost to the extent practicable, either on-site or off-site. Trees less than 12-inches in dbh should be replaced at a 1:1 ratio. Replacement trees should be of equal or better wildlife quality than those removed and be regionally adapted native species. A three to five year maintenance plan that ensures an 85 percent survival rate should be developed for the replacement trees.	JS	Adverse impacts to vegetation would be minimized to the greatest extent practicable through the use of BMPs outlined in Appendix E of the EA. Vegetation clearing would occur within existing footprints where vegetation is being maintained. As a result, impacts on vegetation are expected to be negligible to minor.
8				TPWD recommends that the CBP obtain data from the Texas Natural Diversity Database (TXNDD) in addition to the data sources listed in the EA when evaluating the potential presence of protected species and habitats that may be impacted by the proposed action.	JS	The TXNDD was used on March 14, 2014 as indicated in the reference section in the EA. The source has been added to Section 3.6 and Table D-2.
9			3.6	TPWD recommends that CBP revise Section 3.6 of the EA to include a discussion on potential issues to state-listed and rare species that may be impacted as a result of the proposed action.	JS	Table D-2 was created to identify a representative range of impacts to state-listed species as efficiently as possible.

10				The references section in the draft EA states that TPWD threatened and endangered species lists were accessed on December 27, 2010. TPWD recommends the CBP review the most recent TPWD county lists as these list have been updated since 2010 and are consistently updated with new species and listing changes. These lists are available online at http://www.tpdw.state.tx.us/gis/ris/es/. If during construction, the project area is found to contain rare or protected species, natural plant communities, or special features, TPWD recommends that precautions be taken to avoid impacts to them.	JS	The TXNDD was used on March 14, 2014 as indicated in the reference section in the EA. The source has been added to Section 3.6 and Table D-2. No new construction would occur as part of the Proposed Action. CBP would take precautions to avoid sensitive species and habitat during maintenance and repair activities.
11			Appendix E	TPWD recommends that the CBP revise the threatened and endangered species BMPs within Appendix E to include state-listed and rare species with a recommendation to contact TPWD if state-listed or rare species and their habitat may be impacted by the proposed action.	JS	The amount of disturbance associated with this EA is limited. The general BMPs described in Appendix E provide sufficient protections for state-listed species.
12				USIBWC project areas along the Texas border/Action Area include the Rio Grande Canalization Project (RGCP), Rio Grande Rectification Project (RGRP), Presidio Flood Control Project (PFCP), Amistad Dam and Reservoir, Falcon Dam and Reservoir, and the Lower Rio Grande Flood Control Project (LRGFCP).	GA	Comment noted.
13			Section 2.3.2	Section 1 of the EA and the associated paragraph in the Executive Summary, as well as Section 2.3.2 under Tactical Infrastructure Assets on Land Managed by Other Federal and State Agencies, should include USIBWC in the list of agencies with property through which this Action Area crosses and with which coordination will be required prior to conducting any maintenance or repair activities.	GA	Text revised to incorporate USIBWC into the list of agencies that CBP would coordinate with prior to conducting maintenance or repair activities on lands under their control.
14				Section 1 also indicates tribal land of the Kickapoo Tribe is within the region of influence but fails to mention the Ysleta del Sur Pueblo. The Ysleta del Sur Pueblo tribal lands are located within the El Paso Sector area and appear to be within the region of influence according to Figure 1-1.		Ysleta del Sur Pueblo added per comment.

15			2.2 3.12. 3.1	Sections 2.2 and 3.12.3.1 mention the preparation of a Programmatic Agreement (PA) between CBP, the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Officer (SHPO), and Federal agencies and federally recognized tribes that own or manage land along the U.S./Mexico international border. The USIBWC has not been included in the development or review of this PA. The USIBWC should be included in the PA process and requests to be a signatory to the PA as the agency owns and/or manages property along the international border.	GA	A letter to USIBWC was sent in 2010 notifying USIBWC of the intent to develop and implement the PA. USIBWC was invited to participate in the development of the PA and to be a signatory to the agreement and initially declined. USIBWC recently contacted CBP asking to be a signatory to the PA and CBP granted the request.
16				Any maintenance or repair of tactical infrastructure located on USIBWC owned and/or managed property must be coordinated with the USIBWC prior to the action. The USIBWC maintains vegetation and levee roads within the aforementioned project areas. The USIBWC has specific requirements for levee road maintenance and vegetation management to include the established vegetative buffer for the jaguarondi and ocelot, also known as the cat corridor, within the LRGFCP.	GA	CBP would coordinate with USIBWC regarding maintenance and repair activities proposed on USIBWC land. BMPs described in Appendix E would be implemented to minimize or avoid impacts on ocelot, jaguarondi, and their habitats.
17				Ysleta del Sur Pueblo supports incorporation of the repair and maintenance of tactical infrastructure within a general plan of prioritized and coordinated repair and maintenance. The primary concern of Ysleta del Sur Pueblo is the protection of the Rio Grande River and its environs from Fonseca Drive in the City of El Paso down river to the international bridge. While the Pueblo certainly has traditional ceremonial sites and gathering locations within that reach of the river, it is the river itself and its environs which are sacred.	JL	BMPs described in Appendix E would be used to minimize impacts to all water resources, including the Rio Grande, during any maintenance and repair activities.
18			3.12. 1	Referencing the first paragraph of Section 3.12.1 of the EA, we note with approval the citation of the American Indian Religious Free Act (AIRFA) as a defining source of heritage-related resources included in the EA's definition of 'cultural resources.'	JL	Thank you for your comment.

19			13.12.3.1 3.3.2	We further note that the draft Programmatic Agreement (PA) mentioned in the second paragraph of section 13.12.3.1 appears too limited to satisfy the requirements of AIRFA and Presidential Executive Order (PEO) 13007. The PA is to be between the CBP and 'federally recognized tribes that own or manage land along the U.S./Mexico international border." The Pueblo is obviously a proper signatory to a PA as the Pueblo's reservation is along the international border, yet it's protected interested extend far beyond the borders of its reservation. The Pueblo is a proper signatory between (1) the river and its environs is a Pueblo religious site and (2) the Pueblo conducts religious practices along the reach of the river as described above. The first sentence of the second paragraph should be rewritten to read in pertinent part 'tribes that own or manage land along the U.S./Mexico international border or whose religious sites and practices may be affected by project activities.' A similar change in wording should occur in the paragraph entitled "Tactical Infrastructure Assets on Tribal Lands," in section 3.3.2 of the EA.	JL	Text revised per comment.

20				In that federally recognized Indian tribes will be entering into PAs with CBP regarding project activities, the EA should at the least contain a citation to the Department of Homeland Security's Tribal Consultation Policy, perhaps in the paragraph entitled "Tactical Infrastructure Assets on Tribal Lands." At present the Policy may be viewed over the Internet at www.dhs.gov/sites/default/files/publications/DHS%20Tribal%20Consultation%20Policy%20Final%20PDF.pdf. The Pueblo is pleased to note that the policy contains the following: "The steps listed above provide general principles to guide engagement; the specific manner in which DHS and the Indian Tribes engage in Consultation will be flexible in recognition of the uniqueness of each Indian Tribe and the wide range of Federal actions that may warrant Consultation. In many cases, Consultation will most appropriately occur between officials of Tribal Governments and DHS personnel at the local level." Like many tribes, the Pueblo has its own consultation policy and a position paper on cultural affiliation with which local CBP personnel are familiar. A copy of each accompanies this letter to impress upon the drafters of the EA the high regard Indian tribes place upon government to government consultation which far exceeds providing stakeholders an opportunity to download massive documents, digest same (while trying to run a government), and offer meaningful comments within a 45 day period.	JL	Citation added per comment. CBP did extend government to government consultation as part of the PA process. Ysleta del Sur Pueblo was invited to participate via correspondence sent to the head of the Pueblo in 2010 and a second letter sent in 2012 detailing the PA process and inviting the pueblo to participate. Per a July 5, 2012 response from Javier Loera, the Ysleta del Sur Pueblo did not wish to consult on the agreement but asked to be kept informed. CBP has included the Pueblo in all notifications to non-participating tribes.
21				The letter received by Ysleta del Sur Pueblo was addressed to Albert Alvidrez. Mr. Alvidrez is listed in Appendix B as a tribal contact for the Pueblo. This information is incorrect. Frank Paiz is correctly identified in Appendix B as a tribal contact for the Pueblo. I (Javier Loera) respectfully request that I also be listed as a tribal contact for the Pueblo.	JL	Text revised per comment.
22				No historic properties affected. Project may proceed	MQ	Thank you for your comment.

23				A letter was sent to Mr. Tim Bone in Alpine, Texas at Texas Parks and Wildlife Department by UPS re: Notice of Availability for the Draft Environmental Assessment (EA) Addressing Proposed Tactical Infrastructure Maintenance and Repair along the U.S./Mexico International Boarder of Texas. This email is to inform you that Mr. Tim Bone no longer works in the office or for Texas Parks and Wildlife for that matter.	DK	Tim Bone removed from the interested party list per comment.

Reviewer: Please provide your name, title, commercial phone number, email address, and date of comments

Mike Doyal (MD) (County Judge)
Corey Smith (CS) (Delaware Nation)
Michael L. Elliott (ME) (National Park Service)
Miranda ‘Nax’ce” Myer (MM) – (Tonkawa Tribe)
Jessica Schmerler (JS) (Texas Parks and Wildlife Department)
Gilbert Anaya (GA) (International Boundary and Water Commission United States and Mexico)
Javier Loera (JL) (Ysleta del Sur Pueblo)
Mark Quinton (MQ) (State Historic Preservation Office)
Doris King (DK) (Texas Parks and Wildlife Department)

APPENDIX C

Tactical Infrastructure Classifications and Maintenance and Repair Standards

APPENDIX C

Tactical Infrastructure Classifications and Maintenance and Repair Standards

Introduction

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

Road Classification

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

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

Road Maintenance and Repair

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

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

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

FC 1 – Paved Roads

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

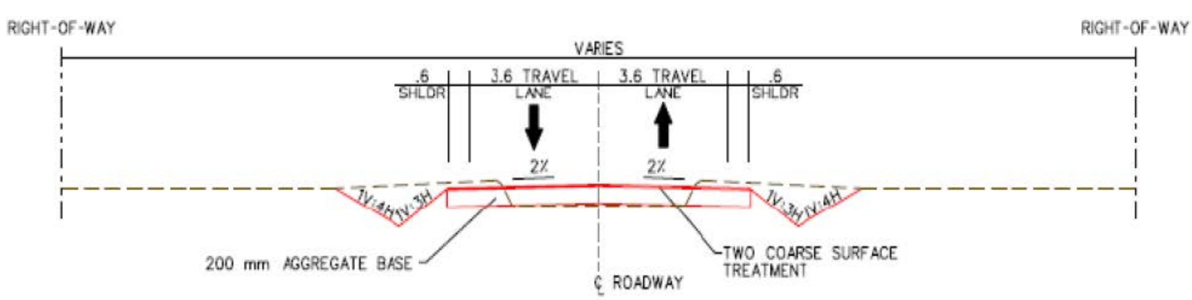

Figure C-2. FC-1 Paved Road (Diagram)

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

FC 2 – All-Weather Roads

The proposed all weather road facility consists of two (2) 3.6 m (12 ft) travel lanes at a 4% cross slope. The proposed section consists of 150 mm (6 in) of compacted aggregate base. Parallel ditches with a 1V:3H front slope and a 1V:4H back slope are proposed to provide proper drainage. Existing FC 2 roadways may vary from proposed roadway specifications.

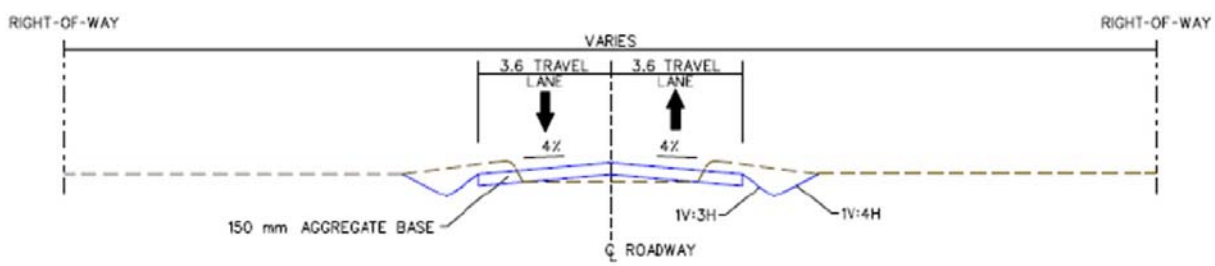

Figure C-4. FC-2 All-Weather Road (Diagram)

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

FC 3 – Graded Earth Roads

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

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

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

FC 4 – Two-Track

The proposed two track road facility consists of one (1) 3.0 m (10 ft) travel lane at a 0% cross slope. The proposed section consists of natural ground. Ditches are not proposed for this facility. Existing FC 4 roadways may vary from proposed roadway specifications.

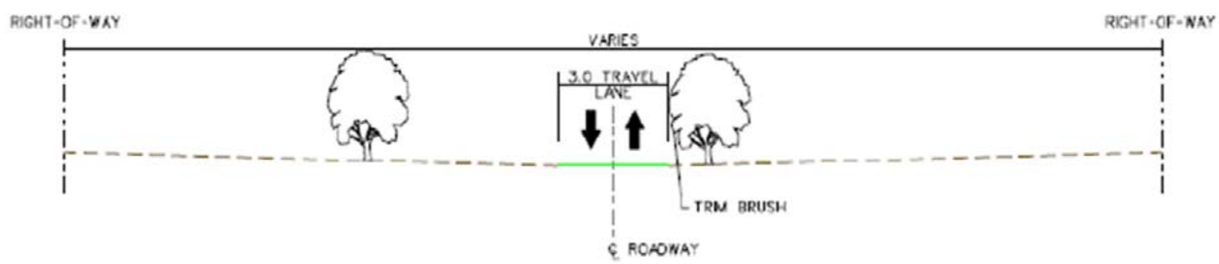

Figure C-8. FC-4 Two-Track Road (Diagram)

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

FC5 – Sand Road

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

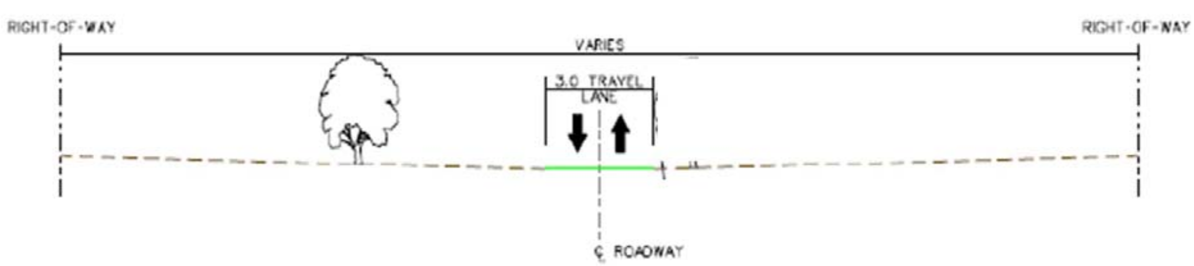

Figure C-10. FC-5 Sand Road (Diagram)

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

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

Figure C-11. Standard Grading Equipment

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

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

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

APPENDIX D

Detailed Maps of the Tactical Infrastructure Maintenance and Repair Action Area

APPENDIX D

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

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

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

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

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

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

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

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

Map Index for Texas Federally Threatened and Endangered Species

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

Threatened and Endangered Plant Species:

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

Threatened and Endangered Fish, Bird, and Mammal Species:

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

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

Species	Listing Status	Habitat	Range (County)	Determination
ARACHNIDS				
Guadalupe Cave pseudoscorpion *Archeolarca guadalupensis*	R	Lives in leaf mold or decaying vegetation, in soils, beneath bark and stones, and in some mammals' nests.	Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
AMPHIBIANS				
Black-spotted newt *Notophthalmus meridionalis*	T	Wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods.	Cameron and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Dolan Falls salamander *Eurycea sp 10*	R	Springs and waters.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Edwards Plateau spring salamanders *Eurycea sp 7*	R	Springs and waters of some caves of this region.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Mexican burrowing toad *Rhinophrynus dorsalis*	T	Roadside ditches, temporary ponds, arroyos, or wherever loose friable soils are present in which to burrow; generally underground emerging only to breed or during rainy periods.	Starr and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
AMPHIBIANS (CONTINUED)				
Mexican treefrog *Smilisca baudinii*	T	Sub-humid regions near streams and in resacas.	Hidalgo and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Northern leopard frog *Rana pipiens*	R	Streams, ponds, lakes, wet prairies, and other bodies of water; will range into grassy, herbaceous areas some distance from water; eggs laid March-May and tadpoles transform late June-August; may have disappeared from El Paso County due to habitat alteration.	El Paso	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Sheep frog *Hypopachus variolosus*	T	Predominantly grassland and savanna; moist sites in arid areas.	Hidalgo and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
South Texas siren (large form) *Siren sp 1*	T	Wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods, but does require some moisture to remain.	Hidalgo, Maverick, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Valdina Farms sinkhole salamander *Eurycea troglodytes complex*	R	Isolated, intermittent pools of a subterranean streams and sinkholes.	Edwards, Kinney, Uvalde, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
AMPHIBIANS (CONTINUED)				
White-lipped frog *Leptodactylus fragilis*	T	Grasslands, cultivated fields, roadside ditches, and a wide variety of other habitats; often hides under rocks or in burrows under clumps of grass; species requirements incompatible with widespread habitat alteration and pesticide use in south Texas.	Hidalgo, Starr, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
BIRDS				
Audobon's oriole *Icterus graduacauda audubonii*	R	Scrub, mesquite; nests in dense trees, or thickets, usually along water courses.	Cameron, Dimmit, Hidalgo, Maverick, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Baird's sparrow *Ammodramus bairdii*	R	Short-grass prairie with scattered shrubs.	Brewster, Culberson, Dimmit, Edwards, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Terrell, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Brown jay *Cyanocorax morio*	R	Woodlands and mesquite along the Rio Grande; dense brushy woods, open woods, forest edge, second-growth woodland, clearings, plantation; nests in tree or shrub often far out on limb, usually 7-21 meters above ground.	Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
Brownsville common yellowthroat *Geothlypis trichas insperata*	R	Tall grasses and bushes near ponds, marshes, and swamps.	Brewster, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Cactus ferruginous pygmy-owl *Glaucidium brasilianum cactorum*	T	Riparian trees, brush, palm, and mesquite thickets; during day also roosts in small caves and recesses on slopes of low hills; breeding April to June.	Cameron, Hidalgo, Starr, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Common black-hawk *Buteogallus anthracinus*	T	In cottonwoods (*Populus* spp.) or willows (*Salix* spp.) within riparian areas.	Brewster, Cameron, Culberson, Hidalgo, Jeff Davis, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Ferruginous hawk *Buteo regalis*	R	Open areas, especially prairies, plains, and badlands.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Gray hawk *Asturina nitida*	T	Riparian woodlands and adjacent scrub grasslands.	Brewster, Cameron, Hidalgo, Presidio, Starr, Terrell, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Hook-billed kite *Chondrohierax uncinatus*	R	Dense tropical and subtropical forests, but does occur in open woodlands.	Hidalgo, Starr, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

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

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
Reddish egret *Egretta rufescens*	T	Brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear.	Cameron, Hidalgo, and Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Rose-throated becard *Pachyramphus aglaiae*	T	Riparian trees, woodlands, open forest, scrub, and mangroves; breeding April to July.	Cameron, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Sennett's hooded oriole *Icterus cucullatus sennetti*	R	Builds nests in Spanish moss (*Tillandsia usneoides*). Breeding March to August.	Brewster, Cameron, Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Snowy plover *Charadrius alexandrinus*	T	Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast.	Cameron, Culberson, El Paso, Hudspeth, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Sooty tern *Sterna fuscata*	R	Predominately 'on the wing'; does not dive, but snatches small fish and squid with bill as it flies or hovers over water; breeding April-July.	Cameron	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Southeastern snowy plover *Charadrius alexandrinus tenuirostris*	R	Wintering migrant along beaches and bayside mud or salt flats.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
Texas Botteri's sparrow *Aimophila botterii texana*	T	Grassland and short-grass plains with scattered bushes or shrubs, sagebrush, mesquite, or yucca; nests on ground of low clump of grasses.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Tropical parula *Parula pitiayumi*	T	Dense or open woods, undergrowth, brush, and trees along edges of rivers and resacas; breeding April to July.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Western burrowing owl *Athene cunicularia hypugaea*	R	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows.	Brewster, Cameron, Culberson, Dimmit, Edwards, El Paso, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Starr, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Western snowy plover *Charadrius alexandrinus nivosus*	R	Breeds in open areas of shortgrass prairie.	Cameron, Culberson, El Paso, Hidalgo, Hudspeth, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
White-faced ibis *Plegadis chihi*	T	Freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
BIRDS (CONTINUED)				
White-tailed hawk *Buteo albicaudatus*	T	Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May.	Cameron, Hidalgo, Hudspeth, and Kinney	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Wood stork *Mycteria americana*	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds; formerly nested in Texas, but no breeding records since 1960.	Cameron, Hidalgo, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Zone-tailed hawk *Buteo albonotatus*	T	Riparian areas near arid open areas, including open pine-oak woodlands, and mesa or mountain country.	Brewster, Cameron, Culberson, Edwards, Hidalgo, Jeff Davis, Pecos, Presidio, Starr, Terrell, Uvalde, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
CRUSTACEANS				
Devil's Sinkhole amphipod *Stygobromus hadenoecus*	R	Subaquatic; subterranean obligate crustacean; in cave pools.	Edwards	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Ezell's cave amphipod *Stygobromus flagellatus*	R	Known only from artesian wells.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH				
American eel *Anguilla rostrata*	R	Most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Blotched gambusia *Gambusia senilis*	T	Formerly known from springs and vegetated, quiet pools; probably extirpated.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Blue sucker *Cycleptus elongatus*	T	Typically found in channels and flowing pools with a moderate current. Substrate type usually exposed bedrock, sometimes in combination with sand and gravel. Adults winter in deep pools and spawn on riffles upstream in spring.	Brewster, Kinney, Maverick, Presidio, Terrell, Uvalde, Val Verde, and Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bluntnose shiner *Notropis simus simus*	T	Pecos River; main river channel.	El Paso, Hudspeth, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Chihuahua catfish *Ictalurus sp.*	R	Rio Grande, main river channel.	Brewster, Jeff Davis, Kinney, Maverick, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Chihuahua shiner *Notropis chihuahua*	T	Clear cool water typically associated with springs; often in pools with slight current with a gravel or sand substrate.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (CONTINUED)				
Conchos pupfish *Cyprinodon eximius*	T	Sloughs, backwaters, and margins of larger streams and mouths of creek tributaries to larger rivers.	Brewster, Presidio, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Guadalupe bass *Micropterus treculii*	R	Perennial streams.	Edwards and Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Headwater catfish *Ictalurus lupus*	R	Clear streams and rivers with moderate gradients.	Brewster, Jeff Davis, Kinney, Maverick, Presidio, Terrell, Uvalde, Val Verde, and Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Manantial roundnose minnow *Dionda argentosa*	R	Creeks, medium rivers, streams and springs.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Maravillas red shiner *Cyprinella lutrensis blairi*	R	Maravillas Creek.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican goby *Ctenogobius claytonii*	T	Brackish and freshwater coastal streams.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican redhorse *Moxostoma austrinum*	R	Near rocks and boulders in rapids of small to large streams.	Brewster, Hudspeth, Kinney, Maverick, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (CONTINUED)				
Mexican stoneroller *Campostoma ornatum*	T	Riffles, chutes, and pools of creeks and rivers with a substrate consisting of sand, pebbles, gravel, or bedrock.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Opossum pipefish *Microphis brachyurus*	T	Brooding adults found in fresh or low salinity waters and young move or are carried into more saline waters after birth.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Pecos pupfish *Cyprinodon pecosensis*	T	Shallow margins of clear, vegetated spring waters high in calcium carbonate, as well as in sinkhole habitats.	Culberson, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Proserpine shiner *Cyprinella proserpina*	T	Rocky runs and pools of creeks and small rivers.	Kinney, Maverick, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Rio Grande chub *Gila pandora*	T	Pools of small to moderate-sized tributaries, often near inflow of riffles and in association with cover such as undercut banks and plant debris.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Rio Grande darter *Etheostoma grahami*	T	Gravel and rubble riffles of creeks and small rivers; spawns in the winter.	Kinney, Maverick, Terrell, Val Verde, and Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
FISH (CONTINUED)				
Rio Grande shiner *Notropis jemezanus*	R	Riffles of large rivers or creeks with a substrate of rubble, gravel and sand, often overlain with silt.	Brewster, Cameron, Hidalgo, Kinney, Maverick, Presidio, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
River goby *Awaous banana*	T	Clear water with slow to moderate current, sandy or hard bottom, and little or no vegetation; also enters brackish and ocean waters.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
INSECTS				
A mayfly *Allenhyphes michaeli*	R	Texas Hill country. Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A mayfly *Caenis arwini*	R	Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A mayfly *Campsurus decoloratus*	R	Clay substrates; mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A mayfly *Neochoroterpes kossi*	R	Small streams and adjacent shoreline vegetation.	Culberson	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
A Royal moth *Sphingicampa blanchardi*	R	Woodland - hardwood; Tamaulipan thornscrub with caterpillar's host plant, Texas Ebony (*Pitheocellobium flexicaule*) an important element.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A Royal moth *Sphingicampa raspa*	R	Wooded areas with oaks, junipers, legumes and other woody trees and shrubs	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A tiger beetle *Tetracha affinis angustata*	R	Open sandy areas, beaches, open paths or lanes, or on mudflats; larvae in hard-packed ground in vertical burrows	Hidalgo and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A tiger beetle *Cicindela hornii*	R	Dry areas on hillsides or mesas where soil is rocky or loamy and covered with grasses.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
A tiger beetle *Amblycheila picolominii*	R	Bare rock/talus/scree, desert, grassland/herbaceous; burrowing in or using soil.	Culberson	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Arroyo darner *Aeshna dugesi*	R	Creek, high - moderate gradient; eggs laid in aquatic plants, larvae cling to bottom of pools of streams, adults forage widely in pools in streams, from desert up to pine-oak zone.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
Barbara Ann's tiger beetle *Cicindela politula barbarannae*	R	Limestone outcrops in arid treeless environments or in openings within less arid pine-juniper-oak communities; open limestone substrate itself is almost certainly an essential feature; roads and trails.	Culberson, El Paso, and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Blanchard's sphinx moth *Adhemarius blanchardorum*	R	Deciduous forest.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bleached skimmer *Libellula composita*	R	Dragonfly; alkaline spring-fed streams and marshes, adults can oviposit directly into hot water in hot springs, larvae live in cooler spring runs, adults forage in brushlands; invertivore, diurnal, larvae overwinter, flight season mid June to late August.	Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bonita diving beetle *Deronectes neomexicana*	R	Streams and creeks.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Cazier's tiger beetle *Cicindela cazieri*	R	Found in open, sunny areas; larvae of tiger beetles are also predaceous and live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
Chisos metalmark *Apodemia chisosensis*	R	Agave scrub communities.	Brewster and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Chisos skipperling *Piruna haferniki*	R	Openings in oak-pine woodlands with an understory of broad-leaved grasses.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Coahuila giant skipper *Agathymus remingtoni valverdiensis*	R	Associated with the foodplant Lechuguilla (*Agave lechuguilla*) in desert hills and thorn forest.	Edwards, Kinney, Terrell, and Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Flint's net-spinning caddisfly *Cheumatopsyche flinti*	R	Found in springs.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Freeman's metalmark *Calephelis rawsoni freemani*	R	Wet areas including stream edges, gulches, subtropical woodland, and shaded limestone outcrops.	Brewster and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Guadalupe Mountains tiger beetle *Cicindela politula petrophila*	R	Open, sunny areas; larva lives in vertical burrows in soil of dry paths, fields, or sandy beaches.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
Hungerford's naucorid *Ambrysus hungerfordi hungerfordi*	R	Known from one location; riparian, cottonwoods and willows, only associated aquatic plant was alga in low density, plunge pool at the base of waterfall; flow present year-round.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Leonora's dancer damselfly *Argia leonorae*	R	Small streams and seepages.	Hudspeth, Kinney, Presidio, Terrell, Uvalde, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Los Olmos tiger beetle *Cicindela nevadica olmosa*	R	Found in open, sunny areas; larvae live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Manfreda giant-skipper *Stallingsia maculosus*	R	Subtropical thorn and pine forests. The larval hostplant is Texas tuberose (*Manfreda maculosa*).	Cameron, Hidalgo, and Kinney	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Neojuvenile tiger beetle *Cicindela obsoleta neojuvenilis*	R	Bare or sparsely vegetated, dry, hard-packed soil; typically in previously disturbed areas.	Dimmit, Hidalgo, Maverick, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Poling's hairstreak *Fixsenia polingi*	R	Oak woodlands.	Brewster, Culberson, El Paso, Jeff Davis, Pecos, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Rawson's metalmark *Calephelis rawsoni*	R	Desert scrub or oak woodlands in foothills.	Brewster, Hidalgo, Jeff Davis, Pecos, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
Sage sphinx *Sphinx eremitoides*	R	Desert, grassland; sandy prairie or desert with sage; caterpillars feed on leaves of sage; adults emerge late spring or summer.	Terrell and Uvalde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Smyth's tiger beetle *Cicindela chlorocephala smythi*	R	Live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Subtropical blue-black tiger beetle *Cicindela nigrocoerulea subtropica*	R	Live in vertical burrows in soil of dry paths, fields, or sandy beaches.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Tamaulipan agapema *Agapema galbina*	R	Tamaulipan thornscrub with adequate densities of the caterpillar foodplant *Condalia hookeri hookeri*.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Tawny giant skipper *Agathymus neumoegeni chisosensis*	R	Grasslands, shrublands, and woodlands.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas austrotinodes caddisfly *Austrotinodes texensis*	R	Karst springs and spring runs; flow in type locality swift but may drop significantly during periods of little drought; substrate coarse and ranges from cobble and gravel to limestone bedrock; many limestone outcroppings also found along the streams.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
INSECTS (CONTINUED)				
Texas minute moss beetle *Limnebius texanus*	R	Adult moss beetles of this genus are aquatic and herbivorous; larvae are semiaquatic and carnivorous; found in vegetation along margins of streams.	Culberson and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
MAMMALS				
Big free-tailed bat *Nyctinomops macrotis*	R	Roosts in cracks and crevices in cliff faces and canyon walls	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis Pecos, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Black bear *Ursus americanus*	T	Large tracts of bottomland hardwood forests.	Brewster, Culberson, Dimmit, Edwards, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Black-tailed prairie dog *Cynomys ludovicianus*	R	Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups.	Culberson, Edwards, El Paso, Hudspeth, Jeff Davis, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Carrizo Springs pocket gopher *Geomys personatus streckeri*	R	Underground burrows of deep, sandy soils; feed mostly on vegetation	Dimmit, Maverick, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
Cave Myotis *Myotis velifer*	R	Roosts in caves and tunnels.	Brewster, Culberson, Dimmit, Edwards, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Coues' rice rat *Oryzomys couesi*	T	Cattail-bulrush marsh with shallower zone of aquatic grasses near the shoreline; shade trees around the shoreline are important features; prefers salt and freshwater, as well as grassy areas near water.	Cameron, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Davis pocket gopher *Geomys personatus davisi*	R	Burrows in sandy soils	Dimmit, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Davis Mountains cottontail *Sylvilagus floridanus robustus*	R	Brushy pastures, edges of cultivated fields, and well-drained streamsides.	Brewster, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Desert bighorn sheep *Ovis canadensis mexicana*	R	Rocky mountainous terrain including bluffs and steep slopes with sparse vegetation.	Brewster, Culberson, Hudspeth, and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
Desert pocket gopher *Geomys arenarius*	R	Cottonwood-willow association; live underground, but build large and conspicuous mounds.	El Paso and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Fringed Myotis *Myotis thysanodes*	R	Ranges from desert scrub to mountain pine communities. Roosts in caves and mines.	Brewster, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Ghost-faced bat *Mormoops megalophylla*	R	Occupies caves and mines	Brewster, Cameron, Dimmit, Edwards, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Presidio, Starr, Terrell, Uvalde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Gray-footed chipmunk *Tamias canipes*	R	Forest-dwelling; favorite habitat is downed logs near edges of clearings; also occur in dense stands of mixed timber (oaks, pines, firs) and on brushy hillsides, especially with rock crevices.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Greater western mastiff bat *Eumops perotis californicus*	R	Roosts in crevices and cracks in cliffs faces.	Brewster, Jeff Davis, Kinney, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Guadalupe southern pocket gopher *Thomomys bottae guadalupensis*	R	Ranges from loose sands and silts to tight clays; dry deserts to montane meadows.	Brewster, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
Limpia Creek pocket gopher *Thomomys bottae texensis*	R	Ranges from loose sands and silts to tight clays in lower canyons to higher coniferous woodlands	Brewster, Culberson, Hudspeth, Jeff Davis and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Limpia southern pocket gopher *Thomomys bottae limpiae*	R	Ranges from loose sands and silts to tight clays	Brewster, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Long-legged bat *Myotis volans*	R	Open woods and mountainous areas. Roosts in buildings, crevices, and hollow trees; may use caves as night roosts.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican long-tongued bat *Choeronycteris mexicana*	R	Deep canyons where uses caves and mine tunnels as day roosts.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	R	Ranges from desert scrub to pinyon-juniper woodlands. Roosts in caves or mines.	Brewster, Culberson, Edwards, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Pecos River muskrat *Ondatra zibethicus ripensis*	R	Creeks, rivers, lakes, drainage ditches, and canals; prefer shallow, fresh water with clumps of marshy vegetation, such as cattails, bulrushes, and sedges.	El Paso, Hudspeth, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MAMMALS (CONTINUED)				
Plains spotted skunk *Spilogale putorius interrupta*	R	Open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Cameron, Hidalgo, Starr, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	R	Desert areas with rugged canyons, rock outcrops, and high cliffs. Roosts in caves and rock crevices.	Brewster, Jeff Davis, and Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Presidio mole *Scalopus aquaticus texanus*	R	Occurs in moist (not wet), sandy soils; live underground in excavated or usurped burrows.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Southern yellow bat *Lasiurus ega*	R	Tree roosting species that commonly roosts in the dead fronds of palm trees (*Sabal mexicana*).	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas pocket gopher *Geomys personatus fuscus*	R	Underground burrows of deep, sandy soils.	Kinney and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Spotted bat *Euderma maculatum*	T	Ranges from desert scrub to pine forests at high elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Western red bat *Lasiurus blossevillii*	R	Riparian areas. Roosts in deciduous trees along riparian courses.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

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

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS				
Chisos Mountains threeband *Humboldtiana chisosensis*	R	Xeric rockslides along the lower margin of pine woodlands.	Brewster	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Brune's tryonia *Tryonia brunei*	R	Benthic; abundant on firm substratum and in soft mud before modification.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Davis Mountains threeband *Humboldtiana cheatumi*	R	Terrestrial snail; deciduous leaf litter in cool, moist upper reaches of canyons.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Davis spring snail *Fontelicella davisi*	R	Freshwater; in and on mud and rocks among patches of watercress in spring-fed rivulets.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
False spike mussel *Quadrula mitchelli*	T	Medium to large rivers with substrate from mud through mixtures of sand, gravel, and cobble.	Brewster, Cameron, Hidalgo, , Kinney, Maverick, Pecos, Starr, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Franklin Mountain talus snail *Sonorella metcalfi*	R	Terrestrial; bare rock, talus, scree; inhabits igneous talus most commonly of rhyolitic origin.	El Paso	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS (CONTINUED)				
Franklin Mountain wood snail *Ashmunella pasonis*	R	Terrestrial; bare rock, talus, scree; talus slopes, usually of limestone, but also of rhyolite, sandstone, and siltstone, in arid mountain ranges.	El Paso and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican fawnsfoot mussel *Truncilla cognata*	T	Largely unknown; possibly intolerant of impoundment; possibly needs flowing streams and rivers with sand or gravel bottoms based on related species needs.	Kinney, Maverick, Terrell, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mitre Peak threeband *Humboldtiana ferrissiana*	R	Terrestrial snail; in leaf litter, under rocks.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mount Livermore threeband *Humboldtiana palmeri*	R	Terrestrial snail; highest parts (most mesic) of igneous intrusive mountains; in leaf litter; among boulders.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Northern threeband *Humboldtiana ultima*	R	Leaf litter in mesic canyons of limestone mountains; in soil, under rocks.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Presidio County spring snail *Fontelicella metcalfi*	R	Found in the outflows of springs (24 degrees C) in fine mud and dense watercress.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
MOLLUSKS (CONTINUED)				
Rio Grande monkeyface *Quadrula couchiana*	R	Habitat largely undescribed, but probably small to moderate size streams and moderate size rivers with flowing waters and substrates ranging from mud to gravel.	Kinney	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Salina mucket *Potamilus metnecktayi*	T	Lotic waters with a substrate of clay and silt along river banks.	Brewster, Cameron, Hidalgo, Kinney, Maverick, Presidio, Starr, Terrell, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
San Carlos threeband *Humboldtiana hoegiana praesidii*	R	Leaf litter and in soil under rocks in higher elevations of desert mountain ranges.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Stockton Plateau threeband *Humboldtiana texana*	R	Rocky hillsides with a mixture of dwarf oaks and bunch grasses. Elevation from 1,200-1,500 m (3,900-5,000 ft)	Pecos	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
REPTILES				
Big Bend slider *Trachemys gaigeae*	R	Quiet bodies of fresh water with muddy substrates and abundant aquatic vegetation.	Brewster, El Paso, Hudspeth, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Black-striped snake *Coniophanes imperialis*	R	Semi-arid coastal plain, warm, moist micro-habitats and sandy soils.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
Chihuahuan Desert lyre snake *Trimorphodon vilkinsonii*	T	Rocky hillsides and mountain slopes.	Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Chihuahuan mud turtle *Kinosternon hirtipes murrayi*	T	Fresh water with abundant aquatic vegetation; semi-aquatic.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Keeled earless lizard *Holbrookia propinqua*	R	Coastal dunes, barrier islands, and other sandy areas.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mountain short-horned lizard *Phrynosoma hernandesi*	T	Usually in open, shrubby, or openly wooded areas with sparse vegetation at ground level; soil may vary from rocky to sandy; burrows into soil or occupies rodent burrow when inactive; inactive during cold weather.	Culberson, El Paso, Hudspeth, and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
New Mexico garter snake *Thamnophis sirtalis dorsalis*	R	Wet or moist habitat; irrigation ditches, and riparian-corridor farmlands, less often in running water; home range about 2 acres.	El Paso	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Northern cat-eyed snake *Leptodeira septentrionalis septentrionalis*	R	Thorn scrub woodland; dense thickets bordering ponds and streams; semi-arboreal.	Cameron, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
Reticulate collared lizard *Crotaphytus reticulatus*	T	Open brush-grasslands; thorn-scrub vegetation, usually on well-drained rolling terrain of shallow gravel, caliche, or sandy soils; often on scattered flat rocks below escarpments or isolated rock outcrops among scattered clumps of prickly pear and mesquite.	Dimmit, Hidalgo, Kinney, Maverick, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Reticulated gecko *Coleonyx reticulatus*	T	Rocky canyons and crevices in arid habitats.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Spot-tailed earless lizard *Holbrookia lacerata*	R	Moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas.	Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Speckled racer *Drymobius margaritiferus*	T	Dense thickets near water, Texas palm groves, riparian woodlands; often in areas with much vegetation litter on ground.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
Texas horned lizard *Phrynosoma cornutum*	T	Arid and semi-arid regions with sparse vegetation, including shrubs, grasses, and cacti.	Brewster, Cameron, Culberson, Dimmit, Edwards, El Paso, Hidalgo, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Starr, Terrell, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas indigo snake *Drymarchon melanurus erebennus*	T	Thornbush-chaparral woodlands of south Texas, in particular dense riparian corridors; requires moist microhabitats, such as rodent burrows, for shelter.	Cameron, Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Uvalde, Val Verde, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas scarlet snake *Cemophora coccinea lineri*	T	Mixed hardwood scrub on sandy soils.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas tortoise *Gopherus berlandieri*	T	Scrub and brushlands with sandy, well draining soils.	Brewster, Cameron, Dimmit, Edwards, Hidalgo, Kinney, Maverick, Starr, Terrell, Uvalde, Val Verde, Webb, Zapata, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts. .

Species	Listing Status	Habitat	Range (County)	Determination
REPTILES (CONTINUED)				
Trans-Pecos black-headed snake *Tantilla cucullata*	T	Mesquite-creosote and pinyon-juniper-oak in the limestone hills.	Brewster, Jeff Davis, Pecos, Presidio, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
PLANTS				
Alkali spurge *Chamaesyce astyla*	R	In nearly bare areas within alkali sacaton (*Sporobolus airoides*) grasslands on alkaline and/or saline silt loam on alluvial flats along a spring-fed desert stream; flowering and fruiting at least March-June and August-September.	Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Amelia's abronia *Abronia ameliae*	R	Occurs on deep, well-drained sandy soils of the South Texas Sand Sheet in grassy and/or herbaceous dominated openings within coastal live oak woodlands or mesquite-coastal live oak woodlands.	Hidalgo and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Appressed two-bristle rock daisy *Perityle bisetosa var appressa*	R	Rock outcrops and crevices in limestone exposures on cliffs.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Bailey's ballmoss *Tillandsia baileyi*	R	Epiphytic on various trees and tall shrubs, perhaps most common in mottes of Live oak on vegtated dunes and flats.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Bearded mock-orange *Philadelphus crinitus*	R	Talus slopes (igneous); flowering July-August.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Big Bend hop-hornbeam *Ostrya chisosensis*	R	Mixed woodlands on mesic, rocky, igneous slopes at high elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Bigpod bonamis *Bonamia ovalifolia*	R	Slopes and drainages with sandy and/or gravelly soils.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Black-corona milkvine *Matelea atrostellata*	R	Rocky soils in mountain canyons and oak-pinyon-juniper woodlands.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Blumberg's centaury *Centaurium blumbergianum*	R	Known from perennial seeps and associated drainages in limestone, sandstone, or gypseous canyons.	Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Broadpod rushpea *Pomaria brachycarpa*	R	Grasslands, live oak savannas, and open mesquite woodlands on shallow, stony, clay soils over limestone; most specimens are from ungrazed roadsides, often in shallowest soils on landscape where competition from taller perennial grasses is minimal; flowering April-July.	Edwards and Kinney	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Brush-pea *Genistidium dumosum*	R	Desert scrub on rocky limestone hills at lower elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Buckley's spiderwort *Tradescantia buckleyi*	R	Occurs on sandy loam or clay soils in grasslands or shrublands.	Cameron and Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Bushy wild buckwheat *Eriogonum suffruticosum*	R	Open areas on limestone slopes, low hills, and clay flats.	Brewster, Pecos, and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chaffey's cory cactus *Escobaria dasyacantha var chaffeyi*	R	Pine-oak-juniper woodlands on rocky igneous and limestone soils at 1425-2225 m (4675-7300 ft).	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chihuahua balloon-vine *Cardiospermum dissectum*	R	Thorn shrublands or low woodlands on well to excessively well drained, calcareous, sandy to gravelly soils in drier uplands of the Lower Rio Grande Valley, in areas underlain by the Goliad formation, Catahoula and Frio formations undivided, Jackson Group, and other Eocene formations; flowering (April-) July-September, probably throughout the growing season in response to rainfall. excessively well drained, calcareous, sandy to gravelly soils	Hidalgo, Starr, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Chihuahua scurfpea *Pediomelum pentaphyllum*	R	Texas habitat unknown; in Arizona, found in highly degraded desert grasslands or mixed desert scrub; soils are described as deep sandy loams, sometimes with sparse to moderate amounts of small-sized gravel (0.5-1 cm diameter), some soils display minor eolian coppicing; flowering April-May.	Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chisos agave *Agave glomeruliflora*	R	Gravelly or rocky soils in oak-juniper woodlands and mesquite-creosote bush-invaded grasslands at elevations of about 600-1800 m (1950-5900 ft); flowering mid-spring to early fall.	Brewster, Culberson, Hudspeth, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chisos coral-root *Hexalectris revoluta*	R	In humus in oak groves along rocky creekbeds at mid- to high elevations; in the Glass Mountains, it has been found among lechuguilla and shinnery oak on the sunny slopes and ridges; usually flowering May-August.	Brewster and Culberson	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Chisos oak *Quercus graciliformis*	R	Oak woodlands in dry rocky canyons, usually associated with a high water table; above elevations of 1650 m (5400 ft); flowering in the spring, fruiting July-early September.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Chisos pinweed *Lechea mensalis*	R	Open oak-pinyon-juniper woodlands over igneous or sandstone rock outcrops at high elevations.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Cliff bedstraw *Galium correllii*	R	Dry, steep or vertical limestone cliff faces at elevations of 350-500 m (1150-1650 ft); flowering April-November, fruiting May-December.	Brewster and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Comal snakewood *Colubrina stricta*	R	In El Paso County, found in a patch of thorny shrubs in colluvial deposits and sandy soils at the base of an igneous rock outcrop; flowering late spring or early summer.	El Paso	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Correll's bluet *Houstonia correllii*	R	Sandy soils in grasslands with scattered shrubs or in mesquite savannas; does not occur in disturbed sandy areas or in 'improved' pastures; flowering March.	Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Correll's false dragon-head *Physostegia correllii*	R	Wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May-September.	Kinney, Maverick, Val Verde, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Correll's green pitaya *Echinocereus viridiflorus var correllii*	R	Among grasses on rock crevices on low hills in desert or semi-desert grassland on novaculite or limestone; flowering March-May.	Brewster and Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Cox's dalea *Dalea bartonii*	R	Semi-desert shortgrass grasslands with scattered pinyon pine and juniper in gravelly soils on limestone hills; probably flowering in late spring, fruiting in late summer-early fall.	Brewster and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Cutler's twistflower *Streptanthus cutleri*	R	Open shrublands or grasslands on calcareous gravel of talus slopes, rocky hillsides, and gravelly streambeds, at moderate elevations in the Chihuahuan Desert; flowering mostly February-March, sometimes into May.	Brewster County	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Desert night-blooming cereus *Peniocereus greggii var greggii*	R	Chihuahuan Desert shrublands or shrub invaded grasslands in alluvial or gravelly soils at lower elevations, 1200-1500 m (3900-4900 ft), on slopes, benches, arroyos, flats, and washes; flowering synchronized over a few nights in early May to late June when almost all mature plants bloom, flowers last only one day and open just after dark, may flower as early as April.	Brewster, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Dimmit sunflower *Helianthus praecox ssp hirtus*	R	Bluestem midgrass grasslands on loose, well-drained, slightly acid, deep, sandy soils, mostly of Antosa-Bobilla Association and Poteet Series; underlain by Carrizo Sand Formation; flowering late summer-fall.	Dimmit	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Don Richard's spring moss *Donrichardsia macroneuron*	R	Shaded limestone rocks partially submerged in rapidly flowing relatively thermally constant water at a spring complex in a short 10 m (30 ft) run between the spring source and the river.	Edwards	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Duncan's cory cactus *Escobaria dasyacantha var duncanii*	R	Chihuahuan Desert scrub at low to moderate elevations 650-1825 m (2150-6000 ft) on hills, ledges, and benches in cracks and crevices of limestone outcrops; flowering February-March (-May, or July in New Mexico), fruiting mostly May-June.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Durango yellow-cress *Rorippa ramosa*	R	Moist, fine-textured, alluvial soils on floodplains and in beds of intermittent streams; flowering March-May.	Brewster and Terrell	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Dwarf broomspurge *Chamaesyce jejuna*	R	Found on grama-grass prairie on caliche uplands, also dry caliche slopes, and limestone hills; flowering late March through July.	Brewster, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Falfurrias milkvine *Matelea radiata*	R	Only two known specimens; one from clay soil on dry gravel hills at altitude of approximately 45 m (150 ft); other from Falfurrias, no habitat description; probably flowering May-June.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Glass Mountains rock-daisy *Perityle vitreomontana*	R	Crevices and solution pockets in Capitan Limestone exposures on cliffs and rock outcrops.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Graybeard cactus *Echinocereus viridiflorus var canus*	R	Steep rubble of black Maravillas chert, near top of ridge.	Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Grayleaf rock-daisy *Perityle cinerea*	R	Crevices in dry limestone caprock of mesas; flowering spring-fall.	Pecos and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Green Island echeandia *Echeandia texensis*	R	Found in areas with saline clays of lomas dominated by herbaceous species with scattered brush and stunted trees, or in grassy openings in subtropical thorn shrublands; flowers April, June, and November	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Green spikemoss *Selaginella viridissima*	R	Shaded or sheltered igneous, limestone, or sandstone rock ledges, boulders and cliffs in woodlands and shrublands.	Brewster and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Gregg's wild-buckwheat *Eriogonum greggii*	R	Sparingly vegetated openings in thorn shrublands in shallow soils on xeric ridges; also on excessively drained, sandy soil over caliche and calcareous sandstone of the Goliad Formation and over sandstone or fossiliferous layers of the Jackson Group; flowering February-July.	Hidalgo and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Golden-spine hedgehog cactus *Echinocereus chloranthus var neocapillus*	R	Sparsely vegetated desert grasslands over novaculite outcrops; flowering late March-early May.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Golden-spine prickly-pear *Opuntia aureispina*	R	Desert flats and low hills on slabs of fractured Boquillas limestone at 480-850 m (1576-2800 ft) elevation; flowering March-May.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Guadalupe Mountains columbine *Aquilegia chrysantha var chaplinei*	R	Perennially moist to wet limestone canyon walls; moist leaf litter and humus among boulders in wooded mesic canyons; flowering April-November (most reliably June-July).	Culberson and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

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

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Gyp locoweed *Astragalus gypsodes*	R	Gypsum or stiff gypseous clay soils on low rolling hills, mostly low elevations; many of the known locations are on the Castile Formation (Permian); flowering March-June.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Gypsum hotspring aster *Arida blepharophylla*	R	Perennial springs, seeps, and their drainages in sandstone, calcareous, or gypseous canyons; flowering summer and fall.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Gypsum scalebroom *Lepidospartum burgessii*	R	Gypsum dune system in the salt basin west of the Guadalupe Mountains, east of Dell City; sparsely vegetated areas; some plants on and around shifting, unstabilized dunes; others in stabilized gypseous soils with a well-developed microbiotic crust; flowering late April- early October.	Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Havard's machaeranthera *Xanthisma viscidum*	R	Occurs on calcareous or sandy soils in desert shrublands or mesquite grasslands.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Havard's stonecrop *Sedum havardii*	R	Crevices in igneous rock outcrops at mid-to-high elevations, sometimes loose igneous talus, in oak-pinyon woodlands and chaparral; flowering May-September.	Brewster and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Heather leaf-flower *Phyllanthus ericoides*	R	Crevices in limestone on dry canyon walls and other rock outcrops; flowering October, and presumably in other months, given sufficient moisture.	Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Hester's cory cactus *Escobaria hesteri*	R	Grasslands on novaculite hills or limestone hills and alluvial fans, also in pine-oak-juniper woodlands on igneous substrates; flowering April-early June.	Pecos and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Hinckley's brickellbush *Brickellia hinckleyi var hinckleyi*	R	Mixed woodlands or forests on rocky slopes in higher elevation mountain canyons; flowering July-October.	Brewster and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Hinckley's columbine *Aquilegia chrysantha var hinckleyana*	R	Wet areas near waterfalls, perennial seeps, springs, etc., in canyons of desert mountains; flowering March-November.	Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Hinckley's Jacob's-ladder *Polemonium pauciflorum ssp hinckleyi*	R	Mesic canyons and shaded talus boulder field on igneous slopes, elevation 2,100-2,300 m (6,900-7,550 ft), often in the shade of a pine-oak-juniper forest; flowering July-October.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Hueco rock-daisy *Polemonium pauciflorum ssp hinckleyi*	R	North-facing or otherwise mostly shaded limestone cliff faces within relatively mesic canyon system; flowering spring-fall.	El Paso	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Irion County wild-buckwheat *Eriogonum nealleyi*	R	Grasslands and shallow stony soils over limestone and indurated caliche, often collected from ungrazed but sparsely vegetated roadsides, particularly where limestone or caliche is exposed on hilltops; flowering June-September.	Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Jackie's bluet *Stenaria mullerae var pooleana*	R	North- to east-facing vertical limestone cliff faces in mid-elevation canyons; flowering May, perhaps to September.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Kay's grama *Bouteloua kayi*	R	Gravelly soils on desert flats and on limestone ledges along bluffs; flowering May-November.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Kleberg saltbush *Atriplex klebergorum*	R	Occurs in sparsely vegetated saline areas, including flats and draws; in light sandy or clayey loam soils with other halophytes; occasionally observed on scraped oil pad sites; observed flowering in late August-early September.	Starr, Webb, and Zapata	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Lateleaf oak *Quercus tardifolia*	R	Mixed evergreen-deciduous woodlands in moist canyon bottoms at elevation ca. 2,150 m (7,050 ft); flowering in the spring.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Leatherweed croton *Croton pottsii var thermophilus*	R	Sparsely vegetated desert grasslands on extremely xeric sites at low elevations (500-800 m [1650-2640 ft), on substrates ranging from sand to limestone and basalt; flowering spring-fall.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Leoncita false foxglove *Agalinis calycina*	R	Grasslands on perennially moist heavy, alkaline/saline, calcareous silty clays and loams in and around desert springs and seeps; flowering September-October.	Brewster and Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Lila de los llanos *Echeandia chandleri*	R	Among shrubs or in grassy openings in subtropical thorn shrublands on somewhat saline clays of lomas also observed in a few upland coastal prairie remnants on clay soils over the Beaumont Formation at inland sites well to the north and along railroad right-of-ways and cemeteries; flowering (May-) September-December, fruiting October-December.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Little-leaf brongniartia *Brongniartia minutifolia*	R	Desert shrublands at lower elevations 600-1400 m (1950-5000 ft), in blackish sand, gravel, volcanic ash and other substrates, often in or along arroyos or shallow drainages; flowering May-August.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Livermore sandwort *Arenaria livermorensis*	R	Sparsely vegetated igneous rock outcrops at higher elevations, 2300-2500 m (7600-8200 ft).	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Livermore sweet-cicely *Osmorhiza bipatriata*	R	Moist igneous-derived soils of shaded rocky slopes around springs in high mountain canyons; occurs in shade of a mesic canyon forest; flowering Jun	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Longstalk heimia *Nesaea longipes*	R	Moist or subirrigated alkaline or gypsiferous clayey soils along unshaded margins of cienegas and other wetlands; also occurs common in moderately alkaline clay along perennial stream and in subirrigated wetlands atop poorly-defined spring system; also occurs in low, wetland area along highway right-of-way; flowering May-September.	Pecos and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Many-flowered unicorn-plant *Proboscidea spicata*	R	Dry sandy alluvial and/or Eolian soils on terraces or in other disturbed sandy habitats; flowering May-June.	Brewster, Jeff Davis and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Manystem spiderflower *Cleome multicaulis*	R	Wet, saline or alkaline sandy soils around alkali sinks or flats, saline playas, springs, or meadows.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Maravillas milkwort *Polygala maravillasensis*	R	Crevices of limestone exposed on canyons walls, and in low desert mountains at 450-950 m (1,450-3,100 ft) elevation; flowering May-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Mary's bluet *Stenaria butterwickiae*	R	Shallow pockets or crevices in limestone bedrock on ridgetops; flowering or fruiting at least May-August.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Matt Turner's aster *Arida matterneri*	R	In gypseous or sandy soils along shallow, perennial seeps and streams within canyons in the Chihuahuan Desert; flowering summer-early fall (July-September).	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
McCart's whitlow-wort *Paronychia maccartii*	R	Substrate for type location described as 'very hard-packed red sand', possibly the Cuevita-Randado Complex, probably occurring in thorn shrubland plant community; based on type specimen's presence of flowers and collection date, flowers in March.	Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Mexican mud-plantain *Heteranthera mexicana*	R	Wet clayey soils of resacas and ephemeral wetlands; flowering June-December.	Cameron, Dimmit, Hidalgo, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Nickel's cory cactus *Coryphantha nickelsiae*	R	Limestone outcrops and nearby alluvial or gravelly soils on hills or plains in grasslands or shrublands at low elevations; flowering August through September.	Webb	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Ojinaga ringstem *Anulocaulis reflexus*	R	Primarily on shaley gypseous clays at 800 - 1200 m (2600-4000 ft); flowering mid-May - mid-October.	Jeff Davis and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Old blue pennyroyal *Hedeoma pilosum*	R	Single historic record from open exposed limestone; flowering period unknown.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Orcutt's senna *Senna orcuttii*	R	Gravelly or rocky soil on limestone slopes and in beds of intermittent streams, within various mid- to lower elevation Chihuahuan Desert communities; at least one site is on east- to north-facing slopes; flowering July-August.	Brewster and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Perennial caltrop *Kallstroemia perennans*	R	Somewhat barren gypseous clays or limestone soils at low elevations in the Chihuahuan Desert; flowering late spring-early fall.	Brewster, Presidio, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Plains gumweed *Grindelia oolepis*	R	Heavy clay (blackland) soils, often in depressional areas, sometimes persisting in areas where mowing may maintain or mimic natural prairie disturbance regimes; roadsides, railroad rights-of-ways, vacant lots in urban areas, cemeteries; flowering April-December.	Cameron	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Powell's Mormon tea *Ephedra torreyana var powelliorum*	R	Desert scrub on gravelly to fine grained gypseous soils; 850-1100 m (2789-3609 ft).	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Prostrate milkweed *Asclepias prostrata*	R	Grasslands or openings in shrublands on loamy fine sands and fine sandy loams of the Copita, Hebbronville, and possibly other soil series occurring over the Laredo, Yegua, and other Eocene formations; flowering April-October.	Starr and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Purple gay-mallow *Batesimalva violacea*	R	Among boulders in seasonally moist igneous rock canyons, often under small trees and large shrubs; flowering/fruiting at least October-November in Big Bend National Park.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Ripley's senna *Senna ripleyana*	R	Gravelly hilltops in arid grasslands and creosote flats in Chihuahuan Desert; elevation ranges 1,200-1,500 m (3,900-4,900 ft); flowering/fruiting July-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Robust oak *Quercus robusta*	R	Mixed evergreen-deciduous woodlands in moist canyon bottoms at elevations ca. 1,280 m (4,200 ft) flowering in the spring.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Royal red penstemon *Penstemon cardinalis ssp regalis*	R	Pine-oak woodlands in canyons at higher elevations; flowering May-June (-August).	Culberson and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Runyon's cory cactus *Coryphantha macromeris var runyonii*	R	Gravelly to sandy or clayey, calcareous, sometimes gypsiferous or saline soils, often over the Catahoula and Frio formations, on gentle hills and slopes to the flats between, at elevations ranging from 10 to 150 m (30 to 500 ft); late spring or early summer, November, fruit has been collected in August.	Cameron, Hidalgo, and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Runyon's water-willow *Justicia runyonii*	R	Margins of and openings within subtropical woodlands or thorn shrublands on calcareous, alluvial, silty or clayey soils derived from Holocene silt and sand floodplain deposits of the Rio Grande Delta; can be common in narrow openings such as those provided by trails through dense ebony woodlands and is sometimes restricted to microdepressions; flowering (July-) September-November.	Cameron and Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Rydberg's scurfpea *Pediomelum humile*	R	Shortgrass grasslands or cenizo-guajillo shrublands on shallow, stony to gravelly clay soils on dry, open limestone or yellowish, eroding caliche hills; flowering March-May.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Sabinal prairie-clover *Dalea sabinalis*	R	Rocky soils or on limestone outcrops in sparse grassland openings in juniper-oak woodlands; flowering April-May or May-June.	Uvalde and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Sand prickly-pear *Opuntia arenaria*	R	Deep, loose or semi-stabilized sands in sparsely vegetated dune or sandhill areas, or sandy floodplains in arroyos; flowering May-June.	El Paso and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Sand sacahuista *Nolina arenicola*	R	Mesquite-sand sage shrublands on windblown Quarternary reddish sand in dune areas; flowering time uncertain May-June, June-September.	Culberson, Edwards, and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Shinners' rocket *Thelypodiopsis shinnersii*	R	Mostly along margins of Tamaulipan thornscrub on clay soils of the Rio Grande Delta, including lomas near the mouth of the river; flowering March-April.	Cameron and Starr	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Shinner's sunflower *Helianthus occidentalis ssp plantagineus*	R	Mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country.	Dimmit	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Shinners' tickle-tongue *Zanthoxylum parvum*	R	Understory of maple-oak woodlands or evergreen oak shinnery on rocky, often shallow, well-drained, neutral, non-calcareous loams underlain by rhyolite, tuff trachyandesite, or other igneous rock, at elevations between about 1,350-1,750 m (4,400-5,750 ft); flowering late March-early April, before the leaves have fully expanded.	Brewster and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Sierra del Carmen oak *Quercus carmenensis*	R	Shrublands and woodlands on talus slopes at 2,200-2,500 m (7,200-8,200 ft) elevation; immature fruit collected in July.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Silvery wild-mercury *Argythamnia argyraea*	R	Among shortgrasses in grasslands or open shrublands on which whitish clay soils, particularly those derived from the Yegua Formation; flowering April-June; fruit may persist until fall.	Kinney and Maverick	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Silver cholla *Opuntia imbricata var argentea*	R	Rocky limestone slopes, rarely in alluvial soils in mesquite thickets, flowering April-July; fruit ripening two-three months after flowering.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Slimlobe rock-daisy *Perityle dissecta*	R	Limestone cliff faces in desert canyons; flowering/fruiting spring-fall.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Small-leaved yellow velvet-leaf *Wissadula parvifolia*	R	Occurs on sandy loams or clays in shrublands or woodlands on gently undulating terrain of the Holocene sand sheet over the Goliad Formation.	Hidalgo	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Smooth-stem skullcap *Scutellaria laevis*	R	Mountain slopes and in arroyos along dry streambeds; flowering April-September.	Culberson and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Sparsely-flowered jewelflower *Streptanthus sparsiflorus*	R	Shaded areas in gravelly limestone canyons and arroyos, often in dry creek beds at elevations ranging 1,200-1,800 m (3,900-5,900 ft); flowering May-June.	Culberson	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Spiny kidney-wood *Eysenhardtia spinosa*	R	Grasslands or sparse shrublands on igneous outcrops or limestone hills; on rocky hills and gravelly drainages of mixed igneous origin; flowering July – October.	Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Springrun whitehead *Shinnersia rivularis*	R	In shallow, slow-moving water in small, usually spring-fed streams and rivers arising from calcareous outcrops; rooted in a mucky to gravelly bottom; flowering throughout the year, most reliably March-May.	Uvalde, Val Verde, and Zavala	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Stairstep two-bristle rock-daisy *Perityle bisetosa var scalaris*	R	Crevices in limestone exposures on bluffs and other rock outcrops; flowering May-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Stalk-leaf phacelia *Phacelia petiolata*	R	On gypsum soils at low elevations; flowering May-August.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Standley's draba *Draba standleyi*	R	Crevices in sparsely vegetated igneous boulders and rock outcrops at high elevations in pine-oak-juniper woodlands; flowering June-October.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Straw-spine glory-of-Texas *Thelocactus bicolor var flavidispinus*	R	Rocky hills in desert grasslands or shrublands below about 1,500 m (5000 ft); flowering late March-May.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
St. Joseph's staff *Manfreda longiflora*	R	Thorn shrublands on clays and loams with various concentrations of salt, caliche, sand, and gravel; rossettes are often obscured by low shrubs; flowering September-October.	Hidalgo, Starr, and Zapata	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Swallow spurge *Chamaesyce golondrina*	R	Alluvial or eolian sand along Rio Grande, occasionally on adjacent shale or limestone slopes; flowering June-November.	Hudspeth and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Terlingua brickellbush *Brickellia hinckleyi var terlinguensis*	R	Chihuahuan Desert; perhaps at lower elevations than var. hinckleyi; found on slope in the Chisos Mountains and along creek bottom; flowering July-October.	Brewster and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas false saltgrass *Allolepis texana*	R	Sandy to silty soils of valley bottoms and river floodplains, not generally on alkaline or saline sites; flowering (May-) July-October depending on rainfall.	Brewster, El Paso, Jeff Davis, and Presidio	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Texas greasebush *Glossopetalon texense*	R	Dry limestone ledges, chalk bluffs, and limestone outcrops; one population is on an extremely steep slope, inaccessible to most herbivores; flowering period uncertain, including at least June-December.	Uvalde and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Texas golden prince's plume *Stanleya pinnata var. texana*	R	Occurs on clay or silty soils on sparsely vegetated limestone and/or gypseous hills, draws, washes, and flats.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Texas largeseed bittercress *Cardamine macrocarpa var texana*	R	Seasonally moist, loamy soils in pine-oak woodlands; flowering in early spring and usually withering by the beginning of summer.	Brewster, Hudspeth, Kinney, and Uvalde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Texas milkvine *Matelea texensis*	R	Desert grasslands or woodlands over igneous substrate, at elevations between 1200-1500 m (3900-5000 ft); flowering/fruiting May-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Texas mock-orange *Philadelphus texensis*	R	Limestone outcrops on cliffs and rocky slopes, on boulders in mesic canyon bottoms, usually in shade of mixed evergreen-deciduous slope woodland forest; flowering April-May, but readily recognizable throughout the growing season.	Edwards and Uvalde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Texas trumpets *Acleisanthes crassifolia*	R	Shallow, well-drained, calcareous, gravelly loams over caliche on gentle to moderate slopes, often in sparsely vegetated openings in cenizo (*Leucophyllum frutescens*) shrublands; known populations occur on Austin Chalk (Cretaceous) or Uvalde Gravel (Pleistocene); flowering March-November, fruiting April-December.	Kinney, Maverick, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas windmill-grass *Chloris texensis*	R	Sandy to sandy loam soils in relatively bare areas in coastal prairie grassland remnants, often on roadsides where regular mowing may mimic natural prairie fire regimes; flowering in fall.	Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Texas wolf-berry *Lycium texanum*	R	Semi-desert grasslands and thorn shrublands on sandy, gravelly, and/or loamy soils, on very gently sloping terrain as well as in rocky areas of canyons, often over limestone at moderate elevations; flowering March-October.	Brewster, Culberson, and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Tharp's blue-star *Amsonia tharpii*	R	Open areas in midgrass grasslands or shrublands in shallow clay soils over limestone.	Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Three-tongue spurge *Chamaesyce chaetocalyx var triligulata*	R	In crevices in steep limestone cliffs and on scree and colluvium below; flowering/fruiting July-October.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Trans-Pecos maidenbush *Andrachne arida*	R	Crevices in calcareous bedrock exposures on arid mountain slopes, usually with succulents, Texas sites are on Cretaceous limestone; flowering July-October.	Brewster and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Turner's horseweed *Laennecia turnerorum*	R	Occurs on silty limestone-derived soils in Chihuahuan Desert shrubland in basins surrounded by desert mountains.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Two-bristle rock-daisy *Perityle bisetosa var bisetosa*	R	Crevices in limestone exposures on bluffs and other rock outcrops; flowering late summer-fall.	Brewster and Pecos	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Vasey's bitterweed *Hymenoxys vaseyi*	R	Occurs on xeric limestone cliffs and slopes at mid- to high elevations in desert shrublands.	El Paso	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Warnock's coral-root *Hexalectris warnockii*	R	In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons.	Brewster, Culberson, Jeff Davis, Presidio, and Terrell	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Warnock's rock-daisy *Perityle warnockii*	R	Crevices and solution pits in steep, dry, inaccessible limestone bluffs; flowering spring-fall.	Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Watson's false clappia-bush *Pseudoclappia watsonii*	R	Chihuahuan Desert shrublands on dry, rocky, gypseous clay hills and arroyos; flowering May-August.	Brewster, Hudspeth, and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term minor to no direct and indirect adverse impacts.
Wendt's malaxis *Malaxis wendtii*	R	Oak-juniper-pinyon woodlands ; flowering July-September.	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Wheeler's spurge *Chamaesyce geyeri var wheeleriana*	R	Sparingly vegetated, loose eolian quartz sand on reddish sand dunes or coppice mounds; flowering and fruiting at least August-September.	El Paso and Hudspeth	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
White column cactus *Escobaria albicolumnaria*	R	Creosote bush or lechuguilla canyon shrublands primarily on nearly level terrain to rolling hills on thin, gravelly soils or limestone bedrock of the Santa Elena, Glen Rose, Boquillas, and Telephone Canyon formations; at lower elevations 550-1370 m (1800-5000 ft) in the Chihuahuan Desert; flowering early March-May.	Pecos and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Wilkinson's whitlow-wort *Paronychia wilkinsonii*	R	Shallow rocky soils in crevices on novaculite hills or outcrops at low to moderate elevations in the Chihuahuan Desert; flowering April-October	Brewster	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

Species	Listing Status	Habitat	Range (County)	Determination
PLANTS (CONTINUED)				
Withered woolly loco *Astragalus mollissimus var marcidus*	R	Short to midgrass grasslands and occasionally shrublands on gravelly and sometimes clayey soils in basins, flats, and slopes at mid to higher elevations, usually on conglomerate or igneous substates; flowering April-July.	Jeff Davis and Presidio	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Wright's trumpets *Acleisanthes wrightii*	R	Open semi-desert grasslands and shrublands on shallow stony soils over limestone on low hills and flats; flowering spring-fall.	Brewster, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Wright's water-willow *Justicia wrightii*	R	Shortgrass grasslands and/or shrublands; dry gravelly clay soils over limestone on flats and low hills at elevations of 900-1500 m (2950-4900 ft); flowering April-August.	Brewster, Pecos, Terrell, and Val Verde	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.
Young's snowbells *Styrax platanifolius ssp youngiae*	R	In relatively mesic montane limestone canyons; flowering Apr-May, fruiting July-September.	Brewster and Jeff Davis	Long term negligible direct and indirect adverse impacts. Short term negligible to no direct and indirect adverse impacts.

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

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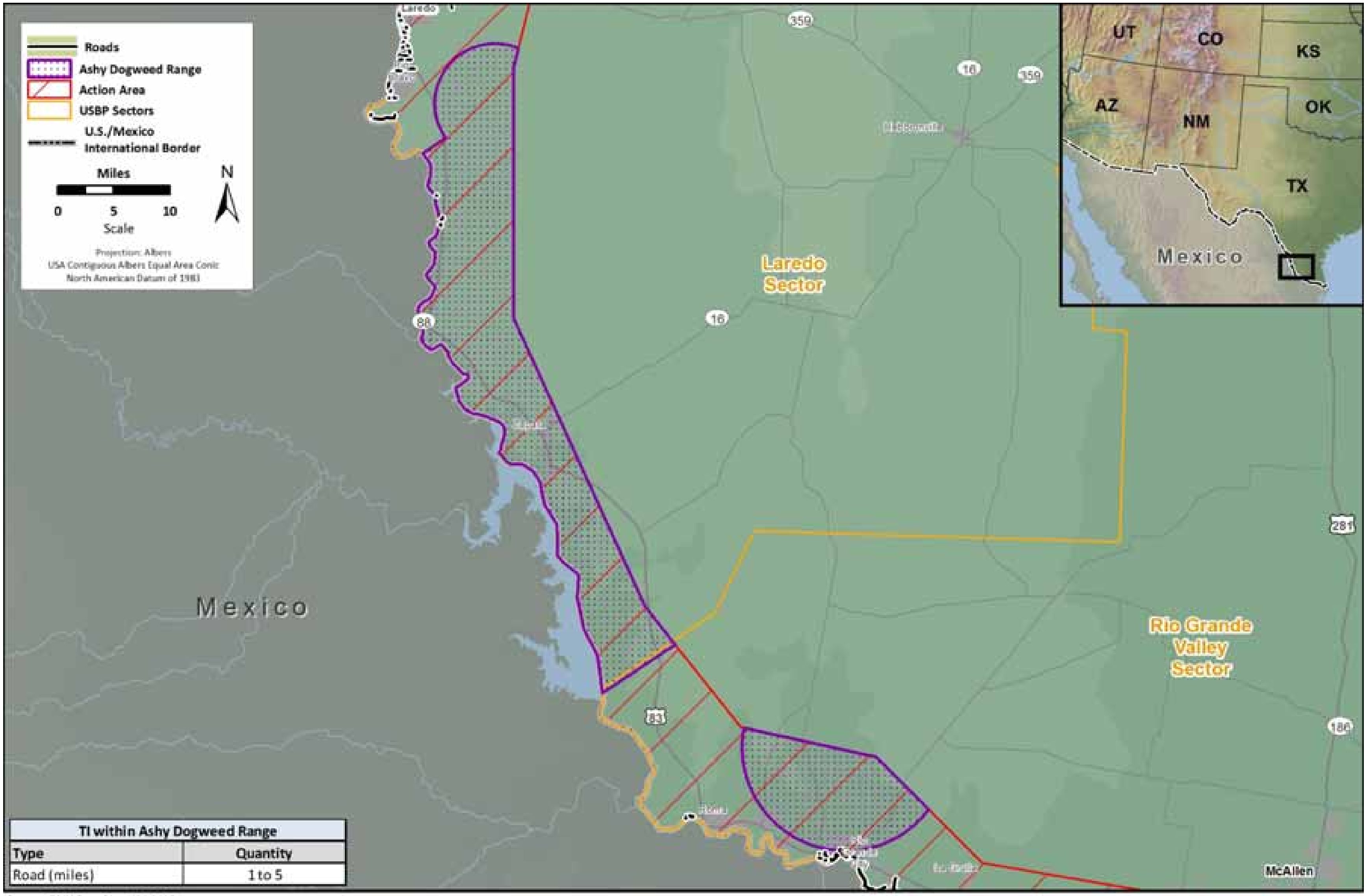
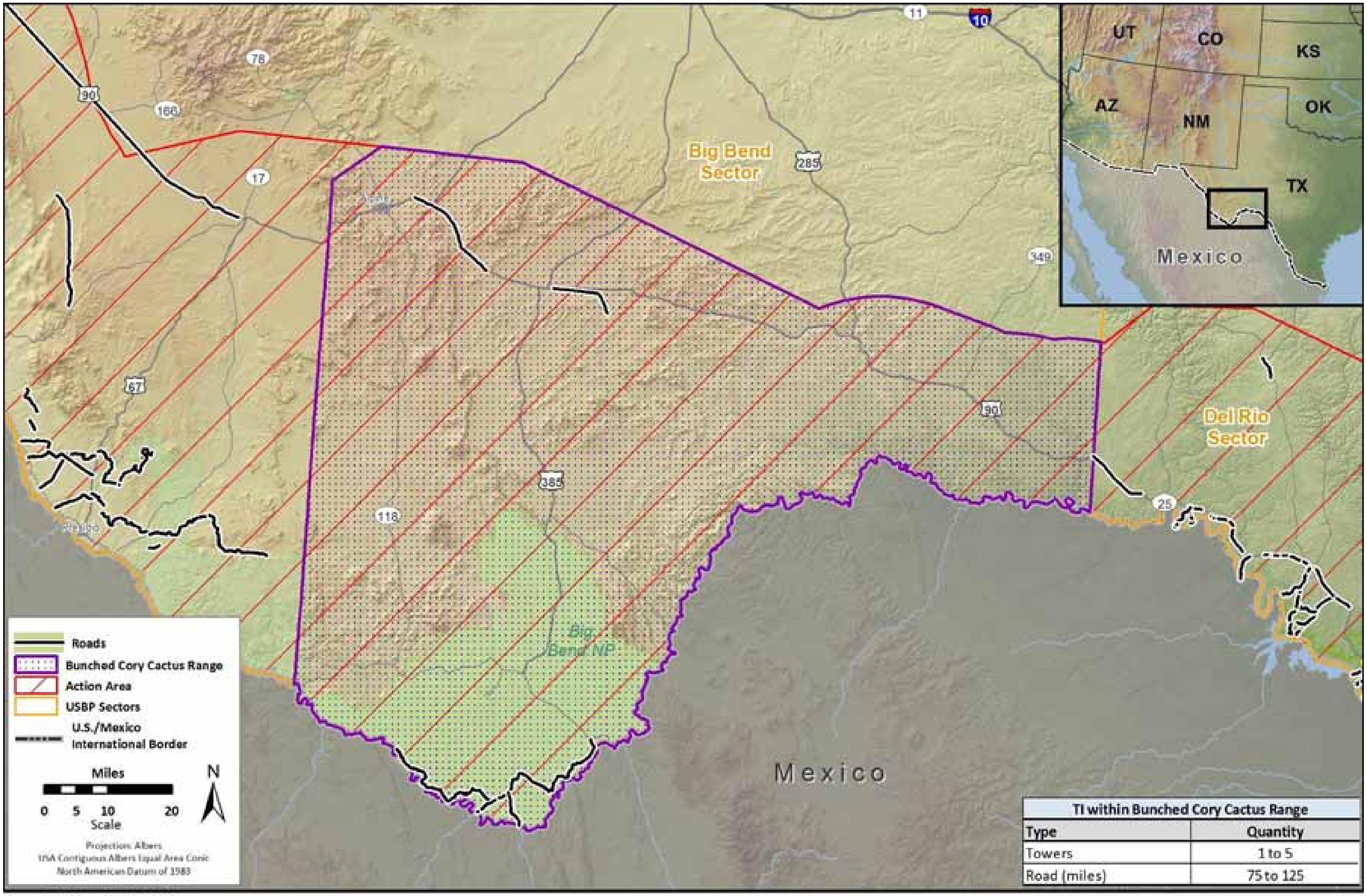


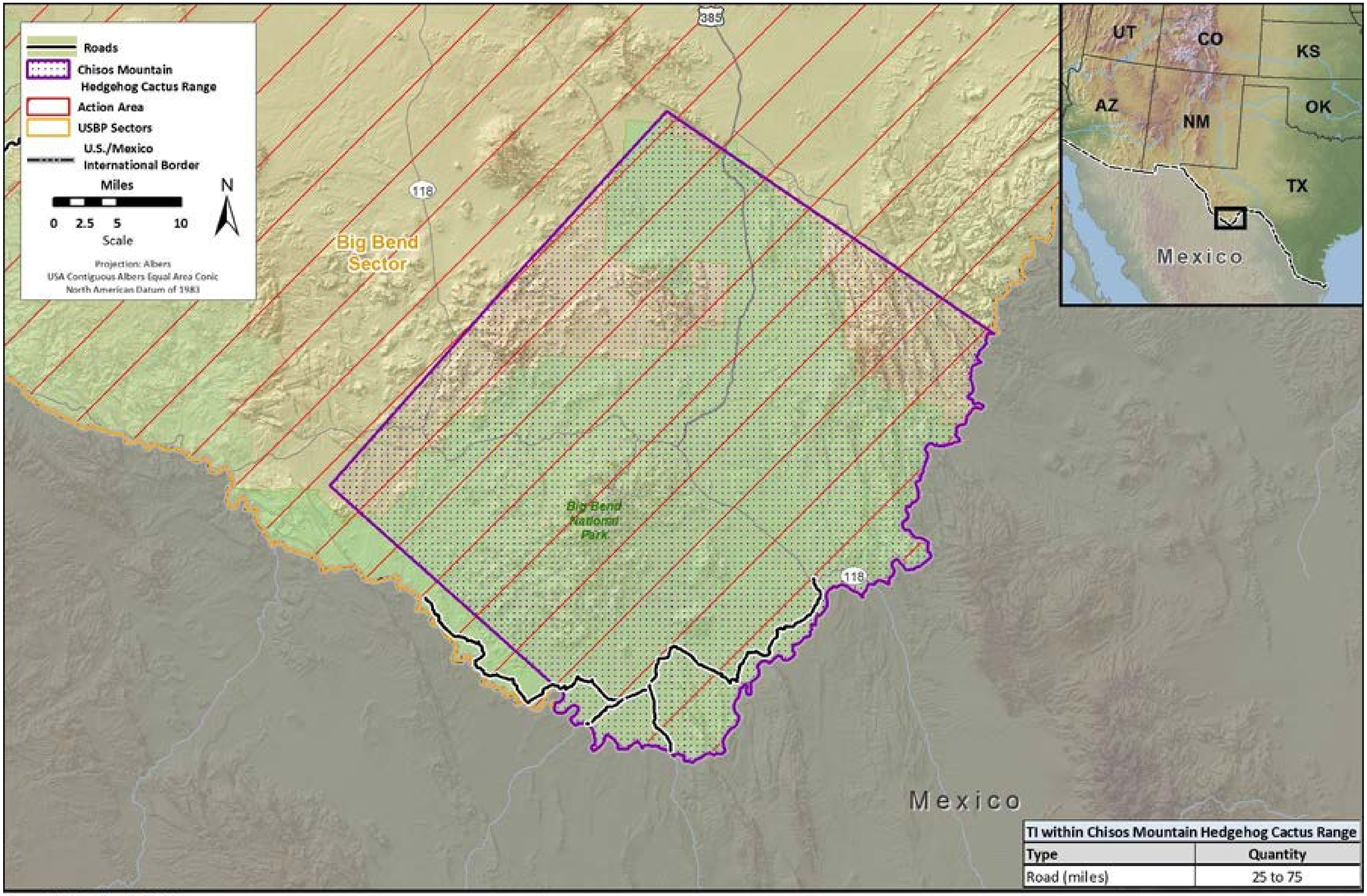
TI within Ashy Dogweed Range	
Type	Quantity
Road (miles)	1 to 5

Source: ESRI StreetMap USA 2010



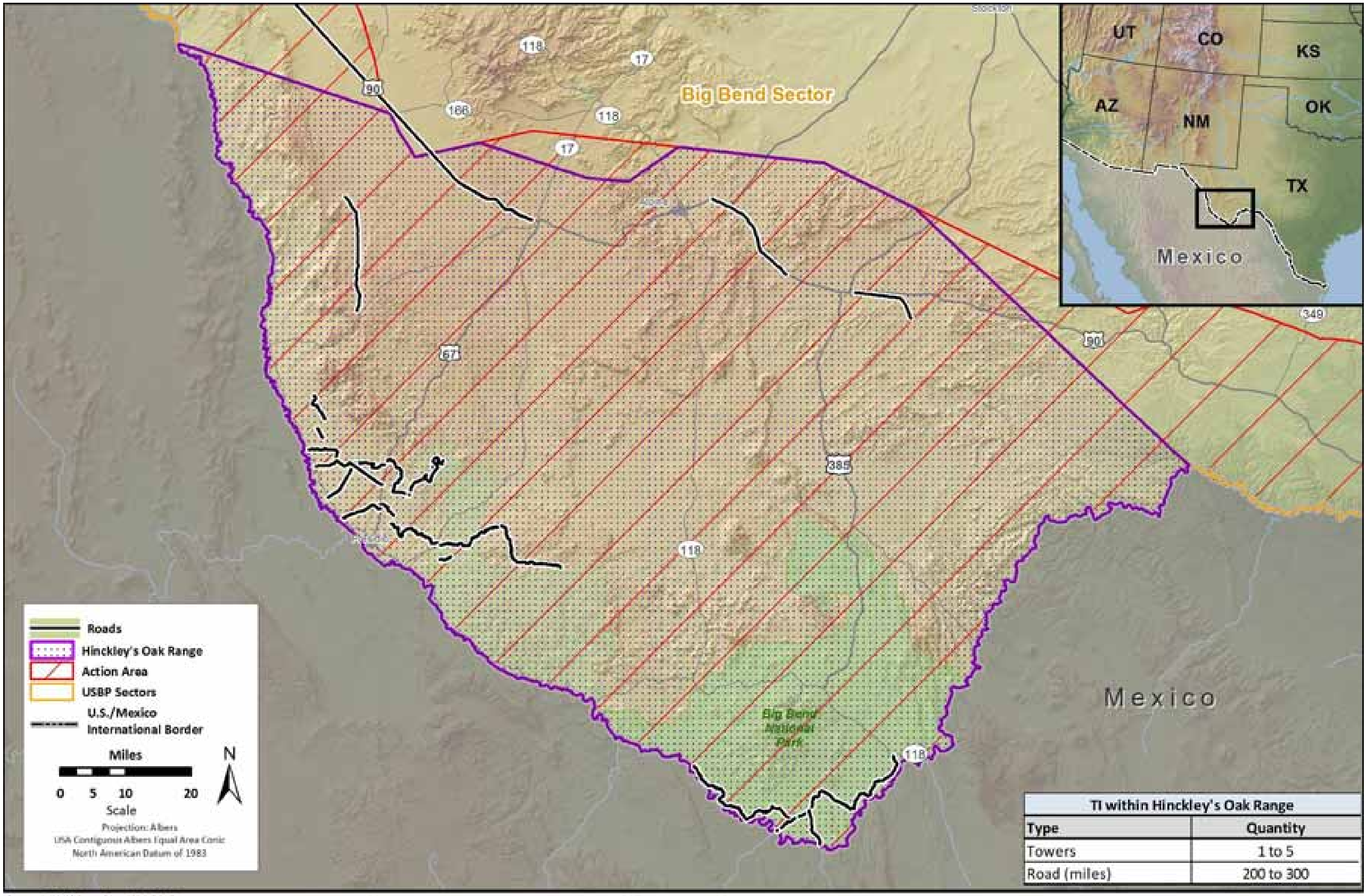
TI within Bunched Cory Cactus Range	
Type	Quantity
Towers	1 to 5
Road (miles)	75 to 125

Source: ESRI StreetMap USA 2010



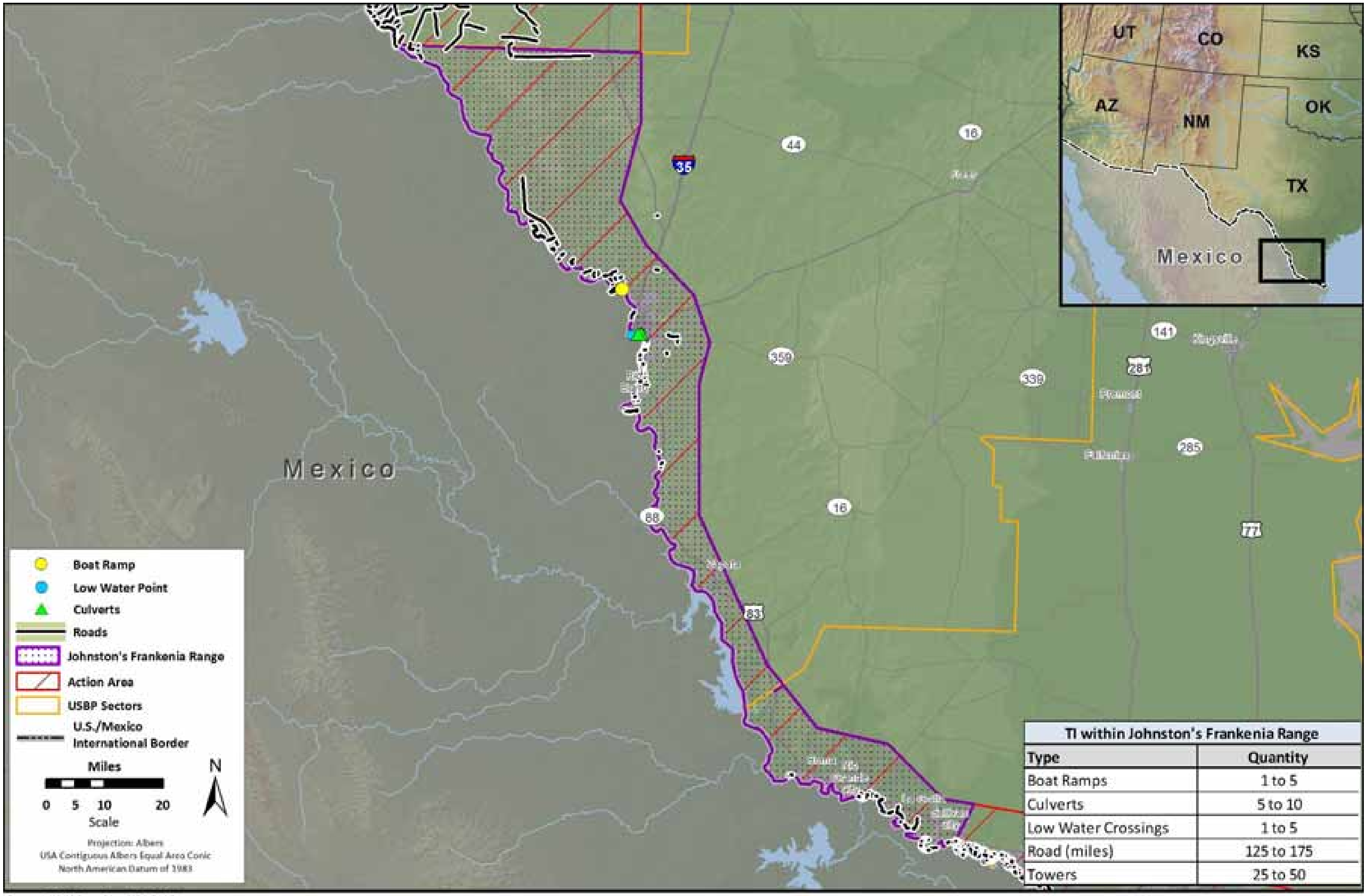
TI within Chisos Mountain Hedgehog Cactus Range	
Type	Quantity
Road (miles)	25 to 75

Source: ESRI StreetMap USA 2010



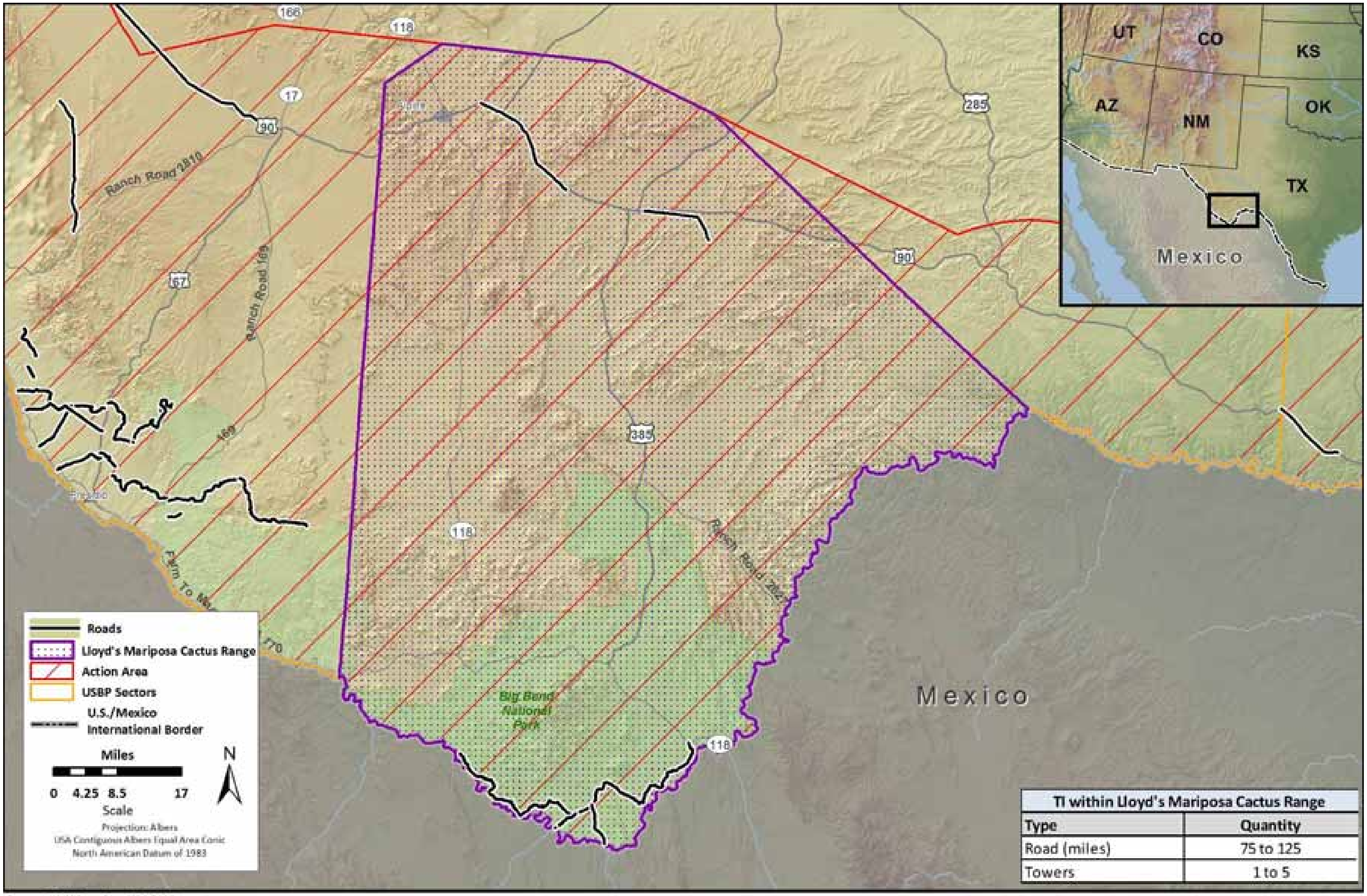
TI within Hinckley's Oak Range	
Type	Quantity
Towers	1 to 5
Road (miles)	200 to 300

Source: ESRI StreetMap USA 2010



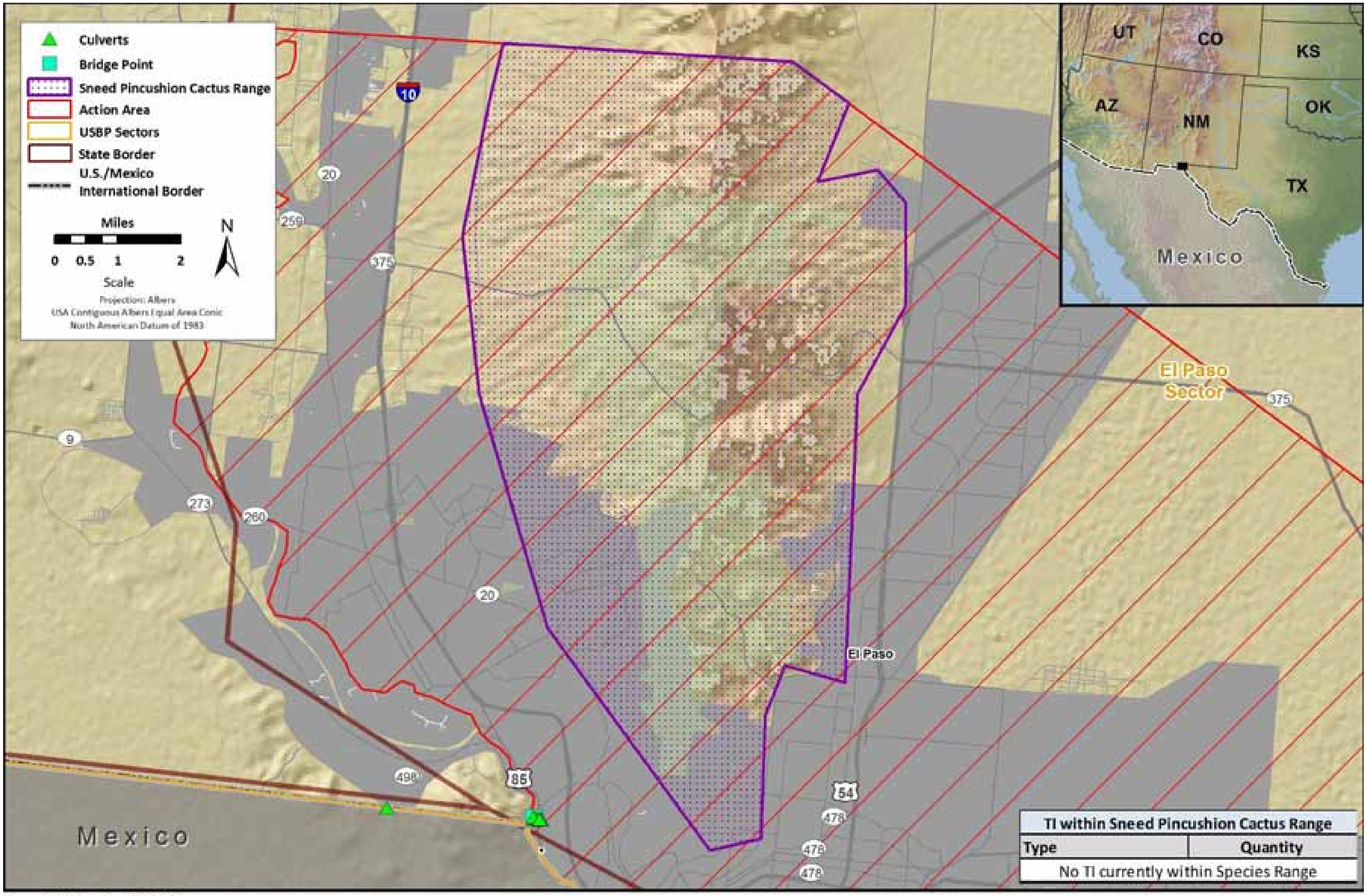
TI within Johnston's Frankenia Range	
Type	Quantity
Boat Ramps	1 to 5
Culverts	5 to 10
Low Water Crossings	1 to 5
Road (miles)	125 to 175
Towers	25 to 50

Source: ESRI StreetMap USA 2010



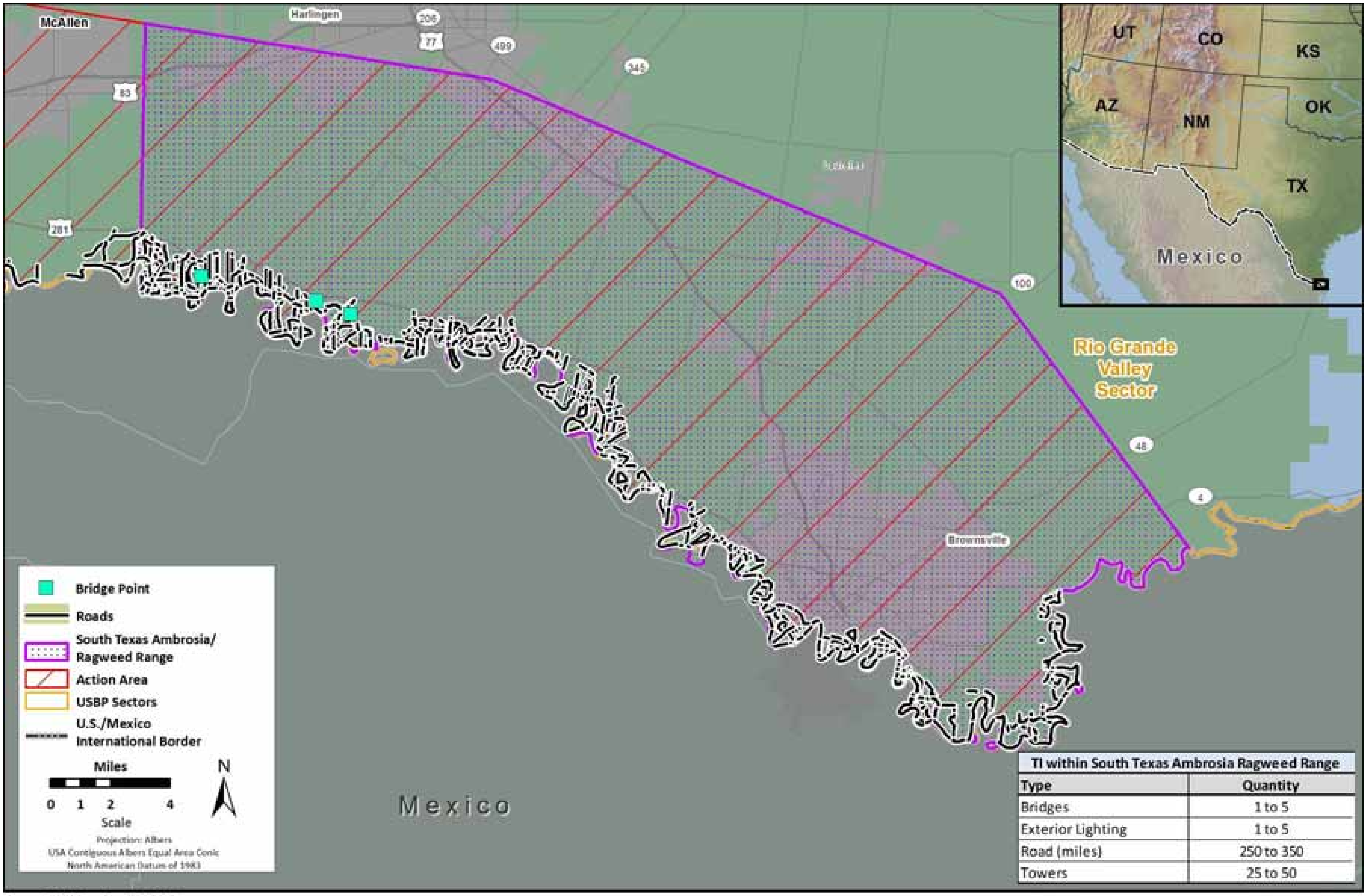
TI within Lloyd's Mariposa Cactus Range	
Type	Quantity
Road (miles)	75 to 125
Towers	1 to 5

Source: ESRI StreetMap USA 2010



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

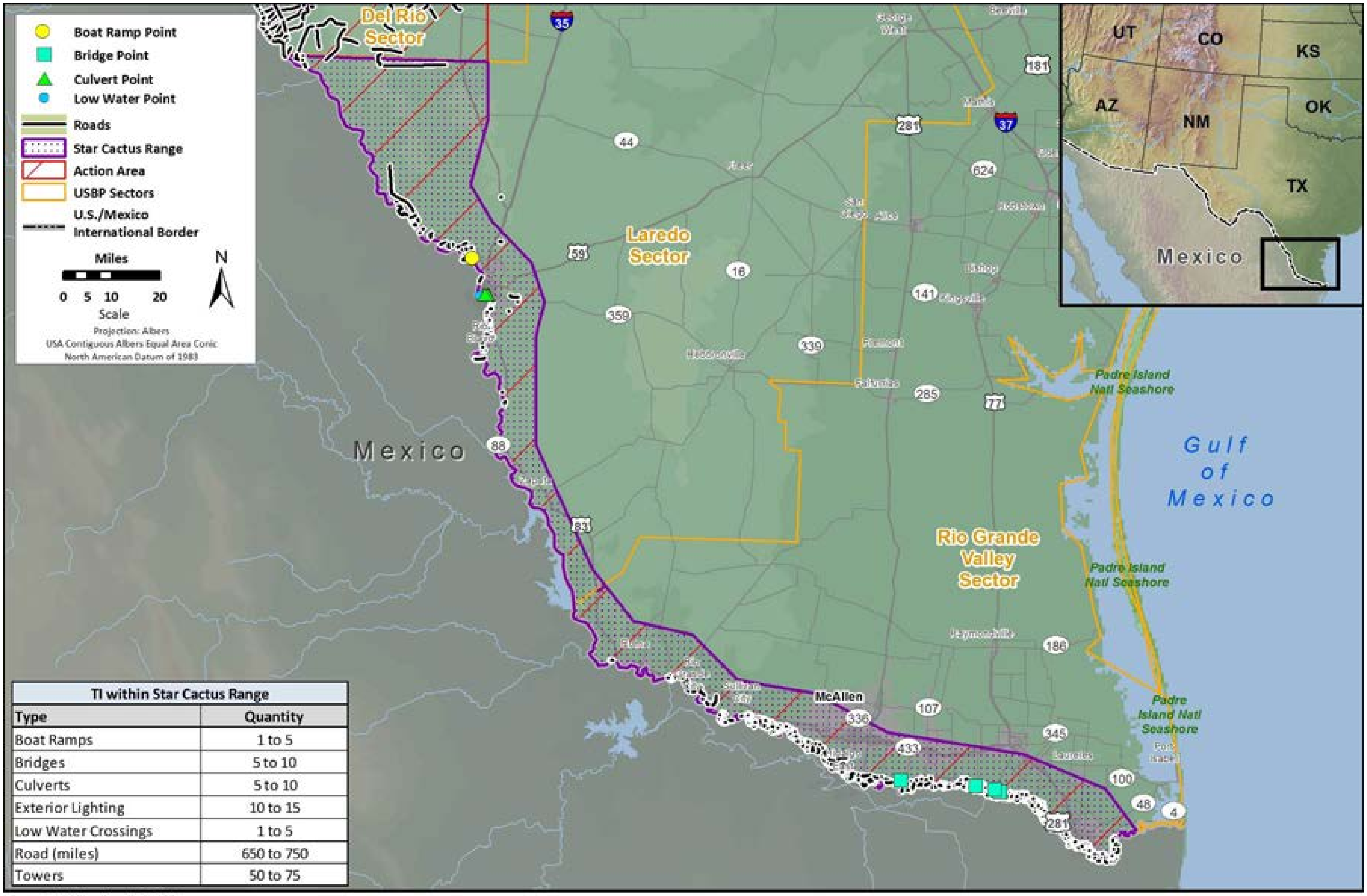
Source: ESRI StreetMap USA 2010



TI within South Texas Ambrosia Ragweed Range

Type	Quantity
Bridges	1 to 5
Exterior Lighting	1 to 5
Road (miles)	250 to 350
Towers	25 to 50

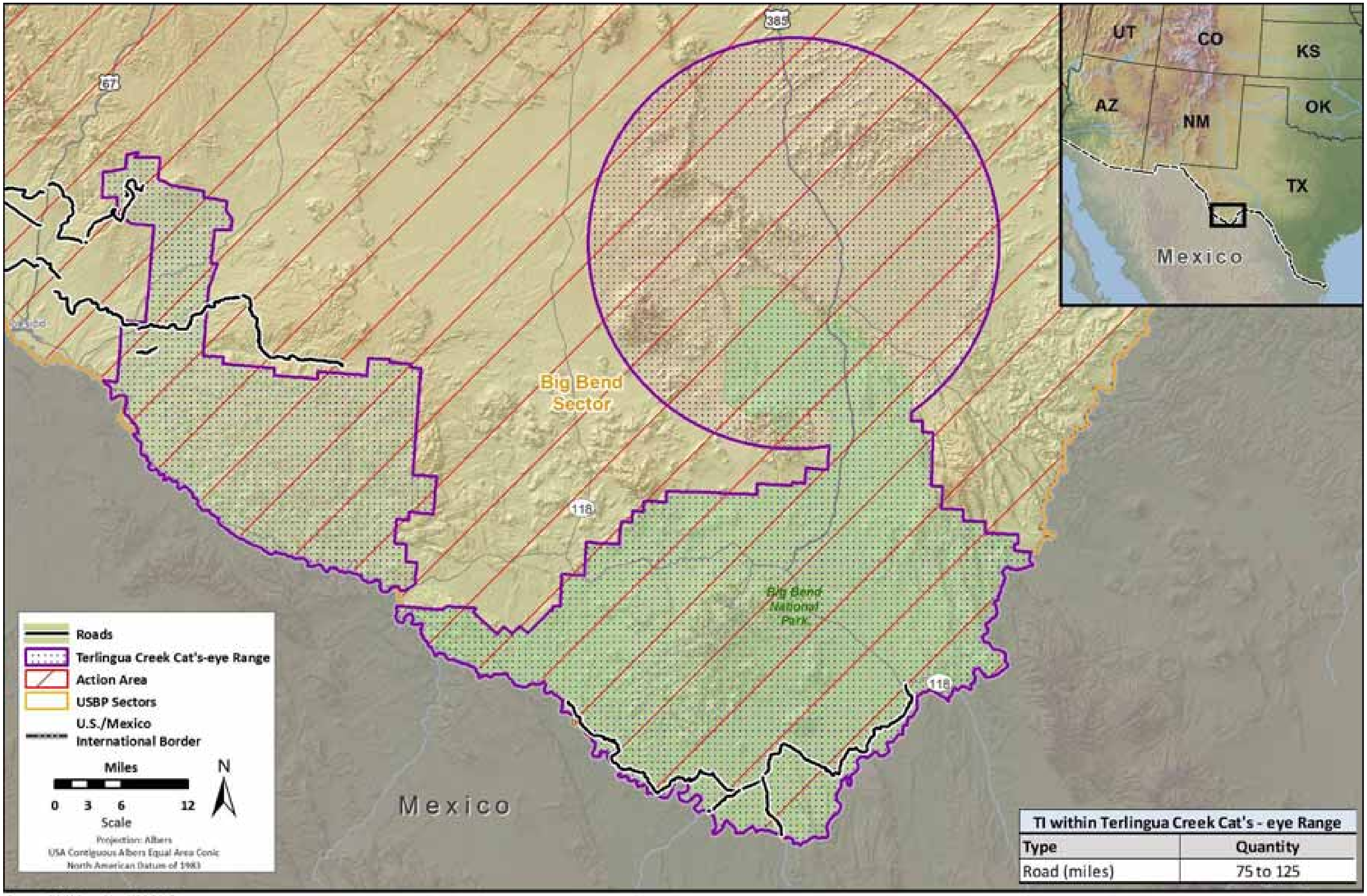
Source: ESRI StreetMap USA 2010



TI within Star Cactus Range

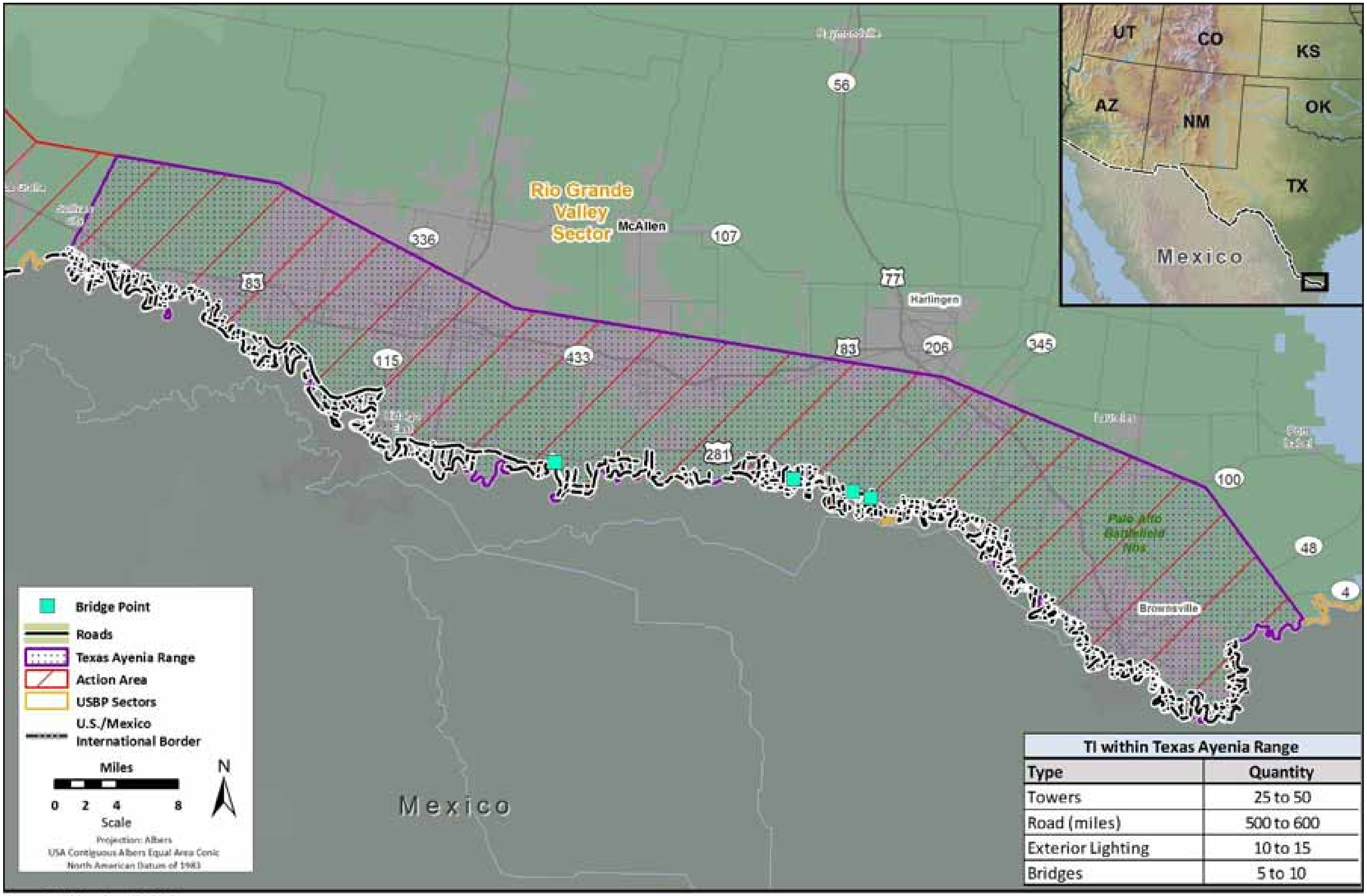
Type	Quantity
Boat Ramps	1 to 5
Bridges	5 to 10
Culverts	5 to 10
Exterior Lighting	10 to 15
Low Water Crossings	1 to 5
Road (miles)	650 to 750
Towers	50 to 75

Source: ESRI StreetMap USA 2010



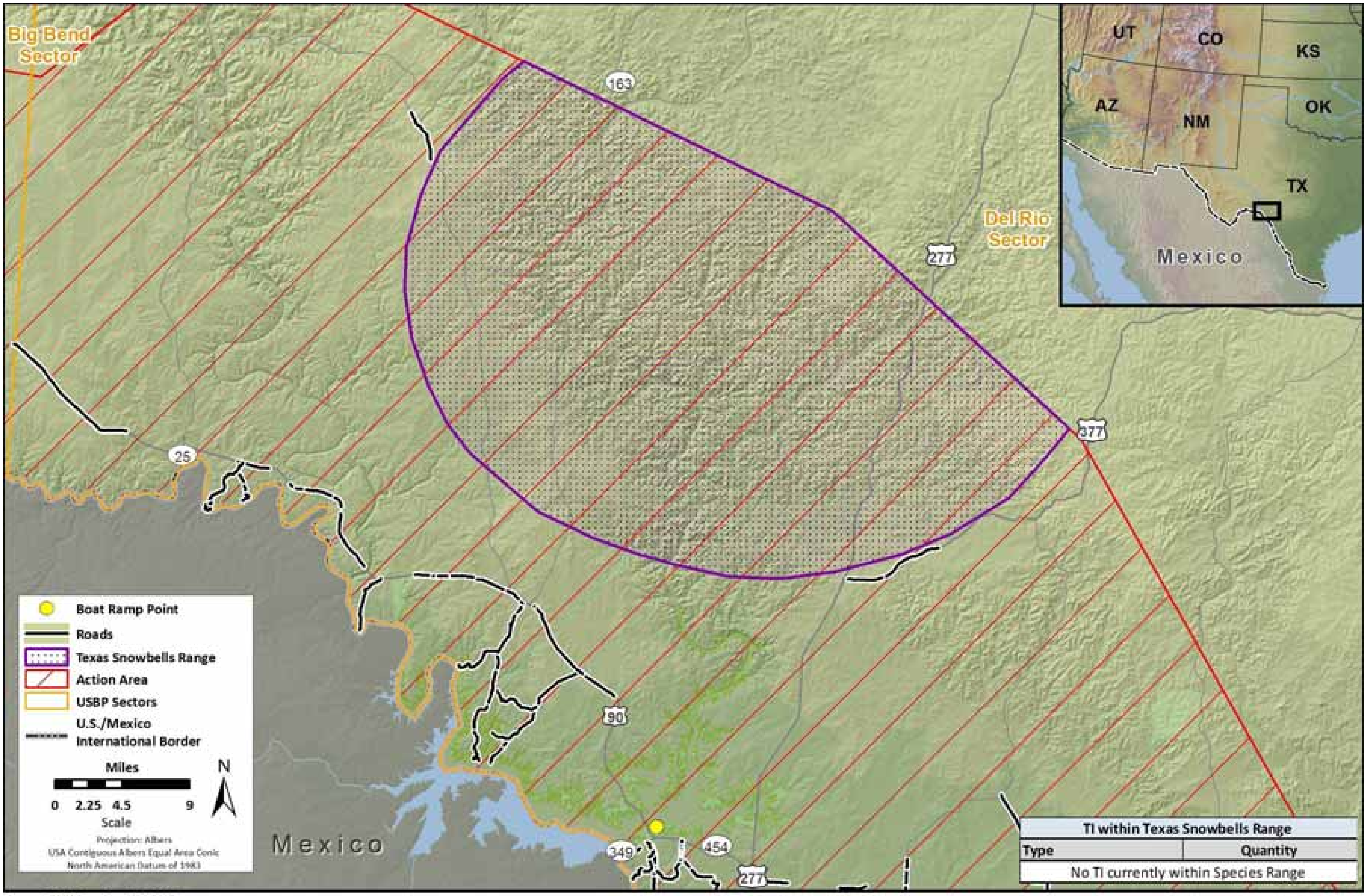
TI within Terlingua Creek Cat's - eye Range	
Type	Quantity
Road (miles)	75 to 125

Source: ESRI StreetMap USA 2010



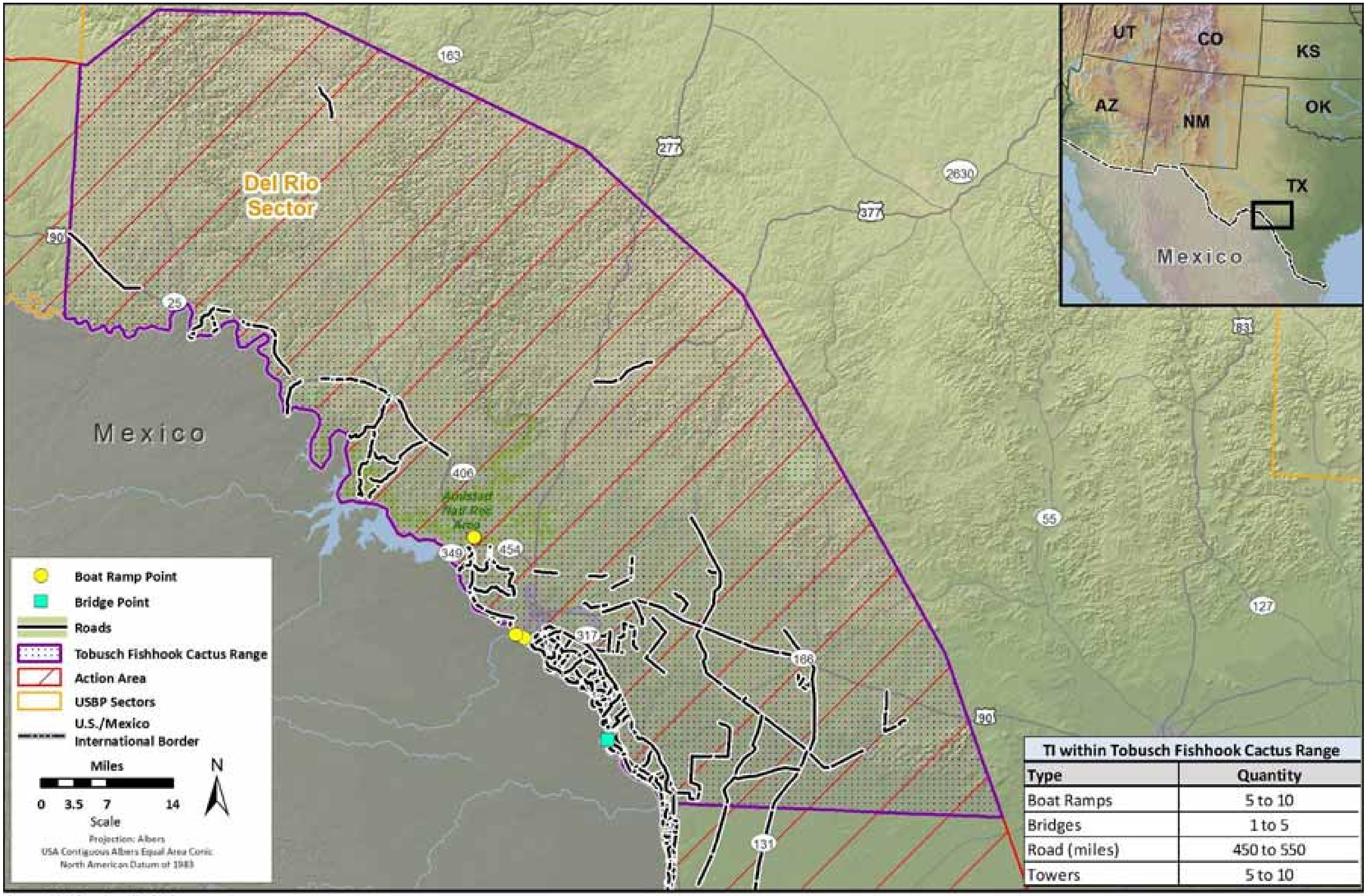
TI within Texas Ayenia Range	
Type	**Quantity**
Towers	25 to 50
Road (miles)	500 to 600
Exterior Lighting	10 to 15
Bridges	5 to 10

Source: ESRI StreetMap USA 2010



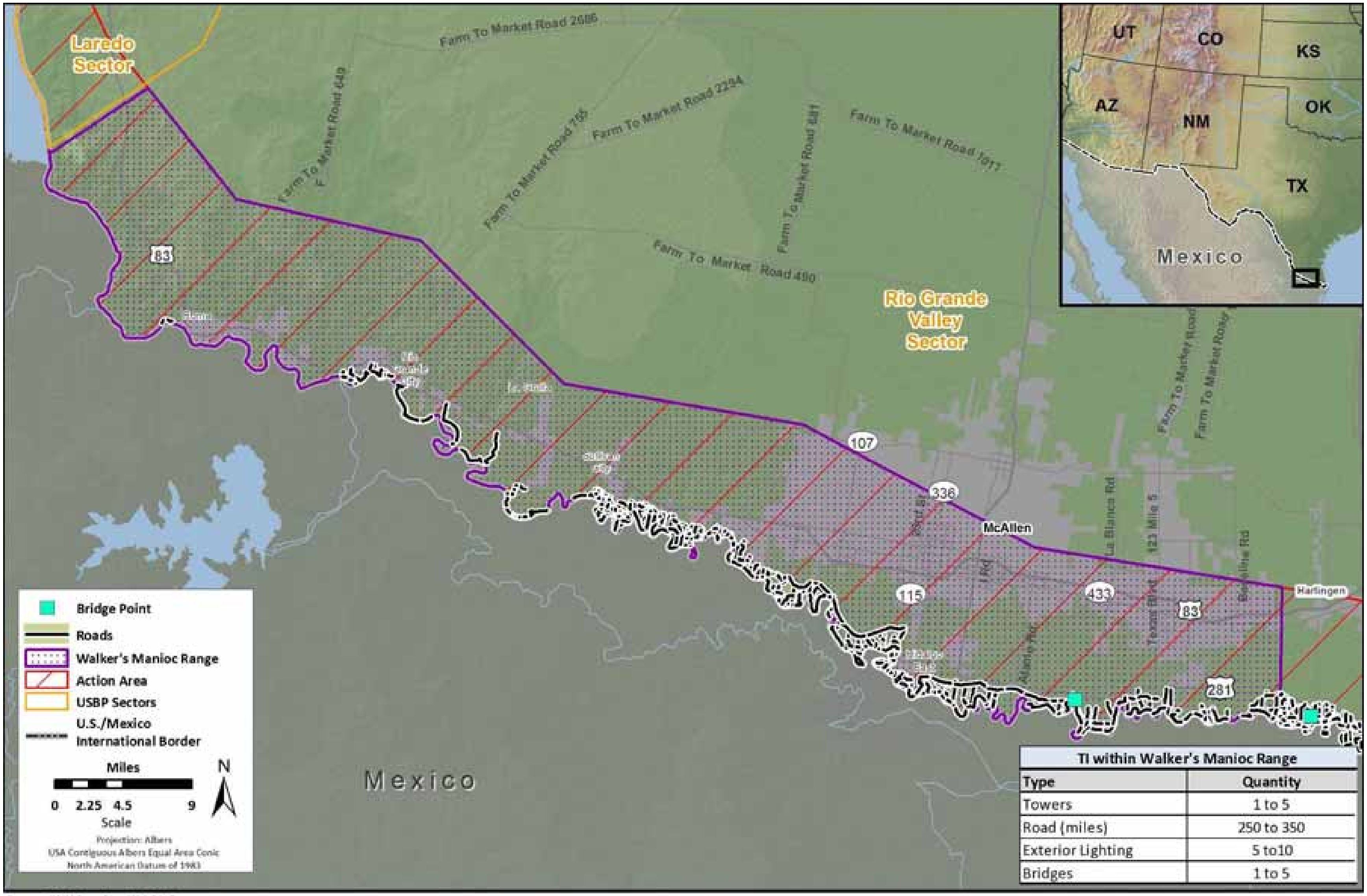
TI within Texas Snowbells Range	
Type	Quantity
No TI currently within Species Range	

Source: ESRI StreetMap USA 2010



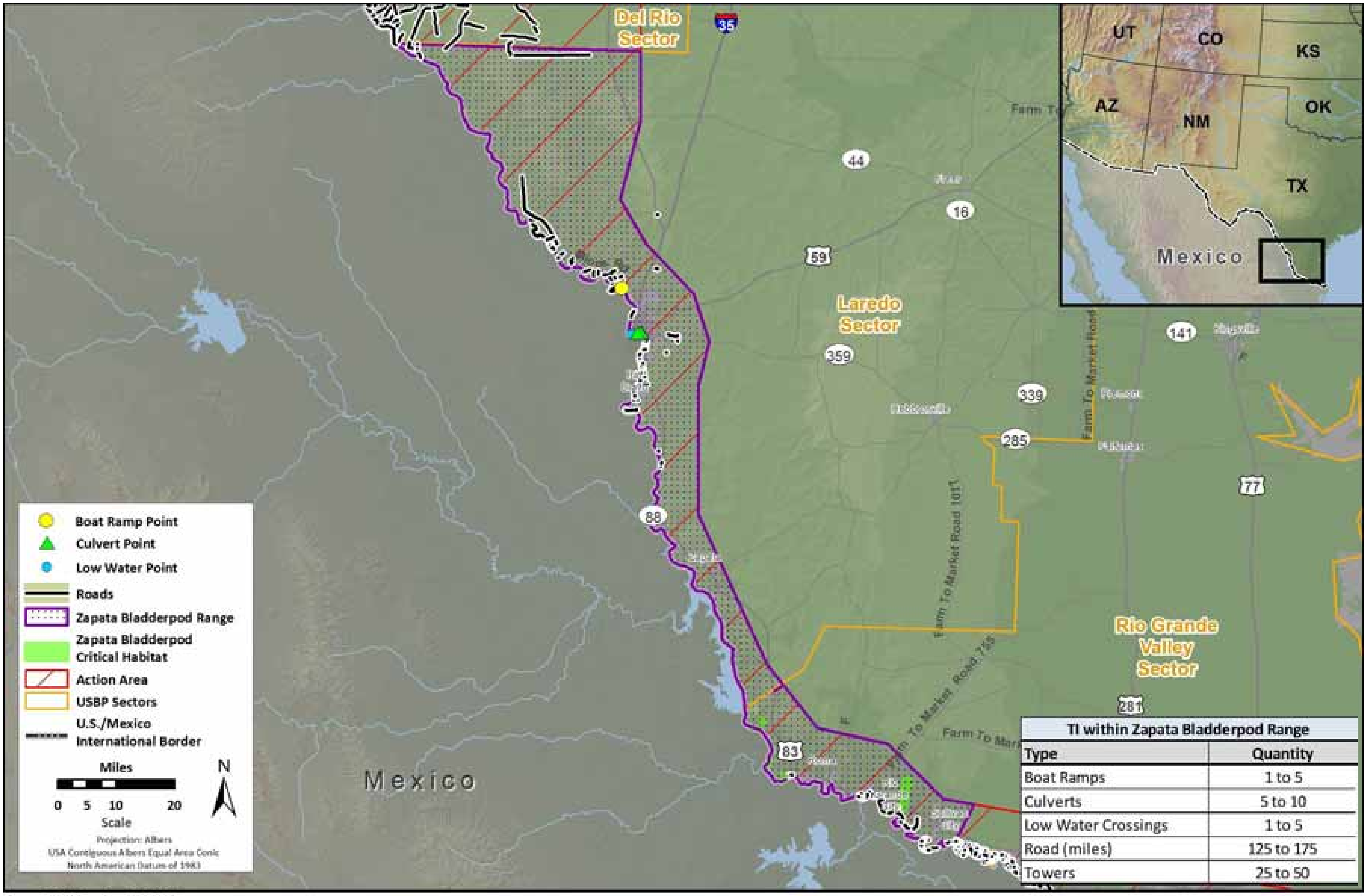
TI within Tobusch Fishhook Cactus Range	
Type	**Quantity**
Boat Ramps	5 to 10
Bridges	1 to 5
Road (miles)	450 to 550
Towers	5 to 10

Source: ESRI StreetMap USA 2010



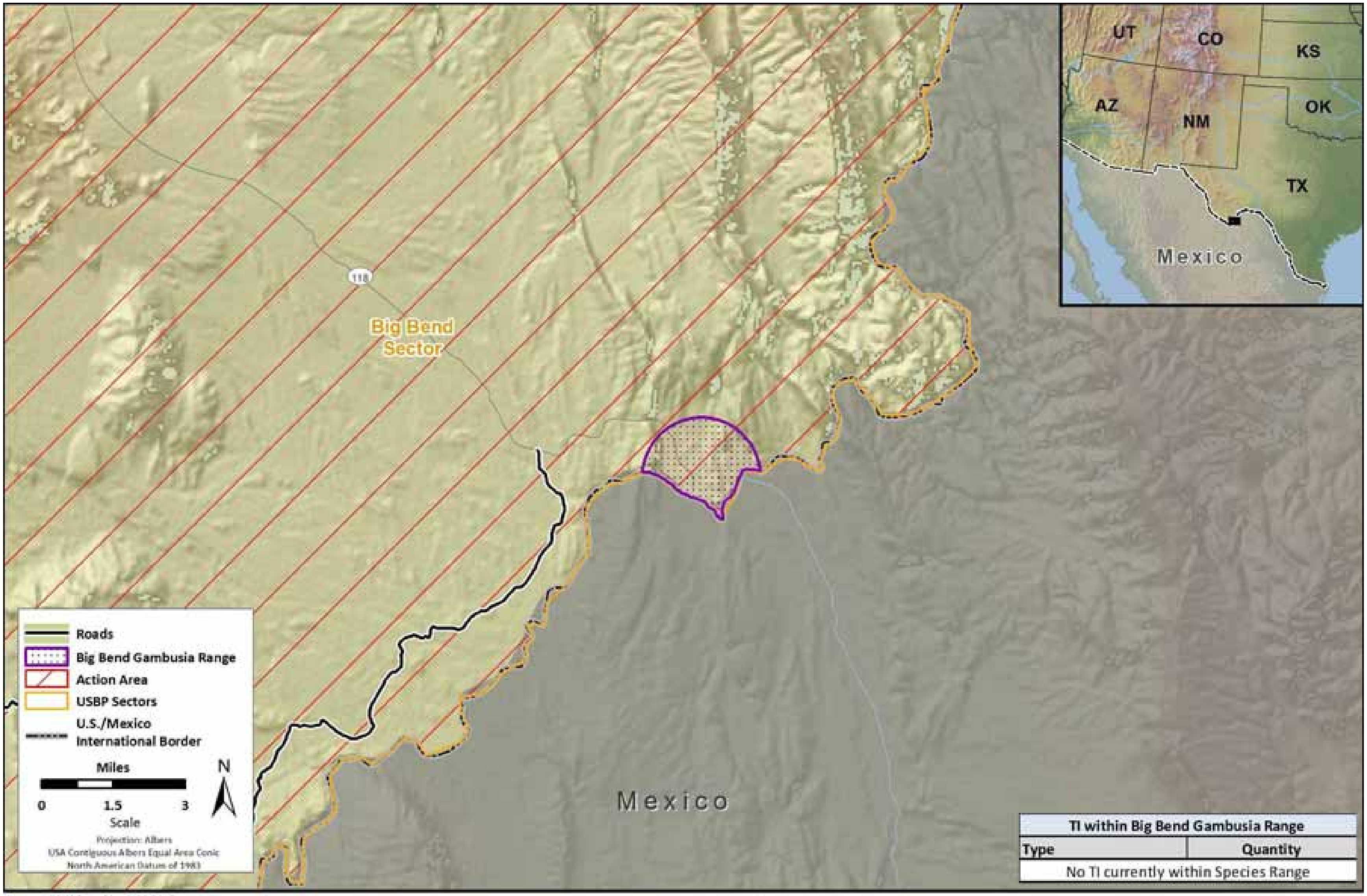
TI within Walker's Manioc Range	
Type	**Quantity**
Towers	1 to 5
Road (miles)	250 to 350
Exterior Lighting	5 to10
Bridges	1 to 5

Source: ESRI StreetMap USA 2010



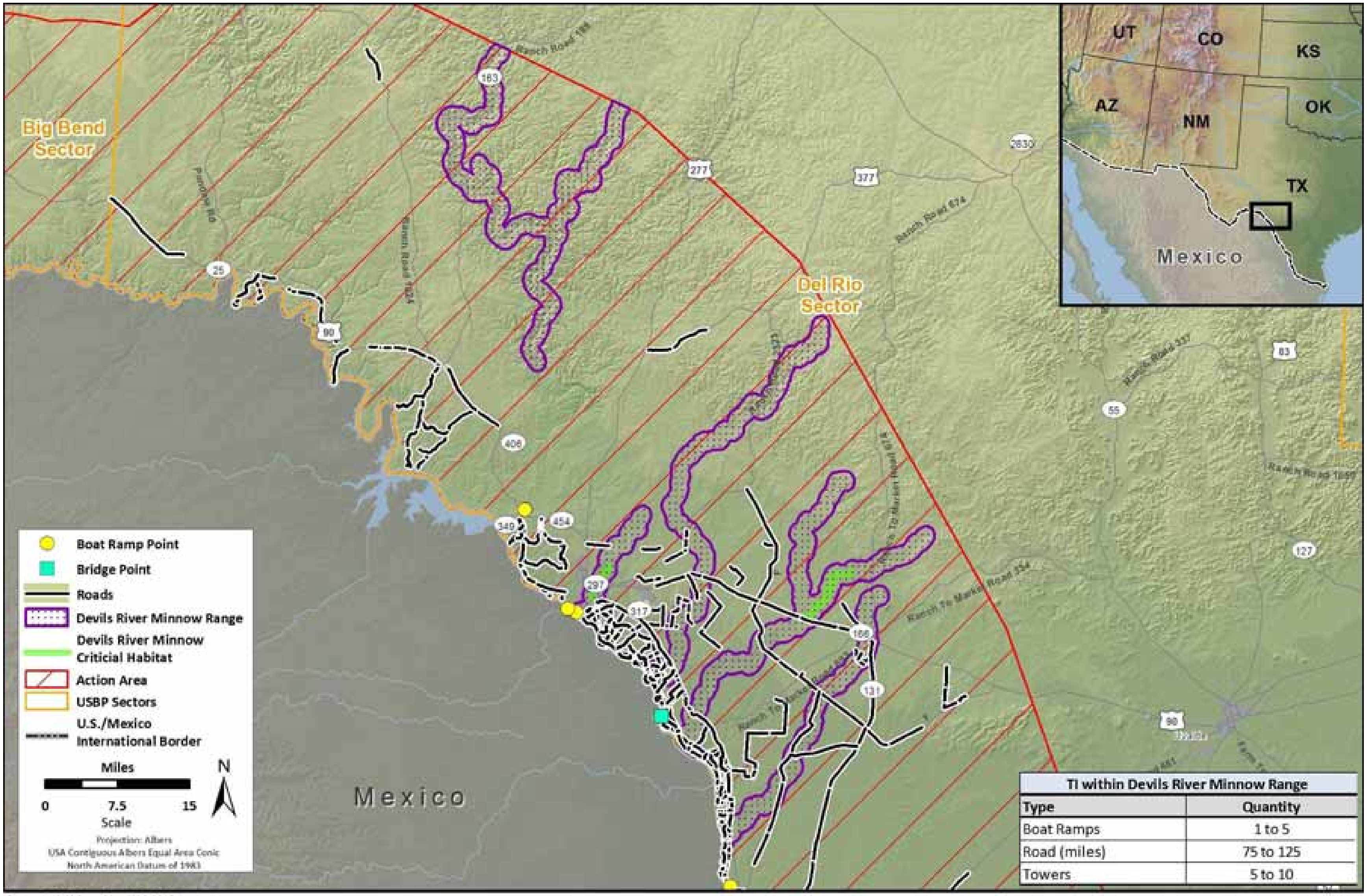
TI within Zapata Bladderpod Range	
Type	Quantity
Boat Ramps	1 to 5
Culverts	5 to 10
Low Water Crossings	1 to 5
Road (miles)	125 to 175
Towers	25 to 50

Source: ESRI StreetMap USA 2010



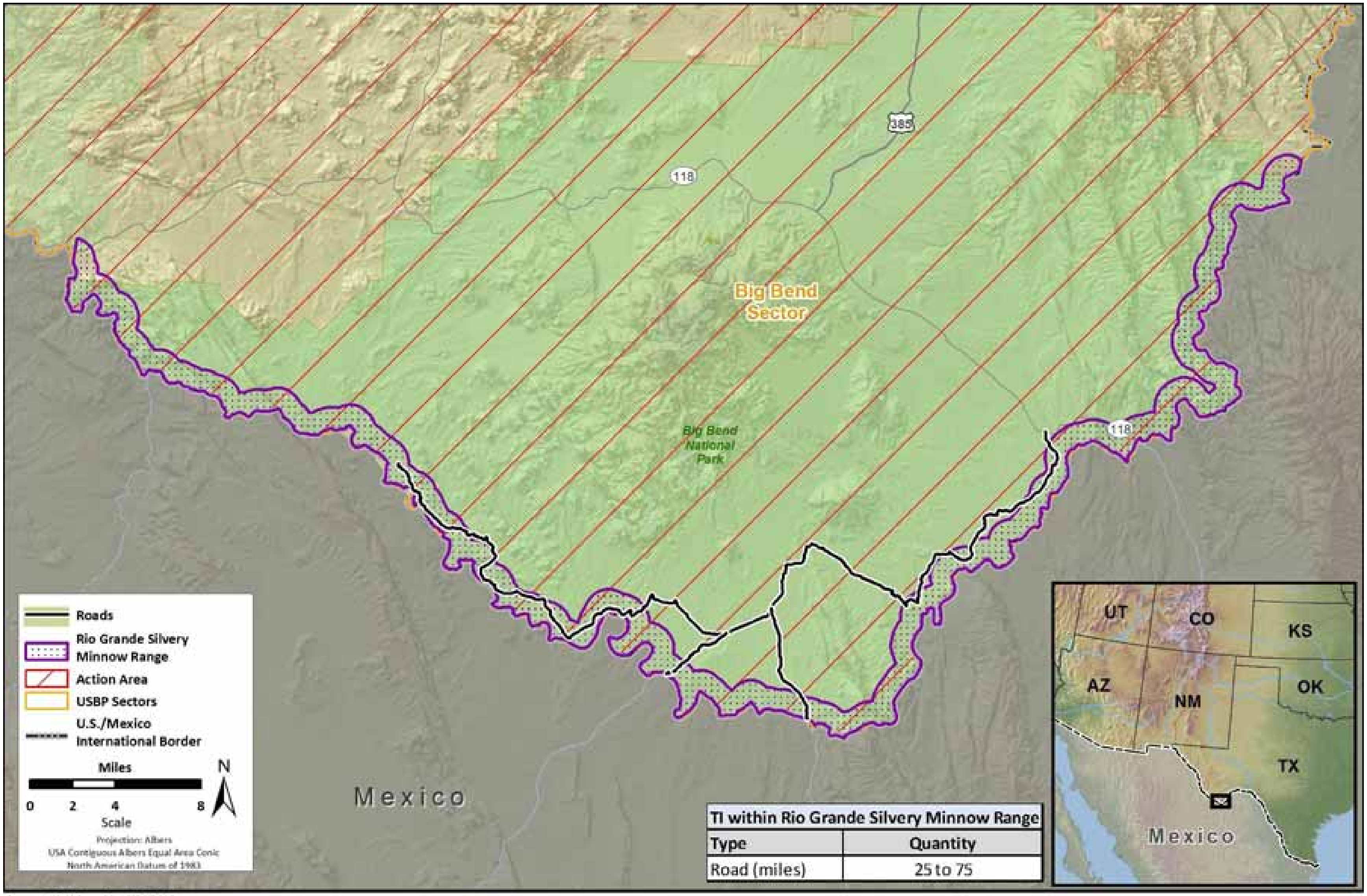
TI within Big Bend Gambusia Range	
Type	Quantity
No TI currently within Species Range	

Source: ESRI StreetMap USA 2010



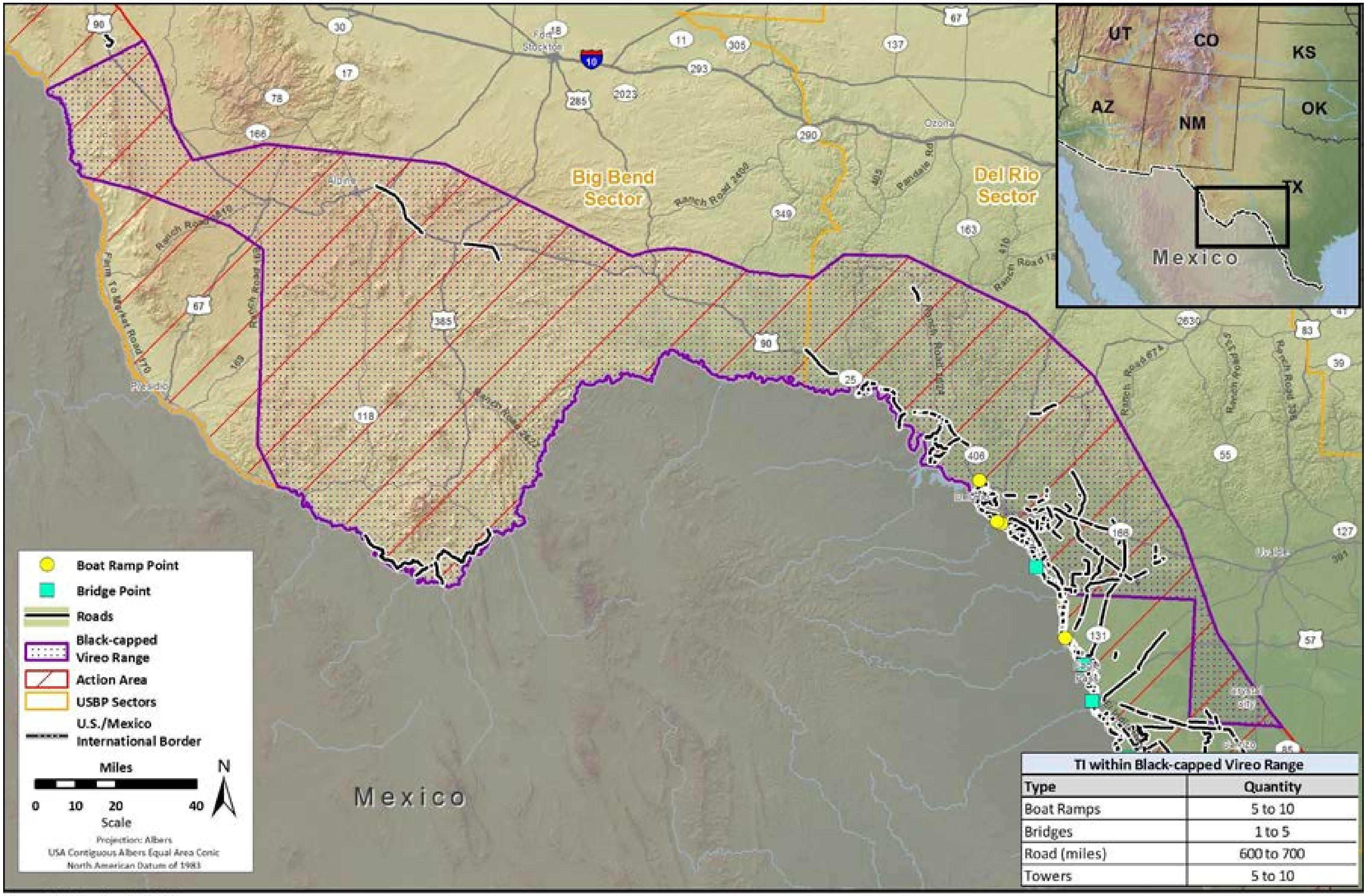
TI within Devils River Minnow Range	
Type	Quantity
Boat Ramps	1 to 5
Road (miles)	75 to 125
Towers	5 to 10

Source: ESRI StreetMap USA 2010



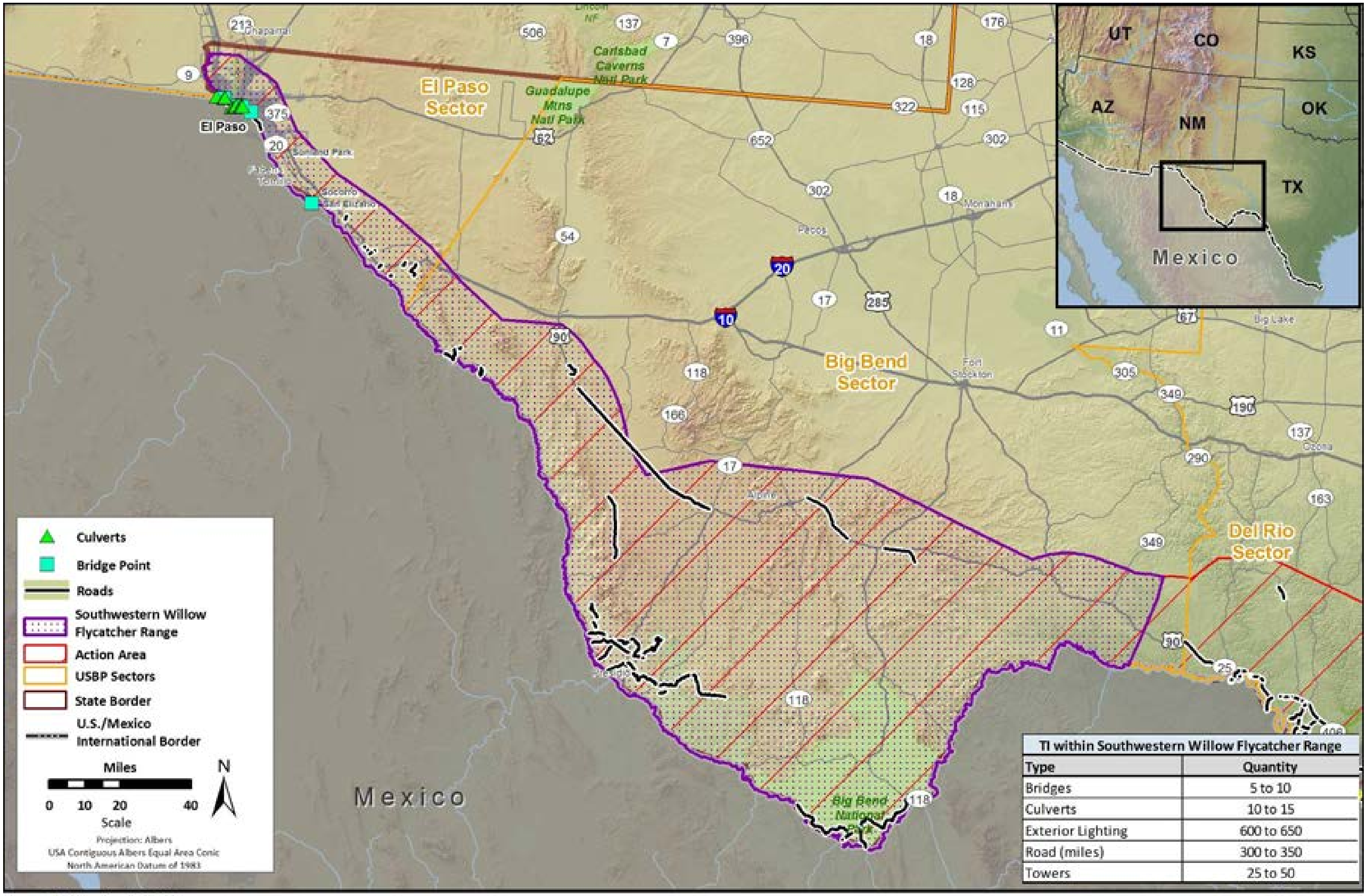
TI within Rio Grande Silvery Minnow Range	
Type	Quantity
Road (miles)	25 to 75

Source: ESRI StreetMap USA 2010



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

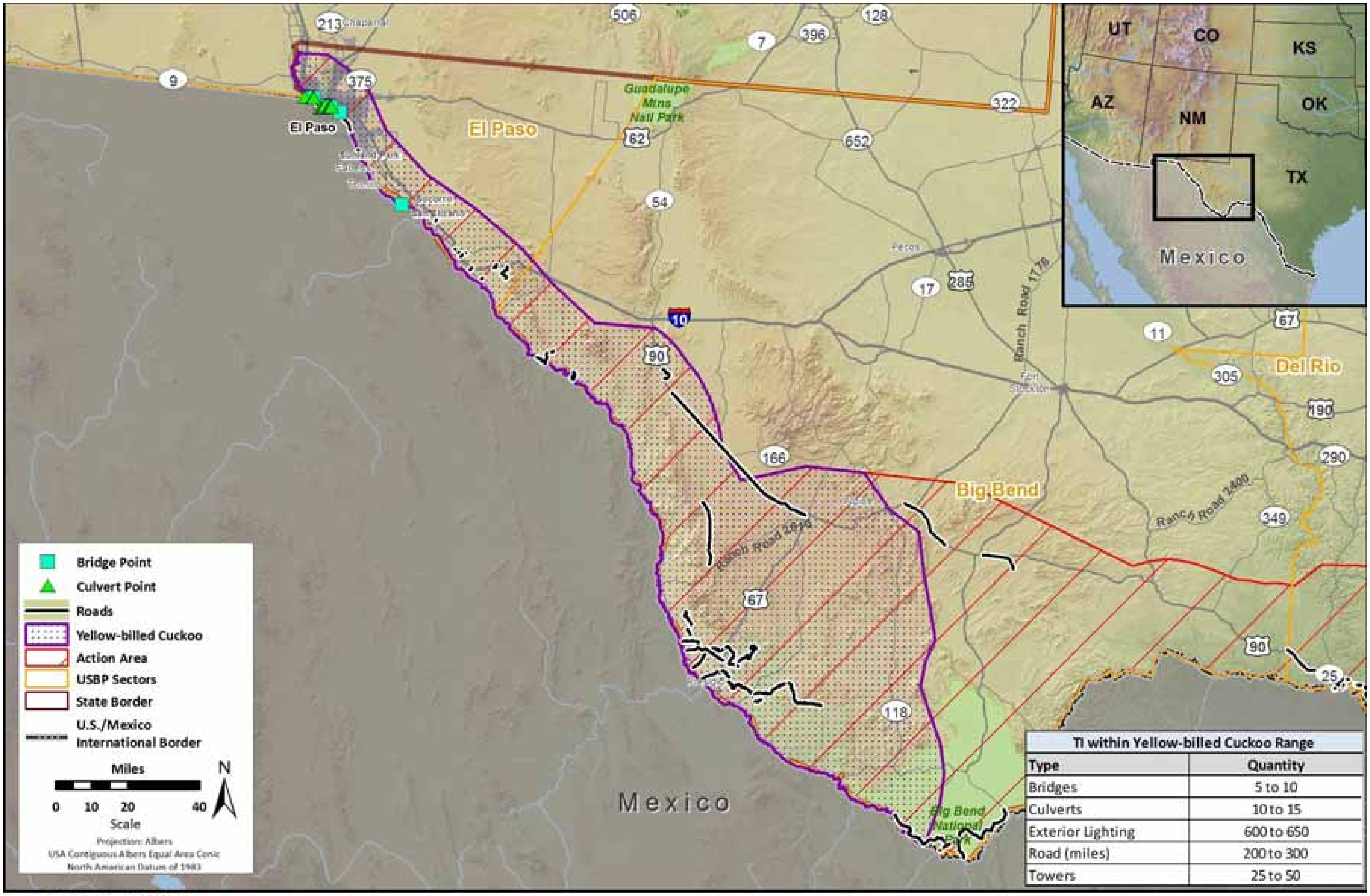
Source: ESRI StreetMap USA 2010



TI within Southwestern Willow Flycatcher Range

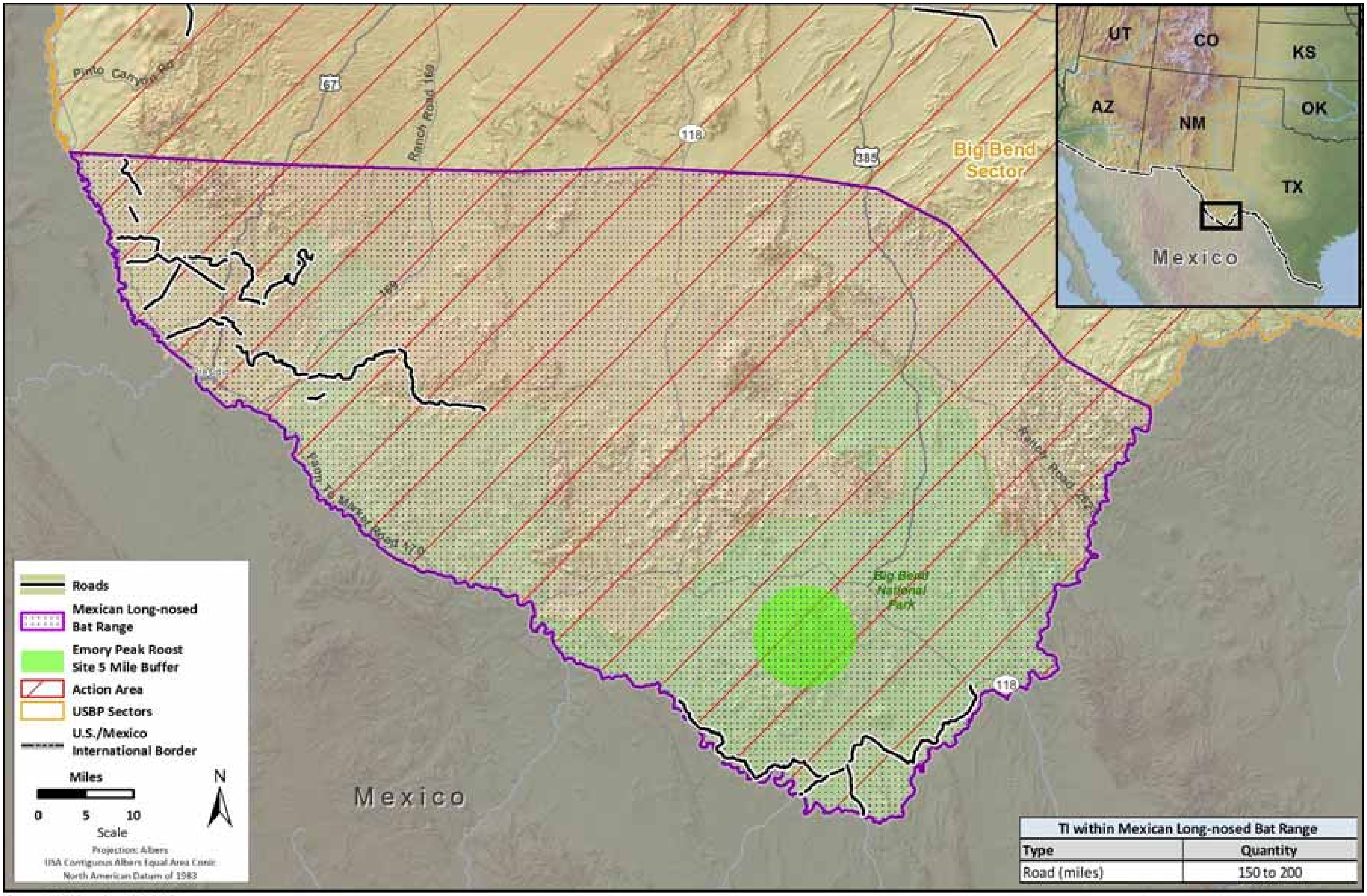
Type	Quantity
Bridges	5 to 10
Culverts	10 to 15
Exterior Lighting	600 to 650
Road (miles)	300 to 350
Towers	25 to 50

Source: ESRI StreetMap USA 2010



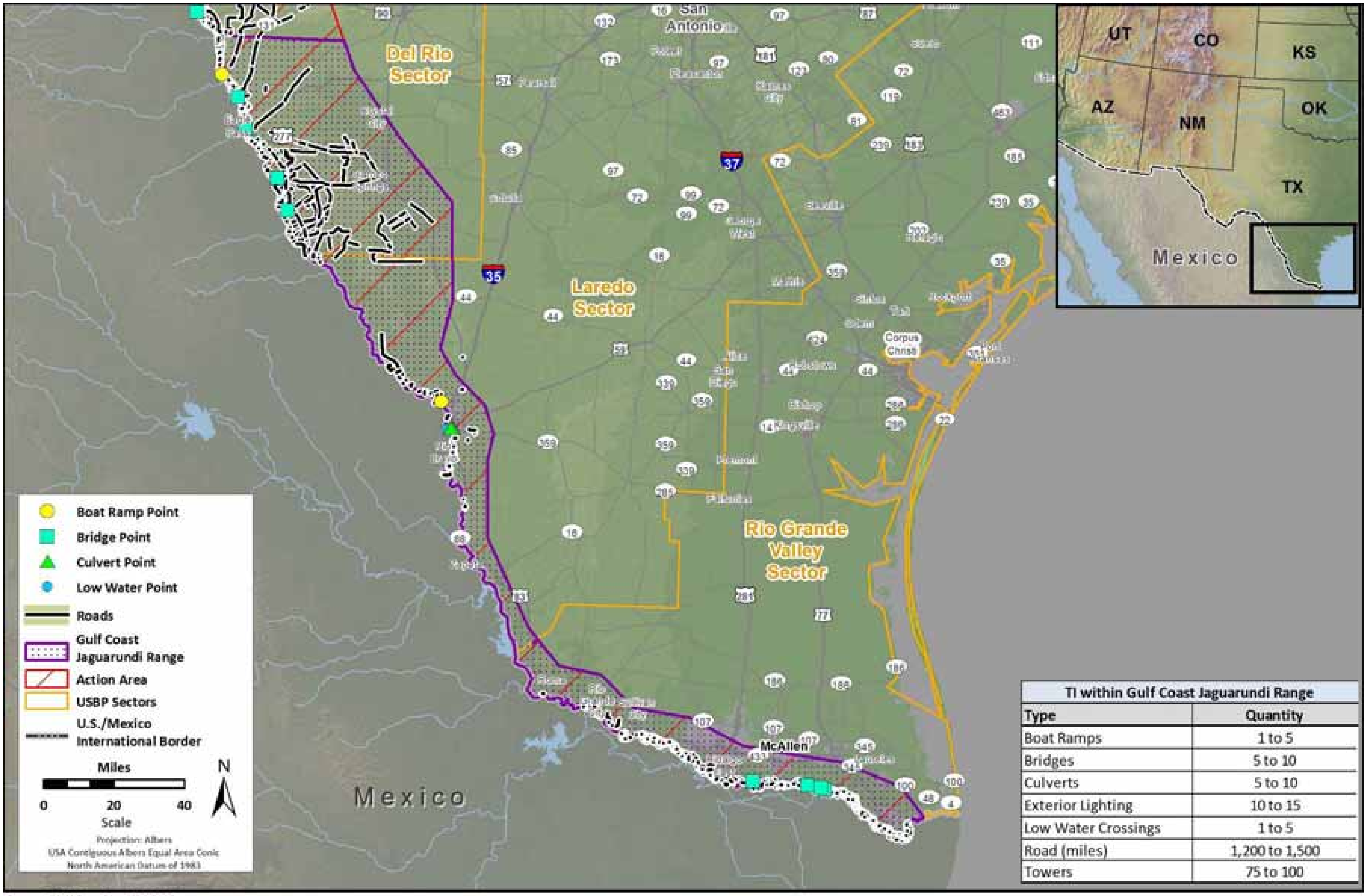
TI within Yellow-billed Cuckoo Range	
Type	Quantity
Bridges	5 to 10
Culverts	10 to 15
Exterior Lighting	600 to 650
Road (miles)	200 to 300
Towers	25 to 50

Source: ESRI StreetMap USA 2010



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

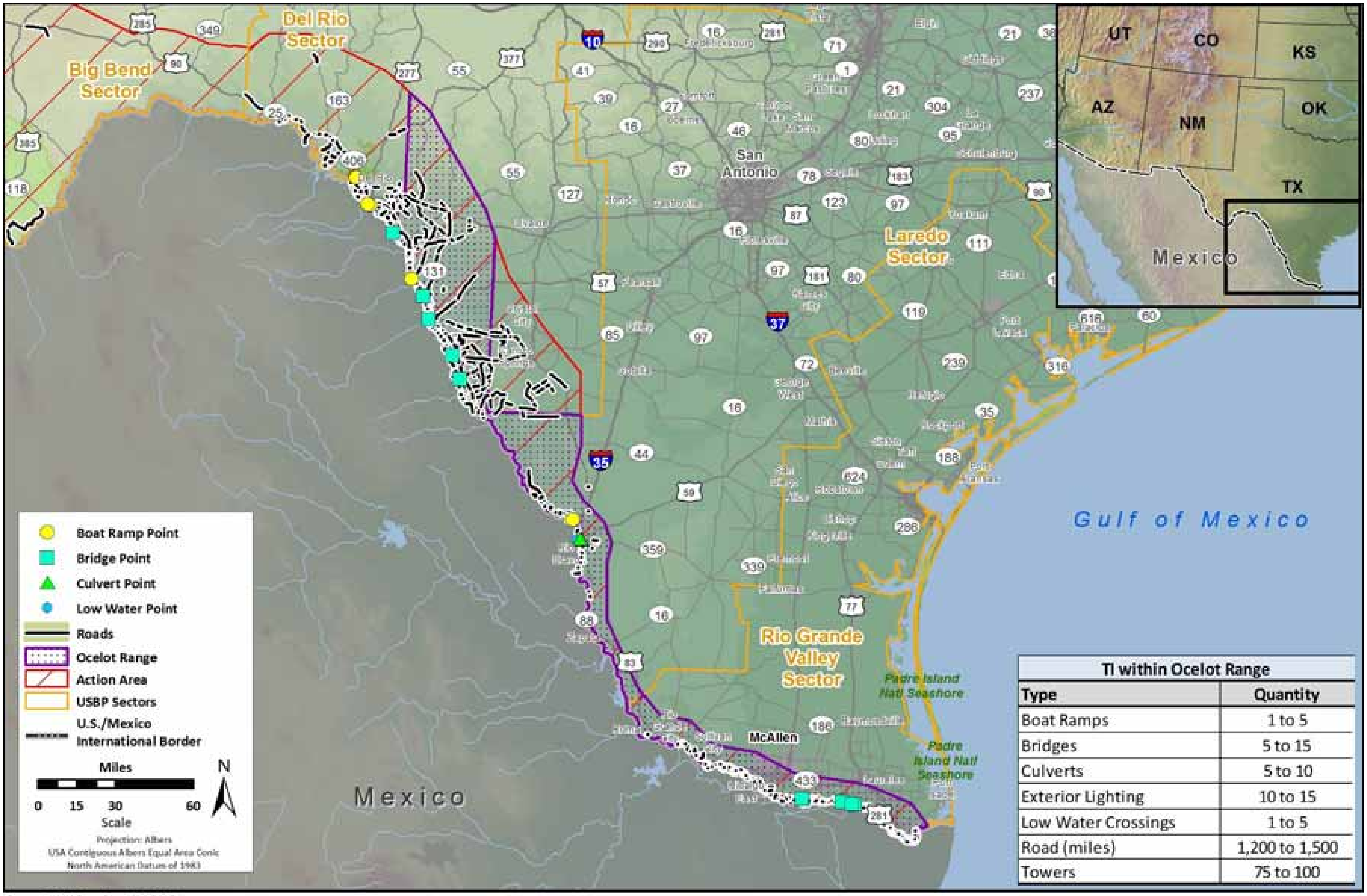
Source: ESRI StreetMap USA 2010



TI within Gulf Coast Jaguarundi Range

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

Source: ESRI StreetMap USA 2010



TI within Ocelot Range

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

Source: ESRI StreetMap USA 2010

APPENDIX E

Best Management Practices

APPENDIX E

Best Management Practices

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

Land Use

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

Geology and Soil Resources

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

Vegetation

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

2. If mechanical methods are used to remove invasive plants, the entire plant should be removed and placed in a disposal area. If herbicides are used, the plants will be left in place. All chemical applications on federally managed land must be used in coordination with the Federal land manager. Training to identify nonnative invasive plants will be provided for CBP personnel or contractors, as necessary.
3. If the maintenance and repair activities will take place on a Federal agency's land, the appropriate agency's herbicide policy for vegetation control must be followed. Contractors applying herbicides must verify that the appropriate agency's policy is being followed, if it exists. This information should be requested from the contracting officer's technical representative (COTR).
4. New guidance from the U.S. Environmental Protection Agency (USEPA) on herbicide application in riparian areas is imminent. Check with COTR on the status of these regulations prior to applying herbicide in such areas.
5. Coordinate with the CBP environmental SME to determine if the maintenance or repair activities occur in a highly sensitive area or an area that poses an unacceptable risk of transmitting diseases and invasive species. If it is determined that maintenance or repair activities occur in such an area, follow the CBP cleaning protocol.
6. A fire prevention and suppression plan will be developed and implemented for all maintenance and repair activities that require welding or otherwise have a risk of starting a wildfire.
7. Identify fill material, sandbags, hay bales, and mulch brought in from outside the project area by its source location. Use sources that are sterile or weed-free.
8. Clearly demarcate the perimeter of all new areas to be disturbed using flagging or temporary construction fencing. Do not allow any disturbance outside that perimeter. Riparian vegetation should be protected during maintenance and repair activities.
9. Avoid the removal of mature trees providing shade or bank stabilization within the riparian area of any waterway during maintenance or repair activities.
10. If vegetation must be removed, allow natural regeneration of native plants by cutting vegetation with hand tools, mowing, trimming, or using other removal methods that allow root systems to remain intact to prevent disturbance that encourages establishment of invasive plant species. In addition, all soils that are disturbed that will not otherwise be stabilized during maintenance and repair activities shall be reseeded using species native to the project vicinity. This BMP does not apply to any non-native, invasive vegetation control that may occur as part of the tactical infrastructure maintenance and repair Program.
11. Vegetation targeted for retention will be flagged for avoidance to reduce the likelihood of being treated.
12. Periodic inspections of tactical infrastructure by the CBP SME will be conducted to evaluate and document conditions, including erosion, and to ensure that prescriptions are followed and performed in the appropriate community types. As necessary, maintenance or repair will be scheduled to minimize erosion and correct other adverse conditions.

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

Wildlife

1. If hollow bollards are necessary, cover hollow bollards (i.e., those that will be filled with a reinforcing material such as concrete) to prevent wildlife from entrapment. Deploy covers (and ensure they remain fully functioning) when the posts or hollow bollards arrive on the site and are unloaded, until they are filled with reinforcing material.
2. Ensure temporary light poles and other pole-like structures used for maintenance and repair activities have anti-perch devices to discourage roosting by birds.
3. Clearing of riparian vegetation will not occur within 100 feet of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.
4. Minimize animal collisions during maintenance and repair activities by not exceeding speed limits of 35 miles per hour (mph) on major unpaved roads (i.e., graded with ditches on both sides) and 25 mph on all other unpaved roads. During periods of decreased visibility (e.g., night, poor weather, curves), do not exceed speeds of 25 mph.
5. Do not permit pets owned or under the care of the contractor or sector personnel inside the project boundaries, adjacent native habitats, or other associated work areas.
6. To prevent entrapment of wildlife species, ensure excavated, steep-walled holes or trenches are either completely covered by plywood or metal caps at the close of each work day, or include one or more escape ramps (at no greater than 1,000-foot intervals and sloped less than 45 degrees) constructed of earth fill or wooden planks.
7. Each morning before the start of maintenance or repair activities and before excavated, steep-walled holes or trenches are filled, ensure they are thoroughly inspected for trapped animals. Ensure that any animals discovered are allowed to escape voluntarily (by escape ramps or temporary structures), without harassment, before maintenance or repair activities resume; or are removed from the trench or hole by a qualified person and allowed to escape unimpeded.

Threatened and Endangered Species and Other Protected Species

General BMPs

1. Coordinate with COTR or environmental SME to determine which threatened and endangered species could occur in the vicinity of maintenance and repair activities. In areas where there are no threatened and endangered or other species concerns, the personnel performing the maintenance or repair activity are responsible for monitoring the implementation of general maintenance and repair BMPs to avoid impacts on the environment.
2. To protect individual federally listed species within the project area, suspend work in the immediate vicinity of the individual until it moves out of harm's way on its own, or enlist a qualified specialist (i.e., individuals or agency personnel with a permit to handle the

species) to relocate the animal to a nearby safe location in accordance with accepted species-handling protocols.

3. Vegetation control outside the immediate footprint of tactical infrastructure within suitable habitat and within the range or designated critical habitat of threatened and endangered species. If a threatened or endangered species, primary constituent element (PCE), or other indicators of suitable habitat occur within the project area, then further consultation with USFWS will be required
4. Develop and implement a training program to inform maintenance or repair personnel of the federally listed species that occur within the Program area, penalties for violation of Federal or state laws, proper implementation of included BMPs, and reporting methods.
5. Check visible space underneath all vehicles and heavy equipment for federally listed species and other wildlife prior to moving vehicles and equipment at the beginning of each workday and after vehicles have idled for more than 15 minutes.
6. Coordinate with the CBP environmental SME to determine if the maintenance or repair activities occur in a highly sensitive area or an area that poses an unacceptable risk of transmitting diseases and invasive species. If it is determined that maintenance or repair activities occur in such an area, follow the CBP cleaning protocol for all equipment.
7. Equipment staging areas shall be located at previously used staging areas or at least 0.3 miles away from known, occupied sites of listed aquatic species.
8. CBP will not use surface water from aquatic or marsh habitats for maintenance and repair projects, if that site supports aquatic federally listed species or if it contains non-native invasive species or disease vectors based on the best available information provided by USFWS.
9. CBP will not use surface water from untreated sources, including water used for irrigation purposes, for maintenance and repair projects located within one mile of aquatic habitat for federally-listed aquatic species. Groundwater or surface water from a treated municipal source will be used when within 1 mile of such habitats.

Migratory Bird BMPs

1. Initial mechanical and chemical vegetation clearing and subsequent mechanical vegetation control should be timed to avoid the migration, breeding, and nesting timeframe of migratory birds (March 15 through September 15). Herbicide retreatments could occur throughout the year. When initial mechanical and chemical vegetation control must be implemented during March 15 through September 15, a survey for nesting migratory birds will be conducted immediately prior to the start of activities. If an active nest is found, a buffer zone (91 meters [300 feet]) will be established around the nest and no activities will occur within that zone until nestlings have fledged and abandoned the nesting area.
2. A survey for migratory birds will also be conducted prior to all other maintenance and repair activities to be implemented during the nesting period in areas where migratory birds might be nesting.

3. If maintenance or repair is scheduled during the migratory bird-nesting season, take steps to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and structures, and use of various excluders (e.g., noise). Birds can be harassed to prevent them from nesting on the site. Once a nest is established, they cannot be harassed until all young have fledged and left the nest site. If nesting birds are found during the supplemental survey, defer intrusive maintenance and repair activities until the birds have left the nest. Confirmation that all young have fledged should be made by qualified personnel.

Species Specific BMPs

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

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

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

Common Name	Habitat	Blooming Season
Ashy dogweed	Open areas on fine sandy-loam soils on level or rolling grasslands.	March-May
Bunched cory cactus	Bouquillas and Santa Elena limestone formation within Chihuahuan desert scrubland.	April-August
Chisos Mountain hedgehog cactus	Alluvial flats at elevations of 650-750 meters (1,950-2,250 feet) in Chihuahuan desert vegetation.	March-July
Hinckley's oak	Dry limestone slopes at elevations between 1,066 and 1,370 meters (3,500 and 4,500 feet) in Chihuahuan desert vegetation.	March-April
Johnston’s frankenia	Open or sparsely vegetated rocky gypseous hillsides and saline flats.	year-round
Lloyd’s Mariposa cactus	Very open area with few shrubs in the Chihuahuan desert scrubland at elevation between 750 and 1,050 meters (2,500 and 3,500 feet).	July-August
Tobusch fishhook cactus	Eastern Edwards Plateau of Texas on high stream banks.	April-September
Sneed pincushion cactus	Cracks on vertical limestone cliffs and ledges within semi-desert grasslands at elevations of 1,200 to 2,350 meters (3,900 to 7,700 feet).	March-May
South Texas ambrosia	Subtropical woodland communities within coastal prairies and savannas with well drained, heavy soils at low elevations from 7 to 20 meters (23 to 66 feet).	Year-round
Star cactus	Sparse open thorn shrub and grasslands with gravelly clay and loam soils.	Late summer-early fall
Terlingua Creek cat’s-eye	Open or sparsely vegetated areas with impure silty limestone soils (Fizzle Flat lentil) at elevation between 955 and 1,045 meters (3,150 and 3,450 feet).	March-May

Common Name	Habitat	Blooming Season
Texas ayenia	Open ground, on the edges of thickets, or within thickets, and on dry, alluvial clay soils.	Year-round
Texas snowbells	Edwards Plateau Vegetation Area. Lightly wooded areas with vertical limestone and dolomite cliffs.	March-May
Walker's manioc	Endemic to the Tamaulipan biotic province. Grows among low shrubs, native grasses, and herbaceous plants, either in full sunlight or in the partial shade of shrubs.	April-September
Zapata bladderpod	Graveled to sandy-loam soils on upland terraces that are above the Rio Grande floodplain.	February-April

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

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

Table E-2. Threatened and Endangered Fish Species Habitat

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

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

1. Vegetation control in suitable habitat of threatened or endangered bird species will be limited to the minimum necessary to maintain drivable access roads and to maintain the functionality of other tactical infrastructure (see **Table E-3** for a description of suitable habitat and nesting season for each species). This limited vegetation control will be conducted outside of the nesting season. This restriction does not apply to areas where protocol surveys have been conducted and it has been determined that the area is not occupied and does not contain PCEs.
2. For all other maintenance and repair activities to be conducted within suitable habitat of a threatened or endangered bird species during the nesting season, the following avoidance measures will apply. A qualified biologist will conduct a survey for threatened and endangered birds prior to initiating maintenance and repair activities. If a threatened or endangered bird is present, a qualified biologist will survey for nests approximately once per week within 152 meters (500 feet) of the maintenance or repair area for the duration of the activity. If an active nest is found, no maintenance or repair will be conducted within 152 meters (500 feet) of the nest until the young have fledged.

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

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

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

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

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

Gulf Coast jaguarundi (Herpailurus yagouaroundi cacomitli) and ocelot (Leopardus pardalis)

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

2. Minimize animal collisions during maintenance and repair activities by not exceeding speed limits of 35 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.

3. Should an ocelot or jaguarundi be spotted on the project site, the Corpus Christi Office of the Coastal Ecological Services Field Office, (361) 994-9005, or the South Texas Refuge Complex (STRC) Dispatch at Santa Ana NWR, (956) 784-7520, will be called immediately. If CBP, contractors, or biological monitors locate a dead, injured, or sick ocelot or jaguarondi, initial notification must be made to the USFWS Law Enforcement Office in McAllen, TX, (956) 686-8591, STRC Dispatch, (956) 784-7520 or Corpus Christi (361) 994-9005. To the extent practicable, the finder has the responsibility to ensure evidence intrinsic to the specimen is not unnecessarily disturbed.

Water Resources

1. The environmental SME must be consulted to validate the need for site-specific storm water pollution prevention plans (SWPPPs), spill protection plans, and regulatory approvals. Site-specific SWPPPs and spill protection plans will be prepared and regulatory approval sought, if necessary, in cases of highly sensitive work sites and large scopes of work that pose a significant risk. Where a site-specific SWPPP is not necessary, the personnel performing the maintenance will comply with a generic SWPPP and spill protection plan that covers most routine maintenance and repair activities. Prior to arrival on the work site, key personnel will understand correct implementation of these BMPs and their responsibility to address deficiencies.
2. The environmental SME will provide locations that have the potential for wetlands or other waters of the United States. If no current existing U.S. Army Corps of Engineers (USACE) jurisdictional determination is available, a delineation will be conducted and jurisdictional determination will be obtained from the USACE. Prior to conducting any activities that have the potential to affect wetlands and other waters of the United States, all Federal and state Clean Water Act (CWA) Section 404 individual or applicable nationwide permits and 401 and other applicable permits will be obtained.
3. Prepare and implement an SWPPP as required by regulation prior to applicable maintenance and repair activities (i.e., those with greater than 1 acre of exposed dirt or as required by property manager). Implement BMPs described in the SWPPP to reduce

erosion. Consider areas with highly erodible soils when planning the maintenance and repair activities and incorporate measures such as waddles, aggregate materials, and wetting compounds in the erosion-control BMPs.

4. Coordinate with the environmental SME to determine which maintenance activities occur within the 100-year floodplain. Maintenance activities within the 100-year floodplain will be conducted in a manner consistent with Executive Order 11988 and other applicable regulations.
5. All maintenance contractors and personnel will review the CBP-approved spill protection plan and implement it during maintenance and repair activities.
6. Coordinate with the environmental SME to ensure that CWA permits are in place for any changes to existing boat ramps.
7. Contact the environmental SME to coordinate with waterway permitting agencies when performing work below the ordinary high water mark.
8. Wastewater from pressure washing must be collected. A ground pit or sump can be used to collect the wastewater. Wastewater from pressure washing must not be discharged into any surface water.
9. If soaps or detergents are used, the wastewater and solids must be pumped/cleaned out and disposed of in an approved facility. If no soaps or detergents are used, the wastewater must first be filtered or screened to remove solids before being allowed to flow off site. Detergents and cleaning solutions must not be sprayed over or discharged into surface waters.
10. If the surrounding area has dense, herbaceous cover (i.e., primarily grasses) and there are no listed plant species or habitat for such, the wastewater (with or without detergent) could be discharged directly to the grassy area without collection or filtering as long as it is well dispersed and all the wastewater can percolate into the grass and soil. If wastewater runs off the grassy area, it must be filtered.
11. Prevent runoff from entering drainages or storm drains by placing fabric filters, sand bag enclosures, or other capture devices around the work area. Empty or clean out the capture device at the end of each day and properly dispose of the wastes.
12. Avoid contaminating natural aquatic and wetland systems with runoff by limiting all equipment maintenance, staging, laydown, and dispensing hazardous liquids (e.g., fuel and oil) to designated upland areas.
13. Avoid contamination of groundwater and surface waters by collecting concrete wash water in open containers, and frequently disposing of it on site by application as a binder to riprap areas. Avoid contamination of groundwater and surface waters by storing any water that has been contaminated (e.g., with maintenance materials, oils, equipment residue) in closed containers on site until removed for disposal. In upland areas, storage tanks must be on-ground containers.
14. Avoid contamination of groundwater and surface waters by ensuring that water tankers that convey untreated surface water do not discard unused water where it has the potential to enter any aquatic or wetland habitat.

15. Cease work during heavy rains and do not resume work until conditions are suitable for the movement of equipment and materials.
16. Uncured concrete should not be allowed to enter the water.
17. Work should be done from the top of the bank or a floating barge, when practicable. Heavy equipment use within the active flowing channel should be avoided.
18. Floating dock components containing foam must be encapsulated to prevent the introduction of foam particles into the water.
19. For all in-water work in streams, sediment barriers will be used to avoid downstream effects of turbidity and sedimentation.
20. Do not pressure wash more than the area to be painted or treated (e.g., for graffiti removal) each day.
21. If the purpose of cleaning is for graffiti removal, spot clean, steam clean, or scrape dirty areas rather than pressure washing entire sections of fence or levee wall.
22. Operate pressure-washing equipment according to manufacturer's recommendations.
23. Except for emergency repairs required to protect human life, limit work within drainages to dry periods to reduce effects on downstream water quality.
24. Riprap should be placed on a layer of geotextile fabric to prevent underlying sediment from being washed out through the openings of the riprap.
25. Riprap should be keyed into the wash/streambed to ensure its stability and effectiveness.

Noise

1. All Occupational Safety and Health Administration requirements will be followed with respect to maintenance and repair noise impacts. Ensure all motorized equipment possess properly working mufflers and are kept properly tuned to reduce backfires. Ensure all motorized generators will be in baffle boxes (i.e., a sound-resistant box that is placed over or around a generator), have an attached muffler, or use other noise-abatement methods in accordance with industry standards. For activities involving heavy equipment that could generate noise, seasonal restrictions might be required to avoid impacts on threatened or endangered species in areas where these species or their potential habitat occur. See species-specific BMPs.

Cultural Resources

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

understand the proper BMPs to implement should cultural resources be encountered in the project area.

Roadways and Traffic

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

Hazardous Materials and Waste Management

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

12. Minimize site disturbance and avoid attracting predators by promptly removing waste materials, wrappers, and debris from the site. Any waste that must remain on site more than 12 hours should be properly stored in closed containers until disposal.

Socioeconomic Resources, Environmental Justice, and Protection of Children

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

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APPENDIX F

Soils Mapped within the Tactical Infrastructure Maintenance and Repair Action Area

APPENDIX F

Soils within the Tactical Infrastructure Maintenance and Repair Action Area

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

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

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

APPENDIX G

Air Quality Emissions Calculations

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

Air Quality Emissions from the Proposed Action

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

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

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

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

Combustion Emissions

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

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

Emission Factors Used for Construction Equipment

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

Grading

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

Paving

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

Demolition

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

Building Construction

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

Note: Footnotes for tables are on following page

Architectural Coatings

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

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

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

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

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

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

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

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

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

Summary of Input Parameters

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

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

Total Project Emissions by Activity (lbs)

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

Results: Total Project Annual Emission Rates

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

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

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

Duration of Construction Project	-	months
Area	-	acres

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

Duration of Construction Project	12	months
Area	911.5	acres

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

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

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

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

New Road Construction Emission Factor

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

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

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

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

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

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

References:

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

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

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

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

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

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

Assumptions.

Terrain is mostly flat.

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

200 hp bulldozers are used for site clearing.

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

Vibratory drum rollers are used for compacting.

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

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

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

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

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

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

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

Qty Equipment: 274.0

Grading days/yr: 5.6

Construction Commuter Emissions

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

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

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

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

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

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0 00005478	1.09568235

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

Construction Commuter Emissions

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

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