

**Biological Assessment
International Boundary Vehicle Barrier
Organ Pipe Cactus National Monument, Arizona
March 2003**

I. Executive Summary

The National Park Service (NPS) proposes to construct a vehicle barrier along those portions of the US-Mexico border at Organ Pipe National Monument (ORPI) where the terrain allows illegal vehicle crossing. This represents a total of about 30 miles (48 km) of barrier, which traverses virtually the entire international border at ORPI. The barrier will consist of a railroad rail horizontal cross piece 3 feet (0.9 m) high, anchored to uprights every 5 feet (1.5 m). The uprights will be built of railroad rail and/or concrete-filled steel posts. Where terrain or subsurface conditions make post construction difficult, a steel-girder barrier without a foundation ("Normady barrier") will be placed on the ground surface.

The intent of the structure is to prevent damage to natural and cultural resources, and to increase the safety of patrol officers who work along the border (NPS, Border Patrol, local law enforcement, etc.), as well as the safety of other staff and the general public. Vehicle crossings by drug smugglers, illegal aliens or illegal alien smugglers destroy vegetation, compromise designated wilderness, degrade habitat for endangered species, damage cultural and archaeological sites, and cause other resource impacts. Vehicle pursuit by law enforcement personnel is a routine occurrence and is the single most dangerous activity along the border at this time. In August 2002, NPS Ranger Kris Eggle was killed while attempting to apprehend armed criminals who had entered the U.S. illegally by vehicle, driving through the unsecured border and then cross-country. The proposed barrier will eliminate or greatly reduce such incursions across the border and into the ORPI wilderness backcountry. The barrier would also eliminate the most-used escape route for fleeing vehicles returning to Mexico (the unhardened border), thereby greatly reduce the probability that flight will lead to escape. This will in turn greatly reduce the number of vehicle pursuits.

II. Description of the Proposed Action

A. Purpose and Need for the Action

Organ Pipe Cactus NM is being heavily impacted by vehicles, smuggling illegal immigrants and drugs, which drive from Mexico through the current barbed-wire international boundary fence, and then cross-country through ORPI's wilderness backcountry. The U.S. Border Patrol estimates that in Fiscal Year 2000, 500 people per day (180,000 per year) and 700,000 pounds of drugs entered the United States illegally through ORPI. As security is tightened at major ports of entry, airports and urban areas, remote areas like ORPI will become increasingly attractive to terrorists, smugglers and others seeking illegal entry into the United States. A breakdown of border-related activities of these kinds is presented in Figure 1.

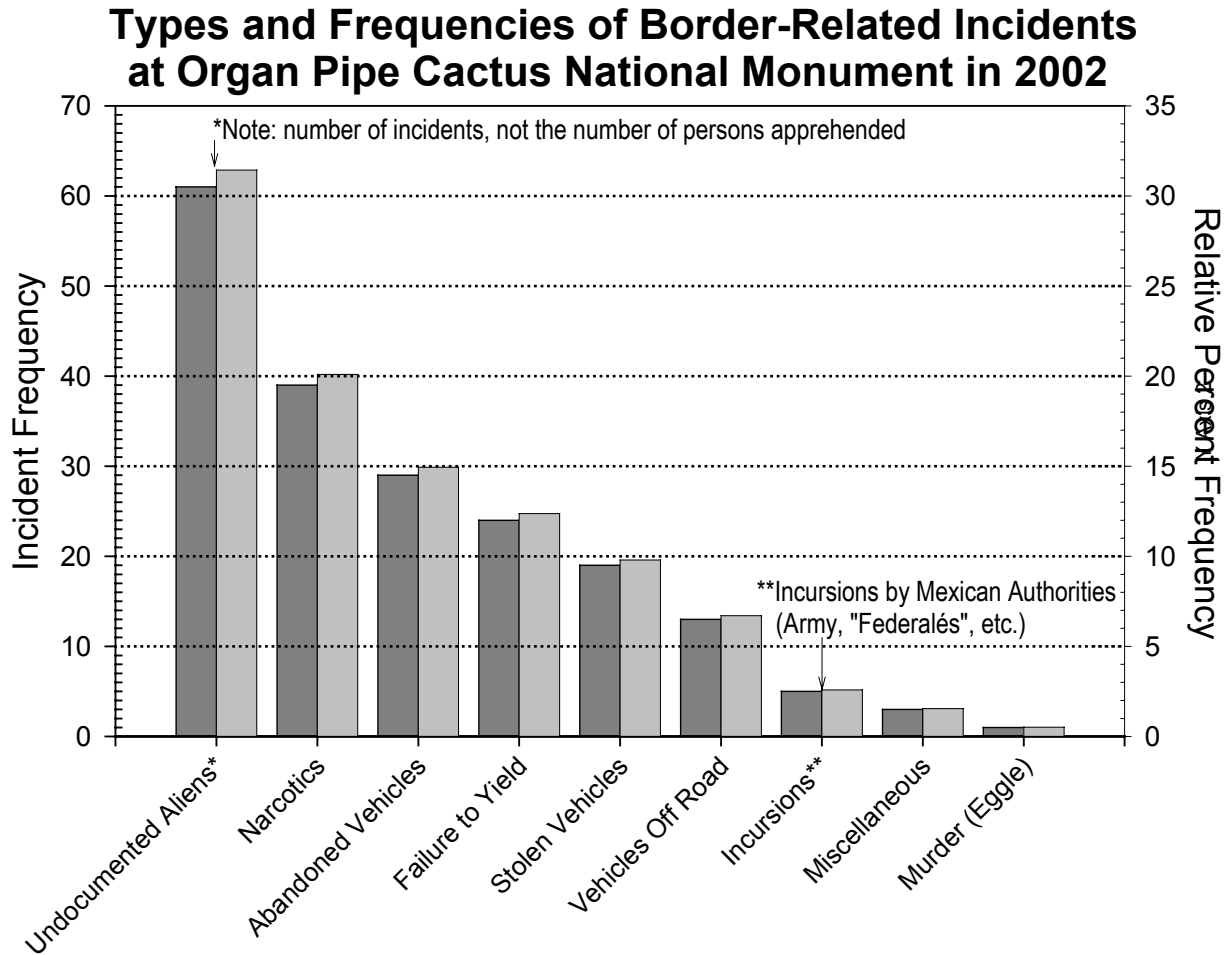


Figure 1. Types and frequencies of border-related incidents at Organ Pipe Cactus National Monument in 2002.

On August 9, 2002, NPS Law Enforcement Ranger Kris Eggle was shot and killed in the line of duty on while pursuing an armed gunman fleeing from Mexican authorities just north of the border. The gunmen entered the United States illegally by vehicle, which was then abandoned after driving cross-country. Not only would this vehicle barrier severely curtail the transport of illegal persons and drugs by vehicle, it would also most likely have prevented the event of August 9th, or similar events from occurring in the future. Not being able to access the U.S. by vehicle would have forced this particular vehicle to continue on the roadway in Mexico, without entering the United States via ORPI.

Natural resources have been severely impacted by these incursions (Figures 2 and 3). Illegal transport of drugs and people into the United States by vehicle has created over 149 miles (240 km) of illegal vehicle roads through designated wilderness areas in the past 24 months (Figure 4). It should be noted that these roads, mapped in Figure 4, are a minimum representation of the current situation. The roads mapped in Figure 4 are those that have been driven illicitly numerous times, creating well-defined dirt roads. Because

of the extensive network of illegal roads, usually in remote locations, the NPS has not been able to inventory and map them all. Furthermore, not shown here are the extensive lesser trackways where vehicles have driven cross-country only one to several times over a given route. In addition to creating new, illegal roads, smugglers and illegal immigrants also use “official” backcountry roads. Illicit traffic is causing severe damage to these roads and adjacent areas, because the roads are not suitable for the large volumes of traffic they are currently bearing (Figure 3).

This illegal cross-country driving is of particular concern for two endangered species, the cactus ferruginous pygmy-owl and the Sonoran pronghorn, whose life histories and habitat requirements make them especially sensitive to human presence. In ORPI, this illicit cross-country travel has physically damaged three recently-occupied territories of the endangered cactus ferruginous pygmy-owl. Smuggler activity is also suspected to have disturbed nesting pygmy-owls. Regarding the Sonoran pronghorn, over the last two years disturbance caused by rampant illicit backcountry driving is likely to have combined with drought stresses to bring the U.S. pronghorn population to the verge of extinction. Eliminating illegal vehicle entry along the international border at ORPI’s southern boundary will allow recovery of much of the disturbed acreage, will greatly improve the safety and welfare of employees and visitors, and will facilitate conservation and recovery of several endangered species.



Figure 2. Illegal off-road driving damage in Sonoran pronghorn habitat, Organ Pipe Cactus National Monument, Arizona. Photograph by T. Tibbitts, NPS.



Figure 3. Damage to official backcountry road and adjacent areas from illicit vehicle traffic, in Sonoran pronghorn habitat, Organ Pipe Cactus NM. Photograph by K. Eggle, NPS.

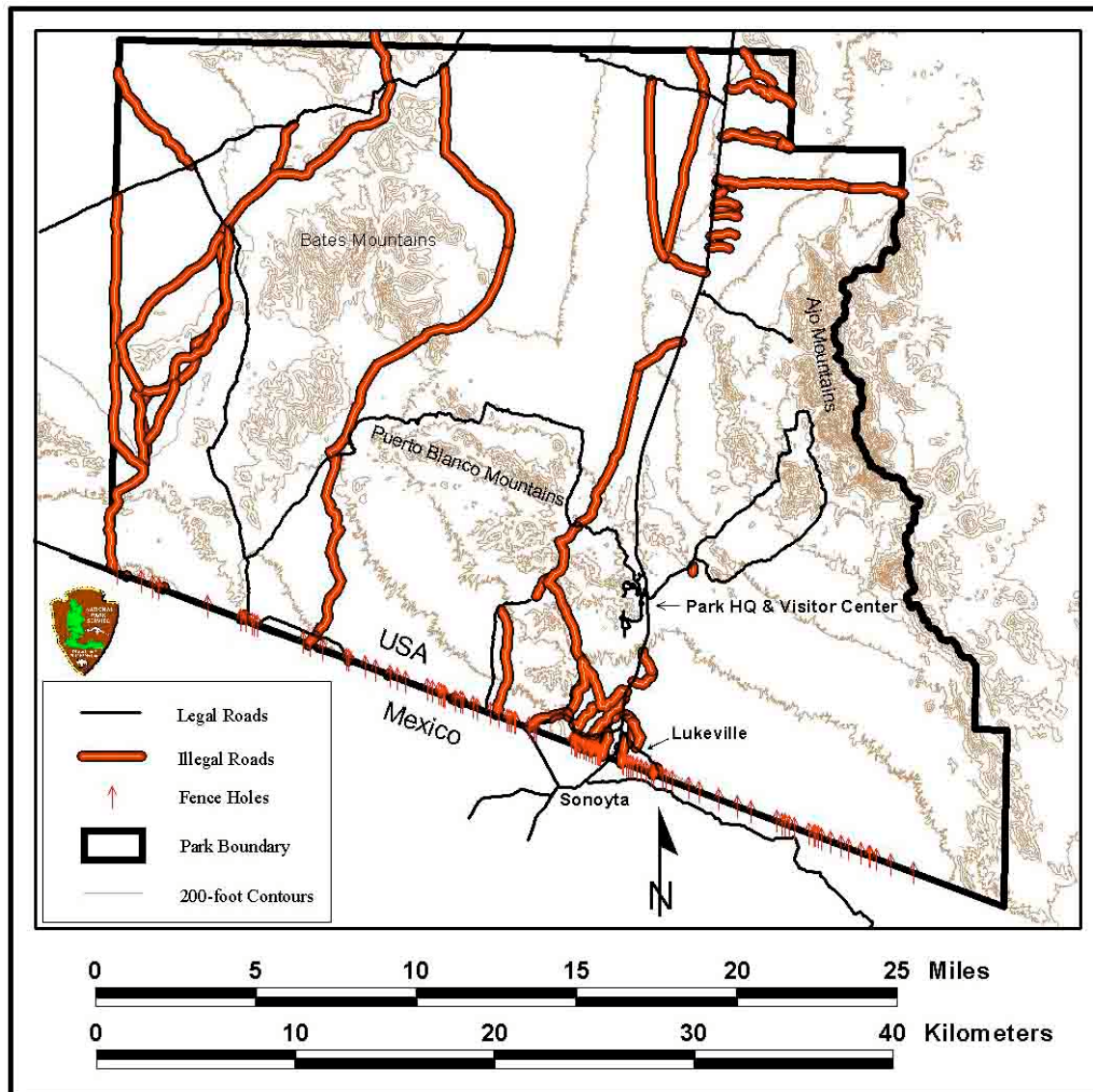


Figure 4. Illegal border-fence drive-throughs (fence holes), and illegal cross-country roadways created in Organ Pipe Cactus National Monument, 2001-2002.

B. Site Description

Organ Pipe Cactus National Monument lies in southwestern Arizona. It is located along the international border with Mexico, in western Pima County, south of the town of Ajo. ORPI is comprised of approximately 330,689 acres of Sonoran Desert plains, bajadas, and rugged mountains. Its “sister” park, El Pinacate Reserva de la Biosfera, nearby to the southwest. The city of Sonoyta, Sonora, lies immediately south of ORPI and the Port Of Entry of Lukeville, Arizona.

The proposed project area is the approximately 30-mile length of ORPI’s southern boundary, the international border with the Republic of Mexico (Figures 4 and 5). This border extends from the Sierra de Santa Rosa in ORPI’s southeastern corner,

northwestward to the boundary between ORPI and Cabeza Prieta National Wildlife Refuge.

The project area traverses a variety of Sonoran Desert environments, and also passes adjacent to agricultural areas (in Mexico), residential areas (in Mexico), and passes through the commercial/administrative developments of the Port Of Entry at Lukeville, Arizona. The natural environments traversed by the project are all vegetated in the Sonoran Desertscrub plant community, primarily Arizona Uplands and Lower Colorado River Valley subdivisions. The Arizona Uplands associations are typified by saguaro, organ pipe, and other mixed cactus, foothill paloverde, ironwood, velvet mesquite, ocotillo, brittlebush and triangle-leaf bursage. Arizona Uplands associations and subassociations are present from steep slopes and rockpile environments (e.g. Sierra de Santa Rosa, Sonoita Mts) downslope and along much of the international boundary east of Lukeville. Moving west of Lukeville and the Sonoita Mountains, Arizona Uplands associations gradually give way to elements of the Lower Colorado River Valley associations, including elephant tree and desert saltbush. The proposed project would pass approximately 100m (328 ft) south of the edge of Quitobaquito Pond, and would pass through the mesquite-wolfberry bosque associated with Quitobaquito. Near its western extent, the project would pass through the edge of the riparian floodplain associations of the Rio Sonoita.

C. Description of the Proposed Action and Methods:

Area Disturbed:

The primary area of project disturbance will be approximately 30 feet (9.15 m) wide and approximately 30 miles (48.25 km) long. The vehicle barrier will consist of two major segments (Figure 5). One segment will extend from the steep western slopes of the Sierra de Santa Rosa (southeastern corner of ORPI) northwestward, to the steep eastern slopes of "Monument Hill" in the Sonoita Mountains, about 1.5 mile (2.4 km) west of the Lukeville Port Of Entry. This segment will be approximately 12.9 miles (20.8 km) in length, interrupted only by the Port of Entry. The second segment, approximately 14.7 miles (23.7 km) in length, will extend from the western slopes of "Monument Hill" in the Sonoita Mountains northwestward, to ORPI's southwestern corner. This segment will be contiguous for its entire length.

In addition to the primary project corridor, there will also be 35 staging areas and 2 turn-around sites, for vehicle turn-around and materials storage (Figure 5, Table 1). In most cases, these staging areas will extend approximately 30 feet (9.15 m) beyond the primary 30 feet (9.15 m) disturbance strip. These staging areas will vary considerably in length, from approximately 100 to 250 feet (30 to 76 m). West of Monument Hill in the Sonoita Mountains, staging areas will also incorporate the South Puerto Blanco Drive, widened by 5 ft (1.5 m) for up to 300 ft (91.4 m). Within this overall project footprint, substantial areas are already disturbed, primarily in the form of the existing border fence access road. This road, within the primary 30-ft (9.15 m) project corridor, will be used as the primary project work access avenue. It will be retained as a road approximately 12 ft (3.6 m) wide after the project. As presented in Table 2, the project will result in a net disturbance of approximately 70.3 new acres (28.47 ha).

Table 1. Locations and sizes of staging and turnaround areas, international boundary vehicle barrier, Organ Pipe Cactus National Monument, Arizona.

Site ID	Site Name	Type	Acres	Ha	Devegetated?	UTM Easting	UTM Northing	Km Locator
East terminus	Santa Rosas terminus	Turn	0.048	0.02		345287.43	3522125.37	0.0E
1E	Santa Rosas	Staging	0.098	0.04		345182.31	3522162.041	0.1E
2E	Sonoyta Valley	Staging	0.189	0.08		343454.22	3522802.4	1.9E
3E	Sonoyta Valley	Staging	0.086	0.04		342132.01	3523300.778	3.3E
4E	Sonoyta Valley	Staging	0.201	0.08		341010.25	3523724.185	4.5E
5E	Sonoyta Valley	Staging	0.161	0.06		339704.75	3524217.048	5.9E
6E	Sonoyta Valley	Staging	0.116	0.05		337892.11	3524899.973	7.8E
7E	Salsola EMP site W	Staging	0.351	0.142		336956.61	3525253.477	8.8E
8E	Dos Lomas East	Staging	0.116	0.05		336431.77	3525450.986	9.4E
9E	Dos Lomas corral	Staging	0.423	0.17		335533.02	3525789.552	10.3E
9E	Dos Lomas bypass road	Staging	0.998	0.4		335373.79	3525934.781	11.3E
Turn	Las Palmas	Turn	0.122	0.05		334632.55	3526128.657	11.9E
10E	Dos Lomas west	Staging	0.185	0.08		334058.68	3526345.301	12.5E
Turn	Dos Lomas parking area	Turn	0.04	0.02	x	333409.83	3526590.704	12.8E
11E	Dos Lomas eroded area	Staging	0.125	0.05		333105.77	3526704.966	13.8E
12E	Gachado - Dos Lomas	Staging	0.243	0.1		332219.31	3527040.104	15.0E
13E	Gachado	Staging	0.358	0.15		331005.06	3527497.768	15.9E
14E	Gachado Burn West	Staging	0.172	0.07		329996.71	3527876.567	16.2E
15E	Lukeville East	Staging	0.215	0.09	x	329076.04	3528220.841	17.1E
Turn	Lukeville East	Turn	0.014	0.004	x	328998.68	3528245.656	17.2E
Turn	Lukeville East	Turn	0.026	0.01	x	328930.61	3528271.448	17.3E
Turn	Lukeville East	Turn	0.032	0.01	x	328834.17	3528309.463	17.4E
Turn	Lukeville East	Turn	0.093	0.04	x	328737.26	3528346.035	17.5E
16E	Lukeville East - Airstrip	Staging	0.155	0.06	x	328647.73	3528381.654	15.6E
17E	Lukeville Store	Staging	0.226	0.09	x	327937.56	3528650.347	18.3E

Table 1, Continued. Locations and sizes of staging and turnaround areas, international boundary vehicle barrier, Organ Pipe Cactus National Monument, Arizona.

Site ID	Site Name	Type	Acres	Ha	Devegetated?	UTM Easting	UTM Northing	Km Locator
x	Lukeville west	Turn	0.107	0.04	x	327810.37	3528697.674	18.5E
18E	Pink House	Staging	0.247	0.1	x	327465.06	3528828.414	18.8E
19E	Dowling	Staging	0.069	0.03	x	326536.17	3529179.582	19.8E
terminus	Monument Hill terminus	Turn	0.063	0.02		325039.34	3529746.086	0.0W
0W	Monument Hill	Staging	0.088	0.04		324969.48	3529773.091	0.1W
1W	W of Monument Hill	Staging	0.172	0.07		323980	3530170.374	1.1W
2W	La Abra Plain- MX tire fence	Staging	0.15	0.06		322438.16	3530736.555	2.8W
3W	La Abra plain W of SenitaBa	Staging	0.249	0.1		320625.79	3531427.649	4.7W
4W	La Abra Plain	Staging	0.129	0.05		319499.49	3531847.867	5.9W
5W	La Abra Plain	Staging	0.099	0.04		317868.69	3532459.282	7.5W
6W	La Abra Plain Obelisk Site	Staging	0.063	0.02		316862.65	3532832.038	8.6W
7W	La Abra Plain West	Staging	0.161	0.06		315522.75	3533350.37	10.0W
8W	La Abra Plain Wash Site	Staging	0.08	0.03		314968.89	3533561.69	10.6W
9W	10-Mile Hill access road & staging	Staging	2.13	0.86		313247.38	3534734.298	12.8W
10W	Aguajita	Staging	0.624	0.25		310077.88	3535459.696	15.8W
11W	QBQ parking area	Staging	0.179	0.07	x	309204.32	3535729.698	16.7W
12W	West of QBQ	Staging	0.155	0.06		308300.87	3536047.268	17.7W
13W	W of Williams Spring Road	Staging	0.144	0.06		307108.77	3536498.324	18.9W
14W	Hocker Well	Staging	0.261	0.1		305566.72	3537083.199	20.5W
15W	Cerro Blanco West	Staging	0.137	0.06		303720.38	3537775.301	22.5W
16W	Corner Well	Staging	0.176	0.07	x	302933.87	3538068.518	23.3W
TOTAL	Staging & turning sites		10.276	4.16				
TOTAL	Devegetated sites		1.58	0.64				
TOTAL	Acreage to be devegetated		8.696	3.52				
	ALSO: 18 ft of 30-ft strip		61.6	24.95				
	PROJECT TOTAL		70.3	28.47				

Table 2. Total and net project footprint and disturbance, international vehicle barrier, Organ Pipe Cactus National Monument.

Feature	Acres	Hectares
Primary project corridor, 30 ft (9.15 m) by 30 miles (48.25)	105.18	42.6
Staging and turn-around areas	10.3	4.16
<i>Total all-inclusive project footprint</i>	<i>115.48</i>	<i>46.77</i>
Areas already devegetated by illegal traffic	1.58	0.64
Existing border fence road (12 ft/ 3.6 m wide)	43.6	17.7
<i>Net area of project impact</i>	<i>70.3</i>	<i>28.47</i>

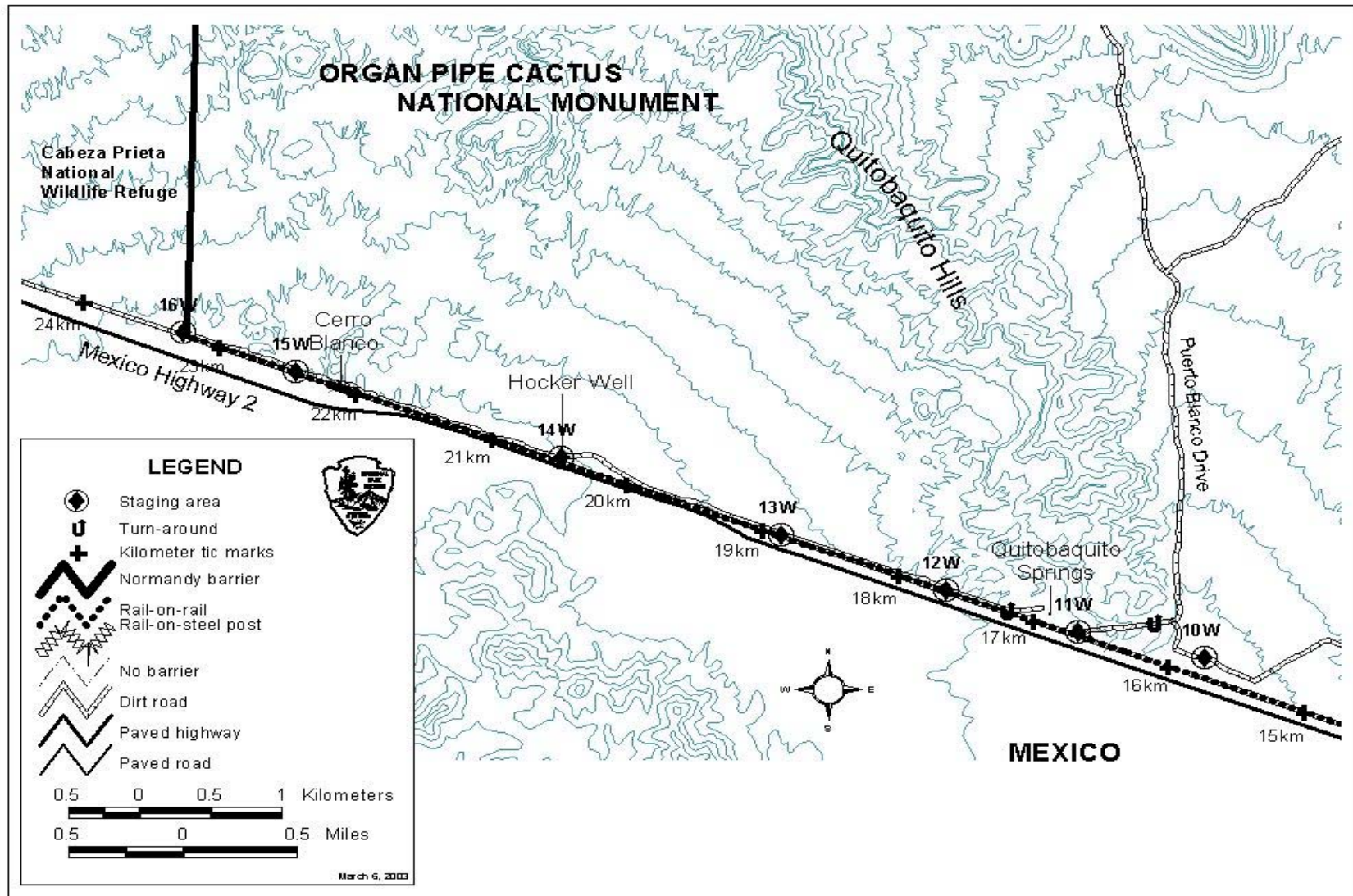


Figure 5. Vehicle barrier and related project features along the international boundary at Organ Pipe Cactus National Monument, Arizona. Western portion of project, southwestern corner of Monument to Aguajita Springs. (Kilometer measurements begin at Monument Hill, off map to east.)

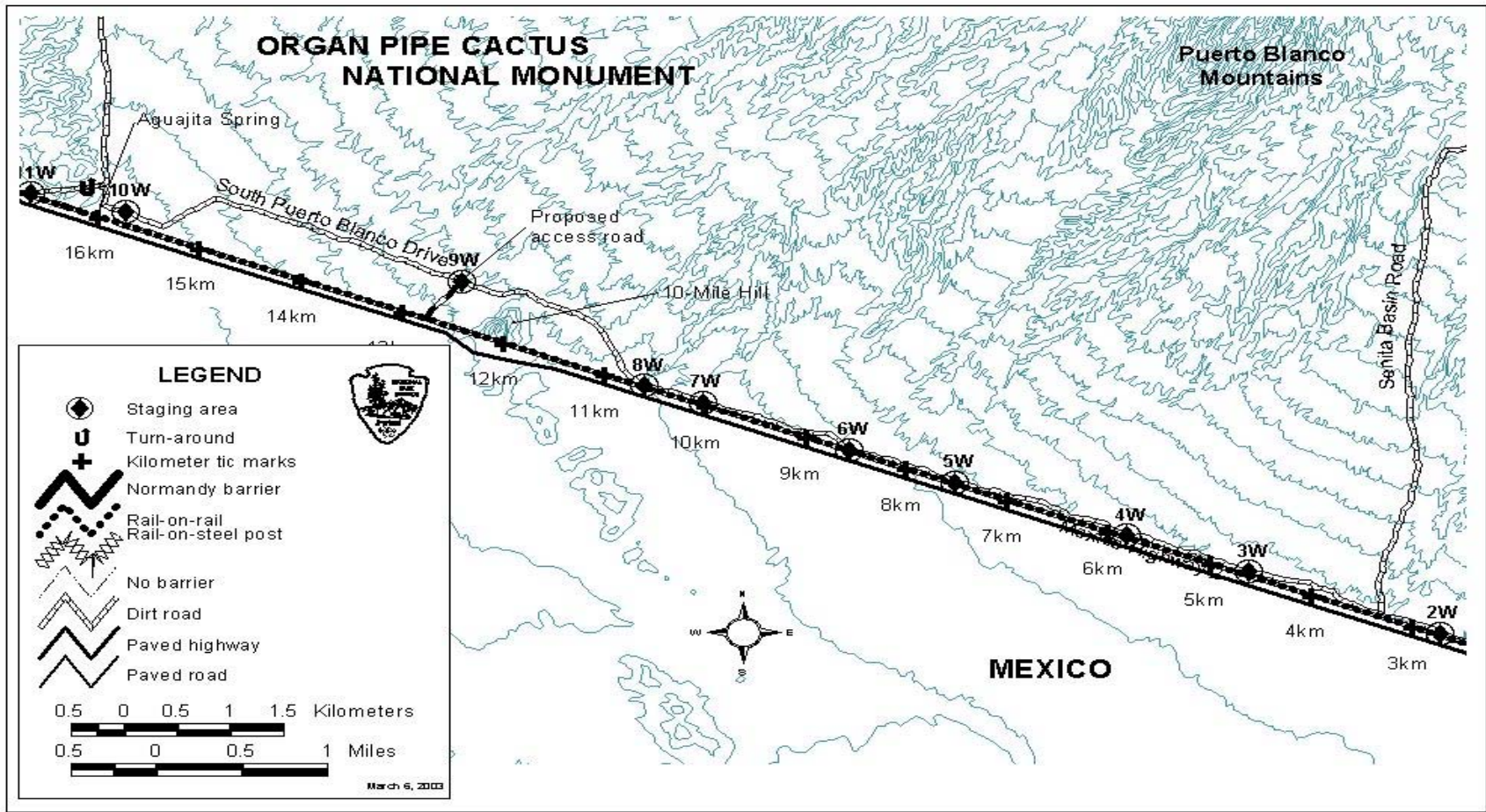


Figure 5 (Continued). Vehicle barrier and related project features along the international boundary at Organ Pipe Cactus National Monument, Arizona. West-central portion of project, Aguajita Springs to Senita Basin Road. (Kilometer measurements begin at Monument Hill, off map to east.)

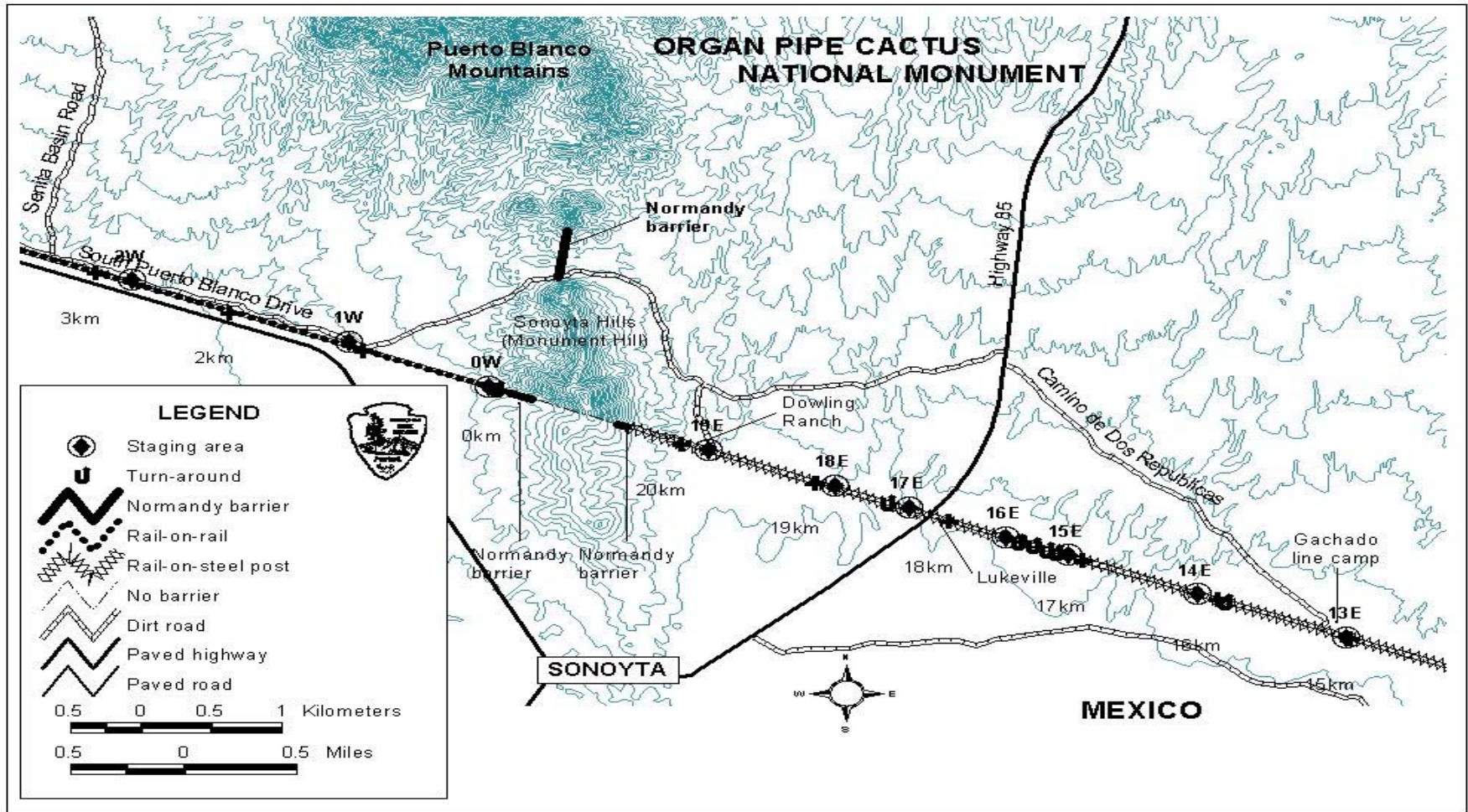


Figure 5 (Continued). Vehicle barrier and related project features along the international boundary at Organ Pipe Cactus National Monument, Arizona. East-central portion of project, Senita Basin Road to Gachado. (Kilometer measurements for western segment begin at Monument Hill; measurements for eastern segment begin at Sierra de Santa Rosa, off map to east.)

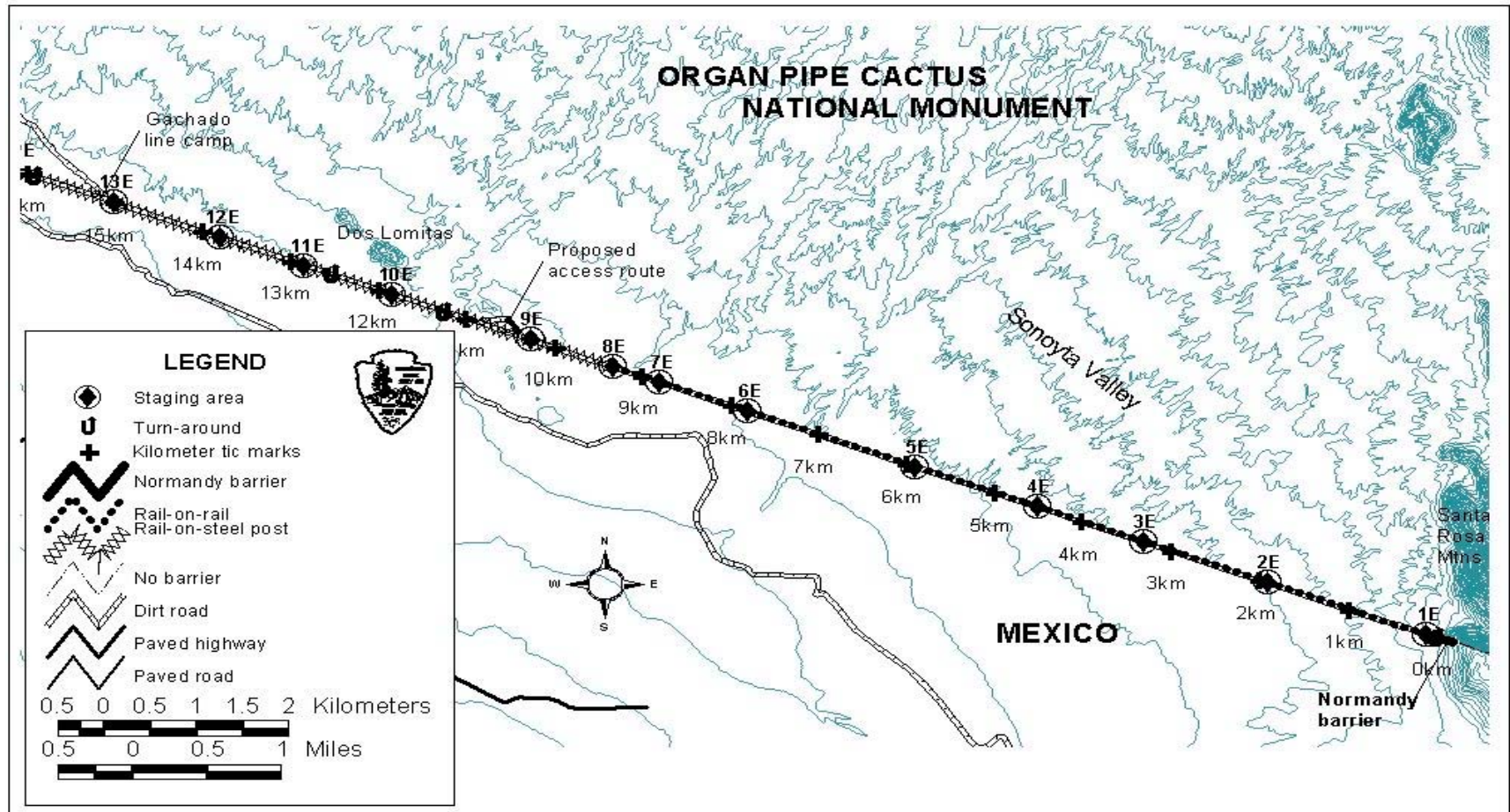


Figure 5 (Continued). Vehicle barrier and related project features along the international boundary at Organ Pipe Cactus National Monument, Arizona. Eastern portion of project, Gachado to Sierra de Santa Rosa. (Kilometer measurements begin at Sierra de Santa Rosa.)

Construction Methods:

The barrier will consist of a horizontal railroad rail cross piece set 3 feet (0.9 m) high, welded to uprights every 5 feet (1.52 m). The uprights will be built of railroad rail and/or concrete-filled steel posts (See Appendix 1). Contrary to the design presented in Appendix 1, the uprights will not be anchored in a concrete-filled trench. The uprights will be anchored in holes drilled to 5 ft (1.52 m) depth, then filled with 3 ft (0.91 m) of concrete. The remaining 2 ft (0.6 m) of depth will be backfilled with the excavated soil and gravel. Uprights will alternate between 5 and 6 ft (1.52 – 1.83 m) above ground.

In some areas, the existing barbed-wire boundary fence will be left in place, approximately 1-2 ft (0.3 - 0.6 m) south of the new vehicle barrier. In other areas, the existing barbed-wire boundary fence will be removed. In those areas where livestock are present in adjacent Mexico, one strand of barbed wire will be placed above the horizontal member of the vehicle barrier, and one strand of smooth wire will be placed no less than 18" (46 cm) above ground, below the horizontal member. At this time, it has not been determined where the existing barbed-wire fence will be retained or removed.

Where terrain or subsurface conditions make it difficult or impossible to drill holes for the post uprights, a steel-girder barrier without a foundation ("Normandy barrier") will be placed on the ground surface. These barriers will be used on the steep slopes of the Sierra de Santa Rosa, and "Monument Hill" just west of Lukeville in the Sonoyta Mts. A Normandy Barrier will also be placed across the drainage at the north end of "Monument Hill," to prevent further use of this route for illegal traffic.

For most of its length, the vehicle barrier will be constructed approximately three feet (0.9 m) north of the international border. For a length of 0.75 to 1.0 mile (0.9 to 1.2 km) just east of Gray Ranch (aka Dos Lomitas or Blankenship Ranch), the barrier will be constructed 10 to 15 feet (3.3 to 4.6 m) north of the boundary (Figure 5, approx Km 8.5E to east end of "Proposed Access Road" at Gray Ranch). This will be done because the parallel border road in Mexico is severely entrenched, lower than the surface on the U.S. side. The construction will be moved north to avoid bank erosion. Also, the barrier will divert approximately 10 feet to the north of the boundary survey obelisks, to avoid impacts on these historical features.

Staging, materials storage, and vehicle turn-arounds will take place at various locations (Figure 5). Some off-site material storage will take place at locations such as the U.S. Border Patrol station in Why.

The vehicle barrier will be similar in appearance to the one pictured in Figure 6. Differences will be that the ORPI vehicle barrier will be constructed of railroad rail, not the steel girders pictured on this barrier near Naco, Arizona. Also, the horizontal member of the ORPI barrier will be set at 3 ft (0.91 m) above ground, which is higher than pictured here. Finally, all vertical members will extend into the ground.

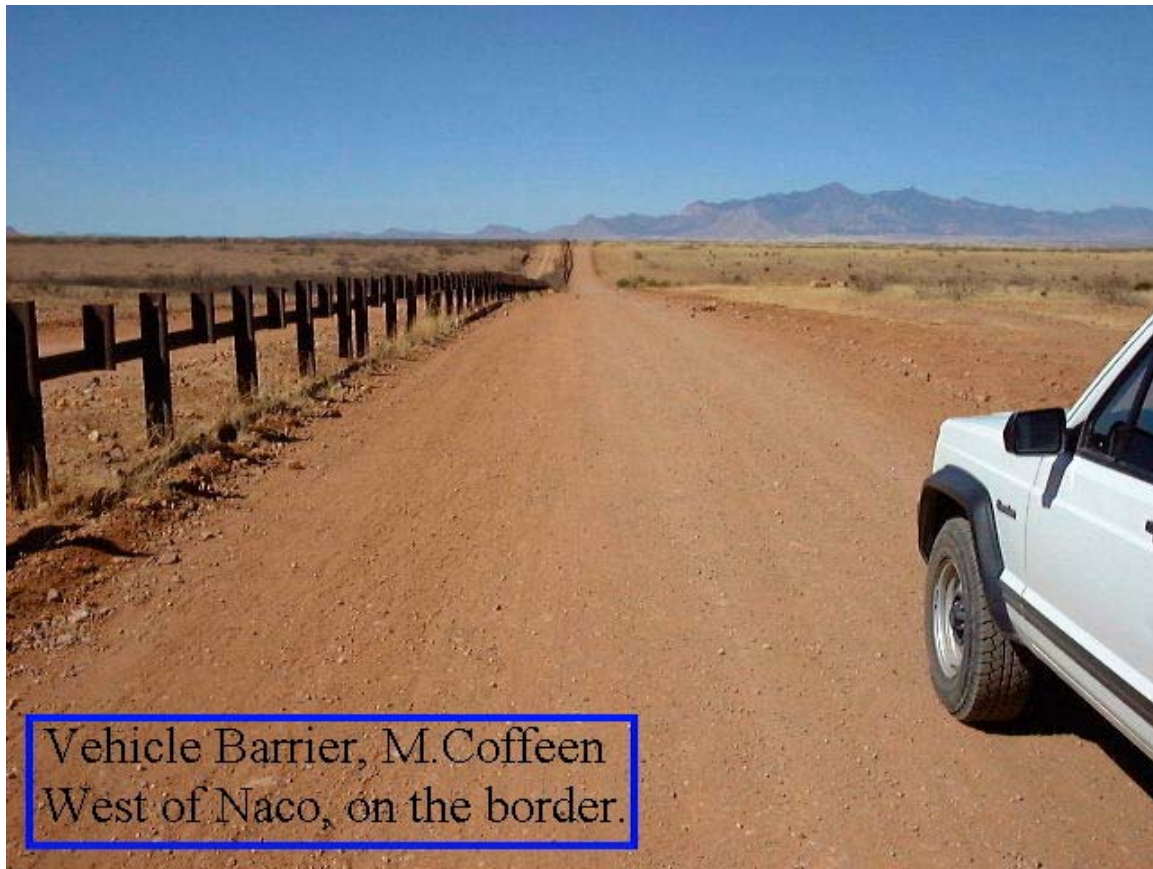


Figure 6. Vehicle barrier at international boundary west of Naco, Arizona. Photograph by M. Coffeen, U.S. Fish and Wildlife Service.

Construction Schedule:

Construction may begin between September and October 2003. Construction would take place over approximately 18 months, in 3 or 4 deployments of Joint Task Force 6 personnel. Estimated cost is \$14,730,000.

- D. Compliance: An environmental assessment has been prepared for this project to comply with requirements of the National Environmental Policy Act.

III. Threatened and Endangered Species Potentially Affected by the Proposed Action

A. Quitobaquito pupfish (*Cyprinodon eremus*) Endangered, Critical Habitat Designated

1. Status

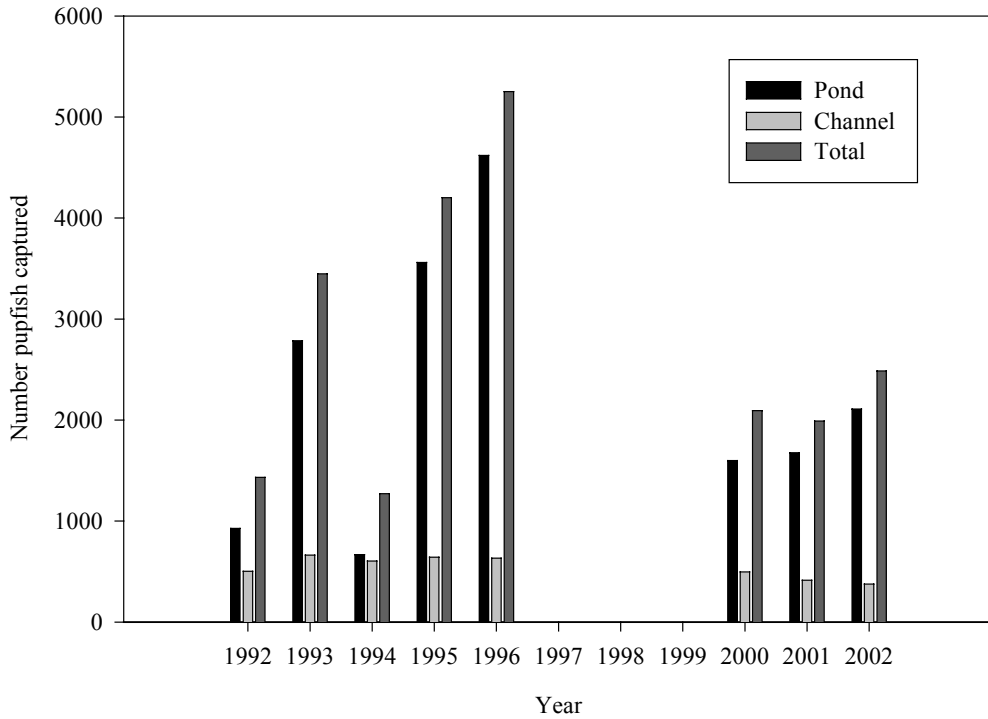
The Quitobaquito pupfish inhabits the springs, stream, and pond at Quitobaquito in the southwestern portion of ORPI, and also occurs in several isolated pools and ephemeral reaches of the Rio Sonoyta in adjacent Mexico. Until 1999, this pupfish was considered an endangered endemic subspecies of the desert pupfish; *Cyprinodon macularius eremus*. In 1999, Echelle et al. (2000) examined mitochondrial DNA of *Cyprinodon macularius*, and found Quitobaquito pupfish significantly distinct to be designated, along with pupfish in the adjacent Rio Sonoyta, as a distinct species, *Cyprinodon eremus*. Quitobaquito is designated critical habitat for the pupfish.

ORPI staff carry out annual monitoring of Quitobaquito pupfish. The results of the census for recent years are presented in Table 3 and Figure 7. Statistical values should be viewed cautiously, as the census is intended as a general index, not a rigorous population sample. With that in mind, captures in 2002 were less than one standard deviation below the mean of captures in 1992-1996 and 2000 – 2001. 2002 captures were approximately half those of 1995 and 1996, but were slightly higher than 2000 and 2001. The 2002 census suggests that the current population is above the low levels reached in 1992 and 1994 (and some years in the 1980s), but not at the high levels of 1995-1996. The apparent population reduction that took place between 1996 and 2000 may or may not be in the range of normal fluctuation. No causative factors were identified. No nonnative fish have been detected in the weekly visual inspections and the periodic trapping sessions specifically targetting non-native fish. None have been documented since 1993, when a catfish (*Ictalurus melas*) was caught and removed from the southwest spring. Based on total pupfish captures and subjective observations of pupfish remaining in the system after sampling, we estimate that Quitobaquito contained at least 3,500 pupfish in September 2002. The apparent population reduction since the mid-1990s causes moderate concern.

	Pond	Channel	Total
1992	929	504	1,433
1993	2,785	663	3,448
1994	668	604	1,272
1995	3,559	642	4,201
1996	4,619	633	5,252
1997-1999 ¹	-	-	-
2000	1,598	496	2,094
2001	1,678	414	1,992
2002	2,109	377	2,486
Mean	2,280.6	541.6	2,772.3
Standard Deviation	1,421.0	109.5	1,406.2
Standard Error	502.4	38.7	597.1
95% Conf	1,188.0	91.5	1,175.7
99% Conf	1,758.4	135.5	1,740.0

¹Pupfish investigations in 1997, 1998, and 1999 used methods that were not comparable to other years.

Figure 7. Captures of Quitobaquito pupfish (*Cyprinodon eremus*), 1992-2002, by standardized trapping effort. Quitobaquito Springs, Organ Pipe Cactus National Monument



2. Potential Impacts of Proposed Action (Preferred Alternative) on Species and Habitat

The potential impacts of the proposed project are discussed briefly below. All potential adverse effects should be avoided or precluded by the precautions and actions discussed below under “Mitigation.” This will result in the project having a net beneficial effect on the pupfish.

Adverse Effects

Hydrological Disturbance

The subsurface aquifer of Aguajita Wash provides water for more than five springs and seeps in the Quitobaquito area, from Aguajita Springs on the southeast to Williams Spring more than 1 ½ miles to the northwest (Carruth 1996). All these springs and the Aguajita aquifer are hydrologically linked. Bedrock is as shallow as 18 inches (45 cm) along the boundary line at Quitobaquito, so holes for most of the vertical supports will be drilled into bedrock. Drilling into the shallow bedrock granite and gneiss in the Aguajita-Quitobaquito area may affect this aquifer, with resulting effects on springflow into Quitobaquito Pond. However, this potential impact may be offset by the concrete that will be placed in drill holes to anchor the vertical supports.

Chemical Contamination

Due to the proximity of the project to Quitobaquito, any spills or leaks of petroleum products, solvents, or other contaminants could pose a threat to the pupfish.

Fire

Construction activities such as rock drilling and welding steel could ignite a wildfire at Quitobaquito. Wildfire in the thickets surrounding Quitobaquito would be difficult to control and could pose a threat to the pupfish. A fire could be likely to carry from the pond up the entire length of the channel. Such a fire could possibly kill significant numbers of pupfish from heat, at least in the shallow channel. Subsequent ash input into the system may further harm the surviving fish.

Beneficial Effects

Prevention of Habitat Impacts

The vehicle barrier will eliminate or reduce the ability of vehicles to cross the international border illegally at Quitobaquito. Without the barrier, a vehicle can potentially drive from Mexico Highway 2 right to the edge of Quitobaquito Pond, and then unload large volumes of contaminants, or non-native fish.

Fire

Constructing the project will result in creating a gap approximately 30 feet wide, in the mesquite tree canopy along the international boundary at Quitobaquito. This gap will serve to some degree as a firebreak. Currently, wildfire could spread from informal campsites and smuggler/UDA staging areas with the mesquite bosque on the Mexican

side, to the bosques and woodlands surrounding Quitobaquito. Such fire could have detrimental effects on pupfish and other natural resources

3. Mitigation

To avoid general impacts, all construction activities, impacts, and equipment will be kept strictly within 30 feet of the international border. This will keep activities approximately 200 feet (61 m) from the southern edge of the pond.

No water will be taken from the Quitobaquito system for any project-related purpose.

To prevent hydrological disturbance, no blasting will take place within 2 miles of Quitobaquito. Prior to drilling holes for upright supports, a geohydrologist familiar with the published research on Quitobaquito geohydrology, will evaluate the project design and methods, to determine whether there is a risk that drilling the project bore holes may affect the subsurface hydrology.

To prevent chemical contamination and miscellaneous anthropogenic impacts, no project staging will take place at Quitobaquito, e.g. no cement mixing, washing or refueling equipment, etc. Also, there will be no storage of materials, vehicles, or fuel within 500 feet (152 m) of Quitobaquito.

Dust abatement measures will be used within 0.5 mile (800 m) of Quitobaquito, using non-toxic, neutral means (e.g. water).

To prevent danger of wildfire, project workers will observe a “no smoking” area within 500 feet (152) of Quitobaquito. A fire suppression crew will be present, fully equipped, during the time that construction passes through the Quitobaquito area. Also, all vegetation that is cut to make room for construction will be removed from the area immediately and in its entirety. It will be salvaged as firewood, taken to the ORPI brush dump, or otherwise removed from the project area.

4. Determination of Effects

May affect: not likely to adversely affect: By observing the precautions described above, all potential adverse impacts on the Quitobaquito pupfish will be avoided

May affect: likely to beneficially affect: Beneficial effects should result from the proposed project. Beneficial effects will be in the form of improving site security, reducing the potential for wildfire to spread from Mexico. It is the judgement of the National Park Service that these beneficial effects will greatly outweigh the potential adverse effects described above (Table 5.).

Critical Habitat: No adverse modification of designated critical habitat will take place.

B. Lesser long-nosed bat (*Leptonycteris curasoae*) Endangered

1. Status

The lesser long-nosed bat (*Leptonycteris curasoae*) is a nectar, pollen, and fruit-eating species that migrates seasonally from Mexico to summer in southern Arizona and southwestern New Mexico. This species was listed as endangered in 1988 (U.S. Fish and Wildlife Service 1988). A recovery plan was finalized in 1997 (USFWS 1997). No critical habitat has been proposed or designated.

Organ Pipe Cactus National Monument contains the largest known maternity colony of *Leptonycteris curasoae* in the United States (USFWS 1997). The colony consists of approximately 16,000 to 25,000 or more adult females by late May and early June (Figure 8); adults and juveniles are present into September (Tibbitts 2002, OPCNM 1996-2002). The colony has been known since approximately 1969 (Pat Brown in litt., Cockrum 1981, 1984). It is located in an abandoned mine tunnel which passes completely through a hill associated with the Ajo Mountains. This colony is located approximately 15 miles from the proposed project area, at its nearest point. The tunnel was excavated sometime in the early 1900s, and mining activity in the area ceased sometime prior to the 1970s. The two openings to the tunnel used by the bats are fenced off as a hazardous mine features, and are posted with bilingual “Danger/Peligro” signs and “Radiation Area” signs. The tunnel is unsafe for human entry. Lesser long-nosed bats are known to forage throughout much of ORPI where flowers and fruit of saguaro, organ pipe, barrel cactus, and agave are available. This species is routinely mist-netted at virtually all general bat monitoring sites (tinajas) in ORPI (Organ Pipe Cactus NM unpubl. data). ORPI staff monitor the maternity colony to determine relative numbers of bats, and to assess the security of the colony from harm.

The Monument has not been well surveyed to determine the number of additional day and night roosts that might exist in natural caves and/or human-made tunnels. However, some additional roosts are known in and adjacent to ORPI. Smaller day roosts are known in other mine tunnels, and are also suspected in other mines and natural rock crevices and caves. Short-term night roosts are known in natural caves, under the eaves of buildings, and inside several abandoned buildings associated with past ranching activities. One larger day roost is known in an abandoned mine adit just outside ORPI, on Cabeza Prieta National Wildlife Refuge (Cockrum 1981, Cockrum and Petryszyn 1991). This colony is comprised of approximately 5,000 bats (C. McCasland, Cabeza Prieta National Wildlife Refuge pers. comm., D. Dalton, unpubl. data). It is likely that there is within- and between-season interchange between these colonies, perhaps even within and between nights (USFWS 1997).

The maternity colony is monitored by ORPI staff, using methods developed and recommended by Dalton and Dalton (1994) and Dr. Yar Petryszyn. An index of the number of bats is derived by making periodic estimates of exit flights, using ambient light, night-vision equipment, and/or a dimmed, constricted headlamp beam. In addition to developing estimates of the *Leptonycteris* colony size, ORPI staff also continually assess the general security of the roost. Tunnel openings are inspected for signs of human activity, as is the general Copper Mountain area. During the months when the bats are not present, the entire length of the tunnel is examined for evidence of human entry or other problems.

It is likely that the Copper Mountain colony has increased substantially in size since the late 1980s and early 1990s. In those years, the colony was estimated at 7,000-12,000 (Cockrum and Petryszyn 1991, U.S. Fish and Wildlife Service 1995). Tibbitts (2002) examined emergence estimates for Copper Mountain from 1989 through 2001, attempting comparisons over the years with differing methodologies in mind. Although comparison was difficult, he found it likely that the colony has increased in size since it was discovered in 1969. Using June estimates as an indication of base colony size, the average June emergence estimate for 1989-1996 was 12,808. The average June estimate for 1997-2001 was approximately 18,933, with recent years (e.g. 2000-2002) approaching 24,000 bats (Tibbitts 2002, Organ Pipe Cactus National Monument 1995 through 2002) (Figure 8).

In summary, the maternity colony of lesser long-nosed bats at Copper Mountain appears to have increased substantially in size in the last 14 years. The species is routinely caught, as one of the more common bats, in the course of ORPI's bat monitoring activities. The species appears to be doing well within ORPI at this time. Potential threats include: smugglers using roost sites as hideouts; loss of foodplants due to habitat destruction caused by off-road driving and construction projects.

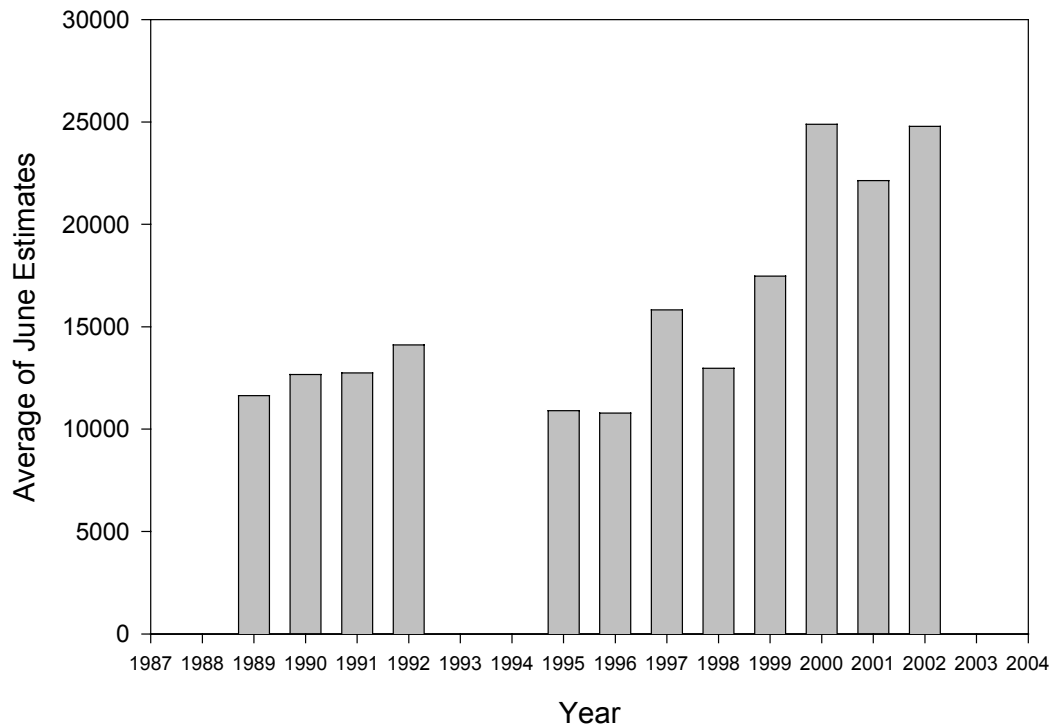


Figure 8. Average of June exit flight counts of *Leptonycteris curasoae* at Copper Mountain, Organ Pipe Cactus National Monument, Arizona. Data for 1989-1992 are from Dalton and Dalton (1994). Data for 1995-2002 are from Organ Pipe Cactus National Monument annual endangered species reports.

2. Potential Impacts of Proposed Action (Preferred Alternative) on Species and Habitat

The proposed project is likely to result in both adverse and beneficial effects on the lesser long-nosed bat.

Adverse Effects

Roost sites

No known or suspected roost sites will be directly or indirectly impacted by the proposed action. At its closest point, the proposed action area is approximately 15 miles (24 km) from the known maternity colony, and will have no direct or indirect effects on that colony site. The proposed action will not directly impact any potential roosting habitat.

Foraging habitat:

The proposed project will result in destruction of lesser long-nosed bat food plants. Current estimates are that the proposed project would impact approximately 70 acres (28.3 ha) over and above the existing roadway area. Using the current estimate for the area impacted by the proposed project, ORPI staff surveyed the area within 30 feet (9.15 m) of the current boundary fence for saguaro and organ pipe cactus, and also the wider staging and turn-around areas. For the 30-ft (9.15 m) primary project corridor, this survey was conducted as a one-time drive-through survey, traveling an average of approximately 5 mph (8 kph) along the existing fenceline/boundary road. Staging and turn-around areas were designed and located to avoid saguaro and organ pipe to the greatest extent possible, and were surveyed on foot to count those that could not be avoided. All saguaro and organ pipe cactus that could be seen were counted. The cacti counted were classified only as “small/salvageable” (<1m for saguaros, <1m and <4 stems for organ pipe) and “large” (everything larger). For the driving survey of the primary project corridor, several 100 m (328 ft) stretches were also counted in walking surveys, to calibrate effectiveness of the driving survey. These “calibration” re-surveys indicated that cactus up to nearly 0.5m (1.64 ft) tall could be missed during the driving survey. Taking into consideration that potential under-count, and the probability that many if not most cactus smaller than about 8” (20 cm) tall were also missed, we estimate that up to approximately 750 to 1000 saguaro cactus, and 80 to 100 organ pipe will be destroyed. This estimate does not include the number of seedling (e.g. <2 in or <5 cm) saguaro and organ pipe cactus that would be destroyed, which could number thousands. Finally, some plants outside the 30-ft (9.15 m) survey strip may also be impacted, as roots and/or rooting areas damaged by the construction affect plant vigor and mortality. The visual drive-through survey counted 588 saguaros and 51 organ pipe cactus within the impact zone. Of these, 1 organ pipe and 13 saguaros were in the staging and turn-around areas. One section of approximately 0.8 km (0.5 mi) was not surveyed, due to suspicious persons hiding beneath a tree along the boundary fence.

Because the removal of the foodplants described above may equate to reduction in food available to the lesser long-nosed bat, it must be considered an impact. However, the significance of this impact is difficult to evaluate when considered in the context of regional food supplies. Of the Monument’s approximately 330,000 acres, almost half (165,000 acres, 66,828 ha) may provide a relatively high density of foodplants for the lesser long-nosed bat. Loss of these 70 acres would constitute loss of very roughly

0.04% of the available foraging habitat in ORPI. It is unknown at this time how much additional loss of foraging habitat is taking place contemporaneously, due to extensive damage by smugglers and illegal immigrants, invasion by non-native plants, disease, or other factors.

The proposed project will result in up to approximately 70 acres (28.5 ha) of newly-disturbed ground, over and above the existing border maintenance road. This newly-disturbed ground will be susceptible to colonization by invasive exotic plants such as buffelgrass (*Pennisetum ciliare*). ORPI has almost eradicated buffelgrass from the Monument, the result of 8 years of an aggressive removal and monitoring program. However, the proposed project would provide an extensive opportunity for renewed invasion. Along much of its length, the construction zone would be immediately adjacent to extensive buffelgrass infestations along Mexico Highway 2, and smaller populations east of Lukeville. If the project disturbance areas are not actively revegetated with native plants, and continuously cleared of colonizing buffelgrass, the proposed project will likely result in widescale re-invasion of buffelgrass into ORPI. Such an invasion would be likely to adversely affect the lesser long-nosed bat, through changes in plant species richness, species and community diversity, structure, and fire frequency.

Other invasive plants also present the potential for increased infestation on the disturbed soils. Tumbleweed (*Salsola tragus*) is spreading into ORPI from Mexican agricultural lands east of Sonoyta-Lukeville, and in combination with buffelgrass, carried at least one recent wildfire in the area. Other problematic invasives along the international boundary include but are not limited to blue panic (*Panicum antidotale*, a Federal Noxious Weed), bermuda grass (*Cynodon dactylon*), and Sahara mustard (*Brassica tournefortii*).

Beneficial Effects

Habitat Restoration and Damage Prevention

The proposed project is likely to facilitate the restoration and recovery of lesser long-nosed bat habitat that has been damaged by illegal off-road driving. Of the illegal roads illustrated in Figure 4, the eastern 2/3 are in desertscrub habitat with abundant forage plants (saguaro and organ pipe cactus). Illegal roads don't often cause immediate mortality of mature individuals of these large plants. However, the illegal roads may damage the shallow root systems of large individuals, causing loss of vigor or death later. Off-road driving routinely results in destruction of numerous small saguaro and organ pipe cactus (e.g. smaller than 2 ft/0.6m), and can be assumed to destroy large numbers of seedlings. The proposed vehicle barrier should eliminate or greatly reduce use of these roads, resulting in the eventual restoration of approximately 98 miles (158 km) of illegal roads in high-quality bat foraging habitat. Assuming an average width of approximately 8 feet, this equates to restoration of approximately 95 acres (38.5 ha). In addition to this habitat restoration, the proposed project will prevent future habitat degradation of this type.

3. Mitigation

No mitigation measures are identified at this time. A vegetation salvage and rehabilitation plan is under development.

4. Determination of Effects

May adversely affect. The proposed project may adversely affect the lesser long-nosed bat, through removal of food plants and facilitating invasion by non-native plants.

May affect: likely to beneficially affect: The proposed project is likely to beneficially affect the lesser long-nosed bat, by preventing or greatly reducing impacts on foodplants caused by illegal off-road driving, and allowing recovery of habitat already impacted. It is the judgement of the National Park Service that these beneficial effects are likely to outweigh the adverse effects described above (Table 5.).

C. Sonoran pronghorn (*Antilocapra americana sonoriensis*) Endangered

1. Status

The Sonoran pronghorn inhabits broad alluvial desert valleys, bajadas, and to a lesser extent foothills areas in southwestern Arizona and northwestern Sonora (Hoffmeister 1986, USFWS 1998). Like other subspecies of the American pronghorn, they prefer open country with expansive views (USFWS 1998). Flat valleys and isolated hills are used more than other topographic features such as mountain slopes (AGFD 1985). The Sonoran pronghorn is found in the Lower Colorado River Valley and Arizona Uplands subdivisions of Sonoran Desertscrub (Brown 1982). The Sonoran pronghorn tends to inhabit relatively open expressions of these associations. However, seasonal shifts in habitat use take place. In general, Sonoran pronghorn tend to occupy valley floor areas in winter (Lower Colorado River Valley subdivision), then move upslope (and southeastward) onto bajadas in spring and summer, into Arizona Uplands subdivision habitats (Wright and deVos 1986, Hervert et al. 1996). The valley floors used in winter tend to be open habitats of creosote-bursage associations with some perennial grasses, and some winter annual plants providing additional forage. Trees such as paloverde (*Parkinsonia* spp.), ironwood (*Olneya tesota*) and mesquite (*Prosopis* sp.) are present primarily along dry watercourses, and are used for thermal cover. As the annual spring dry season progresses, pronghorn move eastward and upslope into the comparatively more dense and diverse Arizona Uplands association. It is likely that by making this seasonal movement, pronghorn may be able to access more forage plants that have substantial water content, and also escape a few degrees of heat by gaining altitude and greater access to thermal cover. However, pronghorn may be more vulnerable to predators in this more complex, densely vegetated summer habitat.

The Sonoran pronghorn range is functionally divided into two, possibly three subpopulations, by a combination of busy roadways and fences. The United States population is separated from the Mexico population by Mexico Highway 2 and the International Boundary fence. The Mexican population is likely to be further subdivided, by Highway 8, which connects the border city of Sonoyta, Sonora, with the coastal city of Puerto Penasco, Sonora. Available literature indicates that as Highway 8 has become improved and much busier in the 1990s, and being fenced for part of its length, it is now

likely to prevent movement between pronghorn in the Pinacate region and those on the coastal plain east and south of Highway 8 and Puerto Penasco (Ockenfels et al. 1994, Ockenfels et al. 1997, USFWS 1998, Bright and van Riper III 2000, J. Hervert, AGFD, and C. Castillo, El Pinacate Biosphere Reserve, pers. comm.).

The pronghorn's current range in the United States is the area bounded on the north by Interstate 8, on the east by Highway 85, on the south by the International Boundary/Highway 2, and on the west approximately by the Tule Desert west of the Cabeza Prieta Mountains. In the United States, Sonoran pronghorn apparently no longer (or very rarely) occur east of Highway 85. In the last 30 years, pronghorn are known to have crossed to the east of Highway 85 only three times. A male was found dead near the Ajo Mountain Loop Drive in 1972. In June 1996 a single female was observed crossing east to west, approximately 12 miles north of Ajo on the Barry M. Goldwater Range (USFWS 1998). And in the extreme drought summer of 2002, two radiocollared pronghorn crossed Highway 85 in Organ Pipe (Arizona Game and Fish Department unpubl. data, T. Tibbitts and B. Barns pers. obs.). Although observations along State Route 85 have been limited in past decades, pronghorn were supposedly not uncommon along the highway and throughout the Sonoyta Valley as recently as the 1960s (H. Coss, NPS Retired, pers. comm.). Long-time Ajo residents reported seeing more Sonoran pronghorn along the highway near Ajo and south in the Valley of the Ajo in previous decades (USFWS 1998). A recent remote-sensing habitat analysis indicated that suitable pronghorn habitat does exist east of Highway 85 in Organ Pipe Cactus (Marsh et al. 1999).

Organ Pipe Cactus National Monument is within the current and historic range of the Sonoran pronghorn. Pronghorn are present in the Monument year-round, but there is likely an increase in numbers in summer, when pronghorn from areas to the north and west move into Organ Pipe. Thus the monument serves as crucial habitat for pronghorn to survive the spring-summer stresses of extreme heat and aridity. For example, in the summers of 1996 and 1997, up to 70% of the radiocollared subset of the population was in the Monument (AGFD unpubl. data). While historically pronghorn probably ranged throughout suitable habitat west of the Ajo Mountains, in contemporary times they are found only west of Highway 85 in the Monument. All valley floors, bajadas, smaller hills, and foothills areas west of Highway 85 are potentially occupied by pronghorn. Based on radiotelemetry data and incidental visual sightings, pronghorn most commonly occur in the Valley of the Ajo, the Puerto Blanco Mountains' foothills, Acuna Valley, Bates Mountains' foothills, Growler Valley and San Cristobal Wash. Sonoran pronghorn are known to occur in the project area (AGFD radiotelemetry data, Organ Pipe Cactus NM file records).

Monitoring of the status and movements of Sonoran pronghorn in Organ Pipe Cactus NM is done primarily by the Arizona Game and Fish Department. The AGFD provides weekly data updates on locations of radio-collared animals. In addition, Monument staff record all casual observations. These data are of great value in managing for Sonoran pronghorn. However, due to the rarity of sightings, and the subspecies' widely nomadic nature, these location data are not taken to represent the sole pronghorn presence in the Monument at a given time. The Monument operates under the premise, indicated by the accumulated radiotelemetry and casual observations of many years, that Sonoran pronghorn occupy all suitable habitat west of Highway 85,

throughout the year, and occasionally occur east of Highway 85, most likely during dry summers.

In 1998, the U.S. pronghorn population was estimated at approximately 142 animals, based on a biennial aerial survey (Bright et al. 1999). The survey of December 2000 resulted in an estimate of 99 animals (Arizona Game and Fish Department unpublished data). Fawn recruitment in 2001 was favorable, allowing optimistic speculation that the population may have increased to as many as 140 animals (AGFD and USFWS in litt.). However, the extremely dry conditions from mid-2001 through 2002 likely caused substantial mortality of adults, 2001 juveniles, and 2002 fawns. The December 2002 aerial survey resulted in an estimate for the U.S. population of just 33 animals (J. Morgart and J. Bright, in litt.) The current dry conditions, coupled with an already critically low population level, place the U.S. population of Sonoran pronghorn in extreme jeopardy.

2. Potential Impacts of Proposed Action (Preferred Alternative) on Species and Habitat

The proposed project would affect Sonoran pronghorn in several ways. Potential effects would be both beneficial and adverse.

Adverse Effects

Direct Impacts on Habitat

Current estimates are that the proposed project would result in a net increase in impacted land of approximately 70 acres (28.5 ha), almost half of which is east of Highway 85. All acreage to be impacted is immediately adjacent to the international border. Radiotelemetry data gathered by AGFD, and biennial Sonoran pronghorn surveys, indicate this area is seldom used by Sonoran pronghorn. Approximately half of the project length is immediately adjacent to Mexican Highway 2, a busy highway that pronghorn are unlikely to approach. Therefore the area to be impacted by this project is very unlikely to be used by Sonoran pronghorn as habitat. Furthermore, this acreage appears very small in the context of the approximately 2 million acres (809,814 ha) of potentially suitable habitat available to the U.S. population of Sonoran pronghorn. However, when the impacts of this and the many other small-acreage impacts are considered together, the cumulative impacts probably constitute adverse impacts on the Sonoran pronghorn (NPS 2001).

Movement Barrier

The proposed project directly overlays an existing barrier to Sonoran pronghorn movement. Currently, pronghorn appear not to cross the international boundary. This is believed to be due to the combined barrier effects of: (1) the international-boundary livestock fence; (2) Mexican Highway 2; (3) Right-of-way fencing and livestock fencing that is intermittent along Highway 2 between Sonoyta and San Luis; (4) Human settlements and activity concentrations, which are expanding linearly along the boundary, both east and west of Sonoyta. The proposed vehicle barrier will replace the livestock fence in some areas, while in others the existing livestock fence will remain, several feet south of the vehicle barrier. At this time, it has not been determined in which areas the livestock fencing will remain. The horizontal member of the vehicle barrier would be set at 36" (91 cm). The recommended height of the lower strand of wire for a pronghorn-

passable fence is 18" to 20" (45 to 48 cm). Although the horizontal member of the barrier fence will be railroad rail, much heavier than fence wire, it is believed that by being 16" (40 cm) higher than the recommended height for a pronghorn fence the vehicle barrier will be less of a physical barrier than a pronghorn-friendly wire fence. This would appear to be a moot question however, considering the strong evidence that the international border is already a barrier to pronghorn movement.

In some areas, the vehicle barrier may be used to anchor wire fencing to exclude livestock. In these areas, the only wire below the horizontal railroad rail would be a smooth wire, set no less than 18 in (45 cm) above ground.

Disturbance

Construction activity should not be a source of disturbance for Sonoran pronghorn. Where the project takes place east of Highway 85, it is highly unlikely that Sonoran pronghorn will be in the project vicinity at all, either in the U.S. or Mexico. West of Highway 85, project construction will take place an average of approximately 100 m (328 ft) north of Mexico Highway 2. This highway and associated truck stops, military checkpoints, residences, and other businesses already constitute a 24-hour, noisy, busy region of human activity. While construction will increase this activity level by a small increment, it seems clear that the question of disturbance of pronghorn in the international border/project area is a moot point, much like the question of movement barriers. The effect already exists, at a scale greater than the proposed project, and due to forces that are not under the control of the NPS.

Habitat Degradation

The proposed project will result in up to approximately 70 acres (28.5 ha) of newly-disturbed ground, over and above the existing border maintenance road. This newly-disturbed ground will be susceptible to colonization by invasive exotic plants such as buffelgrass (*Pennisetum ciliare*). ORPI has almost eradicated buffelgrass from the Monument, the result of 8 years of an aggressive removal and monitoring program. However, the proposed project would provide an extensive opportunity for renewed invasion. Along much of its length, the construction zone would be immediately adjacent to extensive buffelgrass infestations along Mexico Highway 2, and smaller populations east of Lukeville. If the project disturbance areas are not actively revegetated with native plants, and continuously cleared of colonizing buffelgrass, the proposed project will likely result in widescale re-invasion of buffelgrass into ORPI. Such an invasion would be likely to adversely affect the Sonoran pronghorn, through changes in plant species richness, species and community diversity, structure, and fire frequency, and animal community structure.

Other invasive plants also present the potential for increased infestation on the disturbed soils. Tumbleweed (*Salsola tragus*) is spreading into ORPI from Mexican agricultural lands east of Sonoyta-Lukeville, and in combination with buffelgrass, carried at least one recent wildfire in the area. Other problematic invasives along the international boundary include but are not limited to blue panic (*Panicum antidotale*, a Federal Noxious Weed), bermuda grass (*Cynodon dactylon*), and Sahara mustard (*Brassica tournefortii*).

Beneficial Effects

Habitat Restoration and Damage Prevention

The proposed project is likely to facilitate the restoration and recovery of habitat that has been damaged by illegal off-road driving. Of the illegal roads illustrated in Figure 4, the great majority are west of Highway 85 in Sonoran pronghorn habitat. The proposed vehicle barrier should eliminate or greatly reduce use of these roads, resulting in the eventual restoration of approximately 132 miles (213 km) of illegal roads. Assuming an average width of approximately 8 feet, this equates to restoration of approximately 128 acres (51.8 ha). In addition to this habitat restoration, the proposed project will prevent future habitat degradation of this type.

Disturbance Prevention

As noted above, up to 500 or more people per day and 700,000 pounds of drugs entered the United States illegally through ORPI in FY2000. In 2001 and 2002, it was estimated that as many as 1000 people moved through ORPI's backcountry illegally in some 24-hour periods during the peak months. As illustrated in Figure 4, many of the travel routes for this influx traverse Sonoran pronghorn habitat. The peak period for much of this travel are February-May, the fawning season, when pronghorn are moving eastward toward and into ORPI. While the vehicle barrier may not substantially reduce illegal foot traffic, it will reduce or eliminate illegal vehicular traffic at this sensitive time of year. Therefore the proposed project should substantially reduce disturbance of Sonoran pronghorn.

3. Mitigation

No mitigation measures are identified at this time. A vegetation salvage and rehabilitation plan is under development.

4. Determination of Effects

May affect, not likely to adversely affect. The proposed project may affect, but is not likely to adversely affect the Sonoran pronghorn, by changing the degree to which the international border is a barrier to pronghorn movements. In some areas, the border may be more passable to pronghorn because the proposed vehicle barrier should be more passable than the previous barbed-wire fence. In other areas, where the vehicle barrier is constructed and the barbed wire fence remains, the barrier effect may be increased. In both situations, actual change in pronghorn movements are not likely, due to the overriding barrier effects of Mexico Highway 2, associated right-of-way fencing, and human developments and activity along Highway 2.

May affect, likely to beneficially affect: The proposed project is likely to beneficially affect the Sonoran pronghorn through reducing disturbance and habitat degradation. This beneficial effect would be achieved by substantially reducing the volume of illegal cross-country vehicle traffic that is currently rampant through much of ORPI. It is the judgement of the National Park Service that these beneficial effects will greatly outweigh the potential adverse effects described above (Table 5.).

D. Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) Endangered, with Proposed Critical Habitat

1. Status

The cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) is a rare permanent resident in ORPI. Through limited surveys, we have located and monitored approximately 3 to 7 territories annually since 1995 (Organ Pipe Cactus NM 1995 through 2002; also Tibbitts in prep.). Surveys were performed according to the protocol developed jointly by the U.S. Fish and Wildlife Service and Arizona Game and Fish Department (AGFD and USFWS 2000). Surveys have focussed on previously occupied sites and environmental compliance surveys for planned development projects. Additionally, as time permitted surveys were carried out in previously unsurveyed areas of high habitat quality.

An analysis of data through 1998 found that 53% of owl locations were in middle- and upper-bajada Arizona Uplands desertscrub, while 37% were associated with xeroriparian habitats (Tibbitts and Dickson 1998). The remaining 10% were associated with foothills or lower bajada areas. Surveys since that analysis have located additional occupied areas, which generally confirm a preference for middle- and upper-bajada desertscrub and/or xeroriparian associations. Tibbitts and Dickson (1998) estimated that approximately 50% (167,000 acres) of the Monument may be suitable pygmy-owl habitat. Subsequent evaluation indicates that this suitability varies substantially in quality.

The status of the pygmy-owl in ORPI is unclear. Several territories in high-quality habitat are occupied almost every year (e.g. Kuakatch sites, Growler). Other sites of moderate quality are occupied more erratically (e.g. Armenta area). Several locations where pygmy-owls were routinely observed historically have not been re-occupied for a number of years (Residence/HQ area, Alamo). In 2002, the continuing drought may have affected pygmy-owl nesting, as birds located in late winter were generally undetectable by mid-spring (OPCNM 2000, 2001, 2002). In recent years, two to three known pygmy-owl territories ("Boundary Bird," "Armenta Southeast" and "Growler") are known to have suffered habitat impacts, and suspected to have suffered disturbance, due to illegal off-road driving by smugglers and illegal immigrants.

The project area has not been surveyed for pygmy-owls, with two exceptions. An area of high habitat quality approximately two miles west of the Sonoyta Mountains, and north of the South Puerto Blanco Drive, was surveyed in 1998. No pygmy-owls were detected. Also, ORPI files contain a single record of a pygmy-owl at Quitobaquito in 1964. Pygmy-owls have not been detected in recent years at Quitobaquito, in the course of surveys and general avian studies.

The proposed project area and adjacent landscapes contain some suitable habitat for pygmy-owls. Approximately the eastern 14.13 miles (22.87 km) of the project were proposed as critical habitat for the pygmy-owl on November 27, 2002 (USFWS 2002). Within that proposed critical habitat, and along the entire 30-mile (48.4 km) length of the project, habitat for pygmy-owls varies from suitable to unsuitable. Expressed in terms of

the definition of “critical habitat,” within the proposed critical habitat, and along the entire 30-mile (48.4 km) length of the project, the “primary constituent elements” of pygmy-owl habitat alternate between present to absent. Habitat along the project area ranges from steep rocky slopes (unsuitable habitat), across upper, middle, and lower bajada settings (habitat of varying suitability), and traverses valley floor areas (generally unsuitable). The project also would pass through areas heavily impacted by past agriculture, current agriculture (in Mexico), urban development, and illicit cross-border traffic. These areas are largely unsuitable as pygmy-owl habitat.

ORPI staff carried out an assessment of pygmy-owl habitat along the entire project length, not just the proposed critical habitat section. The results of that assessment are presented in Table 4. This habitat assessment proceeds from east to west, from the western slope of the Sierra de Santa Rosa to the southwestern corner of ORPI. The habitat assessment was based on the experiences of ORPI staff with occupied and unoccupied habitat in ORPI and other areas of southern Arizona, and with the habitat descriptions provided in the critical habitat proposal (USFWS 2002). Areas were considered to be of “High” quality if they had, within the disturbance corridor and in general surroundings, relatively high densities of Sonoran Desertscrub trees (e.g. mesquite, ironwood, paloverde, acacia), with many trees of fairly large stature, a fairly complex shrub layer, mixed cactus, and at least some saguaro cactus present. Areas were considered to be of “Moderate” quality if they supported typical middle bajada desertscrub of moderate density, with associations including trees (e.g. mesquite, ironwood, paloverde, acacia), shrubs (e.g. creosotebush, bursage, mixed cactus, ocotillo) with saguaro cactus present. Areas were considered to be of “Low” quality, and lacking the “primary constituent elements” of habitat (USFWS 2002), if they supported typical lower bajada desertscrub with an open character, low plant species diversity (e.g. creosote flats, saltbush flats), desertscrub trees present mainly in widely-separated washes, and saguaro cactus uncommon to rare. Areas were considered to be of “Poor” quality, and lacking the “primary constituent elements” of habitat, if they supported open or sparse vegetation as in “Low” quality, but of an even more monotypic, low-stature character, with few or no saguaro cactus or washes present, and/or on steep rocky slopes. Representative photographs of these habitat classifications are presented in Appendix 2.

Table 4. Assessment of pygmy-owl habitat quality, boundary vehicle barrier project, Organ Pipe Cactus National Monument, AZ. Area measurements are for new ground-disturbing impact of main project corridor and staging/turnaround areas.							
Part 1: Sierra de Santa Rosa (Km 0.0 East) westward to east slope of Monument Hill (Km 20.8 East) (See Figure 3 for kilometer reference points). All in proposed critical habitat.							
From:	To:	Total length	Habitat quality and area				Notes
			Poor	Low	Moderate	High	
0.0 km 0.0 mi	1.06 km 0.66 mi	1.06 km 0.66 mi				0.643 ha 1.575 ac	Upper bajada: Dense desertscrub, numerous columnar cacti, trees.
1.06 m 0.66 mi	2.25 km 1.39 mi	1.19 km 0.73 mi				0.734 ha 1.812 ac	Moderate to Low: 2-3 saguaros per acre, mostly creosote on uplands.
2.25 km 1.39 mi	3.91km 2.43 mi	1.66 km 1.04 mi		0.953 ha 2.353 ac			Low to Poor: ≤1 saguaro/acre. Open creosote uplands, few drainages.
3.91 km 2.43 mi	7.06 km 4.38 mi	3.15 km 1.95 mi		1.872 ha 4.622 ac			Low to Mod: Creosote bottomland w/ very few saguaros, some riparia areas w/ mesquite and paloverde
7.06 km 4.38 mi	7.99 km 4.96 mi	0.93 km 0.58 mi		0.561 ha 1.385 ac			Low to Poor: Creosote flat w/ large creosote. No saguaros.
7.99 km 4.96 mi	9.28 km 5.76 mi	1.29 km 0.80 mi				0.851 ha 2.101 ac	Mod to High(?): Bosque of mesquite, Lycium, large creosote, no saguaros
9.28 km 5.76 mi	10.9 km 6.77 mi	1.62 km 1.01 mi		1.111 ha 2.743 ac			Low: Very open scrub of creosote, saltbush, white bursage, few/no saguaros. Impacts of past ranching.
10.9 km 6.77 mi	15.10 km 9.38 mi	4.20 km 2.61 mi	2.610 ha 6.444 ac				Poor to Low: Open saltbush flats, some creosote, saguaros 200-300m apart. Impacts of past ranching, current border crossing.
15.10 km 9.38 mi	18.40 km 11.43 mi	3.30 km 2.05 mi		2.339 ha 5.775 ac			Low to Mod (?): Saltbush flats w/ small riparian stringers. Few saguaros. Last 1km heavily impacted (border crossing) and developed (Lukeville)
18.40 km 11.43 mi	20.8 km 12.85 mi	2.40 km 1.42 mi				1.510 ha 3.728 ac	Mod to Low: Lukeville, mixed desertscrub w/ saltbush, saguaros, some washes. Border-crossing impacts.
Totals:			2.610 ha 6.444 ac	6.836 ha 16.878 ac	3.095 ha 7.641 ac	0.643 ha 1.575 ac	13.184 ha 32.551 ac

Table 4, Continued. Assessment of pygmy-owl habitat quality, boundary vehicle barrier project, Organ Pipe Cactus National Monument, AZ. Area measurements are for new ground-disturbing impact of main project corridor and staging/turnaround areas.

Part 2: West slope of Monument Hill (Km 0.0 West) westward to southwestern corner of OPCNM (See Figure 3 for kilometer reference points). Proposed critical habitat extends from Km 0.0 to approximately Km 2.0. Mexico Highway 2 is 100m south of all reaches beyond Km 2.0.

From:	To:	Total length	Habitat quality and area impacted				Notes
			Poor	Low	Moderate	High	
0.0 km 0.0 mi	2.07 km 1.28 mi	2.07 km 1.28 mi				1.268 ha 3.130 ac	High to Moderate: Arborescent desertscrub, high density of trees and saguaros. <i>End of proposed critical habitat.</i>
2.07 km 1.28 mi	6.50 km 4.03 mi	4.43 km 2.75 mi				2.646 ha 6.532 ac	High to Moderate: Arborescent desertscrub, high density of trees and saguaros, some more open areas. Some border-crossing impacts.
6.50 km 4.03 mi	9.24 km 5.74 mi	2.74 km 1.71 mi				1.567 ha 3.869 ac	Middle bajada desertscrub, some open areas, some more dense. Some border-crossing impacts.
9.24 km 5.74 mi	11.0 km 6.83 mi	1.76 km 1.09 mi				1.058 ha 2.612 ac	Mod to Low: Thinning desertscrub, phasing into open saltbush.
11.0 km 6.83 mi	12.8 km 8.01 mi	1.8 km 1.183 mi	1.850 ha 4.567 ac				Poor to Low: Saltbush-cholla flats, and "Coyote Hill" with steep cholla slopes.
12.80 km 8.01 mi	16.00 km 9.94 mi	3.20 km 1.93 mi				1.785 ha 4.407 ac	Mod to Low: Saltbush desertscrub w/ much ironwood and saguaro. Open saltbush flats, also bottomland thickets.
16.00 km 9.94 mi	16.50 km 10.25 mi	0.50 km 0.31 mi				0.275 ha 0.679 ac	High: Bosque of Aguajita Wash (mesquite, wolfberry, desert caper)
16.50 km 10.25 mi	17.30 km 10.75 mi	0.80 km 0.49 mi		0.510 ha 1.259 ac			Low stature open desertscrub on rocky Quitobaquito Hills
17.30 km 10.75 mi	17.60 km 10.93 mi	0.30 km 0.18 mi				0.165 ha 0.407 ac	High: Bosque at Quitobaquito (muesquite, wolfberry, acacia, paloverde). Border-crossing impacts.
17.60 km 10.93 mi	20.60 km 12.79 mi	3.00 km 1.87 mi		1.870 ha 4.617 ac			Low: Open saltbush flats with chain-fruit cholla.
20.60 km 12.70 mi	21.90 km 13.60 mi	1.30 km 0.90 mi				0.715 ha 1.765 ac	Mod to High(?) Edge of Rio Sonoya bosque: mesquite, large creosote, interspersed w/ cholla, saguaro, saltbush.
21.90 km 13.60 mi	22.70 km 14.10 mi	0.80 km 0.50 mi		0.500 ha 1.234 ac			Low to Poor: Sparse desertscrub on rocky hills (Cerro Blanco).
22.70 km 14.10 mi	23.70 km 14.72 mi	1.00 km 0.621 mi		0.62 ha 1.530 ac			Low: Open sparse desertscrub.
Totals:			1.850 ha 4.567 ac	3.500 ha 8.642 ac	4.410 ha 10.888 ac	5.069 ha 12.515 ac	14.829 ha 36.612 ac

2. Potential Impacts of Proposed Action (Preferred Alternative) on Species and Habitat

The proposed project will result in both adverse and beneficial effects on the cactus ferruginous pygmy-owl.

Adverse Effects

Adverse Modification of Habitat

The proposed project will result in adverse modification of proposed critical habitat for the pygmy-owl, and will also result in impacts on suitable pygmy-owl habitat that has not been proposed as critical habitat. The maximum acreages of habitat that would be impacted by the proposed project are presented by habitat quality, in the "Totals" lines at the end of Table 4, Parts 1 and 2. All areas in Part 1 are in proposed

critical habitat. In Part 2, only the areas listed for km 0.0 to 2.07 (mile 0.0 to 1.28) would be in proposed critical habitat. In summary, the proposed project would impact approximately 35.67 acres (14.45 ha) of proposed critical habitat. Of those, 12.346 acres (5 ha) were ranked as suitable (“high” or “moderate” quality), and 23.322 acres (9.45 ha) ranked as unsuitable (“low” or “poor” quality). Viewed as a whole, the proposed project would impact 32.619 acres (13.21 ha) of suitable pygmy-owl habitat (“high” and “moderate” quality), not all of which are proposed as critical habitat. The project would impact 36.531 acres (14.795 ha) of unsuitable habitat (“low” and “poor” quality), some of which are proposed as critical habitat.

The proposed project will result in up to approximately 70 acres (28.5 ha) of newly-disturbed ground, over and above the existing border maintenance road. This newly-disturbed ground will be susceptible to colonization by invasive exotic plants such as buffelgrass (*Pennisetum ciliare*). ORPI has almost eradicated buffelgrass from the Monument, the result of 8 years of an aggressive removal and monitoring program. However, the proposed project would provide an extensive opportunity for renewed invasion. Along much of its length, the construction zone would be immediately adjacent to extensive buffelgrass infestations along Mexico Highway 2, and smaller populations east of Lukeville. If the project disturbance areas are not actively revegetated with native plants, and continuously cleared of colonizing buffelgrass, the proposed project will likely result in widescale re-invasion of buffelgrass into ORPI. Such an invasion would be likely to adversely affect the cactus ferruginous pygmy-owl, through changes in plant species richness, species and community diversity, structure, and fire frequency, and animal community structure.

Other invasive plants also present the potential for increased infestation on the disturbed soils. Tumbleweed (*Salsola tragus*) is spreading into ORPI from Mexican agricultural lands east of Sonoyta-Lukeville, and in combination with buffelgrass, carried at least one recent wildfire in the area. Other problematic invasives along the international boundary include but are not limited to blue panic (*Panicum antidotale*, a Federal Noxious Weed), bermuda grass (*Cynodon dactylon*), and Sahara mustard (*Brassica tournefortii*).

Beneficial Effects

Habitat Restoration and Damage Prevention

The proposed project is likely to facilitate the restoration and recovery of pygmy-owl habitat that has been damaged by illegal off-road driving. Of the illegal roads illustrated in Figure 4, approximately 75% are within proposed critical habitat. Although not all this area is truly suitable pygmy-owl habitat, it should be noted that the proposed project would therefore allow restoration to begin on 111 miles (179 km) of illegal roads. Assuming an average width of approximately 8 feet, this equates to restoration of approximately 107.6 acres (43.5 ha) of proposed pygmy-owl critical habitat.

Of the illegal roads illustrated in Figure 4, the majority are in more open desertscrub habitat than is typical for pygmy-owls (even though they are in proposed critical habitat). However, some of the illegal roads in Figure 4 pass through suitable pygmy-owl habitat, and even through pygmy-owl territories. The proposed vehicle barrier should eliminate or greatly reduce use of these roads, resulting in the eventual

restoration of approximately 47 miles (75.8 km) of illegal roads in suitable habitat. Assuming an average width of approximately 8 feet, this equates to restoration of approximately 45.6 acres (18.5 ha) of suitable pygmy-owl habitat. In addition to this habitat restoration, the proposed project will prevent future habitat degradation of this type.

(Note: Some of the roads discussed above are those in the northeastern corner of ORPI, pictured in Figure 4. Although these roads originate locally from Highway 85, not the border, use of these roads should be eliminated or reduced by the vehicle barrier. These roads are typically established and used by people who have crossed the border illegally, then drive north on Highway 85, but then drive cross-country to circumvent the Border Patrol checkpoint just north of ORPI.)

Disturbance Prevention

As noted above, up to 500 people per day and 700,000 pounds of drugs entered the United States illegally through ORPI in FY2000. In 2001 and 2002, it was estimated that as many as 1000 people moved through ORPI's backcountry illegally in some 24-hour periods during the peak months. The peak period for much of this travel is February-May, the pygmy-owl breeding season. While the vehicle barrier may not substantially reduce illegal foot traffic, it will reduce or eliminate illegal vehicular traffic at this sensitive time of year. Therefore the proposed project should significantly reduce disturbance of the cactus-ferruginous pygmy-owl.

As noted above, several illegal roads traverse known pygmy-owl territories and are suspected to have caused disturbance and habitat degradation. As an example, the "Boundary Bird" territory, in high-quality habitat, was occupied by a pair in 2001 (Figure 9). In late 2001 and 2002, smugglers established roads through the territory. The "Boundary Bird" territory was subsequently unoccupied in 2002.

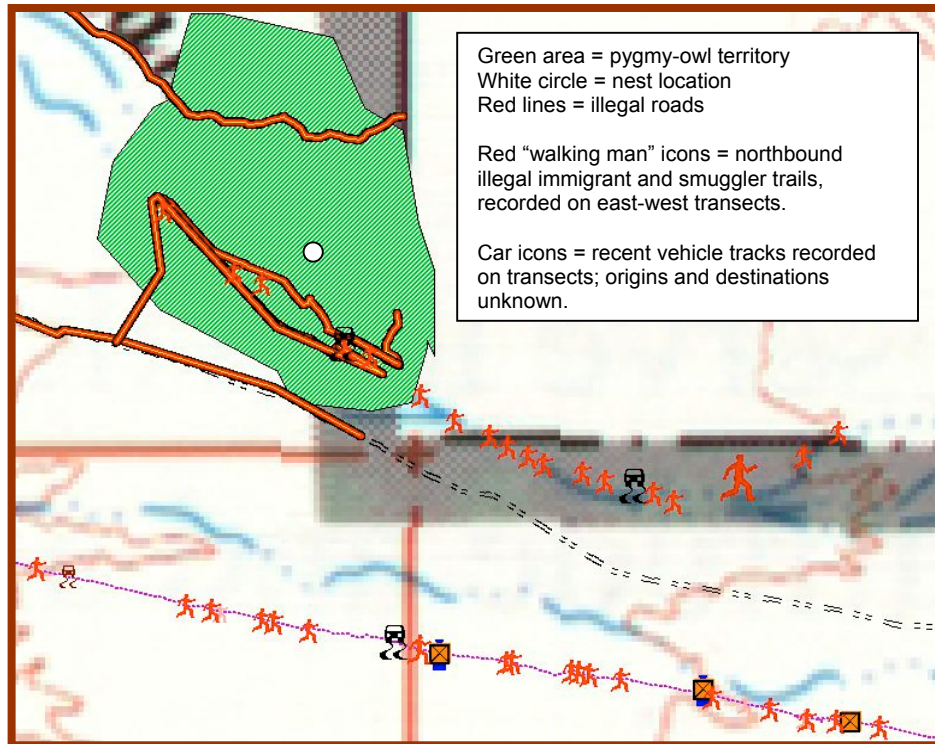


Figure 9. "Boundary Bird" pygmy-owl territory and illegal roads. Territory defined by visual, aural, and radiotelemetry observations. Organ Pipe Cactus National Monument.

3. Mitigation

No mitigation measures are identified at this time. A vegetation salvage and rehabilitation plan is under development.

4. Determination of Effects

May adversely affect. The proposed project may adversely affect the cactus ferruginous pygmy-owl, by destruction of up to 12.23 ha (30.20 ac) of habitat that is of "Moderate" to "High" quality. This habitat is distributed discontinuously along a strip approximately 30 miles (48.4 km) in length. Only two small areas (less than 1 km/ 0.62 mi) of this habitat have been surveyed. No pygmy-owls were detected.

Will adversely modify proposed critical habitat. The proposed project would "adversely modify" up to 12.576 ha (31.058 ac) of proposed pygmy-owl critical habitat. However, by our habitat assessment, only 4.404 ha (10.876 ac) of that area is of "Moderate" to "High" quality, where the primary constituent elements of pygmy-owl critical habitat are present.

May beneficially affect. The proposed project is also likely to beneficially affect the pygmy-owl, by: 1) Preventing or greatly reducing habitat destruction; 2) Preventing or greatly reducing disturbance of resident birds; 3) Allowing restoration to begin, in areas

already impacted by off-road driving. It is the judgement of the National Park Service that these beneficial effects will outweigh the adverse effects described above (Table 5.).

IV. Conclusions - Summary of all Determinations

Please also refer to Table 5, following.

Quitobaquito pupfish:

May affect, not likely to adversely affect.

May affect, likely to beneficially affect.

Will not adversely modify critical habitat.

Lesser long-nosed bat:

May adversely affect.

May affect, likely to beneficially affect.

Sonoran pronghorn:

May affect, not likely to adversely affect.

May affect, likely to beneficially affect.

Cactus ferruginous pygmy-owl:

May adversely affect.

Will adversely modify proposed critical habitat.

May affect, likely to beneficially affect.

Table 5. Summary of adverse and beneficial effects on listed endangered species, resulting from proposed vehicle barrier at Organ Pipe Cactus National Monument.

Species	<i>Adverse Effects</i>		<i>Beneficial Effects</i>	
	Habitat Impacted	Other Adverse Effects	Habitat to be Restored	Other Beneficial Effects
Quitobaquito pupfish	None	None	None	Improved site security
Lesser long-nosed bat	<70 ac (28.5 ha)	Potentially facilitates non-native plants	95 ac (38.5 ha)	Reduced likelihood of roost disturbance Future habitat impacts prevented/reduced
Sonoran pronghorn	<50 ac (20.2 ha)	May reinforce existing movement barrier Potentially facilitates non-native plants	128 ac (51.8 ha)	Reduced likelihood of disturbance Future habitat impacts prevented/reduced
Cactus ferruginous pygmy-owl		Potentially facilitates non-native plants		Reduced likelihood of disturbance
1. Proposed critical habitat	35.7 ac (14.4 ha)		107.6 ac (43.5 ha)	Future habitat impacts prevented/reduced
2. Actual suitable habitat	32.6 ac (13.2 ha)		45.6 ac (18.5 ha)	

V. Literature Cited

- Arizona Game and Fish Department. 1985. Interim Report on the Sonoran Pronghorn antelope (*Antilocapra americana sonoriensis*). October 1983 – March 1985. Phoenix, Arizona. 57 pp.
- Arizona Game and Fish Department and U.S. Fish and Wildlife Service. 2000. Cactus ferruginous pygmy-owl survey protocol. Draft of January 2000. 10 pp.
- Bright, J. L. and C. van Riper III. 2000. Pronghorn home ranges, habitat selection and distribution around water sources in Northern Arizona. USGS Forest and Rangeland Ecosystem Science Center, Colorado Plateau Field Station, Northern Arizona University. Technical Report USGSFRESC/COPL/2000/18. 28pp.
- Bright, J.L., J. Hervert, L. Piest, R. Henry, and M. Brown. 1999. Sonoran pronghorn 1998 aerial survey summary. Technical Report 152. Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix AZ. 9 pp.
- Brown, D. E. 1982. Biotic communities of the American Southwest, United States and Mexico. Desert Plants. 4 pp.
- Carruth, R. 1996. Geohydrology of Quitobaquito Springs, Organ Pipe Cactus National Monument, Arizona. University of Arizona, Tucson.
- Cockrum, E.L. 1981. Bat populations and habitats at the Organ Pipe Cactus National Monument. Technical report No. 7. Cooperative National Park Resources Studies Unit, University of Arizona, Tucson. 31 pp.
- Cockrum, E.L. 1984. Reference manual: Mammals of the Organ Pipe Cactus National Monument. University of Arizona and Southwest Parks and Monuments report, Tucson, Arizona. 209 pp.
- Cockrum, E.L. and Y. Petryszyn. 1991. The long-nosed bat *Leptonycteris*: an endangered species in the southwest? Occ. Pap. Mus. Texas Tech. Univ., 142:1-32.
- Dalton, V.M. and D.C. Dalton. 1994. Census protocol for the long-nosed bat (*Leptonycteris curasoae*) at Copper Mountain Mine. Report submitted to Organ Pipe Cactus National Monument. 20pp.
- Echelle, A.A., R.A. Van Den Bussche, T.P. Malloy, Jr., M.L. Haynie, and C.O. Minckley. 2000. Mitochondrial DNA variation in pupfishes assigned to the species *Cyprinodon macularius* (Atherinomorpha: Cyprinodontidae): Taxonomic implications and conservation genetics. Copeia 2000(2): 353-364.

- Hervert, J. J., R. S. Henry, M. T. Brown, L. A. Piest. 1996. Sonoran pronghorn population monitoring: Progress report. Technical report 110, Nongame and Endangered Wildlife Program, Arizona Game and Fish Department. 5 pp.
- Hoffmeister, D.F. 1986. Mammals of Arizona. The University of Arizona Press. 602pp.
- Marsh, S. E., C. Wallace, and J. Walker. 1999. Evaluation of satellite remote sensing methods for regional inventory and mapping of desert resources. Arizona Remote Sensing Center, Office of Arid Lands, The University of Arizona, Tucson. 27 pp plus tables and figures.
- National Park Service. 2001. Re-analysis of cumulative effects on the Sonoran pronghorn. Supplement to the Environmental Impact Statement for the 1997 General Management Plan/Development Concept Plans for Organ Pipe Cactus National Monument. 155 pp.
- Ockenfels, R. A., A. A. Alexander, C. L. Dorothy Ticer and W. K. Carrel. 1994. Home ranges movement patterns and habitat selection of pronghorn in central Arizona. Arizona Game and Fish Department Technical Report 13. 80 pp.
- Ockenfels, R. A., W. K. Carrel, and C. van Riper III. 1997. Home range and movements of pronghorn in northern Arizona. Biennial Conf. Research on the Colorado Plateau 3:45-61.
- Organ Pipe Cactus National Monument. 1995. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.
- _____. 1996. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.
- _____. 1997. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.
- _____. 1998. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.
- _____. 1999. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.

- _____. 2000a. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.
- _____. 2000b. Twin Peaks Campground Access Road Rehabilitation. Environmental Assessment.
- _____. 2001. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.
- _____. 2002. Threatened, endangered and sensitive species: Annual summary of activities. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.
- Tibbitts, T.J. 2002. Lesser long-nosed bat monitoring at Organ Pipe Cactus National Monument, 1997-2001. National Park Service Report.
- U.S. Fish and Wildlife Service. 2002. Designation of critical habitat for the Arizona distinct population segment of the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) (Proposed Rule). Federal Register 67(229):71032-71064).
- _____. 1988. Determination of endangered status for two long-nosed bats. Federal Register 53(190):38456-38460).
- _____. 1997. Lesser Long-nosed Bat Recovery Plan. U.S. Fish and Wildlife Service Region 2, Albuquerque, New Mexico. 45 pp.
- _____. 1998. Final Revised Sonoran Pronghorn Recovery Plan. Albuquerque, NM. 70 pp.
- Wright, R. L. and J.C. deVos, Jr. 1986. Final report on Sonoran pronghorn status in Arizona. Arizona Game and Fish Department, Phoenix AZ.

VI. Appendices

Appendix 1. Schematic drawings of vehicle barrier fence.

Appendix 2. Representative photographs of habitat evaluations for cactus ferruginous pygmy-owl.

Appendix 2.

Representative photographs of habitat evaluations for cactus ferruginous pygmy-owl.



“Poor” (=unsuitable) habitat. Km 10.7 East, near Border Monument 166. Saltbush- bursage flats with small xeroriparian stringers. Proposed critical habitat. Photograph by T. Tibbitts, NPS.



“Poor” (=unsuitable) habitat. Km 12.6 East. Saltbush flats with small xeroriparian stringers, few isolated saguaro cactus. Proposed critical habitat. Photograph by T. Tibbitts, NPS.

Appendix 2, Continued.

Representative photographs of habitat evaluations for cactus ferruginous pygmy-owl.



“Low” (=unsuitable) habitat quality. Km 16.0 East Saltbush-bursage flats with saguaro cactus present, but trees widely scattered and small in stature. Proposed critical habitat. Note new illegal road on left.



“Low” (=unsuitable) habitat quality. Km 6.83 East Creosotebush-bursage flats, with few saguaro cactus present, trees sparsely distributed. Proposed critical habitat. Photographs by T. Tibbitts, NPS.

Appendix 2, Continued.

Representative photographs of habitat evaluations for cactus ferruginous pygmy-owl.



“Moderate” (=suitable) habitat quality. Km 7.17 West. Sonoran Desertscrub, moderate density and diversity, medium xeroriparian areas present. Not in proposed critical habitat. Photograph by T. Tibbitts, NPS.



“Moderate” (=suitable) habitat quality. Approximately Km 9.02 West, Border Monument #170. Sonoran Desertscrub, moderate density and diversity, medium xeroriparian areas present. Not in proposed critical habitat. Photograph by V. Tippet, NPS.

Appendix 2, Continued.

Representative photographs of habitat evaluations for cactus ferruginous pygmy-owl.



“High” (=suitable) habitat quality. Km 0.44 West, just west of Monument Hill. Sonoran Desertscrub with high tree density/diversity, saguaros present, and diverse shrub layer. Proposed critical habitat.



“High” (=suitable) habitat quality. Km 4.92 West. . Sonoran Desertscrub with high tree density/diversity, saguaros present, and diverse shrub layer. Not proposed critical habitat. Photographs by T. Tibbitts, NPS.