

## CHAPTER 6 CUMULATIVE EFFECTS

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### 6.1 CUMULATIVE EFFECTS METHODOLOGY

Cumulative effects are those additive or interactive effects that would result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7). Interactive effects may be either countervailing—where the net cumulative effect is less than the sum of the individual effects— or synergistic—where the net cumulative effect is greater than the sum of the individual effects. The Council on Environmental Quality handbook for considering cumulative effects advises that focusing the cumulative effects analysis on meaningful cumulative impact issues, rather than on all conceivable impact relationships, is critical to the success of this analysis to support better decisions about the proposed action and alternatives (Council on Environmental Quality 1997). The handbook also advises that cumulative effects need to be analyzed in terms of the specific resources, ecosystem, and human community that may be affected by the proposed action or alternatives. The analysis must consider how cumulative effects may be manifested over short and long time frames and how they may cause meaningful impacts that extend over areas that may exceed political or administrative boundaries. Each affected resource, ecosystem, and human community must be analyzed in terms of its own capacity to accommodate additional effects, based on its own time and space parameters.

This EIS describes proposed and alternative management strategies for each of 17 separate resource management elements for the BMGR designed to protect and conserve its natural and cultural resources and provide for sustainable public access (see Table 3-3). The selected strategies for each of the 17 resource elements comprise the proposed action. In the interest of providing meaningful results, the cumulative effects analysis incorporating these proposed and alternative management strategies for the 17 resource elements was designed in view of the following six parameters:

- The proposed action and alternatives for each resource element are principally programmatic in scope and, with the exception of the alternative management strategies for motorized access, do not describe site specific actions
- Each of these actions, including those that would manage public access and recreation, was designed to be consistent with the military purposes of the BMGR and the goals established for protecting and conserving its resources
- A principal requirement of the INRMP is the implementation of ecosystem management principles to protect and conserve ecosystem components and functions
- The planning time horizon for the INRMP is 25 years, the duration of the BMGR land withdrawal, but the INRMP vision, as expressed through its policy-based goals, is to implement management actions that would support healthy ecosystem functions and protect biodiversity over the expanse of the range for a much longer time span
- with the exception of the alternative management strategies for motorized access, the individual effects of the proposed action and alternatives for each resource element and aggregate effects of the proposed action and alternatives would generally be broad in scope; site specific impacts cannot be predicted

- the aggregate effects of the proposed action and alternatives are beneficial for natural and cultural resources and the protection and conservation of biodiversity within the BMGR and its larger ecosystem

As stated in Section 5.1, cumulative effects analyzed in this chapter should not be confused with aggregate effects analyzed in Chapter 5. Aggregate impacts pertain to the proposed action and alternatives only, while cumulative impacts pertain to the additive or interactive effects that would result from the incremental impact of the proposed action and alternatives when added to other past, present, and reasonably foreseeable future actions.

The following cumulative effects analysis considers impacts that may occur at the individual resource, ecosystem, and human community scales. The six preceding parameters, the programmatic nature of the EIS, and the resulting general degree of specificity with which most of the individual and aggregate effects of the proposed action and alternatives could be predicted indicate that the cumulative impacts that would result from the implementation of the proposed action can only be meaningfully made at an equivalent broad-based level. Meaningful cumulative impacts conclusions can be reached for individual BMGR resources—and for some sensitive resources, such as endangered species, these conclusions will be particularly important—but most of the important cumulative effects results pertain to the ecosystem and human community scales. This perspective is in accordance with the mandates of the MLWA of 1999, Sikes Act, and DoD policy (DoD 4715.3) that specify that the proposed INRMP must provide for the protection of natural and cultural resources and sustainable multipurpose public use of BMGR resources consistent with its military purposes and ecosystem sustainability through a plan that incorporates ecosystem management principles.

The individual resources that may be affected by the proposed action and alternatives have been divided into 20 resource impact assessment categories as described in Chapter 4. Chapter 5 provides the individual and aggregate impact assessments of how the proposed action and each alternative would affect each of these categories of resources. The resource impact assessment categories include:

- earth resources
- water resources
- climate and air resources
- vegetation
- wildlife and wildlife habitat
- protected species
- wildfire management
- grounds maintenance
- public utilities and transportation corridors
- special natural/interest areas
- outdoor recreation
- public health and safety
- law enforcement
- transboundary and domestic perimeter land use
- cultural resources
- visual resources
- hazardous materials and waste
- socioeconomics
- noise
- environmental justice

Consideration of the cumulative effects of the proposed action and alternatives of this EIS at the ecosystem scale is, in turn, dependent on the scale at which the ecosystem within the BMGR is viewed. At the broadest ecosystem assessment scale, the approximately 1.8 million-acre BMGR may be regarded as a component of the 55 million-acre Sonoran Desert ecoregion. As it occurs within the BMGR, this ecoregion can in turn be divided into the Lower Colorado River and

Arizona Uplands subdivisions. At a more refined scale, the 13 natural communities identified by TNC provide the most representative ecosystem-based breakdown, to date, of the native biodiversity that is found within the BMGR and the contiguous Cabeza Prieta NWR (Hall and others 2001). Depending on the context of the resource being assessed, each of these ecosystem assessment scales have roles in considering the cumulative effects of the proposed action and alternatives presented in this EIS.

The concept of resource connectivity is critical to determining the applicability of ecosystem scales to the consideration of cumulative effects. This concept states that in order for there to be an additive or interactive cumulative relationship between activities or resources in one location or time and those at another location or time that can be meaningfully defined there must be a discernible biological, demographic, hydrological, airborne, geological, sociological, or other type of interrelationship or pathway that will propagate the effect. For example, the health and survival of species are dependent not only on the quality and availability of the environment that supports one phase of their life cycle but are also connected to the condition of those environments that support their other life cycle phases. The long-term survival of a species, such as the flat-tailed horned lizard, that does not migrate, may be dependent on connective relationships in other ways. The quality and availability of habitat both inside and outside of the BMGR is critical to the survival of this species and actions that affect the habitat outside of the range is a cumulative impact issue of concern. Another connective relationship in the case of this species is associated with the level of genetic exchange between lizard populations inside and outside of the BMGR and the degree to which physical barriers may disrupt or prevent that exchange. Thus, the ecosystem scales used to assess the cumulative effects of the proposed action and alternatives in this EIS were varied as appropriate to consider the various connective relationships that could propagate those effects.

The human community examined in the consideration of cumulative impacts includes those government agencies involved in the management of the BMGR or that have other activities on the range, members of the public that visit the range for recreational or other purposes, Native American tribes that have a cultural affiliation to the range or an interest in its management, members of the public or non-governmental groups that have interests in the natural and cultural resources of the range, and local communities in the vicinity of the range as described in Section 4.19.

Four steps have been identified for determining the cumulative effects that would result from the implementation of the proposed action and alternatives under consideration in this EIS. These steps include:

1. identify the aggregate effects of the proposed action and the alternatives for each resource impact assessment category considered in Chapter 5
2. identify the additive or interactive effects of other past, present, and reasonably foreseeable future actions on each resource impact assessment category
3. combine the aggregate effects of the proposed action and each alternative with the additive or interactive effects of past, present, and reasonably foreseeable future actions to define the total cumulative effect on each resource that would result from implementing each alternative
4. define the cumulative effects of the proposed action and each alternative—when added together with the effects of other past, present, and reasonably foreseeable future actions—at the ecosystem and human community scales

## **6.2 AGGREGATE EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES**

The aggregate effects of the proposed action and alternatives on individual resources within the BMGR region are identified in Table 6-1. This table summarizes the conclusions reached in the aggregate effects analysis presented in Chapter 5. The determination shown in each cell represents a summation of the aggregate effects of all 17 resource management elements associated with each alternative on each individual resource assessment category. These overall aggregate effects were defined for each assessment category as being adverse, beneficial, or mixed. Adverse and beneficial effects were further defined according to a scale that rated these effects from being slightly adverse or beneficial to being more adverse or beneficial. These ratings were defined for each alternative and resource impact assessment category relative to the existing resource conditions and other alternatives.

## **6.3 EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS**

### **6.3.1 Effects of Past, Present, and Reasonably Foreseeable Future Actions on Individual Resources**

A comprehensive list of past, present, and reasonably foreseeable future actions within the BMGR and its surrounding region was compiled for the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001). This Supplemental EIS was prepared by the Marine Corps to address the cumulative effects on Sonoran pronghorn that would result from proposed actions and alternatives for military training activities and support facilities when combined with other past, present, and reasonably foreseeable future actions. Although the scope of this document was limited to an effects analysis on a single target species, the inventory of past, present, and future actions within the greater BMGR region was extensive and thorough. Nearly all of this inventory continues to be current with applicable updates. The inventory is presented in Table 6-2 for use as a basis for identifying past, present, and reasonably foreseeable future actions that are relevant to this cumulative effects analysis. Additional material on these actions and the adopted methodology is available in the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001). The locations within the BMGR region where the 70 actions described in the inventory occur is shown in Figure 6-1 by either an identification number from Table 6-2 or by general place name references. The additive or interactive effects of these actions are identified in Table 6-3.

### **6.3.2 Effects of Past and Present Actions on the Ecological Landscape and Human Community**

The current status of individual resources, the indigenous ecosystem, and human communities within the BMGR region has been determined, in large part, by the aggregate effects of human activities, principally since the Gadsden Purchase of 1853 transferred the BMGR region from Mexican to American sovereignty. Chief among these activities in shaping the character of the ecological landscape of the BMGR region are economic development, military training, land use designations, and resource conservation actions. Outdoor recreation has more recently joined the list of key activities affecting natural resources within this area. Widespread effects of off-road driving and concentrated foot traffic by drug smugglers and UDAs are the most recent addition

<b>TABLE 6-1 SUMMARY OF AGGREGATE EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES ON INDIVIDUAL RESOURCES</b>						
Resource Impact Assessment Category	Area of Effect	Type of Effect				
		Proposed Action	Alternative Management Strategy A (No-Action)	Alternative Management Strategy B	Alternative Management Strategy C	Alternative Management Strategy D
Earth Resources	RW	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Water Resources	RW	● <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Climate and Air Resources	RW	ME	ME	□ <sub>A</sub>	ME	ME
General Vegetation	>RW	● <sub>B</sub>	ME	ME	● <sub>B</sub>	● <sub>B</sub>
General Wildlife and Wildlife Habitat	>RW	● <sub>B</sub>	ME	ME	● <sub>B</sub>	● <sub>B</sub>
Protected Species	>RW	● <sub>B</sub>	ME	ME	● <sub>B</sub>	● <sub>B</sub>
Wildfire Management	>RW	● <sub>B</sub>	NE	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Grounds Maintenance	<MU	ME	ME	ME	ME	ME
Public Utilities and Transportation Corridors	>RW	□ <sub>A</sub>	□ <sub>A</sub>	□ <sub>A</sub>	□ <sub>A</sub>	□ <sub>A</sub>
Special Management Areas	RW	ME	ME	□ <sub>A</sub>	ME	● <sub>B</sub>
Outdoor Recreation	MU	ME	ME	ME	ME	ME
Public Health and Safety	RW	● <sub>B</sub>	NE	□ <sub>A</sub>	● <sub>B</sub>	● <sub>B</sub>
Law Enforcement	RW	ME	ME	○ <sub>B</sub>	ME	ME
Transboundary and Domestic Perimeter Land Use	>RW	ME	NE	ME	ME	ME
Cultural Resources	RW	● <sub>B</sub>	□ <sub>A</sub>	□ <sub>A</sub>	● <sub>B</sub>	● <sub>B</sub>
Visual Resources	RW	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Hazardous Materials and Waste	RW	ME	NE	□ <sub>A</sub>	ME	○ <sub>B</sub>
Socioeconomics	>RW	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>
Noise	MU	ME	□ <sub>A</sub>	□ <sub>A</sub>	ME	● <sub>B</sub>
Environmental Justice	>RW	NE	NE	NE	NE	NE

Type of Effect: Slightly Beneficial = ○<sub>B</sub>      Beneficial = ●<sub>B</sub>      More Beneficial = ●<sub>B</sub>  
 Slightly Adverse = □<sub>A</sub>      Adverse = ■<sub>A</sub>      More Adverse = ■<sub>A</sub>  
 Mixed Effect (Includes mixed beneficial and adverse effects with no clear beneficial or adverse aggregate effect) = ME  
 No Effect = NE

Area of Effect: Smaller Than Management Unit = <MU      Management Unit = MU      Range Wide = RW      Larger Than Range Wide = >RW

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas	Mexico	
1	Historical mining and ranching activities		✓	✓	✓	✓	✓	✓	Fortuna Mine located in northwest Gila Mts. (1894-1925), Ajo Mine located near Ajo (1850s-1900), Betty Lee mine located near Copper Mts. (1920s-1930s), and 218 mines, prospects, claim groups, and mineral deposits within BMGR and adjacent areas prior to World War II, pre-1941. Cattle grazing located throughout BMGR region from Sand Tank Mts. (most intense) to Lechuguilla Desert (least intense), pre-1941.
2	Phelps Dodge Ajo. Mine	✓					✓		New Cornelia Open Pit (1910-1985).
3	Lower Gila South Resource Management Plan (Goldwater Amendment)		✓	✓					Implemented 1990 and expired November 2001.
4	Lechuguilla-Mohawk HMP			✓					Also includes public lands north and west of BMGR-West, implemented 1995 and expired November 2001.
5	Draft Barry M. Goldwater—East HMP		✓						Also includes Sand Tank Mt. Area, not finalized or implemented.
6	Transportation/utility corridors	✓	✓		✓		✓	✓	Major highways include U.S. 80 (1920s) and Interstate 8 (mid-1970s) from east of Gila Bend to west of Yuma, State Route 85 (1920s) from Gila Bend to Ajo to Mexico, and Highway 2 in Mexico (no date). Railroads include Southern Pacific, from east of Gila Bend to west of Yuma (1870s-present), and Tucson, Cornelia and Gila Bend, from Gila Bend to Ajo (1916 to 1986). Agricultural irrigation canals, along northern BMGR boundary (from 1920s), and utility lines, situated along Interstate 8 and State Route 85, were also developed.
7	Agricultural development	✓					✓	✓	Current croplands are generally interspersed along the lower Gila River and in the Yuma Valley from the 1890s and Mexico south of Organ Pipe NM from the 1970s.
8	Five BLM livestock grazing allotments: Cameron, Childs, Coyote Flat, Sentinel and Why allotments	✓					✓		Sentinel allotment is located south of Interstate 8. Remaining four allotments include all public lands surrounding Why and Ajo, Arizona (1940s-present). Grazing was ended at Cameron Allotment in September 2004 through a BLM buy-out of the allottee's grazing rights and range improvements. Removal of internal fences is in progress and livestock waters will be adapted to wildlife use. Construction of two or more forage enhancement plots for Sonoran pronghorn is pending (January 2005+).
9	Improvements at Childs Mountain	✓				✓			Construction of Air Route Surveillance Radar for FAA and watchable wildlife overlook for Cabeza Prieta NWR (1998-2000).
10	Past designation and military use of BMGR		✓	✓					Use of the BMGR from 1941 through MLWA of 1999, also includes overlying restricted airspace.
11	AGFD management activities		✓	✓	✓	✓	✓		AGFD has been and continues to be responsible for management of wildlife resources within the BMGR since before the range was established in 1941.

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ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas	Mexico	
12	U.S. Border Patrol activities and illegal UDA and drug smuggler entry to the United States		✓	✓	✓	✓	✓		The Border Patrol monitors and interdicts illegal UDA and drug smuggler entries to the United States along the entire Arizona/Mexico border (long standing continuous operation, sharp increase in illegal border crossings began about 1999 and continue in large numbers). Numerous wildcat roads and distinct foot trails in Organ Pipe Cactus NM, Cabeza Prieta NWR, and BMGR have been and continue to be created by border crossers. Numerous broken-down vehicles have been abandoned within these areas by border crossers. Border Patrol mission also includes search and rescue services for stranded migrants and placement and maintenance of radio-powered rescue beacons (14 installed on BMGR and adjacent areas in 2001). Impacts from illegal off-road driving and foot traffic, authorized Border Patrol off-road driving for interdictions and search and rescue, abandoned vehicles and personal belongings, trash, use of wildlife waters, and some damage to BMGR facilities. Illegal traffic also disrupts military training. Interdiction activities and infrastructure are being increased.
13	Past recreation within the BMGR		✓	✓					Hunting, camping, four-wheel driving, hiking, exploring are traditional dispersed recreation occurring as compatible with the military mission. Developed recreational areas located at Baker Tanks and the Gila Bend AFAF. Interpretive facilities are located at El Camino del Diablo and Tinajas Altas Mountains ACEC.
14	Cabeza Prieta NWR/Wilderness and Comprehensive Conservation Plan	✓				✓			Refuge established in 1939, 860,010 acres, 95 percent of refuge designated wilderness (1990), release of the draft plan and EIS is expected Spring-Summer 2005.
15	Organ Pipe Cactus National Monument and General Management Plan/Development Concept Plans	✓			✓				Monument established in 1937, 333,689 acres, 94 percent designated as wilderness (1978). General Management Plan/Development Concept Plans provided programmatic guidance for managing the Monument for the next 10 to 15 years (1997). Plan implementation was suspended in February 2001 pending completion of a Supplemental EIS (SEIS) addressing cumulative impacts on Sonoran pronghorn in accordance with a court order. Monument SEIS was completed in July 2001 and plan implementation resumed in November 2001.
16	Recreation on the BLM Ajo Block	✓					✓		Ongoing recreation activities within BLM lands in the vicinity of Ajo.
17	Marine Corps TACTS Range improvements			✓					Includes 17 threat emitters, some of which are mobile units (1996-1999).

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18	International border vehicle barrier			✓	✓	✓	✓		A physical barrier in Organ Pipe Cactus NM is being constructed along the international border between the U.S. and Mexico to impede/deter entry into the U.S. of UDAs and drug smugglers driving cross-country in vehicles. Plans to extend the barrier along the international border through Cabeza Prieta NWR and BMGR—West to the Colorado River are under development (2004+).
19	Archaeology and other resource survey activities		✓	✓	✓	✓	✓		BMGR—West proposed project surveys from 1970s through present; BMGR—East proposed project surveys from 1970s through present, surface use and special area surveys from mid-1990s through present.
20	Sonoran Pronghorn Recovery Plan		✓	✓	✓	✓	✓	✓	Action applies to entire U.S. Sonoran pronghorn habitat area, first plan published 1982, updated 1998, and a Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan completed January 2002.
21	Biological monitoring in association with tactical ranges		✓						Air Force biologists check daily for the presence of Sonoran pronghorn within North and South TAC range target areas prior to air to ground bombing and strafing missions, training missions are aborted at targets with pronghorn present (1997-present).
22	North American Free Trade Act (NAFTA) related developments	✓	✓	✓	✓		✓	✓	Mostly affects the U.S. Highway 95 and the proposed Yuma ASH corridors, but traffic has also increased on State Route 85. The primary port of entry would occur at San Luis (1995-present).
23	National Guard beddown at the Western Army National Guard Aviation Training Site (WAATS)	✓	✓						Between 32 and 50 Apache helicopters are being added to those stationed at the WAATS in Marana, Arizona. WAATS uses the BMGR to support live-fire weapons training needs. Gila Bend AFAF is used as a forward operating area for aircrew changes and helicopter refueling and rearming (2002).
24	Paving/Repaving of road segment, parking, and pad areas, BMGR—East and Gila Bend AFAF		✓						Ten road paving projects totaling about 8.25 miles within the BMGR and 11 paving projects totaling about 3.5 miles and 1.5 acres of parking areas at Gila Bend AFAF have been approved through an environmental assessment dated 20 September 2000. All of the projects have been completed.
25	Cleanup of inactive Air Force targets		✓						EOD surface clearances and debris cleanups are being considered for 18 inactive target and 3 non-target sites, action pending.

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26	Sonoran pronghorn forage enhancement, artificial waters, and semi-captive breeding	✓	✓	✓		✓	✓		(1) The forage irrigation program is designed to improve the habitat available to free-roaming Sonoran pronghorn in the U.S. population. Program includes developing, operating, maintaining, monitoring, and, as necessary, adapting irrigated forage plots (about five acres) to support natural forage growth to sustain pronghorn during drought. Dual objectives of forage plots are to reduce adult mortalities and to promote sustainable fawn survival and recruitment. Two forage plots, one in the Cabeza Prieta NWR and one in BMGR—East, have been developed and three are under construction. Five forage plots should be operational, if needed, by spring 2005—three in the Cabeza Prieta NWR and two in BMGR—East. Additional plots would be developed in the BLM Ajo Block, Organ Pipe Cactus NM, and BMGR—West as required. (2) Maintaining and expanding a system of artificial waters is intended to support free-roaming Sonoran pronghorn during drought. The current system has six operational waters—five in Cabeza Prieta NWR and one in Organ Pipe Cactus NM. Six waters are planned for construction in 2005; most will be located in the CPNWR. (3) The captive-breeding program, initiated in 2004, is based on an approximately one square kilometer pen located in the Cabeza Prieta NWR. The breeding pen is equipped with a forage enhancement irrigation system, artificial water, predator exclusion fencing, and continuous staffing. Two does from Mexico and four does and one buck from the United States are currently in the pen. If the plan proceeds as envisioned, 10 to 15 fawns will be produced in the pen in 2005. Once the facility's productivity is assured, surplus animals produced will be released to join the free-roaming herd. Periodic exchanges of animals between the U.S. breeding facility and all three Sonoran pronghorn sub-populations is a part of the planned program to insure the genetic diversity of the overall population.
27	Man in the Biosphere Program	✓			✓			✓	Two designated biosphere reserves include the Organ Pipe Cactus NM and the El Pinacate y el Gran Desierto de Altar (1976).
28	Arizona State Parks Arizona Trails 2000 Plan		✓	✓	✓	✓	✓		This statewide plan provides information and recommendations to agencies for their management of motorized and non motorized trails. The plan guides the expenditures from the Arizona Off-highway Vehicle Recreation Fund, Arizona Heritage Fund Trails Component, and Federal Recreational Trails Program (1999).
29	BLM National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands						✓		This national strategy provides guidance and offers recommendations for actions to improve OHV motorized vehicle management on public lands administered by the BLM. Applicable to BLM lands adjacent to the BMGR (2001).

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30	BMGR ICRMP		✓	✓					This rangewide ICRMP describes requirements of the National Historic Preservation Act, as well as those of other heritage preservation statutes, and goals, objectives, and action items for the management of cultural resources on the BMGR (Summer 2002).
31	Proposed Air Force gravel extraction		✓						Ten extraction sites are proposed in the tactical ranges, in or near Manned Ranges 1 and 3, and along the DART Drop Road near Gila Bend AFAF to provide sand and gravel for the construction and maintenance of targets and other facilities within BMGR—East (action pending completion of NEPA process).
32	Flash Burning of military munitions residue	✓	✓						Flash burning of military missions residue is a recently approved process for insuring that demilitarized munitions that had been recovered from BMGR—East tactical and manned ranges are free of ignitable or explosive residues before being released for recycling as scrap metal (see Appendix B). The flashing of the militarized munitions occurs at the four RMCPs within BMGR—East (2000).
33	Rescheduling of South TAC annual EOD clean-up	✓	✓						EOD clearance for South TAC was recently rescheduled from April through June to the fall to avoid potential disturbances of Sonoran pronghorn during the summer heat.
34	Unmanned threat emitters	✓	✓						Includes the proposed installation of four unmanned threat emitters and reconfiguration of 10 target sites (2001).
35	Installing fences and signs on the BMGR	✓	✓						Signs, gates, and fences have been installed at each road entry point into East TAC Range from Management Unit 6 and from the Bender Springs area in Management Unit 7 (Fall 2001).
36	Reduced 5-year EOD clearance requirements		✓						The Air Force five-year EOD clearance criteria for tactical and manned ranges was reduced from a distance of one nautical mile from each target or until the density of collectible munitions items is five pieces per acre or less, whichever is the greater distance, to one kilometer from each or until the density of collectible munitions items is five pieces per acre or less, whichever is the shorter distance (August 2001).
37	Transporting new boilers to Palo Verde Nuclear Generating Station and related road work	✓	✓						Travel route followed State Route 85 from Mexico through Organ Pipe Cactus National Monument and BMGR—East, modification of several at grade wash crossings was necessary (Summer 2002).
38	Cellular Phone Towers	✓	✓						Four towers ≤100 feet tall are proposed by American tower Corporation along State Route 85 at 100 by 100-foot sites named Tenmile Wash, Midway, Blindman Butte, and Childs Ranch. Luke AFB is considering granting leases of five years with nine 5-year extension options for the required lands (2001).

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39	Gila Bend to Ajo 230 kilovolt (kV) Transmission line	✓	✓						Construction of a 230 kV transmission line from Gila Bend to Ajo to support the reopening of the Phelps Dodge Ajo, Inc. Mine was approved in 1998 with a 10-year approval lifespan. The transmission line would parallel the State Route 85 and the existing Public Service Co. 69 kV transmission line. No immediate plans to construct the new transmission line are active until economic conditions improve sufficiently (1998).
40	Increasing Air Force night training operations		✓			✓			Increases in night attack training are anticipated within the next several years to better prepare pilots for real world combat missions. As much as a two-fold increase in night sortie rates may occur (2002+).
41	Air Force Sensor Training Area/ Mission Support Plan		✓						The Air Force is installing new scoring systems and upgraded target simulations at existing targets to create more realistic training conditions. Plans are also being evaluated for a new electronically scored and recorded target area for training with precision-guided munitions (2005+).
42	Organ Pipe Cactus NM proposed projects	✓			✓				More than 100 past, current, and proposed projects; examples include 10 RV camping sites (1983-1984), enlarged parking areas at campgrounds and trailheads (1998-2000), low-level overflight reconnaissance for Sonoran pronghorn (ongoing), and North Puerto Blanco Loop Drive widening (pending).
43	Phelps Dodge Ajo, Inc. mine reopening	✓					✓		New technologies would allow further production from the mine if copper prices reach economically feasible levels. Primary activity would include copper ore mining, milling, and concentrating. Concentrate would be shipped via the Tucson, Cornelia, and Gila Bend Railroad, which would be upgraded. Workforce would include 350 to 400 new employees. Project life is expected to be 10+ years. (Startup pending, date unknown).
44	Future aircraft and weapons (F-22A, F-18 E/F, MV-22/CV-22, Joint Strike Fighter, Joint Direct Attack Munitions, other stand-off weapons)		✓	✓					New aircraft and weapons for the Air Force, Marine Corps, and Navy are being developed or entering production. These aircraft and weapons will replace those currently in use throughout the armed forces. BMGR is a likely candidate for continued military training using these new aircraft weapon systems (date unknown).
45	Relocating Unmanned Aerial Vehicle (UAV) to MCAS Yuma	✓		✓					Relocation of a Marine squadron to MCAS Yuma that operates UAVs is under evaluation. The reconnaissance UAV flies at high altitudes and cannot be seen or heard at ground level. Squadron would add up to 195 personnel to MCAS Yuma. UAV operations would likely be conducted out of Cannon Air Defense Complex and AUX-2 (pending).

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas	Mexico	
46	Dewatering of the Gila River and agricultural development	✓					✓		Eleven major reservoir or irrigation diversion dams, constructed on the Gila River system from 1891 to 1959, eliminated perennial or seasonally intermittent flows from the Lower Gila River. Gillespie Dam constructed on the Gila River north of Gila Bend in 1921 provided diversions via canals to the Gila Bend area for agricultural development. Agricultural development and water diversions from below Painted Rock Reservoir to Yuma eliminated a once extensive riparian ecosystem. Today, nearly 93,000 acres of irrigated cropland and orchards are located within 5 miles of the northern and western BMGR boundaries.
47	Reserva de la Biosfera (Biosphere Reserve) de El Pinacate Y El Gran Desierto de Altar (The Pinacate and Great Desert), Mexico	✓						✓	A designated core protection area lies within a larger protective buffer area and is contiguous with the Reserva de la Biosfera Alto Golfo de California y Delta del Rio Colorado located 40 miles to the southwest, where the Colorado River delta meets the Sea of Cortez. Ongoing extensive livestock grazing and wood cutting activities have damaged the natural flora and fauna of the region. The Biosphere Reserve was designated in 1992.
48	Flat-tailed Horned Lizard Rangewide Management Strategy	✓		✓					Management strategy established four flat-tailed horned lizard management areas in California and one in Arizona. The Arizona management area (established 1997), consists of approximately 114,000 acres of which about 99,000 acres are located within BMGR—West, is by far the single largest protected management area (24 percent of total) for this species. MCAS Yuma entered into a conservation agreement with the AGFD and USFWS to implement the management strategy. Rangewide Management Strategy updated and proposed listing of lizard withdrawn in 2003.
49	Past urban development and current regional population growth trends						✓		Communities, many dating from the 1850s, were developed in response to mining, agricultural, military, and transportation developments. Although agriculture remains important, the Yuma economy has long been diversified and includes military bases, multiple industries, recreation, and, most recently, seasonal and permanent retirement communities. Growth and economic diversity is also affecting other communities in the BMGR locality. The three counties in which the BMGR is located experienced 40 percent growth from 1990 to 2000 and are projected to increase by about 21 percent between 2000 and 2015. Key growth areas in the immediate BMGR region are Yuma, Gila Bend, and Ajo.

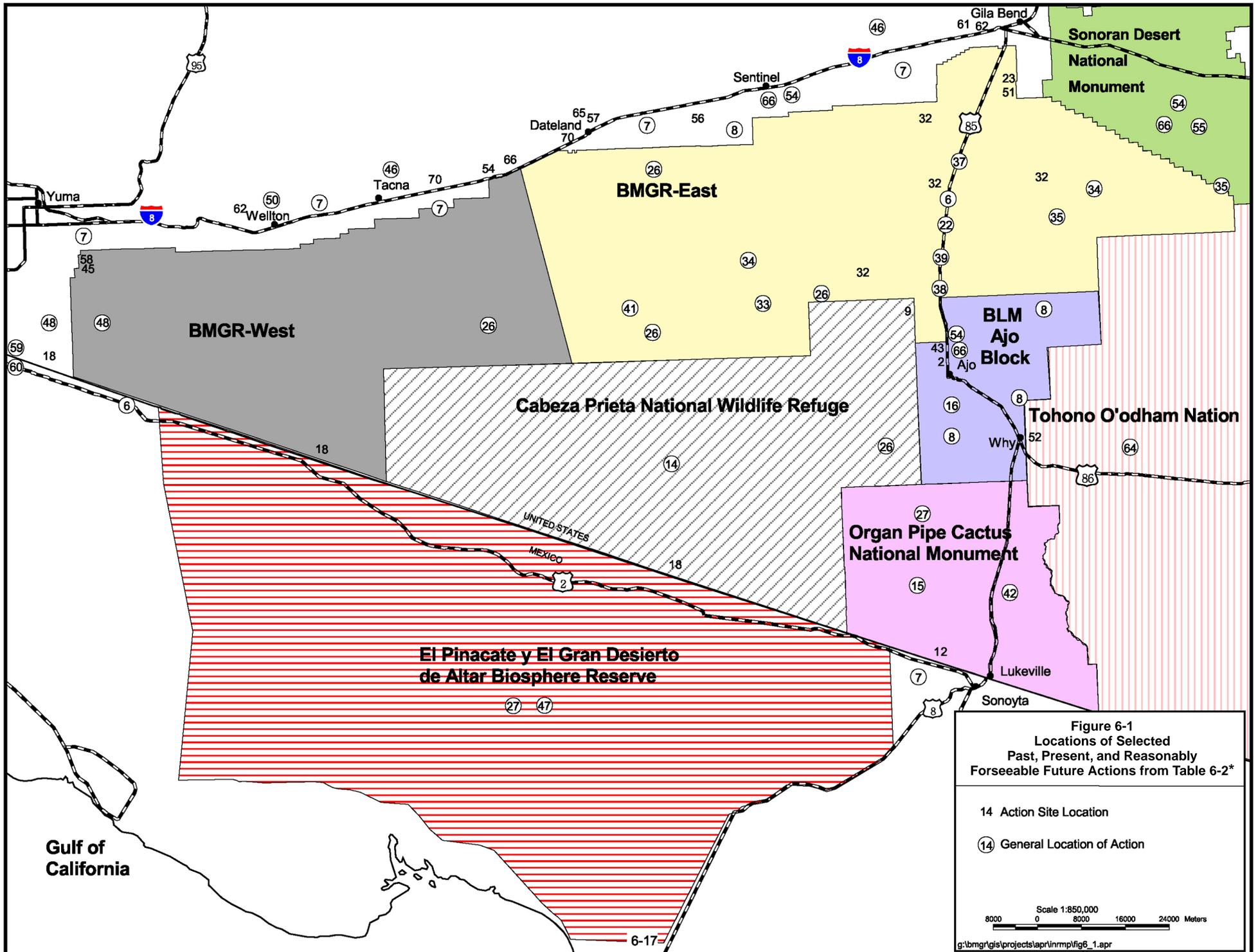
TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas	Mexico	
50	Continued development in vicinity of BMGR—West boundary (near Wellton and Yuma)	✓					✓		The Yuma and Yuma Foothills areas continue to experience rapid growth in residential, commercial, agricultural, and light industrial development. A recent project that demonstrates the rapid development occurring in the Yuma area is the County 14 road extension and the improvements associated with this development along the BMGR on the west side of the Gila Mountains. A number of residential subdivisions recently have been approved in this area to accommodate expanded growth. The boundaries of the City of Yuma and the Town of Wellton also have been expanded, including lands within the BMGR (Yuma County 2003, 2001a). Dome, Ligurta, Roll, Tacna, Wellton, and Mohawk, traditional agricultural communities, have also experienced unprecedented growth. Wellton, the largest community grew by 75 percent from 1990 to 2000. Continued growth is ongoing.
51	Munitions storage area improvements at Gila Bend AFAF	✓	✓						The munitions storage area at Gila Bend AFAF was upgraded and expanded to meet new Air Force explosive storage safety standards and for supporting military training mission requirements (2001).
52	Hickiwan casino, convenience store, and RV Park (about one mile east of Why)	✓					✓		A convenience store, gaming casino, and 92-space RV Park were constructed on the Tohono O'odham Nation about 1 mile east of Why, Arizona, from 1996 to 1998. Facilities developed to support these operations include a well, water treatment, and sewer.
53	Military Training Route (MTR) Realignment		✓		✓	✓	✓		Seven low-level MTRs that lead to BMGR—East were relocated to avoid overflights of villages and other areas within the Tohono O'odham Nation (1999).
54	Environmental Baseline Survey (EBS) activities for non-renewed parcels	✓					✓		A Phase 1 EBS was completed by Luke AFB (2002) for the four parcels of BMGR lands that were not renewed by the MLWA of 1999. Areas with recognized environmental conditions, that indicate an existing release, a past release, or material threat of a release of hazardous substances or petroleum products within the parcels, were identified. With the exception of possible displaced munitions located within Sand Tank Mountains and Sentinel Plain parcels, no other recognized environmental conditions were classified at the EBS sites. The munitions issue is being addressed by the Air Force and the BLM.
55	Sonoran Desert NM establishment and management	✓					✓		Sonoran Desert NM, totaling approximately 496,337 acres, was designated in January 2001. The new national monument, which is north of and contiguous to the East TAC, includes the former 77,957-acre Sand Tank Mountains parcel of the BMGR (formerly Air Force Management Area A) that was not renewed by the MLWA of 1999. A management plan for the national monument is being prepared by the BLM. (Draft plan and EIS expected 2005)

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas	Mexico	
56	Dairy located south of Interstate 8 at Aztec	✓					✓		A special use permit was granted in April 1999 by the Yuma County Board of Supervisors for the construction of a dairy farm at a location south of Interstate 8 at the Aztec exit. The dairy began operating in 2001. In November 2002, the Yuma County Board of Supervisors approved the modification of the special use permit to allow for the increase in the maximum number of cows to 5,000 (Yuma County Department of Development Services 2002).
57	Development of fallow agricultural land in Dateland area	✓					✓		The town of Dateland is encouraging development of fallow agricultural land north and south of Interstate 8.
58	Yuma Area Service Highway	✓		✓			✓		The highway has been proposed to connect Interstate 8 east of Yuma to U.S.-Mexico border at San Luis, with a portion within the northwesternmost edge of BMGR—West (estimated 2005).
59	San Luis, Arizona, commercial port-of-entry	✓					✓		Relocation of the San Luis commercial port-of-entry four miles from the existing port-of-entry, to a location west of the BMGR is planned in association with the development of the Yuma ASH (estimated 2005).
60	Parque Industrial Internacional (near San Luis)	✓						✓	A major 8,000-acre industrial park being developed in Mexico opposite the San Luis commercial port-of-entry and Yuma ASH terminus. Development began in the early 1990s. A counterpart 400-acre industrial park is anticipated in the United States just east of the proposed commercial port-of-entry (pending).
61	Paloma Ranch just west of Gila Bend and mixed-use development proposed in Gila Bend	✓					✓		Approximately 100,000 acres of fallow Paloma Ranch agricultural land west of Gila Bend is planned for future development of either residential or light and heavy industrial uses. To date, the only major development proposed within Paloma Ranch is an electrical power plant (see description below).
62	Power Plants being constructed/proposed at Gila Bend and Wellton	✓					✓		Construction of a 2,000 megawatt power plant by Panda Power and Gila Bend Power Partners, LLC is underway. Construction of a second 750-megawatt plant is on hold. Mixed land use development is expected near the plants. In a separate venture, Dome Valley Energy Partners LLC plans to develop, build, own, and operate the Wellton-Mohawk Generating Facility, located 25 miles east of Yuma and 9 miles west of Wellton. An EIS has been prepared to evaluate this proposed natural gas fired plant and its proposed interconnection with Western Area Power Administration's transmission system at Ligorita Substation in Arizona. The Record of Decision is expected in late fall 2004.
63	Pima County Sonoran Desert Conservation Plan		✓				✓		The Sonoran Desert Conservation Plan was prepared by Pima County land use planning and its implementation is overseen by the Pima County Board of Supervisors. The plan identifies the BMGR as a potential area for biological conservation priority.

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas	Mexico	
64	Management Plan for Tohono O'odham Nation	✓					✓		A long-term goal of the Tohono O'odham Nation is to develop a Resource Management Plan that may be implemented in cooperation with federal, state, and county agencies, as well as private landholders whose lands adjoin or include portions of the Nation's traditional territory (pending).
65	El Camino del Sol Airpark in Dateland	✓					✓		A residential airpark in Dateland has been proposed but it does not appear that the airpark will be developed in the near future.
66	BLM management of former BMGR Sentinel Plain, Sand Tank Mountains, Ajo Airport, and Interstate 8 parcels not renewed by the MLWA of 1999	✓					✓		Management of the Sand Tank Mountains parcel will be addressed by the pending Sonoran Desert National Monument management plan. Management of the Sentinel Plain and Ajo Airport parcels will be addressed by the pending Phoenix South Resource Management Plan. Management of the Interstate 8 parcels will be addressed by the pending Yuma Resource Management Plan. Draft plans and EISs expected 2005 and 2006 (Yuma).
67	YTRC improvements to military training facilities in BMGR—West			✓		✓			BMGR—West improvements including new ground support areas, ground support zones, TACTS Range threat emitters, modifications to the Moving Sands and Cactus West target complexes, a parachute drop zone, a runway upgrade at AUX-2, and low-level flight corridors overlying the Cabeza Prieta NWR were authorized under the YTRC EIS (1997) and YTRC Supplemental EIS (2001).
68	Beddown of Combat Search and Rescue (CSAR) assets at Davis-Monthan AFB		✓	✓			✓		A CSAR unit is being established at Davis Monthan AFB in order to meet Air Force needs to support worldwide, deployable long-range combat search and rescue of downed aircrew members. Action will add 12 HH-60 helicopters, 10 HC-130 fixed-wing aircraft, and 1,059 personnel to Davis-Monthan AFB. Training will occur in low altitude tactical navigation areas of East TAC, North TAC (northeast of Crater Range), and Yuma TACTS Range. (This action began in the fall of 2002, with the beddown to be completed by 2007.)
69	Removal of Cabeza Prieta NWR and Organ Pipe Cactus NM fence lines				✓	✓			Livestock exclusion fences along the Cabeza Prieta NWR and Organ Pipe Cactus NM boundaries with the BLM Ajo Block are being removed following closure of BLM's Cameron grazing allotment (2005).

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas	Mexico	
70	Proposed Arizona Clean Fuels petroleum refinery in eastern Yuma County	✓					✓		The proposed petroleum refinery would be constructed north of Interstate 8 east of Tacna (at Avenue 45E) or at an alternative site north of Interstate 8 west of Dateland (at Avenue 64E). The refinery would produce gasoline, diesel fuel, jet fuel, liquefied petroleum gas, sulfur, and petroleum coke. Primary raw materials for the refinery would be crude oil and natural gasoline, which would be delivered to the refinery primarily via a pipeline. Other raw materials include butane, propane, alkylate, and oxygenates (which would be delivered via rail) and natural gas (which would be received by pipeline). Refined fuel products would be shipped from the refinery by pipeline, rail, and truck. Refined liquefied petroleum gas, sulfur, and petroleum coke would be shipped by rail. Project would include construction of a raw materials supply pipeline from either the ports of Guaymas or Tijuana, Mexico, that would cross either the Yuma area or parts of BMGR—West. Existing highways and rail lines are available to import raw materials and export products. An existing pipeline may be available for product distribution; requirements for a new product distribution pipeline are currently unknown. A draft air quality permit for the refinery was circulated by the ADEQ for public comment during September-November 2004. A decision on the permit application is expected in early 2005. Other environmental compliance documentation is pending. Dates for the refinery construction and operation have not been announced.

\* Adapted and updated from Yuma Training Range Complex Supplemental Environmental Impact Statement, September 2001



**Figure 6-1**  
**Locations of Selected**  
**Past, Present, and Reasonably**  
**Forseeable Future Actions from Table 6-2\***

- 14 Action Site Location
- ⑭ General Location of Action

Scale 1:850,000  
 8000 0 8000 16000 24000 Meters

g:\bmg\gis\projects\laprinrmp\fig6\_1.apr

\*Note: 42 of the 70 actions listed in Table 6-2 are shown on this map. The locations of the other 28 actions either are applicable to broad areas of the BMGR or its vicinity, as identified in Table 6-2, or are at places outside of this map window.

**TABLE 6-3  
ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE  
FUTURE ACTIONS ON INDIVIDUAL RESOURCES**

Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
Earth Resources	1-29, 31, 32, 34-39, 41-44, 46-53, 55-70	<p>While almost all of the past, present, and reasonably foreseeable actions identified in Table 6-2 were identified herein as potentially causing some effect on earth resources, the net additive or interactive effects are dominated by the past development involving intense agriculture, industrial, municipal, and residential land uses encompassing large acreages. These meaningful effects have permanently altered the structure and function of earth resources. Most development has affected the basin areas of both the Sonoran Desert and Salton Trough physiographic provinces, which are shared in part by the BMGR (most of the BMGR is in the Sonoran Desert section; however, the Yuma Desert, in the southwestern BMGR, is within the Salton Trough section). The physical disturbance that has occurred within the BMGR from past and present military, agency and public use, is minor in contrast to other earth resources effects that have occurred outside of range.</p> <p>Many of the identified actions would only have the potential for minor localized effects on earth resources such as increased erosion, which would not be meaningful in context of this additive or interactive effects analysis (e.g., the unmanned threat emitter and cellular phone tower projects), while others would have localized, major impacts that would be meaningful (e.g., reopening of the Phelps Dodge mine), but would not necessarily have additive or interactive impacts with other actions analyzed. One important exception may be the adverse effects of off-road driving and concentrated foot traffic by drug smugglers and UDAs, which is widely distributed throughout the U.S. side of the international border but is especially pronounced in Cabeza Prieta NWR, Organ Pipe Cactus NM, BMGR, Sonoran Desert NM, and the Tohono O'odham Nation. Border Patrol interdiction of cross-border traffic in areas outside of the contiguous Cabeza Prieta NWR, Organ Pipe Cactus NM, and BMGR complex is believed to have contributed to the explosive and ongoing regional growth in illegal border traffic by deflected smugglers and UDAs to this area. Within the complex, Border Patrol activities may serve to ameliorate some illegal migration and smuggling effects by deterring and limiting cross-border traffic, but can also exacerbate these effects by contributing additional off-road driving in interdiction and search and rescue efforts. Drag road construction and maintenance in the BMGR has disrupted and captured surface water runoff channels. Unless it is brought under control in the near future, off-road driving associated with cross-border traffic threatens to create an ever growing network of cross-country vehicle tracks of unmanageable proportions with widespread soil and surface hydrology effects. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. A second important exception would be the proposed refinery north of BMGR—West near Tacna. The project would occupy about 3,000 acres of vacant desert and abandoned agricultural land, which would be graded and prepared in accordance with the approved industrial plant and environmental requirements. Construction of a raw materials supply pipeline from either the ports of Guaymas or Tijuana, Mexico, potentially would disturb earth resources in BMGR—West or its vicinity. A product distribution pipeline, if needed, would not be likely to affect the BMGR.</p> <p>There are relatively few actions that would have the potential for synergistic impacts where the net effect of two or more actions would be greater than the individual effect of either. Meaningful synergistic impacts typically center around the large-scale effects that negatively affect earth resources, such as increased population and urban growth and various industrial and residential developments to support that growth.</p>

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		Long-term countervailing beneficial impacts have also resulted from past actions designating the Cabeza Prieta NWR, Organ Pipe Cactus NM, Sonoran Desert NM, and BLM Wildernesses and ACECs in the region and the ongoing preservation/conservation based management of these areas and the prohibition of the types of intense land uses that have negatively affected earth resources in the region. Together, with the Cabeza Prieta NWR, Organ Pipe Cactus NM, Sonoran Desert NM, and El Pinacate y el Gran Desierto de Altar, the BMGR represents an intact remaining example of the Sonoran Desert physiographic province, as detailed in Section 4.2, which is a benefit that is expected to extend into the future.
Water Resources	1-8, 10-16, 18, 20, 23-29, 31, 36, 37, 41-43, 46-50, 52, 55-69	<p>The two watersheds in the BMGR region most meaningfully affected by the net additive or interactive effects of identified past, present, and future actions are the Gila River, located north of the BMGR, and the Rio Sonoyta located south of the BMGR, with some effects in the vicinity west of BMGR also potentially affecting the Colorado River watershed. The most wide-reaching effects to these water resources began with the loss of perennial and seasonally intermittent flows from disruption of perennial flows with dams and loss of groundwater for municipal, domestic, and agricultural purposes. Some of the identified actions would continue to cause similar effects to these waters, but most would be of little meaning in this watershed context.</p> <p>Unless it is brought under control in the near future, off-road driving associated with cross-border traffic (see Earth Resources) threatens to become an important individual effect on surface hydrology by creating an ever growing, widespread network of cross-country vehicle tracks. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. There are no other meaningful important individual effects or synergistic adverse effects. As with earth resources, meaningful synergistic adverse impacts identified center around the large-scale effects that could negatively affect water resources, such as increased population and urban growth and various land uses involving water use or discharge into waterways. The BMGR is downgradient of lands that are protected, with the headwaters in Organ Pipe Cactus NM, Cabeza Prieta NWR, and Sonoran Desert NM. The uses on the BMGR, which have minimally affected water resources, in this large-scale watershed context, flow northward to the Gila drainages and southward into the Sonoran drainages in the Cabeza Prieta NWR and Mexico.</p>
Climate and Air Resources	2-7, 10, 12, 14, 15, 23-29, 31, 32, 34, 36-50, 55-70	<p>The air quality of the BMGR region is generally regarded as good despite past and present actions. Most air quality effects are short-term and dissipate over time, even large-scale effects such as those that occurred when the smelter was active at the Ajo Mine. Many other effects are localized and the potential for impacts to occur, either additively or interactively, is dependent upon the season and other atmospheric conditions affecting the distribution of particulate matter and other pollutants within the airshed. Generally, activities and uses potentially affecting BMGR air resources are located within industrialized or urban settings. Large-scale air circulation patterns generally transport air into this airshed eastward from the Pacific Ocean and northward from the Gulf of California. These factors make additive or interactive impacts on air resources difficult to ascertain.</p> <p>The identified actions most likely to have additive or interactive impacts on BMGR air resources are large-scale urban, agricultural, and industrial development (including power plants and a proposed petroleum refinery); transportation corridors; and military use. Individual actions such as the Yuma ASH, power plant and refinery construction, agriculture, and development of industrial parks further expand these types of development within the BMGR perimeter, where the increased emissions are more likely to be additive or</p>

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		<p>interactive with those resulting from actions and uses within the BMGR. The reopening of the Ajo Phelps Dodge is not expected to involve smelting and, thus, impacts on air quality are not expected to be major. An air quality permit application for the proposed refinery is pending final Arizona Department of Environmental Quality action. The refinery application states that the proposed industrial plant would utilize best available control technology that would ensure that the facility would meet or exceed all emission limits. Fugitive dust issues within the BMGR, Cabeza Prieta NWR, and Organ Pipe Cactus NM are being exacerbated by off-road driving associated with cross-border traffic (see Earth Resources). As with earth and water resources, however, perimeter lands that are managed for preservation purposes, including Cabeza Prieta NWR, Organ Pipe Cactus NM, Sonoran Desert NM, and El Pinacate y el Gran Desierto de Altar preclude types of uses that are principally associated with high levels of emissions. Likewise, development in the Tohono O’odham Nation has been at low levels, with few impacts on air quality.</p>
General Vegetation	1-8, 10-18, 20, 23, 26, 28, 29, 31, 34-36, 38-39, 41, 42, 46-52, 55-69	<p>As detailed in Section 4.5, the plant communities of the BMGR have retained relatively unaltered structure, composition, and function. Within some other areas of the greater Sonoran Desert ecoregion, however, these plant communities have been greatly affected by development that has destroyed or altered them significantly. Within the U.S. portion of the Sonoran Desert Ecoregion (Arizona and California), 87 percent of the landscape-scale land areas is managed by federal or state agencies, but less than 20 percent of this land is managed to promote the long-term persistence of conservation elements (Marshall and others 2000). The collective protection of plant communities within the contiguous BMGR-Cabeza Prieta NWR-Organ Pipe Cactus NM-Sonoran Desert NM, thus represents a large landscape-scale conservation area for the ecoregion. While large-scale development has not occurred within El Pinacate y el Gran Desierto de Altar, ongoing extensive livestock grazing and wood cutting activities have damaged the natural flora and fauna of this area to a greater extent than the other identified preservation areas.</p> <p>The past, present, and future actions within the BMGR and surrounding preservation areas are relatively minor and localized, the net additive or interactive effects on vegetation would be of little consequence in terms of these landscape-scale conservation areas. Many of the identified past, present, and future actions that have the greatest effect on general vegetation are outside of the protected area, but could nonetheless affect vegetation within these areas by factors such as the introduction and proliferation of invasive species and the unnatural proliferation of fire as carried by these invasive species. Unless it is brought under control in the near future, off-road driving associated with cross-border traffic (see Earth Resources) threatens to become an important individual effect on plant communities through vehicles directly crushing plants and by creating an ever growing, widespread network of cross-country vehicle tracks that disrupt soils and surface water hydrology. Illegal off-road driving creates avenues that may promote the spread of invasive and noxious plant species. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. The development in the unprotected areas of the BMGR perimeter also has a substantial potential to have additive or interactive impacts with those effects on plant communities that occur within the BMGR.</p>
General Wildlife and Wildlife Habitat	1-8, 10-20, 23-26, 28, 29, 31-44, 46-52, 55-68	<p>The additive or interactive effects on general wildlife habitat are similar in context to those discussed for general vegetation in terms of loss and conversion of habitat. Effects to wildlife also include population declines from increased rates of death or injury and decreased recruitment rates, loss/conversion of habitat, habitat fragmentation, and disruption/disturbance from noise and human activity. Again, as</p>

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		<p>with the previous resources discussed, the greatest and most extensive additive or interactive effects to general wildlife and wildlife habitat have occurred as the result of intense agriculture, industrial, municipal, and residential land uses development encompassing large acreages. Most of this use has been outside of the BMGR-Cabeza Prieta NWR-Organ Pipe Cactus NM-Sonoran Desert NM complex and, to some degree, outside of El Pinacate y el Gran Desierto de Altar.</p> <p>The additive or interactive impacts that potentially affect BMGR wildlife and wildlife habitat most directly are generally those on the BMGR perimeter that would potentially cause deleterious effects which could extend to wildlife populations and habitats on the BMGR. An exception within the BMGR is the adverse effects of off-road driving and concentrated foot traffic by drug smugglers and UDAs (see Earth Resources). Unless it is brought under control in the near future, off-road driving associated with cross-border traffic threatens to become an important individual effect on wildlife and wildlife habitat from vehicles crushing plants and animals, and by creating an ever growing, widespread network of cross-country vehicle tracks that disrupt soils and surface water hydrology. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. Illegal off-road driving may lead to habitat fragmentation and create avenues that promote the spread of invasive and noxious plant species. Due to the ecological landscape scale of habitat loss, curtailment, modification, and fragmentation within the BMGR region, these issues are further discussed in Section 6.3.2</p>
Protected Species	1-8, 10-18, 20-23, 25-26, 28, 29, 31- 34, 36-44, 46-50, 53, 55-68	<p>Additive or interactive effects on protected species from the identified actions are readily identifiable for flat-tailed horned lizard and Sonoran pronghorn. A recent thorough assessment of additive or interactive effects on Sonoran pronghorn that result from past and present actions and that would result from reasonably foreseeable future actions within the historic range and current distribution of this species is presented in the YTRC Supplemental EIS (September 2001). Those actions causing Sonoran pronghorn habitat loss or curtailment, habitat modification and diminished quality of habitat, overutilization, disease or predation, management or regulatory conflicts, death or injury, harassment, diminished fawn recruitment, or exposure to toxic substances or materials have the potential for adverse additive or interactive impacts. Somewhat underestimated by that 2001 document, however, have been the explosive and continuing growth in adverse effects from off-road driving and concentrated foot traffic by drug smugglers and UDAs (see Earth Resources). Unless it is brought under control in the near future, off-road driving associated with cross-border traffic threatens to become an important individual effect on the Sonoran pronghorn and its habitat through the direct effects of vehicles on these animals associated with increasing traffic and an ever growing, widespread network of cross-country vehicle tracks. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. Some actions have resulted in additive or interactive effects that have acted significantly to support the survival of this species. Most important among these countervailing actions are the long-standing prohibition on Sonoran pronghorn hunting in the U.S., habitat protection and conservation within the BMGR, Cabeza Prieta NWR, and Organ Pipe Cactus NM, and recovery efforts directed by the Sonoran Pronghorn Recovery Plan. Closure of the Cameron grazing allotment and the soon to be completed removal of livestock fences between the BLM Ajo Block and the Cabeza Prieta NWR and Organ Pipe Cactus NM will also benefit this species.</p>

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		<p>For the flat-tailed horned lizard, additive or interactive impacts include urban, industrial, and agricultural development west of the BMGR within the historic and current range of this species, including development in California. The Yuma ASH may have important adverse impacts on this species in combination with other past, present, and future uses affecting this species. Off-road driving associated with cross-border traffic also may adversely and significantly affect flat-tailed horned lizard in a manner similar to Sonoran pronghorn. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. The 2003 Flat-tailed Horned Lizard Range-wide Management Strategy and four associated HMAs, including the one on the BMGR have countervailing effects on this species sufficient to lead to a January 2003 decision by the USFWS not to list the flat-tailed horned lizard as threatened.</p> <p>Additive or interactive effects on other protected species within the BMGR are more difficult to identify because the range is not as central to their survival and they have not been studied on the range to the extent that the Sonoran pronghorn and flat-tailed horned lizard have been. Additive or interactive impacts similar to those discussed for Sonoran pronghorn and flat-tailed horned lizard are nonetheless the cause of the decline and protected status of other species addressed in Section 4.7. Similarly, habitat protection and conservation within the BMGR, Cabeza Prieta NWR, and Organ Pipe Cactus NM has been a countervailing additive or interactive effect working in favor of protected species present within these areas.</p>
Wildfire Management	1-8, 10-15, 23, 28, 29, 31, 40-41, 44, 46-50, 55-59, 61-67	The identified additive or interactive impacts of wildfire management are directly related to those on general vegetation and to the extent to which plant communities have been altered by the introduction of invasive species that could carry wildfire to a greater extent than would occur naturally. Additive or interactive impacts also result from development that increases the presence of human activities within the region.
Grounds Maintenance	3, 10, 13, 24, 48, 51, 67	Additive or interactive effects on grounds maintenance are limited to those past, present, and future actions affecting operations or procedures within the maintained grounds of the BMGR—primarily at Gila Bend AFAP or Cannon Air Defense Complex. The military use of these areas is predominant, but some limited recreation use does occur. Some of the repaving projects and the Munitions Storage Area project were within the Gila Bend AFAP, although they were not related to landscape-maintenance activities. The Cannon Air Defense Complex is within flat-tailed horned lizard range. However, no meaningful additive or interactive impacts on grounds maintenance are identified.
Public Utilities and Transportation Corridors	2-7, 10, 12, 37-39, 43, 46, 48-50, 58-62, 64, 65	The additive or interactive impact of the identified actions on public utilities and transportation corridors is a development-service relationship as the development of such services is interrelated with urban settlement and economic growth activities. The development of these services is somewhat precluded by the protected status of much of the lands in the BMGR region. Most development of public utilities and transportation corridors has occurred to the north and south of the BMGR, with network-type development centered in urban areas. The State Route 85/railroad corridor remains the only corridor within the BMGR, although the Yuma ASH is proposed for the western fringes of the range. Section 4.10 further discusses the particulars of these public utilities and transportation corridors. Meaningful additive or interactive impacts associated with public utilities and transportation corridor development are further discussed

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		in and Section 6.3.2.
Special Management Areas	3-6, 10-13, 25, 48-50, 58, 67	The additive or interactive impact of the identified actions on special natural/interest areas relates to the historic recognition and management of the recently expired ACECs, SRMAs, and Backcountry Byway. This background information is covered in detail in Section 4.11. These special natural/interest areas have influenced and may continue to influence past, present, and future use of the BMGR by the military, Border Patrol, Arizona Game and Fish Department, and the public. The additive or interactive effect(s) to the flat-tailed horned lizard from the development within or near that portion of the HMA west of the BMGR, the Yuma ASH, and in the other designated management areas for this species in California and actions related to the Flat-tailed Horned Lizard Management Strategy could continue to effect the HMA. Future cleanup of inactive targets could cause some relatively low levels of disturbance within the expired Sentinel Plain SRMA
Outdoor Recreation	3-7, 9-18, 20, 28- 30, 35, 42, 44, 46- 50, 53, 55, 66, 67, 69	The identified additive or interactive impacts to outdoor recreation include the regional trends of increasing population and participation in outdoor recreation activities and the types of outdoor recreation opportunities in the BMGR region. Many of the identified past, present, and reasonably foreseeable actions involving development to accommodate population growth are correlated to the elimination of open space that was traditionally available for outdoor recreation and increasing reliance on public lands to provide outdoor recreational opportunities. Access to private and public lands is becoming increasingly difficult due to various factors including transfer of ownership, changes in land use, fee increases, and urban sprawl. The explosive and continuing growth of illegal cross-border by drug smugglers and UDAs (see Earth Resources) may be having a depressing effect on outdoor recreation at the BMGR and other regional locations because of public concerns for safety and the adverse effects from off-road driving and concentrated foot traffic on the attractiveness of the environment. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. In addition, some designated recreation and preservation areas have had to limit outdoor recreation access for resource protection purposes. Because of the relevance of this topic in the context of this INRMP, these issues have been previously detailed in Section 4.12 and these additive or interactive outdoor recreation effects within the BMGR region are further addressed in Section 6.3.2.
Public Health and Safety	1-7, 9-18, 22-26, 28-29, 31, 35, 37- 40, 42-47, 49-51, 53-54, 58, 65-67	The impacts of the actions identified on public health and safety are generally additive, where each identified action has some discernible potential to increase hazards or risks to public health or safety. For example, development of transportation corridors is correlated with the potential for vehicle/train accidents, risks from mining include heavy equipment use and excavation, risks associated with military operations include accidents or mishaps with aircraft, munitions, etc. Overall, however, these risks are generally managed by a combination of the responsible private parties and federal, state, and local governments so as to minimize the chances of them occurring and reduce impacts should they occur. An exception may be real or perceived risks to public safety from growing and widespread cross-border traffic by drug smugglers and UDAs (see Outdoor Recreation).
Law Enforcement	3-5, 10-16, 47, 49, 50, 55, 59	The identified additive or interactive impacts to law enforcement include those enforcement requirements related to resource protection and public safety within the BMGR and other public lands as well as the actions taken to prevent the unauthorized entry of illegal aliens and drug smuggling across the U.S.-Mexico border. Agencies involved in law enforcement primarily for public safety and resource

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		protection generally include BLM, USFWS (within the refuge and with regard to endangered species protection), AGFD (with regard to hunting laws), NPS, and the Air Force and Marine Corps with regard to law enforcement on the BMGR. Arizona Department of Public Safety and local municipal law enforcement agencies provide the primary public law enforcement outside the BMGR. Law enforcement relative to the international border is primarily the responsibilities of the United States Customs Service and Border Patrol. Several of the identified actions were detailed in the existing conditions for this resource in Section 4.14. Meaningful additive or interactive impacts potentially resulting from the actions identified are the increased population and rates of illegal border activity. Minor additive or interactive effects could result from the relocation of the San Luis Port of Entry.
Transboundary and Domestic Perimeter Land Use	2-7, 9, 10, 12-18, 20, 27, 28, 29, 35, 37-39, 42, 43, 45-50, 52-56, 58-66, 70	Nearly all of the identified actions that are outside of the BMGR are identified as potential additive or interactive effects on transboundary and domestic perimeter land use. While some of the minor individual actions would not have meaningful effects, they are additive and influence overall regional development trends.
Cultural Resources	1-7, 10-19, 25, 31, 44, 46, 47, 49, 50, 55, 58-60, 64-67	Some historic military and non-military activities within the BMGR have no doubt resulted in the loss of cultural resources and the information potential represented in these resources. The significance of these losses cannot be assessed; however, the military surface use footprint within the range that has caused notable surface disturbance has been limited to a relatively small portion of the range (< 10 percent). Consideration of potential cultural resource effects has preceded most military and other government actions within the range that had been conducted over the last several decades with the result that potential adverse effects on these resources have been avoided or mitigated. A separate ICRMP, which is mutually supportive with the INRMP, has been developed for the management of cultural resources within the BMGR. Certain non-government activities, including public recreation, have not been adequately assessed as to their potential adverse effects on cultural resources and the extent to which damage to these resources has occurred so the significance of that potential damage cannot be determined. Management programs currently in place for the range are initiating actions to assess the extent to which recreation and other non-regulated activities, such as from growing and widespread cross-border traffic by drug smugglers and UDAs, may be affecting cultural resources. Recommendations for regulating recreation and other activities to protect cultural resources will be forthcoming when the results of these assessments are available.
Visual Resources	1-7, 9-19, 24-26, 31, 32, 35-40, 42-44, 46, 47, 49, 50, 55, 58-67	The additive or interactive effects of past activities on visual resources have generally not been significant in terms of the overall BMGR landscape. With the exception of some localized foreground areas, the vistas within and of the BMGR are of a natural and unmodified landscape. Military activities, such as target and electronic instrument installations, have created visual intrusions. These effects, however, were consequences of activities that are consistent with the purposes for which the BMGR was established and are not contrary to visual resources management standards for the range. Other visual foreground effects have resulted from vehicle use by non-military agencies and public visitors. Collectively, multiple roads and vehicle trails created by this use have modified the foreground character in some areas from a primitive to a semi-primitive appearance. Off-road driving and concentrated foot traffic from growing and widespread cross-border traffic by drug smugglers and UDAs may be greatly exacerbating adverse visual effects on the attractiveness of the foreground environment in affected areas. Plans to erect vehicle barriers and implement other border control

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe. Some developments located outside of the range, such as Interstate Highway 8, communications towers, water towers, and buildings, are also visually intrusive within the middleground or background from viewpoints within the BMGR.
Hazardous Materials and Waste	1-7, 9, 10, 12, 25, 31, 32, 34, 37-40, 42-46, 49, 50, 54, 58-62, 64-67	The use, handling, transport, and storage of hazardous materials and waste, other than military munitions, is much more prevalent in the region, primarily in association with industrial and agriculture and transportation than within or adjacent to the BMGR. Most of the actions identified as having a potential effect are potential future projects that would involve the temporary use of hazardous substances and the creation of wastes from relatively minor activities that would not be meaningful. Additive or interactive impacts within the BMGR could result from military use, historic but inactive mines, fuel and other fluids from vehicles operated by civilian agencies and the public, and wildcat dumping. These effects are further discussed in Section 6.3.2.
Socioeconomics	1-8, 10-16, 19, 22-26, 28-34, 36- 40, 42-48, 49, 50, 52, 55, 58-67, 70	Centers of economic activity within the BMGR region include Yuma, the Lower Gila River corridor, Gila Bend, Ajo, Sonoyta, and San Luis Rio Colorado. All of these areas have experienced economic growth over the last 10 years and the various ongoing and planned development projects, as indicated by the actions listed in Table 6-2, are evidence of expected continued growth. The expected additive or interactive effect of these economic activities is for continued growth in the region's population. No negative economic consequences of the area's growth are foreseen, but the expected continued increase in population will likely lead to increased competition for recreational opportunities within the BMGR and other public lands in the region.
Noise	2-7, 9-19, 23-25, 28, 29, 31-34, 36- 40, 42-46, 49, 50, 52-53, 55, 58-67	In the absence of military or non-military human activities, the background noise that occurs within those portions of the BMGR that are away from developed areas on its perimeter is typically characterized by sounds produced by weather, wildlife, and other natural phenomenon. Natural quiet within the range under these conditions can reach levels of stillness comparable to other remote desert wilderness areas. Noise is generated within the region by many activities, but the predominant sources of noise within the BMGR are associated with military activities. Among these military activities, the most prevalent source of noise—in terms of the area, frequency, duration, and intensity of effect—is military aircraft flight operations. Other military training or support operations that generate noise within the range include live ordnance delivery training, vehicle use, portable or fixed-site generator operations, training ordnance delivery, EOD detonations, munitions and target scrap demilitarization processing, and small arms training. The additive or interactive effect of the noise generated by all military operations is non-significant for human health and safety and has generally not been found to cause harmful effects in wildlife populations. Noise from military sources can cause annoyance among recreational visitors; but given that the fundamental purpose of the range is for military training, a standard to require that military activities be managed to maintain conditions of natural quiet is inappropriate.  Non-military sources of noise within the BMGR region include activities performed by civilian government agencies, members of the public, or persons entering the United States illegally from Mexico. Noise is also generated within the range by high-speed highway traffic on State Route 85. The U.S. Border Patrol conducts regular low-level helicopter overflights and surface vehicle patrols within the range. Other government agency activities are performed as required for natural and cultural resources management and civil law enforcement purposes. The principal noise generating activities among these management and enforcement operations involve surface

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
Resource Impact Assessment Category	Actions Causing Potential Additive or Interactive Effects (Numbers from Table 6-2)	Description of Meaningful Additive or Interactive Effects
		vehicle use but some aircraft overflights are also conducted, usually in support of wildlife management purposes. Vehicle use is also the principal noise source generated by public visitors to the range. The most prevalent source of noise generated by non-military activity outside of the BMGR that affects the range is associated with traffic on Interstate Highway 8 and Mexico Highway 2 and Union Pacific Railroad trains. The Yuma ASH would also contribute high-speed traffic noise to the range environment. The additive or interactive effect of noise generated by all military and non-military sources is non-significant for human health and safety within the BMGR. Noise should generally not cause harmful effects in wildlife populations, but some noise abatement procedures are in place to reduce potential noise-induced harassment impacts on Sonoran pronghorn fawns during their first three to four months of life.

to the list. An overview of these key activities and their environmental effects will provide the best summation of their cumulative effects on the region's ecosystem and human communities that is both (1) commensurate with the level of specificity with which the aggregate effects of the proposed and alternatives in this EIS can be assessed and (2) meaningful to the decisions that are to be made regarding the long-term management of natural and cultural resources within the BMGR. The additive or interactive effects of these activities on individual resources are summarized in Table 6-3.

### **6.3.2.1 Additive or Interactive Effects of Activities Before 1937**

On the broader landscape scale, early past activities that have wrought the most significant changes in natural communities and ecosystem functions as well as in the human community include:

- European settlement and the Gadsden Purchase
- rise of permanent American settlements and towns
- development of impoundments and diversions of the Colorado and Gila rivers
- construction of canal systems and the advent of broad scale irrigated agriculture
- development of transportation corridors including wagon roads, railroads, and highways
- mining
- livestock grazing

European settlement, through Mexico prior to the Gadsden Purchase and from the United States following the purchase, likely eliminated or displaced most Native American use of the BMGR region, outside of the Tohono O'odham Nation (including the San Lucy District near Gila Bend) and the Cocopah and Quechan Indian reservation near Yuma, by the early 1900s. After the Gadsden Purchase, the predominant land uses assumed an American character.

During the almost 90 years from the Gadsden Purchase until before World War II, economic development in the BMGR region was slow by today's standards but gave rise to the area's main communities, transportation corridors, agricultural areas, and mining and livestock industries.

The origins of the three principal U.S. communities—Yuma, Gila Bend, and Ajo—within the region can generally be traced to the 1850s when early settlements at these locations were made possible by economic development opportunities. Although Yuma was located at an advantageous crossing point on the Colorado River that was historically important to Native Americans as well as Anglo American explorers, settlers, and other travelers, it was not until Fort Yuma was constructed on the western side of the river in 1850 that there was sufficient local economic activity to give rise to the town on the eastern bank. After the closing of the fort in 1883, the town continued to prosper as a result of the new Arizona Territorial Prison, mining activity in nearby mountains, and its strategic location as an interchange point for commerce and people moving to/from the Sea of Cortez via the Colorado River and overland east-west via wagon roads and the Southern Pacific Railroad, which was constructed during the 1870s. Agricultural development became a mainstay of the Yuma and Wellton-Tacna area economies following the completion of Bureau of Reclamation projects—Laguna Dam (1909) and the Colorado River Siphon (1912)—which provided irrigation water to the Yuma Valley and Wellton-Tacna areas. Conversion to agricultural cropland, urban, and other developed uses has irreversibly eliminated hundreds of thousands of acres of natural desert communities within this area. The trade-off, of course, has been the development of an economic base that supports tens

of thousands of permanent residents and tens of thousands of winter season visitors and provides agricultural and other products throughout the nation.

The origins and prosperity of Gila Bend are also rooted in agriculture and transportation. The first reported Spanish settlement farm, which followed a long history of Native American irrigated and floodwater agriculture at this site, was established by 1700 within the Gila River flood plain. Rich soils occurred at this location as a result of the annual spring floods of the Gila River. Farming continued in the Gila Bend area but it was not until 1921, when the construction of Gillespie Dam on the Gila River north of Gila Bend provided the irrigation water diversions through the Gila Bend Canal, that such diversions were necessary to support agricultural development of extensive tracts of land north and west of the town.

Gila Bend is also located at a position where overland routes from the east and southeast converged with the historic east-west route along the Gila River. In 1858, Gila Bend became an important stop along the overland stage route that traversed southern Arizona. Construction of the Southern Pacific Railroad during 1870s, which passes through Gila Bend, signified the importance of the Gila River corridor as an overland transportation route linking south central Arizona and points east with Southern California. Wagon roads paralleled the Gila Bend to Yuma segment of the railroad and by the 1920s a graded gravel highway that was to become U.S. Highway 80, which was paved by 1932, was constructed as a conveyance for motor vehicle traffic. U.S. Highway 80 was later replaced by Interstate Highway 8, which was constructed during the late 1960s and early 1970s. Although Gila Bend remains a small community of about 2,000 residents, the Paloma Farms west and north of town grew to encompass about 100,000 acres of croplands. Agricultural and transportation industries continue to dominate the Gila Bend economy but the ongoing construction of two electrical generating stations promises to provide an impetus for residential and light industrial development as well.

The Town of Ajo had its origins in mining beginning in 1854 with the organization of the Ajo Copper Company; however, the town did not flourish until the early 1900s when technological improvements in mining methods made mining both easier and more profitable. Ore was first shipped out of Ajo by pack mule overland to Yuma and then by wagon road to the Southern Pacific Railroad at Gila Bend. Ore was shipped from Ajo to Gila Bend by railroad from 1916 onward after the single-track, Tucson, Cornelia and Gila Bend Railroad was constructed across what is now BMGR—East. The mine at Ajo closed in 1986 because of falling world copper prices and the area was hard hit economically. The town has seen some economic recovery, however, as a retirement community and regional tourism crossroads. There are some prospects that continuing advances in cost efficient mining technology may support reopening of the Ajo Mine if international copper prices rise to levels that would justify making the necessary investments in this technology.

No major mines were developed within the interior of BMGR—East, but small prospects were developed within the Mohawk and Granite mountains, Sentinel Plain, Crater Range, White Hills, and Saucedo and Sand Tank mountains. None of these prospects covered more than a few acres or has caused extensive surface disturbance or erosion problems.

Mining development within the BMGR—West land area, prior to its multi-step inclusion in the military reservation in 1942 and 1943, also appears to have been scattered and limited but occurred on a larger scale at two sites. The two largest mining operations in the area were the Fortuna Mine (active from 1894 to about 1925) on the west side of the Gila Mountains and the

Betty Lee Mine (active in the 1920s and 1930s) within an eastward opening canyon of the Copper Mountains (U.S. Air Force 1986). Numerous other historic mines and prospects are found within BMGR—West, however, these sites are small to inconsequential in size. Most of these sites are located within the mountainous terrain of Baker Peaks, Wellton Hills, Copper Mountains, and Mohawk Mountains.

Ranching is the remaining early economic activity that contributed to the opening and settling of the BMGR region. Spanish settlers probably brought livestock to this region on a continuing basis at least as early as the late 1700s. American ranchers apparently arrived within the region at about the same time as the Gadsden Purchase of 1853. Not much is known about ranching activities from the 1800s, but plant community damage from over-grazing in the mid-1800s was noted as still in evidence in 1901 in what is now the Cabeza Prieta NWR (McGee 1901). Noted ranchers from the early part of the 1900s included the Childs, Cameron, and Gray families. Tom Childs, Jr. established a ranching operation 10 miles north of Ajo during this period. His operation was apparently one of the largest in the area with cattle from the Gila River to Mexico and west to the Mohawk Mountains (U.S. Air Force 1986). BLM grazing allotments under the Childs and Cameron family names continue to this day in the area around Ajo. The Gray Ranch was established in the Organ Pipe Cactus NM area in 1919 (Rutman 1997). Other ranches were also active throughout the region including the BMGR—East area. Evidence of historic ranching operations is found in many locations within BMGR—East. The remains of corrals, wells, buildings, fencelines, or other types of ranch improvements may be found south of the White Hills; in the Childs, Growler, and San Cristobal valleys; on the Sentinel Plain; between the Saucedo and Sand Tank mountains; and on the east side of the Sand Tank Mountains in the Paradise Well area. Livestock grazing occurred within what is today the Sonoran Desert NM during at least the first four decades of the 1900s prior to the BMGR during World War II. Ranching operations have also occurred in the Gila Bend area, and along the highway and Gila River corridor between Gila Bend and Yuma.

The extent to which livestock grazing occurred within BMGR—West prior to 1942 is not fully understood. In the 1870s, the Baker Ranch was located near the northern edge of what is now the BMGR near Tacna, Arizona. Evidence of what may have been another ranching operation lies just inside BMGR—West at the northern end of the Sierra Pintas (U.S. Air Force 1986). All that remains at the Sierra Pintas site is a collapsed, hand-dug well and remnants of a corral made of mesquite and ironwood sticks (U.S. Air Force 1986). Another hand-dug well shaft is located near the northern boundary of BMGR—West in the valley between the Mohawk Dunes and Mohawk Mountains. The purpose of this well is not known. No other evidence is known to indicate that livestock grazing occurred as an important industry within the BMGR—West area prior to World War II. However, the climatic and forage conditions that have prevailed during the several decades suggest that success for such an industry would have been dependent on highly ephemeral forage that appears only during the winter and early spring seasons of unusually wet years. Broyles and Hartmann (2000) shared this view as a result of their survey of the environmental setting and history of the Tinajas Altas region. Tinajas Altas, a collection of deep natural rock tanks that hold rain water throughout most years, is found in a canyon on the east side of the Tinajas Altas Mountains about four miles north of the international border. Broyles and Hartmann found no evidence of cattle camps, line camps, or ranches at Tinajas Altas, which is in the southwestern quarter of BMGR—West. They conclude that the presence of cattle within what is today BMGR—West likely occurred only in years with abundant winter rains when cattle strayed (or possibly were driven) south from settlements along the Gila River. They also point out, however, that large herds of cattle and packstock were driven by various parties along El

Camino del Diablo through the Tinajas Altas area on trips to/from Sonoyta, Mexico, and Yuma and California from the 1850s to as late as perhaps 1910. The USFWS reported this driveway to be active until at least 1945 (USFWS 1945). Livestock on these drives would have made use of forage encountered along the trail. This observation suggests that ephemeral forage would likely also have been used to at least supplement the feed of packstock used at early mining operations within BMGR—West and BMGR—East, although, as already noted, most of these areas were not the scenes of extensive mining activities.

Two cities located on the Mexican side of the international border are the rough counterparts of Gila Bend and Yuma. Sonoyta, about 70 miles south of Gila Bend and immediately south of Organ Pipe Cactus NM, began as early as the late 1500s as a mission, ranching, and farming settlement positioned on the Rio Sonoyta. San Luis Rio Colorado, located on the Colorado River about 20 miles south of Yuma, also originated as a mission and farming community. Sonoyta and San Luis Rio Colorado are linked by Mexico Highway 2, which roughly parallels the international border.

When the first nearly 90 years of American sovereignty over the BMGR region drew to a close prior to the beginning of World War II, the region could be characterized as having three areas of substantial agricultural development—Yuma Valley, the Wellton-Tacna Gila River corridor area, and Gila Bend—and one heavy industrial area, Ajo, based on large-scale mining separated by vast tracts of undeveloped backcountry where scattered mining and livestock grazing were the only ongoing economic activities. Although the distances within the region were large, Yuma and Gila Bend and Gila Bend and Ajo are respectively separated by 116 and 42 highway miles, development of these communities and their associated industries did not occur in isolation from one another. Rather, these communities were linked in an often mutually supportive manner by wagon roads, railroads, and eventually highways that carried copper ore, agricultural products, fuel, and other forms of local and transcontinental commerce as well as settlers, workers, and other travelers.

Taking stock during the mid 1930s of the ecological health of that portion of the region currently occupied by the BMGR probably would have revealed that most of the interior of the area had been relatively unaffected by the development of the periphery of the region over the 85 plus previous years. This observation is based on the conditions present within the range today, the previous review of development in the region at that time, and the historical records that are available. Inventories that have been completed in recent years on surface use activities within the BMGR show that most of the area was free of heavy soil disturbing activities prior to the advent of military training in 1941 (US Air Force 1998b; U.S. Marine Corps 2001). Principal exceptions to this observation would have been limited and scattered mining operations and various dirt roads that had been pioneered through the range for mining, livestock grazing developments, community-to-community travel, early land surveys, or other purposes. As reported by a number of sources and as demonstrated by TNC's project to identify natural community conservation elements in support of the development of the proposed INRMP, some of the most substantial tracts of relatively undisturbed natural plant communities remaining in the Sonoran Desert occur within the BMGR (Wachter and others 1976, US Air Force 1986, Marshall and others 2000, Hall and others 2001). It follows from these observations, that similar plant community conditions must have been present in the 1930s and 40s over most of the range area or the conditions observed today would not be present. Still, a survey during the mid 1930s would not likely have found all aspects of the range ecosystem to be intact or the long term protection and conservation of its natural and cultural resources, including the biodiversity of the

region, to be certain. The development that had occurred in the region had already brought some substantial changes to its environment including:

- The sharp decline of much of the native riparian community of the Lower Gila River, principally in response to the loss of perennial and seasonally intermittent flows in the river to upstream impoundments and diversions created by the construction of eight major dams by 1939. Accompanying the decline in riparian habitat was a complete loss of habitat within associated river flood plains and upland river valley areas to cropland conversion. As the river continued to be dewatered and habitat conversion to agriculture increased, the river corridor that had been the most productive habitat in the region and haven to many wildlife species during summer heat and drought was increasingly becoming a barrier to wildlife movement. The dewatering of the river and the rise of agriculture are cited as two of the early critical factors that led to the decline of the Sonoran pronghorn to endangered species status (Wright and deVos 1986). Additional material on this subject from the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference. These events also probably affected other ungulate including desert bighorn sheep and white tail and mule deer.
- The continuing rise of modern transportation corridors, including railroads and paved highways, between Yuma and Gila Bend, Gila Bend and Ajo, and Ajo and Sonoyta that increasingly fragmented natural communities and presented barriers to the movement of some wildlife species.
- Year-round livestock grazing within the eastern portion of the region and possibly ephemeral livestock grazing within some western areas of the region. The NPS has found that by the mid 1930s the area that was to become Organ Pipe Cactus NM had experienced excessive livestock stocking rates and year-round grazing in excess of sustainable grazing use levels for more than half a century (U.S. DOI, NPS 2001). The NPS further found that:

Short-term overuse by livestock can lead to loss of plant vigor, decrease in plant cover, and decrease in seed input to the system. Longer-term overuse can cause further decreases in plant cover, plant density, and shifts in species richness, composition and diversity. Long-term grazing pressure of the sort that occurred on the monument and adjacent areas can have long-lasting impacts, including type conversions (changing one type of plant association to a less productive type), decrease in species richness, decrease in species and community diversity, and accelerated erosion. Furthermore, desert plants, particularly long-lived species, and desert plant communities take many decades if not centuries to recover from such extensive disturbance.

As indicated in the proceeding discussion of historic livestock grazing, much of the eastern portion of the BMGR region was probably subject to this activity between the 1850s and 1930s.

- An increasing cumulative number of scattered mines, prospects, livestock improvements, and access roads within the interior of the BMGR region that were not collectively substantial in area but that nevertheless further opened the interior to potential development intrusions.
- The rise of towns and small cities with a regionally increasing population that would have imposed rising pressures on the area's natural resources. One of these pressures may have been the early over hunting of Sonoran pronghorn (USFWS 1998a).

### **6.3.2.2 Additive or Interactive Effects of Activities Since 1937**

Three events occurred between 1937 and 1943 that have had a significant long-term effect on the natural and cultural sources within the interior of the BMGR region and have continued to influence development within the region through the present. The first two events, creation of Organ Pipe Cactus NM in 1937 and Cabeza Prieta NWR in 1939, placed a contiguous area of 1,865 square miles into land use designations that emphasized conservation management over most consumptive uses. Although both the NM and the NWR would be subject to continuing legal and illegal grazing pressures until the mid 1970s, their respective designations arrested the potential for most other types of economic development and set these areas on a long-term course of management that would be increasingly protective of ecosystem functions and biodiversity.

The third event, designation of the BMGR through a series of contiguous land withdrawals in 1941, 1942, and 1943, was to have effects that both consumed and protected the range environment. Consumption came principally in the form of those parts of military training that caused direct impacts to soil surfaces and vegetative communities as a result of activities such as auxiliary airfield construction, ORV use, target construction, and air to ground ordnance deliveries. The total military surface use footprint within the BMGR over the course of 60 years is summarized in Table 4-5 which shows that less than 10 percent of the range area has been affected by activities that cause low to high levels of surface disturbance and that less than 3 percent has been subject to moderate to higher levels of disturbance. An indirect negative effect of the military range land withdrawal was that USFWS access to much of the interior of the Cabeza Prieta NWR was at many times limited by safety requirements associated with overhead air-to-air gunnery training until 1994 when the air-to-air firing range over the refuge was placed into an inactive reserve status.

The principal environmentally protective benefit of the military range was that, in exchange for surface use impacts resulting from military training, appropriate land uses, including but not limited to livestock grazing and mining, were prohibited by the legal instruments that established the range land withdrawals. This protection was also extended to about 95 percent of the Cabeza Prieta NWR, which was included within the military range. Prior to the withdrawal for the range, the NWR was subject to future mining claims and continued livestock grazing rights. Safety hazards and security requirements associated with military training also greatly limited the extent to which BMGR and Cabeza Prieta NWR lands could be subject to impacts from recreational use.

In any event, by 1943, Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR had placed over 4,900 square miles (reduced to about 4,750 square miles by deletions from the northern BMGR land area after World War II, many of which have been subsequently developed—see Figure 2-3) of the best remaining contiguous tracts of Sonoran Desert off limits to economic land use development through the additive and interactive actions of their respective land use designations. This was the case within the National Monument because of the NPS mission to preserve and protect the lands in its care for future generations. However, resource conservation objectives were not as well established for the Cabeza Prieta NWR during the first several decades of its existence. Although not by design, the safety and security requirements imposed by military use for both BMGR and NWR lands provided an enhanced level of protection to the refuge from potentially damaging levels of recreation use. The recognized high quality and expansiveness of many of the natural communities within the BMGR are also, in part, a product of long-standing limits on public use. The course had inadvertently been set by the 1941-1943

BMGR land withdrawals to conserve the environmental qualities for which its lands are currently recognized. In the absence of the military land withdrawals, the potentials for the continued long-term protection and sustainable use of an expansive portion of the Sonoran Desert ecosystem that are under consideration in this EIS might not have been realized.

During and following World War II, all land-use within the BMGR was controlled by the requirements of the military mission. Over time, the aggregate military surface use footprint grew to reach the levels indicated in Table 4-5 as mission requirements changed, although not all portions of that footprint were active at the same time. The active military surface use footprint has actually declined by 22 percent from the peak extent of 274,000 acres that was reached about 10 years ago. The extent and density of the road network within the range also increased over time to 2,222 miles of inventoried roads with an estimated aggregate roadbed area of 8,000 acres,<sup>39</sup> but the historic timing and rate of this increase is not specifically known. Most of the road mileage increase within the long-serving tactical and manned ranges and Management Unit 1 target complex and auxiliary airfield areas that are restricted to public access is a result of the development of targets and other infrastructure needed to support military training. Military activities also contributed to new roads within areas that are currently open to the public, but much of the mileage increase in these locations, including some of the dense road network patterns, can be attributed to recreational vehicle use. The U.S. Border Patrol was responsible for the creation of some roads, such as the east-west drag roads across the Mohawk Valley and Lechuguilla Desert, which have become some of the most prominent thoroughfares on the range. Not accounted for in the preceding surface use acreage and road mileage figures are impacts caused by unauthorized off-road driving by recreationists, UDAs, and smugglers and authorized off-road driving by the Border Patrol when necessary for search and rescue or some law-enforcement purposes. Necessary off-road driving in support of military training activities is accounted for in these figures, but the figures do not take into account the aggregate surface impacts of spent aerial gunnery and air to ground munitions delivered outside of designated weapons ranges over the course of the preceding 60 years. Although these munitions impacts cannot be specifically quantified, the aggregate surface area affected by these munitions deliveries is considered to be negligible.

Non-military off-road driving and the resulting proliferation of wildcat roads have been identified as the most serious illegal activity on the range since the development of the Luke Air Force Range Natural Resources Management Plan (U.S. Air Force 1986). Recreational driving is recognized as having contributed to the creation of certain dense, local road networks in several BMGR—West locations, such as in the vicinities of Tinajas Altas, Fortuna Mine, and Dripping Springs. However, increased law enforcement and public outreach efforts within the range since the latter-1990s are believed to have contributed to a decline in off-road driving by public visitors to the range. Since assuming surface management responsibility for the range in November 2001, the Air Force and Marine Corps have increased the active presence of law enforcement officers on the range and these agencies have plans to further expand their enforcement activities.

In spite of earlier successes in reducing off-road driving activities, illegal off-road driving has reemerged over the last several years as the preeminent activity damaging the BMGR environment. In this case, illegal off-road driving is occurring principally as a result of cross-border drug smuggler and UDA traffic. Increased off-road driving also occurs in support of authorized law enforcement and search and rescue activities by the U.S. Border Patrol and other

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<sup>39</sup> There is considerable overlap between the military surface use footprint and the aggregate roadbed area

public safety agencies in response to the need to interdict illegal entries into the United States and to provide life saving services to undocumented migrants that find themselves in peril from exposure to weather extremes and the lack of water or shelter within the BMGR. The NPS found that by 2003, cross-border traffic in Organ Pipe Cactus NM was causing significant and adverse effects on wildlife, wildlife habitat, vegetation, soils, endangered species, cultural resources, and the safety of government personnel and the public (U.S. DOI, NPS 2003b). The NPS response was the construction of a vehicle barrier in the monument along its portion of the international boundary to prevent or deter off-road vehicle entry to the United States. Construction of the barrier is nearing completion. The Border Patrol is planning a similar response to address cross-border traffic through the Cabeza Prieta NWR, western BMGR, and areas west of the BMGR to the Colorado River.

In addition to causing direct impacts to soils, vegetation, and wildlife, there is a concern that aggregate military and non-military surface use has also caused wildlife habitat fragmentation and that it has facilitated the introduction of invasive plant species. With the exception of State Route 85 corridor, which is a fully fenced transportation and utility corridor, habitat fragmentation has not yet been identified as a significant resource management issue within the BMGR. High-speed traffic on State Route 85 has been identified as a eastward habitat curtailment to Sonoran pronghorn within Organ Pipe Cactus NM and this highway may also impede the future recolonization of BMGR—East by these animals to the east of the highway (USFWS 1998a; U.S. Marine Corps 2001). Additional material on this subject from the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference. The proposed Yuma ASH has the potential to fragment habitat at the western end of BMGR—West if the USFWS Biological and Conference Opinion of 1996 is not adhered to. This effect would separate habitat within the range from habitat outside the range. In contrast, State Route 85 separates approximately 326,000 acres, or 18 percent, of the range land area in Management Units 6 and 7 from the remainder of the range. These units, however, are contiguous with about 237,000 acres of the Sonoran Desert NM located south of Interstate Highway 8 and additional hundreds of thousands of acres within the Tohono O'odham Nation. There are no highways or other human structures between BMGR—East and Cabeza Prieta NWR. The boundary between the military range and the Tohono O'odham Nation is separated by a cattle fence.

No other specific habitat fragmentation effects from either military or non-military surface use have been observed at this time that disrupt the movements or habitat requirements of macro fauna within the BMGR. Potential fragmentation effects on smaller wildlife species have not been investigated. This potential would presumably be greatest in association with the largest and most heavily traveled roads within the range, such as Border Patrol drag roads or roads used for daily access to manned and tactical ranges to support ongoing training missions. The potential for habitat fragmentation may also be exacerbated in the few passes that traverse some of the long trending mountain ranges, such as the Gila and Mohawk Mountains, that otherwise can pose extensive barriers to the movement of many species of terrestrial wildlife that depend on lower elevation habitats. With the exception of two air-to-ground targets located in passes through the Crater Range within North TAC Range, historic military surface use has not been positioned within these geographic areas. The creation over the years of multiple redundant roads through Cipriano and Tinajas Altas passes by public recreation has had some potential to cause habitat fragmentation effects within these constricted areas but the level of impact has not yet been known to affect wildlife movements including those of bighorn sheep.

Closure of the Cameron grazing allotment within the BLM Ajo Block has made the subsequent, and soon-to-be-completed, elimination of livestock exclusion fences between the Ajo Block and the Cabeza Prieta NWR and Organ Pipe Cactus NM possible. Removal of these fences will eliminate the last internal structural impediment to large mammal movements within the contiguous area of the BMGR, Cabeza Prieta NWR, Organ Pipe Cactus NM, and Ajo Block.

The extent to which surface disturbance has served as a vector for the introduction of invasive plant species within the BMGR is not yet well understood. Some potential for these effects has been documented by Malusa and others (2001) in the Mohawk Sand Dunes in association with drag roads used routinely for law-enforcement surveillance by the U.S. Border Patrol. If roads and vehicle use are important vectors that promote the introduction of invasive plant species, then the proliferation of wildcat off-road vehicle tracks by smugglers and UDAs may exacerbate the problem. Determining the extent to which invasive species are a threat to the native ecosystem of the BMGR is a management problem that will require additional monitoring as well as interagency cooperation to determine and, if necessary, control.

Other potential additive or interactive effects from military use on the ecosystem of the BMGR include impacts from hazardous materials or wastes, munitions delivery, and noise. As described in Section 4.18, both the Marine Corps and Air Force have maintained long-standing and aggressive hazardous materials and waste containment and clean-up programs. The use of potentially hazardous materials or wastes, such as paints, solvents, lubricants, or other petroleum products, is closely regulated. Materials dispensed for use on the range are inventoried and carefully tracked in terms of their use and, if necessary, proper disposal. Special provisions are taken to contain materials, such as vehicle fuels and lubricants, that may be subject to spillage or leakage while they are in use on the range. Certified spill response plans are in place with both the Marine Corps and Air Force, which include full coordination with other agencies with applicable resource management or regulatory jurisdictions, to provide for timely and appropriate containment and remediation actions should a release of a hazardous material or waste occur. Releases of hazardous materials are likely to occur in the event of an aircraft crash. Plans are also in place to direct and coordinate responses to these events including steps to contain and remediate spills associated with crashes.

Procedures for the handling of hazardous materials and wastes as a result of military use have long been in use on the BMGR. Handling procedures for hazardous materials and wastes within the BMGR have not always been up to contemporary standards and releases of such substances in the past may not have been handled in accordance with today's standards. The 1992 IRP for the range, however, was designed to identify, investigate, and remediate past release sites. As a result of the range of the IRP, 12 sites were identified within the BMGR and all sites have been adequately addressed, including no further declarations on site ST-108, AUX-2; site DP-109, Napalm Burn Area; and site SS-123, Fortuna Mine.

The most likely apparent sources of hazardous materials and wastes within the BMGR from non-military origins would include historic but inactive mines, fuel and other fluids from vehicles operated by civilian agencies and the public, and wildcat dumping. Nevertheless, none of these sources are known to contribute notable quantities of hazardous materials or wastes. Wildcat dumping, however, is an increasing source of solid waste in the form of trash and debris that is principally discarded around the periphery of the range. Another problem source of solid waste is items discarded by UDAs as they attempt to cross the range while entering United States illegally.

Collectively, hazardous materials and wastes have not been a prominent source of environmental concern within the BMGR. Inadvertent releases that do occur are promptly contained and remediated as appropriate and there are no apparent residual contamination problems associated with historic uses. There is no evidence to indicate that hazardous materials or wastes pose a threat to the overall health or functions of the ecosystem within the range.

As already discussed, munitions deliveries can cause a high degree of physical impact to core target areas but these areas are tightly concentrated and do not constitute a significant portion of the range land area. Target impact areas are accounted for within the data representing the military surface use footprint. From an ecological perspective, the pulverized soils within core target impact areas are areas of greatly simplified function and structure compare to surrounding undisturbed natural communities. The disturbed soils of these impact areas are known to support an abnormally high abundance of annual forbs following winter or spring rains that are particularly attractive forage to Sonoran pronghorn. These impacts areas may also be fertile grounds for colonization by invasive species.

The best available evidence indicates that noise generated by military activities, including aircraft overflights, is not a significant problem for wildlife in general. Some specific activities that generate noise in certain circumstances, such as low-level helicopter overflights of Sonoran pronghorn females and fawns during the early months of the fawn's life, may be problematic. There are no indications, however, that noise plays a larger and more pervasive role within the BMGR that effects the structure, functions, or distributions of natural communities or individual species. Additional material on this subject from the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference.

Land use development in the region surrounding the BMGR during and after the second World War continued in the pattern establish before the war. Three additional dams were constructed on the Gila River system, including Painted Rock Dam in 1959, which all but eliminated natural flows within the lower Gila River corridor. The dewatering of this corridor was accompanied by continued agricultural development along the river and in the Yuma Valley area until at the present time there are nearly 94,000 acres of inventoried cropland within 5 miles of the northern and western boundaries of the BMGR.

Urban population growth and mixed economic development has continued in the Yuma area and, as previously indicated, unprecedented residential growth has occurred in many of the rural communities bordering the BMGR. Increased population in the region has in turn increased the numbers of people that have turned to the BMGR as an outdoor site over the last two decades. In addition, the increase in the popularity and availability of sport utility vehicles and other types of four-wheel-drive vehicles has made remote locations, such as the BMGR, accessible for recreation by a higher proportion of the general population. In some respects, an increase in the number of federally restricted or protected land areas within the BMGR region has led some to increasingly favor the range for vehicle based recreation. Yuma Proving Ground was established in 1943; much of the Kofa and Cabeza Prieta NWRs were designated as wilderness in 1990; six wilderness areas—Muggins Mountains, Eagletail Mountains, Woolsey Peak, North Maricopa Mountains, South Maricopa Mountains, and Table Top—to the north and east of the BMGR were designated in 1990, and Sonoran Desert NM, which incorporated North Maricopa Mountains, South Maricopa Mountains, and Table Top wildernesses within its boundaries, was established in 2001.

Interstate Highway 8 was constructed during the late 1960s and early 1970s forming an imposing four-lane, high-speed, fenced barrier lying between the BMGR and the diminished Gila River riparian corridor. Increases in highway speeds on State Route 85 through Organ Pipe Cactus NM from about 35 miles per hour during the World War II era to the current 65 miles per hour has been credited with curtailing Sonoran pronghorn movement to the east of this highway since the mid 1970s (U.S.DOI, NPS 2001). Mexico Highway 2 between Sonoyta and San Luis Rio Colorado was constructed as a paved highway at some point since World War II, thus, completing the encirclement of the contiguous land area generally composed by about 82 percent of the BMGR, all of the Cabeza Prieta NWR, and most of the Organ Pipe Cactus NM by joining the combination of Interstate Highway 8, State Route 85, and U.S. Highway 95 and paved Yuma County roads. The use of Mexico Highway 2 by heavy trucks has reportedly increased markedly since the passage of NAFTA in 1995 (U.S.DOI, NPS 2001). Additional material on this subject from the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference.

Another economically related phenomenon is the unprecedented surge of smuggler and UDA traffic that has streamed across the interior of the BMGR region in recent years, first discussed in Section 2.5.2 and also addressed in 4.13.1.5 and 4.14. Driven principally by the quest for work and better pay, this traffic and the US law enforcement response is nonetheless causing some of the most significant environmental damage to occur in some of the most remote locations of the region's interior. Range-wide impacts resulting from off-road driving, discarded refuse, and disturbances to wildlife are one of the preeminent sources of damage to the range environment. A directly connected factor contributing to vehicle caused environmental damage is the off-road driving conducted by Border Patrol agents in their efforts to interdict smuggler and UDA traffic and to conduct life-saving search and rescue services to persons stranded in the range. No data are available that quantify either the spatial distribution or severity of resource damage within the BMGR that may have occurred or is currently occurring as a result of Border Patrol and UDA traffic. Such data would not be easily or readily obtainable. The various road management strategies proposed in the EIS were designed to specifically address this problem. Additionally, increased law enforcement efforts within the range during the mid- and late-1990s are believed to have contributed to a decline in off-road driving by visitors to the range. Since assuming surface management responsibility for the range in November 2001, the Air Force and Marine Corps have increased the active presence of law enforcement officers on the range and these agencies have plans to further expand their enforcement activities.

In recent years, some roads that were formerly open to public use have been closed or seasonally closed to public use, both within and near the BMGR. Some of these occur in the Ajo Area, including the 11 miles of road that serve as run-in lines to Manned Ranges 1 and 2 in Management Unit 6. These run-in lines were closed under the authority of the MLWA of 1999 [P.L. 101-65 §3031(b)(2)(A) and (B)] to protect public safety and support the military training mission of the BMGR (see Section 2.2.6). These run-in lines are used in training as a visual aid for pilots flying military aircraft on specific types of approaches over Area B to Manned Range 1 and Manned Range 2 to deliver air-to-ground ordnance on designated targets. Closure of the Manned Range 1 and Manned Range 2 lead-in lines to public access is a safety requirement to protect visitors from potential inadvertent releases of ordnance from aircraft approaching these weapons ranges. The closed Manned Range 1 run-in line formerly provided a shorter-distance drive from the Ajo area to destination points in the Saucedo Mountains than the alternate route that remains open for public access. However, both routings reach the same destination and traverse interesting and scenic landscapes. The Air Force determined that it was necessary to

close the Range 1 and Range 2 lead-in lines to public access because safety must take priority over convenience.

Seasonal (four-month) closures during the Sonoran pronghorn fawning season (15 March to 15 July) have been implemented for:

- San Cristobal Valley area of BMGR—East (generally, Management Unit 4, which is otherwise open for special use permit access only)
- Mohawk Valley area of BMGR—West (generally, Management Unit 3)
- Approximately 65,000 acres of BLM-administered public lands in the Ajo Block west SR 85 and south of the Darby Wells/Scenic Loop/Chico Shunie Road (does not include Darby Wells/Scenic Loop/Chico Shunie Road and public lands north of these roads or the Gunsight Wash winter camping areas)
- Approximately three-quarters of the Cabeza Prieta NWR, including Charlie Bell Road and El Camino del Diablo East of Tule Well (the Wellton Road from Interstate 8 to Tule Well and Christmas Pass remains open)
- Pozo Nuevo Road and Bates Well roads in the northwestern portion of Organ Pipe Cactus NM

In addition, conditions at Organ Pipe Cactus NM led to the closure of the following roads to vehicle traffic until further notice: Pozo Nuevo, Camino de Dos Republicas, South Puerto Blanco Drive, and North Puerto Blanco past the five-mile gate (DOI, NPS 2004a).

The Ajo area human community is the most affected by these closures. Economic activity associated with winter visitors and tourism, however, apparently has not been substantially affected. The four-month seasonal closure includes about a month and a half of the hottest annual average temperatures in southern Arizona (June to mid-July), when visitation is typically the lowest and when winter visitors/part-time residents are not present. The four-month closure also includes the milder season from late March through May. Currently, the seasonal Sonoran pronghorn closures generally affect BLM lands within the southern portion of the Ajo Block (i.e., the BLM-administered land that surrounds the community of Ajo). Some of these routes are contiguous with the Bates Well road (seasonally closed for Sonoran pronghorn), and to some extent the Pozo Nuevo road (closed indefinitely), on Organ Pipe Cactus NM and are part of a circulation pattern route with BLM lands in the Ajo Block to the north of the monument. The Pozo Nuevo road connects with the portion of El Camino del Diablo within Cabeza Prieta NWR (which is seasonally closed for Sonoran pronghorn). Several of the routes in Management Unit 6 are part of a circulation pattern of routes on BLM lands in the Ajo Block to the south, including the Manned Range 1 target run-in line (closed for military safety and security), which is in the southwest corner of Management Unit 6 (see Figure 3-1). However, areas to the north, east, and west of Ajo are not impacted by these closures, including the Darby Wells/Scenic Loop/Chico Shunie Road and Gunsight Wash campsite area.

The seasonal Sonoran pronghorn closures were implemented as a result of biological opinions issued to the Air Force, Marine Corps, Army National Guard, NPS, and BLM in November 2001 based on a court-ordered reassessment of cumulative impacts to this species. The BLM published the notice of closure in March 2003. Estimates of use of the Gunsight Wash campground site (located south of Ajo with the closure area located to the south, west, and north of the site) are perhaps most indicative of changes of visitation in the Ajo area in recent years. The BLM estimates that this campground had 4,050 visitors in FY 2001; 3,200 visitors in FY 2002; and

2,500 visitors in FY 2003 (DOI, BLM 2004). Some of the decrease in visitation has been attributed to decreasing popularity of RV camping.

Although some decreases in visitation to Organ Pipe Cactus NM have apparently occurred in recent years (total FY recreation visits reported by the NPS are 318,668 for 2001; 295,083 for 2002; and 270,124 for 2003 [DOI, NPS 2004b]), these reductions have not been attributed to the closures and may be attributable to safety concerns related to the international border, unfavorable wildflower viewing conditions due to the recent drought, or decreases in travel following the September 11 terrorist attack.

A recent survey of visitor experience within the Cabeza Prieta NWR found that 13 percent of the respondents were visiting the refuge from Ajo and the surrounding area (within the 85321 zip code). When asked, "What would enhance your experience at Cabeza Prieta NWR?," 32 percent of all responses pertained to roads and access (more than any other comment category). Comments in this category included those about poor road conditions and limited refuge access due to seasonal road closures or lack of roads. Some indicated that having only four-wheel drive access was a problem, while others praised the refuge for allowing only four-wheel drive vehicles and limiting access. Additionally, 84 percent of all respondents indicated that they made local purchases in the Ajo area and 16 percent indicated that they made local purchases in the Yuma area (Ponds and others 2004).

The economic impacts associated with any reduction in visitation due to route closures alone are not quantifiable, but the road closures are not regarded as creating an economic hardship for the Ajo area. Ample opportunities to access desert environments remain despite the closures. Roads that remain open on Organ Pipe Cactus NM include the most frequently visited Ajo Mountain Drive; portions of Puerto Blanco Drive; and routes within the western, northern, and eastern portions of the Ajo Block, including the Darby Wells/Scenic Loop/Chico Shunie Road and Gunsight Wash campsite area. Of greater consequence are the social impacts to the community of Ajo, which has been denied access to routes that have traditionally been used by local residents for recreation. Social impacts from reduced access include dissociation or resentment from denied access to sites or areas that are valued for the experiences or sense of place attachment they offer, and perceived loss of one's right to access public lands. These impacts can be to individuals, families, or groups that are denied access. These are additive with the overall condition of Ajo as a community that is surrounded by lands in federal ownership, which limits outward growth of the urbanized area and certain types of socioeconomic development.

### **6.3.3 Additive or Interactive Effects of Reasonably Foreseeable Future Actions on the Ecological Landscape and Human Community**

Reasonably foreseeable future military actions within the BMGR include cleanup of inactive targets, development of gravel extraction sites for targets and maintenance, potential development of an electronically scored simulated urban target area, increased aircrew training operations at night within the BMGR—East, possible relocation of a Marine squadron to MCAS Yuma that would operate UAVs within BMGR—West, and the continuing beddown of the CSAR unit at Davis Monthan AFB (see actions 25, 31, 40, 41, 45, and 68 in Table 6-2). Next-generation aircraft and weapon systems will also likely be introduced to the BMGR within future years (see action 44 in Table 6-2). The individual and cumulative effects of these actions will be assessed in separate NEPA documentation. At this time, it is reasonable to project that these actions would not cause appreciable increases in the military surface use footprint within the

range but these actions may affect public access as a result of modified safety and security requirements. Continuing Sonoran pronghorn recovery actions, including the forage enhancement and semi-captive breeding projects (see action 26 in Table 6-2), may also prompt changes to public access privileges within portions of the BMGR, Cabeza Prieta NWR, Organ Pipe Cactus NM, or adjacent BLM lands. Flat-tailed horned lizard management actions will continue within Management Unit 1 in support of implementing the 2003 Rangewide Management Strategy for this species (see action 48 in Table 6-2). These actions will differ very little from ongoing management activity and will not affect current military operations, public use, or other natural or cultural resources (see action 12 in Table 6-2). Finally, illegal cross-border traffic involving off-road driving and concentrated foot traffic as well as Border Patrol interdiction and search and rescue operations will continue. The future scale of these activities and their resulting effects are not quantifiable, but current trends indicate that these cross-border traffic issues will constitute the most significant threat to the natural and cultural resources within the BMGR over at least the next several years. Beyond that timeframe, plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe.

Many of the future actions that are pending within the BMGR region outside of the military range involve economic development activities that are less reasonably foreseeable as specific projects but that appear to be collectively inevitable (see actions 43, 49, 50, 57-59, 60-63, and 65 in Table 6-2). Most of the economic growth in the region is expected in the Yuma area but unprecedented residential growth has occurred in the greater Wellton-Tacna area over the last 10 years and is expected to continue. Population growth and urban development are also anticipated to accelerate in Gila Bend in response to a new electric power generating station that is currently under construction adjacent to this town. The proposed power plant and petroleum refinery in eastern Yuma County would create job opportunities and likely promote additional economic development in that area. The potential reopening of the Phelps Dodge Mine in Ajo is dependent on international copper prices and is therefore less certain. Reopening this mine would create job opportunities for 350 to 400 people in Ajo, but may have negative effects on the attractiveness of this community as a retirement area. Economic development in Sonoyta and San Luis Rio Colorado, Mexico, is also expected to continue at a rapid pace as a result of cross border trade advantages imparted by the NAFTA. Collectively, these projections for economic development will likely result in some additional irretrievable loss of wildlife habitat and conversions of native Sonoran Desert to urban activities. Much of the anticipated or planned development in the vicinities of Yuma, Gila Bend, Wellton and Tacna, and Dateland, however, is expected to involve the conversion of existing agricultural lands to urban land uses with no direct loss in undisturbed desert. Still, the increases in population that will occur in these communities and elsewhere in the region as a result of the accelerated economic activity will place more pressures on the wildlands, including the BMGR, that remain in the region. These pressures may be expected to come in the forms of degraded air quality, curtailed wildlife movement corridors, increased traffic, and increased demand for outdoor recreation.

The reasonably foreseeable future also includes the ongoing or pending development of four management plans for various wildland areas outside of the BMGR (see actions 14, 55, 64, and 66 in Table 6-2). These areas include the Cabeza Prieta NWR, Sonoran Desert NM, Tohono O'odham Nation, and the Sentinel Plain, Interstate 8, and Ajo Airport parcels that were not renewed as a part of the BMGR. These areas are contiguous with the BMGR and, collectively, the pending management plans should enhance and coordinate conservation of natural and

cultural resources throughout this greater region. They also may involve the additional closures or limitations on motorized or other types of public use.

No additional limits on public access to the BMGR per the authority of the MLWA of 1999 [P.L. 101-65 §3031(b)(2)(A) and (B)] are foreseeable at this time. However, currently unanticipated military operations, public safety, or national security exigencies could emerge that would require further closures.

#### **6.3.4 Additive or Interactive Effects of All Past, Present, and Reasonably Foreseeable Actions on the Ecological Landscape and Human Community**

The additive or interactive effects of all past, present, and reasonably foreseeable actions on the ecological landscape and human community of the BMGR region are best summarized in terms that characterize how the current status of the region was shaped, its present ecological and human community conditions, and future activities that will likely influence its fate. These effects include:

1. Native American cultures and land uses in the region were displaced or eliminated first by Spanish settlement and economic development (1500s-1853) and then by American settlement and development following the Gadsden Purchase of 1853. Spanish economic and development activities were focused on farming, livestock grazing, and trade. These activities were expanded and accelerated in the region following the American acquisition of sovereignty. Since 1853, the principal centers of economic activity in the BMGR region have been Yuma, the Lower Gila River corridor in the vicinity of Wellton and Tacna, Gila Bend, Ajo, Sonoyta, and San Luis Rio Colorado. These communities and development areas were linked by transportation corridors that originated as overland trails and wagon roads, were expanded to include railroads, and eventually further developed to include modern two-lane and four-lane highways. The additive or interactive ecological effects of economic development are principally the collective result of (1) dewatering of the Gila River through impoundments and diversions; (2) conversion of Rio Sonoyta streamflows from perennial to intermittent due to groundwater pumping; (3) the loss of riverine and riparian habitat along these formally perennial streams; (4) irreversible conversion of native Sonoran desert to agricultural, urban, and industrial purposes within the Yuma Valley, lower Gila River corridor, Gila Bend, Ajo, Sonoyta, and San Luis Rio Colorado areas; (5) development of transportation corridors linking the principal centers of economic activity; (6) livestock grazing within the interior of the region; and (7) opening of the interior of the BMGR region as a result of unimproved road development to support livestock grazing, prospecting and mining, and land survey. As a result of these actions, structural and functional components of the region's ecosystem have been diminished. Accordingly, its resiliency to resist, recover from, or adapt to impacts has also been reduced. The most critical effects of these actions have been the loss of riverine and riparian habitat, the loss of other habitats to agriculture and urban oriented activities, and the fragmentation of habitat from the development of major transportation corridors and irrigation canals. These outcomes have, in turn, impacted natural communities and selected wildlife species within the interior of the region, in part by retarding or curtailing wildlife movements and migrations. Further, these outcomes have limited or eliminated biologically productive and protective floodplain and bottomland habitats that were at least seasonally important to many upland wildlife species and reducing the availability of riverine and riparian habitat impacted upland wildlife that utilize these very limited corridor areas directly or indirectly for support during certain phases in their life

cycles. The ecological effects of perimeter development on the interior of the BMGR region have been further exacerbated by the stresses induced by historic livestock grazing and the opening of the area to vehicle access through the development of backcountry roads.

2. Three long-standing, land use designations—Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR—have provided resource conservation protection to much of the interior of the BMGR region. These designations, from the 1937 to 1943 timeframe, have collectively eliminated or prohibited appropriate land uses, such as livestock grazing, mining, and farming, from the region's 4,750 square mile interior and have somewhat offset the adverse ecological effects of the economic development and population growth that has occurred on its perimeter. The NM and NWR designations have also placed resource protection and conservation at the core of land management priorities for about 40 percent of the region's interior. Military use of the BMGR has resulted in the impairment of some of natural and cultural resource qualities but, with a surface use footprint that has affected less than 10 percent of the range area at low to high levels of surface disturbance and less than 3 percent of the area at moderate to high levels of disturbance, designation of the military range has also had the countervailing effect of protecting over 90 percent of the area from the deleterious effects of long-term economic land use development. The interior land area of the BMGR region also has an advantage associated with its surface hydrology that helps to insulate this area from potential impacts originating outside of its perimeter. The topography of the BMGR region, including Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR, is such that the headwaters of almost all surface water drainage from the region originates from within the region and drains to locations outside of the region. Most of the region drains to the north or northwest into the Gila River. The exceptions include the area along the southern portions of Organ Pipe Cactus NM and Cabeza Prieta NWR in the area west of the Gila and Tinajas Altas Mountains. These locations drain into either the Rio Sonoyta or Colorado River in Sonora, Mexico. The only notable location that drains into rather than out of the region is the Growler Wash that flows into Organ Pipe Cactus NM from BLM lands located in the vicinity of Ajo. As a result of these drainage patterns, Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR are generally not vulnerable to surface waterborne sources of hazardous materials or wastes or other contaminant that originated outside their collective boundaries.
3. The adverse effects of off-road driving and concentrated foot traffic by drug smugglers and UDAs in the BMGR and contiguous Cabeza Prieta NWR, Organ Pipe Cactus NM, and BLM Ajo Block currently are causing the most significant environmental impacts in these areas. Border Patrol interdiction of cross-border traffic in areas outside of the contiguous Cabeza Prieta NWR, Organ Pipe Cactus NM, and BMGR complex is believed to have diverted smugglers and UDAs into the complex. Within the complex, Border Patrol activities have served to ameliorate some illegal migration and smuggling effects by deterring and limiting cross-border traffic, but have also exacerbated these effects by contributing additional off-road driving in interdiction and search and rescue efforts. Drag road construction and maintenance in the BMGR has disrupted and captured surface water runoff channels. Unless it is brought under control in the near future, off-road driving associated with cross-border traffic threatens to create an ever growing network of cross-country vehicle tracks of unmanageable proportions with widespread and adverse effects on soils, surface drainage hydrology, wildlife, wildlife habitat, cultural resources, visual resources, and public safety. In aggregate, adverse effects associated with illegal cross-border traffic appear to dwarf the combined adverse impacts

from all other current sources and threaten to overwhelm the benefits of all natural and cultural resource management activities. Plans to erect vehicle barriers and implement other border control measures along the entire length of the international boundary from at least Organ Pipe Cactus NM to the Colorado River may reduce this traffic to an environmentally manageable level, possibly by the 2009 timeframe.

4. Setting the adverse effects associated with illegal cross-border traffic aside, the current relationship between the ecological conditions of the BMGR region and its human community is best characterized as one of growing tension. The tension is that between a fairly well protected and expansive core land area that continues to harbor a representative cross section of indigenous Sonoran Desert natural communities and biodiversity that is nonetheless ringed by transportation corridors, centers of population, and economic development activity that in a number of ways threaten the long-term ecological health of the core. The past, present, and reasonably foreseeable future actions that collectively affect and to some degree diminish the ecological health of the region's interior have been defined under the first two points.
5. The additive or interactive effects of past, present, and reasonably foreseeable future actions on the human community are also divergent. On one hand, the economic development activities that have occurred within the region have provided humans livelihoods and support for diverse cultural amenities. Prosperity over recent years has made, and will likely continue to make, these benefits increasingly available to a growing number of people. The extraction of these economic and other types of benefits from among the region's natural resources has, of course, not come without trade-offs. Development of the selected resource uses have come at the loss of other natural and cultural resource values with the consequence that those values are either no longer available or are available only in diminished quantity and quality for the enjoyment and benefit of the human community. A case-in-point within the BMGR region is that of the Sonoran pronghorn. This endangered species continues to survive within the United States but marginally so and almost exclusively within habitat currently found in Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR. The relatively infrequent opportunity to observe these animals is welcomed by most visitors to these areas. In the late 1900s, the Sonoran pronghorn was much more widely distributed within the Sonoran Desert in both the United States and Mexico. Many factors have contributed to the decline of this species but among the critical additive or interactive impacts that affect the prospects for its continued survival are the loss of the habitats adjacent to and within the former Gila River riparian corridor. The availability of these habitats have been irreversibly lost to this species as a result of the development of the railroad and interstate highway that block its north-south movements, conversion of river corridor habitats to agriculture and other economic uses, and dewatering of the river itself. As a result of these and other additive or interactive effects, the Sonoran pronghorn population has lost much of its capacity to tolerate the effects of severe drought during its spring and early summer fawning season. In one of a number of management efforts to compensate for the aggregate losses incurred by this species, substantial portions of Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR are now closed to visitor use each year from March 15th through July 15th to increase the potential for pronghorn fawn survival by decreasing the potential for harmful levels of harassment of fawns during a vulnerable point in their lives. The trade-offs to the human community have been the reaping of economic benefits gained from the modifications to the Gila River corridor and transportation developments at the cost of seasonal visitation privileges to the

interior of the BMGR region and the threat of the additional loss of the Sonoran pronghorn species.

#### **6.4 THE INCREMENTAL EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES WHEN TAKEN TOGETHER WITH ALL PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS ON THE ECOLOGICAL LANDSCAPE AND HUMAN COMMUNITY**

A fundamental purpose of the proposed INRMP is to provide for the protection and conservation of natural and cultural resources of the BMGR and sustainable multipurpose public use, to the extent activities are consistent with the military purposes of the range. This fact is directly relevant to the overall determination of the cumulative effects of preparing an INRMP considered together with other past, present, and reasonably foreseeable future actions. As the preceding review and analysis presented in Sections 6.2 and 6.3 demonstrate, the BMGR represents an expansive environment that harbors some of the largest and least disturbed remaining tracts of indigenous Sonoran Desert. Some of the natural communities present on the range are the best surviving representatives of these community types in the entire Sonoran Desert ecoregion. This is not to say that the additive or interactive effects of past and present actions, including non-military activities but excluding illegal cross-border traffic and associated law enforcement responses, have not adversely affected the range environment. These adverse effects have been thoroughly reviewed and documented in this EIS. The additive or interactive impacts of these past and present actions have been limited, however, and the overall BMGR ecosystem has remained relatively healthy and intact as a result.

Therefore, the fundamental ecosystem management task for the proposed INRMP is to protect and conserve components, structure, and functions of this ecosystem. On overall balance, the management actions adopted through this plan must not harm these basic ecological components and processes. The vision of the proposed INRMP is to achieve more than the basic management expectations and ultimately set management on a course that will also help to restore damage to BMGR environments and enhance the overall resiliency of its ecosystem and biodiversity. Towards these ends, the proposed action and all of the alternatives have been designed to, at a minimum, meet the overall requirement of protecting and conserving the basic ecological components and processes of the range environment while balancing opportunities for public use. The proposed action, however, is aimed at also fulfilling the long-term plan vision of guiding management such that overall improvements in the vitality and resilience of the range environment are achieved.

The aggregate effects of the proposed action and alternatives on individual resources within the BMGR are presented in Table 6-1. On overall balance, the proposed action and Alternative Management Strategies C and D are beneficial for the natural and cultural resources of the range and provide mixed effects for outdoor recreation. All three of these alternatives provide for public access but each strikes a balance between access and resource protection and conservation goals that favors the protection and conservation side of this management equation. The effects of these three alternatives on recreation are mixed because of the widely varying expectations that different groups of people have regarding desirable recreational experiences. The overall balances of Alternative Management Strategies A and B are shifted more in the direction of providing for public access and, as a result, these strategies would be less beneficial for the long-term protection and conservation of natural and cultural resources than the proposed action or Strategies C or D. In fact, the aggregate effects of the no-action alternative (Strategy A) were

found to be slightly adverse for vegetation, wildlife, wildlife habitat, and protected species not because the provisions of this strategy would cause direct harm to these resources but because this strategy would fall somewhat short of the long-term goal of facilitating restoration and improvements in the range ecosystem and biodiversity. Although Strategies A and B provide for more public access than the proposed action or Strategies C or D, the aggregate effect of Strategies A and B on outdoor recreation were also found to be mixed because of the continuing variances in the perspectives of different segments of the population regarding the appropriateness of various recreation activities and the desirable characteristics of environments in which to pursue activities of their choice.

The additive or interactive effects of past, present, and reasonably foreseeable future actions on the individual resources within the BMGR are identified in Table 6-3. For most resource categories, including those for vegetation, wildlife, wildlife habitat, and protected species, the additive or interactive effects of past, present, and reasonably foreseeable future actions have been adverse and in some cases, such as protected species, these effects have also been significant. The cumulative impact of combining the proposed action, Alternative Management Strategy C, or Alternative Management Strategy D with the additive or interactive effects of past, present, and reasonably foreseeable future actions would be beneficial for most individual resources in that these alternatives would encourage or facilitate improvements in the existing conditions of these resources. In contrast, the cumulative impact of combining Strategies A or B with the additive or interactive effects of past, present, and reasonably foreseeable future actions would benefit the existing conditions of fewer individual resources.

The aggregate effect of the proposed action and all alternatives when considered on the broader scales of the BMGR ecosystem and the human community are overall countervailing influences for the restoration of the effects of past damage, the management and regulation of ongoing use, and adjustments and adaptations in management for responding to emerging issues. In aggregate, each of these strategies provides for sustainable multi-purpose use without compromising resources. Strategies A and B, however, in comparison to the proposed action, Strategy C, and Strategy D, promise less effective management tools toward this end.

The aggregate effect of Strategy D is overall most beneficial on both the human community and ecological landscape (see Table 6-1). This strategy offers the most ecosystem benefits at the scale of species-specific, natural community, range-wide ecosystem, and the greater ecosystem of which the BMGR is a part. While most effects on the human community are mixed, this strategy also offers the greatest benefits in terms of socioeconomics and public health and safety. One notable adverse individual effect on the human community, however, would result from the public utilities and transportation corridors management objectives in this strategy, which would preclude the development of new corridors, including the Yuma ASH for which extensive efforts are currently underway. The incremental impact from the closure of 34 miles of roads within Management Unit 6 under Strategy D, plus the other military safety and security, Sonoran pronghorn seasonal, and other indefinite closures in the Ajo area on the human community is also notable. The changes within the BMGR under Strategy D would consist of a loss of convenient access (including hunter access) in localized areas, but would continue to provide access to recreation destinations and a functioning circulation of routes. Although the minimal significance of the 34 miles of road closures on the human community is increased somewhat in the context of the other closures in the area, it would not rise to a level constituting a significant adverse

impact or economic hardship on the Ajo area community. Also, regardless of management strategy, there is an outstanding potential for BMGR recreation to be having adverse effects on cultural resources. Without having surveyed all areas of the range, recreation use could be causing damage to cultural resources that is yet unknown. As Strategy D is the most restrictive in terms of limiting the extent and types of recreation use, this strategy is the most advantageous in terms of minimizing the potential for such effects to unknowingly occur.

Next to Strategy D, the proposed action offers the most aggregate benefits. The proposed action includes some tradeoffs, which are less beneficial to resources as compared to Strategy D, but is less adverse in terms of the human community. A key example is that the proposed action would allow for the development of the Yuma ASH. Another tradeoff is that less extensive road closures are proposed within Management Unit 2, which is a popular area for recreation, including recreational driving and camping. The incremental impact from the closure roads in Management Unit 6 along with the other seasonal and indefinite closures in the Ajo Area is reduced from that of Strategy D, as eight fewer miles would be closed. Otherwise, there is little distinction in potential aggregate impacts of Strategy C and the proposed action.

Similarly, Strategies A and B would be less beneficial than the proposed action or Strategies C and D. The distinction between the two is that Strategy A is the continuation of management in accordance with the Goldwater Amendment and the habitat management plans, which are less comprehensive in comparison to the other strategies in terms of biodiversity management and are outdated; thus, this strategy has the potential for adverse effects above all other strategies in terms of general vegetation, wildlife and wildlife habitats, protected species, and cultural resources. Strategy B is less beneficial as compared to the other actions as it allows for the careful consideration of some consumptive uses (e.g., ORV use areas, wood cutting, and public entry to mines) that previously have not been sanctioned on the range. This strategy is potentially adverse above all other strategies on both ecological and human community scales in terms of special natural/interest areas, public health and safety, cultural resources, and hazardous materials and waste. Neither Strategy A nor B would close roads within Management Unit 6 and, therefore, there would be no incremental impact to the Ajo area in combination with other seasonal and indefinite closures.

Until recently, the BMGR has been fairly well protected from widespread adverse impacts that would threaten both its ecological health and management efforts to conserve it. The deleterious effects of cross-border smuggler and UDA traffic, however, threaten to undermine the health of the BMGR and adjacent regions and overwhelm the management prescriptions of the proposed INRMP. Plans for controlling the international border are beyond the scope of the proposed INRMP and, in fact, exceed the authorities of the Core Planning Team agencies that prepared this EIS and the proposed INRMP. These agencies will continue to work cooperatively and collaboratively with the Border Patrol and other units of the Department of Homeland Security to the extent that they are able to bring illegal cross-border traffic under control. Until control is reestablished, or the traffic subsides for other reasons, many of the goals of the proposed INRMP may not be achievable.

Regardless of the alternative selected for managing motorized access and unroaded areas in the BMGR, the road inventory developed for the proposed INRMP will serve as the benchmark against which the proliferation of vehicle tracks and roads established by cross border traffic will

be assessed. There also will be a continuing management need to minimize the effects of illegal road proliferation and to eliminate wildcat roads from the authorized road network as soon as possible. The BMGR road network of the selected alternative will be documented in the proposed INRMP and will serve as the authorized standard for this management task.