**SEPTEMBER 2002**

**REVIEW DRAFT**

# ENVIRONMENTAL IMPACT STATEMENT
# U.S. BORDER PATROL
# TUCSON AND YUMA SECTORS
# ARIZONA


**IMMIGRATION AND NATURALIZATION SERVICE**
**WASHINGTON, D.C.**

BW1 FOIA CBP 009584

# REVIEW DRAFT

# ENVIRONMENTAL IMPACT STATEMENT

# U.S. BORDER PATROL

# TUCSON AND YUMA SECTORS

## September 2002

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Lead Agency: Immigration and Naturalization Service
425 I Street NW
Washington, D.C. 20536

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## ABSTRACT

PROPOSED ACTION: This USBP proposes to expand its current operations/activities and complete ongoing infrastructure projects. In addition to those projects currently being constructed, this alternative would include (b) (5)

(b) (5)

PURPOSE AND NEED: The improvements that have been completed or are being proposed by INS and USBP are in an effort to enhance the USBP's capability to gain, maintain and extend control of the U.S.-Mexico border.

ALTERNATIVES ADDRESSED:

(b) (5)

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTIONS:

(b) (5)

CONCLUSIONS: Potential impacts to threatened or endangered species, cultural resources sites, wetlands and other sensitive resources would be avoided to the extent practicable. Where impacts are unavoidable, mitigation measures to reduce or compensate for losses would be implemented and coordinated through the appropriate Federal and state resource agencies. No significant impacts to land use, soils, air quality, hazardous waste sites, or socioeconomic resources are expected. Implementation of best management practices and stormwater pollution prevention plans would be required, as appropriate, for construction activities to reduce any potential effects to soils, soil erosion, and water quality. Based upon the results of the PEIS and environmental design measures to be incorporated as part of the proposed action, it has been concluded that the proposed action will not have a significant impact on the environment.


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# EXECUTIVE SUMMARY

## PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
## U.S. BORDER PATROL ACTIVITIES
## WITHIN THE BORDER AREAS OF THE
## TUCSON AND YUMA SECTORS
## ARIZONA

(X) Draft ( ) Final

U.S. Immigration and Naturalization Service
Headquarters, Facilities and Engineering Division
425 I Street, NW (b) (6)
Washington, DC 20536

Type of Action: ( X) Administrative
( ) Legislative

**PROPOSED ACTION:**
This Programmatic Environmental Impact Statement (PEIS) analyzes the potential for significant adverse or beneficial environmental impacts of the U.S. Border Patrol (USBP) operations and proposed infrastructure within the Arizona border regions of the Tucson and Yuma Sectors, Arizona. The PEIS was prepared in accordance with provisions of the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) Regulations for Implementing NEPA, and Immigration and Naturalization Service (INS) Regulations for Implementing NEPA (28 CFR part 61). The proposed action is located along the international border between the United States and Mexico in Cochise, Santa Cruz, Pima and Yuma counties, Arizona.

The scope of this PEIS covers the daily operations (*i.e*., ground and aerial patrols, maintenance of drag roads, lighting, remote video surveillance (RVS) systems, and checkpoint operations) within the Tucson and Yuma (Arizona portion) Sectors. The PEIS also addresses the potential effects of known or reasonably foreseeable infrastructure construction projects (*i.e*., fences, bridges, stations, and lighting). The PEIS describes the purpose and need, alternatives considered, existing conditions of the human and natural environment, the anticipated impacts that would result from implementation of the alternative, any design measures needed to reduce potential impacts, and cumulative impacts for the study area.

**PURPOSE AND NEED FOR THE PROPOSED ACTION:**

The overall need of the operations and infrastructure proposed by the USBP in this PEIS is to satisfy the USBP mission mandated by the U.S. Congress to gain, maintain, and extend control of the border to prevent the unlawful entry of persons into the United States. The purpose of the programs and improvements of the proposed action are to facilitate USBP law enforcement along the identified section of the U.S.-Mexico border, as mandated by Federal laws, by:

(1) Providing a safe, effective, and efficient working environment in which to accomplish the USBP mission.
(2) Enhancing the effectiveness of the apprehension activities through the combined use of manpower, technology and infrastructure to increase deterrence.
(3) Protecting sensitive resources, public and private lands, and U.S. citizens from illegal entrants and illegal activities.

In addition to the purpose and need stated above, the proposed border infrastructure system has been planned in compliance with Title I, Subtitle A, Section 102, of the *Illegal Immigration Reform and Immigrant Responsibility Act* (IIRIRA) of 1996. IIRIRA states that the Attorney General, in consultation with the Commissioner of Immigration and Naturalization, shall take such actions as may be necessary to install additional physical barriers, roads and other infrastructure deemed necessary in the vicinity of the U.S. border to deter illegal crossings in areas of high entry into the U.S.

**ALTERNATIVES:**

Four separate alternatives were considered in the PEIS that could satisfy all or portions of the purpose and need. The proposed action alternative (Alternative 1) analyzes potential impacts from the expansion of operations/activities and the completion of all on-going and proposed infrastructure construction projects. This is the preferred alternative. Alternative 2 emphasizes expanding the use of technology-based operations and infrastructure such as RVS, lighting, skywatch towers, and sensors over the traditional operations (e.g., patrols, road dragging, checkpoints). The only infrastructure that would be constructed under this alternative would be the technology-based structures. That is, no additional roads, fences, etc., would be constructed.

Alternative 3 considers expanding operations/activities with no new construction of traditional infrastructure (i.e. fences, roads, etc.). Alternative 4 considers construction of additional infrastructure while maintaining the current level of operations/activities. NEPA also requires that the "No Action" alternative be analyzed in an EIS. The "No Action" alternative, as presented in this PEIS, would not allow for the expansion of USBP operations and would eliminate all proposed infrastructure construction. Each alternative carried forward for analysis is briefly described in the following paragraphs.

<u>No Action Alternative</u>
The No Action Alternative would consist of continuing the operations at the same level as they are currently. On-going infrastructure construction would be completed, but no new infrastructure construction would be initiated. Even though this alternative would reduce unavoidable impacts and irretrievable losses of resources, it would greatly hinder the USBP's mission to gain and maintain control of the border.

<u>Alternative 1. Expand Operations and Infrastructure (Proposed Action)</u>
This alternative would allow the USBP to expand its current operations/activities and complete ongoing infrastructure projects. In addition to those projects currently being constructed, this alternative would include construction of several proposed infrastructure projects. Infrastructure projects that are currently planned include new or expanded station facilities, roads, fences, and vehicle barriers. This alternative would

also include construction or installation of technology-based structures such as RVS systems, stadium lighting, and ground sensors.

Alternative 2. Expansion of Technology Based Infrastructure/Operations Only
This alternative promotes the use of technology-based operations and infrastructure over traditional barrier type operations. This alternative would include expanding the use of RVS sites, remote-sensing systems, portable generator and stadium style lights, skywatch towers, sensors, and repeaters. Traditional operations would remain at current levels and no new traditional infrastructure (e.g., roads, fences, vehicle barriers, etc.) would be constructed.

Alternative 3. Expansion of Traditional Operations without New Infrastructure
Alternative 3 includes the expansion of current USBP operations (e.g., drag roads, checkpoints and aerial reconnaissance), but would not allow for construction of proposed infrastructure projects. Construction projects that have already been evaluated through the NEPA process and/or currently under construction would be completed.

Alternative 4.
This alternative would allow for the completion of current infrastructure projects and the construction of proposed infrastructure projects but would not allow for the expansion of USBP operations.

**ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION:**
This PEIS presents information on the existing conditions of the project area and analyzes potential impacts, in a programmatic sense, to the environment that could occur as a result of the proposed operational and construction activities. Resources, which are not expected to be affected by the Proposed Action, are not fully analyzed in this PEIS. Background information on the existing environmental resources documented in this report was utilized, where appropriate, in developing this PEIS and to provide the reader with an understanding of the region's environment.

Implementation of the Proposed Action (Alternative 1) would impact a maximum of about 6,124 acres, primarily due to the construction activities. This amount is the worst-case estimate. A large portion of the 6,124 acres occurs along roads and fences and other areas that have already been disturbed. (b) (7)(E) (b) (7)(E) Additional impacts to the human and natural environment could occur due to operational activities, such as disturbances to park visitors, impacts to vegetation and cultural resources sites from off-road activities, and additional lighting.

Illumination from stadium and portable lighting systems are expected to affect an additional 1,289 acres. This acreage would not be removed from biological productivity; rather this is the estimated acreage that would be (b) (7)(E) (b) (7)(E) (b) (7)(E) (b) (7)(E) (b) (7)(E)

Potential impacts to threatened or endangered species, cultural resources sites, wetlands and other sensitive resources would be avoided to the extent practicable. Where impacts are unavoidable, mitigation measures to reduce or compensate for

losses would be implemented and coordinated through the appropriate Federal and state resource agencies.

No significant impacts to land use, soils, air quality, hazardous waste sites, or socioeconomic resources are expected. Implementation of best management practices and stormwater pollution prevention plans would be required, as appropriate, for construction activities to reduce any potential effects to soils, soil erosion, and water quality. The Proposed Action would not impact prime farmlands.


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# *SECTION 1.0*
# *INTRODUCTION*

## 1.0 INTRODUCTION

The Immigration and Naturalization Service (INS) has the responsibility to regulate and control immigration into the United States (U.S.). The INS has four major areas of responsibility: (1) facilitate entry of persons legally admissible to the U.S. (2) grant benefits under the Immigration and Nationality Act (INA) of 1952 including assistance to persons seeking permanent resident status or naturalization, (3) prevent unlawful entry, employment or receipt of benefits, and (4) apprehend or remove aliens who enter or remain illegally in the U.S. In regards to the latter responsibility, the U.S. Congress in 1924 created the U.S. Border Patrol (USBP) to be the law enforcement arm of the INS. The USBP has since become the leading Federal enforcement agency in the apprehensions of undocumented aliens (UDAs) and smugglers.

The Tucson and Yuma Sectors of the USBP are responsible for controlling approximately 400 miles of the U.S.-Mexico border, most of which are remote and rugged lands. Figure 1-1 depicts the border counties under the Tucson and Yuma Sector's jurisdiction. Figure 1-2 identifies the approximate boundaries of the different USBP station Areas of Operations (AO) within the Tucson and Yuma Sectors. Although the Yuma sectors AO extends into California, this Programmatic Environmental Impact Statement (PEIS) only addresses those effects resulting from USBP Yuma Sector activities in Arizona. Monitoring such a vast area creates a somewhat daunting task. UDAs and/or smugglers use many areas, both urban and rural, of the border to gain illegal access to the U.S. Numerous tactics are employed to detect illegal entrants including remote sensing techniques as well as visual observations. Remote sensing techniques include (b) (7)(E) and (b) (7)(E) Visual observations can be obtained from aerial reconnaissance using fixed-wing aircraft or helicopters, or on the ground by USBP agents on foot or using vehicles, bicycles, motorbikes, all-terrain vehicles (ATVs), or horses.

This PEIS addresses the actual and potential effects, beneficial or adverse, of INS and USBP operations and infrastructure construction projects (ongoing and proposed) within the Tucson and Yuma Sectors' jurisdiction within Arizona. The expansion of USBP

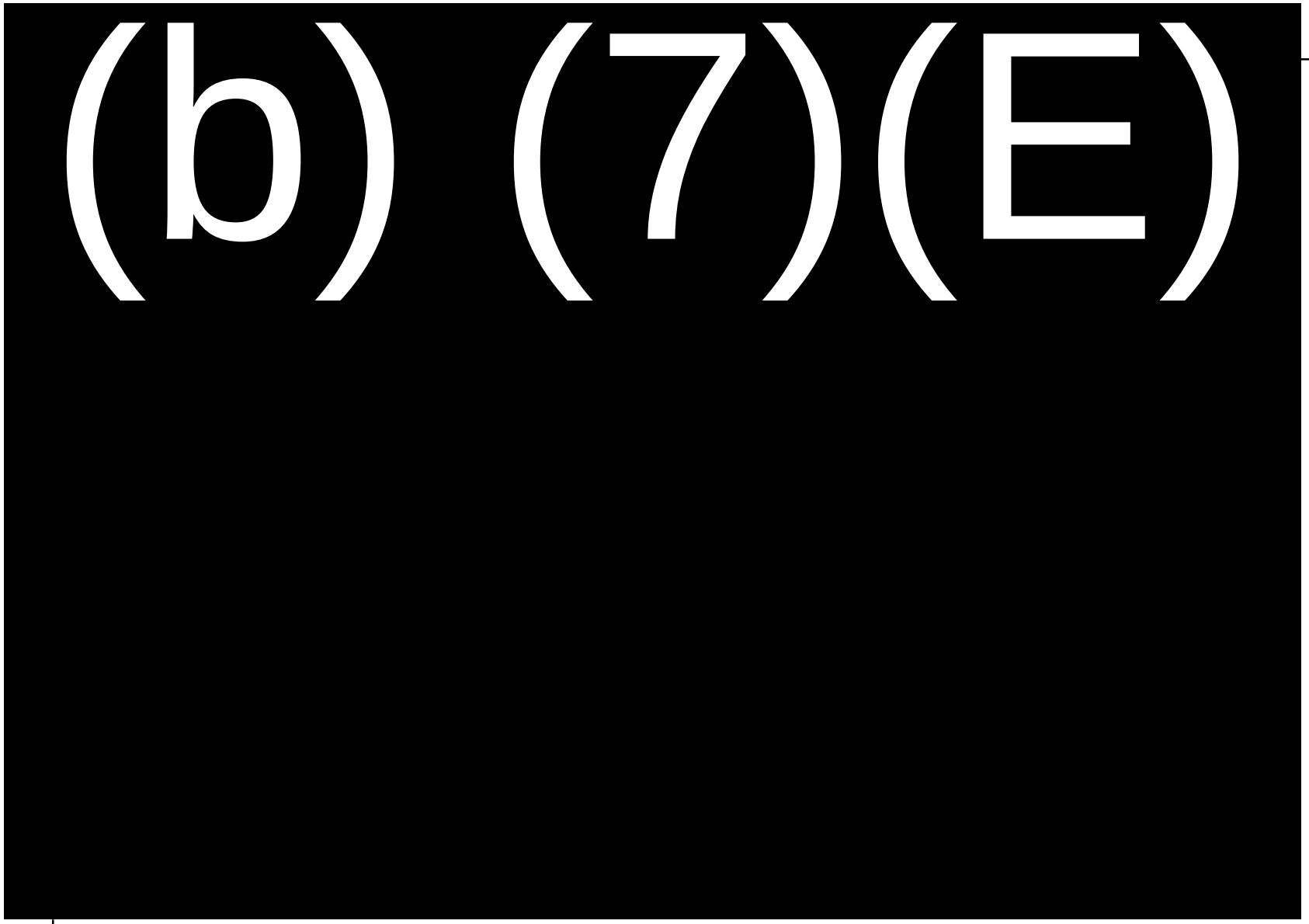


Figure 1-1: Counties Within the Project Area

Scale: not to scale

Date: September 2002

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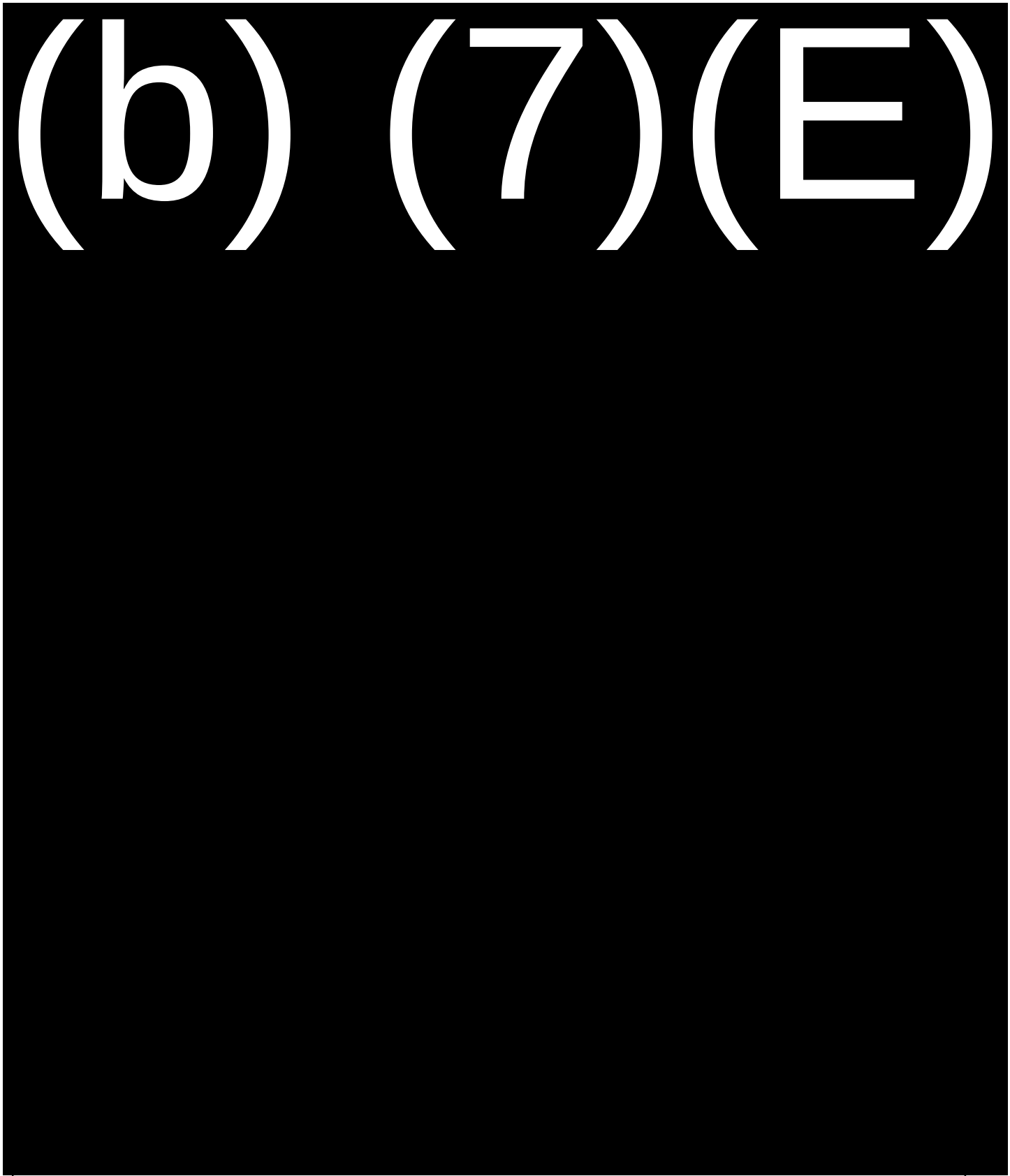


Figure 1-2: U.S. Border Patrol Station
Boundaries within the Tucson and Yuma Sectors

Scale: not to scale

Date: September 2002

GULF SOUTH RESEARCH CORPORATION

operations and infrastructure construction are being proposed by INS in an effort to enhance the USBP's capability to gain, maintain and extend control of the U.S.-Mexico border. The cumulative effects of these actions, in conjunction with other ongoing and proposed projects, will also be addressed in this document. This PEIS was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality (CEQ) Regulations for the Implementation of NEPA as well as the INS' Procedures for Implementing NEPA *(28 CFR Part 61, Appendix C)*.

The PEIS study area is defined by the limits of ongoing operations/activities and infrastructure location. While the Tucson and Yuma Sectors extend well north of the border area, (b) (7)(E) (b) (7)(E) To discuss impacts in detail, the study area was limited to the immediate border counties. In addition, this analysis is limited to that portion of the Yuma Sector within Arizona. This PEIS also focuses primarily on the operations of the USBP although some discussion regarding infrastructure projects are also presented. The INS and USBP are currently preparing Environmental Assessments (EA) that will address the ongoing and proposed infrastructure projects at the station level. These EAs will provide more site-specific information that cannot be provided in a PEIS of this scope.

## 1.1 U.S. Border Patrol Mission and Authority

The mission of the USBP is to protect the U.S. boundaries through the detection and prevention of smuggling and illegal entry of UDAs into the U.S. The mission includes the enforcement of the INA and the performance of a uniformed, Federal law enforcement agency with authority delegated by the U.S. Attorney General.

The primary sources of authority granted to officers of the INS are the INA, found in Title 8 of the United States Code (8 U.S.C.), and other statutes relating to the immigration and naturalization of aliens. The secondary sources of authority are administrative regulations implementing those statutes, primarily those found in Title 8 of the Code of Federal Regulations (8 C.F.R. Section 287), judicial decisions, and administrative decisions of the Board of Immigration Appeals.

Subject to constitutional limitations, INS officers may exercise the authority granted to them in the INA. The statutory provisions related to enforcement authority are found in Sections 287(a), 287(b), 287(c), and 287(e) [8 U.S.C. **§** 1357(a,b,c,e)]; Section 235(a) (8 U.S.C. **§** 1225); Sections 274(b) and 274(c) [8 U.S.C. **§** 1324(b,c)]; Section 274A (8 U.S.C. **§** 1324a); and Section 274C(8 U.S.C. **§** 1324c) of the INA.

Other statutory sources of authority are Title 18 of the United States Code (18 U.S.C.), which has several provisions that specifically relate to enforcement of the immigration and nationality laws; Title 19 [19 U.S.C. 1401 **§** (i)], relating to Customs cross-designation of INS officers; and Title 21(21 U.S.C. **§** 878), relating to Drug Enforcement Agency cross-designation of INS officers.

## 1.2 History and Background

Because of concerns of rising numbers of undocumented migrants, the U.S. Congress passed the Immigration Act of 1891, the nation's first comprehensive immigration law. The Act created the Bureau of Immigration within the Treasury Department and placed the Commissioner of Immigration in the port of New York. The Bureau of Immigration was transferred to the Department of Commerce in 1903. Immigration continued to rise, reaching a peak in 1907 when 1,285,349 immigrants arrived. Subsequent legislation (e.g., Immigration Act of 1924) that required more stringent requirements to enter the U.S., coupled with the events surrounding World War I and the Great Depression, caused immigration rates to decline over the next few decades.

In the years preceding World War II, the numerical quota system continued under amendments to the Immigration Act of 1924. Immigration increased quickly after the war, however, partially because of new legislation that relaxed or waived some quotas to allow immigration of war brides, refugees, and orphans. The Displaced Persons Act of 1948, the Immigration and Nationality Act of 1952, and the Refugee Relief Act of 1953 were among those acts.

Until the 1960s, the majority of immigrants to the U.S. came from Europe, with smaller numbers coming from Asia and other countries in the Western Hemisphere. In the 1960s the national origins principle of determining immigration quotas was discontinued after

40 years of use. During the 1960s and 1970s, various legislation allowed for the immigration of refugees fleeing from political upheavals in specific countries and fleeing due to fear of persecution because of race, religion or political beliefs. It was also during this period that the INA was amended in October 1965, placing the first numerical ceiling on the total number of immigrants into the U.S., but abolished quotas by nationality. The new system provided an annual ceiling of 290,000 (later reduced to 270,000 in 1980 by Congress).

Since 1980, an average of 150,000 immigrants have been naturalized every year. At the same time, however, UDAs have become a significant issue. INS' apprehension rates are currently averaging more than one million UDAs per year throughout the country. Studies have indicated approximately 10 million undocumented aliens are in the U.S. For the past several years, Mexicans have comprised the largest number of legal as well as illegal immigrants to the U.S.

The USBP activities are administered under the Field Operations Division of the INS, which is one of three INS Executive Divisions. As mentioned previously, the USBP's primary function is to detect and prevent the unlawful entry of aliens and smuggling along the nation's land and water borders. With the increase in illegal drug trafficking, the USBP also has assumed the major Federal responsibility for illegal drug interdiction. In fiscal year (FY) 1999, the USBP made over 7,500 drug seizures along the southwestern border, resulting in the removal of over a million pounds of marijuana, about 24,000 pounds of cocaine, and 724 ounces of heroin from the streets of the U.S. The combined value of these drugs was over $1.7 billion.

Until the early 1990's there was limited awareness of southwest border issues and little national attention was given to illegal border activity. As a result, the USBP growth was nominal, funding for enforcement efforts fell short, and the USBP was required to function within severe constraints. Social events in the nineties elevated the nation's awareness concerning illegal immigration and narcotics smuggling and generated substantial interest in policing the southwest border. Increased national concern has led to increases in funding and staffing and has enabled the USBP to develop effective enforcement strategies independent of conventional limitations.


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The mission of the USBP is to detect, deter and apprehend illegal entry across the border. Deterrence is effected through the actual presence (24 hours per day, seven days per week) of the USBP agents on the border, fences and other physical (natural and man-made) barriers, lighting, and the certainty that the illegal entrants will be detected and apprehended. Detection of the illegal traffickers is accomplished through a variety of low-technology and high-technology resources including observing physical signs of illegal entry (vehicle tracks, footprints, refuse, human waste, clothes, etc.), visual observation of the illegal entries, information provided by private landowners or the general public, ground sensors, and remote video surveillance (RVS). The continuation of historic enforcement operations such as dragging operations, aerial reconnaissance, remote sensing technology, lighting, increased patrols and patrol agents, coupled with additional future infrastructure, would greatly facilitate deterrence of illegal crossings and allow the USBP to gain and maintain control of the border.

In partial response to the continued problems of smuggling and UDAs, the U.S. Congress passed the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) of 1996. Title 1, Subtitle A, Section 102 of IIRIRA states that the Attorney General, in consultation with the Commissioner of Immigration and Naturalization, shall take such actions as may be necessary to install additional physical barriers, roads and other infrastructure deemed necessary in the vicinity of the U.S. border to deter illegal crossings in areas of high entry into the U.S.

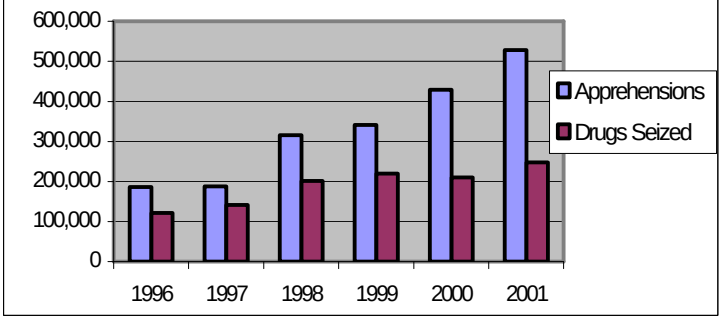
## 1.3 Purpose and Need

The purpose of the programs and improvements discussed in this PEIS is to facilitate USBP law enforcement along the identified section of the U.S.-Mexico border as mandated by Federal laws. The need for these programs is to gain, maintain, and extend control of the U.S. border. Additional information to support this need and purpose is provided in the following paragraphs.

The U.S. experiences a substantial influx of illegal immigrants and drugs each year. Both of these illegal activities cost the American citizens billions of dollars annually due directly to criminal activities, as well as the cost of apprehension, detention and incarceration of criminals; and, indirectly in loss of property, illegal participation in

government programs and increased insurance costs. Some studies have indicated that approximately 10 million illegal aliens reside in the U.S.

**Figure 1-3**
**Apprehension and Drug Seizure Data for Tucson and Yuma Sectors**



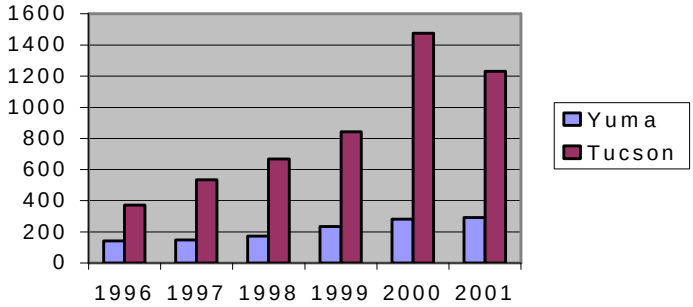

Rising rates of violent crime, serious damage to the Nation's health and economy, and strains on vital relationships with international allies led the U.S. Congress to develop the National Drug Control Strategy. The National Drug Control Strategy included the USBP and mandated a "prevention through deterrence" strategy. The National Drug Control Strategy also formulated a multi-year approach that required the USBP and other local Drug Law Enforcement Agencies to "... gain, maintain, and extend control..." of the border region into the U.S.

USBP stations along the U.S.-Mexico border experienced a 25% increase in the number of drug seizures from FY 1998 to FY 2001, and an overall 30% increase since FY 1995. More importantly, the value and number of drug seizures along the southwestern border represent at least 95% of those made by the USBP throughout the nation. In particular, the USBP Tucson and Yuma Sectors have experienced tremendous increases, partially in response to successful deterrence programs in other sections of the southwest border such as San Diego and El Paso. During the period from FY 1996 to FY 2001, the Tucson and Yuma Sectors experienced a 180% (528,060) increase in the number of UDA apprehensions and a 100% (247,890) increase in the amount of drugs seized (Figure 1-3). In addition, the U.S. is also experiencing epidemic levels of drug use and drug-related crimes as reported by the Office of National Drug Control Policy (1999 and 2000):

- Illegal drugs cost our society approximately $110 billion annually
- 1.5 million Americans were arrested in 1997 for violating drug laws
- 819 persons per 100,000 population were murdered during drug related offenses
- 322,000 Americans are casual heroin users and over 800,000 are heavy users
- 1.5 to 3 million Americans are casual cocaine users
- Prison populations (drug-related crimes) doubled between 1989 and 1996
- Over 10% of Americans used some form of illicit drug in 1998

To combat these rising numbers, the Clinton Administration committed additional resources to law enforcement agencies, including the USBP. As indicated in Figure 1-4, the numbers of agents assigned to the Tucson (1,230) and Yuma (333) sectors has more than tripled since FY 1996. The USBP station facilities were not designed to house the number of agents currently assigned to these sectors.

Figure 1-4
Number of Agents Assigned to the Tucson and Yuma Sectors




The constant flow of UDAs passing through the U.S.-Mexico border area also threatens public lands, archaeological and historic buildings/structures, and endangered species habitat. Vehicles used by smugglers are continuously being abandoned in National Parks and other natural and sensitive areas. Removal of these vehicles is becoming an ever-increasing burden on Federal and State land managers, private landowners, as well as the USBP. UDAs have trampled vegetation and left litter, abandoned vehicles and deposited human excrement in an area that extends from the Bureau of Land Management's (BLM) Guadalupe Canyon in the southeast corner of Arizona to the U.S. Forest Service's (USFS) Coronado National Memorial south of Sierra Vista (Arizona Daily Star 2000). The following description was taken from a letter written by James Bellamy, Superintendent at the Coronado National Monument to Senator Jon Kyl on June 20, 2000.

> *"This activity* [UDA invasion into protected areas] *has significantly impacted park resources. Human foot traffic has created several trails the width of one-lane roads. The large numbers of people have destroyed vegetation, exposed bare ground, eroded deep hillsides, and caused scars that will take years to heal. Smaller trails cover some parts of the park like spider webs. Litter covers the ground in many places, particularly plastic water bottles, food containers, discarded clothing and blankets. Conditions are very unsanitary in many places due to the amount of feces and toilet paper."*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The problem is equally severe at the San Pedro River, which flows north out of Mexico and is considered an important bird migration corridor. Officials at the San Pedro National Riparian Conservation Area estimate that as many as 500 illegal entrants a day are moving along the river, nearly twice the number of people who visited the area legally the year before (Arizona Daily Star 2000). Managers of Federal and state administered lands in the area are also voicing concern: "We consider it to be a very serious environmental problem. We're talking about thousands of people walking from south to north, breaking through brush and making their own trails. That's not a positive." (Radke 2000).

There is also a growing concern for the safety of employees and visitors of public lands. In February 2000, a Coconino County Superior Court judge and several others complained to agency officials after more than 100 illegal entrants ran through their San Pedro River campsite during the night (Arizona Daily Star 2000). That and other complaints have prompted the BLM to advise San Pedro visitors not to camp within the conservation area. At the Coronado National Memorial the greater safety problem is for park employees and their families, where park rangers have been assaulted in the past. BLM employees are so concerned about encountering UDAs during their work that they often have to work in pairs. Additional safety hazards to both visitors and staff are those posed by speeding vehicles transporting illegal entrants, and the potential of wildfires from cigarettes and warming fires. Thus, the purpose and need of the operations and infrastructure proposed by the USBP is to:

(1) Satisfy the USBP mission mandated by the U.S. Congress to gain and maintain control of the border to prevent the unlawful entry of persons into the U.S.

(2) Provide a safe, effective, and efficient environment in which to accomplish the USBP mission.

(3) Enhance the effectiveness of the apprehension activities through the combined use of manpower, technology and infrastructure to increase deterrence.

(4) Protect sensitive resources, public and private lands, and U.S. citizens from illegal entrants and illegal activities.

Following the terrorist attacks on U.S. soil on September 11, 2001, the U.S. Attorney General emphasized the need to prevent terrorism. The INS and USBP are key elements in responding to this new threat to our nation and its citizens. The ability of the USBP to insure the integrity and security of our national borders would be an integral part of this effort to deter and prevent terrorism. The deployment of operation

infrastructure, and technology strategies along the U.S.-Mexico border are key elements in the USBP's efforts to deter and prevent terrorist from entering the U.S.

## 1.4 Operations/Activities

For the purposes of this PEIS, USBP operations have been placed in activity groups to evaluate the potential impacts of various methods of apprehending illegal entrants. The activity groups are patrol roads, drag roads, off-road operations, sensors, air operations, checkpoints, observation points, and portable lighting. The following paragraphs describe each of these activity groups.

Several measures have to be employed by the USBP in order to observe illegal activity or signs of illegal activity including road patrols, low-level flights, drag roads, establishment of checkpoints and observation points. Once illegal activity has been detected, the USBP agents must attempt to apprehend and detain illegal entrants. Ground vehicles, horses, ATVs, and aircraft may be used, individually or collectively to make the apprehensions. When possible, the USBP agents remain on existing roads while attempting to apprehend illegal entrants; however, since illegal entrants attempt to avoid detection by avoiding existing roads, off-road activity by the USBP is sometimes required.

### 1.4.1 Patrol Roads

Patrol roads are improved and semi-improved roads within a station's AO. These roads are generally located within or near known illegal alien travel corridors and are patrolled on a regular basis. Many of these are roads traveled by the general public, and USBP traffic constitutes a small percentage of total traffic volume.

Photo 1-1
Patrol Road

### 1.4.2 Drag Roads

Drag roads are existing unimproved roads that are highly traveled or regularly crossed by illegal aliens. The surface of these roads is prepared using a method known as dragging. Dragging is accomplished by the use of a 4-wheel drive vehicle towing several tires bolted together on sections of the road at speeds between (b) (7)(E) miles per hour. This method erases old tracks and smoothes the road surface so any new tracks crossing the road can be easily located. These roads are located within known illegal alien travel corridors and are instrumental in detecting evidence of vehicle and/or pedestrian crossings. Many of these roads are open to the public and used as general transportation routes. The frequency at which these roads are prepared varies for each station but can occur up to (b) (7)(E)

Photo 1-2
Drag Road

### 1.4.3 Off-road Operations

Off-road operations are defined for the purposes of this PEIS as any ground activity conducted by the USBP outside of established roads or trails. Off-road operations are conducted at intervals that range from (b) (7)(E) depending on the station. Off-road operations may include foot patrol, horse patrol, 4-wheel drive vehicles, ATV, and motorbikes. Ground units remain on established roads to the greatest extent possible; however, they may travel off-road to follow the tracks of illegal entrants. Off-road pursuit by vehicle only occurs when it has been determined that the persons are likely to be in a specific area or when they have been located.

### 1.4.4 Sensors

Sensors are small transmitters that are placed on or near roads and trails within illegal alien travel corridors. (b) (7)(E)
(b) (7)(E) The sensors are

(b) (7)(E) When sensors are activated by traffic, a signal is broadcast to the nearest USBP station indicating where the sensor is located and when it was activated. Sensors have historically been used by the USBP to improve their apprehension efficiency by increasing the area agents can protect from illegal entry. The use of sensors also reduces the number of agents needed to patrol a station's AO. Furthermore, (b) (7)(E) (b) (7)(E) entering the U.S. (b) (7)(E) (b) (7)(E) and replacing the sensor in the ground. Typically, this process take (b) (7)(E) In some instances, sensors will malfunction, requiring additional maintenance. Sensors are generally (b) (7)(E)

### 1.4.5 Air Operations


Photo 1-3
OH-6 Alpha Helicopter

Currently the Tucson and Yuma Sectors maintain 12 OH-6A helicopters, two HU-1H "Huey" helicopter, one A-Star helicopter, and three fixed-wing aircraft (two Cessnas and one Supercub Piper) that can provide assistance to any station within the two sectors. The Yuma Sector anticipates receiving one A-Star helicopter in FY 02 or early 03. Currently, the Tucson Sector's air operations are located at the Tucson International Airport and Fort Huachuca's Libby Airfield and the Yuma Sector's air operations are located at the U.S. Marine Corps Air Station (MCAS) Yuma. However, one airplane and one helicopter are stationed at the Nogales International Airport. The Sierra Vista/ Fort Huachuca area is also being considered as a possible location for Tucson Sector air operations in the future. Potential impacts resulting from the relocation would be analyzed in a project specific EA. Each station within the two sectors, except Willcox and Casa Grande, maintains refueling tanks and a helipad.

The USBP air operations are currently used in deterrence and search and rescue (SAR) missions. Helicopters fly along the border at elevations high enough to be seen, and hopefully deter illegal entrants. (b) (7)(E) Sector; however, when assistance is requested, helicopters fly anywhere in the Tucson Sector. (b) (7)(E) Each

(b) (7)(E)

(b) (7)(E)

. As a conservation measure of the original BO, the Yuma Sector receives weekly Sonoran pronghorn telemetry reports from the Arizona Game and Fish Department (AGFD) to avoid Sonoran pronghorn concentrations and fawning areas as much as possible. Helicopters in the Yuma Sector must remain (b) (7)(E) (b) (7)(E) The three fixed-wing aircraft fly (b) (7)(E)

During the height of summer, extreme temperatures and humidity levels can occur in the desert, making the area extremely treacherous. Illegal entrants routinely fall victims to this harsh environment while attempting to enter the U.S. During the summers of 2000 and 2001 the Tucson Sector conducted Operation Skywatch. The purpose of Operation Skywatch is to conduct aerial reconnaissance along the U.S.–Mexico border to detect or rescue UDAs during the extremely hot summer months (May/June to September). Operation Skywatch commenced in early June 2002 and will continue for approximately 125 days. The USBP Tucson Sector maintains and operates two additional fixed-winged single engine aircraft and up to 20 helicopters (including the nine helicopters normally maintained by the Tucson Sector), reassigned on a temporary basis from the Yuma Sector and other USBP sectors, for aerial reconnaissance missions along the U.S.-Mexico border in Arizona. The aircraft support personnel for the action include (b) (7)(E) (b) (7)(E) (INS 2002c). The USBP has proposed to conduct Operation Skywatch annually for the next five years. EAs were prepared for the 2000, 2001 Operation Skywatch programs. Emergency Section 7 consultation with the USFWS, Phoenix Field Office was initiated for the 2000 Operation Skywatch program. An EA and FONSI have been completed for

the 2002 Operation Skywatch program. In addition, INS and the USBP has entered into emergency Section 7 consultation for the 2002 program (INS 2002c).

### 1.4.6 Checkpoints

Checkpoints are vehicle inspection points located along major highways leading away from the international border. The checkpoints are established to inspect vehicle traffic and intercept smuggling operations. The sites used for checkpoints are generally sections of road with wide shoulders that allow parking of vehicles and trailers on the roadside to reduce unwarranted interference to traffic flow. Some checkpoints, however, are established facilities that require all vehicles to exit the freeway at offramps.

Photo 1-4
Vehicle Checkpoint

### 1.4.7 Observation Points

Observation points are usually elevated locations overlooking routes used by illegal aliens. These sites are used as platforms fo(b) (7)(E) (b) (7)(E) skywatch towers, and other optical devices. These locations are accessible by vehicle on established roads or trails. Because aliens change routes often to avoid apprehension, observation points change on a regular basis. Repeater locations are also used by the USBP for radio and sensor communications. These locations are mountain or hilltop sites where antennas and electronic signal receiving and sending equipment are placed. Generally, several companies and organizations use these sites for similar purposes. The locations often have radio, television, and telephone equipment at the sites. Access to repeater sites is by established road or helicopter.

Photo 1-5
Skywatch Tower

## 1.5 Infrastructure

Infrastructure is an essential part of the USBP's capabilities to apprehend and detect UDAs and smugglers. Infrastructure can include items that assist in detection such as RVS, or deter entry such as fences and lights, or assist in apprehension such as border roads and fences. The following paragraphs discuss the typical infrastructure used by the USBP.

### 1.5.1 ISIS Components


Photo 1-6
RVS system

Components of INS' Integrated Surveillance Intelligence Systems (ISIS) have become an integral part of the detection process, thereby enhancing the agents' ability to apprehend illegal entrants. ISIS components include, but are not limited to, unattended ground sensors, low-light television cameras, infrared cameras, towers, (and their connections to power and communication lines), and (b) (7)(E) The various remote-sensing systems can be used separately or in combination with several types of systems or with other, more routine, enforcement actions (i.e., patrols). However, to be most effective, or for maximum optimization, the ISIS needs to be utilized in conjunction with other infrastructure and resources.

Thus, the combination of sound infrastructure (e.g., roads, fences, barriers, and ISIS components) and adequate resources (e.g., vehicles, field agents, support personnel, etc.) is essential for the effective enforcement of the border strategy and integral to the success of the USBP to gain, maintain and extend control of the border.

### 1.5.2 Fences and Barriers

Border fences have proven to be an effective deterrent in numerous areas (e.g., San Diego, Naco, Nogales, and Tecate), even though a single fence can be breached (since USBP agents can not protect the south side of the fence). Fences are typically constructed in urban or developed areas, particularly around legal Points of Entry (POE)

*Bollard fence*

*Landing mat fence*

*Picket or decorative fence*


*Sandia fence*

**Exhibit 1-1 Various Styles of Fences Used Along the Border**

although some barriers and fences have been installed in distant areas. Military surplus steel landing mat fences have been the type of fence most commonly constructed along the border. However, numerous other styles, including bollard, Sandia, and steel picket fences, have also been used. Fences are generally (b) (7)(E) feet high and usually vary constructed within six feet of the U.S.-Mexico border, although the designs can depending upon the, presence of other natural or man-made physical barriers, local terrain, and the USBP station's enforcement strategy.

### 1.5.3 Roads

Roads are probably the most important infrastructure for current USBP enforcement activities. The condition and maintenance of southwest border roads is therefore one of the most serious enforcement concerns. Many of the dirt roads within the Tucson and

Yuma border region were about (b) (7)(E) wide when originally built. Over the years, vegetation has encroached to the point that some of these roads are now less than (b) (7)(E) feet wide. In addition, many roads have experienced wind and water erosion that has resulted in impassable stretches. The current condition of the deteriorated roads does not allow efficient use of some roads by the USBP. Their condition prohibits adequate enforcement actions within some regions. Bridges, culverts, low water crossings, gabions, water bars, and other drainage or erosion control structures are designed and emplaced to reduce erosion and reduce required road maintenance. These roads are used as patrol routes, drag roads for detection of potential illegal entry, and fire breaks.

### 1.5.4 Permanent and Portable Lighting

Two types of light systems are used by the USBP along the U.S.-Mexico border to aid in the deterrence and detection of UDAs in the Tucson and Yuma Sectors. Permanent, fixed stadium style lights are deployed in areas with utilities, specifically near POEs and portable, diesel generator lights are used in remote areas or areas lacking utilities. Permanent lights consist of stadium-type lights on approximately (b) (7)(E) with (b) (7)(E) (b) (7)(E) Light bulbs can range from (b) (7)(E) Two types of poles are used for most projects: wooden poles, encased in concrete and steel culverts (to prevent them from being cut down), or steel poles with concrete footings. Permanent lights are powered by overhead or underground electrical lines. The lights are generally operated 10 –12 hours from dusk until dawn.

Portable lights allow the USBP the flexibility to move lights to sites where USBP intelligence indicates increases in UDA and smuggling activities may occur. Portable light systems have become integral components of the detection process, thereby enhancing the agents' ability to apprehend the illegal entrants without increasing the number of agents in the field. The addition of portable light systems more effectively controls high traffic areas and enhance the safety of USBP agents. These lights are powered by a (b) (7)(E) generator. Portable lights will generally operate continuously every night and will require (b) (7)(E) prior to the next night's operation. The portable light systems can be towed to the desired location by USBP vehicles, but they are typically spaced approximately (b) (7)(E) apart,

depending upon topography and UDA traffic patterns. Placement of the portable lights is estimated to affect (b) (7)(E) while the area affected by illumination from the lights is expected to be (b) (7)(E) mostly in a southerly direction. The lighting systems would have shields placed over the lamps to reduce or eliminate the effects of backlighting.

Permanent and portable lighting systems can be used separately or in combination with other, more routine, enforcement actions (i.e., patrols). However, to be most effective, or for maximum optimization, light systems needs to be utilized in conjunction with other infrastructure and resources.

## 1.6 Report Organization

The operations and infrastructure projects discussed above are considered to have some degree of impact upon the natural environment along the U.S.-Mexico Border. Consequently, the INS and USBP elected to prepare this PEIS to determine the extent of these impacts.

This PEIS is organized into 11 major sections including this section. Section 2.0 will describe the alternatives being considered. Section 3.0 will describe the affected environment of the project study area. Section 4.0 will discuss the environmental consequences of implementing the viable alternatives. Section 5.0 will discuss cumulative impacts from this and other proposed projects, and Section 6.0 will discuss the proposed environmental design measures. Sections 7.0, 8.0, 9.0, 10.0, and 11.0 present references cited in the document, a list of the persons involved in the preparation of this document, a distribution list, a list of acronyms and abbreviations, and an index, respectively. Appendix A includes supporting documents of the public involvement program such as copies of the scoping meeting notices and notices of availability published in local newspapers, and a summary of the comments received during the public comments. Appendix B provides a list of common wildlife in the study area. Appendix C provides a list of state protected species in Arizona. Appendix D contains the USBP Yuma Sector Biological Assessment (BA) and Tucson Sector BA. Appendix E is a list of National Register of Historic Places (NRHP) within the study area.

# *SECTION 2.0*
# *OVERVIEW OF EXISTING OPERATIONS AND ALTERNATIVES*

# 2.0 OVERVIEW OF EXISTING OPERATIONS AND ALTERNATIVES CONSIDERED

## 2.1 Overview of the Tucson and Yuma Sectors

The following paragraphs describe the existing operations and infrastructure located within the Yuma and Tucson Sectors.

### 2.1.1 Tucson Sector

The Tucson Sector encompasses all counties in southern Arizona except for Yuma, La Paz and Mojave and is responsible for 281 miles of the U.S.-Mexico Border. The sector is comprised of eight Border Patrol stations. These stations include the following: Ajo, Casa Grande, Tucson, Nogales, Douglas, Naco, Sonoita, and Willcox. Most of these stations are located near the U.S.-Mexico International Border. Existing infrastructure and operations within the stations that comprise the Tucson Sector are summarized in Table 2-1. The following subsectors provide descriptions of the activities that occur with each of the station's AO.

#### 2.1.1.1 Ajo Station

The Ajo Station is located at Why, Arizona on State Highway 85, about 30 miles north of the Lukeville, Arizona POE. There are currently 79 USBP agents assigned to the station. The Ajo Station's AO consists of approximately 9,000 square miles, and 65 miles of international border all within Pima County. Within the station's AO are the towns of Ajo, (b) (7)(E) and Why, Arizona. The Ajo Station's AO also includes portions of the Cabeza Prieta National Wildlife Refuge (CPNWR), Organ Pipe Cactus National Monument (OPCNM), BGMR East, and the Tohono O'odham Indian Nation. The terrain is characterized by arid and rural desert with valleys, arroyos and mountains. The majority of mountains in this area trend in a northwest to southeast direction. Valleys are relatively flat and sparsely vegetated allowing vehicles to enter the U.S. in most areas without the need for roads. There are (b) (7)(E) areas where the majority of illegal aliens attempt to enter the station's AO: (b) (7)(E)

USBP activities within the Ajo Station's AO are discussed below and are

presented in Table 2-1. Figure 2-1 depicts the locations of current infrastructure and activities within the Ajo Station's AO. The station is currently constructing additional parking spaces and classrooms in the back of the station. Patrol roads within the station's AO, including State Highway 85, cover approximately 185 miles of semi-improved and unimproved roads. (b) (7)(E) The Ajo Station currently operates (b) (7)(E) Drag roads within the station's AO total approximately four miles and are primarily located along the border on (b) (7)(E); however, no dragging operations are currently being conducted in the Ajo Station's AO.

Off-road operations conducted in the station's AO include agents on foot, 4-wheel drive vehicles, and 13 ATVs. Agents use the ATVs for SAR missions on BLM lands approximately three times a month. (b) (7)(E) and destinations are dependent upon the travel route of illegal aliens. A helipad and refueling station are located at the Border Patrol station. Flights generally trend along (b) (7)(E) and are usually related to SAR missions for lost and/or distressed aliens, with most flights originating from the Yuma Sector to the west.

The Ajo Station currently uses approximately 100 sensors. Sensors are scheduled for (b) (7)(E) Sensors are located on or near roads and trails and their placement correspond to areas of high foot and vehicle traffic, particularly near the border. The Ajo Station also has (b) (7)(E) sites throughout its AO. In addition, a 250-foot long pedestrian barrier fence is located near the U.S. Customs building at the Lukeville POE.

#### 2.1.1.2 Casa Grande Station

The Casa Grande Station's AO is approximately 7,000 square miles, the majority of which is located in western Pima County. There are currently 96 USBP agents assigned to the station. The station's AO encompasses 48 miles of remote international boundary entirely within the Tohono O'odham Indian Nation. The station's AO includes metropolitan areas such as Casa Grande and Chandler, Arizona, as well as the sparsely populated Indian Nation. The station's AO is relatively flat desert terrain with numerous washes at the border, and hills scattered throughout the area. Vegetation is sparse in


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**Table 2-1. Existing Infrastructure within the Tucson Sector**

| | STATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Ajo** | **Casa Grande** | **Tucson** | **Nogales** | **Sonoita** | **Naco** | **Douglas** | **Willcox** | **TOTALS** |
| **ACTIVITY** | | | | | | | | | |
| Miles of drag roads[1] | 4 | 48 | 33 | 10 | 50 | 21 | 25 | 20 | 207 |
| Miles of patrol roads | 185 | 172 | 133 | 60 | 391 | 47 | 85 | 165 | 1253 |
| Miles of existing border road | | | 60 | 13 | | 30 | 32 | | 190 |
| No. of repeater sites | 3 | 3 | 5 | 1 | 2 | 1 | 12 | 3 | 30 |
| No. of ground sensors | 100 | 85 | 100 | 338 | 96 | 124 | 300 | 100 | 1243 |
| No. of agents | 79 | 96 | 180 | 497 | 56 | 212 | 469 | 60 | 1649 |
| No. of RVS sites | | | | 10 | 0 | 8 | 13 | | 31 |
| Miles of portable generator lights (number of lights) | | | | 2.5 (65) | | 10 (35) | 66 (97) | | 78.5 (197) |
| Miles of stadium style lights | | | | 1.5 | | 2 | 3 | | 6.5 |
| Pedestrian barrier fence (ft.) | 250 | | | | | | | | 250 |
| Miles of decorative fence | | | | 0.5 | | | 2.4 | | 2.9 |
| Miles of bollard fence | | | | | | | 0.2 | | 0.2 |
| Miles of landing mat fence | | | | 3.1 | | 2.7 | 3.5 | | 9.0 |
| Miles of vehicle barriers | | | | 0.1 | | 2.5 | 0 | | 2.6 |
| Miles of vertical fence extension | | | | 2 | | 1.4 | 0 | | 3.4 |
| Low-water crossing | | | | | | 2 | 5 | | 7 |
| Air patrols | (b) (7)(E) | | | | | | | | 8 stations |
| Helipad | yes | no | yes | yes | no | yes | yes | No | 6 stations |
| Off road operations[2] | yes | yes | yes | yes | yes | yes | yes | Yes | 8 stations |
| Station construction | yes | no | no | no | no | yes | yes | No | 2 stations |
| Horse patrols | no | no | no | yes | yes | yes | yes | Yes | 5 stations |
| Checkpoint | (b) (7)(E) | | | | | | | | 6 stations |

[1] The miles of drag roads provided for the Ajo and Willcox Stations are potential miles, as no dragging operations are currently conducted in these stations.
[2] Off-road operations typically involve foot pursuit of UDAs; however, ATVs, motorcycles, bicycles, and four-wheel drive vehicles are operated off-road if needed in the pursuit of UDAs.





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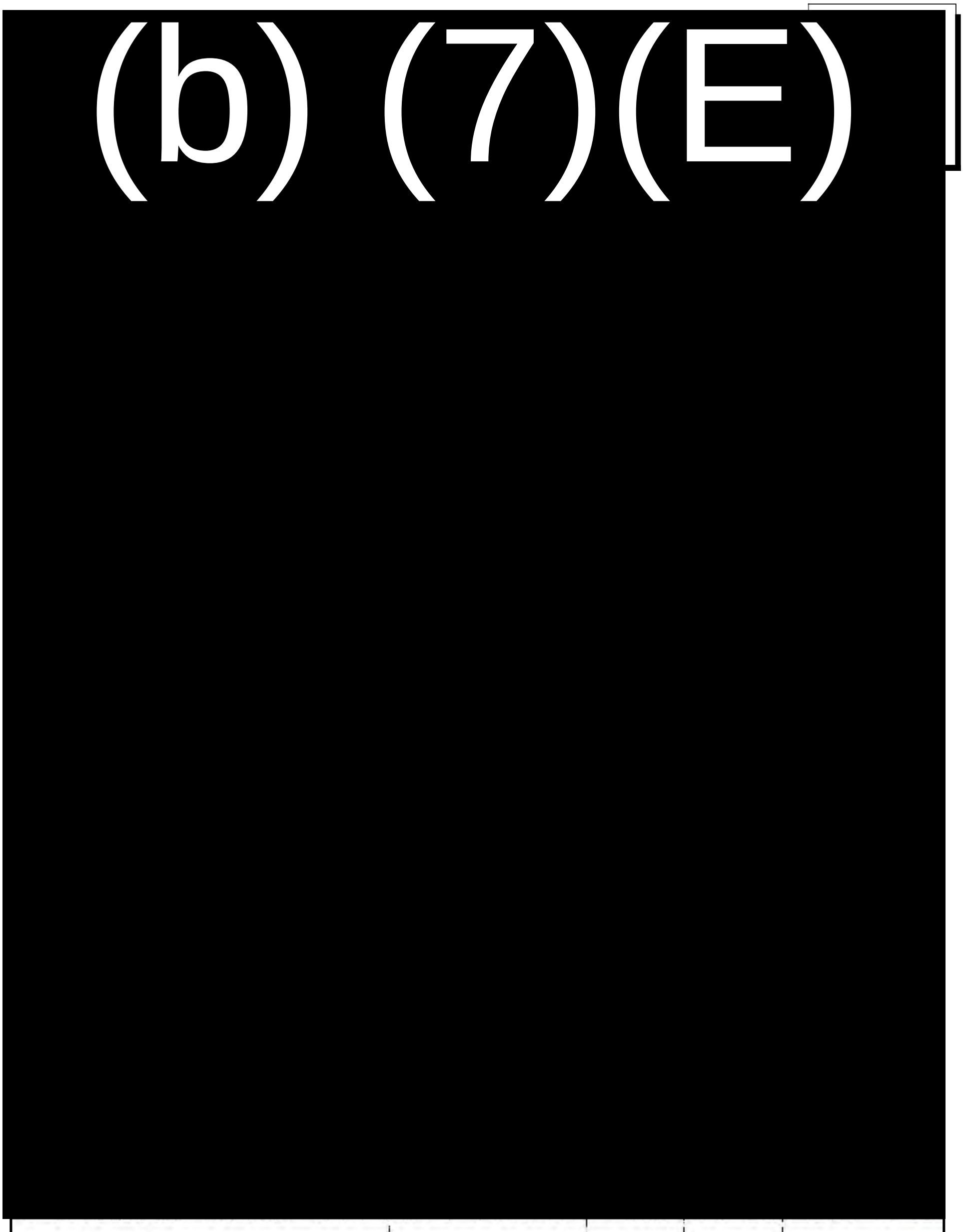
(b) (7)(E)



Source: Ajo (1982) & Lukeville (1975) USGS 1:250,000 topographic maps

Figure 2-1: U.S. Border Patrol Activities Within the Ajo Station Area of Operations.

Scale: on map

Date: September 2002

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the open, and heavy in the washes. There are no POEs within the station's AO, and the closest town or village to the border is (b) (7)(E). During the spring and summer months when temperatures in the desert can exceed 120 degrees Fahrenheit (°F) with very low humidity, aliens sometimes suffer from exhaustion and dehydration, and consequently agents must routinely conduct SAR operations.

USBP activities within the station's AO are discussed below and presented in Table 2-1. Figure 2-2 depicts the current infrastructure and enforcement activities within the Casa Grande Station's AO. The Casa Grande agents patrol various public roads within their AO, as well as 32 miles of unimproved roads, and upwards to 140 miles of jeep trails that are located within or near known illegal alien travel corridors. Seventeen miles of unimproved roads (b) (7)(E) (b) (7)(E) located within the station's AO.

The Casa Grande Station currently maintains 48 miles of drag roads, with the largest segment located along the international border. Off-road operations in the station's AO entails the use of motorcycles and ATVs on a (b) (7)(E) The Casa Grande Station is currently using 16 motorcycles and six ATVs to access the U.S.-Mexico Border. Four-wheel drive vehicles are used infrequently to assist agents or distressed aliens.

The Casa Grande Station does not maintain a helipad or refueling tanks. There are no scheduled helipatrols within the station's AO. However, when assistance is requested, (b) (7)(E) Helicopters also assist in SAR missions involving distressed aliens. (b) (7)(E)

The Casa Grande Station utilizes approximately (b) (7)( sensors that are primarily located along patrol and drag roads along known illegal alien travel corridors. Less than (b) (7)(E) sensors are moved per year. (b) (7)(E), and about one


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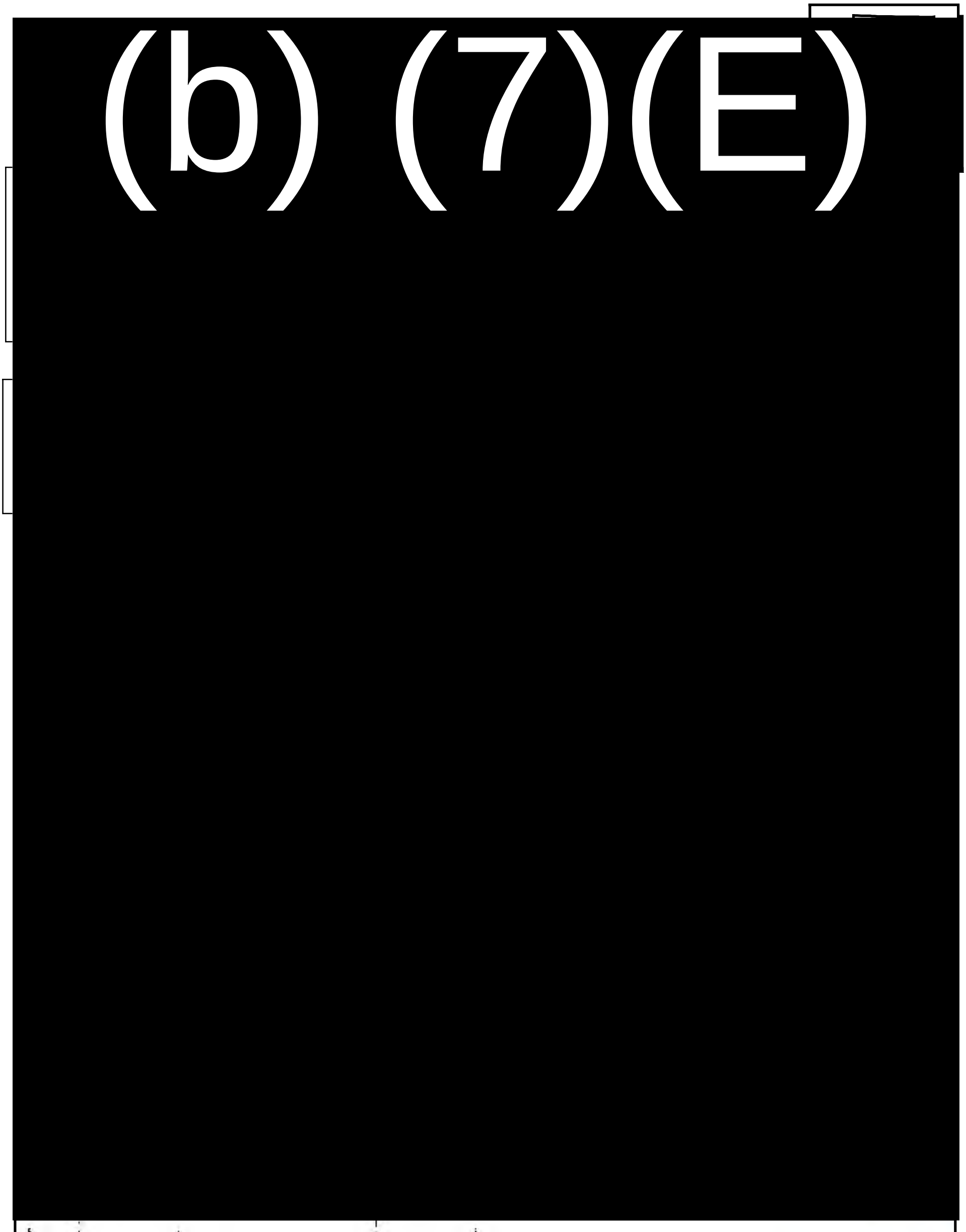


Source: Lukeville, Arizona (1975); Nogales, Arizona (1969); Tucson, Arizona (1982) and Ajo, Arizona (1977) USGS 1:250,000 topographic map

Figure 2-2: U.S. Border Patrol Activities Within the Casa Grande Station Area of Operations.

Scale: on map

Date: September 2002

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sensor per month requires repairs. There are (b) (7)(E) located within the Casa Grande Station.

### 2.1.1.3 Tucson Station

The Tucson Station includes a portion of Santa Cruz and Pima counties. There are currently 180 USBP agents assigned to the station. The AO for this station encompasses 4,000 square miles including 51 linear miles of the international border stretching from the (b) (7)(E) (b) (7)(E) The station includes the metropolitan area of Tucson and the (b) (7)(E). Large arid deserts, agricultural valleys and rugged mountains characterize the terrain of this station's AO.

USBP activities within the Tucson Station's AO are discussed below and presented in Table 2-1. Figure 2-3 depicts current USBP activities in the southern portion of the Tucson Station's AO. (b) (7)(E) The third phase is special operations such as criminal alien prosecutions, intelligence and narcotics prosecutions.

Agents at the Tucson Station patrol approximately 133 miles of improved and unimproved roads within the station's AO. (b) (7)(E) Off-road activities include the use of 4-wheel drive vehicles, dirt bikes, and foot patrols. Off-road activities (b) (7)(E). There are 33 miles of drag roads that are (b) (7)(E). (b) (7)(E)

The Tucson International Airport and Fort Huachuca Libby Airfield are currently utilized as bases for air operations within the entire Tucson Sector. There are no specific flight routes or destinations within the Tucson Station. Air operations in this area are infrequent and are primarily used to assist ground units in the interdiction of illegal entries of aliens and narcotics.


BW1 FOIA CBP 009626

(b) (7)(E)

Source: Nogales (1969) & Tucson (1977) USGS 1:250,000 Topographic Maps

Figure 2-3: U.S. Border Patrol Activities Within the Tucson Station Area of Operations.

Scale: on map

Date: September 2002

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The Tucson Station currently utilizes 100 sensors placed near roads and/or trails within known travel corridors. They are located primarily along the border and extend from the (b) (7)(E) (b) (7)(E) are maintained in the Tucson's Station AO.

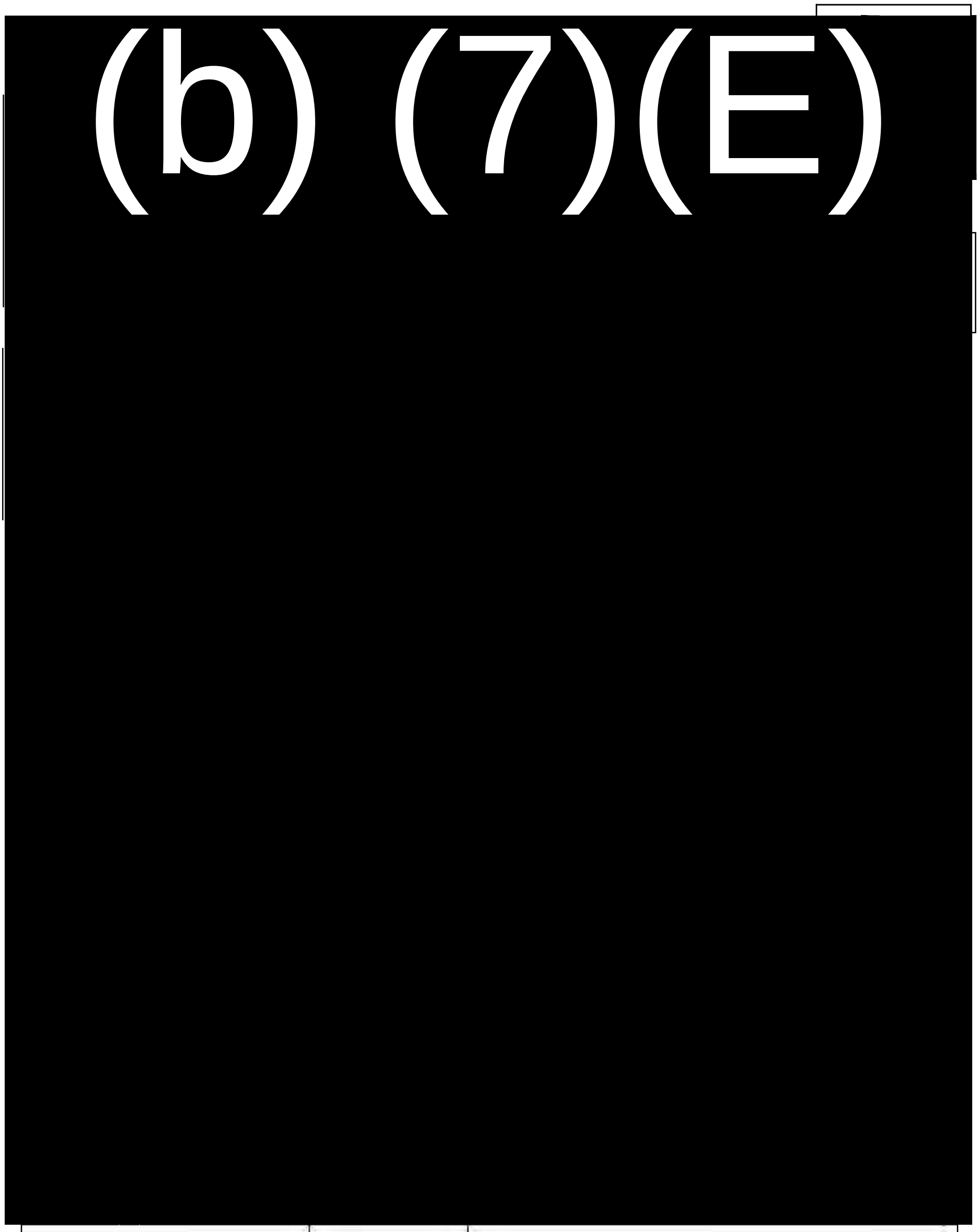
### 2.1.1.4 Nogales Station

USBP activities within the Nogales Station AO are discussed below and presented in Table 2-1. Figure 2-4 depicts the locations of current infrastructure and patrol operations within the Nogales Station's AO. There are currently 497 USBP agents assigned to the Nogales Station. Agents patrol approximately 60 miles of semi-improved and unimproved roads (b) (7)(E). These roads are primarily concentrated in the area around the (b) (7)(E). The Nogales Station is currently (b) (7)(E) ) and (b) (7)(E), which is (b) (7)(E). In addition, there are currently 10 RVS sites, 1.5 miles of stadium-style lights, 2.5 miles of portable generator lights (65 lights), 3.1 miles of landing mat fence, and 0.5 miles of decorative fence. Drag road preparation is conducted on 10 miles of road(b) (7)(E) Off-road activities entail the use of 4-wheel drive vehicles, ATV's, horses, bike patrols, and foot patrols.

The Nogales Border Patrol Station has a helipad and refueling capabilities. In addition, the Nogales International Airport is also utilized for air operations. The entire border within the station's AO is patrolled (30 miles) (b) (7)(E), with a concentrated effort in the area (b) (7)(E). Helicopters also patrol along (b) (7)(E). There are currently 338 sensors in use within the station's AO.

### 2.1.1.5 Sonoita Station

The Sonoita Station's AO encompasses 1,000 square miles and 25 miles of international border within Santa Cruz County. The area extends from the (b) (7)(E) west to the (b) (7)(E) east. The northern border is approximately (b) (7)(E) miles (b) (7)(E). There are currently 56 USBP agents assigned to the station. The station has a rough, rocky, mountainous terrain and rolling hills with deep canyons interspersed. Elevations within the station's AO range from 4,000 to 9,500 feet mean




Source: Nogales (1969) USGS 1:250,000 Topographic Map

Figure 2-4: U.S. Border Patrol Activities Within the Nogales Station Area of Operations.

Scale: on map

Date: September 2002

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sea level (msl). The station's AO is largely rural with cattle ranches and private residences intermixed with national forest and state lands.

USBP activities within the station's AO are discussed below and presented in Table 2-1. Figure 2-5 depicts the locations of current infrastructure within the Sonoita Station's AO. Agents at the Sonoita Station currently patrol approximately 391 miles of semi-improved and unimproved roads on a (b) (7)(E) . The Sonoita Station operates (b) (7)(E) ) and (b) (7)(E) ). There are approximately 50 miles of drag roads within the station's AO. (b) (7)(E) .

Dirt bike and ATV use is generally restricted to trails and established unimproved roads and are conducted (b) (7)(E) , manpower allowing. Horseback (b) (7)(E) manpower allowing) and foot patrols (b) (7)(E) are conducted throughout the (b) (7)(E) Helicopter flights in the station's AO originate from either Nogales or Tucson and are used to assist agents patrol for illegal aliens and narcotics. Helicopter flights within the station's AO occur in the (b) (7)(E) in response to alien traffic patterns, (b) (7)(E) but there are no set flight paths. However, helicopters fly along the international border (b) (7)(E) There are currently 96 sensors dispersed throughout the station's AO. Sensors are typically moved or undergo scheduled maintenance (b) (7)(E) Contributing factors to the Sonoita Station's enforcement issues are (b) (7)(E) .

### 2.1.1.6 Naco Station

The Naco Station's AO is located within Cochise County and covers approximately 2,000 square miles. The station's AO includes 30 miles of international border and the communities of (b) (7)(E) . There are currently 212 USBP agents assigned to the station. The geographical terrain of the area is desert with rolling hills covered with brush thickets and numerous north-south trending washes, and mountains on the western portion. The approximate elevation of the station is 4,800 feet msl.

(b) (7)(E)

(b) (7)(E)

Source: Nogales (1969) USGS 1:250,000 Topographic Map

Figure 2-5: U.S. Border Patrol Activities Within the Sonoita Station Area of Operations.

Scale: on map

Date: September 2002

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USBP activities within the station's AO are discussed below and presented in Table 2-1. Figure 2-6 depicts the locations of current infrastructure within the Naco Station's AO. Agents at the Naco Station patrol 47 miles of improved and semi-improved roads within their AO (b) (7)(E) . There is currently (b) (7)(E) and (b) (7)(E) within the station's AO. The Naco Station maintains 21 miles of drag roads along the border. Frequency of drag road preparation (b) (7)(E) . Off-road activity is limited to (b) (7)(E) There is a helipad and a small refueling facility at the Naco Station. Helicopter flights within the station's AO (b) (7)(E) with no set flight paths; although they (b) (7)(E) . Approximately 124 sensors are in use and are maintained or moved monthly. The (b) (7)(E) . There are currently 8 RVS sites, 35 portable generator lights in use over a 10-mile corridor 2 miles of stadium style lights, 2.7 miles of fence, 2.5 miles of vehicle barriers, and 1.4 miles of vertical fence extension. In addition, the station is currently conducting maintenance on 30 miles of existing unimproved roads (border road) and construction of a new station.

#### 2.1.1.7 Douglas Station

The Douglas Station is located within southeast Cochise County and includes approximately 30 miles of international border. There are currently 469 USBP agents assigned to the station. The communities of (b) (7)(E) The City of Douglas shares the border with Agua Prieta, Mexico. The terrain of the area is relatively flat high desert, with numerous washes, and is bordered by the (b) (7)(E) . The approximate elevation of the station is 4,000 feet msl.

USBP activities within the Douglas Station's AO are discussed below and are presented in Table 2-1. Figure 2-7 depicts the locations of current infrastructure within the Douglas Station's AO. Activities are primarily concentrated near the (b) (7)(E) and patrols occur on 85 miles of improved and semi-improved roads. The Douglas Station maintains (b) (7)(E) There are 25 miles of drag roads within the Douglas Station's AO that are (b) (7)(E) . Off-road activities entail the cross-country tracking of alien groups using horses or on foot, (b) (7)(E) ,


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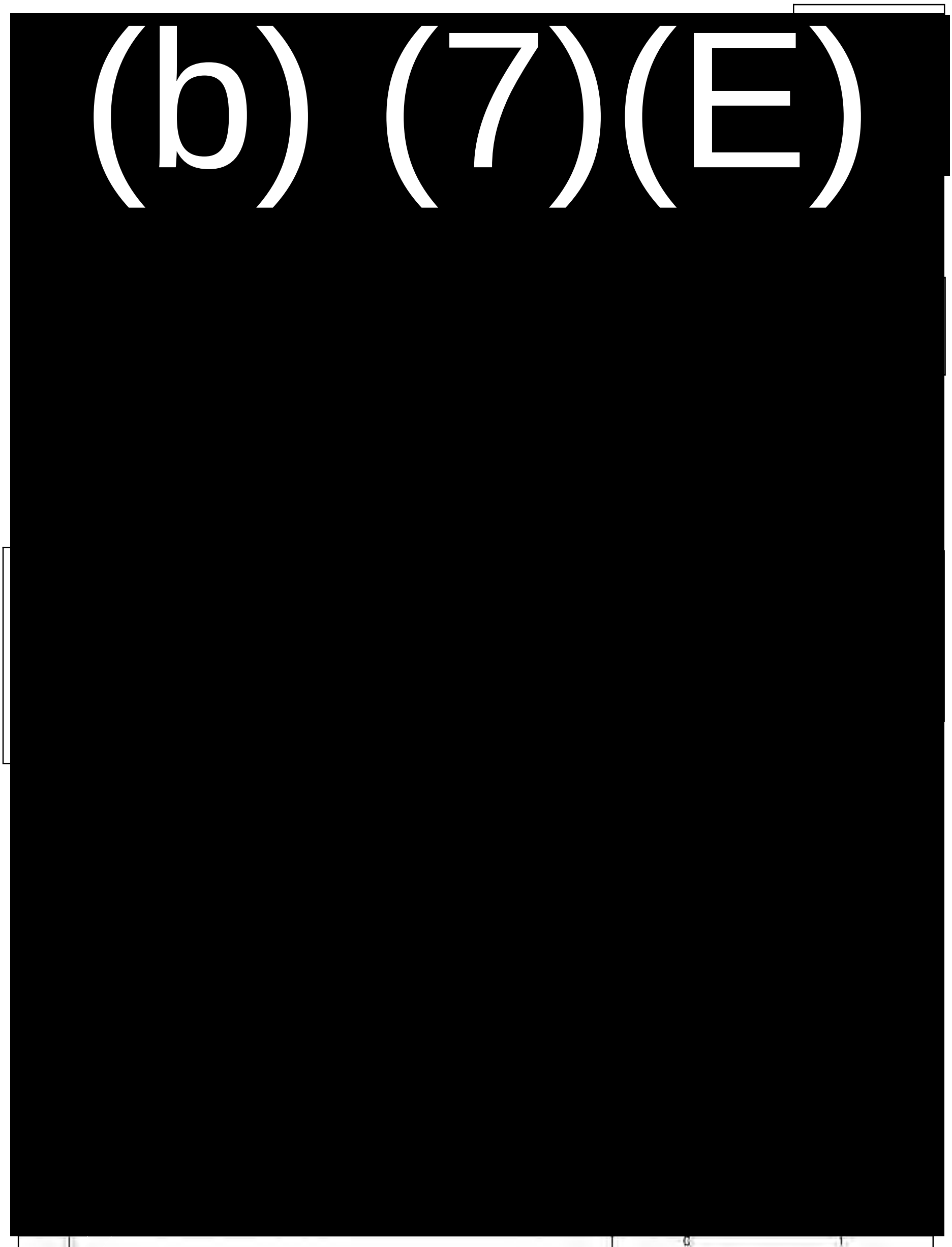
(b) (7)(E)



Source: Nogales (1969) & Douglas (1970) USGS 1:250,000 Topographic Maps

Figure 2-6: U.S. Border Patrol Activities Within the Naco Station Area of Operations.

Scale: on map

Date: September 2002

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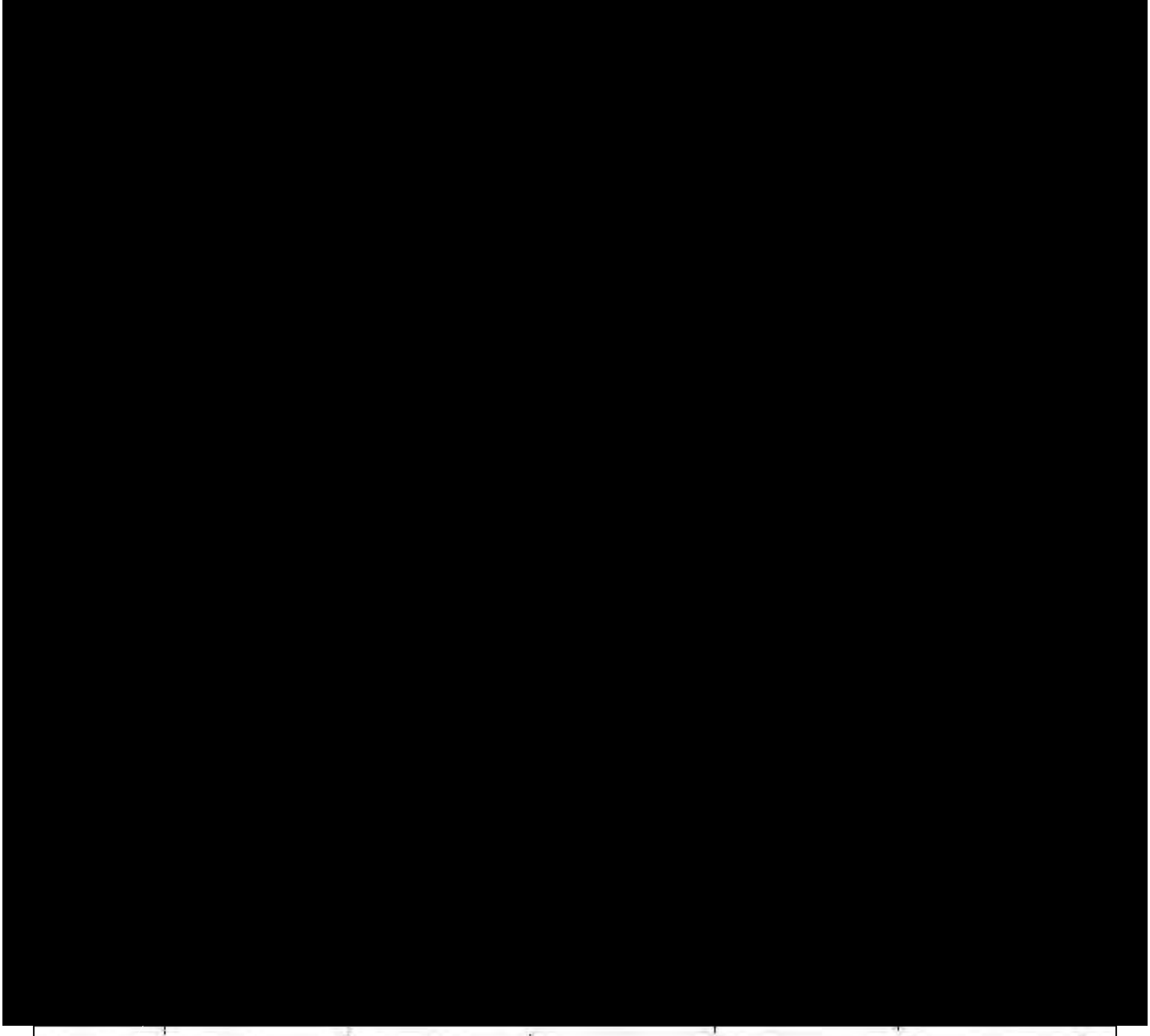
(b) (7)(E)



1 2 3 4 5 6

Source: Douglas (1970) USGS 1:250,000 Topographic Map

Figure 2-7: U.S. Border Patrol Activities Within the Douglas Station Area of Operations.

Scale: on map

Date: September 2002

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throughout the station's AO. ATVs are also used outside the city limits to patrol the U.S.-Mexico Border. The station currently uses 27 ATVs.

Douglas has helipad and refueling capabilities located at the local airport. There are currently (b) (7)(E) in the Douglas area. When assistance is requested, (b) (7)(E) . Deviations from this route are only made to follow tracks, persons, or vehicles that have entered the U.S. illegally. There are approximately 300 sensors in use by the Douglas Station at are moved in response to this time. They are concentrated near the (b) (7)(E) and along the border. Sensors changes in alien traffic routes. There are currently 13 RVS sites, three miles of stadium style lights, 66 miles of portable generator lights (97 lights), 3.5 miles of landing mat fence, 2.4 miles of decorative fence, (b) (7)(E) , and 0.2 miles of bollard fence. In addition, a new Border Patrol station has been approved through prior NEPA documents (INS 2000b); and construction was initiated in 2001.

#### 2.1.1.8 Willcox Station

The Willcox Station's AO begins at (b) (7)(E) . The Willcox Station's AO is located in Cochise County, Arizona. There are currently 60 USBP agents assigned to the station. The Wilcox Station was originally designed for five agents, so overcrowding has occurred. As a result, (b) (7)(E)

The (b) (7)(E) miles of border section of the station's AO is (b) (7)(E) . The remaining 15 border miles are relatively flat desert terrain. (b) (7)(E) There are no towns or villages along the border, consequently, there are no POEs in the area. Two private ranches and the San Bernardino National Wildlife Refuge (SBNWF) are located within this station's AO. USBP activities within the Willcox Station AO are presented in Table 2-1. Figures 2-8 and 2-9 represent current infrastructure within different sections of the Willcox Station's AO.

There are approximately 165 miles of patrol roads and trails within the station's AO. The principal patrol road in this area is (b) (7)(E)


BW1 FOIA CBP 009635

MATCHLINE

(b) (7)(E)



Source: Douglas (1970) & Nogales (1969) USGS 1:250,000 Topographic Maps

Figure 2-8: U.S. Border Patrol Activities Within the Southern Willcox Station Area of Operations.

Scale: on map

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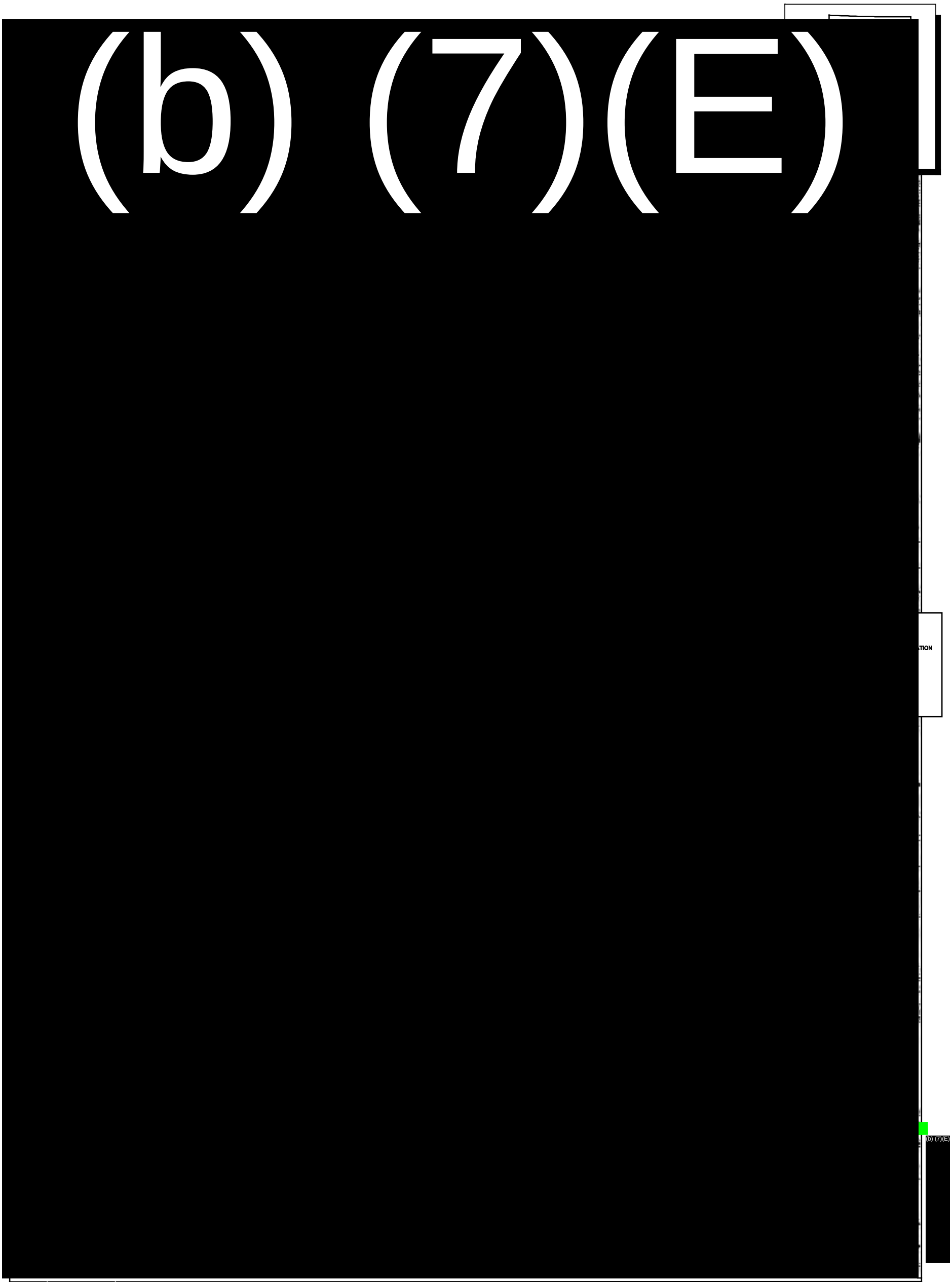


Figure 2-9: U.S. Border Patrol Activities Within the Northern Willcox Station Area of Operations.

Scale: on map

Date: September 2002

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also (b) (7)(E) . All other patrol roads are patrolled (b) (7)(E) The station operates (b) (7)(E) and (b) (7)(E) There are no unimproved roads used as patrol roads. Currently, there are no established drag roads in the station's AO; however, the USBP (b) (7)(E) Off-road operations are limited to daily horse patrols.

There are no helicopter facilities, regular flights or regular patrol routes at this time within the station's AO. Approximately 100 sensors are being used and are concentrated along the border and major roads. Sensors are moved when necessary, based on changes in alien traffic patterns. (b) (7)(E) .

### 2.1.2 Yuma Sector

The Yuma Sector was established in 1955. The Sector encompasses all or portions of Yuma, La Paz and Mojave counties in Arizona; Riverside, San Bernardino, Imperial counties in California; and Lincoln, Nye and White Pine Counties in Nevada. The Yuma Sector Headquarters is located in the southwest corner of Arizona and has responsibility for 118 miles of international border. The sector area consists of 76,000 square miles, falling under the responsibility of three stations located at Yuma and Wellton, Arizona, and Blythe, California. The Blythe Station is the smallest of the three stations with 40 assigned agents and operations primarily involve vehicle checkpoint inspections and patrols on surfaced roads. This PEIS addresses USBP actions only occurring in Arizona; therefore, the Blythe Station and the Imperial County, California portion of the Yuma Station are not included as part of this PEIS. These areas were also not included as part of the Yuma Sector Biological Assessment. Existing infrastructure and operations within the Arizona portion of the Yuma Sector are presented in Table 2-2.

A new (b) (7)(E) square feet ($ft^2$) sector maintenance facility was completed in June 2001. This new facility is located on South Avenue A directly across from the existing Yuma Station in Yuma, Arizona. A new (b) (7)(E) sector headquarters is currently being constructed immediately north of the maintenance facility. Construction is expected to be complete in November 2002. The construction of these facilities were analyzed in a previous NEPA document (INS 1999b).


BW1 FOIA CBP 009638

**Table 2-2. Existing Infrastructure within the Yuma Sector**

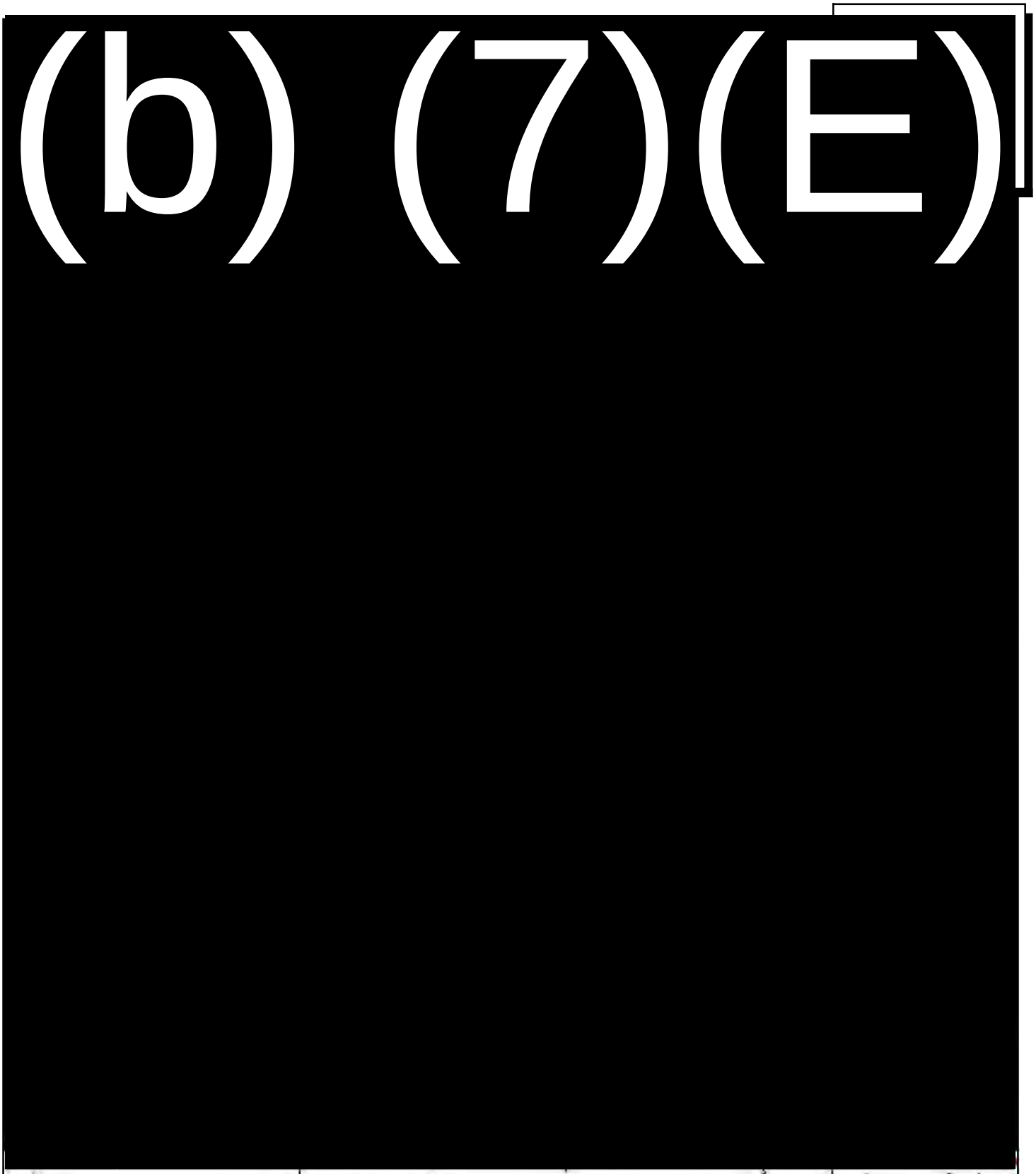
| ACTIVITY | STATION | |
|---|---|---|
| | Yuma | Wellton |
| miles of drag roads | 70 | 192 |
| miles of patrol roads | 500 | 150 |
| no. of repeater sites | 3 | 1 |
| no. of ground sensors | 214 | 47 |
| no. of agents | 240 | 43 |
| no. of RVS sites | 16 | 3 |
| miles of portable generator lights | 3 (40 lights) | 0 |
| miles of stadium style lights | 3 (147 lights) | 0 |
| miles of landing mat fence | 6.3 | 0 |
| air patrols | yes | yes |
| off road patrols | yes | yes |
| station construction | yes | |
| Checkpoint | (b) (7)(E) | (b) |

### 2.1.2.1 Yuma Station

The Yuma Station is located at 12122 South Avenue A in Yuma. The station patrols a total of 54 miles of the Mexico border, including 28 miles along the Sonora border, 17 miles of which is a river border where the international line is formed by the Colorado River between Arizona and Mexico. There are currently 214 USBP agents assigned to the station. The Yuma Station's AO includes the (b) (7)(E) . (b) (7)(E) The El Centro Sector is responsible for areas (b) (7)(E) However, this PEIS only addresses those activities conducted by the Yuma Station in Arizona. The analysis area of the Yuma Station for this PEIS is depicted in Figure 2-10.

USBP activities within the Yuma Station's AO are discussed below and are presented in Table 2-2. The locations of current and proposed infrastructure are depicted in Figure 2-10. There are approximately 500 miles of patrol road within the station's AO. The station operates (b) (7)(E) and (b) (7)(E) The Yuma Station prepares 70 miles of drag roads (b) (7)(E) within the station's AO. Off-road operations are limited to agents on foot and ATV


BW1 FOIA CBP 009639




Source: El centro (1977) USGS 1:250,000 Topographic Map

Figure 2-10: U.S. Border Patrol Activities Within the Yuma Station Area of Operations

Scale: on map

Date: September 2002

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and 4-wheel drive vehicles if pursuing UDAs. Currently, the Yuma Station maintains 9 ATVs.

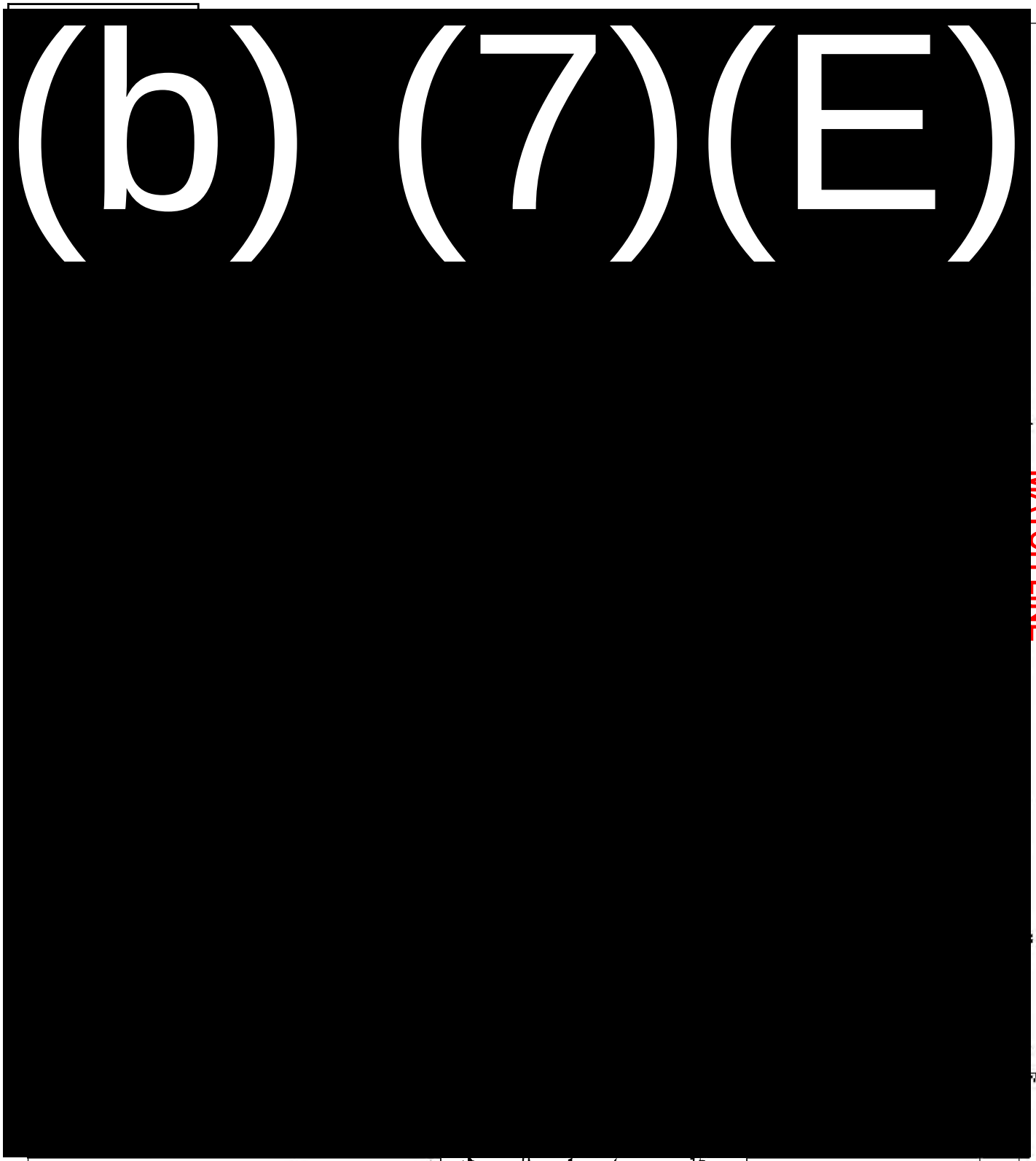
A new (b) (7)(E) station facility is proposed for the Yuma Station. The proposed facility would be located across Avenue A from the existing Yuma Station. Construction is anticipated to begin in December 2002 (Haynes 2002). The construction of the new facility was analyzed in previous NEPA documents (INS 2002d).

Helicopters are used to patrol the U.S.-Mexico Border and for SAR missions. There are approximately (b) (7)(E) conducted in the Yuma and Wellton areas. A total of 214 sensors are currently being used throughout the Yuma Station's AO. These sensors normally require routine maintenance (b) (7)(E). The station currently uses 40 portable generator lights along three miles near the town of San Luis. Three miles of stadium style lights are in use on the western side of San Luis. There are 16 RVS sites and 6.3 miles of fence within the station's AO. Recent USBP NEPA documents that addressed lighting projects include (1) Final Environmental Assessment - Portable Lights Within the Naco Corridor, Cochise County, Arizona (INS 2001) and (2) Final Environmental Assessment for Permanent Lighting Structures near Calexico, California (INS 2002b).

#### 2.1.2.2 Wellton Station

On February 1, 1955 the Wellton Station was established. The station was closed from 1964 to 1967, and was operated as the Tacna Station from 1970 until 1990, when the current station was opened. The station is responsible for 64 miles of international boundary. The station area includes the (b) (7)(E) There are currently 47 USBP agents assigned to the station.

USBP activities within the Wellton Station's AO are discussed below and presented in Table 2-2. Figures 2-11 and 2-12 represent the current and proposed infrastructure within the station's AO. There are approximately 150 miles of patrol roads and 192 miles of drag roads within the station's AO. The station currently maintains a (b) (7)(E) and (b) (7)(E). A total of 47 sensors are utilized throughout the station's AO. These sensors normally require maintenance every(b) (7)(E)




Source: El Centro (1977) USGS 1:250,000 Topographic Map

Figure 2-11: U.S. Border Patrol Activities within (b) (7)(E) of the Wellton Station Area of Operations

Scale: on map

Date: September 2002

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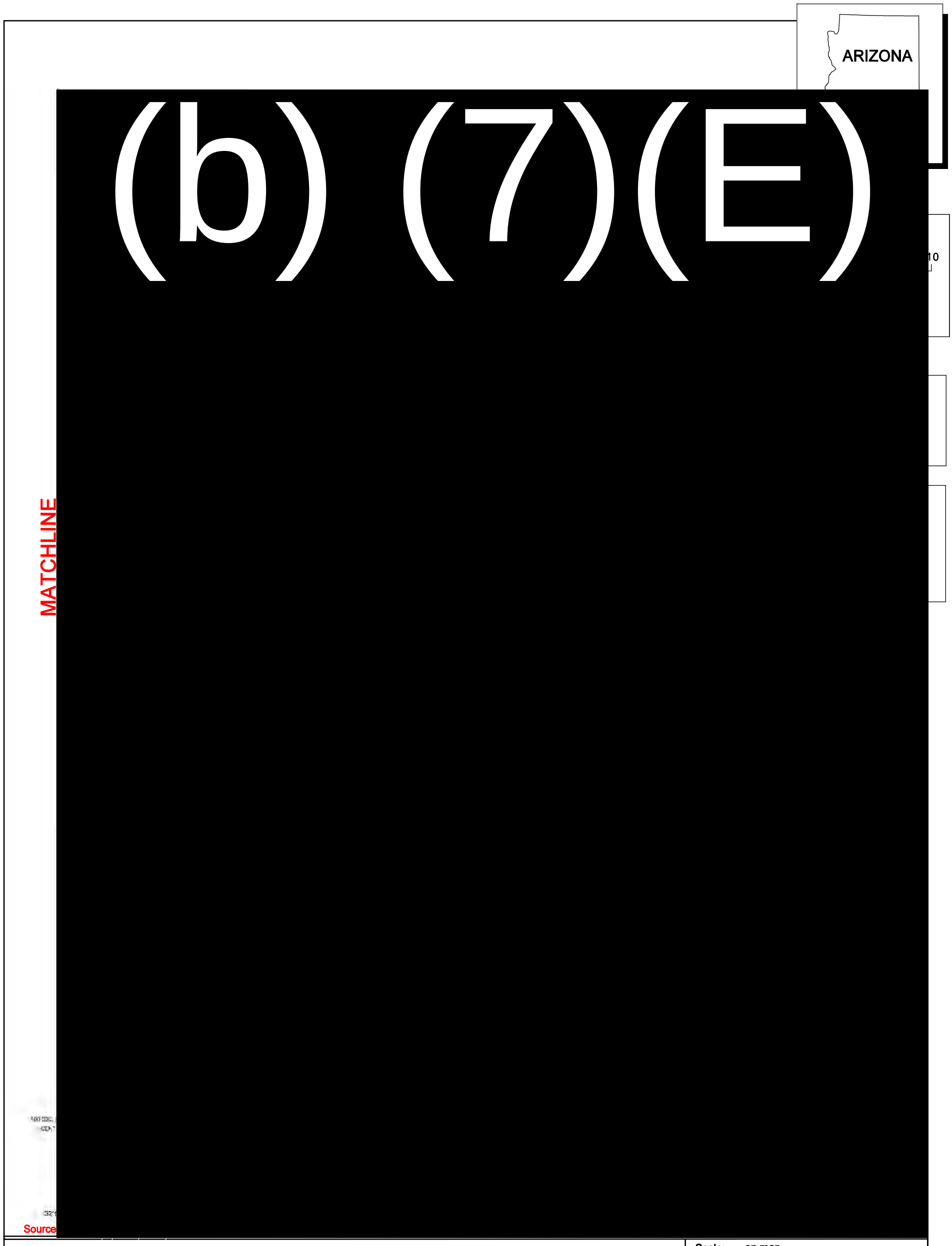


Figure 2-12: U.S. Border Patrol Activities Within (b) (7)(E) of the Wellton Station Area of Operations.

Scale: on map

Date: September 2002

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(b) (7)(E) . Eight emergency beacons are deployed in the station's AO. The beacons are to aid distressed persons who have been overcome by the extreme desert environment. If activated, the beacon will transmit a distress signal to the USBP and a rescue helicopter will be dispatched to the activated beacon to assist the individual(s) in need.

The Wellton Station is the only area with a designated helicopter flight route. (b) (7)(E) , are made from the MCAS-Yuma patroling a 2.5-hour flight loop. Deviations from this route are only made to follow tracks, persons, or vehicles, which made an illegal entry into the U.S, or those of stranded tourists requiring assistance. (b) (7)(E)

(b) (7)(E)

## 2.2 Alternatives Considered

All alternatives addressed in this PEIS will consider a combination of USBP operations/activities and infrastructure construction. For the purposes of this PEIS, traditional USBP operations/activities are defined as patrolling of roads, dragging of unimproved roads, off-road operations, air operations, and vehicle checkpoint operations. Technology based operations include RVS, remote sensing, portable and fixed lighting, skywatch towers, sensors (b) (7)(E) and radio repeaters. Infrastructure projects would include, but are not limited to, the construction of roads, bridges, fences and vehicle barriers, training ranges, USBP stations, helipads and vehicle barriers. Alternatives considered in the PEIS are presented in Table 2-3.

**Table 2-3 Alternatives Considered in the PEIS**

| Alternative | Description |
|---|---|
| No Action | Maintain all operations/activities at current level of effort with no new infrastructure construction |
| 1 | Expand all operations/activities and construct proposed infrastructure (Preferred Alternative) |
| 2 | Expand use of technology based operations/activities, maintain current level of effort for other operations/activities, and construct technology based infrastructure |
| 3 | Expand all operations/activities with no new infrastructure construction |
| 4 | Maintain all operations at current level and construct proposed infrastructure |

### 2.2.1 No Action Alternative

This alternative would not allow for the expansion of USBP operations and would eliminate all proposed construction projects. USBP use and maintenance of roads would continue. This alternative would, however, allow all ongoing infrastructure projects and any normal maintenance and operation requirements associated with existing infrastructure to continue. This alternative would halt any additional impacts and would eliminate the potential for future effects to the natural environment. Even though this alternative would reduce unavoidable impacts and irretrievable losses of resources, it would greatly hinder the USBP's mission to gain and maintain control of the border.

### 2.2.2 Alternative 1. Preferred Alternative- Expand Operations and Infrastructure

This alternative would allow the USBP to expand its current operations/activities and complete ongoing and proposed infrastructure projects. In addition to those projects currently being constructed, this alternative would include several proposed construction projects. In March 2002, the USBP completed the Border Infrastructure Reference Document (BIRD) for the Tucson Sector (INS 2002a). This document serves as a corner stone of the operational and infrastructure needs of each of the Tucson Stations. Therefore, it is the basis of infrastructure proposed within the Tucson Sector under this alternative.


BW1 FOIA CBP 009645

A summary of proposed infrastructure projects within the Tucson and Yuma Sectors is presented in Table 2-3. This alternative would help the USBP achieve their mission of deterrence by allowing the USBP to expand current operations/activities as dictated by changes in illegal entrant strategy. This alternative would give the USBP flexibility to concentrate resources where they are needed most.

Further NEPA documentation may be required to address any impacts associated with significant increases in USBP operations/activities prior to implementation. Normal, routine enforcement operations (e.g., concentrating patrol agents in certain areas, increasing the dragging frequency for a specific period in response to increased traffic, and requesting aerial support), would not require NEPA analyses. Likewise, increases in staff/agents would not require further NEPA documentation. Impacts from the expansion of operations/activities cannot be addressed until their parameters have been defined. Under this alternative, INS and the USBP would have to evaluate the proposed increase/expansion in accordance with 28 CFR Part 61, Appendix C, to determine if additional NEPA documents would be required.

Implementation of Alternative 1 would result in unavoidable environmental impacts. For example, the USBP proposed infrastructure would have unavoidable adverse impacts, primarily to vegetation communities, which have become established within road and fence rights-of-way or other proposed construction sites. Synergistic adverse effects to wildlife populations, due to reductions/alterations of habitats, would also occur. Even though this alternative would have unavoidable impacts and irretrievable losses of resources, it would greatly enhance the USBP's mission to gain and maintain control of the border. This alternative would also enhance the ability of the USBP to deter and apprehend illegal entrants near the border and therefore result in less trans-border traffic and fewer enforcement actions outside the immediate border vicinity. As documented in Section 1.3, the constant flow of UDAs passing through the U.S.-Mexico border area threatens public lands, archaeological and historic buildings/structures, and biological resources, including endangered species habitat. Therefore, implementing Alternative 1 would also produce beneficial consequences to wildlife habitat and populations in areas that have been substantially adversely affected by illegal drug smuggling traffic.


BW1 FOIA CBP 009646

### 2.2.3 Alternative 2. Expand Use of Technology-Based Operations and Infrastructure

This alternative promotes the use of technology-based operations and infrastructure over traditional barrier type operations. This alternative would include expanding the use of RVS sites, remote-sensing systems, portable generator and stadium style lights, skywatch towers, sensors, and repeaters (see Table 2-4). This alternative would still require the proposed construction/expansion of the USBP stations outlined in Table 2-4 to house the equipment required for these types of operations. An increase in the technology-based operations and infrastructure would enhance the deterrence and detection abilities of the USBP. However, this alternative would not provide the level of deterrence provided by barriers (i.e., fences and vehicle barriers). This alternative would have less direct impacts to the regions natural environment than Alternative 1; however, indirect impacts would be greater due to increased illegal entrant foot and vehicle traffic.

### 2.2.4 Alternative 3. Expand Current Operations with No New Infrastructure

This alternative includes the expansion of current USBP operations but would not allow for construction of proposed infrastructure projects. Construction projects that have already been evaluated through the NEPA process and/or currently under construction would be completed.

Changes in strategy and/or location of illegal entrants determine the locations of proposed infrastructure projects. This alternative would not give the USBP flexibility to concentrate infrastructure resources to these newly identified high traffic areas. Illegal entrants would quickly identify areas that were either limited or void of adequate infrastructure and relocate their operations. This would force the USBP to increase operations/activities in areas that have not traditionally required their presence.

As mentioned previously under Alternative 1, significant increases in certain operations, and activities might require additional NEPA documentation. Again, however, normal, routine operation, even if additional support personnel or equipment were deployed, would not require a separate analysis. The determination of which type of NEPA documentation, if any, is required would be made in accordance with 28 CFR Part 61, Appendix C.


BW1 FOIA CBP 009647

**Table 2-4. Proposed Infrastructure Projects within the Tucson and Yuma Sectors**

| | Station | Proposed Projects |
|---|---|---|
| YUMA SECTOR | **Yuma** | • Construction of new Border Patrol Station (within Yuma)<br>• Two miles of landing mat fence extension near San Luis<br>• Two miles of stadium style lights near Gadsden and San Luis (36 lights)<br>• 13 - 54 portable generator lights (2 miles)<br>• Three proposed RVS sites |
| | **Wellton** | • Construction of new Border Patrol Station (undetermined location)<br>• 35 proposed remote sensors |
| TUCSON SECTOR | **Ajo** | • Construction of vehicle barriers in (b) (7)(E)<br>• 13 RVS sites near border<br>• Primary Pedestrian barrier fence (60 miles) with (b) (7)(E) for access by the (b) (7)(E)<br>• New Checkpoint Facility<br>• 12' square concrete pads for placement of mobile LORIScopes (18 total)<br>• All-weather patrol road along the border with associated drainage solutions<br>• (b) (7)(E) drag roads on either side of the patrol road<br>• Bridges, culverts, and low water crossings with operable pedestrian barriers |
| | **Casa Grande** | • Maintenance of existing border road (48 miles)<br>• Addition of 15 RVS sites<br>• 12 remote sensors<br>• Primary Pedestrian barrier fence with (b) (7)(E) for access by the (b) (7)(E) to the (b) (7)(E) (37 miles)<br>• New Remote Processing Facility on the eastern end of the station's AO<br>• 12' square concrete pads for placement of mobile LORIScopes (12 total)<br>• Bridges, culverts, and low water crossings with operable pedestrian barriers to complement existing and proposed road infrastructure |
| | **Tucson** | • Maintenance of existing border roads (43miles)<br>• Addition of 5 RVS sites<br>• Pole-mounted area lighting. Poles (492) to be spaced at a maximum spacing of 300 feet (18 Stadium style lights)<br>• Primary pedestrian barrier fence with (b) (7)(E) or access by the (b) (7)(E) (28 miles)<br>• New remote processing facility on (b) (7)(E)<br>• Pad sites for checkpoint facility on (b) (7)(E) just north of the border and checkpoint facility on (b) (7)(E)<br>• 12' square concrete pads for placement of mobile LORIScopes (12 total)<br>• All-weather patrol road along the border along with associated drainage solutions<br>• All-weather service road, located roughly 2 miles north of the border (28 miles)<br>• (b) (7)(E) drag roads on either side of the patrol road (57 miles)<br>• Bridges, culverts, and low water crossings with operable pedestrian barriers to complement existing and proposed road infrastructure |


BW1 FOIA CBP 009648

**Table 2-4. Proposed Infrastructure Projects within the Tucson and Yuma Sectors**

| | Station | Proposed Projects |
|---|---|---|
| | **Nogales** | • Maintenance of existing roads (7 miles)<br>• Border patrol access road (18 miles)<br>• 61 portable stadium lights<br>• 18.6 miles of stadium lighting, poles (545) to be spaced at a maximum of 300 feet<br>• All-weather patrol road along the border (31 miles)<br>• (b) (7)(E) drag road along patrol road (31 miles)<br>• Construction of new checkpoint facility<br>• Renovations to two stormwater tunnels<br>• 25 proposed RVS sites<br>• Primary Pedestrian barrier fence with (b) (7)(E) for access by the (b) (7)(E)<br>• All-weather patrol service road north of the secondary fence (31 miles)<br>• 12' square concrete pads for placement of mobile LORIScopes (12 total)<br>• Upgrade of primary pedestrian with vertical angel caps<br>• Motion sensor systems mounted on primary pedestrian barrier fence<br>• Secondary pedestrian barrier fence with (b) (7)(E) at the main north to south access roads<br>• Bridges, culverts, and low water crossings and cattleguards with operable pedestrian barriers |
| **TUCSON SECTOR** | **Sonoita** | • 40 miles of road improvements<br>• 13 proposed RVS sites<br>• All-weather patrol road along the border along with associated drainage solutions (29 miles)<br>• All-weather patrol service road north of the secondary fence along with associated drainage solutions (29 miles)<br>• (b) (7)(E) drag road on both sides of the patrol road (58 miles)<br>• Expansion of border patrol station<br>• Construction of new remote processing facility<br>• Construction of a new helipad (located at USBP Station)<br>• Relocation of checkpoint station to (b) (7)(E)<br>• Primary pedestrian barrier fence with (b) (7)(E) for access by the (b) (7)(E) (29 miles)<br>• Secondary pedestrian barrier fence with (b) (7)(E) at the main north to south access roads (29 miles)<br>• 12' square concrete pads for placement of mobile LORIScopes (8 total) |


BW1 FOIA CBP 009649

**Table 2-4. Proposed Infrastructure Projects within the Tucson and Yuma Sectors**

| | Station | Proposed Projects |
|---|---|---|
| TUCSON SECTOR | **Naco** | • Construction of access road to the border (16 miles)<br>• 9 proposed RVS sites<br>• All-weather patrol road along the border along with associated drainage solutions (31 miles)<br>• All-weather patrol service road north of the secondary fence along with associated drainage solutions (31 miles)<br>• (b) (7)(E) drag road south of the patrol road (31 miles)<br>• Stadium style lights (16 lights) for length of station (minus existing 2 miles) – 29 miles (510 poles)<br>• Combine two lighting callouts<br>• Primary pedestrian barrier fence (29 miles) with (b) (7)(E) for access by the (b) (7)(E) , 1.6 miles fence with vertical angle cap<br>• Secondary pedestrian barrier fence with (b) (7)(E) at the main north to south access roads and (b) (7)(E) (30 miles)<br>• Motion sensor systems mounted on primary pedestrian barrier fence.<br>• 12' square concrete pads for placement of mobile LORIScopes (10 total)<br>• Checkpoint Facility on (b) (7)(E)<br>• Construction of a (b) (7)(E) station facility in (b) (7)(E) Arizona<br>• Pole-mounted area lighting. Poles to be spaced at a maximum spacing of 300 feet.<br>• Bridges, culverts, and low water crossings with operable pedestrian barriers |
| | **Douglas** | • Maintenance of existing roads (33 miles)<br>• (b) (7)(E) drag road south of the patrol road (23 miles)<br>• All-weather patrol road along the border along with associated drainage solutions (23 miles)<br>• All-weather patrol service road north of the secondary fence along with associated drainage solutions (23 miles)<br>• Primary pedestrian barrier fence with (b) (7)(E) for access by the (b) (7)(E) (23 miles)<br>• Secondary pedestrian barrier fence with (b) (7)(E) at the main north to south access roads (23 miles)<br>• Two ditch closures (two miles at 30 ft. wide)<br>• Four proposed RVS sites<br>• Motion sensor systems mounted on primary pedestrian barrier fence<br>• 12' square concrete pads for placement of mobile LORIScopes (8 total)<br>• Upgrade International Ditch to a concrete lined open channel (1.4 miles)<br>• Bridges, culverts, and low water crossings with operable pedestrian barriers |


BW1 FOIA CBP 009650

**Table 2-4. Proposed Infrastructure Projects within the Tucson and Yuma Sectors**

| | Station | Proposed Projects |
|---|---|---|
| | **Willcox** | • Seven proposed RVS sites near border<br>• Construction of new Border Patrol Station (within the (b) (7)(E) city limits)<br>• All-weather patrol service road north of the secondary fence along with associated drainage solutions (16 miles)<br>• (b) (7)(E) drag road south of the patrol road (16 miles)<br>• Primary pedestrian barrier fence with (b) (7)(E) for access by the (b) (7)(E)<br>• Secondary pedestrian barrier fence with (b) (7)(E) at the main north to south access roads<br>• Motion sensor systems mounted on primary pedestrian barrier fence<br>• 12' square concrete pads for placement of mobile LORIScopes (8 total)<br>• Construction of new Border Patrol Station (within the (b) (7)(E) city limits)<br>• Bridges, culverts, and low water crossings with operable pedestrian barriers |

Source: INS 2002a

### 2.2.5 Alternative 4. Maintain Current Level of Operations and Construct Infrastructure

This alternative would allow for the completion of current infrastructure projects and the construction of proposed infrastructure projects (see Table 2-4) but would not allow for the expansion of USBP operations. Increases in infrastructure would enhance the detection and apprehension abilities of the USBP. Improved roads and bridges would provide a safer driving environment and allow for quicker response time. Additional or improved fences would facilitate deterrence and protect adjacent habitats and residential/commercial properties from degradation by illegal entrant foot traffic.

While this alternative would facilitate the deterrence and detection of illegal trans-border activities, the USBP's ability to apprehend illegal entrants could be hampered if they are not allowed to increase operations/activities to adapt for changes in illegal entrant strategy.


BW1 FOIA CBP 009651

# *SECTION 3.0*
# *AFFECTED ENVIRONMENT*

BW1 FOIA CBP 009652

# 3.0 AFFECTED ENVIRONMENT

Discussions in this chapter shall be limited to only those resources that could potentially be affected by USBP activities, as per CEQ guidance (40 CFR 1501.7). Therefore, discussions of resources such as geology, utilities, communications and climate are limited in scope. Furthermore, detailed descriptions about the existing conditions of the human and natural environment along the Arizona border were presented in the Technical Support Documents for the Supplemental Programmatic Environmental Impact Statement (SPEIS) for INS and JTF-6 activities (USACE 2001). These discussions are incorporated herein by reference, as allowed by the CEQ regulations for implementing NEPA (40 CRF Part 1508).

## 3.1 Land Use

Four counties (Cochise, Pima, Santa Cruz, and Yuma counties, Arizona) within 50 miles of the U.S.-Mexico border comprise the study area for the Tucson and Yuma Sectors. As mentioned previously, this is not the entire area under the Yuma Sectors' jurisdiction. Portions of Imperial, Riverside, and San Bernardino counties, California are contained in the Yuma Sector; however, because this assessment only includes those counties in Arizona affected by USBP activities, these counties are not included as part of this PEIS. The major land uses include agriculture, rangeland, urban, forest, recreation/special use, military, and water. The major Federal agencies controlling large land areas are the USFS, National Park Service (NPS), BLM, and the Department of Defense (DoD). The major state agencies controlling large areas of land are the Arizona State Land Department and Arizona State Parks. Native American Tribes also own significant areas of land. Private and corporate uses are classified as urban areas and intensive specialized agriculture land, along with large areas of rangeland. "Other" land ownership includes land controlled by other Federal agencies, such as, the U.S. Fish and Wildlife Service (USFWS), along with county and municipal lands.

### 3.1.1 Cochise County

The total area of Cochise County, Arizona is approximately 6,170 square miles. The 1999 census estimated the population to be 112,754 with a population density of 18.3 persons per square mile (U.S. Census Bureau). The largest land use in the entire county is in the private

and corporate ownership category (42%). The principal land use outside the urban areas is rangeland and agriculture (cotton, alfalfa, barley, corn, and vegetables). The Federal government controls approximately 841,000 acres (21%). The USFS controls approximately 490,000 acres (12%) of land in this county. The majority of the USFS land is the multiple-use Coronado National Forest. The USFWS controls the San Bernardino National Wildlife Refuge within Cochise County. The BLM controls approximately 350,000 acres (9%). The BLM land includes the Chiricahua National Monument and numerous multiple use areas used primarily for grazing. The State of Arizona controls approximately 1,368,000 acres (34%), which is used primarily for recreation, historical, and natural areas. The study area has three small to medium sized urban areas; Douglas, Bisbee and Naco, Arizona that range in population from less than 1,000 to over 15,000 inhabitants.

### 3.1.2 Pima County

The total area of Pima County, Arizona is 9,187 square miles. The 1999 census estimated the population to be 803,618 with a population density of 87.5 persons per square mile (U.S. Census Bureau). Major industries located in Pima County include agriculture and tourism. Major land uses in the County include: CPNWR, OPCNM, Tohono O'odham Indian Nation, and the BANWR. According to the Arizona Department of Commerce (2000), the primary urban areas and their 1998 populations are Tucson (460,466), Oro Valley (21,411) and Marana (7,197), Arizona.

### 3.1.3 Santa Cruz County

The total area of Santa Cruz County, Arizona is 1,238 square miles. The 2000 census estimated the population to be 38,381 with a population density of 31.0 persons per square mile (U.S. Census Bureau 2000). Major industries located in Santa Cruz County include tourism, international trade, and manufacturing. According to the Arizona Department of Commerce (2000), the primary urban areas and their 1998 populations are Nogales (22,042) and Patagonia (970), Arizona.

### 3.1.4 Yuma County

The total area of Yuma County, Arizona is 5,514 square miles. The 2000 census estimated the population to be 160,026 with a population density of 29.0 persons per square mile (U.S. Census Bureau 2000). Major industries located in Yuma County include tourism, international trade, agriculture, and manufacturing. The Northeast portion of the county consists of the Fort Yuma Quechan Indian Reservation. The Cocopah Indian Reservation is located in the Southeastern portion of Yuma County and consists of three separate areas; West Reservation, East Reservation, and North Reservation. Other land uses in the County include: Kofa National Wildlife Refuge, Marine Corps Air Station – Yuma (MCAS-Yuma), BMGR-West, and the CPNWR. According to the Arizona Department of Commerce (2000), the primary urban areas and their 1998 populations are Yuma (62,433), San Luis (12,149), and Somerton (6,930), Arizona.

## 3.2 Transportation

### 3.2.1 Roads

The Interstate highway system within the study area is well developed (Rand McNally 1997). The following paragraphs describe the Interstate and U.S. Highways found within each county.

#### 3.2.1.1 Cochise County

Interstate 10 runs through Cochise County, Arizona and continues west through the cities of Tucson and Phoenix. U.S. Highway 90 runs from Interstate 10, through Sierra Vista, into Bisbee, Arizona. U.S. Highway 92 also runs from Sierra Vista to Bisbee, Arizona, but takes a more southern route near Naco, Arizona. U.S. Highway 80 runs from Interstate 10 (at Benson, Arizona) to the New Mexico border, passing through Bisbee and Douglas, Arizona. From Graham County (north of Cochise County, Arizona), U.S. Highway 191 intersects Interstate 10 and runs south to Douglas, Arizona. U.S. Highway 181 connects U.S. Highway 191 to the Chiricahua National Monument. U.S. Highway 186 also provides access to the Chiricahua National Monument via Interstate 10 at Willcox, Arizona. Cochise County, Arizona contains two legal POEs, Douglas and Naco, Arizona.

#### 3.2.1.2 Pima County

State Route 86 is the major east-west arterial through central Pima County, Arizona. There are no major roadways that parallel close to the U.S.-Mexico border. There are two crossings from Mexico via Pima County, Arizona. The first is provided along State Route 85 at Lukeville, Arizona and the second is along State Route 286 at Sasabe, Arizona.

#### 3.2.1.3 Santa Cruz County

State Route 289 parallels the U.S.-Mexico border in the southern portion of Santa Cruz County, Arizona. Interstate 19 is the major roadway in the County. Access to Mexico is provided through Nogales, Arizona. Vehicles can access the border crossing from the north along Interstate 19. Vehicles from the eastern portion of Santa Cruz County, Arizona or western Cochise County can access Interstate 19 and the border from State Route 82.

#### 3.2.1.4 Yuma County

The primary roadway access provided from Interstate 8 to the border crossing at San Luis, Arizona is U.S. Highway 95. Highway 95 is a north-south artery that proceeds from San Luis, Arizona through Yuma, Blythe, Las Vegas, and Boise to the Canadian border in Idaho. It intersects with not only Interstate 8, but with Interstates 10, 15, 40, 80, 84, and 90.

### 3.2.2 Airports

There are two major airports within the study area: Tucson International Airport and Yuma International Airport. In addition to these major airports, there are numerous small and medium airports located throughout the study area. These small to medium sized airports do not conduct regularly scheduled commercial or commuter flights. Most of these airports are not located in the vicinity of the border area. Some of these smaller airports could be utilized by planes providing air surveillance of the U.S.-Mexico border.

## 3.3 Soils

Soil composition and other attributes are a function of source material, climate, and topography. Many parts of the study area have not been mapped for soils including parts of Cochise, Pima, and Yuma counties, Arizona. The counties within the study area share a similar climate and similar types of parent material: unconsolidated stream sediments,

consolidated sedimentary rocks, and crystalline igneous and metamorphic rocks. There are 42 general soil associations within the Basin and Range Province, which can be grouped by topography: mountains, uplands/foothills, valley slope, and alluvial fan/floodplain. The counties where these soils occur are listed in Table 3-1, and briefly described below.

The mountainside soils are shallow; steep, and, where sufficient soil is present, well drained. There are four general soil associations present in this group that can be found throughout the mountain ranges of the study area.

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 may be exposed. Twelve general soil associations are present in this group. Transitional soils are rarely found in western Pima, Yuma, and La Paz counties, Arizona except in the Supersitition-Rositas association in Yuma County, Arizona where sand dunes are present.

The soils of the valley slopes are deep, well drained, and on slopes of up to 10 degrees. They form on and from older alluvial layers. Sediments are unsorted and have variable textures. There are eight general soil associations present in this group. These soils are extensive in Cochise, Santa Cruz, and eastern Pima counties, Arizona.

The alluvial fan/floodplain soils are level to near level, deep soils formed from older alluvium. Composition and texture are variable depending upon host material. Sixteen general soil associations are present in this group. Examples of these soils include: Dry Lake-Playa found in the Willcox Playa, Vinton-Gila found in the San Pedro River Basin, Grabe-Gila-Pima found in the Santa Cruz River Basin, and Rillito-Gunsight-Pinal found in the Lower Colorado River and Lower Gila River basins (U.S. Department of Agriculture 1971; Richardson and Miller 1974; Richardson et al. 1979; Barmore 1980).


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**Table 3-1. Soil Characteristics for Counties within the Basin and Range Province.**

| Topography/ Soil Association | Counties | Permeability Range | Flood/Erosion Hazard | Limits to Construction |
|---|---|---|---|---|
| **Mountains** | | | | |
| Luzena-Faraway | Cochise | Moderate-slow | Rare/severe | Low-high shrink-swell |
| Barkerville-Gaddes | Cochise | Moderately rapid | Rare/severe | Low shrink-swell |
| Tortugas-Rock Outcrop | Cochise, Santa Cruz | Moderate | Rare/severe | Low shrink-swell |
| Faraway-Rock Outcrop-Barkerville | Santa Cruz | Slow | Slight/high | Low shrink-swell |
| Cherioni-Gachado-Rock Outcrop | Pima | Slow | Slight/slight | Low shrink-swell |
| Lomitas-Rock Outcrop | Yuma, La Paz | Moderate | Rare/severe | Low shrink-swell |
| **Uplands/Foothills:** | | | | |
| White House-Bernadino-Carulampi | Pima, Santa Cruz | Slow-moderate | Rare/severe | High shrink-swell |
| Kimbrough-Cave | Cochise | Moderate | Rare/severe | Moderate shrink-swell |
| Hathaway-Nickel | Cochise, Santa Cruz | Moderate | Rare/severe | Low shrink-swell |
| Rilloso-Latene | Cochise | Moderate | Rare/severe | Moderate shrink-swell |
| Graham-Lampshire-Ustollic | Cochise | Slow-rapid | Rare/severe | Low-high shrink-swell |
| Mabray | Cochise | Moderate | Rare/severe | Low |
| Krentz | Cochise | Moderate | Rare/severe | Low shrink-swell |
| Rough Broken Land-Gullied Land | Cochise | Moderate | Rare/severe | Low-moderate shrink-swell |
| Granite Rock Land | Cochise | Moderate-slow | Rare/severe | Low-high shrink-swell |
| Pinaleno-Nickel-Palos Verdes | Pima | Slow-rapid | Rare/slight | Low shrink-swell |
| Lamphshire-Chiricahua-Graham | Santa Cruz | Slow-moderate | Rare/moderate-high | Low-high shrink-swell |
| Superstition-Rositaas | Yuma | Rapid | Rare/moderate | Low shrink-swell |
| **Valley Slope:** | | | | |
| Sonoita-Anthony | Cochise, Pima Santa Cruz | Moderate | Slight/slight | Low shrink-swell |
| White House Tubac-Forrest | Pima, Cochise | Slow | Slight/severe | High shrink-swell |
| Eba | Cochise | Slow | Rare/moderate | Moderate shrink-swell |
| Martinez | Cochise, Santa Cruz | Very slow | Slight/moderate | High shrink-swell |
| Casto | Cochise, Santa Cruz | Slow | Rare/severe | Low shrink-swell |





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**Table 3-1. Continued**

| Topography/ Soil Association | Counties | Permeability Range | Flood/Erosion Hazard | Limits to Construction |
|---|---|---|---|---|
| Cruces | Cochise | Moderate | Rare/severe | Low shrink-swell |
| Bonita-Sontag | Cochise | Slow-very slow | Slight/moderate | High shrink-swell |
| Laveen-Coolidge | Pima | Moderate-rapid | Severe/severe | Moderate shrink-swell |
| **Alluvial Fan/Valley Floor:** | | | | |
| Gothard-Crot-Stewart | Cochise | Moderately slow | Slight-severe/slight | High shrink-swell |
| Elfrida | Cochise | Moderately slow | Slight/slight | Moderate shrink-swell |
| Karro | Cochise | Moderately slow | Slight/slight | Moderate shrink-swell |
| McAllister | Cochise | Slow | Slight/slight | Moderate shrink-swell |
| Mohave | Cochise | Moderately slow | Slight/slight | Moderate shrink-swell |
| Dry Lake-Playa | Cochise | Rapid-slow | Severe/severe | High shrink-swell |
| Comoro-Anthony-Grabe | Cochise | Moderately rapid | Slight/slight | Low shrink-swell |
| Vinton-Gila | Cochise<br>Pima | Rapid | Slight/severe | Low shrink-swell |
| Guest | Cochise | Slow-very slow | Slight/slight | High shrink-swell |
| Coolidge-Wellton-Antho | Yuma | Moderately rapid | Slight/slight | Low shrink-swell |
| Antho-Valencia-Gilman | Pima | Moderate-slow | Severe/moderate | Low shrink-swell |
| Rillito-Gunsight-Pinal | Pima, Yuma | Moderate | Slight/moderate | Low shrink-swell |
| Gilman-Vint-Brisos | Yuma, La Paz) | Moderate-rapid | Severe/slight | Low shrink-swell |
| Imperial-Glenbar-Holtville | Yuma, | Slow-moderate | Frequent/slight | Moderate-high shrink-swell |
| Comora-Pima | Santa Cruz | Occasional/slight | Occasional/slight | Low-high shrink-swell |
| Harqua-Perryville-Gunsight | Yuma, | Occasional/slight | Occasional/slight | Low-moderate shrink-swell |

Source: U.S. Department of Agriculture 1971; Richardson and Miller 1974; Maricopa Planning Department 1977; Richardson et al. 1979





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In the mountainous uplands, Group V soils consist of excessively drained to well-drained, moderately sloping to very steep loamy coarse sands to loams represented by the Tollhouse-La Posta-Rock Land soil associations.

## 3.4 Prime Farmlands

All prime farmlands in Arizona are classified as Category 1 based on the requirement of irrigation to be arable. Prime farmlands in Arizona occur mainly within the San Pedro Valley. Many of the soils identified within the study area require irrigation in order to be considered prime farmlands. These soils are not considered unique because they require irrigation. The prime farmlands located within the study area are presented in Table 3-2.

## 3.5 Biological Resources

### 3.5.1 Vegetation Communities

The rich floral communities (3,666 species of native and naturalized plants) of Arizona can be defined on the basis of the interaction of geology, soils, climate, animals, and man. These vegetation areas set the stage for a wide array of land uses that varies from intensive cropland agriculture to extensive ranching and urban development. There are four biotic provinces in Arizona. The two provinces in the study area are: 1) the Apachian province which runs west from the New Mexico-Arizona state line through a large portion of Cochise, Santa Cruz, and parts of Pima counties, Arizona and 2) the Sonoran province which includes the northwestern part of Santa Cruz, Pima, Yuma, and La Paz counties, Arizona (Dice 1943). The Apachian biotic province covers the high grassy plains and mountains of southeastern Arizona and consists of plant and wildlife species adapted to semiarid conditions. The Sonoran biotic province covers the desert region of southwestern Arizona and is characterized by extensive plains from which isolated small mountains and buttes rise abruptly. Common and scientific names of plant species potentially occurring in the study area are presented in Appendix B.

Four of the six major vegetation communities in Arizona (i.e., Forest, Woodland, Grassland, and Desert Scrubland) are located within the study area (Brown 1982; Brown and Lowe 1983).

**Table 3-2. Study Area Soils Considered Prime Farmland When Irrigated**

| Soil name | Counties |
|---|---|
| Antho fine sandy loam | Yuma |
| Anthony fine sandy loam, 0 to 3 percent slopes* | Pima |
| Anthony sandy loam | Yuma |
| Bucklebar-hayhook-tubac complex, 0 to 3 percent slopes | Pima |
| Chucum loam, 1 to 3 percent slopes | Pima |
| Comoro sandy loam, 0 to 2 percent slopes* | Pima |
| Comoro soils, 0 to 5 percent slopes | Santa Cruz |
| Dateland fine sandy loam | Yuma |
| Dateland loamy fine sand | Yuma |
| Dateland-denure association, 1 to 3 percent slopes | Pima |
| Dateland-denure association, 1 to 3 percent slopes | Pima |
| Denure-panaka complex, 1 to 3 percent slopes | Pima |
| Diasnar sandy loam, 1 to 5 percent slopes | Pima |
| Gadsden clay | Yuma |
| Gadsden silty clay loam, 0 to 1 percent slopes* | Pima |
| Gilman loam | Yuma |
| Gilman very fine sandy loam, 0 to 1 percent slopes* | Pima |
| Ginland silty clay, 0 to 1 percent slopes* | Pima |
| Glenbar loam, 0 to 1 percent slopes* | Pima |
| Glenbar silty clay loam | Yuma |
| Glendale clay loam, 0 to 2 percent slopes* | Pima |
| Glendale silt loam, 0 to 3 percent slopes* | Pima |
| Glendale silt loam, 1 to 3 percent slopes* | Pima |
| Glendale-pajarito complex, 1 to 3 percent slopes* | Pima |
| Grabe soils | Santa Cruz |
| Grabe-Comoro complex, 0 to 5 percent slopes | Santa Cruz |
| Guest fine sandy loam, 0 to 1 percent slopes* | Pima |
| Guest soils | Santa Cruz |
| Hantz clay loam, 0 to 1 percent slopes* | Pima |
| Hantz loam, 0 to 1 percent slopes* | Pima |
| Holtville clay | Yuma |
| Indio silt loam | Yuma |
| Kofa clay | Yuma |
| Mohall loam, 0 to 2 percent slopes | Pima |
| Mohall loam. 0 to 2 percent slopes | Pima |
| Mohall-pahaka complex, 1 to 3 percent slopes | Pima |
| Mohall-pahaka complex, 1 to 3 percent slopes | Pima |
| Mohall-trix complex, 0 to 1 percent slopes | Pima |
| Mohall-trix complex, 0 to 1 percent slopes | Pima |
| Pajarito-sahuarita complex, 1 to 3 percent slopes | Pima |
| Pima soils | Santa Cruz |
| Ripley silt loam | Yuma |
| Riveroad and comoro soils, 0 to 2 percent slopes* | Pima |
| Sasco loam, 0 to 1 percent slopes | Pima |
| Tubac complex, 0 to 2 percent slopes | Pima |
| Tucson-mohall-valencia complex, 1 to 3 percent slopes* | Pima |
| Vecent clay loam, 0 to 1 percent slopes* | Pima |
| Vecont clay loam, 0 to 1 percent slopes* | Pima |
| Winterburg loam, 0 to 1 percent slopes | Pima |

* - These soils are also considered prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
Source: Breckenfield 2000.

#### 3.5.1.1 Forest

The forest community of this province consists of the Petran Subalpine Conifer Forest and the Petran Montane Conifer Forest. The Petran Subalpine Conifer Forest is a boreal forest found only in Cochise County, Arizona in the Chiricahua Mountains at elevations above 7,400 ft. msl. It consists of Englemann spruce/alpine fir series, bristlecone pine, and limber pine series. The Petran Montane Conifer Forest is a cold-temperate forest and occurs in Cochise County, Arizona in the Chiricahua Mountains between 6,800 and 10,000 ft. msl in elevation. The major tree series are Douglas fir/white fir series, pine series, and Gambel oak series.

#### 3.5.1.2 Woodland

The only woodland vegetation community in the study area is the Madrean Evergreen Woodland. It is a warm-temperate woodland found throughout the mountains of Cochise and eastern Pima counties starting at an elevation of 4,000 ft. msl. This community includes dominant tree species such as alligatorbark juniper, one-seed juniper, Mexican pinyon pine, Chihuahua pine, Arizona pine, Arizona white oak, Mexican blue oak, and Chihuahua oak.

#### 3.5.1.3 Grasslands

The grassland communities of this province consist of the Semi-desert Grasslands and the Plains Grassland. The Semi-desert Grassland is found in the valley areas of Cochise and eastern Pima counties. This vegetation is dominated by grama grasses, tobosa grass, curlymesquite grass, sacaton, and scrub-shrubs such as honey mesquite, one-seed juniper, littleleaf sumac, false-mesquite, and desert hackberry. The Plains Grassland community is located between 4,000 and 7,500 ft. msl in elevation. Dominant species include grama grasses, buffalo grass, Indian rice grass, galleta grass, prairie junegrass, plains lovegrass, vine mesquite, wolftail, and alkali sacaton. Shrubs such as four-wing saltbush, sagebrush, and snakeweed are often scattered throughout.

#### 3.5.1.4 Desert Scrubland

Desert scrubland comprises the vast majority of the habitat within the study area. Desert scrubland is subdivided into Chihuahuan desert scrub and Sonoran desert scrub. Chihuahuan desert scrub is found only in Cochise and eastern Pima counties. Creosote bush is the dominant vegetation, but cacti, tarbush, squawbush, ocotillo, and honey mesquite are also common associates. Sonoran desert scrub is found in Yuma and Pima Counties. The Sonoran desert scrub is divided into seven subdivisions, two of which occur in the study area - the Lower

Colorado River Valley (LCRV) and Arizona Upland Subdivisions (Brown 1994). The LCRV Subdivision is the driest of the Sonoran desert Scrub covering most of the study area in Yuma and Pima Counties. The dominant vegetation series within the LCRV is the creosote bush-white bursage. Common associates of the creosotebush-white bursage community include aster, quail bush, seep willow, foothill palo verde, arrow weed, screwbean mesquite, willow, and seablite. A dense and taller community of broad-leaved deciduous trees and shrubs dominates dry washes or streambeds throughout the study area. This community is referred to as the wash-woodland and is dominated by the palo verde-smoke tree-desert ironweed association. The Arizona Uplands subdivision is primarily located in Pima County and is dominated by the paloverde-cacti-mixed scrub vegetation.

### 3.5.2 Fish and Wildlife Resources

#### 3.5.2.1 Arizona

Arizona contains an enormous diversity of environments for wildlife ranging from hot, dry deserts at low elevations through rich upland deserts, grasslands, and woodlands at mid-elevations to cold, moist montane/alpine habitats. The distribution of these environments is controlled generally by climatic conditions as well as locally by topographic factors. Physiographic features such as scarps, plateaus, plains, mountains, and drainage systems along with soil types and pedogenic and biotic elements influence wildlife distribution. Due to the difference in climate and topography within the study area, the terrestrial wildlife will be divided into wildlife found in southeastern Arizona and wildlife found in southwestern Arizona.

The native faunal components of southeastern Arizona include 370 species of birds. The study area is dominated by sparrows and towhees (35 species); wood warblers (32 species); swans, geese, and ducks (31 species); tyrant flycatchers (30 species); and sandpipers and phalaropes (26 species). The majority of these bird species occur in spring and fall when Neotropical migrants (e.g., flycatchers and warblers) pass through on their way to summer breeding or wintering grounds and in the winter when summer resident birds (i.e., robins, kinglets, and sparrows) from the north arrive to spend the winter. The majority of the 109 mammalian species found in the study area are bats and rodents (i.e., mice and rats, squirrels) with rodents (e.g., pocket mice and kangaroo rats) being the most commonly encountered mammals. Of the 23 amphibian species which inhabit southeastern Arizona, spadefoot toads and true toads are dominant and the most widespread. A total of 72 species of reptiles can be found in the area

with the iguanid lizards and colubrid snakes being the most prevalent along with whiptails. The types of wildlife found in southeastern Arizona are listed in Appendix B (Lowe 1964; Hoffmeister 1986; Lane 1988; USDOI 1989; USACE 1990; Davis and Russell 1991; Lowe and Holm 1992).

The native faunal components of southwestern Arizona support 230 species of birds. Common species include sparrows and towhees (30 species); swans, geese, and ducks (22 species); sandpipers and phalaropes (22 species); wood warblers (21 species); tyrant flycatchers (18 species); and kites, eagles, and hawks (15 species). The majority of these bird species occur in spring and fall when Neotropical migrants (e.g., flycatchers and warblers) pass through on their way to summer breeding or wintering grounds and in the winter when summer resident birds (i.e., robins, kinglets, and sparrows) from the north arrive to spend the winter. The majority of the 62 mammalian species are bats (e.g., plainnose) and rodents (e.g., pocket mice, kangaroo rats, squirrels, and mice and rats) with rodents being the most common. Of the eight species of amphibians in southwestern Arizona, only two, the Sonoran desert toad and the red-spotted toad, are common. Forty-seven species of reptiles inhabit the area with iguanid lizards, colubrid snakes, and rattlesnakes being the most dominant and common. The types of wildlife found in southwestern Arizona are listed in Appendix B (Fowlie 1965; Bernard and Brown 1978; Hoffmeister 1986; Natural Resources Planning Team 1986; Groschupf et al. 1987; Rosenberg et al. 1991).

Distribution patterns of freshwater fish in Arizona are controlled by climatic and geological factors. A total of 47 fish species can be found in the major river basins and springs in the study area. The San Pedro River system supports 19 fish species; the Santa Cruz River system, 12 species; the Rio Yaqui Basin, 11 species; Monkey Spring, 10 species; Sycamore Bear Canyon, four species; and Quitobaquito Spring, two species. The lower Gila River system contains 11 fish species of which only the Desert pupfish is a native species. The Lower Colorado River system supports 36 fish species of which only four are native. The fishes found in the study area are listed in Appendix B (Minckley 1973; Rinne and Minckley 1991; Robbins et al. 1991).

### 3.5.3 Threatened/Endangered Species and Critical Habitat

The Endangered Species Act (ESA) [16 U.S.C. 1532 et. seq.] of 1973, as amended, 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 lies with the Secretary of the Interior and the Secretary of Commerce.

The USFWS and the National Marine Fisheries Service (NMFS) are the primary agencies responsible for implementing the ESA. The USFWS is responsible for birds, terrestrial, and freshwater species, while the NMFS is responsible for non-bird marine 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 in danger of extinction throughout all or a significant portion of its range. A threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those, which have been formally submitted to Congress for official listing as threatened or endangered. Species may be considered endangered or threatened when any of the five following criteria occurs: (1) The 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) The inadequacy of existing regulatory mechanisms; and (5) Other natural or human-induced factors 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 (C) designation includes those species for which the USFWS has sufficient information on hand 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.

The ESA also calls for the conservation of what is termed Critical Habitat - the areas of land, water, and air space that an endangered species needs for survival. Critical habitat also includes such things as food and water, breeding sites, cover or shelter, and sufficient habitat area to provide for normal population growth and behavior. One of the primary threats to many species is the destruction or modification of essential habitat by uncontrolled land and water development.

### 3.5.3.1 Federal

A total of 43 Federally endangered, threatened, proposed threatened, and candidate species occur within Cochise, Pima, Santa Cruz, and Yuma counties, Arizona This list includes 11 birds, 7 mammals, 3 reptiles, 2 amphibians, 11 fishes, 1 invertebrate, and 8 vascular plants. A total of 24 species are listed as endangered, 9 as threatened, 4 as proposed threatened, and 6 as candidate. Information pertaining to these federally protected species is included in Table 3-3.

Protected species in the study area are generally concentrated near the San Pedro River, and the Lower Colorado River of Arizona. The Canelo Hills ladies' tresses, bald eagle, loach minnow, spikedace, Huachuca water umbel, southwestern willow flycatcher, Chiricahua leopard frog, and Huachuca springsnail have all been documented in or near the San Pedro River area. Additionally, the densely vegetated riparian areas associated with the San Pedro River are preferred habitats for the ocelot. The lesser long-nosed bat, lemmon fleabane, Huachuca water umbel, Sonoran tiger salamander, Chiricahua leopard frog, and Mexican spotted owl have all been documented within the Huachuca Mountains. The California brown pelican, Yuma clapper rail, razorback sucker, and desert pupfish have all been documented in or near the Lower Colorado River drainage.

In addition, other species with known occurrences within the study area include the Cochise pincushion cactus (scattered locations throughout Cochise County), Kearney's blue star (Baboquivari Mountains, Pima County), nichol turk's head cactus (scattered locations throughout southwestern Pima and north-central Pima counties), Pima pineapple cactus (Baboquivari Mountains and Santa Rita Mountains, Pima and Santa Cruz counties), masked bobwhite (BANWR, Pima County), Sonoran pronghorn (southwestern Pima and Yuma counties), Sonoita mud turtle (Quitobaquito Spring, Pima County), beautiful shiner (San Bernadino Creek, Cochise County), desert pupfish (Quitobaquito Spring, Pima County), Gila chub (Gila River basin), Gila topminnow (Santa Cruz River, Santa Cruz County), Sonoran chub (Atascosa Mountains, Santa Cruz county), Yaqui catfish (San Bernadino Creek, Cochise County), Yaqui chub (San Bernadino Creek, Cochise County), Yaqui topminnow (San Bernadino Creek, Cochise County), and flat-tailed horned lizard (Yuma County).

**Table 3-3. Federally Listed, Proposed, and Candidate Species Potentially Occurring within Cochise, Pima, Santa Cruz, and Yuma Counties, Arizona**

| Common/Scientific Name | Status | Date Listed | Counties | USBP Stations | Habitat |
|---|---|---|---|---|---|
| **PLANTS** | | | | | |
| Acuna cactus<br>*Echinomastus erectocentrus acunensis* | C | 7/1/75 | Pima | (b) (7)(E) | Well drained knolls and gravel ridges in Sonoran desertscrub |
| Canelo Hills ladies' tresses<br>*Spiranthes delitescens* | E | 1/6/97 | Cochise, Santa Cruz | | Finely grained, highly organic, saturated soils of cienegas |
| Cochise pincushion cactus<br>*Coryphantha robbinsorum* | T | 1/9/86 | Cochise | | Semidesert grassland with small shrubs, agave, other cacti, and grama grass |
| Huachuca water umbel<br>*Lilaeopsis schaffneriana ssp. recurva* | E | 1/6/97 | Cochise, Pima, Santa Cruz | | Cienegas, perennial low gradient streams, wetlands |
| Kearney's blue star<br>*Amsonia kearneyana* | E | 1/19/89 | Pima | | West-facing drainages in the Baboquivari Mountains |
| Lemmon fleabane<br>*Erigeron lemmonii* | C | 7/1/75 | Cochise | | Crevices, ledges, and boulders in canyon bottoms in pine-oak woodlands |
| Nichol's turk's head cactus<br>*Echinocactus horizonthalonius* var. *nicholii* | E | 10/26/79 | Pima | | Sonoran desertscrub on limestone slopes in desert hills |
| Pima pineapple cactus<br>*Coryphantha scheeri robustispina* | E | 4/20/92 | Pima, Santa Cruz | | Sonoran desertscrub or semi-desert grassland communities |
| **BIRDS** | | | | | |
| Bald Eagle<br>*Haliaeetus leucocephalus* | T | 1/12/95 | Cochise, Pima, Santa Cruz, Yuma | | Large trees or cliffs near water with abundant prey |
| Brown pelican<br>*Pelecanus occidentalis* | E | 10/13/70 | Yuma | | Feed in shallow estuarine waters; nest on small coastal islands |
| Cactus ferruginous pygmy-owl<br>*Glaucidium brasilianum cactorum* | E | 3/10/97 | Cochise, Pima, Santa Cruz, Yuma | | Mature cottonwood/willow, mesquite bosques, and Sonoran Desertscrub |
| Masked bobwhite<br>*Colinus virginianus ridgewayi* | E | 3/11/67 | Pima | | Desert grasslands with diversity of dense native grasses, forbs and brush |
| Mexican spotted owl<br>*Strix occidentalis lucida* | T | 3/15/93 | Cochise, Pima, Santa Cruz | | Nests in canyons and dense forests with multi-layered foliage structure |





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**Table 3-3 Continued**

| Common/Scientific Name | Status | Date Listed | Counties | USBP Stations | Habitat |
|---|---|---|---|---|---|
| Mountain plover<br>*Charadrius montanus* | PT | 2/18/99 | Cochise, Pima, Yuma | (b) (7)(E) | Open arid plains, short-grass prairies, and scattered cactus |
| Northern aplomado falcon<br>*Falco femoralis septentrionalis* | E | 1/25/86 | Cochise, Santa Cruz | | Grassland and Savannah |
| Southwestern willow flycatcher<br>*Empidonax traillii extimus* | E | 2/27/95 | Cochise, Pima, Yuma | | Cottonwood/willow and tamarisk vegetation communities along rivers and streams |
| Whooping crane<br>*Grus americana* | E | 3/11/67 | Cochise | | Marshes, prairies, natural lakes |
| Yellow-billed cuckoo<br>*Coccyzus americanus* | C | NA | Cochise, Pima, Santa Cruz | | Large blocks of riparian woodlands |
| Yuma clapper rail<br>*Rallus longirostris yumanensis* | E | 3/11/67 | Yuma | | Cattail and bulrush marshes along the Colorado River, Gila River, and Salton Sea |
| **AMPHIBIANS** | | | | | |
| Chiricahua leopard frog<br>*Rana chiricahuensis* | T | 7/15/02 | Cochise, Pima, Santa Cruz | | Streams, rivers, backwaters, ponds, and stock tanks |
| Sonora tiger salamander<br>*Ambystoma tigrinum stebbinsi* | E | 1/6/97 | Cochise, Santa Cruz | | Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains |
| **INVERTEBRATES** | | | | | |
| Huachuca springsnail<br>*Pyrgulopsis thompsoni* | C | 1/6/89 | Cochise, Santa Cruz | | Aquatic areas, small springs with vegetation slow to moderate flow |
| Stephan's riffle beetle<br>*Heterelmis stephani* | C | NA | Santa Cruz | | Free-flowing springs and seeps |
| **MAMMALS** | | | | | |
| Black-tailed prairie dog<br>*Cynomys ludovicianus* | C | 10/4/99 | Cochise | | Short-grass prairie habitats |
| Jaguar<br>*Panthera onca* | E | 7/22/97 | Cochise, Pima | | Variety of habitats from Sonoran desert to conifer forests |
| Jaguarundi<br>*Felis yagouaroundi tolteca* | E | 6/14/76 | Cochise, Pima, Santa Cruz | | Dense thorny thickets of mesquite and acacia |





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**Table 3-3 Continued**

| Common/Scientific Name | Status | Date Listed | Counties | USBP Stations | Habitat |
|---|---|---|---|---|---|
| Lesser long-nosed bat<br>*Leptonycteris curasoae yerbabuenae* | E | 9/30/88 | Cochise, Pima, Santa Cruz | (b) (7)(E) | Desert scrub habitat with agave and columnar cacti present as food plants |
| Mexican gray wolf<br>*Canis lupus baileyi* | E | 3/11/67 | Cochise, Pima, Santa Cruz | | Chaparral, woodland, and forested areas; may cross desert areas |
| Ocelot<br>*Felis pardalis* | E | 7/21/82 | Cochise, Pima, Santa Cruz | | Humid tropical and sub-tropical forests, savannahs, and semi-arid thornscrub |
| Sonoran pronghorn<br>*Antilocapra americana sonoriensis* | E | 3/11/67 | Pima, Yuma | | Broad, intermountain alluvial valleys with creosote-bursage/palo verde-mixed cacti |
| **REPTILES** | | | | | |
| New Mexican ridge-nosed rattlesnake<br>*Crotalus willardi obscurus* | T | 4/4/78 | Cochise | (b) (7)(E) | Presumably canyon bottoms in pine-oak and pin-fir communities |
| Sonoyta mud turtle<br>*Kinosternon sonoriense longifemorale* | C | 9/19/97 | Pima | | Ponds and streams |
| Flat-tailed horned lizard<br>*Phrynosoma meallii* | PT | 12/21/01 | Yuma | | Sand flats, small to medium sand dunes, desert pavement with fine blowsand and associated vegetation consisting of creosote bush and white bursage |
| **FISHES** | | | | | |
| Beautiful shiner<br>*Cyprinella formosa* | T | 8/31/84 | Cochise | (b) (7)(E) | Small to medium sized streams and ponds with sand, gravel, and rock bottoms |
| Desert pupfish<br>*Cyprinodon macularius* | E | 3/31/86 | Pima, Santa Cruz, Imperial | | Shallow springs, small streams, and marshes; tolerates saline and warm water |
| Gila chub<br>*Gila intermedia* | PT | 8/9/02 | Cochise, Pima, Santa Cruz | | Pools, springs, cienegas, and streams |
| Gila topminnow<br>*Poeciliopsis occidentalis occidentalis* | E | 3/11/67 | Pima, Santa Cruz | | Small streams, springs, and cienegas vegetated shallows |





BW1 FOIA CBP 009669

**Table 3-3 Continued**

| Common/Scientific Name | Status | Date Listed | Counties | USBP Stations | Habitat |
|---|---|---|---|---|---|
| Loach minnow<br>*Tiaroga cobitis* | T | 10/28/86 | Cochise, Pima | (b) (7)(E) | Cool to warmwater, low gradient streams and rivers in the Gila River basin |
| Razorback sucker<br>*Xyrauchen texanus* | E | 5/22/90 | Yuma | | Rivers with strong, uniform currents over sandy bottoms |
| Sonora chub<br>*Gila ditaenia* | T | 4/30/86 | Santa Cruz | | Large, deep, and permanent pools with bedrock-sand substrates |
| Spikedace<br>*Meda fulgida* | T | 7/1/86 | Cochise, Pima | | Cool to warmwater streams and rivers of moderate gradient in the Gila River basin |
| Yaqui catfish<br>*Ictalurus pricei* | T | 8/31/84 | Cochise | | Moderate to large streams with slow current over sand and rock bottoms |
| Yaqui chub<br>*Gila purpurea* | E | 8/31/84 | Cochise | | Deep pools of small streams, pools, or ponds near undercut banks |
| Yaqui topminnow<br>*Poeciliopsis occidentalis sonoriensis* | E | 3/11/67 | Cochise | | Vegetated springs, brooks, and margins of backwaters. Found generally in the shallows |

**Source:** USFWS 2000a. INS 2002e, and INS 2002f

**Legend:**
E – Endangered
T – Threatened
C – Candidate
PT – Proposed Threatened

(b) (7)(E)





BW1 FOIA CBP 009670

#### 3.5.3.2 State

The ADGF maintains lists of Wildlife of Special Concern (WC). This list includes species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines. These species are not necessarily the same as those protected by the Federal Government under the ESA. Information pertaining to WC potentially occurring in Cochise, Pima, Santa Cruz, and Yuma counties, Arizona is presented in Appendix B.

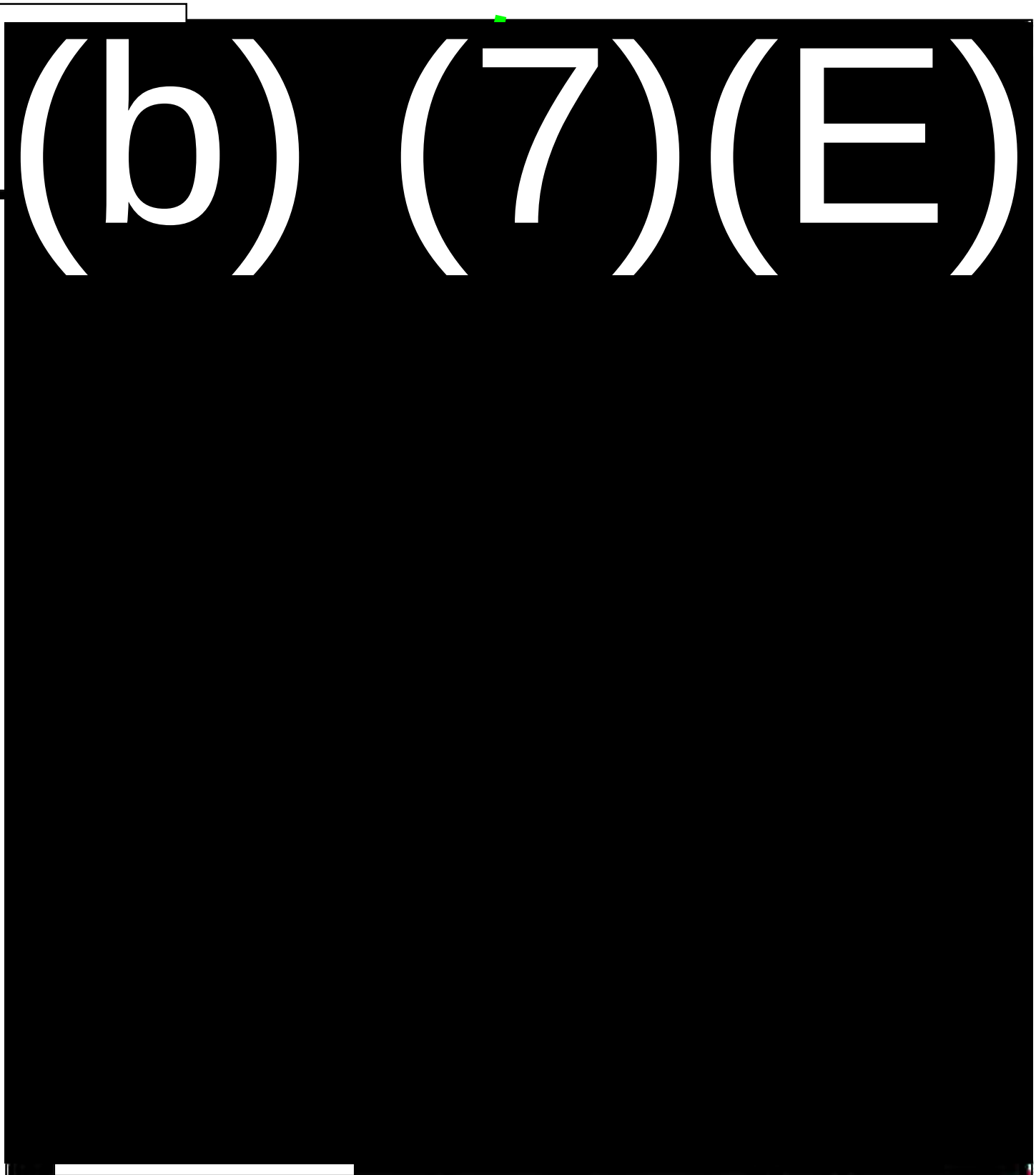
The Arizona Department of Agriculture maintains a list of protected plant species within Arizona. The Arizona Native Plant Law (1993) defines five categories of protection within the state. These include: Highly Safeguarded (HS), no collection allowed; Salvage Restricted (SR), collection only with permit; Export Restricted (ER), transport out of state prohibited; Salvage Assessed (SA), permit required to remove live trees; and Harvest Restricted (HR), permits required to remove plant by products (AGFD 2000a). Information pertaining to state protected plant species potentially occurring in Cochise, Pima, Santa Cruz, and Yuma counties, Arizona is presented in Appendix C.

#### 3.5.3.3 Critical Habitat

Critical habitat, as defined by the ESA, has been designated for 15 species and proposed for two species identified as potentially occurring in the study area. Although critical habitat has been designated for the whooping crane, and New Mexico ridge-nosed rattlesnake, none of their designated critical habitats are present with the study area. The remaining 13 species with designated critical habitat include eight fishes, three birds, one reptile, and one vascular plant.

Fifteen areas were designated as critical habitat for the razorback sucker within waterways in Colorado, Utah, New Mexico, and Arizona on March 21, 1994 (59 FR 13374-13400). Only one area is located within the study area. This area includes a portion of the Colorado River and its 100-year flood plain from Imperial Dam and extending upstream to Parker Dam within the Wellton Station's AO (Figure 3-1).

One area was designated as critical habitat for the desert pupfish in Arizona on March 31, 1986 (51 FR 10842-10851). This area includes a Quitobaquito Springs and a 100-foot




Source: El Centro (1977) USGS 1:250,000 Topographic Map

Figure 3-1: Critical Habitat for the Razorback Sucker Within the Wellton Station Area of Operations

Scale: on map

Date: September 2002

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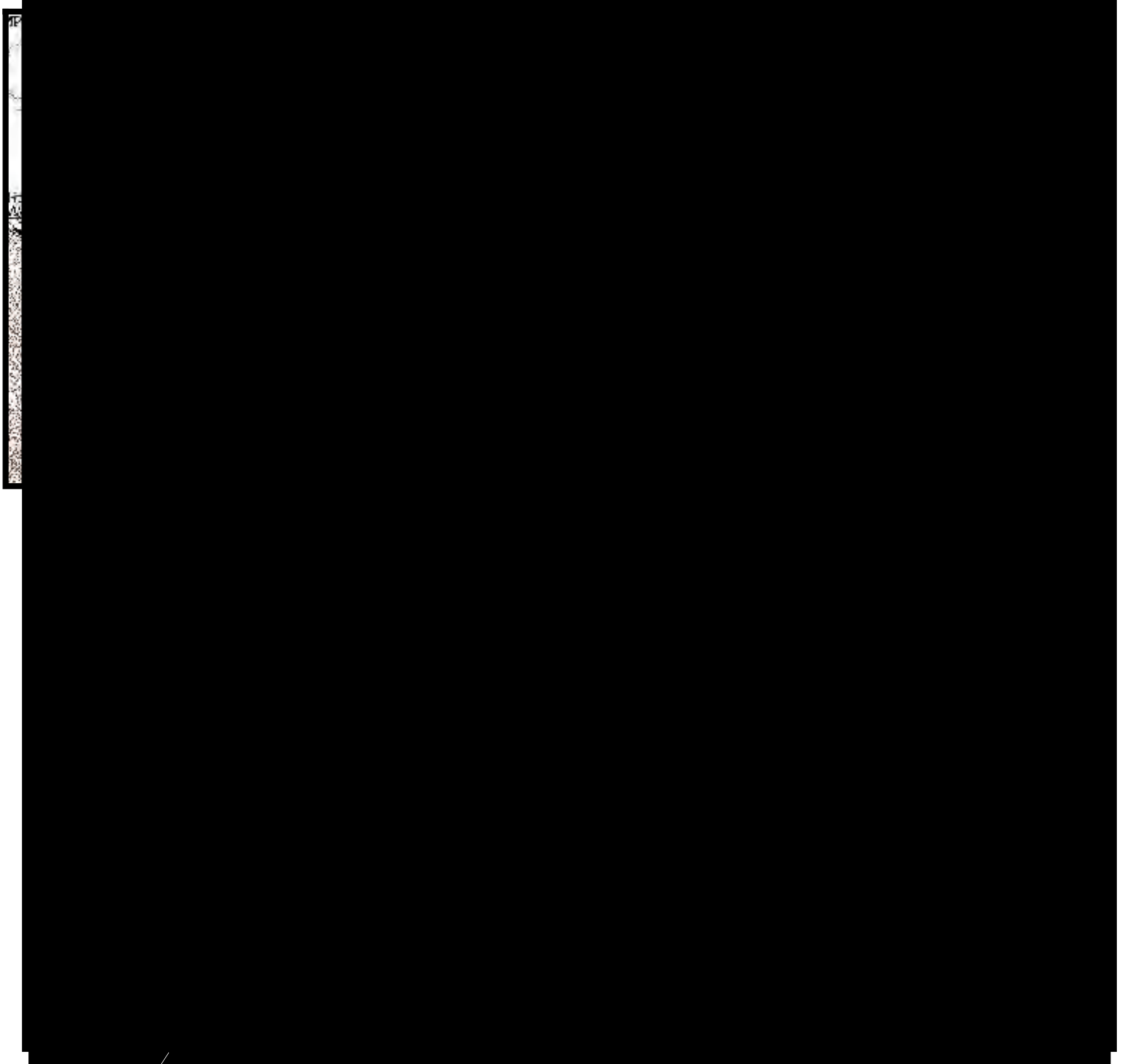
riparian buffer zone around the spring and pond located in OPCNM which is located in the Ajo Station AO, Pima County (Figure 3-2). Four areas were designated as critical habitat for the Sonoran chub in Arizona on April 30, 1986 (51 FR 16042-16047). These areas are located in the Coronado National Forest within the Tucson and Nogales Stations AO, Santa Cruz County (Figure 3-3).

The critical habitat for Sonoran chub is defined as Sycamore Creek, and a riparian zone 25 ft. msl wide along each side of the creek, from Yank's Spring downstream approximately five stream miles to the international border with Mexico; Yank's Spring; Penasco Creek, including a riparian zone 25 ft. msl wide along each side of the creek from its confluence with Sycamore Creek upstream approximately 1.25 miles; and an unnamed tributary to Sycamore Creek upstream approximately 0.25 miles.

The USFWS designated seven areas (units) as critical habitat for the Huachuca water umbel in Arizona on July 12, 1999 (64 FR 37441-37453). All seven units are located within the study area and occur within Sonoita and Naco Station's AOR, Santa Cruz and Cochise counties, Arizona (Figure 3-4 and 3-5). These areas are defined as follows: (1) approximately 1.25 miles of Sonoita Creek southwest of Sonoita; (2) approximately 2.7 miles of the Santa Cruz River on both sides of Forest Road 61, plus approximately 1.9 miles of an unnamed tributary to the east of the river; (3) approximately 3.4 miles of Scotia Canyon upstream from near Forest Road 48; (4) approximately 0.7 miles of Sunnyside Canyon near Forest Road 117 in the Huachuca Mountains; (5) approximately 3.8 miles of Garden Canyon near its confluence with Sawmill Canyon; (6) approximately 1.0 mile of Lone Mountain Canyon, approximately 1.0 mile of Rattlesnake Canyon, 0.6 mile of an unnamed canyon, approximately 1.0 mile of Bear Canyon, and an approximately 0.6 miles reach of an unnamed tributary to Bear Canyon; and (7) approximately 33.7 miles of the San Pedro River from the perennial flows reach north of Fairbank to 0.13 miles south of Hereford, San Pedro Riparian Natural Conservation Area. These areas include stream courses and adjacent areas out to the beginning of upland vegetation.

Seven areas (complexes) were designated as critical habitat for the spikedace and loach minnow on April 25, 2000 (65 FR 24328-24372). Only one, the Middle/Upper San Pedro River Complex 5, is located within the study area. This area is defined as 37 miles of river

(b) (7)(E)



Source: Ajo (1982) & Lukeville (1975) USGS 1:250,000 topographic maps

Figure 3-2: Critical Habitat for the Desert Pupfish Within the Ajo Station Area of Operations

Scale: on map

Date: September 2002

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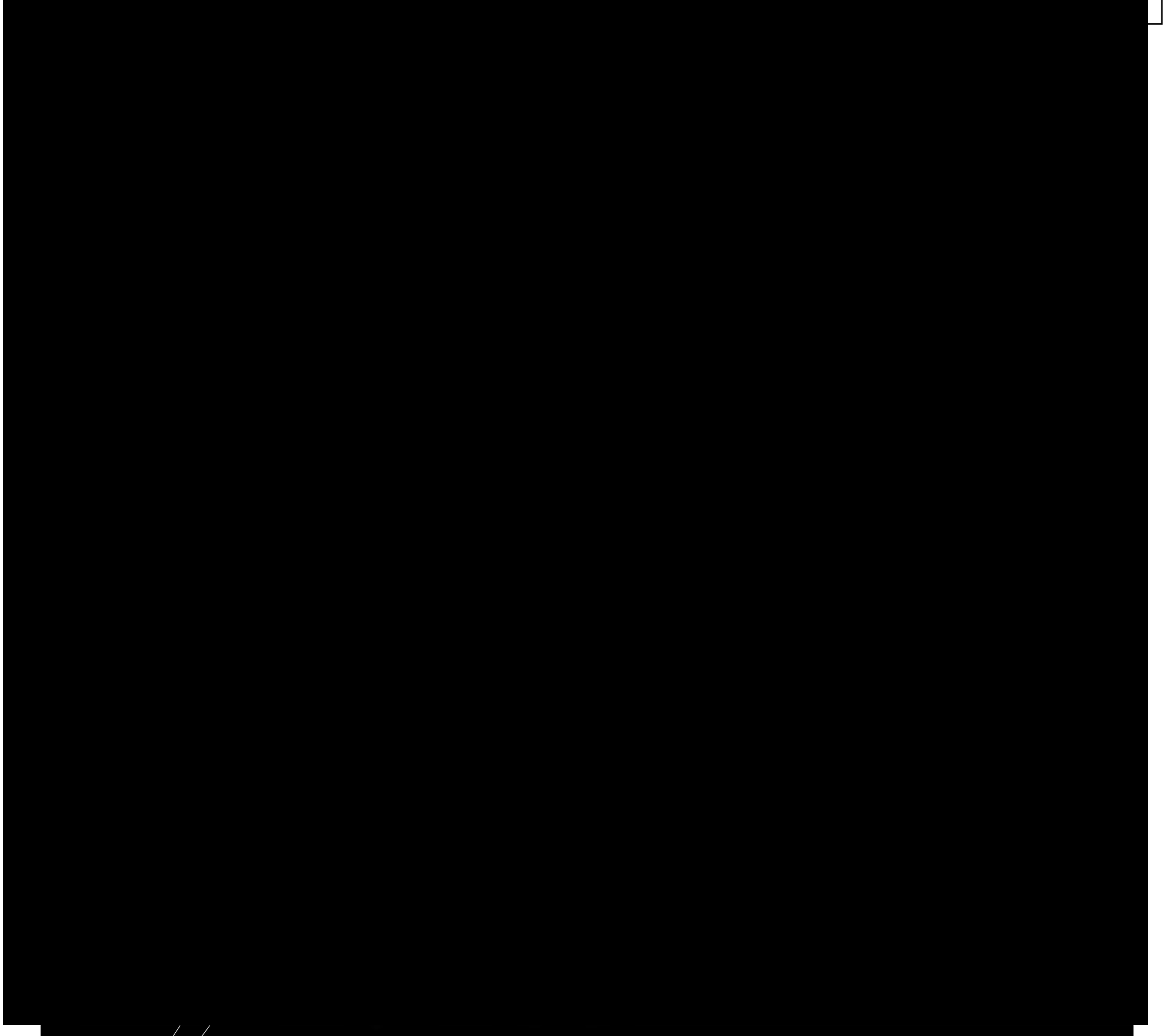
(b) (7)(E)



Source: Nogales (1969) USGS 1:250,000 Topographic Map

Figure 3-3: Critical Habitat for the Sonoran Chub Within the Tucson and Nogales Station Area of Operations.

Scale: on map

Date: September 2002

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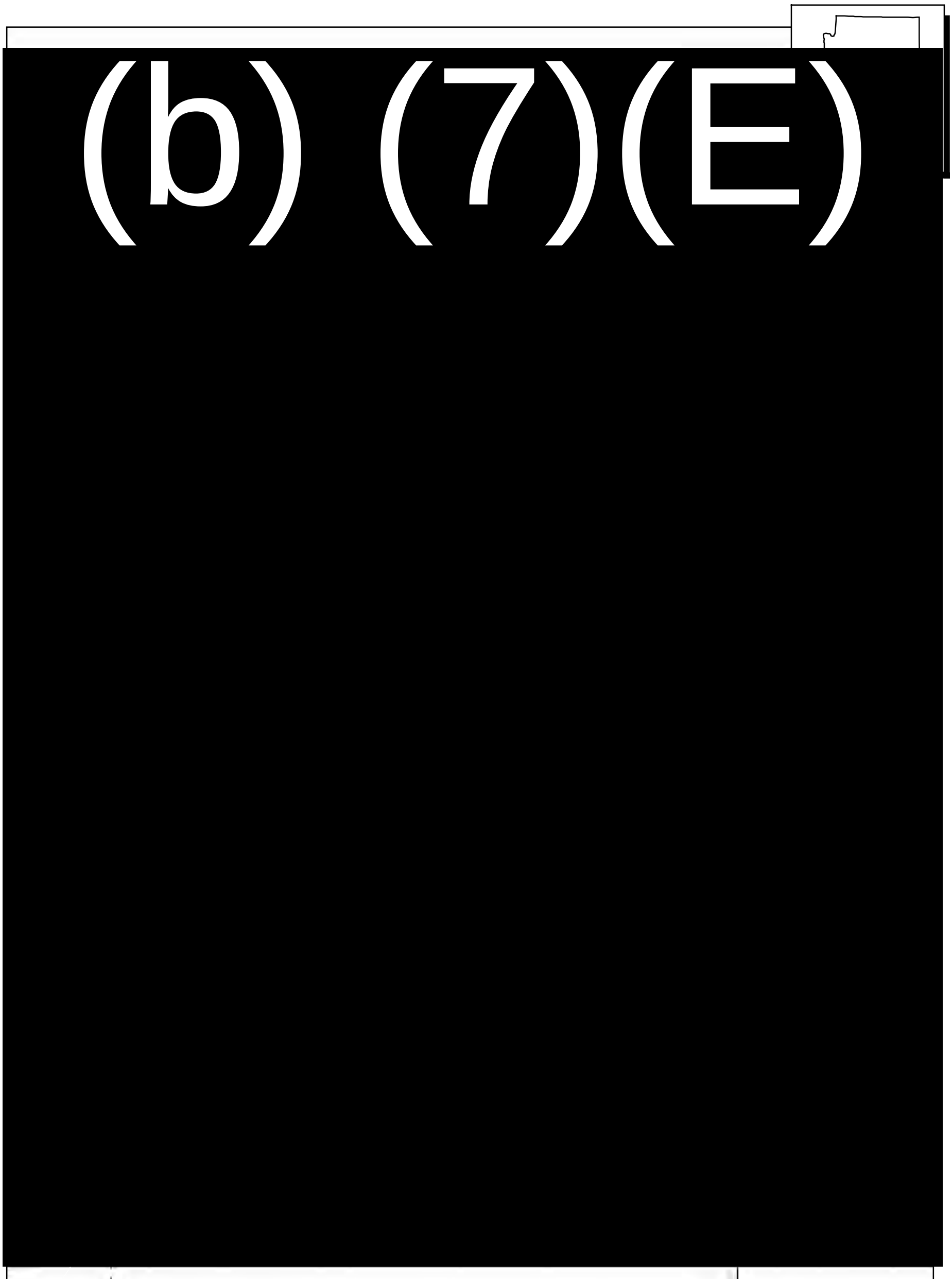


Source: Nogales (1969) USGS 1:250,000 Topographic Map

Figure 3-4: Critical Habitat for the Huachuca Water Umbel and Mexican Spotted Owl Within the Sonoita Station Area of Operations.

Scale: on map

Date: September 2002

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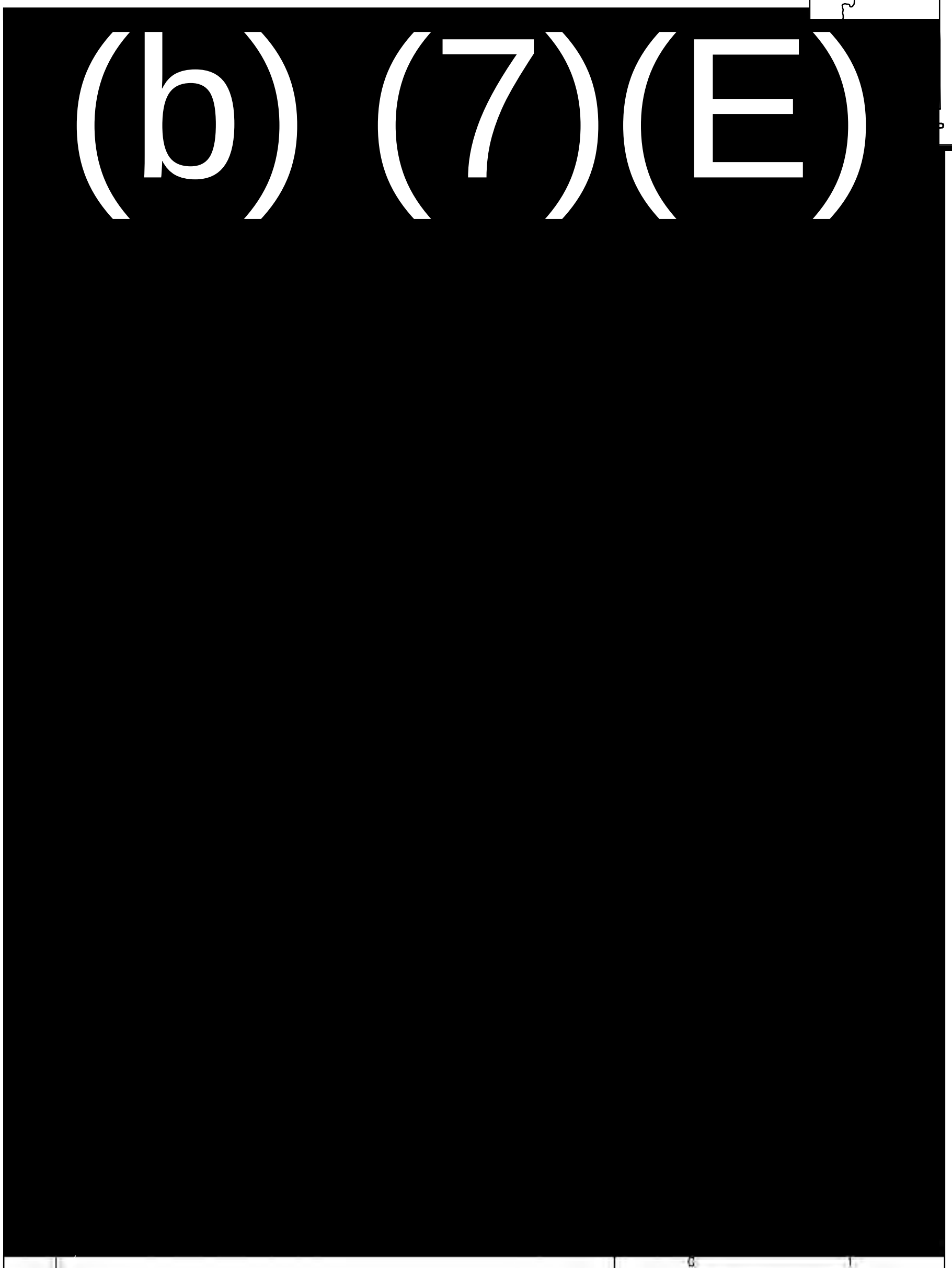
(b) (7)(E)



Source: Nogales (1969) & Douglas (1970) USGS 1:250,000 Topographic Maps

Figure 3-5: Critical Habitat for the Huachuca Water Umbel, Spikedace and Loach Minnow and the Mexican Spotted Owl Within the Naco Station Area of Operations.

Scale: on map

Date: September 2002

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extending from the confluence with the Babocomari River downstream to the U.S./Mexico Border (see Figure 3-5), within the Naco Station AOR, Cochise County, Arizona.

Critical habitat was designated for the Mexican spotted owl by the USFWS on February 1, 2002 (66 FR 8530-8553) precise legal descriptions are unknown at this time. Included in the Arizona proposed areas of critical habitat are portions of Cochise, Pima, and Santa Cruz counties (see Figures 3-4 and 3-5). Primary constituent elements are provided in canyons and mixed conifers, pine-oak, and riparian habitat types that typically support nesting and/or roosting.

The USFWS designated one area (complex) as critical habitat for the beautiful shiner, Yaqui catfish, and Yaqui chub in Arizona on August 31, 1984 (49 FR 34490-34497). This area encompasses all aquatic habitat of San Bernardino National Wildlife Refuge including small permanent streams with riffles, or intermittent creeks with pools and riffles in the Rio Yaqui drainage with clean unpolluted water (Figure 3-6). This area is located in the Willcox Station AOR, Cochise County, Arizona.

## 3.6 Unique and Environmentally Sensitive Areas

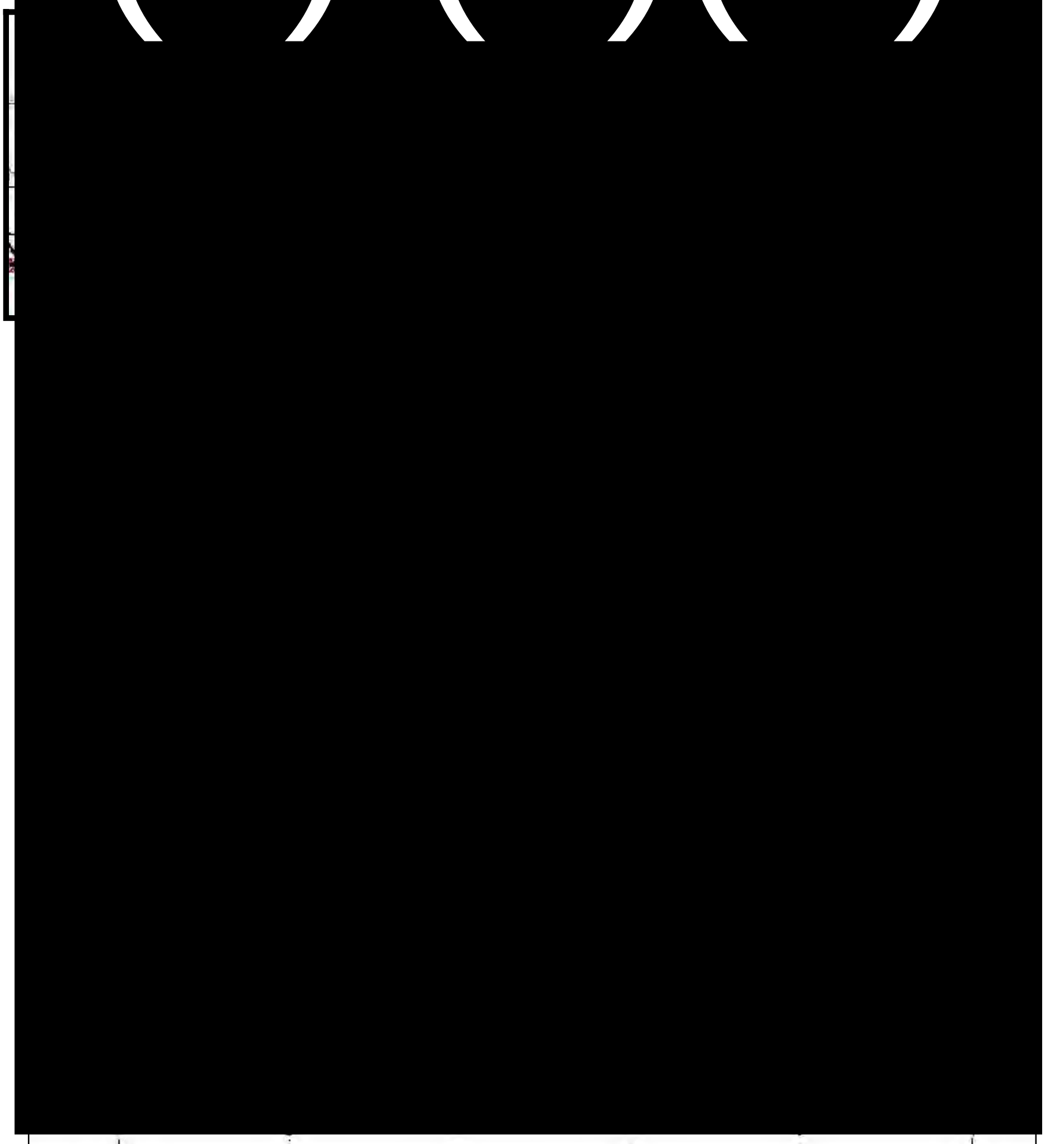
A wide variety of unique or environmentally sensitive areas exist within the study area (Figure 3-7). A list of unique areas found in the study area by county is presented in Table 3-4. The following paragraphs describe the major sensitive areas in the study area.

### 3.6.1 Cochise County

#### 3.6.1.1 Chiricahua National Monument

Chiricahua National Monument comprises 12,000 acres in the Chiricahua Mountains of southeastern Arizona, approximately 30 miles southeast of Willcox (NPS 2000a). These volcanic mountains rise above the surrounding grasslands to elevations ranging between 5,100 and 7,800 ft. msl. The Monument is located 120 miles east of Tucson on State Route 186. Chiricahua National Monument features 17 miles of maintained trail in a monument that is 90% wilderness. It is home to a wide variety of plant and animal species. Most conspicuous are the rare birds such as sulphur-bellied flycatchers, Mexican chickadees, and elegant trogans, which make the area a popular site for bird watching. Mammals such as the

(b) (7)(E)



Source: Nogales (1969) & Douglas (1970) USGS 1:250,000 Topographic Maps

Figure 3-6: Critical Habitat for the Beautiful Shiner, Yaqui Catfish, and Yaqui Chub Within the Southern Willcox Station Area of Operations.

Scale: on map

Date: September 2002

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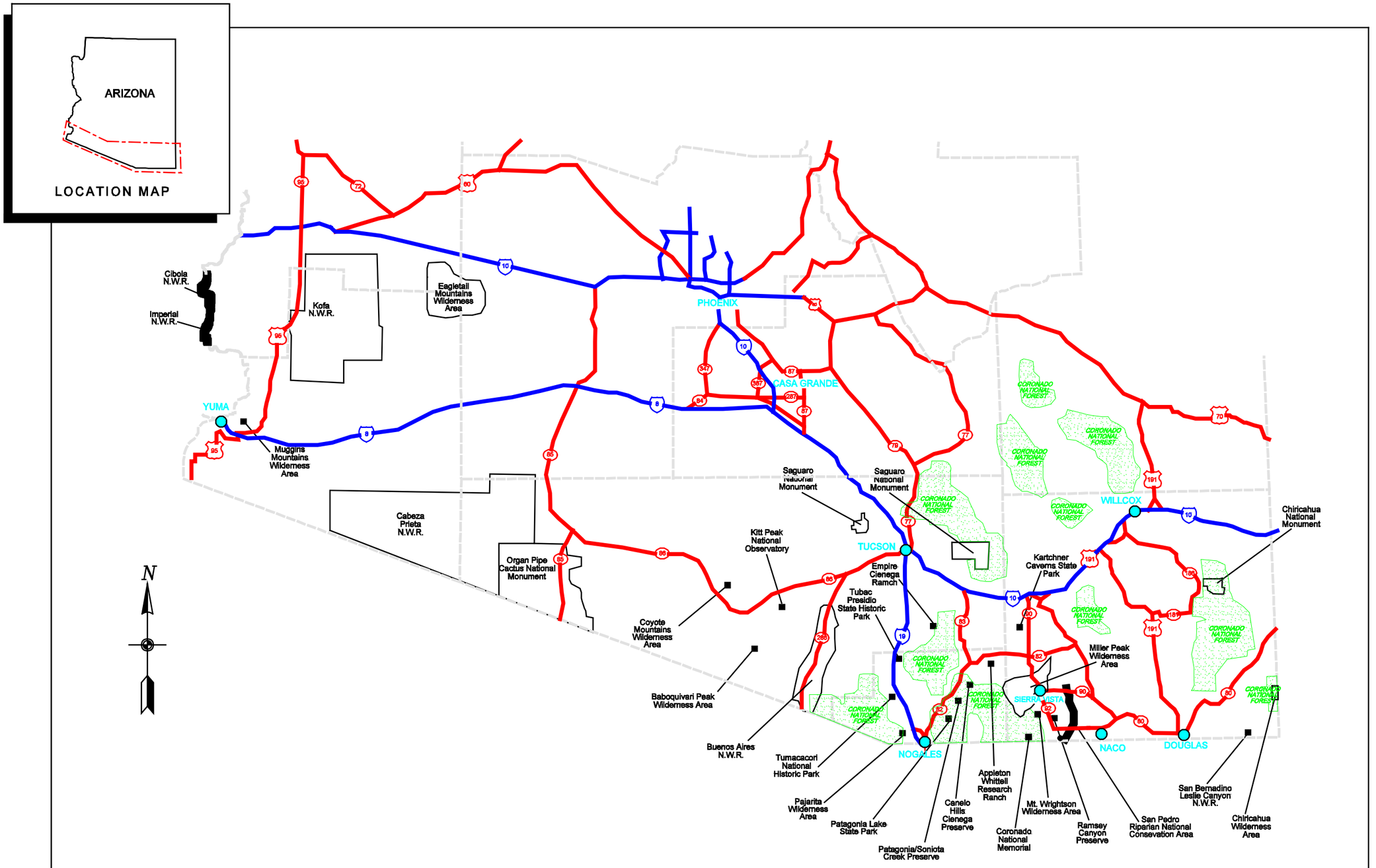


Figure 3-7: Environmentally Sensitive Areas Within the Project Area

| | |
|---|---|
| Scale: | not to scale |
| Date: | September 2002 |
| | GSRC / GULF SOUTH RESEARCH CORPORATION |

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**Table 3-4.**
**Unique and Environmentally Sensitive Areas in the Project Region**

| Area | Acreage | Management |
|---|---|---|
| **Cochise County, Arizona** | | |
| Chiricahua National Monument | 12,000 | NPS |
| Coronado National Forest | 2,475,000 | USFS |
| • Chiricahua Wilderness Area | 87,700 | |
| • Miller Peak Wilderness Area | 20,228 | |
| • Mt. Wrightson Wilderness Area | 25,260 | |
| Coronado National Memorial | 4,750 | NPS |
| Kartchner Caverns State Park | 560 | ASP |
| Ramsey Canyon Preserve | 300 | TNC |
| San Bernadino/Leslie Canyon Wildlife Refuges | 3,549 | USFWS |
| San Pedro Riparian National Conservation Area | 56,500 | BLM |
| **Santa Cruz County, Arizona** | | |
| Appleton-Whittell Research Ranch | 8,000 | NAS |
| Canelo Hills Cienega | 254 | TNC |
| Coronado National Forest | 2,475,000 | USFS |
| • Parajita Wilderness Area | 7,553 | |
| • Goodding Research Natural Area | 545 | |
| Empire-Cienega Ranch | 45,000 | BLM |
| Patagonia Lake State Park | 640 | ASP |
| Patagonia/Sonoita Creek Preserve | 850 | TNC |
| Tubac Presidio State Historic Park | 11 | ASP |
| Tumacacori National Historic Park | 16 | NPS |
| **Pima County, Arizona** | | |
| Baboquivari Peak Wilderness Area | 2,040 | BLM |
| Buenos Aires National Wildlife Refuge | 115,000 | USFWS |
| Cabeza Prieta National Wildlife Refuge | 860,000 | USFWS |
| Coyote Mountains Wilderness | 5,080 | BLM |
| Kitt Peak National Observatory | | NOAOR |
| Organ Pipe Cactus National Monument | 330,689 | NPS |
| Saguaro National Monument | 91,116 | NPS |
| **Yuma County, Arizona** | | |
| Cabeza Prieta National Wildlife Refuge | 860,000 | USFWS |
| Cibola National Wildlife Refuge | 16,627 | USFWS |
| Eagletail Mountains Wilderness Area | 97,800 | BLM |
| Imperial National Wildlife Refuge | 25,125 | USFWS |
| Kofa National Wildlife Refuge | 665,400 | USFWS |
| Muggins Mountains Wilderness Area | 7,711 | BLM |

ASP = Arizona State Parks
BLM = Bureau of Land Management
NAS = National Audubon Society
NOAOR = National Optical Astronomy Observatories
NPS = National Park Service
TNC = The Nature Conservancy
USFS = U.S. Forest Service
USFWS = U.S. Fish and Wildlife Service


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Apache fox squirrel, coatimundis, and peccaries, and trees, including the Chihuahua pine and Apache pine are found within the Monument. The plants found in the area range from cacti in the lowlands; oaks, alligator juniper, and Arizona cypress in the canyon forests; manzanita-buckthorn- skunkbush chaparral on ridges; and ponderosa pine, Douglas fir, and aspen on the highest slopes.

#### 3.6.1.2 Coronado National Forest

The Coronado National Forest covers 2,475,000 acres of southeastern Arizona and southwestern New Mexico (USFS 2000a). Elevations range from 3,000 ft. msl to 10,720 ft. msl in 12 widely scattered mountain ranges or "sky islands" that rise from the desert floor, supporting diverse plant communities. Over 1,100 miles of trails, four small lakes, and eight wilderness areas encompassing 338,536 acres are found within the Coronado National Forest. The three wilderness areas found within the study region of Cochise County are the Miller Peak Wilderness, Chiricahua Wilderness, and Mt. Wrightson Wilderness areas.

- **Chiricahua Wilderness Area:** Chiricahua Wilderness Area is located approximately 40 miles northeast of Douglas in the Chiricahua Mountains. It was established in 1964 and encompasses 87,700 acres (NWPS 2000b). There is wide variation in elevation, slope, moisture, flora and fauna. Many birds found in the wilderness area and in nearby areas such as Cave Creek Canyon are species that are otherwise seen only in Mexico.

- **Miller Peak Wilderness:** Miller Peak Wilderness Area is located six miles northwest of Sierra Vista in the southern portion of the Huachuca Mountains. It was established in 1984 and consists of 20,190 acres. Elevations range from 5,200 ft. msl to 9,466 ft. msl at Miller Peak itself. The Huachucas are famous as a haven for bird life and more than 170 species, including 14 species of hummingbirds, have been observed. More than 60 species of reptiles and 78 species of mammals also are found in this range (NWPS 2000c).

- **Mt. Wrightson Wilderness Area:** Mt. Wrightson Wilderness Area is located 30 miles southeast of Tucson at the core of the Santa Rita Mountains. It has a total of 25,260 acres and is visible from Tucson at 9,452 ft. msl in elevation. This Wilderness has rough hillsides, deep canyons, and lofty ridges and peaks surrounded on all sides by semiarid hills and sloping grasslands and is dominated by Ponderosa pine and Douglas fir. The

stream-fed canyons support an abundance of plant and animal life, including many montane Mexican plants that grow nowhere else north of the border (NWPS 2000d).

#### 3.6.1.3 Coronado National Memorial

The Coronado National Memorial is located in the far southeastern corner of Arizona, 25 miles west of Bisbee in the southern Huachuca Mountains. It commemorates the first major exploration of the American Southwest by Europeans by Francisco Vasquez de Coronado, who was in search of the fabled Seven Cities of Cibola. The Memorial encompasses 4,750 acres of mostly oak woodland, a natural mountain habitat at an elevation about 5,000 ft. msl where a variety of plants and animals are found. The Memorial is known for its wide variety of birds; more than 140 species have been recorded here, including 50 resident birds (NPS 2000b).

#### 3.6.1.4 Kartchner Caverns State Park

Kartchner Caverns State Park is the newest addition to the Arizona State Parks system. It is located nine miles southeast of I-10, in Benson, and encompasses 560 acres. The caves were initially discovered in 1974, but the State Park did not open until 12 November 1999. The massive limestone cave has 13,000 ft. msl of passages, and two rooms as long as football fields. It is considered a "living cave" because the intricate formations continue to grow as dripping water slowly deposits minerals. Kartchner Caverns State Park is a natural refuge and roosting area for approximately 1,000 to 2,000 cave bats that roost in the caverns from late April to mid-September (ASP 2000a).

#### 3.6.1.5 Ramsey Canyon Preserve

Ramsey Canyon Preserve is located 10 miles south of Sierra Vista and is managed by The Nature Conservancy (TNC). It is located in the Huachuca Mountains, bounded on three sides by the Coronado National Forest and encompasses 300 acres. A permanent stream (Ramsey Creek) and high canyon walls provide Ramsey Canyon with a moist, cool, and stable environment unusual in the desert southwest. Water-loving plants such as sycamores, maples, and columbines line the banks of Ramsey Creek, often growing within a few feet of cacti, yucca, and agaves. Communities ranging from semi-desert grassland to pine-fir forest are found within the canyon. Ramsey Canyon is noted for the 14 species of hummingbirds that have been seen at the canyon between April and October. In addition, Coue's deer, coatis, mountain lion, and dozens of varieties of butterflies are also found

within the preserve. The Ramsey Canyon leopard frog exists only in Ramsey Canyon and several nearby sites in the Huachuca Mountains and foothills. There are 45 mammal species and 20 species of reptiles and amphibians in and around the preserve (TNC 2000c).

#### 3.6.1.6 San Bernadino/Leslie Canyon National Wildlife Refuge

This refuge complex includes the 2,309-acre SBNWR, located on the U.S.-Mexico border 17 miles east of Douglas and the 1,240-acre Leslie Canyon National Wildlife Refuge (LCNWR), located 15 miles east of Douglas (USFWS 2000h). Topography of the SBNWR is situated at the bottom of a wide valley at 3,720 to 3,920 ft. msl elevation and encompasses a portion of the Yaqui River. LCNWR is located in rough mountainous terrain, encompassing Leslie Creek, providing valuable riparian habitat. Over 270 species of birds, various mammals, and numerous reptiles and amphibians can be seen at this refuge complex. It also has historically supported approximately one-quarter of the fish species native to Arizona. These include several federally protected species such as the Yaqui chub, Yaqui topminnow, beautiful shiner, and Yaqui catfish.

#### 3.6.1.7 San Pedro Riparian National Conservation Area

The San Pedro Riparian National Conservation Area (SPRNCA) contains approximately 40 miles of the upper San Pedro River and is located between Sierra Vista and Bisbee. It is managed by the BLM's Tucson Field Office and contains over 58,000 acres of public land. The primary purpose for the designation is to protect and enhance the desert riparian ecosystem, a rare remnant of what was once an extensive network of similar riparian systems throughout the Southwest. Wildlife is abundant in the SPRNCA because of the abundant food, water and cover within and surrounding the riparian zone. The SPRNCA supports over 350 species of birds, 80+ species of mammals, two native species and several introduced species of fish, and more than 40 species of amphibians and reptiles (BLM 2000f).

### 3.6.2 Santa Cruz County

#### 3.6.2.1 Appleton-Whittell Research Ranch

The Appleton-Whittell Research Ranch is collaboration among the National Audubon Society, USFS, BLM, Appleton family, and the Research Ranch Foundation. The Research Ranch is an 8,000-acre refuge located near Elgin. The Research Ranch was established in

1968 by the Appleton family for ecological research and has not been grazed by cattle since 1968. The undisturbed habitat consists of semidesert grasslands, oak savannah, oak woodland, and riparian systems (National Audubon Society 2000).

#### 3.6.2.2 Canelo Hills Cienega

Canelo Hills Cienega is located 14 miles south of Sonoita and is managed by TNC (TNC 2000a). The preserve, once part of a "working ranch", includes 260 acres of rolling black oak and Arizona fescue "savannas" with small isolated riparian wetlands in the draw bottoms. O'Donnell Creek is a small perennial stream running through the Canelo Hills Cienega and supports one of the largest populations of the Gila chub and the Canelo Hills ladies' tresses, both endangered species.

#### 3.6.2.3 Coronado National Forest

As discussed previously, the Coronado National Forest covers 2,475,000 acres of southeastern Arizona and southwestern New Mexico (USFS 2000a). One wilderness area, the Pajarita, and one Research Natural Area (RNA), the Goodding, are found within the Coronado National Forest in Santa Cruz County.

- **Pajarita Wilderness Area:** The United States Congress designated the Pajarita Wilderness Area in 1984 and it now has a total of 7,553 acres (NWPS 2000e). More than 660 species of plants have been identified within its borders, 17 of them indigenous. Located near the U.S.-Mexico border, Pajarita is dominated by the narrow and twisting, steep-walled Sycamore Canyon. Although the flows that occur in Sycamore Canyon are ephemeral, the canyon does have year-round pools of water and serves as a major migration corridor for wildlife. Elevations of the wilderness area range from 3,800 ft. msl to 4,800 ft. msl.

- **Goodding RNA:** This RNA was established in 1970 and encompasses 545 acres with elevations ranging from 3,800 to 4,500 ft. msl (USFS 2000b). It is located just north of the U.S.-Mexico border, 15 miles west of Nogales, Arizona and lies within the Pajarita Wilderness Area. The riparian system associated with the intermittent stream flowing through the RNA supports habitat for a number of rare animals. The RNA is the only known location where three species of leopard frogs have co-occurred: Tarahumara leopard frog (no longer expected to occur in this area), Chiricahua leopard frog, and

lowland leopard frog. Bird diversity is high in the area, and the RNA supports the lowest elevation nesting location for the Mexican spotted owl. Perennial waters support rare fish including the Sonoran chub.

#### 3.6.2.4 Empire-Cienega Ranch

Since 1988, the Empire and Cienega ranches have been under the administration of the BLM under the principles of multiple-use and ecosystem management. The Empire-Cienega RCA is a working cattle ranch of 45,000 acres of public land located in southeastern Pima County and northeastern Santa Cruz County. The diversity of habitat in this RCA supports healthy populations of fish and wildlife. Three species of native fish are found in the Cienega Creek: Gila topminnow, Gila chub, and longfin dace. A variety of amphibians and reptiles are found in the RCA and nearly 200 bird species have been identified. Numerous game and non-game mammals are found in the RCA, including 11 species of bats. The field station is located 46 miles southeast of Tucson and 10 miles north of Sonoita. The station is accessed by SR 83, seven miles north of Sonoita, and by SR 82, which is five miles east of Sonoita (BLM 2000c).

#### 3.6.2.5 Patagonia Lake State Park

Patagonia Lake State Park is located approximately 12 miles northeast of Nogales and 20 miles southwest of Sonoita on State Route 82 (ASP 2000b). The lake is 2.5 miles long and approximately 250 acres and was created by damming Sonoita Creek, which flows 2.5 miles along the edge of the park. The lake is stocked every winter with bass, crappie, bluegill, and catfish. The new Sonoita Creek State Natural Area is located in the northeastern portion of the park and the Patagonia/Sonoita Creek Preserve is located near the northwestern portion of the park.

#### 3.6.2.6 Patagonia/Sonoita Creek Preserve

The Patagonia/Sonoita Creek Preserve is located near Patagonia. This 850-acre preserve is managed by TNC. It is located in the floodplain valley between the Patagonia and Santa Rita Mountains and provides a rich habitat of cottonwood-willow riparian forest supporting a wide array of wildlife (TNC 2000b). Over 290 bird species are found here, as well as other animal species including the mountain lion, bobcat, white-tailed deer, javelina, coatimundi, coyote, desert tortoise, occasional rattlesnakes and several toads and frogs.

#### 3.6.2.7 Tubac Presidio State Historic Park

Tubac Presidio State Historic Park is Arizona's first state park (ASP 2000c) and encompasses 11 acres. It is located 45 miles south of Tucson near the community of Tubac. Remnants of the military fort founded by the Spanish in 1752 have been uncovered by University of Arizona archaeologists and preserved by Arizona State Parks. An underground display features portions of the original foundation, walls, and plaza floor of the Presidio (fort) de San Ignacio de Tubac.

#### 3.6.2.8 Tumacacori National Historic Park

Tumacacori National Historical Park is located in the Santa Cruz River Valley 48 miles south of Tucson (NPS 2000e). The 45-acre park is the site of one of the oldest Spanish missions in the southwest.

### 3.6.3 Pima County

#### 3.6.3.1 Baboquivari Peak Wilderness Area

The United States Congress designated the Baboquivari Peak Wilderness Area in 1990 and it now has a total of 2,040 acres (NWPS 2000a). It is Arizona's smallest designated wilderness and is managed by the BLM. Elevations range from 7,730 ft. msl on the summit to 4,500 ft. msl on the desert floor. Vegetation in the higher country includes oak, walnut, and piñon; saguaro, paloverde, and chaparral are found on the lower elevations.

#### 3.6.3.2 Buenos Aires National Wildlife Refuge

The BANWR is an 115,000-acre refuge established to preserve the endangered masked bobwhite quail (USFWS 2000c). It is located in the southeast corner of Pima County, near Sasabe. It contains extensive grasslands, seasonal streams, and a lake. Over 300 species of birds, including hawks, herons, vermilion flycatchers and golden eagles (during migration) are found on this refuge. Other wildlife includes coyotes, deer, foxes, and pronghorn antelopes. In addition to the masked bobwhite quail, BANWR protects habitat for five other endangered species (cactus ferruginous pygmy-owl, Pima pineapple cactus, Kearney bluestar, southwest willow flycatcher, and razorback sucker).

#### 3.6.3.3 Cabeza Prieta National Wildlife Refuge

The CPNWR is located along 56 miles of the U.S.-Mexico border between Yuma and Ajo, in both Yuma and Pima counties. It encompasses 860,000 acres of Sonoran Desert habitat consisting of low mountain ranges separated by broad alluvial valleys and is the third largest national wildlife refuge in the lower 48 states (USFWS 2000d). Under the 1990 Arizona Desert Wilderness Act, more than 803,000 acres of the refuge were classified as wilderness areas. The endangered Sonoran pronghorn and lesser long-nosed bat are found on this NWR, as well as desert bighorns, lizards, rattlesnakes, and desert tortoises. As many as 391 plant species and more than 300 species of wildlife are found on the CPNWR.

#### 3.6.3.4 Coyote Mountains Wilderness

The United States Congress designated the Coyote Mountains Wilderness Area in 1990 and it now has a total of 5,080 acres (BLM 2000a). It is located 40 miles southwest of Tucson and is managed by the BLM. The wilderness area includes the Coyote Mountains, which cover about 40 percent of the total wilderness area. The vegetation includes paloverde, saguaro, chaparral, and oak woodlands. Currently there is no legal public access to the Coyote Mountains Wilderness.

#### 3.6.3.5 Kitt Peak National Observatory

Kitt Peak National Observatory is located 44 miles southwest of Tucson at an elevation of 6,875 ft. msl (NOAOR 2000). The observatory began operating in 1960 and is administered by the Association of Universities for Research in Astronomy and the National Optical Astronomy Observatories (NOAOR).

#### 3.6.3.6 Organ Pipe Cactus National Monument

OPCNM is located along the U.S.-Mexico border in the southwestern portion of Arizona. It runs 40 to 50 miles from both east-to-west and north-to-south, encompassing some 500 square miles (NPS 2000c). Most of the Monument is situated between the Ajo Mountain Range to the east and the Puerto Blanco Mountains to the west, with the Senita Plain extending west from here into the CPNWR. The OPCNM Monument was established as a monument in 1937 and as an International Biosphere Reserve in 1976. It is an almost pristine example of the Sonoran Desert, totaling 330,689 acres. The Monument was established to protect the rare organ pipe cactus and 26 other cacti species, as well as more than 200 species of birds and other animals, many of which are unique to this area. Three

distinctive divisions of the Sonoran Desert converge here, representing six plant communities.

#### 3.6.3.7 Saguaro National Park

Saguaro National Park is comprised of two regions, Saguaro East and Saguaro West, located 30 miles apart on either side of Tucson in the Tucson Basin (NPS 2000d). The basin is situated in the Sonoran Desert between two mountain ranges, the Rincon Mountains and the Tucson Mountains. It encompasses 91,116 acres and is managed by the NPS. More than 2,700 plant species, including 50 varieties of cacti, are found in Saguaro National Park. The park's most prominent feature is the saguaro cactus, which is indigenous to the Sonoran Desert.

### 3.6.4 Yuma County

#### 3.6.4.1 Eagletail Mountains Wilderness Area

Eagletail Mountains Wilderness Area has a total of 97,880 acres and is located 65 miles west of Phoenix, in Maricopa, Yuma, and LaPaz counties (BLM 2000b). It is managed by the BLM. The wilderness includes 15 miles of the Eagletail Mountains ridgeline and Courthouse Rock to the north, Cemetery Ridge to the south, and a large desert plain area between the two ridgelines.

#### 3.6.4.2 Imperial National Wildlife Refuge

Imperial NWR is located 40 miles north of Yuma, with lands situated in both Yuma County, Arizona and Imperial County, California (USFWS 2000f). It is 30 miles long and encompasses 25,625 acres and protects the desert and the Colorado River ecosystem, including the last unchannelized section before the river enters Mexico. More than 15,000 acres of the Imperial NWR is federally designated as a wilderness area. The refuge is home to 268 species of birds, including the endangered Yuma clapper tail, southwestern willow flycatcher, and bald eagle. One special portion of the Colorado River is protected for the endangered razorback sucker.

#### 3.6.4.3 Kofa National Wildlife Refuge

The Kofa NWR is located 40 miles north of Yuma on the east side of Highway 95 (USFWS 2000g). The Kofa NWR comprises 665,400 acres of Sonoran Desert, 516,300 of which are

designated wilderness, and encompasses the Kofa and Castledome Mountain ranges. The desert bighorn sheep and the California palm, the only native palm in Arizona, are found on the NWR. Notable wildlife species found in the area include the white-winged dove, desert tortoise, and desert kit fox. Approximately 800 to 1,000 bighorn sheep now live in the refuge. Other common bird species seen are the American kestrel, northern flicker, Say's phoebe, cactus wren, phainopepla, and orange-crowned warbler.

#### 3.6.4.4 Muggins Mountains Wilderness Area

The 7,711-acre Muggins Mountains Wilderness is located approximately 25 miles east of Yuma and is managed by the BLM (BLM 2000e). The most prominent summits are Muggins Peak at 1,424 ft. msl, Klothos Temple at 1,193 ft. msl, and Long Mountain at 914 ft. msl.

## 3.7 Cultural Resources

### 3.7.1 Culture-History

The archaeology of the study area is quite detailed, and relatively complex considering the various geographic and related cultural features. For purposes of clarity, the following text will present the broad overview of southern Arizona prehistory before outlining the various previous investigations that are important to the understanding of the study area. The predominance of the cultural history of this section comes directly from a baseline document developed for Joint Task Force Six (JTF-6) for Arizona (USACE 1999a).

These periods are commonly subdivided on particular characteristics of the artifact assemblages. The prehistoric periods and corresponding phases are defined by the presence of particular diagnostic artifacts such as projectile points, certain types of pottery, and occasionally, particular site locations. For the Historic period, documentary information more often is used to distinguish certain phases; nevertheless, particular artifacts also can be used to recognize certain historic affiliations.

#### 3.7.1.1 Paleo-Indian (10,000-7,500 B.C.)

The nature and temporal position of the first people in southern Arizona is a subject of debate. Most researchers contend that successive migrations occurred throughout the later part of the Pleistocene, coinciding with global temperature drops that resulted in massive quantities of

water being frozen. As the ice caps increased in size, sea levels dropped, exposing land bridges in the areas where the sea was the shallowest. One of these land bridges connected Alaska with Siberia across the Bering Strait. This land bridge has successively appeared and disappeared over the last 100,000 years as temperatures fluctuated.

A majority of the best-known Paleo-Indian sites in the southwest are in southern Arizona. The earliest occupations at these sites are named after a site near Clovis, New Mexico and are recognized by a particular fluted projectile point type that is thought to have been used for hunting big game such as mammoth, mastodon, and camel. To a certain extent, this view is probably biased because most Clovis sites that have been excavated are kill sites. Plant gathering and processing was, no doubt, an important aspect in the lives of early Paleo-Indians. Of particular importance are the sites in the San Pedro and Sulphur Springs valleys in southeastern Arizona, such as Naco, Murray Springs, Leikham, and Navarette, Arizona which have extinct mammal bones associated with Paleolithic artifacts.

For the Papagueria, or south-central Arizona, the earliest dated site is Ventana Cave. Among the bones of extinct dire wolf, jaguar, shasta ground sloth, and horse, an assemblage of almost 100 tools was recovered. A single point with a concave base represents the Clovis affiliation, while an assemblage of steeply retouched flakes, along with blocky, unifacially and bifacially reduced cobbles, reveals an association with a far western desert Paleo-Indian tradition often referred toas the San Dieguito, known principally in California. Haury (1950) termed this early material the Ventana complex and believed that it was affiliated with the San Dieguito tradition. Radiocarbon dates for the Ventana complex range from 11,300 to 12,600 B.C. (Haury and Hayden 1975). Malcolm Rogers (1945a) originally identified the earliest archeological manifestation in the southwest as the Malpais Industry, but later concluded that the differences he saw between artifacts from the Malpais Industry and San Dieguito I were more apparent than real (Rogers 1958).

#### 3.7.1.2 San Dieguito Complex (10,000-5,000 B.C.)

The earliest accepted prehistoric complex for the Colorado River subregion is the San Dieguito Complex, which was defined first along the southern coastal area near San Diego at the C.W. Harris Site (Rogers 1938; Warren 1966). The San Dieguito complex in California overlaps and runs into the archaic period in the Arizona chronology. Groups associated with the San Dieguito Complex probably were organized as small bands and were nomadic hunter-

gatherers. On a general level, the material culture of the San Dieguito Complex reflects an adaptation focusing on the hunting of animals, not dissimilar in pattern to late Paleo-Indian cultures (Eighmey 1990; Robbins-Wade 1986). Diagnostic lithic artifacts associated with the San Dieguito Complex include well-made foliate knives and projectile points, heavy "horse-hoof" planes, and crescent-shaped stones (Moratto 1984; Eighmey 1990; Robbins-Wade 1990). San Dieguito points and knives are narrow and long in profile with thick cross-sections and the points are usually basal notched (Warren 1966; Davis 1969). Overall, this complex is very similar to contemporary cultures in the Great Basin associated with the Western Pluvial Lakes Tradition (Bedwell 1970; Chartkoff and Chartkoff 1984).

#### 3.7.1.3 Archaic (7500-400 B.C.)

The cultural remains of Archaic people, post-Pleistocene foragers, are more common manifestations than those of Paleo-Indian populations. The cultural affiliation and age of Archaic materials in southern Arizona are not well understood. Two Archaic traditions have been proposed for southern Arizona: the Desert culture (also called San Dieguito II and III) and the Cochise culture. Haury (1950) and Ezell (1954) have argued that the Papagueria was the zone of contact between the Cochise culture, located primarily within southeastern and south-central Arizona and New Mexico, and the Desert culture, recorded in southern California (Rogers 1939; Hester 1973; King 1976) and southwestern Arizona (Rogers 1941; Haury 1950; Hayden 1970; Rosenthal et al. 1978). Other researchers disagree with Haury and Ezell, arguing instead that the Desert culture is a pan-southwestern occurrence extending from California to the Trans-Pecos Region of Texas.

People associated with another complex called the Amargosan are believed to have migrated into east-central Arizona, displacing cultures affiliated with the San Dieguito complex at about 3000 B.C. (Rogers 1958). The eastern aspect of the Amargosan complex produced two-phase patterns, Amargosa I and II, both of which were found at Ventana Cave (Haury 1950). At either the beginning of or during Amargosa II times, trough and basin metates and mortars appeared in southern Arizona for the first time (Rogers 1958).

The three Cochise culture stages generally recognized include the Sulphur Springs, Chiricahua, and San Pedro (Sayles and Antevs 1941). The Sulphur Springs stage (ca. 7500 B.C. to 3500 B.C.), considered to be a specialized, Paleo-Indian adaptation, is known only from a few sites near Double Adobe in southeastern Arizona (Whalen 1971). The Chiricahua

stage, dated by Whalen (1975) from 3500 B.C. to 1500 B.C., marks another aspect of the Archaic period in southern Arizona. Several researchers believe that maize and squash were introduced during the Chiricahua stage (Dick 1951; Martin and Schoenwetter 1960). The San Pedro stage tentatively dates from 1500 B.C. to 100 A.D. (Whalen 1975). Listed among the material cultural inventory are deep basin metates, shaped pestles, mortars, two-hand manos, and an increase in the type and number of pressure flaked tools (Sayles et al. 1958). Pithouses and storage features, agriculture (beans, maize, and squash), and pottery appear at the end of the San Pedro stage (Sayles 1945; Martin et al. 1949; Eddy 1958; Dick 1965).

Due to the nature of the local vegetal material, radiocarbon dates are available only for the later part of the Archaic period, namely, to the time immediately preceding the rise of sedentism and agriculture in southern Arizona. These dates suggest that the Archaic persisted into the first millennium A.D.

#### 3.7.1.4 Amargosa/Elko Period (1500 B.C. - A.D. 900)

Sites representing the Amargosa/Elko period are not well represented in the Colorado River subregion (Eighmey 1990) and are more frequent in the Mojave Desert and Peninsular Ranges (Moratto 1984; Eighmey 1990). Nevertheless, the Amargosa/Elko period appears to bridge the interval of time when cultures were shifting from use of the spear and atlatl to the bow and arrow pestles which implies a heavier reliance on plant foods (especially hard seeds) in some areas. (Moratto 1984). During the Amargosa/Elko period technological changes are also represented by an increase in the number of manos and metates and the introduction of mortars and pestles (Moratto 1984). Shaft smoothers, incised stone tablets and pendants, hollowed-out stone tubes, shell beads, and bone awls also are associated with this period. An additional impetus behind the introduction of new technologies in the southern desert region may have been increasing contacts with desert populations to the east of the Colorado River, as well as the California coastal zone (Moratto 1984).

#### 3.7.1.5 Formative (A.D. 100-1450)

Following the Archaic, the Formative period refers to the prehistoric ceramic-making agriculturalists. In southern Arizona, some researchers date the beginning of the Formative as early as 300 B.C. (Haury 1976), and others as late as A.D. 500 (Schiffer 1982). In south-central Arizona, the principal inhabitants are called Hohokam, a Piman word meaning "all used up" (Haury 1976). Peripheral cultures are the Trincheras in northern Sonora (Bowen

n.d.; Sauer and Brand 1931; Hinton 1955; Johnson 1960, 1963; McGuire and Villalpando 1991), the Mogollon in eastern Arizona (Douglas and Brown 1984, 1985), and the Patayan in western Arizona (Rogers 1945a; Waters 1982).

### 3.7.1.6 Hohokam Culture

When and where the Hohokam arose is still unresolved. Di Peso (1956) and Hayden (1970) believed that the prehistoric people antecedent to the Hohokam in southern Arizona followed the Ootam tradition. Di Peso contended that the Ootam were an indigenous group who came under the rule of Mexican intruders, the Hohokam, from roughly A.D. 900 to 1200. Other researchers have viewed the Hohokam culture as an evolution of indigenous Archaic populations who were influenced by ideas coming from Mexico (Wasley and Johnson 1965; Wilcox 1979).

The Hohokam culture has been defined primarily from sites along the Salt, Gila, and Santa Cruz rivers. In addition to this core area there is also the "Desert Branch" of the Hohokam, which was used to explain variability between contemporaneous populations; those living in the core area of the Salt-Gila and Tucson Basins, the Riverine Hohokam, and those living in the Papagueria, the Desert Hohokam. After A.D. 1000, differences can be clearly seen in burial practices, pottery types, metate types, projectile points, carved stone, figurines, pallettes, stone jewelry, shell jewelry, and subsistence patterns.

Hohokam culture history is generally divided into four temporal periods: the Pioneer Period (A.D. 425-750), Colonial Period (A.D. 750-950), Sedentary Period (A.D. 950-1150) and the Classic Period (A.D. 1150-1450). The Pioneer period is ill defined and based largely on excavations at Snaketown. Hohokam population increased greatly during the Colonial Period as improved irrigation in the Phoenix Basin and to a lesser extent in the Tucson Basin, allowed for the reliable cultivation of maize, beans, squash, and cotton. Primary Village sites with ball courts were constructed along major drainages and cremation burial practices replaced inhumation burial practices. During the Sedentary Period settlement expanded into the secondary drainages and bajadas and agricultural strategies expanded to include rock piles and rock pile fields. Dry farming techniques were employed increasingly in the Santa Cruz Valley. By the Classic Period dramatic changes occurred in the architectural styles, burial practices and material culture. Adobe-walled pit houses and later above ground adobe and stone masonry structures surrounded by adobe or stone walls replaced the previous

pithouse style of architecture. Ball court construction had ceased and was replaced by construction of earthen platform mounds, possibly mesoamerican derived in the large villages. Larger villages were settled situated on major drainages. The abrupt changes during the Colonial period may have been the result of increased warfare in the area (Lascaux 1998).

### 3.7.1.7 Trincheras Culture

The region occupied by the Trincheras culture has been demarcated by Bowen (n.d.) as extending from Puerto Libertad on the south to the international border on the north, and from the Gulf of California on the west to the Rio San Miguel on the east. The pottery series within this area is fairly well documented. Sauer and Brand (1931) have described Trincheras Purple-on-red and Nogales Polychrome. Bowen (n.d.) refined the painted pottery types to include Purple-on-brown and Purple-on-red. Trincheras Polychrome was defined by Di Peso (1956). Even though the types within the Trincheras series have not been securely dated, it is believed that they were produced over a considerable period of time. Cross-dating indicates that most of the Trincheras types were in use at least as early as the Hohokam Colonial period (A.D. 800) and may have extended till Spanish Contact though terminal dates are problematic (McGuire and Villapando 1991, Bowen n.d., Braniff 1978).

The most distinctive aspect of the Trincheras Culture is the “cerros de trincheras”. These are features consisting of dry-laid rock walls, terraces, structures, enclosures, and trails on hill slopes and hilltops. These sites are thought to have multiple functions including garden plots, habitation, and defense due to their location. Based on surveys in Sonora, these may have been constructed as early as A.D. 800, though most date to after A.D. 1100 though southern Arizona sites date A.D. 1100-1300 and have no associative pottery (Lascaux 1998).

Evidently, the Trincheras people exploited a variety of environmental zones including hilltop terraces, inland ridges, floodplains, and valleys (Bowen n.d.; McGuire and Villalpando 1991). A variety of subsistence strategies were utilized including floodwater, runoff and limited canal irrigation agriculture, along with exploitation of wild resources.

Several Trincheras sites display evidence of shell jewelry production and the preparation of shell bracelet "blanks". Large quantities of shell material were moved to the Playa site by the Trincheras people between A.D.800 and A.D. 1200 (Johnson 1960). In the Papagueria it has been hypothesized that shell was used by the populations as barter for agricultural products

from the Salt-Gila Basin Hohokam, thus assuring themselves access to resources necessary to serve as a "buffering mechanism," shielding them from the vagaries of agriculture in a desert environment (Doelle 1980). It is conceivable that the Trincheras people utilized a similar strategy or participated in the Papaguerian system.

### 3.7.1.8 Patayan Culture

Much of the confusion regarding the ceramic period has been resolved by Waters (1982) who basically adopted Rogers' (1940, 1945a, 1945b) diagnostic ceramic traits to provide chronological and typological distinctions for Lowland Patayan pottery types. Three ceramic periods have been defined: Patayan I (A.D. 700-1000), Patayan II (A.D. 1000-1500), Patayan III (A.D. 1500-Present). It must be mentioned that Waters' time periods and ceramic typology have not met universal acceptance (Schroeder 1952, 1967). Unfortunately, the only stratified site excavated to date has been poorly reported (Harner 1958). However, Harner's results appear to contain important differences from those of Rogers, Waters, and Schroeder. Huckell's (1979) excavations in the Crater Mountains have produced data that may be in conflict as well with the time scheme outlined above. Schaefer et al. (1987) proposed a similar chronology based on three periods Patayan I (ca. AD 900-1050), Patayan II (ca. A.D. 1050-1450), and Patayan III (ca. A.D. 1450-1800) based on the works of Shroeder (1952,1957,1961) and Harner (1958).

The frontier between Hohokam and Patayan ceramic types is a short distance west of a line between Gila Bend, Arizona, and OPCNM (Ezell 1954). The excavations conducted by Wasley and Johnson (1965) between Agua Caliente and Gila Bend revealed sites with Patayan pottery and a few intrusive Hohokam sherds. Sites farther west on the Gila River exhibit Patayan ceramics almost exclusively (Schroeder 1952; Breternitz 1957; Vivian 1965). South, near the international border, sites with Patayan sherds were recorded east of the Ajo Mountains in the Quijotoa Valley by Rosenthal et al. (1978). Patayan sherds also were found at sites west of the Ajo Mountains in OPCNM. Immediately west of Organ Pipe, in the CAPNWR, the sites described by Fontana (1965) were dominated by Patayan wares, as were sites in the Sierra Pinacates (Hayden 1967).

The ceramic-bearing Patayans who settled along the lower Colorado and Gila rivers adopted a subsistence strategy of floodwater farming, gathering, and hunting of small game (Rogers 1945a; Schroeder 1957). Riverine settlements were composed of individual

households in a dispersed, or rancheria pattern. Initially, habitations were round or oval, domed, jacal structures with rock foundations that lacked roof supports. Later, houses along the river were also jacal, but square in plan with four roof supports. Structures away from the rivers were domed jacals during all time periods.

The earliest users of Patayan pottery are unclear. Malcolm Rogers (1945a) was of the opinion that the makers of Patayan I (Yuman I) ceramics were immigrants from southern California who, along with the Hohokam, learned to make pottery from people in Mexico. Rogers perceived a hiatus in the local development about A.D. 1000 and concluded that the Patayan I people were not biologically ancestral to the modern Yumans. Harner (1958), on the other hand, saw a direct continuum in Patayan I and II materials. According to Rogers, the makers of Patayan II pottery were the descendants of new immigrants and/or people who settled in the area as a result of internecine warfare on the Colorado River. These people eventually became the modern day Yumans (Rogers 1945a). Rogers (1945a) viewed Patayan II times as ones of expansion and suggested that the trincheras sites in Sonora and the Gila Bend Fortified Hill site (Greenleaf 1975) were responses to raiding by Patayan groups. During the Patayan II period, groups of presumed Yuman-speakers filtered into the Colorado Desert and settled along the shore of Lake Cahuilla (Rogers 1945; Moratto 1984). Groups associated with the Patayan II period constructed domed-shaped, brush-walled houses and cremated their dead. Coprolite studies have revealed a rich diet among the Patayan II inhabitants of Lake Cahuilla, including fish, shellfish, aquatic birds, mammals, and a number of freshwater marsh and lowland desert plants (Wilke 1978). It appears that cultigens were not part of the Lake Cahuilla diet (Weide 1976). During this time there was active trade in seashells between groups living in the desert and others living along the Gulf of California and the southern Pacific coast. At the end of the Patayan II period, it is believed that the Colorado River ceased to drain into Lake Cahuilla and that the lake rapidly began to shrink in size, becoming saline as a result. Thus, it appears that populations in the Colorado Desert quickly dispersed into adjacent areas such as the Lower Colorado River Valley and Peninsular Ranges (O'Connell 1971; Wilke 1978). By Patayan III times, very few inhabitants remained in the Colorado Desert, and of those, the majority were occupying the vestiges of Lake Cahuilla near the present-day shoreline of the Salton Sea (Rogers 1945; Schaefer et al. 1987). Along the Lower Colorado River there had been a continuous occupation of the area from Patayan I through Patayan III times.

Huge figures, or intaglios created on the ground surface are an unusual characteristic of the Lowland Patayan culture. Patterns were formed by cutting, trenching, scraping, outlining with stones, heaping material, or combinations of the above (Hayden 1982; Solari and Johnson 1982). The figures are striking because the desert pavement on which they were constructed provides a dark, contrasting background. Often depicted are anthropomorphic and zoomorphic figures, abstracts, and "avenidas" stretching for as much as 700 ft. msl (Hayden 1982; Solari and Johnson 1982). Hayden (1982) reported ground figures associated with the Malpais Industry, Phase I of the San Dieguito complex, and the Amargosan complex. Solari and Johnson (1982) concurred with Hayden in a general sense, stating that Yumans, specifically Mohave, and their prehistoric Patayan forbearers constructed the ground figures. Rogers (1945a) contended that the figures are from Patayan I, II, and III times. The function of these figures remains obscure.

#### 3.7.1.9 The Mogollon and Pueblo Cultures

The Mogollon culture evolved from the Cochise culture; in fact, early Mogollon villages appear to be little more than late Archaic villages with pottery (Sayles 1945). The hallmarks of this stage are agriculture, red-on-brown pottery, and pithouses. Southeastern Arizona has been included in the San Simon Branch of the Mogollon (Sayles 1945), which has been divided into three periods and six phases. The Early period consists only of the Penasco phase, which was derived from the San Pedro stage of the Cochise culture. In essence, the only difference appears to be the addition of plainware and red slipped pottery. Following this is an intermediate period composed of the Dos Cabezas, Pinaleno, and Galiuro phases, which are defined by the introduction of decorated ceramics. The Late period is composed of the Cerros and Encinas phases, which exhibit considerable influence from the Hohokam to the northwest and Mimbres to the east (Sayles 1945). Although dates for these phases are not clear, the whole sequence likely ranges from about A.D. 200 to 1200.

The appearance of rock and adobe pueblos in the southeastern part of Arizona has been identified with three traditions. One of these traditions is the Ringo phase that, unfortunately, is known only from a single excavation in the Sulphur Springs Valley. The Ringo site consists of two small adobe compounds with 27 rooms with a variety of ceramic trade wares. The ceramic assemblage suggests contact with four areas; (1) Chihuahua (over 25% of the decorated wares), (2) the White Mountain area, (3) the Tonto Basin (these ceramics could have been made locally), and (4) the Tucson Basin (Johnson and Thompson 1963). The

suggested dates for them fall between 1250 and 1325 (Johnson and Thompson 1963). The Ringo phase, although interpreted as basically Mogollon, reflects outside influences likely from the Anasazzi to the north or possibly the Chihuahuan area to the south (Johnson and Thompson 1963).

The Animas phase, best known from Hidalgo County, New Mexico, is represented at the Pendleton Ruin (Kidder et al. 1949). This phase generally has been interpreted very differently from the Ringo phase even though the two overlap temporally. The dating of the Animas phase (ca. A.D. 1175-1350) and the presence of Ramos Polychrome and other Casas Grandes pottery types implies an association with Casas Grandes at its zenith. Unlike the Ringo site, a number of Animas sites fall in the 100 to 300 room category. The nature of the association between the Animas phase and Casas Grandes has been debated for the last 30 years. Kidder et al. (1949) argued that the traits found at the Pendleton Ruin were quite distinct from those at Casas Grandes. More recent researchers have accepted the Animas phase as peripheral to Casas Grandes, but directly interacting with the core area (LeBlanc 1980; DeAtley and Findlow 1980). These authors viewed the Animas phase as non-Mogollon. In fact, LeBlanc (1980) specifically suggests a population movement from the south into the Mimbres Valley that absorbed the remaining indigenous population. Others remain unconvinced of a Casas Grandes expansion into southwestern New Mexico, pointing out that the five excavated Animas phase sites, the few available dates, and the published survey data collected by DeAtley and Findlow (1980) do not present enough data for such a conclusion.

The term Animas phase has not been generally applied in southeastern Arizona. Nevertheless, the great similarities in ceramic types and their frequencies, architectural features, burial patterns, and projectile point styles between most of the pueblo sites in southeastern Arizona and the Animas phase sites in southwestern New Mexico suggest that they are part of the same cultural tradition (Amsden 1928; Sauer and Brand 1930; Kidder et al. 1949; Neily and Beckwith 1985; LeBlanc 1980; DeAtley and Findlow 1980; Klein et al. 1982).

#### 3.7.1.10 Protohistoric Period

The abandonment of the large aggregated pueblos in the Southwest around A.D. 1450 marks the beginning of the Protohistoric period in Arizona, which is another time period that is poorly understood. Based on cross-dating with Hohokam and Salado ceramics, Di Peso (1951) concluded that the inhabitants of Babocomari Village in the San Pedro Valley moved into that

vicinity at a time roughly contemporaneous with the Tucson phase, ca. A.D. 1200-1450. It is possible that abandonment occurred quite late, perhaps during Apache times (Di Peso 1951). If this is the case, then Babocomari Village represents the only large Protohistoric site excavated to date.

The Protohistoric period in the Colorado River subregion began with the exploration of the mouth of the Colorado River by Alarcon in 1540. Some 60 years later, the Spanish explorer Oñate led an expedition down the Lower Colorado River. At the time, the Colorado River subregion was inhabited by Yuman- speakers of the Hokan stock (Moratto 1984). Tribes affiliated with the Yuman language group inhabited the Lower Colorado River, while speakers of the Southern Diegueno language occupied the Colorado Desert. As mentioned above, tribes along the Lower Colorado River were agricultural and grew maize, beans, squash, and some mellons (Eighmey 1990). In the Colorado Desert, tribal groups were more reliant on hunting and gathering. However, some horticulture may have been practiced in the area from time to time; a practice probably adopted from the tribes living along the Lower Colorado River (Schaefer et al. 1987). Groups from the Colorado Desert also went into the Peninsular Ranges to hunt deer and gather mescal (Schaefer et al 1987).

#### 3.7.1.11 Historic Period

The historic period can be broken up into a Spanish/Mexican Period (A.D. 1699-1856) and an American Period (A.D. 1856-1945). Spanish exploration of the area began in 1539 with the explorations of Francisco Vasquiez de Coronado, Melachor Diaz, and Alarcon in 1540. In 1687 the Jessuit missionary Eusebio Francisco Kino traveled through the Santa Cruz Valley and the adjacent Papagueria. During his travels he established a chain of missions which allowed for an influx of Spanish missionaries, explorers, miners, ranchers, and settlers. Silver strikes in 1736 to 1741 and the discovery of gold in Arizona and California during the mid to late 1800's caused a great influx of settlers and prospectors into the area. Tensions increased between the Native American populations and the European settlers and resulted in revolts by the Pima and Papago, and raids by the Apache. By the mid 1800's the El Camino del Diablo became a popular route connecting Sonoita, Mexico to Yuma, Arizona, for people traveling to California. The loss of life from unprepared parties and the Pinacatenos attacks along the route were high (Sykes 1937).

The Gadsen Purchase occurred in 1854 but was not until 1856 that the land left Mexican domain and came under the control of the United States. This ushered in the American Period (1856-1945). Travelers were still coming into the area lured by gold and silver found in Arizona and California. Apache attacks on travelers and settlers of the area prompted the establishment of several forts in southern Arizona and the stationing of troops in the San Bernardino Valley at Silver Creek, Guadalupe Canyon, and, briefly in 1878, at Camp Supply (Wells 1927).

The Apaches continued to raid the San Pedro Valley until 1884 when Colonel George Crook forced them onto the San Carlos Reservation. In 1885, a large number of Apaches led by Geronimo fled the reservation, crisscrossing southeastern Arizona and southwestern New Mexico. However, in 1886 they surrendered to General Crook at Canon de los Embudos in the mountains 30 miles south of the San Bernardino Ranch Headquarters.

At the turn of the century the area became a profitable cattle ranching area. The Anglo-American ranchers in the area employed the local Papago population enabling the Papago to learn a considerable amount about the cattle ranching industry and allowing them to make a shift from subsistence pastoralism to cash ranching. Tensions developed between Papago ranchers and Anglo-American Ranchers over grazing land and waterholes but never resulted in violent conflicts due to the collapse of the cattle market and the establishment of the Papago Reservation (Spicer 1962). The Papago were the last Native American tribe to acquire a reservation. Also during this time ore smelting became a profitable industry and smelters were built in both Douglas and Bisbee. This prompted the development of railroads in the area to transport the ore (Hadley 1987).

The American border once again saw military activity during the Mexican Revolution in 1910. U.S. soldiers were stationed for the first time on the border at Nogales, Naco and Douglas. By 1916 airplanes were also used to patrol the border establishing the first operational airport in Douglas. The airport would be used off and on until 1929 for planes patrolling the border for the Mexican Revolution and the later Escobar rebellion (Christiansen 1974).


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### 3.7.2 Ethnographic Resources and Tribal Concerns

Ethnographic resources are defined by NPS as a site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. Ethnographic resources include Traditional Cultural Properties (TCP). TCPs are resources associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. Traditional resources may include archeological resources, locations of historic events, sacred areas, sources of raw material used to produce tools and sacred objects, topographic features, traditional hunting or gathering areas, and native plants or animals. Identification of these resources requires consultation with the appropriate Native American Tribes which claim a cultural affinity to the area.

In addition, section 106 of the National Historic Preservation Act requires Federal agencies to take into account the effects of their undertakings on historic properties and defines procedures governing Federal agencies statutory responsibilities. The Advisory Council on Historic Preservation (ACHP) codified these compliance procedures as 36 CFR Part 800. Revisions to these procedures emphasized consultation with Native American tribes as part of the Section 106 process. In particular, Sec. 800.2(c)(3) of the revised regulations states that Federal agencies are required to consult not only with the State Historic Preservation Officer (SHPO) and/or the Tribal Historic Preservation Officer (THPO), but also with relevant tribes that might claim cultural affinity in the area of the undertaking. Such consultations should occur on all Federal undertakings subject to Section 106 review, regardless of whether or not the undertaking is on tribal land. As a result, the tribes must be given a reasonable opportunity to identify their concerns, advise on potential resources within the study area, including eligibility and provide input on project effects. The following tribes in Arizona claim cultural affinity to the region of influence: Ak-Chin Indian Community, Gila River Indian Community, Tohono O'odham Nation, Hopi, Salt River Pima-Maricopa Indian Community, Yavapai, Zuni Pueblo, Cocopah, and Fort Yuma - Quechan (Arizona State Parks 1999). Ongoing consultation is being conducted with all the Native American tribes throughout both the section 106 and NEPA processes. Consultation includes the identification of any TCPs, traditional Native American subsistence areas (such as Native

American Ak-Chin fields) or other ethnographic resources that may exist within the project area.

Several Native American reservations also exist within the Study area. Consultation with the THPO of these reservation lands is also required where applicable. The following Native American reservations are within the study area: San Xavier, Pascua Yaqui, Tohono, O'odham, Ak-Chin, Gila River, Gila Bend, Cocopah, Yuma, Fort Yuma, and Colorado River.

### 3.7.3 Previous Investigations

Due to the great extent of the study area, a complete examination of the previous investigations conducted there is not possible. Previous investigations include academic and Section 106 compliance work that has been completed for multiple agencies including, but not limited to, the BMGR, USACE, Arizona Department of Transportation and Development (ADOTD), and INS. The multitude of previous archaeological investigations resulted in the discovery of a vast array of sites in Arizona.

Historic properties in southern Arizona vary greatly in size and configuration. Over 2,000 sites have been recorded within the study area. Lands controlled by BMGR occupy a large portion of the current study area. Numerous archaeological surveys have been completed on BMGR lands between the Mid-1950's through the present day. A total of 41 cultural resources projects have been completed at the BMGR through the year 2000. The majority of these projects consist of intensive archaeological surveys. This has resulted in over 135,600 acres being surveyed and the recording of over 1,000 sites. The present index of properties listed in the National Register of Historic Places (NRHP) (Appendix E) also represents a small proportion of those sites that might be potentially eligible for the NRHP that occur within the study corridor. At the present, this listing is quite biased toward historic mining communities, industrial complexes, and ranches. Only a few of the significant prehistoric properties within the study area are so listed.

Three basic types of archeological sites may be expected to be encountered along the study corridor in southern Arizona. They are: (1) lithic scatters (likely predominantly prehistoric), (2) limited activity sites (prehistoric and historic), and (3) habitation sites (prehistoric and historic)

(Martynec and Peter 1992, Martynec et al 1992). These sites can range from thin surface scatters to extensive deposits of cultural material with intact middens and features.

Lithic scatters are found near exposed rock outcrops and usually consist of a thin scatter of chipped stone debris including primary and secondary flakes, core and core fragments, and a few tools. Sites of this type reflect specific activities involving the manufacture of lithic tools, and as a rule, usually do not contain other kinds of artifacts or features.

Prehistoric limited activity sites consist of thin artifact scatters and/or cultural deposits that contain a variety of tools (aside from lithic debris) representing more than one kind of activity. These sites typically represent activities involved with the acquisition of food, such as hunting and/or butchering and plant processing. Ground stone, ceramics, fire-cracked rock, and ash concentrations commonly occur on these sites. Other features such as pits, rock rings, and middens are found on limited activity sites. Historic limited activity sites consist of features and/or concentrations of artifacts, such as dams, saguaro fruit camps, trash dumps, mining enterprises, and ranch-related features such as dipping tanks and corrals.

Prehistoric habitation sites represent extensive and dense concentrations of artifacts and, as a rule, contain many features. Such sites represent habitation areas that were occupied permanently or revisited on a seasonal basis. Midden deposits, burials, faunal and macrobotanical remains, and structural features regularly occur on these sites in association with a wide array of artifacts, including chipped and ground stone, worked shell and bone, and large quantities of ceramics. Historic habitation sites represent homesteads that usually contain above ground structures associated with a scatter of artifacts.

Other than the three primary site types discussed above, rockshelters, petroglyphs, boulder pictographs, intaglios, shrines, and trails may be encountered along the study corridor as well. Rockshelters consist of rock overhangs that contain deposits of cultural material at their base. As a rule, rockshelters are usually habitation sites and will possess an array of cultural items, many of which are perishable, such as textiles, basketry, netting, etc. Burials, faunal and floral remains, and coprolites also can be found in rockshelters.

Petroglyphs, boulder pictographs, intaglios, shrines, and trails may occur with or without artifacts. Petroglyphs and boulder pictographs consist of images on rocks made in the shape

of animals, humans, or geometric figures. Petroglyphs are carved into the rock surface while pictographs are drawn or painted. Intaglios consist of larger-than-life scraped earth drawings or alignments of rocks resembling animal or human figures or geometric designs. Intaglios can be quite large, extending over 66 ft. in length. Shrines usually consist of small rock arrangements or piles with few associated artifacts. Trails, marking former travel corridors also may be encountered. In many cases, sherds may be scattered along the trails.

The vast majority of prehistoric archeological sites in the Colorado River subregion consist of either surface scatters or as thin subsurface deposits that rarely reveal any discrete temporal separation of occupations. A few stratified sites have been located on terraces of the Lower Colorado River (Schroeder 1961). Sites in the desert areas usually are composed of one or more loci-containing general activity areas, middens, chipping stations, cremations, food processing areas, caches, pottery concentrations, or hearths.

The majority of sites found in the Colorado River subregion appear to consist of temporary camps, which range in size from small surface scatters containing a few artifacts to larger sites that possess numerous artifacts and features. As defined by some researchers, "temporary camps" contain at least three different classes of artifacts or features (Schaefer et al. 1987). These encampments apparently were reoccupied on a yearly basis, probably by a single-family unit, and average 4,920 $ft.^2$ in size and contain several hundred artifacts (Schaefer et al. 1987). Usually sites of this type have patches of carbonaceous soil containing a concentration of lithics and/or sherds, heat-altered sandstone, and pieces of bone and charcoal.

Lithic scatters are also common in the area and are composed of light concentrations of lithic debris that can range in size from 115 $ft.^2$ to over 19,680 $ft.^2$.The range of raw material in a lithic scatter includes quartz, quartzite, obsidian, chalcedony, and site, and metavolcanic felsite (Schaefer et al. 1987). Most lithic scatters in the subregion have been found in areas dominated by creosote-scrub or on top of vegetation-free alkali flats.

As many as 30 "geoglyphs", also referred to as "intaglios", are also found in flat areas of the desert. These features consist of giant, scraped earth drawings, representative of anthropomorphic and zoomorphic figures, as well as other kinds of geometric designs. As in other regions of North America, the function of these sites is unknown; however, it is

conceivable that they were used for spiritual purposes. The features can be quite large, and some are more than 66 ft. in length. Occasionally, base camps exist that represent core settlements such as a village. Relative to temporary camps, these sites are usually Late Prehistoric or Historic in age and, containing more substantial cultural deposits, have a greater density of artifacts spread over large areas. Appendix E provides a complete list of properties listed on the NRHP in each county.

## 3.8 Water Resources

### 3.8.1 Surface and Groundwater Resources

Surface water in the Arizona portion of the study area is located in the Lower Colorado Hydrologic Region which contains seven surface water basins: Upper Gila River, Willcox Playa, Rios de Mexico, San Pedro River, Santa Cruz River, Middle Gila River, and the southern Colorado River. The Willcox Playa Basin is a topographically closed basin that drains toward the interior. The Upper Gila River, San Pedro River, and Santa Cruz River basins drain into the Middle Gila River Basin, which subsequently drains into the Southern Colorado River Basin. The Rios de Mexico Basin, consisting of the Yaqui River and the Sonoran Drainage, drain south into Mexico. Various irrigation canals (i.e., Wellton, Mohawk, East Main, West Main, and B) have been installed along the Lower Gila and Lower Colorado rivers in Yuma County for agricultural and drinking water supplies. The Colorado River and groundwater supply most of the potable water to the study area (USDOI 1977; Anderson and White 1986; Eden and Wallace 1992).

Other important surface water features of the study area include ephemeral waters such as springs, seeps, tinajas. Tinajas are depressions carved out of a streambed by infrequent flash floods. These rockpools in arid regions provided oases for ancient peoples and desert travelers and often support local and unique populations of plant, animals, and invertebrates. Also important are man-made freshwater habitats such as artificial reservoirs (presas), farm ponds (estangues), and cattle tanks (charcos). These habitats create aquatic communities with varying degrees of water permanence in arid parts of the study area that would otherwise lack surface water (Brown 1994).

The majority of the usable groundwater supply within the Arizona portion of the study area originates in alluvial aquifers that are confined and unconfined systems consisting of sand, gravel, silt, and clay. These aquifers range in depth from 100 to 2,000 ft. msl with yields of large capacity wells averaging 1,000 gallons per minute with maximum yields exceeding 2,500 gallons per minute (White and Anderson 1985; Konieczki and Wilson 1992). Two Federally designated sole source aquifers are located within the study area: the Bisbee-Naco in Cochise County was designated January 1, 1984 (49FR2948) and the Upper Santa Cruz and Avra Altar Basin in Santa Cruz and eastern Pima counties was designated September 30, 1988 (53FR38337) (USEPA 1999).

### 3.8.2 Waters of the U.S. and Wetlands

Section 404 of the Clean Water Act (CWA) of 1977 (P.L. 95-217) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States (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. Waters of the United States are further defined as all other 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. 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. Jurisdictional boundaries for these water resources are defined in the field as the ordinary high water mark 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.

The U.S. Army Corps of Engineers (USACE), acting under Section 404 of the Clean Water Act, provides a vital function in protecting our valuable aquatic resources, including wetlands. The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Under Section 404 of the Clean Water Act, the

Secretary of the Army is responsible for administering a Regulatory Program that requires permits for the placement of dredged or fill materials into Waters of the U.S., including wetlands.

Areas regulated under Section 404 are collectively referred to as "Waters of the United States." The Supreme Court ruling in the Solid Waste Agency of Northern Cook County v. USACE case (SWANCC, Case No. 99-1178) on January 9, 2001 restricted the Environmental Protection Agency and USACE's regulatory authority under Clean Water Act. This ruling eliminates the CWA jurisdiction over isolated, non-navigable, and intrastate waters used as habitat by migratory birds. Waters of the United States specifically affected by the SWANCC ruling include: small intrastate lakes, isolated rivers and streams (including intermittent streams), isolated wetlands, sloughs prairie potholes, wet meadows, playa lakes, or natural ponds.

The USACE has established Nationwide Permits (NWPs) to efficiently authorize common activities, which do not significantly impact Waters of the U.S. The NWPs were modified and reissued by the USACE in the Federal Register on 15 January 2002. The effective date for implementation of the new nationwide permits is pending. The USACE has the responsibility to authorize permitting under a NWP, or to require an Individual Permit.

While there are many wetland types in the arid southwestern United States, water is scarce and local wetlands have experienced years of intensive use, modification, degradation, and more recently, efforts at conservation. Wetland types within the study area include riverine and riparian ecosystems (many of which are spatially and/or temporally intermittent), playa lakes (e.g. Willcox Playa), artificial reservoirs, and desert springs (cienegas). Permanent natural lakes do not occur in Arizona. Stream-riparian ecosystems are the predominant form of wetlands in this region and the most highly valued. Current efforts to manage and conserve these habitats for a variety of uses are underway. Disturbance of wetlands takes many forms: flash flooding and extensive drying are probably most influential. However, siltation, cattle grazing, algal pathogens, and various human effects such as water diversion, introduction of exotic species, and recreational abuse may have strong effects.

### 3.8.3 Water Quality

The Arizona Department of Environmental Quality (ADEQ) has undertaken a comprehensive water quality assessment prepared in fulfillment of Section 305(b) of the CWA (ADEQ, 1998). This endeavor was performed concurrently with the Arizona Unified Watershed Assessment (ADEQ, 1998) and the ADEQ Source Water Assessment (ADEQ 1998). These programs are an integral parts of a comprehensive statewide watershed management strategy implemented by the ADEQ and its Water Quality Division. Objectives included within this strategy are 1) Aquifer Protection Program Permits; Wastewater Reuse; and Dry Well Registration; 2) CWA Section 305(b) Water Quality Assessment Report; 3) Triennial Standards Review; 4) Site-Specific Standards Determination; 5) CWA Section 303(d) Listing of Quality-limited (Impaired and Threatened) Waters and Development and Implementation of Total Maximum Daily Loads (TMDL); 6) Safe Drinking Water Act Source Water Assessment, Protection Programs, and Public Water System Supervision.

Water quality monitoring of surface resources is accomplished through four programs in Arizona:

- ADEQ Fixed Station Network – sites selected and monitored to provide data on long-term conditions and trends on wadeable streams
- USGS Monitoring Stations – collects long-term data on major rivers and streams
- ADEQ Clean Lakes Program – collects monitoring data on lakes
- The ADEQ Biocriteria Development Program – monitors pristine, wadeable, perennial waters to use as reference sites for biocriteria

The ongoing assessment of surface waters includes portions of the study area. Assessed waters, their designated uses, assessment category, use support status, and assessment narratives are summarized in Table 3-5.

## 3.9 Air Quality

The USEPA defines ambient air quality in 40 CFR 50 as "that portion of the atmosphere, external to buildings, to which the general public has access". In 40 CFR 50, USEPA has designated "criteria air pollutants" in which ambient air quality standards have been established. Ambient air quality standards are intended to protect public health and welfare and are classified as either "primary" or "secondary" standards. Primary standards define levels of air quality necessary to protect the public health. National secondary ambient air

## Table 3-5. Water Quality, Designated Uses, Assessment Category, and Use Support Status for Watersheds within the Study Area.

| Segment Name/ County Located | ID Number | Miles/Acres in Segment | Designated Uses | Assessment Category | Use Support/ Water Quality Limited | Assessment Narrative |
|---|---|---|---|---|---|---|
| Colorado River: Indian Wash – Imperial Dam/ La Paz & Yuma Co. | 15030104 -001 | 17 miles | A&Ww, FBC, FC, DWS, AgI, AgL | Monitored | Full/No | High Sulfate and TDS |
| Colorado River – Yuma Wash/Yuma Co. | 15030104 -008 | 22 miles | A&Ww, FBC, FC, DWS, AgI, AgL | Evaluated | Partial/No | Selenium levels in some samples |
| Colorado River: Main Canal – Mexico Border/Yuma Co. | 15030107 -001 | 32 miles | A&Ww, FBC, FC, AgI, AgL | Monitored | Parital/Yes | High turbidity, metals and pesticides in some samples |
| Gila River: Coyote Wash – Fortuna Wash/Yuma Co. | 15070201 -003 | 28 miles | A&Ww, FBC, FC, AgI, AgL | Monitored | Non/Yes | High metals, TDS, and turbidity |
| Wellton-Mohawk Canal/Yuma Co. | 15070201 -301 | 15 miles | DWS, AgI, AgL | Evaluated | Threat/No | High copper, DDT metabolites, and toxaphene in some samples |
| Imperial Reservoir/ Yuma Co. | 15030104 -0670 | 513 acres | A&Ww, FBC, FC, DWS, AgI, AgL | Evaluated/ Unknown | Partial/No | High TDS and sulfates; selenium in some samples |
| Mittry Lake/ Yuma Co. | 15030107 -0950 | 384 acres | A&Ww, FBC, FC | Evaluated/ Unknown | Partial/No | Selenium in some samples |
| **SANTA CRUZ RIVER/RIO MAGDELENA/RIO SONOITA WATERSHED** | | | | | | |
| Harshaw Wash/Santa Cruz Co. | 15050301 -268 | 14 miles | A&Ww, FBC, FC, AgI, AgL | Monitored | Full/No | High cromium and zinc in some samples |
| Madera Canyon Creek/Pima Co. | 1500301- 322 | 13 miles | A&Ww, FBC, FC, AgL | Evaluated | Full/No | Use impaired |
| Alum Gulch/Santa Cruz Co. | 1500301- 561A | 2 miles | A&Ww, FBC, FC, AgL | Evaluated | Non/Yes | Use impaired by high metals, low pH |
| Redrock Canyon Creek/ Santa Cruz Co. | 15050301 -576 | 13 miles | A&Ww, FBC, FC | Evaluated | Full/No | Use impaired |
| Cienega Creek/ Santa Cruz and Pima Co. | 15050302 -006A | 37 miles | A&Ww, FBC, FC, AgL | Evaluated | Full/No | Use impaired |
| Cienega Creek/Pima Co. | 15050302 -006B | 11 miles | A&Ww, FBC, FC, AgL | Monitored | Full/No | Use impaired |
| Arivaca Creek/Pima Co. | 15050304 -008 | 15 miles | A&Ww, FBC, FC, AgL | Monitored | Full/No | Low dissolved oxygen during low flow |
| Sycamore Canyon/Pima Co. | 15080200 -002 | 10 miles | A&Ww, FBC, FC, AgL | Evaluated | Full/No | Low dissolved oxygen during low flow |





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**Table 3-5. Continued**.

| Segment Name/ County Located | ID Number | Miles/Acres in Segment | Designated Uses | Assessment Category | Use Support/ Water Quality Limited | Assessment Narrative |
|---|---|---|---|---|---|---|
| Patagonia Lake/Santa Cruz Co. | 1505030 1-1050 | 231 acres | A&Wc, FBC, FC, DWS, AgI, ASgL | Evaluate, eutrophic | Threat/No | High nutrients indicated by aquatic vegetation; mercury in some samples |
| Pena Blanca Lake/Santa Cruz Co. | 1505030 1-1070 | 51 acres | A&Wc, FBC, FC, DWS, AgI, AgL | Monitored, eutrophic | Non/Yes | High mercury in some samples |
| Arrivac Lake/Pima Co. | 1505030 4-0080 | 118 acres | A&Ww, FBC, FC, AgL | Evaluated, eutrophic | Non/Yes | High mercury in some samples and high nutrients |
| **SAN PEDRO RIVER/WILCOX PLAYA/RIO YAQUI WATERSHED** | | | | | | |
| San Pedro River: Dragoon Wash – Tres Alamos Wash/Cochise Co. | 1505020 2-003 | 17 miles | A&Wx, FC, FBC, AgL | Monitored | Non/Yes | Fecal coliform, turbidity, nitrate impairs uses |
| San Pedro River: Babocmari Creek – Dragoon Wash/Cochise Co. | 1505020 2-003 | 17 miles | A&Wx, FC, FBC,AgL | Monitored | Non/Yes | Fecal coliform and turbidity impairs uses, high beryllium in some samples |
| Babocomari Creek/ Cochise Co. | 1505020 2-004 | 33 miles | A&Ww, FC, FBC, AgL | Evaluated | Full/No | Use impaired |
| San Pedro River: Charleston – Walnut Gulch/Cochise Co. | 1505020 2-006 | 9 miles | A&Ww, FC, FBC, AgI, AgL | Evaluated | Full/No | Use impaired |
| San Pedro River: Mexico border – Charleston/Cochise Co. | 1505020 2-008 | 28 miles | A&Ww, FC, FBC, AgI | Monitored | Partial/Yes | Turbidity impairs uses; high metals in some samples |
| Whitewater Draw/Cochise Co. | 1508030 1-002 | 6 miles | A&Wx, FC, FBC, AgI, AgL | Evaluated | Non/Yes | Use impaired by high beryllium, low dissolved oxygen, lead, and turbidity. Other metals detected in some samples |
| Mule Gulch headwaters – Bisbee WWTP/Cochise Co. | 1508030 1-090A | 1 mile | A&Ww, FC, FBC, AgI, AgL | Evaluated | Partial/No | Use impaired by low pH |
| Mule Gulch: Bisbee WWTP – Whitewater Draw/Cochise Co. | 1508030 1-090B | 8 miles | A&Wedw, PBC, AgL | Evaluated | Non/Yes | Uses impaired by zinc, copper, low pH, and turbidity |
| Rucker Canyon Creek – Whitewater Draw/Cochise Co. | 1508030 1-288 | 10 miles | A&Wc, FC, FBC, DWS, AgL | Evaluated | Full/No | Use unimpaired |
| Wilcox Playa/Cochise Co. | 1505020 1-1892 | 29,471 acres | A&Ww, FBC, FC, AgL | Evaluated/Unknown | Threat/No | Use threatened by arsenic, beryllium, cadmium, and turbidity. |





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**Table 3-5. Continued.**

| Segment Name/ County Located | ID Number | Miles/Acres in Segment | Designated Uses | Assessment Category | Use Support/ Water Quality Limited | Assessment Narrative |
|---|---|---|---|---|---|---|
| **SAN CARLOS/SAFFORD/DUNCAN WATERSHED** | | | | | | |
| East Turkey Creek – San Simon Wash/Cochise Co. | 15040006 -837 | 14 miles | A&Wc, FC, FBC, AgL | Evaluated | Full/No | Use unimpaired |
| Cave Creek South Fork/Cochise Co. | 1504006-849 | 22 miles | A&Wc, FC, FBC, AgI, AgL | Evaluated | Full/No | Use unimpaired |
| Cave Creek/Cochise Co. | 15040006 -852A | 9 miles | A&Wc, FC, FBC, AgI, AgL | Evaluated | Full/No | Use unimpaired |

Source: ADEQ Water Quality Assessment, 1998.

Legend: FBC= Full Body Contact, PBC = Partial Body Contact, DWS= Domestic Water Supply, A&W= Aquatic an Wildlife, c= Cold Water, w= warm water, AgI= Agricultural Irrigation, AgL= Agriculture and Livestock Watering, Full= segment fully supports designated uses, Non= segment does not support designated uses, Partial= segment partially supports designated uses, Threat= designated uses threatened by identified pollutants, Yes= water quality in this segement is limited, No= water quality is not limited or threatened.



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quality standards define levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Primary and secondary standards have been established for carbon monoxide, lead, ozone, nitrogen dioxide, particulate matter (total and inhalable fractions) and sulfur dioxide. Areas that do not meet these standards are called non-attainment areas; areas that meet both primary and secondary standards are known as attainment areas.

The majority of the Arizona segment of the U.S.-Mexico border area is sparsely settled desert or semi-desert. However, this segment contains two large areas of urbanization, the Phoenix and Tucson metropolitan areas. Several "sister cities" are also located along the U.S.-Mexico border. There are a number of air quality problems related to the rural, urban, and industrial areas within this study area. Man-made sources of air contaminants affect the air quality of the study area. These sources include industrial emissions, mobile (vehicular) emissions, area emissions (e.g., emissions from numerous residences and small commercial establishments in an urban setting), dust resulting from wind erosion of agriculturally disturbed lands, smoke from forestry burns, and pollutants transported into the study area on winds blowing from major urban/industrial areas outside the study area. One of the largest sources of air pollution in Arizona is the controlled burning of forest lands.

Airborne particulates are a special problem in the border area. Construction activity and windblown dust from disturbed desert are significant sources of fugitive dust. In agricultural areas, farming activity is an additional source of fugitive dust. Many residences in the U.S.-Mexico border area burn non-traditional fuels such as wood scraps, cardboard, and tires to provide warmth in the winter. The resulting particulate loading can also adversely affect air quality in the Arizona border counties.

In addition to airborne particulates, high concentrations of sulfur dioxide in the study area are of concern. Sulfur dioxide ($S0_2$) is the primary contributor to acid deposition, which causes acidification of lakes and streams and can damage trees, crops, historic buildings, and statues. In addition, sulfur dioxide compounds in the air contribute to visibility impairment and may affect breathing and aggravate existing respiratory and cardiovascular disease (USEPA 2000). Ambient sulfur dioxide in the study area results largely from stationary sources such as coal and oil combustion, steel mills, refineries, pulp and paper mills, and from nonferrous smelters.

### 3.9.1 Potential Sources of Air Pollutants

The emission sources of those criteria pollutants regulated by the NAAQS are of concern nationally, statewide and regionally. Ambient concentrations of Carbon Monoxide (CO) are predominantly influenced by mobile source emissions. Emissions of $SO_2$ are associated mainly with stationary sources. Ozone ($O_3$), lead, nitrogen oxides ($NO_x$), VOCs, total suspended particulates (TSP) and inhalable particulate matter ($PM_{10}$/$PM_{2.5}$) come from both mobile and stationary sources.

CO is a colorless, odorless gas that results from the incomplete combustion of gasoline and other fossil fuels and impairs the ability of blood to carry oxygen in the body. In most cities, approximately 80 percent of CO emissions are from motor vehicles. Because CO disperses quickly; the concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near crowded intersections and long heavily congested roadways. Consequently, it is important to evaluate CO concentrations on a localized basis to determine the impacts from the proposed project.

Ozone, also a colorless gas, is a major constituent of photochemical smog at the earth's surface. Research has indicated that ozone damages the respiratory system, reducing breathing capacity and causing chest pain, headache, nasal congestion and sore throat. Individuals with chronic respiratory diseases are especially susceptible to ozone. In addition, high levels of ozone can cause injuries to certain plants, trees, and materials. The precursors in the formation of ozone are VOCs and $NO_x$. In the presence of sunlight, ozone is formed through a series of chemical reactions that take place in the atmosphere. Because reactions occur as the pollutants are diffusing downward, elevated ozone levels are often found many miles from sources of the precursor pollutants. Therefore, the effects of $NO_x$ and VOC emission from mobile sources are examined on a regional basis.

The change in regional mobile source emissions of these pollutants is related to the total number of vehicle miles travels (VMT) throughout the study areas. While the proposed project will result in an increase access throughout the study area, it will not increase the number of regional VMT. Therefore, the proposed alternatives will not have a measurable impact on regional $NO_x$ and ozone levels, and a further analysis is not required.

Inhalable particulates are emitted from various sources: industrial facilities, power plants, construction activities, diesel-powered vehicle and open burning. The pollutants can cause irritation and damage to the respiratory systems, resulting in difficult breathing, inducement of bronchitis, and aggravation of existing respiratory diseases. Also, certain polycyclic aromatic hydrocarbons in particulate matter may be carcinogenic. Individuals with respiratory and cardiovascular diseases, children, and elderly persons are at greatest risk. Secondary effects include soiling, damaging materials and impairment of visibility.

$SO_2$ emissions are primarily associated with the combustion of sulfur-containing fuels, oil and coal. Exposure to high levels of $SO_2$ aggravates asthma, resulting in wheezing, shortness of breath, and coughing. Secondary effects include visibility impairment and acid deposition due to its conversion to sulfate particles. Since electrical generators used to power surveillance lights would utilize diesel fuel, no appreciable amounts of these pollutants would be emitted from project related sources, except from aircraft and vehicles.

Lead emissions are primarily associated with motor vehicle and industrial sources that use gasoline containing lead additives. All vehicles produced in the United State after 1980 are designated to use unleaded fuel, and the ambient air concentration has declined significantly.

### 3.9.2 Ambient Air Quality Monitoring/Status

The project area is located in the southern portions of Arizona along the U.S.-Mexico Border. This area encompasses Cochise, Pima, Santa Cruz and Yuma Counties in Arizona. The counties in the study area are within the Intrastate Air Quality Control Regions (IAQCR) for air quality planning purposes as follows: Cochise and Santa Cruz counties - Southeast Arizona IAQCR, Pima County - Pima IAQCR, Yuma County to Mohave-Yuma IAQCR.

The State of Arizona has adopted the NAAQS as the state's air quality criteria. National and California standards (discussed in the following paragraphs) for air quality are presented in Table 3-6. Based upon a review of 40 CFR 80, portions of Pima County have been designated as non-attainment for the CO, $PM_{10}$ and TSP standards. Portions of Yuma County are also designated as non-attainment for the $PM_{10}$ standard. The rest of the counties are designated as attainment/unclassifiable for all other criteria pollutant standards.

**Table 3-6. Ambient Air Quality Standards For Criteria Pollutants**

| Pollutant | Federal Standard |
|---|---|
| Carbon Monoxide (CO) | |
| Maximum 8-Hour Concentration | 9 ppm |
| Maximum 1 Hour Concentration | 35 ppm |
| Lead (Pb)[2] | |
| Maximum Arithmetic Mean Over Three Consecutive Months | 1.5 µg/$m^3$ |
| Nitrogen Dioxide ($NO_2$) [2] | |
| Annual Arithmetic Mean | 0.05 ppm |
| 1 Hour | |
| Ozone ($O_3$)[2] | |
| 1-Hour Average | 0.12 ppm |
| 8-Hour Average | 0.08 ppm |
| Total Suspended Particulates (PM) | |
| Annual Arithmetic Mean | 75 µg/$m^3$ |
| Maximum 24-Hour Concentration | 250 µg/$m^3$ |
| Inhalable Particulate Matter ($PM_{10}$) [2] | |
| Annual Arithmetic Mean | 50 µg/$m^3$ |
| Annual Geometric Mean | 150 µg/$m^3$ |
| Maximum 24-Hour Concentration | |
| Inhalable Particulate Matter ($PM_{2.5}$) [2] | |
| Annual Arithmetic Mean | 15 µg/$m^3$ |
| Maximum 24-Hour Concentration | 65 µg/$m^3$ |
| Sulfur Dioxide ($SO_2$) | |
| Annual Arithmetic Mean | |
| Maximum 24-Hour Concentration | 80 µg/$m^3$ |
| Maximum 3-Hour Concentration | 365 µg/$m^3$ |
| Maximum 1-Hour Concentration | 1,300 µg/$m^3$ |
| Visibility Reducing Particles | No Standard |
| Sulfates | No Standard |
| 24-Hour Concentration | |
| Hydrogen Sulfide | No Standard |
| 1-Hour Concentration | |

**NOTES:**

1) Ambient air quality standards presented above based upon 40 CFR 50.
2) Federal primary and secondary standards for this pollutant are identical.
3) In sufficient amount to produce an extinction coefficient of 0.23 per kilometer—visibility of ten miles or more due to particles when the relative humidity is less than 70 percent.

Existing air quality in the project regions is monitored by a series of ambient air monitoring networks established and maintained by the state and local air pollution control agencies. Table 3-7 summarizes monitoring data for areas along the U.S.–Mexico border in Arizona.

**Table 3-7. Arizona Emissions Summary for Selected Air Pollutants Along the U.S./Mexico Border (tons/year)**

| Sulfur Dioxide | Total Suspended Particulates | Nitrous Oxide | Carbon Monoxide | Volatile Organic Compounds |
|---|---|---|---|---|
| 4,663 | 1,190 | 6,519 | 689 | 45 |

Source: USEPA 2000.

## 3.10 Socioeconomics

### 3.10.1 Population and Demographics

The Region of Influence (ROI) of the proposed actions consists of a four county area across the border in Arizona. The counties consist of Cochise, Pima, Santa Cruz, and Yuma counties in Arizona. The population and racial mixes of the different counties are presented in Table 3-8. Population in each of the counties ranges from 843,746 in Pima County in 2000 to 38,381 in Santa Cruz County in 2000. There was positive population growth in all counties within the ROI. This growth, between 1990 and 2000 ranged from 49.7% in Yuma County, to 12.7% in Santa Cruz County. The racial mix of the area is predominated by Caucasians in all counties ranging from 77% in Cochise County to 68% in Yuma County, Arizona. Both Santa Cruz County, and Yuma County have the majority of the population claiming to be of Hispanic Origin, 81% and 50% respectively. Overall, the percentage of people claiming Hispanic origin has increased across the ROI between 1990 and 2000. For the most part, racial mix of the counties changed little between 1990 and 2000. A significant drop in the percentage of Caucasian populations seems to be more of a result of changes in data collection between the 1990 and 2000 census, with the 2000 census dividing the population between those of one race or two or more races.

### 3.10.2 Employment and Income

Table 3-9 summarizes the total number of jobs in the study area split by county. Pima County had the largest numbers of jobs in the ROI while Santa Cruz had the lowest. Yuma County had the highest unemployment rate (27.8%) followed Santa Cruz County (20.8%). Pima County (3.3%) was the only county within the ROI that was below the state unemployment rate.

**Table 3-8. Population and Race Estimates within the Study Area**

| Location | White | African American | Asian | Native American | Hispanic Origin | Total | Population Density |
|---|---|---|---|---|---|---|---|
| Arizona | | | | | | | |
| 1990 | 3,277,590 (89%) | 114,960 (3%) | 58,362 (2%) | 214,427 (6%) | 688,355 (19%) | 3,665,339 | 32.3 |
| 2000 | 3,873,611 (75%) | 158,873 (3%) | 92,236 (2%) | 255,876 (5%) | 1,295,617 (25%) | 5,130,632 | 45.2 |
| Cochise | | | | | | | |
| 1990 | 89,282 (92%) | 5,181 (5%) | 2,298 (2%) | 863 (1%) | 28,379 (29%) | 97,624 (3%) | 15.8 |
| 2000 | 90,269 (77%) | 5,321 (5%) | 1,942 (2%) | 1,350 (1%) | 36,134 (31%) | 117,755 (2%) | 19.1 |
| Pima | | | | | | | |
| 1990 | 608,751 (91%) | 21,951 (3%) | 12,650 (2%) | 23,605 (4%) | 163,262 (24%) | 666,957 (18%) | 72.6 |
| 2000 | 633,387 (75%) | 25,594 (3%) | 17,213 (2%) | 27,178 (3%) | 247,578 (29%) | 843,746 (16%) | 91.8 |
| Santa Cruz | | | | | | | |
| 1990 | 29,296 (99%) | 129 (<1%) | 183 (<1%) | 68 (<1%) | 23,221 (78%) | 29,676 (1%) | 31.0 |
| 2000 | 29,168 (76%) | 145 (<1%) | 201 (<1%) | 251 (1%) | 31,005 (81%) | 38,381 (1%) | 31.0 |
| Yuma | | | | | | | |
| 1990 | 100,142 (94%) | 3,345 (3%) | 1,577 (1%) | 1,831 (2%) | 43,388 (41%) | 106,895 (3%) | 29.0 |
| 2000 | 109,269 (68%) | 3,550 (2%) | 1,486 (1%) | 2,626 (2%) | 80,772 (50%) | 160,026 (1%) | 29.0 |

Source: US Census Bureau, 2001





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**Table 3-9. Total Number of Jobs within the Study Area**

| Location | 1989 | 1999 | Percent Change | Unemployment Rate[1] |
|---|---|---|---|---|
| **Arizona** | | | | **4.6%** |
| Cochise | 40,246 | 48,025 | 19% | 5.7% |
| Pima | 320,900 | 429,332 | 34% | 3.3% |
| Santa Cruz | 13,385 | 15,570 | 16% | 20.8% |
| Yuma | 50,726 | 67,112 | 32% | 27.8% |

Source: Regional Economic Information System (2001); DES 2001; EDD 2001
[1]1999 Annual unemployment rate

Table 3-10 summarizes the Total Personal Income (TPI) for the ROI. TPI ranged from $19,215,134 in Pima County, Arizona to $645,821 in Santa Cruz County, Arizona. The average annual growth rate over the past 10 years ranged from 6.8% in Santa Cruz County to 5.1% in Cochise County, Arizona . The average annual growth rate of TPI for the US was 5.4%. All the counties within the ROI were below the average annual growth rate for TPI in relation to their respective states.

**Table 3-10. Total Personal Income for the Region of Influence**

| Location | 1989 TPI (rank) in thousands of dollars | 1999 TPI (rank) in thousands of dollars | Percent State Total | Average Annual Growth Rate |
|---|---|---|---|---|
| **Arizona** | | | | **7.2%** |
| Cochise | $1,289,592 (6$^{th}$) | $2,119,438 (8$^{th}$) | 1.8% | 5.1% |
| Pima | $10,456,146 (2$^{nd}$) | $19,215,134 (2$^{nd}$) | 16% | 6.3% |
| Santa Cruz | $335,315 (12$^{th}$) | $645,821 (12$^{th}$) | 0.5% | 6.8% |
| Yuma | $11,385,369 (5$^{th}$) | $2,502,356 (6$^{th}$) | 2.1% | 6.1% |

Source: BEARFACTS 2001

Per Capita Personal Income (PCPI) data for the ROI is located in Table 3-11. PCPI ranged from $23,911in Pima County, Arizona to $16,496 in Santa Cruz County, Arizona. All the counties were below the National average of $25,288 with Pima County being the closest at 83% of the national average PCPI. The average annual growth rate of PCPI ranged from 4.3% in Pima County to 3.3% in Yuma County. The annual average growth rate of PCPI across the whole ROI was below the average annual growth rate of the Nation of 4.4%.

**Table 3-11. Per Capita Personal Income for the Region of Influence**

| Location | 1987 PCPI (rank) | 1999 PCPI (rank) | Percent of State Average | Percent National Average | Average Annual Growth Rate |
|---|---|---|---|---|---|
| **Arizona** | | | | | **4.3%** |
| Cochise | $13,220 (7th) | $18,797 (9th) | 75% | 66% | 3.6% |
| Pima | $15,742 (2nd) | $23,911 (2nd) | 95% | 84% | 4.3% |
| Santa Cruz | $11,651 (12th) | $16,496 (12th) | 66% | 58% | 3.5% |
| Yuma | $13,401 (6th) | $18,452 (10th) | 73% | 65% | 3.3% |

Source: BEARFACTS 2001

Poverty levels for all counties within the study area are presented in Table 3-12. Poverty estimates are for the ROI range from 25.8 in Santa Cruz County to 16.2% in Pima County, Arizona of people of all ages in poverty.

**Table 3-12. Number of People of All Ages in Poverty by County[1]**

| Location | Number of all ages in poverty | Percent of all ages in Poverty |
|---|---|---|
| **Arizona** | **720,713** | **15.5%** |
| Cochise | 23,611 | 21.7% |
| Pima | 127,496 | 16.2% |
| Santa Cruz | 9,961 | 25.8% |
| Yuma | 33,080 | 25.3% |

[1]Based on 1997 model
Source: U.S. Census Bureau, 2000

### 3.10.3 Housing

The report, *The State of Housing in Arizona*, produced by the Arizona Housing commission in 2000 states that Arizona is currently going through housing crisis where housing prices are rising twice as fast as income statewide. This is of particular importance to low income and minority households.

For both minority and non-minority households, the incidence of housing problems increases dramatically as income levels decrease. Since the percent of minority households that are low income far exceeds the proportionate number in the general population, minorities suffer disproportionately in terms of their basic need for adequate, affordable shelter. This is particularly alarming considering the growth rate of minority

populations in Arizona (Arizona Housing Commission, 2000). A similar situation exits in southeastern California but with a longer history of higher housing costs.

The total number of housing units in the ROI in 2000 was 2,489,189. Table 3-13 summarizes the total number of housing units divided by county. The largest amount of housing units are located in Pima County, Arizona while the smallest is located in Santa Cruz County, Arizona. Santa Cruz and Pima Counties, Arizona have the smallest percentage of vacant units, while Yuma County, Arizona has the largest percentage of vacant housing units. Table 3-14 summarizes household growth trends by county for Arizona and Average Annual Growth rate in Median Household Income and House Sales Price between 1990 and 1995 for Arizona. The latter set of data came from The State of Housing in Arizona. The highest household growth is occurring in Yuma County, Arizona, while the lowest is occurring in Santa Cruz County. The largest discrepancy between in Median household income growth and House Sales Price growth occurs in Pima County, Arizona. House sales prices are growing faster than median household income in all of the Arizona Counties within the ROI except for Santa Cruz County.

**Table 3-13. 2000 Number of Housing Units Divided by County**

| Location | Vacant Housing Units | Owner Occupied Housing Units | Renter Occupied Housing Units | Total Housing Units |
|---|---|---|---|---|
| **Arizona** | **287,862 (13%)** | **1,293,556 (59%)** | **607,771 (28%)** | **2,189,189** |
| Cochise | 7,233 (14%) | 29,523 (58%) | 14,370 (28%) | 51,126 (2%) |
| Pima | 34,387 (9%) | 213,603 (58%) | 118,747 (32%) | 366,737 (17%) |
| Santa Cruz | 1,227 (9%) | 8,026 (62%) | 3,783 (29%) | 13,036 (<1%) |
| Yuma | 20,292 (27%) | 38,911 (52%) | 14,937 (20%) | 74,140 (3%) |

Source: U.S. Census Bureau, 2001

**Table 3-14. Household Growth by County**

| Location | 1990 | 2000 | Percent Change | Average Annual Growth Rate in Median Household Income | Average Annual Growth Rate in Home Sales Price |
|---|---|---|---|---|---|
| **Arizona** | **1,368,843** | **1,901,327** | **39%** | **3.0%** | **8.3%** |
| Cochise | 34,546 | 43,893 | 27% | 4.0% | 7.3% |
| Pima | 261,792 | 332,350 | 27% | 4.3% | 8.6% |
| Santa Cruz | 8,808 | 11,809 | 34% | 2.6% | 2.6% |
| Yuma | 35,791 | 53,848 | 50% | 2.9% | 4.4% |

Source: Arizona Housing Commission, 2000; U.S. Census Bureau, 2001

### 3.10.4 Executive Order 12898, Environmental Justice

Executive Order 12898 of February 11, 1994, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" required The racial mix along the border is mainly Caucasian. Santa Cruz County, Arizona has greater than 50% of the population claiming Hispanic origins, and in Yuma County half (50%) claim Hispanic origins. These areas are particularly sensitive to environmental justice concerns regarding minority populations. Furthermore, the areas along the border, with the exception of Pima County, Arizona are significantly below the National Average of PCPI. These areas range from 57% to 65% of the national average for PCPI. As a result, there is the potential that the activities proposed would be conducted within or in close proximity to low-income populations and neighborhoods in these areas. Finally, due to the current housing shortage as reported by the Arizona Housing Commission (2000), any impacts to housing availability will probably result in higher house prices which could have a particularly significant impact on low-income and minority populations as stated in Section 3.10.3. These impacts would probably be most felt in areas where the average annual growth rate in housing prices is rising faster than the average annual growth rate in median household income.

### 3.10.5 Executive Order 13045, Protection of Children

Executive Order 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 Executive Order 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. Due to the relatively low population density within the project area protection of children issues are unlikely. The area of highest population density lies within Pima County, Arizona, which is almost double of the population density of any of the other counties within the ROI. Over half of the population (486,699) resides in the City of Tucson, which is north of the border and away from the majority of the projects outlined in this programmatic document. As a result, impacts to

residential areas are unlikely which in turn make any impacts to the environmental health or safety of children unlikely.

The racial mix along the border is mainly Caucasian. Santa Cruz County, Arizona has greater than 50% of the population claiming Hispanic origins, and in Yuma County 50% claim Hispanic origins. These areas are particularly sensitive to environmental justice concerns regarding minority populations. Furthermore the areas along the border, with the exception of Pima County, Arizona are significantly below the National Average of PCPI, ranging from 58% to 66% of the national average for PCPI. As a result, there is a probable chance that the activities proposed would be conducted within or in close proximity to low-income populations and neighborhoods in these areas. Finally, due to the current housing shortage as reported by the Arizona Housing Commission (2000), any impacts to housing availability will probably result in higher house prices which could have a particularly significant impact on low-income and minority populations as stated in Section 3.10.3. These impacts would probably be most felt in areas where the average annual growth rate in housing prices is rising faster than the average annual growth rate in median household income.

## 3.11 Public Services and Utilities

### 3.11.1 Fire and Emergency Medical Service

Fire and emergency medical services within each county are well developed. In each case, fire departments are trained to handle emergencies within their respective jurisdictions. Local community hospitals provide medical services to county residents including medical, surgical, obstetric, psychiatric and long-term care inpatient services. The hospitals are supplemented by clinics, which offer internal medicine, general surgery, pediatrics, sub-specialties, occupational medicine, dental and urgent care services. In certain areas emergency departments provide ancillary services to support medical services, including but not limited to laboratory, radiology, physical, occupational and speech therapies, and pharmacies.


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### 3.11.2 Police Protection

Each of the counties in Arizona maintains a local law enforcement department in their respective cities and towns. For example, in Cochise County, the police department consists of four major divisions including Patrol, Investigations, Detention, and Support Services. County jails are located in Bisbee, Arizona with substations located in Sierra Vista, Benson, Willcox, and Douglas, Arizona. In Pima County, the Pima County Sheriff's Department serves the 330,000 people living in unincorporated areas of Pima County. The Yuma Police Department is divided into six (6) major bureaus.

### 3.11.3 Educational and Social Institutions

Northern Arizona University offers an academic center in Yuma, which provides upper division and graduate education for individuals seeking professional and personal growth, career advancement or career transition. In Tucson, the University of Arizona has an enrollment of approximately 35,000 students coming from all 50 states and more than 100 foreign countries. In addition, the University of Phoenix, Prescott College, and Northern Arizona University each offer classes to students. On the smaller scale, local community institutions such as the Pima Community College serve residents of both Pima and Santa Cruz counties including classes, workshops, and seminars held at more than 145 off-campus locations in Tucson, Davis-Monthan Air Force Base, Green Valley, Nogales, and Sells.

### 3.11.4 Medical Services

Typical medical services are provided under county health programs in Arizona. Typical examples are the Cochise Health Systems (AHCCCS/ALTCS Managed Care), Environmental Health Housing Assistance, Medical Assistance, Nursing & Community Health Nutrition and Health Promotion Public Fiduciary. Permanent sites are in Bisbee, Benson, Douglas, Sierra Vista, and Willcox. Many services are mandated by state statute; others are funded by contracts.

In Santa Cruz County, which is considerably smaller than the other respective counties, the majority of health care services are located in Nogales, including Carondelet Holy

Cross Hospital, the only hospital in the county. Holy Cross Hospital provides general medical, critical care, surgical treatment, and outpatient services. Carondelet operates two outpatient treatment clinics in the city of Nogales. The Mariposa Community Health Center is a primary care clinic, and is also located in Nogales. Health care provided at this site includes family practice, general practice, internal medicine, obstetrics and gynecology, pediatrics, and dentistry.

### 3.11.5 Water Supply and Sewer Services

Local municipalities typically provide drinking water supply in Arizona. Local authorities and municipalities also provide sewage services in each county. Most rural areas utilize private water well and septic tank systems.

### 3.11.6 Stormwater

Stormwater management is largely determined by each county's flood control practices, which are primarily adopted from Federal guidelines. Their function is to protect human life and property. In addition, floodplains typically support important riparian ecosystems and a variety of associated wildlife. These areas also perform an important role in recharging valuable groundwater resources.

### 3.11.7 Electricity and Natural Gas

In the Arizona counties, Arizona Power Service provides electricity to meet the primary needs of customers throughout Arizona. UniSource Energy Corporation's subsidiary, Tucson Electric Power, provides an additional source of electricity to areas of Central and Southern Arizona. Southwest Gas provides natural gas utility services to Central and Southern Arizona.

### 3.11.8 Solid Waste

The number of facilities available to treat solid waste is dependent upon the size of the respective counties. Higher volume systems such as the Pima County Wastewater Management Department, Solid Waste Division, provides and operates public facilities

for the safe and sanitary disposal of solid wastes generated within the Pima County jurisdiction under authority from the State of Arizona (ARS 49-741).

Further, the State of Arizona (ARS 49-742 et. seq.) allows the establishment of solid waste user fees to cover the costs of development, construction, operation, administration, and financing of public solid waste management activities, and broadly controls those activities.

The Treatment Division operates and maintains the treatment facilities that receive, treat and dispose of over 64 million gallons of sanitary sewage per day (mgd). Two major facilities handle the sewage from the metropolitan Tucson area, and nine wastewater treatment plants serve remote areas scattered throughout serviced areas of eastern Pima County. In addition, the division includes the Technical Services Section which operates a federally approved pretreatment program and a state of Arizona licensed environmental laboratory for self-monitoring and surveillance sampling.

In Yuma County, residential solid waste transfer sites were authorized in the mid-1980's as a result of concerns for the ability of rural residents to dispose of their household solid wastes. These facilities were constructed in the North Gila Valley, Dome Valley, Wellton, Tacna and Dateland and are maintained by County employees (Public Works/Solid Waste Management). All commercial, industrial or large loads of solid waste not accepted at these facilities are delivered to the Cocopah or Copper Mountain Landfills.

In most cases where capacity is insufficient for a particular county, the remaining waste is transported elsewhere for treatment or disposal.

### 3.11.9 Telephone

Telephone and telecommunications, including local and long-distance voice and data services, is provided to the five counties by SBC Communications, Inc. under the SBC Telecom brand. Several cellular telephone companies also serve the area.

## 3.12 Hazardous Materials

The USEPA in 1996 listed approximately 15,000 uncontrolled hazardous waste sites in the United States. The majority of the uncontrolled hazardous waste sites are waste storage/treatment facilities or former industrial manufacturing sites. The chemical contaminants released into the environment (air, soil or groundwater) from uncontrolled waste sites may include heavy metals, organics, solvents and other chemicals. The potential adverse human health impact of hazardous waste sites is a considerable source of concern to the general public as well as government agencies and health professionals.

A total of 851 contaminated sites were identified in the Arizona study area: 62 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund sites (8 - Cochise County, 38 Pima County, 10 - Santa Cruz County and 6 - Yuma), 17 Resource Conservation and Recovery Act (RCRA) violation and corrective action sites, and 772 Leaking Underground Storage Tanks (LUST) sites. The most notable of these sites is the Phelps/Dodge Smelter in Cochise County, Arizona. Counties or areas that are predominantly rural with historically low industrial activity and small populations typically have a low number of reported sites. Therefore, most of the contaminated sites are expected to be located outside the project area or near the major municipal areas. The trans-boundary movement of hazardous materials/wastes and abandoned or illegal hazardous waste sites is a potential source of pollution occurring in some regions of the border area. Within the study area the transportation, handling, and disposal of hazardous wastes are a cause of public concern.

## 3.13 Noise

Noise is defined as unwanted sound. It is emitted from many sources including airplanes, machinery, railroads, power generation plants, construction equipment, and highway vehicles. The magnitude of noise is described by its sound pressure. Since the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, the decibel (dB). Sound pressures described in decibels are called sound pressure levels.


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The human ear can hear frequencies from about 20 hertz (Hz) to about 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz ranges. When measuring community response to noise, it is common to adjust the frequency content of the measured sound to respond to the frequency sensitivity of the human ear. The adjustment is called A-weighting [American National Standards Institute (ANSI) 1988]. Sound levels measured using A-weighted decibel scale are expressed as dBA. Throughout this analysis, all noise levels are expressed in dBA. Several examples of noise pressure levels in dBA are listed in Table 3-15.

**Table 3-15 A-Weighted (dBA) Sound Levels of Typical Noise Environments**

| dBA | Overall Level | Noise Environment |
|---|---|---|
| 120 | Uncomfortably Loud<br>(32 times as loud as 70 dBA) | Military jet takeoff at 50 ft |
| 100 | Very loud<br>(8 times as loud as 70 dBA) | Jet flyover at 1,000 ft |
| 80 | Loud<br>(2 times as loud as 70 dBA) | Propeller plane flyover at 1,000 ft<br>Diesel truck 40 mph at 50 ft |
| 70 | Moderately loud | Freeway at 50 ft from pavement edge<br>Vacuum cleaner (indoor) |
| 60 | Relatively quiet<br>(1/2 as loud as 70 dBA) | Air condition unit at 10 ft<br>Dishwasher at 10 ft (in door) |
| 50 | Quiet<br>(1/4 as loud as 70 dBA) | Large transformers<br>Small private office (in door) |
| 40 | Very quiet<br>(1/8 as loud as 70 dBA) | Bird calls<br>Lowest limit of urban ambient sound |
| 10 | Extremely quiet<br>(1/64 as loud as 70 dBA) | Just audible |
| 0 | Threshold of hearing | |

Source: Federal Agency Review of Selected Airport Noise Analysis Issues 1992

Noise is usually described in Leq (time-averaged equivalent noise level) or DNL (day-night average noise level). Leq is the equivalent sound level of a steady sound, which has the same A-weighted sound energy as that contained in a time-varying sound, over a specific time period.

DNL is defined as a 24-hour averaged noise level with a 10-dB nighttime (between 10 P.M. and 7 A.M.) penalty. It is the community noise metric recommended by the U.S. Environmental Protection Agency (USEPA) and has been adopted by most Federal agencies. A DNL of 65 dB is the level most commonly used for noise planning purposes.

Areas exposed to DNL above 65 dB are generally not considered compatible for residential use.

Noise is also influenced by many types of variables including the type of equipment generating the noise, vegetation, topography, climate, season of the year, time of the day, and proximity to the noise sources. Noise attenuation is usually estimated at 6 dBA each time the distance is doubled (e.g., a 100 dBA noise level at 100 ft. from the source would be 94 dBA at 200 ft).


BW1 FOIA CBP 009729

# *SECTION 4.0*
# *ENVIRONMENTAL CONSEQUENCES*

## 4.0 ENVIRONMENTAL CONSEQUENCES

This section of the PEIS addresses potential impacts associated with the implementation of the alternatives outlined in Section 2.0. The BIRD summarized infrastructure needs of the USBP Tucson Sector. However, for the purposes of this impact analysis, several assumptions were made by the EIS Team regarding the area of potential impact for each type of proposed infrastructure project.

Road maintenance activities were considered to restore the existing roadbed (b) (7)(E) from (b) (7)(E) i.e., original width of roads). New road construction (patrol roads and service roads) was defined as a (b) (7)(E) right-of-way (ROW). Drag roads were defined as having a (b) (7)(E) ROW. Construction ROWs for fences (primary and secondary) and vehicle barriers were estimated to be (b) (7)(E) wide, although much of this ROW would probably be only temporarily altered. Installation of stadium-style and portable lights was estimated to affect (b) (7)(E) and (b) (7)(E) respectively. The area affected by illumination from stadium-style and portable lights, however, was (b) (7)(E) respectively, from the light source in any direction. The installation or placement of sensors or RVS sites was estimated to affect one $ft^2$ and 1,500 $ft^2$, respectively. The construction of checkpoint facility and remote processing facilities was estimated to affect between one and one and a half acres each. New station construction or expansion was estimated to affect 10 to 20 acres, and helipad construction was estimated to affect (b) (7)(E) The estimates used in calculating areas of impact in regards to the construction of barrier and fences, low water crossings, bridges, drainage canals and ditch closures were based on information provided in the BIRD, from (b) (7)(E) Station AO estimates and from past experiences.

It should be emphasized that all of these estimates should be considered worst-case scenarios. For example, most road improvement projects actually widened the road ROW from zero to (b) (7)(E) Also, portable lighting effects are considered to occur along the entire corridor where they could be placed. In reality, only part(s) of the corridor would be illuminated at a given time since portable lights would be periodically relocated to provide the most effective deterrent and enforcement strategy. Given these assumptions, potential affected acreage from current and future activities within the Tucson and Yuma Sectors are quantified in Tables 4-1 and 4-2, respectively.


BW1 FOIA CBP 009731

**Table 4-1. Existing and Proposed Operations and Infrastructure within the Yuma Sector**

| YUMA SECTOR – EXISTING | |
|---|---|
| **PROJECT DESCRIPTION** | **AREA IMPACTED (Acres)** |
| (b) (7)(E) | |
| **YUMA SECTOR TOTAL (EXISTING):** | (b) (7)(E) |

| YUMA SECTOR – PROPOSED | |
|---|---|
| **PROJECT DESCRIPTION** | **AREA IMPACTED (Acres)** |
| (b) (7)(E) | |
| **YUMA SECTOR TOTAL (PROPOSED):** | (b) (7)(E) |
| **YUMA SECTOR TOTAL (PROPOSED AND EXISTING):** | |


BW1 FOIA CBP 009732

**Table 4-2. Existing and Proposed Operations and Infrastructure within the Tucson Sector**

| TUCSON SECTOR – EXISTING | |
|---|---|
| **PROJECT DESCRIPTION** | **AREA IMPACTED (Acres)** |
| **BARRIER INFRASTRUCTURE** | |
| (b) (7)(E) | |
| **TUCSON SECTOR TOTAL (EXISTING):** | (b) (7)(E) |

| TUCSON SECTOR – PROPOSED | |
|---|---|
| **PROJECT DESCRIPTION** | **AREA IMPACTED (Acres)** |
| **PROPOSED BARRIER INFRASTRUCTURE** | |
| (b) (7)(E) | |

**Table 4-2. Existing and Proposed Operations and Infrastructure within the Tucson Sector**

| TUCSON SECTOR – PROPOSED (CONTD) | |
|---|---|
| **PROJECT DESCRIPTION** | **AREA IMPACTED (Acres)** |
| (b) (7)(E) | |
| **TUCSON SECTOR TOTAL (PROPOSED):** | (b) (7)(E) |
| | |
| **TUCSON SECTOR TOTAL(PROPOSED AND EXISTING):** | |
| | |
| **YUMA AND TUCSON EXISTING TOTAL** | |
| **YUMA AND TUCSON PROPOSED TOTAL** | |
| **YUMA AND TUCSON SECTORS GRAND TOTAL:** | |


BW1 FOIA CBP 009734

Operational impacts quantified herein include areas illuminated by stadium or portable style lights, areas affected by dragging operations, increased patrols and air operations, and areas encompassed by extant checkpoint stations and road maintenance activities. Illumination is typically directed downward and forward toward the south. The USBP has also investigated the use of shields to reduce the amount of backlighting (light projected both to the rear of the light and into the sky). Recent field test have indicated that backlighting can be reduced by 50 percent by installing aluminum shields (HDR 2002). The area illuminated is usually patrol roads or enforcement zones along the border and are, therefore, previously disturbed. Dragging also occurs on extant roads and can occur from (b) (7)(E) No construction of new drag roads is currently proposed or anticipated under any of the alternatives. Road maintenance can occur along any extant road that has been previously upgraded. Maintenance frequency will vary greatly depending upon climatic conditions, illegal traffic patterns, availability of equipment and personnel, erosional rates, and safety hazards.

An increase of about 300 new agents throughout the Tucson and Yuma sectors is expected over the next few years, with the largest increase (b) (7)(E) expected at the (b) (7)(E) Station. Given that the USBP operates in three shifts per 24-hours, the increase in patrols across the entire study area would involve about 100 additional vehicles.

The alternatives are the No Action Alternative (which involves only past and completed projects); Alternative 1 (which includes expansion of operations and infrastructure, including technology-based infrastructure); Alternative 2 (which includes implementation of proposed technology-based operations/systems); Alternative 3 (which includes expanding operations/activities with no new infrastructure construction); and Alternative 4 (which includes only completion of infrastructure projects, but maintains operation at current levels). Table 4-3 summarizes the operations and infrastructure impacts by alternative.

## 4.1 Land Use

### 4.1.1 No Action Alternative

Implementation of the No Action Alternative would affect current land use within the Tucson and Yuma sectors where new construction projects are currently underway, such

**Table 4-3. Summary of Operations and Infrastructure Impacts by Alternative**

| | INFRASTRUCTURE IMPACTS (Acres) | | OPERATION IMPACTS (Acres) | | TOTAL (Acres) |
|---|---|---|---|---|---|
| **ALTERNATIVE** | **EXISTING** | **PROPOSED** | **EXISTING** | **PROPOSED** | |
| | | | | | |
| **No Action – Existing Operations and Infrastructure** | | | | | |
| Yuma Sector | | | | | |
| Tucson Sector | | | | | |
| Total | | | | | |
| | | | | | |
| **Alternative 1- Expand Operations and Infrastructure** | | | | | |
| Yuma Sector | | | | | |
| Tucson Sector | | | | | |
| Total | | | | | |
| | | | | | |
| **Alternative 2 - Expand Operations and Technology-Based Infrastructure** | | | | | |
| Yuma Sector | | | | | |
| Tucson Sector | | | | | |
| Total | | | | | |
| | | | | | |
| **Alternative 3 - Expand Current Operations with No New Infrastructure** | | | | | |
| Yuma Sector | | | | | |
| Tucson Sector | | | | | |
| Total | | | | | |
| | | | | | |
| **Alternative 4 - Maintain Current Level of Operations but Expand Infrastructure** | | | | | |
| Yuma Sector | | | | | |
| Tucson Sector | | | | | |
| Total | | | | | |

(b) (7)(E)

as the Douglas Border Patrol station. These activities would convert less than 20 acres of mostly rangeland to developed areas. Road maintenance and dragging of roads within the study area would occur on existing roads; therefore, land use would not change. In addition, road, fence and most of the light construction along the border in the entire corridor was completed within the Roosevelt Easement along the border, which is regulated by the Federal government as specified under a Presidential Proclamation on May 27, 1907, and has historically been used as border demarcation and barrier systems. The Roosevelt Easement is typically a 60-foot wide corridor that encompasses most of the land along the U.S.-Mexico border.


BW1 FOIA CBP 009736

### 4.1.2 Alternative 1

Land use within the Tucson and Yuma Sectors would not be significantly affected by implementation of Alternative 1. Construction of new Border Patrol Stations in the Naco and Willcox Station AO's would not affect land use because the sites are proposed on lands already classified as urban. New Border Patrol Stations in other areas such as Douglas and could have greater impacts. Other proposed Border Patrol Station improvements would occur in the Tucson and Yuma Sectors. The majority of the proposed construction (e.g., lights and fences) along the border in the Tucson and Yuma sectors would occur within the Roosevelt Easement, although some effects would occur (b) (7)(E) north of the U.S.-Mexico border. Maintenance and/or construction of roads within the Tucson and Yuma sectors would result in possibly converting up to 1,476 acres of rangeland to developed service road surfaces. Potential for this impact would depend greatly on terrain and feasibility to align road surfaces within the Roosevelt easement. If road improvements are implemented within or near the San Pedro National Conservation Area or the Coronado National Monument, which would require coordination and approval from BLM, construction would probably be restricted to existing roads. Therefore, no changes to land use in this area would occur. Recreational opportunities may be temporarily affected, however. Specific roads and/or areas may be closed to recreationist during construction activities. Some recreationist may find construction areas aesthetically displeasing.

Another action that would affect land use to some extent is the installation of RVS sites in the Tucson and Yuma Sectors. Most of these proposed sites would take place on land used privately, primarily for rangeland or grazing. Installation of RVS sites would require the surface disturbance of approximately (b) (7)(E) at each RVS location. With the exception of the physical pole locations, other areas disturbed by construction activities would be insignificant, and would return to their original state over time. The proposed operation of the permanent or portable lights would not have impacts to grazing and rangeland. Therefore, under Alternative 1, the overall land use of the project areas adjacent to each pole site would not significantly change.

Increased operations (e.g., aerial reconnaissance, additional drag roads, etc.) would not significantly affect land use, except in sensitive areas such as parks and refuges,

although the current land use would not change. Recreation opportunities would be affected by increased operations. The type (adverse or beneficial) and magnitude of these impacts would depend upon the type and duration of the operation, season and time of day, and the viewpoint of the recreationist. For instance, as mentioned in Chapter 1, some National Park visitors have been assaulted in recent years by illegal entrants; increased patrols in these areas would be viewed as a benefit to these visitors. On the other hand, off-road ATVs operating in the back-country areas of a park or refuge would reduce the remoteness or wildness qualities.

### 4.1.3 Alternative 2

Land use within the Tucson and Yuma Sectors would not be significantly affected by implementation of this alternative. Since installation of RVS sites represents the only action that affects land use, the overall land use of the project areas adjacent to each pole site would not significantly change under Alternative 2.

### 4.1.4 Alternative 3

This alternative does not propose new construction; therefore, land use within the Tucson and Yuma sectors would not be affected by implementation of this alternative.

### 4.1.5 Alternative 4

Implementation of this alternative would have the same impacts to the current land use from infrastructure construction as Alternative 1. Tables 4-1 and 4-2 list the proposed projects for construction at various locations with the Tucson and Yuma Sectors. The proposed construction infrastructure would change some land uses within the Tucson and Yuma Sectors. Since the operations and maintenance would remain the same, no additional affects to land use would occur.

## 4.2 Soils

### 4.2.1 No Action Alternative

Implementation of the No Action Alternative would eliminate direct disturbances to soils from proposed construction and future operational activities. However, extant erosion problems would continue without USBP road improvement projects. The erosional rate would probably increase without abatement measures. Indirect effects to soils would also occur as UDAs and drug smugglers avoid those areas that currently contain some barrier system components and begin to travel cross-country.

### 4.2.2 Alternative 1

Implementation of this alternative would disturb approximately 6,124 acres of soils by proposed infrastructure construction, within the Tucson and Yuma Sectors. The total area that would be impacted under Alternative 1 is shown by sector in Table 4-3. It should be emphasized again, that these are worst-case estimates. Previously disturbed routes and or locations (approximately 7,699 acres) would continue to be utilized to the maximum extent practicable to reduce the potential for soil impacts. Areas with highly erodible soils would be given special consideration when designing proposed facilities or structures to ensure incorporation of various compaction techniques, aggregate materials, wetting compounds, and revegetation to minimize the potential of soil erosion. Borrow materials, if required, would be obtained from established borrow pits or from on-site sources, as allowed by the appropriate regulatory agencies.

Impacts from the proposed action would result primarily from road construction, construction of fences, and vegetation clearing within the Tucson Sector. The construction of proposed fences would account for about 584 acres of soil disturbance, assuming an average construction easement (b) (7)(E) for Secondary barrier fences. Each new USBP facility and station construction requires about 20 acres of land; approximately 80 acres of land would be disturbed as a result of these activities. Road construction would account for about 1,476 acres of soil disturbance (see Tables 4-1 and 4-2 for road widths/lengths used in calculations). Vegetation clearing would account for 727 acres of soil disturbance. This assumes vegetation clearing would be performed by

scraping the surface of the ground. Vegetation would be cleared within proposed road ROWs and to improve the line of sight for patrol agents. If other, less intrusive, methods (e.g. hand clearing) are used, impacts to soils would be minimized.

The major engineering construction activities (e.g., roads, fences, USBP stations, etc.) would produce the greatest impacts to soils. Construction of USBP stations would require that the site be cleared, grubbed, and paved. Thus, these soils would be essentially removed from biological production.

Soils along the border are typically very sandy and highly erodible. Any construction activity conducted by the USBP must evaluate the erosion potential of the project area soils and incorporate erosion control designs into the construction plan. Prior to March 2003 a Stormwater Pollution Prevention Plan (SWPPP) would be required for all construction sites greater than five acres. For construction activities initiated after March 2003, the threshold for requiring a SWPPP and Notice of Intent under the National Pollutant Discharge Elimination System (NPDES) will be reduced to one acre.

Prime and unique farmlands, as defined by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), are rare along the border**.** Future projects would continue to make all practical attempts to avoid alterations to prime farmlands. Subsequent tiered NEPA documents would address prime farmlands on a site-specific basis.

On the other hand, road maintenance activities would result in reduction of soil erosion in many areas. Roads that are considered impassable due to severe erosion are typically the ones that stations request to be upgraded. Repair/upgrade activities would contain specific design measures to control erosion. Additional or modified compaction techniques and erosion control measures such as waterbars, gabions, straw bales and re-seeding would be implemented to alleviate these situations.

Operations of the USBP would produce minimal impacts to soils because of the primary use of existing roads. The only activities within this support category that would require additional ground disturbances are placement and removal of remote ground sensors, and off-road vehicular traffic. Vehicular traffic is restricted to existing roads and trails, to the

extent practical, unless agents are in pursuit of known illegal entrants or SAR missions. Dragging roads would continue to cause disturbances of existing road surfaces and possibly cultural resources and endangered species.

### 4.2.3 Alternative 2

Implementation of this alternative would significantly reduce future direct impacts to soils. This alternative would disturb approximately 59 acres of soil due to proposed infrastructure construction within the Tucson and Yuma Sectors as indicated previously in Table 4-3. Direct impacts to soils are minimized under this alternative due to limited construction impacts through the use of technology based infrastructure and operations. Indirect effects to soils, however, would continue and perhaps increase. UDAs and drug traffickers would continue to attempt to evade detection and apprehension. Without the additional infrastructure (e.g., roads and barriers) that facilitates apprehensions, success of illegal entry attempts would increase and deterrence would diminish. Consequently, more illegal entry attempts would result, resulting in increases of off-road vehicle and foot traffic by UDAs/drug traffickers and USBP agents.

### 4.2.4 Alternative 3

Operations under this alternative would produce minimal impacts to undisturbed soils because of the use of existing roads. The only activities under this alternative that would produce additional ground disturbances are vehicular off-road activities. Soils of the Chihuahuan and Sonoran Deserts are highly erodible due to sparse vegetation cover and the infrequent but heavy rainfall patterns. Any increase of vehicular traffic on the existing unimproved roads and/or off-road would likely lead to increased rates of soil erosion in those areas.

### 4.2.5 Alternative 4

Implementation of this alternative would be result in similar impacts as mentioned in Alternative 1 (see Table 4-3.). There would be no adverse direct impacts to the soils by maintaining the current operations/activities. However, indirect effects to soils from off-road illegal vehicular and foot traffic would continue and possibly increase.


BW1 FOIA CBP 009741

## 4.3 Biological Resources

### 4.3.1 Vegetation Communities

Vegetation communities, as discussed in Section 3.0 are quite diverse along the U.S.-Mexico border region, ranging from semi-desert grasslands and scrub to mountainous forests. Most of the project region is rural and provides diverse vegetation communities. Types and magnitude of impacts to vegetation communities from USBP actions are also varied. Where practicable, the USBP would attempt to avoid impacts to native vegetation by utilizing existing or previously disturbed areas or by implementing actions with less potential for ground disturbances. Disturbed lands include those which have been graded, paved, plowed, or replanted with non-native vegetation. Enhanced patrol efforts allowed by new roads and improvements to existing roads would reduce indirect impacts associated with illegal traffic. The construction of fences, technology-based infrastructure, and other new infrastructure would enhance apprehensions and deter illegal aliens from crossing the border. Some USBP stations have recently experienced such reductions, as indicated by significant decreases in apprehensions in areas where road improvement projects were completed (USBP 1998).

Indirect effects; however, have occurred to vegetation communities by illegal entrants avoiding fences or heavily patrolled areas. Increases in illegal foot and vehicle traffic have resulted in damages to native vegetation in these areas.

Construction of permanent facilities, roads, vegetation clearing, and other such activities would impact vegetation throughout the project area. Site-specific surveys of vegetation communities by qualified biologists would be conducted to determine potential impacts to vegetation communities prior to implementation of a specific project. Subsequent tiered NEPA documents would need to address potential impacts to ensure that sensitive and rare vegetation communities are not affected.

The long-term effect of nighttime lighting on plant communities is a relatively new area of biological research. USBP light systems generally use light bulbs ranging from (b) (7)(E) (b) (7)(E) that illuminate an area within (b) (7)(E) from the light source, mostly in one direction, as shields placed over the lamps reduce or eliminate the effects of backlighting.


BW1 FOIA CBP 009742

(b) (7)(E) Evidence does exist that shows lights emitting energy within the (b) (7)(E) spectral range are effective in influencing the photosynthesis and photoresponses of plants. However, the amount of energy produced by the lights utilized for this alternative would not be anticipated to be enough to produce measurable effects on the plant communities or agricultural crops outside of a small radius of the proposed project area.

#### 4.3.1.1 No Action Alternative

Implementation of the No Action Alternative would eliminate direct adverse effects to vegetation communities along the border since no proposed construction activities or increased operations would occur. However, indirect adverse effects would increase due to the continued and increasing illegal vehicle and foot traffic, wildfires, and erosion.

#### 4.3.1.2 Alternative 1

This alternative would result in the disturbance of approximately 6,124 acres of vegetation as a result of proposed road, fence, and other various construction projects (see Table 4-3). This amount is the worst-case scenario, since specific estimates of the amount of vegetation that would be impacted are unknown without site-specific surveys in areas where construction is proposed.

The increased operation and maintenance of drag roads may affect vegetation by causing dust to settle on leaves, thus potentially hindering photosynthesis and evapotranspiration. The magnitude of these effects would depend upon the frequency of dragging operations, soil type, and weather patterns. Sonoran desert scrublands would be the primary vegetation community type impacted because it is the most prevalent community in the project area.

Increased operations, such as ground patrols, would also affect vegetation communities. Increased vehicular traffic, off-road activities, and use of remote sensors are some of the activities associated with operational support missions that could have adverse effects on the vegetation communities. The magnitude of these effects, and the time it would take for the community to recover, would depend upon several biotic and abiotic conditions including habitat type, size of the area, season that activity occurred, weather patterns prior to and after the action, and previous condition of the community.

Without upgrades to existing infrastructure, such as road improvements, indirect impacts to vegetation would occur. Extant erosion problems would continue without USBP road improvement projects.

#### 4.3.1.3 Alternative 2

This alternative would result in a significant reduction in the amount of vegetation disturbed. This alternative significantly reduces the amount of construction activities, thereby reducing the potential for impacts to vegetation. Estimates of the amount of vegetation that would be impacted are unknown without site-specific surveys in areas where construction is proposed. Quantification of impacts are unreliable because areas may contain small amounts or be devoid of vegetation. However, in order to compare alternatives, assuming a worst-case scenario, approximately 59 acres would be disturbed, as compared to the approximately 6,060 acres directly disturbed under Alternative 1. This alternative would allow for increased apprehensions without impacts such as additional drag roads, patrol roads, and fences.

#### 4.3.1.4 Alternative 3

The increased operation and maintenance of drag roads may affect vegetation by causing dust to settle on leaves. The magnitude of this effect would depend upon the frequency of dragging operations, soil type and weather.

Increased operations, such as ground patrols and off-road activities, are some of the activities associated with operational support missions that could have adverse effects on vegetation. The magnitude of these effects, and the time it would take for the community to recover, would depend upon several biotic and abiotic conditions including habitat type, size of the area, season that activity occurred, weather patterns prior to and after the action, and previous condition of the local vegetation community. In general, vegetation in this area is not expected to recover to the pre-disturbance conditions within the timeframe of government planning cycles. Without upgrades to existing infrastructure, such as road improvements, indirect impacts to vegetation would occur. Extant erosion problems would continue without USBP road improvement projects.

#### 4.3.1.5 Alternative 4

Implementation of this alternative would result in similar impacts as discussed in Alternative 1 relative to the construction of infrastructure. Indirect effects would continue to occur to vegetation communities by illegal entrants avoiding fences or heavily patrolled areas. By implementing this alternative and maintaining all operations/activities at the current level, the number of illegal entrants would increase and indirectly result in larger areas of damaged native vegetation.

### 4.3.2 Fish and Wildlife Resources

#### 4.3.2.1 No Action Alternative

Based on the information presented in Table 4-3 approximately 70 acres of potential wildlife habitat have been impacted by barrier and technology infrastructure construction, excluding roads. In the past five years, road improvements have been estimated to have impacted up to 100 acres; however, this is a worse-case estimate since the entire width of the existing ROW was used to calculate these acreages. Since 1995, only 2.5 miles of new roads have been constructed, resulting in less than four acres being altered (INS 2000). These impacts have been addressed in prior NEPA documents and have received environmental clearance (INS 2002h, USACE 2000, and USACE 2001b).

As a result of prior construction activities and ongoing USBP operations, fish and wildlife populations in the area have been impacted by habitat loss due to the linear nature of the clearing for road construction, upgrade, and fence and stadium lighting right-of-ways, and more importantly, due to the highly degraded and disturbed nature of the majority of the study area. Under this alternative, no new construction and/or additional operation activities are proposed within the study area; therefore, no additional direct impacts to wildlife are anticipated.

Indirect effects, to fish and wildlife, caused by illegal foot and vehicle traffic would continue under this alternative. It is highly likely that such effects would increase as USBP's effectiveness to apprehend UDAs decreases and, thus, deterrence diminishes.

#### 4.3.2.2 Alternative 1

Based on the information presented in Table 4-3, approximately 6,124 acres of wildlife habitat would be directly lost due to proposed infrastructure and technology-based construction projects. Wildlife movement in the study area would potentially be impacted by infrastructure construction and maintenance. The greatest movement of small animals generally happens when a disturbance such as road grading, dozing, or fence construction occurs. Mobile animals escape to areas of similar habitat, while other slow or sedentary animals such as reptiles, amphibians, insects, and small mammals could potentially be lost. This displacement and/or reduction in the number of animals would not significantly impact animal communities due to the presence of similar habitat adjacent to the project corridor. Larger terrestrial wildlife movements in the construction and maintenance areas would not be affected due to the short duration of time for construction and maintenance activities. Additionally, construction activities would not be conducted during the early morning hours or nighttime hours when wildlife species are most active.

Roads and fences result in other indirect impacts. Improved roads, by design, increase the speed at which vehicles travel and increase traffic as well. Higher vehicular speeds decrease the response time for wildlife to avoid the vehicles, thus, potentially increasing the number of accidental wildlife deaths. Fences serve as a barrier to some wildlife species; the magnitude of this effect depends upon the fence design and location. Fences that would serve as a physical barrier to wildlife species are generally constructed at or near POEs, which are located near developed areas. Vehicle barriers do not impede wildlife movement nor remove/alter significant amounts of wildlife habitat.

On the other hand, roads and fences have afforded protection to some wildlife species and other sensitive resources. Fences do significantly reduce illegal entries and, indirectly, reduce the amount of foot traffic within wildlife communities on the U.S. side of the border. Similarly, improved roads have increased the efficiency of USBP agents to apprehend illegal entrants. Less illegal traffic results in fewer off-road impacts to wildlife.

Impacts to wildlife resulting from operation of the high intensity lighting at night could potentially occur. Approximately 1,289 additional acres would be illuminated under this alternative. The increase in lights along the border could also produce some long-term

cumulative effects, although the magnitude of these effects in some areas is not presently known. Some species, such as insectivorous bats, may benefit from the concentration of insects that would be attracted to the lights. The adverse and/or beneficial affects of lighting on reptiles and amphibians are currently unknown; however, continual exposure to light has been proven to slightly alter circadian rhythms in mammals and birds. Studies have demonstrated that under constant light, the time an animal is active, compared with the time it is at rest, increases in diurnal animals, but decreases in nocturnal animals (Carpenter and Grossberg 1984). Also, in diurnal animals, the total amount of active time increases with light intensity, while the reverse is true in nocturnal species (Carpenter and Grossberg 1984). The alteration of circadian rhythms by high intensity lighting is minimal, accounting for a maximum of two to three hours of increase or decrease in activity per day (Luce 1977). It has also been shown that within several weeks under constant lighting, mammals and birds would quickly stabilize and reset their circadian rhythms back to their original schedules (Carpenter and Grossberg 1984). The long-term effect of an increased photoperiod on mobile wildlife species is expected to be insignificant. Given the vast open area within the study area, animals can easily relocate to adjacent areas of darkness. The lighting in the study area is not constant, and the position of the lights allows for some dark areas to still exist. Therefore, impacts of lighting to wildlife are expected to be short-term and minimal.

Table 4-4 presents estimates of wildlife that could be lost as a result of this alternative. It should be emphasized however, that these are worst case estimates. It should also be noted that these losses could occur throughout the entire study area and that these individual numbers represent numerous and various species.

#### 4.3.2.3 Alternative 2

Based on the information presented in Table 4-2, approximately 89 acres of wildlife habitat would be lost due to construction of proposed technology based infrastructure such as stadium and portable generator lighting, sensor, and RVS installation. This estimate also includes new station construction and station expansion at Douglas and Ajo, respectively.

**Table 4-4. Potential Losses to Wildlife Populations from Proposed Habitat Alterations Under Alternative 1**

| Project Type | Acres | Lizards | Birds | Small Mammals | Large Mammals |
|---|---|---|---|---|---|
| | | | | | |
| Roads | (b)(7)(E) | 116,604 | 99,187 | 1,049,436 | 26,568 |
| Fences | | 45,978 | 39110 | 413,802 | 10,476 |
| Stadium lighting | | 26 | 22 | 235 | 6 |
| RVS Installation | | 47 | 40 | 419 | 11 |
| Sensor Installation | | 60 | 51 | 540 | 13 |
| Portable Lights | | 60 | 51 | 540 | 13 |
| Facility Construction | | 6,320 | 5,376 | 56,880 | 684 |
| Checkpoints | | 3,002 | 2554 | 27,018 | 684 |
| Vehicle Barriers | | 3,830 | 3258 | 34,469 | 873 |
| Helipads | | 1 | 1 | 7 | 1 |
| Fill /Backfill | | 122,371 | 104093 | 1,101,339 | 27,882 |
| Vegetation Clearing | | 57,455 | 48873 | 517,096 | 13,091 |
| Ditch Closures | | 574 | 489 | 5,169 | 131 |
| Concrete Channel | | 292 | 249 | 2,631 | 67 |
| Earthen Mounds | | 11,491 | 9775 | 103,422 | 2,618 |
| TOTAL | | 368,111 | 313,129 | 3,313,003 | 83,118 |

[1] Lizard density 79 individuals/acre; bird density 0.84 individuals/acre; minimum small mammal density 9 individuals/acre; maximum small mammal density 18 individuals/acre

Source: U.S. Army 1994 and GSRC 2002.

Under this alternative, the major construction projects would not occur and, consequently, the potential impacts to wildlife populations would be significantly reduced. However, without the protection afforded by improved roads, fences, and vehicle barriers intended to increase the efficiency of the USBP, the habitats that support wildlife would continue to be subjected to heavy foot and off-road vehicle traffic. In addition, an increase in lighting operations in certain areas could have potential effects on wildlife populations by altering circadian rhythms, disrupting dispersal courses, and increasing predation potential. The magnitude of the effects of lighting projects would depend upon the season, duration, location, intensity, and direction of the lighting. Under this alternative, approximately 1,289 more acres would be illuminated.

Table 4-5 presents estimates of individual wildlife that could be lost as a result of this alternative. It should be emphasized however, that these are worst-case estimates. It

should also be noted that these losses could occur throughout the entire study area and that these individual numbers represent numerous and various species.

**Table 4-5. Potential Losses to Wildlife Populations from Proposed Habitat Alterations Under Alternative 2**

| Project Type | Acres | Lizards | Birds | Small Mammals | Large Mammals |
|---|---|---|---|---|---|
| Stadium lighting | (b)(7)(E) | 26 | 22 | 235 | 6 |
| RVS Installation | | 47 | 40 | 419 | 11 |
| Sensor Installation | | 60 | 51 | 540 | 13 |
| Portable Lights | | 60 | 51 | 540 | 13 |
| Facility Construction | | 6,320 | 5,376 | 56,880 | 684 |
| Checkpoints | | 3,002 | 2554 | 27,018 | 684 |
| TOTAL | | 9,515 | 8,094 | 85,632 | 1411 |

[1] Lizard density 79 individuals/acre; bird density 0.84 individuals/acre; minimum small mammal density 9 individuals/acre; maximum small mammal density 18 individuals/acre

Source: U.S. Army 1994 and GSRC 2002

#### 4.3.2.4 Alternative 3

Some loss of small animals could result from increased activities proposed by this alternative such as road grading and vehicular patrols. Highly mobile animals escape these types of activities, while other slow or sedentary animals such as reptiles, amphibians, and small mammals could potentially be lost. This displacement and/or reduction in the number of animals would not be expected to significantly impact animal populations due to the relative abundance of suitable habitat adjacent to the border. However, increased patrols have afforded protection to some wildlife species and other sensitive resources by reducing illegal entries and the amount of foot traffic within wildlife communities on the U.S. side of the border. Less illegal traffic would result in fewer off-road impacts to wildlife.

#### 4.3.2.5 Alternative 4

Direct effects to fish and wildlife resources as a result of construction of infrastructure would be the same as those described for Alternative 1. Under this alternative, operations would remain at their current levels. Therefore, apprehensions would probably remain constant and deterrence to illegal entry attempts would not be achieved. As UDAs and smugglers become more confident in their capabilities to evade apprehension, more illegal

traffic would circumvent the proposed infrastructure systems and cause additional indirect effects to fish and wildlife resources and their habitats in other remote areas.

### 4.3.3 Threatened/Endangered Species and Critical Habitats

INS/USBP coordinates with the USFWS early in the planning process for all potentially significant actions. The USBP would continue to coordinate with the U.S. Air Force (USAF) and U.S. Marine Corps (USMC) representatives prior to performing any construction activities and would coordinate operations on the military properties. NEPA documents prepared by INS and USBP are also submitted to the USFWS and all appropriate Federal and state resource agencies for review. These documents generally contain information regarding the results of surveys for protected species and/or suitable habitat that may occur within the study area. These surveys and the resultant information would not typically be available to the resource agencies without the efforts of USBP. For example, a BA as part of Section 7 consultation for the USBP Yuma Sector, Wellton Station operations was finalized in 1999, and consultation is currently being reinitiated as a result of current litigation. A BA is currently being prepared for the USBP Tucson Sector operations (INS 2002f). Currently, the Yuma BA is also being updated (INS 2002e). These assessments not only address potential effects to protected species, but also identify changes in daily operations that would be implemented to avoid or mitigate these effects (Appendix D). INS and USBP would continue to coordinate with the Phoenix office of the USFWS to address potential impacts to plans for reintroduction or recovery of protected species.

Beneficial effects on protected species have resulted from INS and USBP actions through habitat protection and enhancement as well as expanding the knowledge of species distribution and habitat suitability (Ervin 1998; Ellingwood and Schoch 1998). For example, the Yuma Sector routinely assists the AGFD and USFWS by providing helicopter reconnaissance during inventories of Sonoran pronghorn. The USBP has provided funding ($25,000) in 2002 for Sonoran pronghorn management (e.g. placement and monitoring of temporary waters for the Sonoran pronghorn on the CPNWR and adjacent Federal land) and funding ($25,000) for the quantification and monitoring of resource damage from past, current, and future UDA and drug smuggler activities, and


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responses to those actions by Federal law enforcement entities. This funding was provided as partial mitigation for Operation Desert Grip.

It also appears that Sonoran pronghorn tend to utilize the USBP drag roads for resting and foraging areas, presumably since the dragging activities indirectly encourage new forb growth in adjacent areas (Hervert 1999). It should be noted that because of the (b) (7)(E) it is highly unlikely that collisions with animals would occur. In addition, improvements to roads allow the USBP to conduct patrol activities more effectively, significantly curtailing the amount of illegal cross-country traffic that is occurring in this area. Illegal entrants have caused a great deal of damage to native vegetation, much of which is contained within wilderness areas, areas of critical environmental concern (ACEC) or areas of designated critical habitat, by repeated trampling, burning and cutting of native vegetation.

#### 4.3.3.1 No Action Alternative

No additional, direct impacts are expected to occur to threatened and endangered species or their habitats if the No Action Alternative is implemented. Direct impacts to protected species as a result of future construction and/or maintenance activities would be eliminated upon implementation of this alternative. However, indirect effects would continue due to illegal cross-country traffic. The rate of these effects could increase as road conditions deteriorate and USBP efforts to patrol remote areas are hampered or precluded. No new information regarding threatened or endangered species and their habitats would be collected from project surveys.

#### 4.3.3.2 Alternative 1

As stated previously, a BA for the Yuma Sector is being updated and a BA is currently being prepared for the Tucson Sector. The Yuma Sector BA is expected to conclude that USBP operations are "likely to affect, and may adversely affect" the Sonoran pronghorn and flat-tailed horned lizard. In addition, Alternative 1 "may affect, but is not likely to adversely affect", the cactus ferriginous pygmy owl, lesser long nose bat, southwestern willow flycatcher, Yuma clapper rail, and bald eagle (INS 2002e). The USFWS (2000) concurred with the USBP's determination that their activities would not affect Nichol's turk's head cactus, brown pelican, and razorback sucker (INS 2002e).

The Tucson Sector BA is also expected to conclude that USBP operations may adversely affect listed species. The Sonoran pronghorn, lesser long-nosed bat, cactus ferruginuous pygmy-owl, Mexican spotted owl, Huachuca water umbel, and Gila topminnow are all species designated as "may affect, likely to adversely affect". In addition, the jaguar, Pima pineapple cactus, masked bobwhite quail, and Chiricahua leopard frog are species designated as "may affect, not likely to adversely affect." The impacts and mitigation efforts documented in the Yuma Sector and Tucson Sector BAs and were not considered to be of magnitude that would jeopardize the continued existence of any protected species (INS 2002e and INS 2002f).

Because of the critically low numbers of individuals that constitute the Sonoran pronghorn population, and effects of helicopter patrols, drag road activities upon pronghorn that fawn or frequent those areas, and impacts from night patrols on resting pronghorn, the USBP concludes that its activities are likely to affect, and may adversely affect the Sonoran pronghorn. However, USBP operations would not jeopardize Sonoran pronghorn's continued existence. Drag roads would have minimal adverse impacts to the pronghorn, in fact dragging may have a beneficial impact, as a result of increased forb production.

Proposed construction/operations occurring within the Yuma AO could potentially impact the state-protected flat-tailed horned lizard. The location of flat-tailed horned lizard habitat in Arizona is depicted in Figure 3-8 of the Biological Assessment for USBP activities within the Yuma sector (Appendix D) and is incorporated herein, by reference. Of the five designated management areas for this species, only two are within the study region: the BMGR-East and BMGR-West and an area of the Colorado River five miles north of and paralleling the U.S.-Mexico border. Potential impacts to the flat-tailed horned lizard include habitat loss, displacement, restricted movement, and various effects due to lighting. Table 4-6 defines the proposed activities and potential area of impact within the Yuma AO that could have an adverse effect upon this species.

Under Alternative 1, several proposed USBP activities are located within designated areas of critical habitat for various protected species. INS and the USBP have entered into Section 7 consultation with the USFWS to address operations near these areas that could affect the species or their habitat. Subsequent infrastructure construction projects

**Table 4-6. Proposed Activities Potentially Affecting the Flat-tailed Horned Lizard Management Area Under Alternative 1**

| Proposed Activity | Management Area | Area Impacted ($ft^2$) | Area Impacted (acres) |
|---|---|---|---|
| 1 RVS installation | Colorado River | 1,500 | 0.03 |
| 2 RVS installation | Barry M. Goldwater Range | 3,000 | 0.07 |
| 2 miles landing mat fence | Barry M. Goldwater Range | 105,600 | 2.42 |
| 2 miles stadium style lights | Barry M. Goldwater Range | 3,200 | 0.07 |
| 2 miles portable generator lights | Barry M. Goldwater Range | 1,200 | 0.03 |
| **Total Flat-tailed Horned Lizard Management Area Impacted by Alternative 1** | | **114,500** | **2.62** |

that potentially affect threatened and endangered species or designated critical habitat would also require formal consultation. Table 4-7 defines the proposed activity, along with its general location and potential area of impact. As can be seen from this and subsequent table, several of the proposed RVS sites are near/within designated critical habitat for aquatic species. These sites would be located away from streams, seeps, and springs and, thus, avoid any potential effects to these species.

**Table 4-7. Proposed Activities Potentially Affecting Critical Habitat Under Alternative 1**

| Proposed Activity | Station | T & E Species Affected | Area Impacted ($ft^2$) | Area Impacted (acres) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| 1 RVS installation | Ajo | Desert pupfish | 1,500 | .03 |
| 1 RVS installation | Sonoita | Huachuca water umbel | 1,500 | .03 |
| 1 RVS installation | Willcox | Beautiful shiner, Yaqui catfish, Yaqui chub | 1,500 | .03 |
| **Total Critical Habitat Area Impacted by Alternative 1** | | | **4,500** | **0.09** |

Direct impacts to threatened and endangered species cannot be accurately predicted for Alternative 1 at this time. In order to determine impacts, professional biologists must first be utilized to survey any proposed and alternate routes and/or locations in order to identify areas which support protected species. For major construction projects where protected species are known or presumed to occur, USBP must continue to use

biologists to monitor construction progress and conduct post project long term monitoring, as deemed necessary. Such assessments are to be coordinated with USFWS and the appropriate state resource agency. Additional NEPA documentation, tiered from this PEIS, is to be completed prior to any maintenance or construction activities, as determined to be appropriate on a project-by-project basis.

#### 4.3.3.3 Alternative 2

As with Alternative 1, impacts to threatened and endangered species cannot be quantified for this alternative at this time. As stated above, these impacts would be quantified on a project-by-project basis with subsequent NEPA documentation, as appropriate.

Implementation of this alternative would eliminate all potential impacts to threatened or endangered species caused by future patrol and drag road maintenance and checkpoint, fence, and vehicle barrier construction. This alternative would significantly reduce major construction activities and consequentially reduce direct impacts to protected species habitats and/or individual specimens of protected species. However, potential impacts to protected species from lighting projects would remain an issue. That potential could increase due to the need to increase lights if roads, fences, and other barriers are not provided. Without the engineering activities, however, illegal foot and vehicle traffic would also probably increase, thereby promoting adverse effects to protected species.

Potential impacts to the state-protected flat-tailed horned lizard under Alternative 2 are the same as addressed in Alternative 1 with the exception of potential impacts related to the two miles of proposed landing mat fence. Table 4-8 defines the proposed activity, along with its location and potential area of impact for Alternative 2.

Under Alternative 2, potential impacts to designated areas of critical habitat of protected species would be similar to that described under Alternative 1 (Table 4-9). INS and USBP must enter into Section 7 consultation with the USFWS prior to any construction activities near these areas.

**Table 4-8. Proposed Activities Potentially Affecting the Flat-tailed Horned Lizard Management Area Under Alternative 2**

| Proposed Activity | Management Area | Area Impacted ($ft^2$) | Area Impacted (acres) |
|---|---|---|---|
| 1 RVS installation | Colorado River | 1,500 | 0.03 |
| 2 RVS installation | Barry M. Goldwater Range | 3,000 | 0.07 |
| 2 miles stadium style lights | Barry M. Goldwater Range | 3,200 | 0.07 |
| 2 miles portable generator lights | Barry M. Goldwater Range | 1,200 | 0.03 |
| **Total Flat-tailed Horned Lizard Management Area Impacted by Alternative 2** | | **8,900** | **0.20** |

**Table 4-9. Proposed Activities Potentially Affecting Critical Habitat Under Alternative 2**

| Proposed Activity | Station | T & E Species Affected | Area Impacted ($ft^2$) | Area Impacted (acres) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| 56 RVS installation | Ajo | Desert pupfish | 84,000 | 1.93 |
| 13 RVS installation | Sonoita | Huachuca water umbel | 19,500 | 0.45 |
| 7 RVS installation | Willcox | Beautiful shiner, Yaqui catfish, Yaqui chub | 10,500 | 0.24 |
| **Total Critical Habitat Area Impacted by Alternative 2** | | | **114,000** | **2.62** |

#### 4.3.3.4 Alternative 3

No additional direct impacts would result to threatened and endangered species or critical habitat, since proposed USBP infrastructure activities would remain at their current levels. However, indirect effects (e.g., potential impacts to protected species from lighting projects ) could occur from increased operational. As in Alternative 2, some loss of small animals could result from increased activities proposed by this alternative such as road grading and vehicular patrols. A protected species that could be adversely affected by increased vehicular patrols include the flat-tailed horned lizard.

The rescinded BO for the Yuma Sector and BAs currently being prepared for the Yuma and Tucson Sectors have concluded that USBP would affect threatened and endangered species (U.S. Department of Justice 1999, INS 2002c, and INS 2002f). As


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mentioned previously, however, no species are considered to be in jeopardy of extirpation or extinction due to impacts caused by USBP activities.

#### 4.3.3.5 Alternative 4

Implementation of this alternative would result in the same direct impacts from construction of infrastructure projects, as discussed in Alternative 1. No additional direct impacts would result from USBP operations, since these activities would remain at their current levels. However, indirect effects would occur as UDAs and smugglers become aware that USBP operations are status quo and they expand their illegal entries into other, unprotected areas.

### 4.3.4 Unique and Environmentally Sensitive Areas

#### 4.3.4.1 No Action Alternative

No impacts are expected to occur to unique and environmentally sensitive areas if the No Action Alternative is implemented. Direct impacts as a result of future construction and/or maintenance activities to these areas would be eliminated upon implementation of this alternative. However, indirect effects would continue due to illegal traffic. As discussed in Section 1.2, the constant flow of UDAs passing through the U.S.-Mexico border area threatens environmentally sensitive areas, such as the Coronado National Monument and the San Pedro National Riparian Conservation Area (Arizona Daily Star 2000).

#### 4.3.4.2 Alternative 1

Under this alternative, several proposed USBP infrastructure projects are located within unique and environmentally sensitive areas. The USBP must consult with the appropriate management agency prior to any construction activities within these areas. Table 4-10 defines the proposed activity, along with its location and potential area of impact. Under this alternative, approximately one acre within unique environmentally sensitive areas would be impacted.


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**Table 4-10. Proposed Activities Potentially Affecting Unique and Environmentally Sensitive Areas Under Alternative 1**

| Proposed Activity | Station | Unique Area Affected | Area Impacted ($ft^2$) | Area Impacted (acres) |
|---|---|---|---|---|
| | | | | |
| 11 RVS installation | Ajo | Organ Pipe Cactus National Monument | 16,500 | 0.38 |
| 2 RVS installation | Tucson | Buenos Aires NWR | 3,000 | 0.07 |
| 1 RVS installation | Tucson | Baboquivari Peak Wilderness Area | 1,500 | 0.03 |
| 1 RVS installation | Nogales | Coronado National Forest (Pajarita Mountains) | 1,500 | 0.03 |
| 1 RVS installation | Sonoita | Coronado National Forest (Patagonia Mountains) | 1,500 | 0.03 |
| 1 RVS installation | Naco | San Pedro Riparian National Conservation Area | 1,500 | 0.03 |
| 3 RVS installation | Naco | Coronado National Forest (Huachuca Mountains) | 4,500 | 0.10 |
| 1 RVS installation | Naco | Coronado National Memorial | 1,500 | 0.03 |
| 3 RVS installation | Willcox | San Bernadino NWR | 4,500 | 0.10 |
| **Total Unique and Environmentally Sensitive Areas Impacted by Alternative 1** | | | **36,000** | **0.83** |

#### 4.3.4.3 Alternative 2

Implementation of this alternative would eliminate all potential impacts to unique and environmentally sensitive areas caused by future patrol and drag road maintenance and checkpoint, fence, and vehicle barrier construction. However, RVS installation would still occur under this alternative. USBP must consult with the appropriate management agency prior to any construction activities within unique or sensitive areas. Table 4-10 defines the number of proposed RVS sites within the location and potential area of impact. Under this alternative, approximately 0.83 acres within unique and environmentally sensitive areas would be impacted.

#### 4.3.4.4 Alternative 3

This alternative has the potential to negatively impact all of the unique and environmentally sensitive areas listed previously in Table 4-9. These impacts, however, should be small and limited to affects associated with increased on and off-road vehicle use. These same areas could potentially be positively affected from crime deterrence resulting from increased patrols. The camps of illegal immigrants can negatively impact sensitive

**Table 4-10. Proposed Activities Potentially Affecting Unique and Environmentally Sensitive Areas Under Alternative 2**

| Proposed Activity | Station | Unique Area Affected | Area Impacted ($ft^2$) | Area Impacted (acres) |
|---|---|---|---|---|
| 11 RVS installation | Ajo | Organ Pipe Cactus National Monument | 16,500 | 0.38 |
| 2 miles vehicle barrier | Ajo | Organ Pipe Cactus National Monument | 105,600 | 2.42 |
| 2 RVS installation | Tucson | Buenos Aires NWR | 3,000 | 0.07 |
| 1 RVS installation | Tucson | Baboquivari Peak Wilderness Area | 1,500 | 0.03 |
| 1 RVS installation | Nogales | Coronado National Forest (Pajarita Mountains) | 1,500 | 0.03 |
| 1 RVS installation | Sonoita | Coronado National Forest (Patagonia Mountains) | 1,500 | 0.03 |
| 9 miles border road improvements | Sonoita | Coronado National Forest (Patagonia Mountains) | 760,320 | 17.45 |
| 1 RVS installation | Naco | San Pedro Riparian National Conservation Area | 1,500 | 0.03 |
| 3 RVS installation | Naco | Coronado National Forest (Huachuca Mountains) | 4,500 | 0.10 |
| 1 RVS installation | Naco | Coronado National Memorial | 1,500 | 0.03 |
| 3 RVS installation | Willcox | San Bernadino NWR | 4,500 | 0.10 |
| **Total Unique and Environmentally Sensitive Areas Impacted by Alternative 2** | | | **901,920** | **20.71** |

areas from the activities of food and wood gathering and the potential for wildfires in wooded areas. Cactus poachers and smugglers of endangered species like to work in remote areas where they do not fear detection. Although these activities are outside of the primary USBP mission, the increased presence of USBP agents should serve as a deterrent to environmental crimes as well.

Increased operations could adversely impact unique and sensitive areas, depending upon the type and duration of the operation. USBP agents are mandated to make every practicable attempt to apprehend illegal entrants; consequently, agents must enter unique and sensitive areas in their pursuit of UDAs and smugglers. Routine operations, however, can be performed in manners that would result in minimal or no adverse impacts to unique and sensitive areas. For example, increased vehicular patrols could remain on existing roads and RVS systems could be installed instead of increasing drag roads.

Increased operations could also have beneficial effects to these resources by deterring UDA and smuggler traffic in these areas. Deterrence is achieved by conveying an absolute certainty of detection and apprehension. The increased operations and infrastructure would greatly enhance the likelihood of detecting and apprehending illegal entrants, and thus providing deterrence.

#### 4.3.4.5 Alternative 4

This alternative would result in the same impacts from proposed construction activities proposed as in Alternative 1, as presented previously in Table 4-9.

## 4.4 Cultural Resources

Arizona are very diverse and rich with prehistoric and historic resources. Consequently, the potential presence of properties eligible for listing on the NRHP is high. A complete list of known NRHP properties is presented in Appendix E. The USBP would consult with the USAF and USMC prior to performing construction activities and would coordinate operations on military properties. The USBP would consult with the appropriate Native American tribes concerning the potential of impacts to TCPs, Sacred sites, or other ethnographic resources prior to performing construction activities and operations where applicable. The USBP provides surveys of all construction sites (temporary and permanent) prior to commencement of construction activities to ensure that significant archaeological sites are avoided to the maximum extent practicable. If a site is unavoidable, other mitigation measures, such as but not limited to data recovery or burial, are implemented with the concurrence of the Arizona SHPO and/or appropriate THPO, as well as Tribal Governments and Bureau of Indian Affairs (BIA), as applicable. By instituting the process of avoidance as the preferred mitigation procedure, combined with monitoring during construction activities, impacts to cultural resources that are eligible or potentially eligible for NRHP have been minimized within the study area. Cumulative impacts to these and other resources are discussed later in this chapter.

Some concerns have been raised that improved roads could lead to increased opportunities for looting or damage of archaeological sites. However, enhanced patrol efforts in these areas allowed by the improved roads and infrastructure would reduce illegal traffic in the area and subsequently have a reduction in the potential for looting and


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damage of significant cultural resources. In addition, the use of artificial lighting in the areas of archaeological sites would also reduce the opportunities for looting and damage of archaeological sites and historic properties. The USBP would provide training to agents on patrol to educate them on the importance of biological and cultural resources, and ways to avoid impacts to such resources while conducting their normal operations.

The predominance of proposed infrastructure would involve ground-disturbing activities during construction. The infrastructure improvements which would involve ground disturbing activities include construction of fences, including landing mat, bollard, and decorative fences, vehicle barriers, helipads, new stations and station expansions, stadium lights, mound construction, sensor placement, RVS sites, repeaters, checkpoints, and general road maintenance. Clearing of vegetation along the border in certain areas would also involve a degree of ground disturbance. Illumination from lights and their associative acreage would not adversely affect archaeological or historical sites. Operations in the study area generally do not adversely impact archaeological and historical sites. All the proposed infrastructure have the potential to visually impact the area and have impacts on the cultural landscape, rock-art, TCPs, and sacred sites. Patrol and apprehension activities limited to existing roads have the potential to impact cultural resources in the area. Keeping these activities limited to the road would avoid undisturbed significant cultural resources thus minimizing any direct adverse effects to cultural resources within the area. Off-road activities, including turn arounds and pull-overs, on the other hand have a greater potential to adversely impact known or unknown cultural resources. USBP agents would typically not be cognizant of recorded or unrecorded sites and, during off-road pursuit or SAR missions, could inadvertently impact these resources. Such activities should be limited to the greatest extent possible in order to avoid negatively impacting unknown cultural resources. Air operations within the study area would have no adverse effects on archaeological or historic sites. Air operations do have the potential to impact TCPs, rock-art and sacred sites. Such potential impacts and appropriate mitigation measures would be identified in consultation with the appropriate Native American tribes. Ongoing coordination with the USAF would also be conducted in order to identify areas of avoidance and thus further minimize impacts to cultural resources from USBP operations. Impacts to cultural resources would be quantified on a project-by-project basis with subsequent NEPA documentation tiered from this programmatic document, as appropriate.


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The surveys and analysis performed by INS/USBP archeologists significantly add to the knowledge base of the history and prehistory of the southwest. Without these activities and the surveys required by INS/USBP, much of this information would never be obtained or would be improperly recovered by amateur archeologists. This is especially true on private lands where there are no requirements for the landowner to conduct routine surveys.

### 4.4.1 No Action Alternative

Section 106 along with NEPA compliance was carried out for specific past and current activities, as applicable. Prior to any ground disturbing activity a full literature and records check for known "historic properties" and a full survey of the project area was conducted to record any unknown archaeological sites. All archaeological sites that were determined either potentially eligible or eligible for the NRHP within the project areas were avoided resulting in no adverse affects to any known significant cultural resources due to the No Action Alternative. On the contrary, increased illumination from stadium and portable lighting, totaling 1,289 acres would have a positive effect on the cultural resources of the study area. Increased illumination would deter the looting of sites and the destruction of sites through illegal traffic, both pedestrian and vehicle.

### 4.4.2 Alternative 1

Under Alternative 1, approximately 6,124 acres would be subject to ground disturbance and could potentially impact cultural resources. Portable lights would have no impact on any archaeological sites if they are located outside of archaeological sites. Placement of lights near structures listed on the NRHP, TCPs, sacred sites and other applicable ethnographic resources would need to be coordinated with the Arizona SHPO, the appropriate THPO, and/or Native American tribes where applicable to ensure that the visual qualities of those resources are not impaired.

Prior to construction, an archaeological records check is conducted on all sections of the project area where ground disturbance is planned. Archaeological records check would include, but not limited to, site and project records on file with the Arizona SHPO office, Arizona State Museum, NPS, BGMR, USFWS and any historical maps on file with the

BLM that could show potential locations for historic structures. Consultation would be done with the Native American Tribes that claim a cultural affinity to the area in order to determine the presence of any TCPs, sacred sites, or other ethnographic resources within the proposed project area. In addition, an intensive archaeological survey would be conducted on areas that have not been previously surveyed and where ground disturbance activities are to take place. All archaeological sites found during those surveys would be recorded and enough information collected to make a determination on whether they meet the criteria for inclusion on the NRHP. All sites that meet the criteria for inclusion on the NRHP and those that do not have enough information to make a successful NRHP eligibility determination would be avoided. If these cannot be avoided, other mitigation measures for these sites would be necessary. Mitigation measures would be developed in consultation with the Arizona SHPO, THPO, and Native American Tribes where applicable. Monitoring in the vicinity of these sites during ground disturbance activities would provide an additional safeguard in avoidance of any adverse impacts to these sites. It should be emphasized that all of the road and most of the fence projects performed by INS/USBP are repair and upgrade projects. Therefore, most of the ground disturbing activities would be in areas of the sites that have been previously disturbed and/or surveyed.

An additional 1,289 acres of illumination as a result of Alternative 1 for a total of 3,725 acres when combined with the 2,436 acres under the No Action Alternative. Consideration of visual impacts to historic properties would be taken into account during the placement of both stadium and portable lights. Illumination would not be expected to have adverse effects on any cultural resources within the project corridor provided the lights are placed at an adequate distance from known historic sites (see Appendix E) and properly coordinated through the Arizona SHPO along with the appropriate THPO where applicable. Consultation with Native American Tribes would be conducted in order to identify any TCP, sacred sites, or other ethnographic resources that could be impacted under this alternative. Lighting has the potential beneficial effect of deterring looting and damage to these sites through intentional and unintentional illegal activity.

Density of sites varies greatly throughout Arizona depending upon topography, available water sources, available sources for tool-making, and suitable habitat for vegetation/wildlife populations. However, for comparison purposes, if it were assumed

that the average site density is 0.07 sites per acre (based on previous survey results within the corridor), the ground disturbing activities that would occur as a result of these actions would be expected to encounter 133 additional sites.

Increases in the amount of agents and subsequently the number of patrols along with roads patrolled would increase the potential of adverse impacts to cultural resources within the area. Increases in incidents of off-road activities through the use of dirt bikes, off-road vehicles, and horses or on foot for apprehension purposes would increase the potential of disturbing unknown cultural resources within the area of operations. When cultural resources are impacted, appropriate mitigation and restoration provisions would be developed in consultation with the Arizona SHPO, THPO, and/or Native American Tribes where appropriate. Any impacts for specific projects would be addressed with project specific NEPA documentation, which would be tiered from this programmatic document.

### 4.4.3 Alternative 2

Under Alternative 2, increases in operations and infrastructure would be focused on technology-based solutions in addition to the existing infrastructure and operations that are already in place. These include sensors, repeaters, RVS sites, stadium and portable lighting, new station and station expansion, and earthen mounds.

Under Alternative 2, an additional five acres would be subject to ground disturbing activities. Portable lights would have no potential impact on any archaeological sites if they were kept within the bounds of existing road right-of-ways and outside the boundaries of archaeological sites. Placement of lights near structures listed on the NRHP need to be coordinated with the Arizona SHPO, along with the appropriate THPO, to ensure that the visual qualities of the historic structures are not impaired. Consultation would be conducted with the appropriate Native American Tribes in order to identify any TCPs, sacred sites, or other ethnographic resources that may be impacted.

Remaining infrastructure activities that could potentially impact both archaeological and historic sites would go through the Section 106 compliance process. Prior to construction, an archaeological records check would be conducted on all sections where ground disturbance is planned. Archaeological records check would include, but not limited to,

site and project records on file with the Arizona SHPO, ASM, USFWS, BGMR, NPS, and any historical maps on file with the BLM that could show potential locations for historic structures. Consultation with the appropriate Native American tribes would be conducted to identify any TCPs, sacred sites, or other ethnographic resources that may be impacted by this alternative. In addition, an intensive archaeological survey would be conducted on areas that have not been previously surveyed and where ground disturbance activities are to take place. All archaeological sites found during those surveys would be recorded and enough information collected to make a determination on whether they meet the criteria for inclusion on the NRHP. All sites that meet the criteria for inclusion on the NRHP and those that do not have enough information to make a successful NRHP-eligibility determination would be avoided. If these cannot be avoided, other mitigation measures for these sites are necessary. Appropriate mitigation measures for these sites would be developed in consultation with the Arizona SHPO, appropriate THPO, and/or the appropriate Native American Tribes. Monitoring in the vicinity of these sites during ground disturbance activities would provide an additional safeguard of avoidance of adverse impacts to these sites.

Illumination from stadium and portable lights would be similar to that described for Alternative 1. Increases in the amount of agents and subsequently the number of patrols along with roads patrolled would increase the potential of adverse impacts to cultural resources within the area. Increases in incidents of off-road activities through the use of dirt bikes, off-road vehicles, and horses or on foot for apprehension purposes would increase the potential of disturbing unknown cultural resources within the area of operations. A larger amount of pedestrian and vehicle traffic is expected under this alternative in comparison to alternate one. The reduction in barriers would allow more illegal traffic to pass freely over the border, particularly vehicular traffic. This would result in an increase of potential impacts of archaeological and historic sites in that area, through either illegal pedestrian or vehicular traffic, or from off-road operations needed in apprehension.

For comparison purposes, if it were assumed that the average site density is 0.07 sites per acre (based on previous survey results within the corridor), the ground disturbing activities that would occur as a result of Alternative 2 would be expected to encounter one additional

site. Impacts for specific projects would be addressed with project specific NEPA documentation, which would be tiered from this programmatic document.

### 4.4.4 Alternative 3

Under this alternative the operations and activities would be increased and no new infrastructure would be constructed. All existing construction projects would be completed and, as a result, ground-disturbing activities would be limited to those outlined under the No Action alternative. Operations and activities would increase. Increases in the amount of agents and subsequently the number of patrols along with roads patrolled would increase the potential of adverse impacts to cultural resources within the area. Increases in incidents of off-road activities through the use of dirt bikes, off-road vehicles, and horses or on foot for apprehension purposes would increase the potential of disturbing unknown cultural resources within the area of operations. A larger amount of pedestrian and vehicle traffic is expected under this alternative in comparison to Alternative 1. The reduction in barriers would allow more illegal traffic to pass freely over the border, particularly vehicular traffic. This would result in an increase of potential impacts of archaeological and historic sites in that area, through either illegal pedestrian or vehicular traffic, or from off-road operations required to apprehend the illegal entrants. Impacts for specific projects would be addressed with project specific NEPA documentation, which would be tiered from this programmatic document.

### 4.4.5 Alternative 4

Implementation of this alternative would result in the same direct impacts from infrastructure projects to cultural resources as indicated in Alternative 1. Increases in USBP agents, number of patrols and other operations would not occur under this alternative, thereby reducing direct impacts caused by these activities. However, indirect effects caused by increased illegal foot and vehicular traffic would occur in areas not protected by infrastructure projects. Impacts for specific projects would be addressed with project specific NEPA documentation, which would be tiered from this programmatic document.


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## 4.5 Water Resources

Water resources within the area encompassed by the PEIS are limited and concerns regarding adequate supplies and quality are increasing. Impacts to water resources would be dependent upon the location of specific projects in relation to water bodies. No significant impacts to regional water resources would be expected. However, subsequent tiered NEPA documents would need to address potential direct and indirect impacts to water resources on a project-by-project basis. Indirect impacts such as dust, stormwater run-off, erosion, accidental spills, and other such activities have the potential to impact water resources and wetlands in the project area. Site-specific surveys of potential impact areas should be conducted in order to determine jurisdictional wetlands, waters of the US, and other water resources that may potentially be impacted by infrastructure projects. In areas where wetlands are identified or suspected, qualified individuals should perform a wetland delineation in order to avoid or compensate for impacts to wetlands.

### 4.5.1 No Action Alternative

The No Action Alternative would not have a direct impact on water resources in the project area. The USBP would continue to patrol roads until they become impassable. Without the road improvements, erosion and sedimentation would continue and, perhaps, increase. The magnitude of indirect impacts would depend upon the rate of increase in current erosion and the location of patrol routes relative to rivers and other drainages.

### 4.5.2 Alternative 1

The deployment of personnel for construction, maintenance, or patrol operations within the study area would result in increased use of the limited water resources in some regions. Most of the proposed construction and maintenance actions are anticipated to be relatively short in duration and therefore are not expected to contribute to long-term impacts. The significance and extent of impacts to water resources would be evaluated on a project and site-specific basis. In some cases, coordination with state and local agencies as well as conformance with Federal regulations regarding surface water impacts would be required. Notification and permitting procedures for specific proposed actions and projects would be


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evaluated for each site-specific construction project proposed prior to commencement of activities (e.g. prior to installation of water wells at checkpoint and other facilities). Personnel would be apprised of applicable water-conserving practices and equipment would be maintained and configured for best efficiency in water resources-limited areas. Best management practices for preventing contamination from stormwater runoff would be specified in mitigation plans and implemented. These plans would also address hazardous substances or contaminated material spills.

Since Alternative 1 has more construction projects and expansion of operational activities associated with it than the other four alternatives, it follows that this alternative would have the greatest potential to directly affect water resources. Impacts to waterbodies from stormwater run-off or accidental spills during construction operations would be one of the more significant effects. The magnitude of these effects would depend upon the size, type and duration of the construction project, timing, weather conditions, and vegetative cover and soil type. Employment of a SWPPP and other erosion control measures, as described above and in Chapter 6, would significantly reduce the potential of adverse impacts to water resources.

Construction of USBP stations and other such permanent facilities would demand additional water and sewage treatment capacities. Subsequent tiered NEPA documents would need to address these needs to ensure that existing treatment facilities would be capable of handling the additional flows without causing a permit violation. Some facilities may require individual treatment systems (e.g., septic tanks, oxidation ponds, etc.); these treatment systems would require permits from the appropriate local and state agencies.

Proposed activities near surface waters in the project area would have minimal impacts. Major surface waters potentially impacted by proposed infrastructure include but are not limited to:

1. RVS sites near the Santa Cruz River;
2. RVS sites, fence, and stadium style and portable generator lights near the San Pedro River; and
3. Proposed portable generator lights, stadium style lights, and fence near the Colorado River.

Potential impacts include siltation from stormwater runoff, erosion, and accidental spills or leaks. However, due to the small area affected by each RVS or portable light generator

site, potential impacts to nearby water resources, if they occurred, would be negligible. Implementation of best management practices (BMP), Spill Containment and Countermeasures Plans (SPCCP), and SWPPPs, would also reduce these risks.

Increased operations could have direct and indirect effects on water resources. Off-road SAR and/or apprehension activities could temporarily affect surface water resources if vehicles have to traverse streams. These effects are difficult, if not impossible, to quantify. The magnitude of the effects would depend upon the number of times the stream/waterbody is crossed, type of vehicle, season, and the size and extant condition of the stream/waterbody.

Portable light generators would not be placed within (b) (7)(E) of an intermittent or permanent stream or waterbody. Thus, the potential for impacts from accidental spills during their operation would be eliminated. Other equipment, including vehicles, would be stored/parked away from arroyos, streams, drainage channels, and other waterbodies, to the extent practicable.

### 4.5.3 Alternative 2

Implementation of this alternative would significantly reduce the potential for water resources to be adversely impacted. Major construction projects such as roads and fences would be eliminated under this alternative and only the use of technology based operations and infrastructure would increase. Estimates of the impacts to water resources that would be impacted are unknown without site-specific surveys in areas where construction is proposed. Impacts based on worst-case scenarios are unreliable because impacted areas may not contain nearby water resources. Impacts to water resources would be addressed in subsequent tiered NEPA documents based on site-specific surveys of impact areas by qualified biologists.

Proposed activities near surface waters in the project area would have minimal impacts. Major surface waters potentially impacted by proposed infrastructure include but are not limited to:

1. RVS sites near the Santa Cruz River.
2. RVS sites and stadium style and portable generator lights near the San Pedro River; and

3. Proposed portable generator lights and stadium style lights near the Colorado River.

Potential impacts include siltation from stormwater runoff, erosion, and spills or leaks. However, due to the small area affected by each RVS sites, potential impacts to nearby water resources, if they occurred, would be negligible. Implementation of BMPs and SWPPP would also reduce these risks. Operational impacts would be similar to that discussed under Alternative 1.

### 4.5.4 Alternative 3

Impacts to water bodies from this alternative would be limited to non-point source sedimentation from eroding road surfaces and other indirect effects. The magnitude of these effects would depend upon the number of vehicle miles, timing, weather conditions, adjacent vegetative cover and soil type. Employment of good maintenance practices for un-surfaced roads and trails, as well as other erosion control measures, would significantly reduce the potential of adverse impacts to water resources. Some such measures are described further, in Chapter 6.

### 4.5.5 Alternative 4

Implementation of this alternative would have the same direct effects from construction activities as Alternative 1. Potential impacts caused by operational activities would be similar to the No Action Alternative, since these actions would remain at the current levels.

## 4.6 Air Quality

Pollutant emissions estimates for existing stationary industrial sources operating within the 50 miles of the U.S.-Mexico border study area are substantial. These estimates represent only a portion of the total pollutant emissions. Air pollutant emissions from mobile sources (e.g. automobiles, aircraft, construction equipment) and other widely dispersed activities (e.g. open burning, wind blown dust) are also substantial in these areas. Many sources are not controlled, particularly in Mexico, but nevertheless have impacts on the study area. Major proposed actions by the INS in these areas must be

evaluated on a site-specific basis prior to commencement. These evaluations could include air quality dispersion modeling to assess the impact on air quality from additional mobile and stationary sources. Coordination with Federal and state regulatory agencies would be imperative to ensure proper notification, permitting and documentation of potential impacts to air quality.

Equipment used for transporting materials and personnel, construction, and surveillance support operations utilize hydrocarbon fuels and internal combustion engines that emit air pollutants. Proposed mobile sources presented in the alternatives include cars, trucks, helicopters and small aircraft. As discussed in Section 3.6, the main pollutant of concern for mobile source operations is CO. Conveyance along unpaved roads and soils disturbed during construction also results in the release of airborne particulate matter. Equipment and vehicles to be used for all proposed actions would be configured and maintained to conform with state and local air quality requirements.

Operational emissions would result from mobile sources and on-site stationary sources. The need for air quality analysis is generally correlated with the environmental class of the project. USEPA and state agency guidelines provide screening criteria for determining whether a detailed analysis and permitting is required. Mobile source criteria are based upon traffic conditions, level of service (LOS), traffic volume increase, and potential improvements resulting from the State mandated programs and implementation plans, etc. Procedures for determining maximum 1-hour and 8-hour CO concentrations are included in the U.S. EPA-developed Guideline for Modeling Carbon Monoxide from Roadway Intersections, (EPA-454/R-92-005), Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9 (Revised); and guidelines and procedures developed by Federal and state agencies.

### 4.6.1 No Action Alternative

The No Action Alternative would eliminate all potential emission sources associated with INS construction activities and future increases in operational support services within the study area. As mentioned above, however, unimproved roads could increase fugitive dust levels that could exacerbate conditions within $PM_{10}$ non-attainment areas. The short duration of construction/maintenance activities and dust suppression measures utilized

during past construction (e.g. water trucks), the type of equipment used, and the good dispersal patterns of the region, indicate that air emissions have not been created that cumulative effect the air quality in the project area. Additionally, the continued use of older vehicles in the INS fleet are assumed to contribute to greater emissions of air pollutants since pollution control technology and requirements have greatly increased in the previous few years. No long-term impacts to air quality are anticipated from the completed projects within the area. The No Action Alternative would eliminate all potential emission sources associated with future construction and maintenance projects. No further impacts, beneficial or adverse, are expected to occur under the No Action Alternative.

### 4.6.2 Alternative 1

Roads, fences, vehicle barriers, and low water crossings are currently approved or funded, and stadium lights, RVS sites, and portable light generators are currently approved for installation. Many of the proposed construction or maintenance projects are anticipated to be relatively short in duration and, therefore, are not expected to contribute long-term air quality impacts. In areas that are chronically or acutely in violation of NAAQS, any additional contribution to air quality degradation could be considered significant and might require a conformity analysis and possibly adequate mitigation. Other proposed actions which involve increases in the number of surveillance vehicles, extended patrols, or other additional uses of hydrocarbon fuels and disturbance of particulate matter would have long-term impacts and would require evaluation on a site-specific basis.

Such increases or impacts on ambient air quality during construction and maintenance activities are expected to be short-term and can be reduced further through the use of standard dust control techniques, including roadway watering and chemical dust suppressants. Although some fugitive dust would be associated with road use, it would not be significantly greater than amounts currently produced. Air quality impacts from construction and maintenance activities (roads, fences, vehicle barriers, stadium lights, RVS sites, portable generator lights) include emissions due to fuel combustion from heavy equipment, and fugitive dust due to travel through the construction area. Based upon the current air quality status of the project area, the pollutants of special concern are airborne particulate matter. Many of the current projects under considerations involve improving

roads, which would decrease the amount of airborne particulate generated by this alternative.

There would be little or no emissions associated with operation of the stadium lights or RVS sites. Some RVS sites could be powered by natural gas generators, which would produce negligible emissions.

(b) (7)(E) are used to power the portable lighting systems, which are in operation approximately 12 hours per day. (b) (7)(E) (b) (7)(E) Since (b) (7)(E) contains inherently low amounts of (b) (7)(E) it is anticipated that installation of portable generators would not contribute to (b) (7)(E) problems in the area. Generator emissions would be expected to be far below the *de minimus* thresholds and, thus, no air conformity analysis would be anticipated.

Permits might be required for actions that would create any air emissions that would jeopardize the Federal attainment status of the Air Quality Region or cause an exceedance in the allowable PSD increment for the region. All future projects would be required to determine if air quality violations could occur and if permits would be required prior to construction. Impacts from other alternatives proposed as part of this analysis would be less than the combined air quality impacts of proposed expansion of operations/activities and construction of additional infrastructure.

### 4.6.3 Alternative 2

This alternative promotes the use of technology-based operations and infrastructure over traditional barrier type operations. Since the use of fences and other physical barriers in the vicinity of the border would not have an affect on air quality, impacts from this alternative would be similar in scope as those from Alternative 1 including increased mobile source emissions and emissions from portable generators.

### 4.6.4 Alternative 3

The air pollutants of special concern for most of the project area are airborne particulate matter. The ambient airborne particulate level under desert conditions is high during certain seasons. Vehicle travel on un-surfaced roads is the primary non-agricultural contributor of airborne particulates from human activities.

This alternative proposes actions that involve increases in the number of surveillance vehicles, extended patrols, additional uses of hydrocarbon fuels and disturbance of particulate matter. These actions would have long-term but minor impacts and would require evaluation on a site-specific basis.

Impacts from fugitive dust emission can be reduced through the use of standard dust control techniques, including roadway watering and chemical dust suppressants. Chemical dust suppressants can produce an impervious surface leading to increased stormwater runoff and therefore, should be evaluated on a case-by-case basis. Although some fugitive dust would be associated with road use, it would not be significantly greater than amounts currently produced.

### 4.6.5 Alternative 4

This alternative would result in the same impacts from construction activities discussed in Alternative 1. However, impacts from operational activities would be similar to those described for the No Action Alternative.

## 4.7 Socioeconomics

INS/USBP activities generally result in beneficial impacts to local, regional, and national economies. The diversity of past projects performed by INS and/or the USBP implies that socioeconomic impacts would vary considerably. Some projects have very small construction and operational impacts while others are more substantial (i.e., construction costs, impacts, and project magnitude). The actual construction activity impacts are usually very localized due to the temporary nature of the construction activities and the fact that the predominance of labor for these projects in the past has been provided by the

National Guard or Active and Reserve military units coordinated through the JTF-6. Consequently, the purchase of construction materials and supplies (increase in local sales and income) is typically the primary, direct economic effect in the project vicinity.

Although construction impacts are temporary in nature, the effects associated with implementation of INS and/or the USBP projects are expected to continue for the economic life of the project. All actions provide socioeconomic benefits from increased detection, deterrence, and interdiction of illegal drug smuggling activities with concomitant benefits of reduced enforcement costs, losses to personal properties, violent crimes, and entitlement programs. These actions can also have direct positive benefits from increased economic activity.

Effects to the aesthetics and/or quality of life could be incurred in certain regions that experience significant new construction actions or increases in patrolling activities. These effects can be either positive or negative, depending upon an individual's judgement. The magnitude of adverse effects, however, would be expected to increase in remote areas rather than in urban or developed areas. Increases in patrolling activities as well as construction activities near wilderness areas, parks, National monuments, and other such sensitive areas would cause the greatest adverse effects, although the impacts are difficult to quantify.

### 4.7.1 No Action Alternative

Most of the labor for completed infrastructure projects came from the either the National Guard or JTF-6 Active/Reserve military units resulting in only temporary increases in the population of the project area. Materials and other project expenditures for the construction activities were predominantly obtained through merchants in the local community further temporarily boosting the local economy.

A total of about 2,060 acres have been illuminated under the No Action Alternative through the use of stadium and portable lighting. The added illumination has deterred drug smuggling, illegal immigration and other illegal activity and is expected to have resulted in the reduction of the associated social costs of such activities. Approximately (b)(7)(E) portable generator lights would be operated under the No Action Alternative. These portable light

units run 12 hours a day consuming approximately (b) (7)(E) of fuel in those 12 hours. As a result, the operation of the portable generator lighting uses approximately (b) (7)(E) gallons of (b) (7)(E) for operation. Fuel purchased locally would continue to provide economic benefits during their operation.

### 4.7.2 Alternative 1

As mentioned previously, the National Guard or JTF-6 Active/Reserve military units have completed most of the INS/USBP infrastructure projects to date. With the exception of USBP Stations and some RVS towers, INS and USBP would be expected to continue to request these units since the labor is provided to INS and USBP at no cost to the agency. The relocation of the units would result in only temporary increases in the population of the project area. Materials and other project expenditures would likely be obtained through merchants in the local community, further temporarily boosting the local economy. Increasing the number of border patrol agents would have a positive effect on the local retail and service industries.

The additional illumination proposed for stadium and portable lights is expected to assist in the deterrence of drug smuggling, illegal immigration and other illegal activity and subsequently result in the reduction of the associated social costs of such activities. An increase in operations in vehicle, pedestrian, and air operations would also require additional fuel and other resources for their continued operation. Increase in manpower at certain stations over the next few years would include a subsequent increase in supplies and other materials used in their daily operations. Most likely, these materials would be purchased from the surrounding communities and would increase revenues for the local economy.

In addition to existing stadium and portable lighting, (b) (7)(E) portable lighting units are scheduled for operation. Though these units would probably not be purchased locally, the fuel for their operation would be supplied by local distributors. Portable lighting generators would operate for 12 hours a day and use an average of (b) (7)(E) (b) (7)(E) per generator during each 12-hour shift. This would require a total of (b) (7)(E) used daily in the operation of the proposed portable lighting units. Adding this to the fuel consumption of the existing portable lighting units totals (b) (7)(E)


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gallons of fuel used daily in their operation. Fuel would be purchased locally and would provide ongoing economic benefits during operation.

### 4.7.3 Alternative 2

Similar socioeconomic effects, direct and indirect, would result upon implementation of this alternative as was discussed for Alternative 1. Materials and other project expenditures would predominantly be obtained through merchants in the local community further temporarily boosting the local economy. Significantly less construction would occur under this alternative compared to Alternative 1. Thus, short-term economic benefits from construction activities and purchase of materials would be less.

The amount of stadium and portable lighting units under this alternative would remain the same as Alternative 1. The added illumination provided under this alternative would increase the potential to deter drug smuggling, illegal immigration and other illegal activity and subsequently result in the reduction of the associated social costs of such activities. As mentioned above, about (b) (7)(E) gallons of (b) (7)(E) would be purchased locally for the operation of the additional portable light generators. Ongoing, long term economic benefits would result from the operation of these generators.

Without the addition of fencing and other infrastructure along the border, illegal pedestrian and vehicle traffic across the border could increase. The associated social costs of increases in crime and drug related activity would be expected to increase.

### 4.7.4 Alternative 3

This alternative is expected to assist in the deterrence of drug smuggling, illegal immigration, other illegal activities and subsequently result in the reduction of the associated social costs of such activities. An increase in operations in vehicle, pedestrian, and air operations would also require additional fuel and other resources for their continued operation. Increase in manpower at certain stations over the next few years, as proposed by this alternative, would include a consequent increase in supplies and other materials used in their daily operations. These materials would likely be purchased from the surrounding communities and would increase revenues for the local economy. Nearby

communities are expected to experience reductions in operating expenses and increased revenue as a result of the actions proposed by this alternative.

### 4.7.5 Alternative 4

Implementation of this alternative would have similar results as Alternative 1, with the exception of increasing the number of USBP agents and operations. There would be no long-term local purchases for materials and supplies (e.g., diesel fuel) would provide economic benefits as described in Alternative 1.

### 4.7.6 Environmental Justice

Executive Order 12898 of February 11, 1994, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" required each Federal agency to identify and address, as appropriate, disproportionate adverse effects of its proposed actions on minority populations and low-income communities.

As indicated earlier in Section 3.10 of this PEIS, the racial mix of the study area is predominantly Caucasian. Santa Cruz and Yuma Counties, Arizona have a significant portion of their total populations claiming Hispanic origins. These counties are particularly sensitive for environmental justice issues concerning minority populations. Particular attention would have to be made regarding the placement of infrastructure and other construction in proximity to minority populations. The INS and/or the USBP projects that have been completed and the current and future projects are sporadically located, based on strategic effectiveness, throughout the respective counties. Furthermore, none of the projects proposed or completed to date would/has displaced minority residences or commercial structures in any community along the project corridor. Therefore, disproportionate effects to minority populations would not be expected. Communities such as Ajo, Gila Bend, San Luis and Yuma due to their higher population and commercial densities would be particularly sensitive to environmental justice issues. Project specific impacts in regard to environmental justice would be addressed in site specific NEPA documentation tiered from this programmatic document.

Since Alternative 1 consists of the greatest acreage of construction activities it would have the most potential to encounter environmental justice issues. The construction in Alternative 2 is greatly reduced and would therefore be less likely to encounter environmental justice issues. Under the No Action Alternative, all environmental justice issues have been addressed in previous compliance documentation and there would be no impacts in regard to environmental justice. Alternatives 3 and 4 would not result in environmental justice issues since no new infrastructure construction projects would be initiated.

The study area has between 16.2% and 30.3% of its total population living at or below poverty levels. The 1997 per capita personal income was estimated to be between 57% to 83% of the national average. It is likely, therefore, that some infrastructure has been completed or is proposed for construction within or near low-income neighborhoods. The location of these structures, however, is selected based on the frequency and intensity of illegal drug traffic and numbers of UDAs and the need to protect these specific areas from illegal entry. As mentioned earlier, no homes or commercial structures have been displaced by INS infrastructure projects. Most projects occur along existing road ROWs that are on public lands. Consequently, no disproportionate adverse effects to low-income populations would be expected from the implementation of any of the alternatives.

On the other hand, implementation of any of the alternatives would enhance the probability of success for the INS and/or USBP although the levels of enhanced success would vary among alternative. This increased success in controlling illegal drug activity and the increasing flow of UDAs into the Tucson and Yuma sectors would benefit all populations, regardless of income, nationality or ethnicity. In addition, construction activities would have short term, but positive impacts on local economies from sales of construction materials, other project expenditures, and temporary employment. Long-term positive impacts would occur on local, regional and national levels by the reduction of illegal immigrants and drug trafficking and the associated social costs. Alternative 1 would provide the most opportunity to deter illegal traffic across the border followed by Alternative 2, Alternative 3 and Alternative 4.

Part of the increase in operations comes from an increase in the amount of Border Patrol agents. An increase of 256 agents, excluding (b) (7)(E) Station, is expected across the

Tucson and Yuma sectors. The largest increase (150 agents) would occur at the (b) (7)(E) station. Increases in the number of agents would put added demands on the housing market. With the housing concerns in Arizona, outlined in Section 3.7, this action could result in higher housing prices in those areas receiving significant numbers of additional BP agents. This could cause environmental justice concerns for both low income and minority populations where the increased demand in housing would further increase the cost of affordable housing.

### 4.7.7 Executive Order 13045, Protection of Children

Implementation of any of the Alternatives would not result in disproportionately high or adverse environmental health or safety impacts to children. The construction would take place away from residential areas and would result in a decrease of illegal traffic throughout the area creating a safer environment for the children. Furthermore, these alternatives would result in a reduction of illegal immigration, drug trafficking, and other crimes within the area further making a safer living environment for the children.

## 4.8 Public Services and Utilities

### 4.8.1 No Action Alternative

Implementation of the No Action alternative would not affect current public services and utilities within the Tucson and Yuma sectors because no new construction would occur. At present, public agencies and private industry regularly perform maintenance of existing utilities within the region and are continuing to provide needed public services, such as law enforcement, medical treatment, education, etc. Therefore, these services have not changed.

However, it should be noted that future impacts may occur regardless of the No Action Alternative since existing infrastructure of services and utilities would eventually be unable to meet the capacity requirements of the growing population within these respective counties.

### 4.8.2 Alternative 1

Implementation of Alternative 1 is expected to cause minimal disruption to current public services within the Tucson and Yuma sectors, with the exception of some possible delays in the vicinity of construction. A proper Maintenance and Protection of Traffic Plan (MPTP) would minimize these potential delays and maintain current flow of traffic through the corridor. Impacts to individual utilities would need to be evaluated on a site-specific basis following a utility survey of the respective areas to be affected. Some anticipated impacts include additional electrical usage, additional disposal of solid wastes, and possible additional need for fire and emergency services.

### 4.8.3 Alternative 2

Implementation of Alternative 2 is not expected to cause any significant disruptions to current public services within the Tucson and Yuma sectors. A proper MPTP during the placement of proposed additional lighting and new stations would minimize any potential delays. As in the case of Alternative 1, the impacts to individual utilities would need to be evaluated on a site-specific basis following a utility survey of the respective areas to be affected. It is, however, anticipated that these impacts would be considerably less than Alternative 1, as roadway construction would be minimal and technological based projects utilize less manpower than other methods.

### 4.8.4 Alternative 3

This alternative would have no significant direct impacts on public utilities, since no new construction would occur. Operational activities would be expanded, but these are not expected to cause significant additional demands on or impacts to public utilities.

### 4.8.5 Alternative 4

Implementation of this alternative would have similar impacts as stated in Alternative 1.

## 4.9 Hazardous Materials

### 4.9.1 No Action Alternative

Completion of all ongoing infrastructure projects is expected to result in a minimal increase in hazardous materials generated by INS operations. These materials include used oil generated from vehicles and other wastes. This increase in materials is expected to have a minimal impact since proposed waste disposal practices are followed at INS facilities. This alternative would also insure that no known waste sites are impacted from construction activities.

### 4.9.2 Alternative 1

Expansion of current operations and infrastructure projects would not affect any known inactive or abandoned hazardous waste sites. INS would perform site-specific Environmental Site Assessments, as appropriate, within the study area prior to implementation of specific construction projects on fee-owned land, and/or prior to acquisition of additional lands required to implement any of those projects. Expansion of current operations is expected to result in a minimal increase in the amounts of hazardous materials required to maintain INS operations, and the waste materials generated by the operations. These materials include vehicle fuels, used oils (usually recycled), waste chemicals and other maintenance chemicals. Additionally, waste materials generated during construction activities would be disposed of in strict compliance with USEPA and state procedures.

### 4.9.3 Alternative 2

As discussed for Alternative 1, projects included under this alternative would not affect any known inactive or abandoned hazardous waste sites. Since this alternative would result in less construction in the vicinity of the U.S.-Mexico border, the probability of encountering hazardous waste sites would be less than Alternative 1. This alternative would result in an increase in used oils generated by INS operations, primarily in the use of portable light generators.


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### 4.9.4 Alternative 3

The actions proposed by this alternative are expected to result in a minimal increase in waste materials generated by INS options. These materials include used oil generated from vehicles, generators, and other equipment maintenance activities. This increase in materials is expected to have a minimal impact since wastes would be disposed of in strict accordance with state and USEPA procedures and regulations. This alternative would generate less waste than any of the other alternatives, with the exception of the No Action Alternative.

### 4.9.5 Alternative 4

Implementation of this alternative would not affect any known inactive or abandoned hazardous waste sites. INS would perform site-specific Environmental Site Assessments within the study area prior to land purchase or implementation of specific projects on fee owned land. Wastes generated by operational activities, including vehicle/equipment maintenance, would remain at current levels. All waste materials generated during construction and operational activities would be disposed of following USEPA and state procedures.

## 4.10 Noise

### 4.10.1 No Action Alternative

The No Action Alternative would not result in any additional noise increases from construction and operational activities.

### 4.10.2 Alternative 1

This alternative would result in construction and operation of new buildings, facilities, roads and ramps, fences and barriers, helipads, lighting, surveillance systems, etc. along the Arizona border.


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#### 4.10.2.1Construction Noise

Construction activities would temporarily increase noise levels at locations immediately adjacent to construction sites. Noise levels created by construction equipment would vary greatly depending on factors such as the type of equipment, the specific model, the operation being performed, and the condition of the equipment. The equivalent sound level (Leq) of the construction activity also depends on the fraction of time that the equipment is operated over the time period of the construction.

Construction equipment can be divided into two major groups, stationary and mobile. Stationary equipment operates in one location for one or more days at a time, with either a fixed power operation (pumps, generators, compressors) or a variable power operation (pile drivers, pavement breakers). Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders) or to and from the site (trucks).

Depending on the scale and the type of project and stage of environmental review, a construction noise assessment may be required on a project-by-project basis. Where the project is major, (i.e., the construction duration is expected to last for more than several months), noisy equipment would be involved, or the construction is expected to take place near a noise-sensitive site (especially for residential and institutional uses), then detailed construction noise analyses might be required. Otherwise, the assessment would be a general description of the equipment to be used, the duration of construction, and any mitigation requirements placed on particularly noisy operations. Most construction activities as the result of this alternative would produce only short-term noise level increases. Since construction would only occur during daylight hours and blasting would not be expected, these short-term increases are not expected to substantially affect adjacent noise sensitive receptors and wildlife areas.

If it is determined to be necessary, a detailed construction noise assessment would predict construction noise level using Federal Highway Administration (FHWA) methodologies or other prediction models. Noise impact would be assessed based on project specific criteria, existing ambient noise level, duration of the construction activities, adjacent land uses, and proximity to sensitive receptors.