

UPDATE OF THE

BARRY M. GOLDWATER RANGE

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN



Prepared by:
U.S. Department of the Air Force, Luke Air Force Base
U.S. Department of the Navy, Marine Corps Air Station Yuma

In cooperation with:
U.S. Department of the Interior, Fish and
Wildlife Service, Cabeza Prieta National Wildlife Refuge
and Arizona Game and Fish Department

2012 UPDATE

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February 2013


**REVIEW AND UPDATE OF THE
INTEGRATED NATURAL RESOURCES
MANAGEMENT PLAN
(2013-2017)**

**Barry M. Goldwater Range
Yuma, Pima, and Maricopa Counties, Arizona**


APPROVAL

We approve the implementation of the activities in this Review and Update of the Integrated Natural Resources Management Plan, and Public Report for the Barry M. Goldwater Range as supporting the military mission while sustaining natural resources for future generations. This plan has been prepared pursuant to the Sikes Act Improvement Act of 1997 (U.S.C. § 670a et seq.) and the Military Lands Withdrawal Act of 1999 (P.L. 106-65 §3031).

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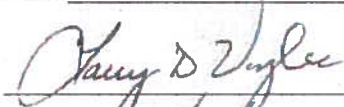

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List of Acronyms and Abbreviations

ACT	air-to-air combat tactics
ACTS	air combat tactics system
ADC	Air Defense Command
ADEQ	Arizona Department of Environmental Quality
AETC	Air Education and Training Command
AFAF	Air Force Auxiliary Field
AFB	Air Force Base
AFI	Air Force Instruction
AFRC	Air Force Reserve Command
AGFD	Arizona Game and Fish Department
AGL	above ground level
AHAS	Avian Hazard Advisory System
ALF	auxiliary landing field
ANG	Air National Guard
APP	Avian Protection Plan
ARNG	Army National Guard
AUX	auxiliary airfield
BASH	Bird/Wildlife or Bird/Animal Aircraft Strike Hazard
BEC	Barry M. Goldwater Range Executive Council
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
BMP	Best Management Practice
BO	Biological Opinion
CEDES	Sustainable Development for the State of Sonora (Mexico)
CONANP	Natural Commission for Protected Natural Areas (Mexico)
CBP	U.S. Customs and Border Protection
DoD	Department of Defense
DOI	Department of the Interior
DZ	drop zone
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOD	explosive ordnance disposal
ESA	Endangered Species Act
ESOH	Environment, Safety, and Occupational Health
ETAC	East Tactical Range
FAA	Federal Aviation Administration
FARP	forward arming and refueling point
FASP	field ammunition supply point

FONSI	Finding of No Significant Impact
FTHL	flat-tailed horned lizard
FW	Fighter Wing
GIS	geographic information system
GMU	Game Management Unit
GPS	global positioning system
HE	high explosive
I-8	Interstate 8
ICC	Interagency Coordinating Committee
ICRMP	Integrated Cultural Resources Management Plan
IEC	Intergovernmental Executive Committee
INRMP	Integrated Natural Resources Management Plan
JSF	Joint Strike Fighter
Km	kilometer
LHA	Landing Helicopter Assault
LiDAR	Light Detection and Ranging
MAGTF	Marine Air Ground Task Force
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
MCO	Marine Corps Order
MLWA	Military Lands Withdrawal Act
MOG	Management Oversight Group
MOU	Memorandum of Understanding
MSL	mean sea level
NEP	nonessential experimental population
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	National Monument
NTAC	North Tactical Range
NWR	National Wildlife Refuge
OHV	Off-highway vehicle
P.L.	Public Law
POL	petroleum, oils, and lubricants
RMCP	Range Munitions Consolidation Point
RMO	Range Management Office
RMS	Rangewide Management Strategy
ROD	Record of Decision
SDZ	surface danger zone
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer

SR	State Route
STA	Sensor Training Area
STAC	South Tactical Range
SWAP	State Wildlife Action Plan
TAC	Tactical Air Combat
TACTS	Tactical Aircrew Combat Training System
U.S.C.	United States Code
UDI	undocumented immigrants
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTC	Urban Target Complex
WDZ	weapon danger zone
WTI	Weapons Tactics Instructors

EXECUTIVE SUMMARY

The Barry M. Goldwater Range (BMGR) in southwestern Arizona has served as a military training range since 1941. While Federal agency responsibility for natural and cultural resource management has varied over previous years, the Military Lands Withdrawal Act of 1999 (MLWA), which renewed the 1.7-million-acre (688,000-hectare) military range, assigned this responsibility to the Secretaries of the Air Force and Navy for the eastern and western portions of the range, respectively. The Air Force and Marine Corps, in partnership with the Department of the Interior and Arizona Game and Fish Department, prepared an Integrated Natural Resources Management Plan (INRMP) for the BMGR in 2007 in accordance with the MLWA, the Sikes Act (16 U.S. Code [U.S.C.] 670a *et seq.*), National Environmental Policy Act of 1969 (42 U.S.C. 4321-4370h), and other applicable laws. As provided by the Sikes Act, INRMPs must be reviewed as to operation and effect on a regular basis, but not less often than every five years. This 2012 INRMP Update for the BMGR is the product of a thorough review of the 2007 INRMP in accordance with the five-year review cycle provided by the Sikes Act and in accordance with other updating procedures provided by the Sikes Act and MLWA.

The 2007 INRMP established overarching goals for managing the natural resources of and public access within the BMGR. The 2007 INRMP also identified agency management responsibilities, 17 categories of management actions (also referred to as management elements) for achieving the management goals, schedules, and funding requirements for implementing the management project actions. The five-year review of the 2007 INRMP addressed the continuing applicability, operation, and effect of the five management goals and the 17 management elements. In accordance with the MLWA, the review was facilitated by the preparation of a Public Report that provides a summary of current use and conditions at the BMGR and the changes in use and conditions that have occurred since the 2007 INRMP was implemented. The use and conditions assessment includes military use, natural and cultural resources, natural and cultural resource management actions, public access, public outreach, and environmental remediation actions. The Public Report was circulated for review and comment by government agencies, Native American tribes, and the general public. An announcement of the availability of the Public Report for review and comment was published in the *Federal Register* on 25 June 2012 and in newspapers in Yuma, Gila Bend, Ajo, Tucson, and Glendale, Arizona. Public open-house meetings on the Public Report and its findings were held in Yuma and Gila Bend during the public comment period, which closed on 30 July 2012.

This 2012 INRMP was updated in consideration of the findings of the Public Report, public input on the Report, and consultations with cooperating and other partner agencies and Native American tribes. The 2012 INRMP Update identifies management and other agency responsibilities at the BMGR and provides summaries of the history of the BMGR and its current military use. The 2012 INRMP also provides concise appraisals of the current conditions of natural resources at the BMGR and identifies the current opportunities for public access. A preliminary list of the 2012 INRMP projects that the Marine Corps or Air Force plan for the next five years was included in the Public Report to encourage feedback from the public and agencies and tribes consulted. The resulting final project list is the heart of the 2012 INRMP

Update. The planned Marine Corps or Air Force projects address the 17 management elements, which are continued from the 2007 INRMP. The 17 management elements are categorized into five general types of actions:

1. Resource management – includes continuing the implementation of the natural resources inventory and monitoring plans
2. Motorized access – includes some modifications of the existing road network to better meet management needs that have been identified in the past five years, as described in Chapter 4.0, and continuing programs to direct the public to use roads remaining open to public access
3. Public use – includes several management elements for providing recreational opportunities while protecting resources
4. Manage realty – includes addressing the public utility and transportation corridors that pass through the range and managing new right-of-way requests
5. Perimeter land use – involves monitoring land uses beyond the range to prevent encroachment, and working with other agencies in regional planning

Identified for each planned Marine Corps or Air Force action are the federal fiscal year for which funding is requested, an estimate of the funding needed for project completion, the expected life span of the project in years, and partners likely to be involved with the project (see Tables 6-1 and 6-2 in Chapter 6.0).

CHAPTER 1 INTRODUCTION

1.1 PURPOSE OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE

The Barry M. Goldwater Range (BMGR) in southwestern Arizona is a major U.S. military installation, encompassing 1,733,921 acres (2,709 square miles), that is used by the U.S. Air Force and U.S. Marine Corps to train military aircrews to fly air combat missions. To a lesser extent, the range is also used for other national defense purposes, most of which support or are associated with air combat training. The Air Force is the primary user of and managing agency for the eastern portion of the range, referred to as BMGR East, and the Marine Corps is the primary user of and managing agency for the western portion of the range, referred to as BMGR West (Figure 1-1).

In accordance with the Sikes Act, Integrated Natural Resources Management Plans (INRMPs) are to be reviewed on a regular basis, but not less than every five years [16 United States Code (U.S.C.) 670a (b)(2)]. This requirement reflects the fact that military activities, natural resource protection and conservation needs, and public access opportunities and patterns are likely to change over time and that there must be a mechanism for adapting an INRMP to changing conditions if the plan is to provide for effective management. This INRMP Update addresses the more in-depth five-year review and update process. The INRMP Update provides an integrated, comprehensive plan for managing the natural resources of the BMGR and for managing sustainable public use of those resources to the extent that such management and use is consistent with the military purposes of the range. Natural resources and public use are managed so that there is no net loss in the capability of the BMGR to support its military purposes and in a manner that is consistent with ecosystem management principles. Further, management prescribed by the INRMP will benefit threatened and endangered species on the BMGR consistent with Federal and State recovery actions for these species under the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 *et seq.*). These purposes are in accordance with the guidance provided for the BMGR by the Military Lands Withdrawal Act (MLWA) of 1999 (Public Law [P.L.] 106-65) and for all U.S. military installations by the Sikes Act, as most recently amended by the Sikes Act Improvement Amendments (hereafter referred to as “Sikes Act” [16 U.S.C. 670a *et seq.*]).

1.2 BMGR OVERVIEW

The predominant use of the BMGR throughout its history has been to provide land and airspace for air combat training. The MLWA of 1999, which superseded the MLWA of 1986 (P.L. 99-606) and extends statutory authorization for the BMGR to October 2024, continues the historic military purposes of the range. This Act reserves the BMGR for use by the Secretaries of the Air Force and Navy for:

- An armament and high-hazard testing area
- Training for aerial gunnery, rocketry, electronic warfare, and tactical maneuvering and air support
- Equipment and tactics development and testing; and other defense-related purposes consistent with those specified in this paragraph [P.L. 106-65 §3031(a)(2)].

For the Air Force, Marine Corps, Navy, Air National Guard (ANG), Army National Guard (ARNG), and Air Force Reserve (AFRC), the BMGR is an essential national defense training area that is indispensable to their abilities to produce the combat-ready aircrews needed to defend the nation and its interests. The BMGR has been one of the nation's most productive military reservations for training tactical aircrews since World War II. As the nation's third largest military reservation, the BMGR has the training capabilities, capacities, and military air base support that provide the flexibility needed to sustain a major share of the country's aircrew training requirements now as well as into the foreseeable future.

Parallel to its continuing value as an essential national defense asset, the BMGR is also nationally significant as a critical component in the largest remaining tract of relatively unfragmented Sonoran Desert in the United States that, with the exception of State Route 85, is free of major developments that may disrupt ecological connectivity. This tract currently totals about 5,000 square miles and, in addition to the BMGR, includes the adjacent, ecologically linked areas of Organ Pipe Cactus National Monument (NM), Cabeza Prieta National Wildlife Refuge (NWR), and Sonoran Desert NM and other lands administered by the Bureau of Land Management (BLM), as shown in Figure 1-1. Within this contiguous complex, the BMGR contributes almost 55 percent of the land area and is more than twice the size of any other component.

The southern boundary of the westernmost portion of the BMGR shares approximately 37 miles of the international border between the United States and Mexico. Off-road driving associated with illegal cross-border traffic and activities by the Border Patrol, as assisted by other law enforcement agencies, to curtail and apprehend illegal crossers adversely affects soils, surface drainage hydrology, wildlife, wildlife habitat, cultural resources, visual resources, and public safety. The deleterious effects of this traffic threaten to undermine the health of the BMGR and adjacent regions and overwhelm the management prescriptions of this INRMP. The Department of Defense (DoD) will continue to work cooperatively and collaboratively with the Border Patrol and other units of the Department of Homeland Security in an effort to minimize the adverse effects on the range's natural resources.

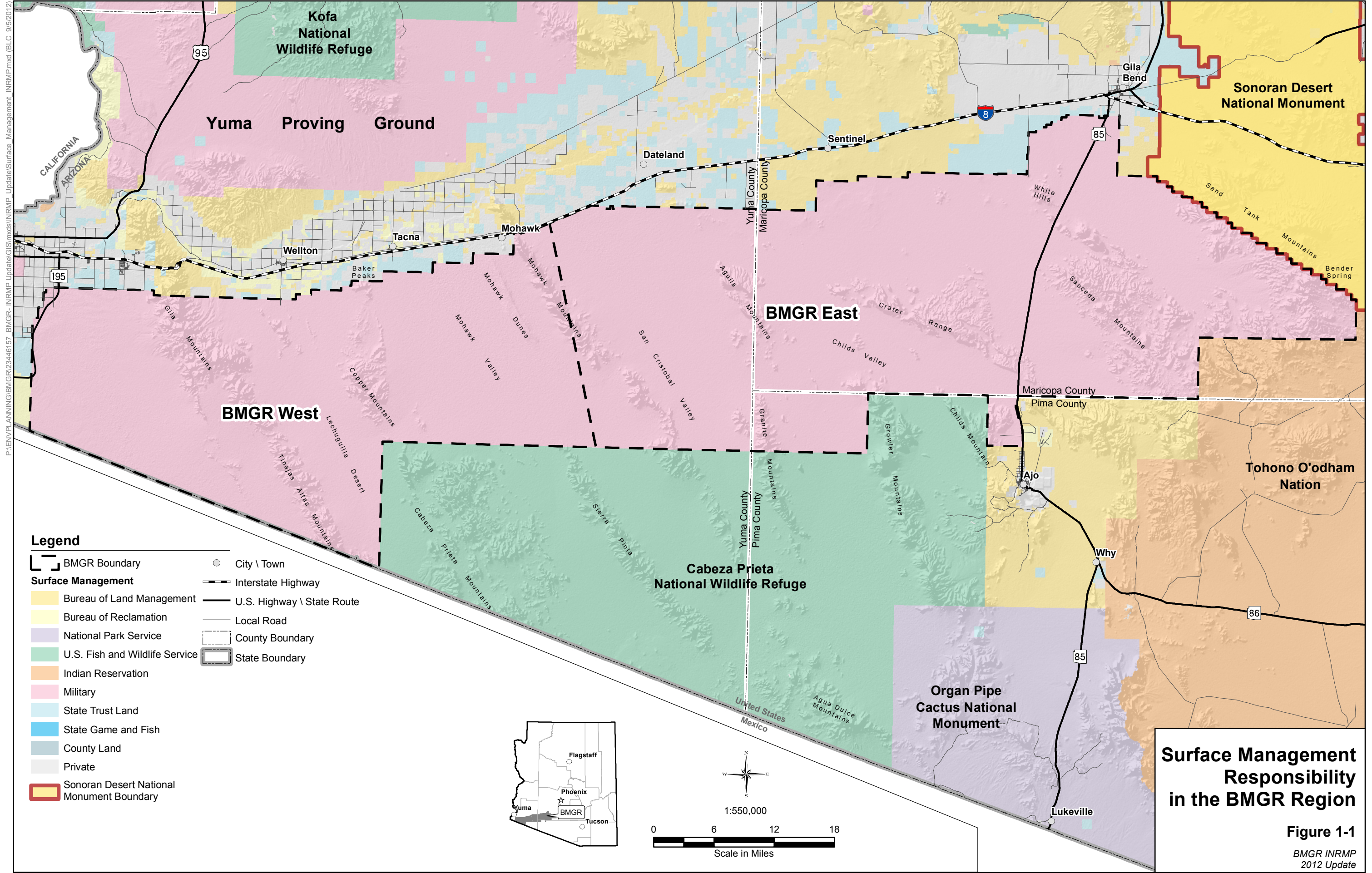
1.3 INRMP AUTHORITY, SCOPE, RESPONSIBILITIES, AND MANAGEMENT GUIDANCE

1.3.1 Authority and Scope

Legal authority for the INRMP is provided by the MLWA of 1999 and Sikes Act. The MLWA of 1999 provides that an INRMP for the range be prepared jointly by the Secretaries of the Navy, Air Force, and Interior and that the INRMP shall:

... include provisions for proper management and protection of the natural and cultural resources of [the range], and for sustainable use by the public of such resources to the extent consistent with the military purposes [of the range]... [P.L. 106-65 §3031(b)(3)(E)(i)].

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Legend

- | | |
|---|----------------------------|
| BMGR Boundary | City \ Town |
| Surface Management | Interstate Highway |
| Bureau of Land Management | U.S. Highway \ State Route |
| Bureau of Reclamation | Local Road |
| National Park Service | County Boundary |
| U.S. Fish and Wildlife Service | State Boundary |
| Indian Reservation | |
| Military | |
| State Trust Land | |
| State Game and Fish | |
| County Land | |
| Private | |
| Sonoran Desert National Monument Boundary | |

Surface Management Responsibility in the BMGR Region

Figure 1-1

BMGR INRMP
2012 Update

The MLWA of 1999 also specifies that the INRMP must be prepared and implemented in accordance with the Sikes Act [P.L. 106-65 §3031(b)(3)(D)]. The Sikes Act sets forth resource management policies and guidance for U.S. military installations and requires the preparation of INRMPs for installations—including those, such as the BMGR, composed of withdrawn lands—with significant natural resources. The Sikes Act provides that the “... Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations...” and that an INRMP is to be prepared to facilitate implementation of that program [16 U.S.C. 670a (a)(1)(A) and (B)]. The Sikes Act further specifies that:

Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out [a natural resources management program] to provide for—

- (A) the conservation and rehabilitation of natural resources on military installations;
- (B) the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping and non-consumptive uses; and
- (C) subject to safety requirements and military security, public access to [the BMGR] to facilitate the use [16 U.S.C. 670a (a)(3)].

Other applicable guidance of the MLWA of 1999 and Sikes Act, as summarized in Table 1-1, stipulates that, to the extent consistent with the military use of the BMGR, the INRMP must provide for wildlife and land management, wildlife-oriented recreation, wildlife habitat enhancement or modification, and wetland conservation; supporting Native American access to sacred sites; and requiring that gates, fences, or other barriers constructed in the future allow for wildlife access. Guidance for implementing the Sikes Act on U.S. Air Force and U.S. Marine Corps installations is provided by Air Force Instruction (AFI) 32-7064 (Department of the Air Force 2004), *Integrated Natural Resources Management*, and Marine Corps Order (MCO) 5090.2A, Chapter 11, *Natural Resources Management* (Department of the Navy, Headquarters U.S. Marine Corps 1998, and as updated in 2008 and 2009), respectively. Sikes Act management programs are also guided by other applicable DoD, Air Force, and Marine Corps regulations as reported in Section 1.3.3 of this INRMP.

Table 1-1 INRMP Elements Specified in the Sikes Act and MLWA of 1999

Sikes Act
<p>To the extent appropriate and applicable, provide for:</p> <ul style="list-style-type: none"> • wildlife management, land management, and wildlife-oriented recreation • wildlife habitat enhancement or modifications • wetland protection, enhancement, and restoration, where necessary for support of wildlife or plants • integration of, and consistency among, the various activities conducted under the plan • establishment of specific natural resources goals and objectives and time frames for proposed actions • sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of wildlife resources • appropriate public access subject to requirements necessary to ensure safety and military security • enforcement of applicable natural resource laws (including regulations) • no net loss in the capability of military installation lands to support the military mission of the BMGR
MLWA of 1999
<p>The INRMP shall:</p> <ul style="list-style-type: none"> • be developed in consultation with affected Native American tribes and include provisions that address (1) meeting the trust responsibilities of the United States with respect to Native American tribes, lands, and rights reserved by treaty or federal law; (2) allowing access to and ceremonial use of sacred sites to the extent consistent with the military purposes of the BMGR; and (3) providing for timely consultation with affected Native American tribes • provide that any hunting on the BMGR be conducted in accordance with the provisions of 10 U.S.C. 2671 (the general military policy for hunting, fishing, and trapping on military reservations) • identify current BMGR test and target impact areas and related buffer or safety zones • provide necessary actions to prevent, suppress, and manage brush and range fires occurring within the BMGR as well as brush and range fires occurring outside of the BMGR resulting from military activities • provide that all gates, fences, and barriers constructed on the BMGR are designed and erected to allow wildlife access, to the extent practicable and consistent with military security, safety, and sound wildlife management use • incorporate any existing management plans pertaining to the BMGR, to the extent that INRMP preparers mutually determine that incorporation of such plans into the INRMP is appropriate • include procedures to ensure that the periodic reviews of the plan under the Sikes Act are conducted jointly by the Secretaries of the Navy, Air Force, and Interior, and that affected States, Native American tribes, and the public, are provided a meaningful opportunity to comment upon any substantial revisions to the plan that may be proposed • provide procedures to amend the plan as necessary

The 2007 INRMP was prepared and implemented in accordance with the MLWA of 1999 and Sikes Act. The INRMP was prepared jointly by the Secretaries of the Navy, Air Force, and Interior, as represented locally by the Installation Commanders of Marine Corps Air Station (MCAS) Yuma and Luke Air Force Base (AFB), and the U.S. Fish and Wildlife Service (USFWS), Southwest Region 2, Regional Director. The Regional Director in turn designated the Refuge Manager of the Cabeza Prieta NWR as his local representative. The INRMP was also prepared in cooperation with the Director of Arizona Game and Fish Department (AGFD).

In accordance with the MLWA of 1999, the INRMP provides for protection of the cultural resources of the BMGR by prescribing that natural resource management actions be fully supportive of and compliant with the prescriptions of the Integrated Cultural Resources Management Plan (ICRMP) for the range (see Section 1.5 of this INRMP). INRMPs and ICRMPs for military installations are prepared as separate but integrated plans rather than as components of a single plan.

INRMPs often incorporate subordinate plans that address installation actions such as pest control or wildfire suppression. Since the completion of the 2007 INRMP, several subordinate plans have been prepared and implemented; these plans are referenced throughout this INRMP.

1.3.2 Agency Responsibilities

The MLWA of 1999 had the effect of transferring federal jurisdiction for managing the natural and cultural resources of the BMGR from the Secretary of the Interior to the Secretaries of the Air Force and Navy, although the Secretary of the Interior retains some oversight responsibilities as well as roles in updating the INRMP. The Secretary of the Air Force, who now has primary surface management responsibility for BMGR East, delegated local command and control for BMGR East to the Commander of the 56th Fighter Wing (FW) at Luke AFB. As a result, Luke AFB also assumes responsibility for preparing and implementing the INRMP for BMGR East. Similarly, the Secretary of the Navy, who has primary surface management responsibility for BMGR West, delegated local command and control for BMGR West and responsibility for preparing and implementing the INRMP for that portion of the range to the Commanding Officer of MCAS Yuma. Thus, the Commanders of Luke AFB and MCAS Yuma provide local command and control for military operations, public access and use, and resource management activities on a daily basis for their respective portions of the BMGR.

Although the Air Force and Marine Corps hold the primary surface management responsibility for the BMGR, the Secretary of the Interior and the AGFD continue to exercise responsibilities for managing natural resources on the range. The Secretary of the Interior was assigned a role by the MLWA of 1999 to assist the Secretaries of the Air Force and Navy both in jointly preparing the INRMP and in jointly conducting periodic reviews of the INRMP for updating the plan as necessary. This role has been delegated to the Manager of the Cabeza Prieta NWR.

As provided by the MLWA of 1999, the Secretary of the Interior also has the authority to transfer land management responsibility for the BMGR from the Air Force and/or Marine Corps to the Department of the Interior (DOI) if the Secretary determines that (1) the Air Force or Marine Corps has failed to manage natural and cultural resources in accordance with the INRMP and (2) this failure is resulting in significant and verifiable degradation of the natural or cultural resources of the BMGR. Another provision of the MLWA of 1999 directs the Air Force and/or Marine Corps to consult with the DOI before using the BMGR for any purpose other than the purposes for which it was withdrawn and reserved. The Arizona State Director of the BLM has the local responsibility for representing the DOI in such oversight activities and consultations.

The State of Arizona has primary jurisdiction over wildlife management within the BMGR, except where pre-empted by federal law. This jurisdiction is implemented on behalf of the State by the AGFD, which acts under the guidance of the Arizona Game and Fish Commission. Nothing in the MLWA of 1999 or Sikes Act either diminishes or expands the jurisdiction of the State with respect to wildlife management. In addition, AGFD is the responsible State agency for providing safe opportunities for off-highway vehicle recreation in Arizona.

1.3.3 Management Guidance

The DoD has shifted its land management focus over the past two decades from protection of individual species to ecosystem management. The two principal reasons for this shift are (1) the Sikes Act emphasizes promoting effective wildlife and habitat protection, conservation, and management, and (2) there is a concern that a disproportionate amount of attention in the past has been placed on managing the needs of individual high-profile species in possible conflict with underlying ecosystem functions. Current DoD policy to display environmental security leadership within DoD operations, activities, and installations worldwide is set forth in DoD Directive 4715.1E, *Environment, Safety, and Occupational Health (ESOH)*. Under this directive, DoD Instruction 4715.3, *Natural Resources Conservation Program*, outlines policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DoD control. This instruction calls for INRMPs to be based, to the maximum extent practicable, on ecosystem management. The goal of DoD ecosystem management is to maintain and improve the sustainability and native biological diversity of ecosystems while supporting human needs, including the DoD mission. This goal is reflected in the Department-level land management policies of the Air Force and Marine Corps. Consequently, ecosystem management and protection of biological diversity are important guiding elements of this INRMP.

DoD policy guidelines on ecosystem management are intended to promote/protect natural processes, but do not preclude active management intervention deemed necessary to address issues such as invasive species, endangered species recovery, or barriers to wildlife movement inside or outside of the installation. DoD expects its resource managers to use the best available science, collaborative efforts with federal and state wildlife agencies, and consultations with outside experts and the public in reaching and implementing decisions about management, including specific needs for intervention.

For the Air Force, additional INRMP authority and guidance are available through the Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, and AFI 32-7064, *Integrated Natural Resources Management*. With AFPD 32-70, the Air Force commits to:

- Cleaning up environmental damage resulting from its past activities
- Meeting all environmental standards applicable to its present operations
- Planning its future activities to minimize environmental impacts
- Managing responsibly the irreplaceable natural and cultural resources it holds in public trust
- Eliminating pollution from its activities wherever possible

These actions are accomplished through an Air Force Environmental Quality Program composed of four pillars: cleanup, compliance, conservation, and pollution prevention.

AFI 32-7064 provides the direction to implement AFPD 32-70, *Environmental Quality*, and DoD Instruction 4715.3, *Environmental Conservation Program*. The instruction explains how to manage natural resources on Air Force installations in accordance with applicable federal, state, and local laws

and regulations. AFI 13-212, *Range Planning and Operations* (6 January 2010), provides guidance on comprehensive range planning, including integration of operational requirements and missions in preparation of INRMPs and ICRMPs. AFI 13-212 further provides that: “Each INRMP and ICRMP will be written [in accordance with] AFI 32-7064 and AFI 32-7065 to support the current and future known mission requirements identified in the [Comprehensive Range Plan] and will be amended as mission requirements change significantly” (Section 9.2) (Department of the Air Force 2010).

Guidance for the Marine Corps’ INRMP process is provided in the *Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans on Marine Corps Installations* (Headquarters, U.S. Marine Corps 2004). This handbook guides the preparation, revision, and implementation of INRMPs in compliance with the Memorandum of Understanding between the DoD, USFWS, and International Association of Fish and Wildlife Agencies, and with the Sikes Act Improvement Act (SAIA) implemented by Office of Secretary of Defense (OSD) Updated Guidance on Implementation of the SAIA of 10 October 2002.

Additional direction is included in MCO P5090.2A, Chapter 11, *Natural Resources Management* (Department of the Navy, Headquarters U.S. Marine Corps 1998, and as updated in 2008 and 2009), which directs installations with land and water suitable for the conservation and management of natural resources to prepare and implement a comprehensive INRMP that fulfills the requirements of the Sikes Act. This order directs that professionally trained personnel are to prepare INRMPs to support the installation operational mission, meet stewardship and legal requirements, and ensure installation resources are managed through an ecosystem approach. It addresses cooperative agreements authorized to implement these plans as well as the need to review and revise the plan.

1.4 INRMP UPDATE AND INTERAGENCY COLLABORATION PROCESSES

1.4.1 INRMP Update Process

This INRMP was prepared in support of an ongoing process to review and update the 2007 INRMP for the BMGR. The INRMP Update was prepared in accordance with the MLWA) of 1999, which provides that periodic reviews of the BMGR INRMP be conducted jointly by the Secretary of the Navy, the Secretary of the Air Force, and the Secretary of the Interior, and that affected States and Indian Tribes, as well as the public, are provided a meaningful opportunity to comment upon any substantial revisions to the updated INRMP (P.L. 106-65 § 3031(b)(3)(E)(ix)). As part of the review process, a Public Report was distributed to describe the changes in military use, environmental conditions, and public access opportunities at the BMGR that have occurred since the 2007 INRMP was implemented and to provide an account of the resource management and public involvement activities that have transpired during the same period. This INRMP Update includes information based on the comments received on the Public Report and responses to those comments. Reviews and updates of the INRMP are scheduled to occur at five-year intervals. The next review and update of the BMGR INRMP is currently scheduled for 2017. A Public Report chronicling changes at BMGR during each five-year review cycle will be issued concurrent with each subsequent update.

1.4.2 Interagency Collaboration and Intergovernmental Consultation

The U.S. Departments of the Air Force, Navy, and Interior and the State of Arizona signed a Cooperative Agreement that went into effect in January 2001 to facilitate joint preparation and implementation of an ecosystem-based INRMP for the BMGR. This agreement neither adds to nor detracts from the individual agency responsibilities and authorities that have been assigned by the MLWA of 1999, Sikes Act, or other applicable law. Rather, the purpose of this agreement is to provide a framework for the Air Force, Navy (Marine Corps), DOI, and State of Arizona to work cooperatively in implementing the provisions of the MLWA of 1999 and Sikes Act.

In addition to the Cooperative Agreement, a previously existing Memorandum of Understanding that established the Barry M. Goldwater Range Executive Council (BEC) was amended in February 2001 for the purpose of "...providing a forum for collaboration by the statutory decisionmakers in the management of resources and their uses..." within the BMGR. The BEC, a local management ad hoc committee, consists of a local senior functional manager for the Air Force, Marine Corps, BLM, USFWS, AGFD, U.S. Customs and Border Protection, and directors for the adjacent Sonoran Desert NM, Organ Pipe Cactus NM, and Cabeza Prieta NWR. The Air Force, Marine Corps, and other BEC members meet six times throughout each year to identify substantive issues, conflicts, or other matters for consideration by this group of managers and agency decision-makers with direct responsibility for, or potential impact upon, lands or resources in the BMGR region. BEC members recognize that the exchange of views, information, and advice relating to the management of natural and cultural resources on the range will help identify the best practicable solutions to issues identified.

In accordance with provisions in the MLWA of 1999, the Secretaries of the Navy, Air Force, and Interior established an Intergovernmental Executive Committee (IEC) in December 2001 to provide a forum solely for the purpose of exchanging views, information, and advice relating to the management of the natural and cultural resources within the BMGR. The IEC membership includes those agencies and Native American tribes that may have a direct responsibility for, potential impact upon, or direct interest in the lands or resources of the BMGR. IEC meetings are open to the public and provide non-IEC participants with periodic opportunities to present opinions regarding BMGR management policies and procedures to the IEC for discussion and possible action recommendations.

1.5 RESOURCE MANAGEMENT PHILOSOPHY/APPROACH

This INRMP update relies on the application of biodiversity and ecosystem management concepts. The following three interrelated facets of ecosystem management are part of the planning and management philosophy for the BMGR: (1) addressing ongoing management issues, (2) continuing the inventory and resource monitoring program that is based on ecological principles, and (3) establishing an adaptive management program. Although presented sequentially, these components are actually interactive and activities related to them are often concurrent. Planning is rarely linear because knowledge increases and conditions (both environmental and military mission) change, necessitating revision of earlier management measures and adaptation of future management measures. Implementing management

measures, monitoring the results of those management measures and changing conditions, and adjusting management accordingly sets in motion a continuing and dynamic management process.

Ecosystem management incorporates the concepts of biological diversity and ecological integrity in a process that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole. In its application, a goal-driven approach is used to manage natural and cultural resources in a manner that supports present and future mission requirements; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of nature's timeframes; recognizes social and economic viability within functioning ecosystems; is adaptable to complex and changing requirements; and is realized through effective partnerships among private, local, state, tribal, and federal interests. Traditionally academic disciplines such as ecology, biogeography, population genetics, economics, sociology, philosophy, and other disciplines are synthesized and applied to the maintenance of biological diversity. Because ecosystem management is based on ongoing studies of the ecology, biological diversity, and resources management, and because ecosystems are open, changing, and complex systems, this planning and management philosophy requires flexibility. Provisions to allow for adaptive management include monitoring, assessment, reassessment, and adjustment as necessary.

The approach to managing cultural resources is provided in a separate ICRMP. Because the authority and guidance for natural and cultural resources management programs on military installations are derived from separate sets of legislation and regulatory requirements, INRMPs and ICRMPs are developed as separate management documents. The Sikes Act provides the primary guidance for natural resources management on DoD lands, while numerous other individual federal laws, federal regulations, executive orders and memoranda, federal guidelines, and military requirements authorize and guide cultural resource management on DoD lands.

An ICRMP was implemented for the BMGR in 2009, and is incorporated by reference into this INRMP. The ICRMP addresses both BMGR West and BMGR East. Volume 1 addresses the issues common to both BMGR East and BMGR West—the physical setting, resource laws, culture history, and other landscape-scale elements. Volume 2 specifically addresses BMGR East and Volume 3 specifically addresses BMGR West. Because the MLWA of 1999 requires that the INRMP for the BMGR provide for the proper management and protection of both natural and cultural resources, the following cultural resource management goals from the ICRMP have been adopted for the INRMP:

- Support military operations through proactive management of cultural resources
- Fulfill legal obligations for protection of historic properties
- Address Native American concerns, including disposition of cultural items

Both the INRMP natural resources management goals and the selected management strategy are compatible with these cultural resources management goals.

The Sikes Act provides that INRMPs must support sustainable multipurpose public use of natural resources—including hunting, fishing, trapping, and non-consumptive uses—to the extent that such use is consistent with the use of military installations to ensure the preparedness of the Armed Forces. The concept of sustainable consumptive use of natural resources is based on the premise that these resources are generally renewable and can be managed to provide an annual or periodic yield of goods, services, and direct and indirect benefits into perpetuity. Cultural resources, however, are not renewable, are in finite supply, are often readily susceptible to damage or loss, and, except in rare circumstances, cannot be recovered or restored once damaged. Because of these characteristics, the broad body of federal laws, regulations, and other forms of guidance has stressed the need to protect, curate, and interpret rather than use cultural resources. The concept of sustainable consumptive use has not been recognized as being compatible with cultural resource management requirements.

Non-consumptive use of cultural resources is also a problematic concept because of the vulnerability of these resources to physical damage, loss of historic information potential, or damage to or desecration of their cultural or religious values. In general, non-consumptive viewing and interpretation of these resources in place may be acceptable, but interpretive development may also be out of place with the undeveloped context of backcountry settings such as the BMGR. Interpretive developments are often expensive to establish and maintain, and they may harm the historic context in which the resources are found.

Interpretation of historic military, ranching, and mining sites may be compatible with public use, but, in the majority of cases, most of the cultural resources on BMGR are surficial archaeological sites that are sensitive or vulnerable to such a degree that they cannot be sustained without special protections from typical public use. Consequently, in most instances, under the ICRMP and this INRMP, access to these locations may be prohibited or restricted in order to protect them. Roads may be closed, and other actions taken as needed, in order to preserve cultural resources.

1.6 INRMP REVIEW AND AMENDMENT PROCEDURES

The Sikes Act provides that INRMPs are to be reviewed on a regular basis, but not less than every five years.

In addition, the MLWA of 1999 stipulates that a public report, which may be combined with any reports required by the Sikes Act, is required concurrent with each review of the INRMP. The report is to describe changes in the condition of the lands withdrawn and reserved for the BMGR. Additional requirements of the public report include: (1) a summary of current military use of the lands, (2) any changes in military use of the lands since the previous report, and (3) efforts related to the management of natural and cultural resources and environmental remediation of the lands during the previous five years [P.L. 106-65 §3031(b)(5)(A)(i) and (ii)].

A Public Report was prepared as the first part of the five-year review and includes:

- a summary of current military land use
- changes in military land use since the previous report
- changes in land and environmental conditions since the previous report
- changes in public access opportunities since the previous report
- a summary of natural and cultural resources management efforts since the most recent report
- a summary of environmental remediation activities since the most recent report
- a summary of public involvement programs since the most recent report

A Notice of Availability was published in the *Federal Register* on 25 July 2012 to announce the release of the Public Report and to identify opportunities for public comment. The availability of the report also was publicized through newspaper advertisements, agency web pages, and IEC meetings.

Public open-house meetings on the Public Report were held on 17 July 2012 in Yuma, Arizona and 18 July 2012 in Gila Bend, Arizona. The Public Report, including the preliminary actions plans for 2013-2017 that were included in the report, was available for public review, with the public comment period concluding on 30 July 2012. Two comments were received during the Public Report review period. One individual suggested methods to notify the public about activities occurring on the range and asked to be added to the notification list for the IEC meetings; that request has been fulfilled. A second individual asked that the *Vulnerability of Species to Climate Change in the Southwest; Threatened, Endangered, and At-Risk Species at the Barry M. Goldwater Range, Arizona* be integrated into the final INRMP for the BMGR.

The second part of the five-year review is the development of this INRMP Update. This INRMP Update identifies proposed amendments to the original INRMP and changes to natural and cultural resources management practices that would be implemented during the subsequent five-year period. This INRMP Update is available to the public, state and local governments, and Native American tribes on BMGR web sites at <http://www.luke.af.mil/library/rangemanagementoffice/index.asp>.

If warranted, proposed management decisions regarding INRMP amendments and changes to management practices will be reviewed under the auspices of the National Environmental Policy Act (NEPA) before being implemented. For this current INRMP Update, no changes have been identified that warrant the preparation of a NEPA document. This INRMP Update, the second part of the five-year report, will be revised to incorporate comments on the draft and then be made available to the public, government, and tribes before implementing the proposed amendments and management practice changes.

In addition to preparing the five-year report, the Air Force and Marine Corps will track their progress in implementing the INRMP on an ongoing basis and will conduct an annual informal review of this progress. DoD guidance provides that the annual reviews shall verify that:

- current information on all conservation metrics is available
- all “must fund” projects and activities have been budgeted for and implementation is on schedule
- all required trained natural resource positions are filled or are in the process of being filled
- projects and activities for the upcoming year have been identified and included in the INRMP (an updated project list does not necessitate revising the INRMP)
- all required coordination has occurred
- all significant changes to the installation's mission requirements or its natural resources have been identified

The Air Force and Marine Corps annually review the progress made in implementing the INRMP with AGFD and USFWS at the regularly scheduled Barry M. Goldwater Executive Committee meeting and with other partners and the public at the Fall IEC meeting. The two Services also each track their own progress using appropriate metrics but common elements to be reported by both include funded/unfunded projects; coordination and feedback from cooperating agencies, military trainers, and range operators; timeframes for implementation projects; deliverables for complying with Biological Opinions; and attainment of project specific objectives. The effectiveness of management guided by the INRMP will also be gauged annually by tracking the degree to which each implementation project provides progress toward attaining the resource management goals established for the INRMP. The INRMP resource management goals are presented in Chapter 5. Current implementation projects and the resource management goal(s) addressed by each project are identified in Chapter 6.

CHAPTER 2 BMGR SETTING, HISTORY, AND MISSION

2.1 BMGR SETTING

The BMGR is located in southwestern Arizona in portions of Yuma, Maricopa, and Pima counties (see Figure 1-1). BMGR West is located entirely in Yuma County; portions of BMGR East are located in each of the three counties. Of the BMGR's 1,733,921 acres, about 60 percent is in BMGR East and about 40 percent is in BMGR West. The range is about 133 miles across on its longest, east-west axis. The BMGR's north-south axes vary in width; at the western end, the north-south axis is about 15 miles wide, is generally 18 to 28 miles wide through much of the length of the range, and then narrows to about 4 miles at its eastern end.

The greater region of the United States in which the BMGR is located currently is predominantly rural and undeveloped and is dominated by federal and tribal lands. Federal lands under the jurisdictions of the BLM, Bureau of Reclamation, or USFWS are contiguous with about 52 percent of the almost 350-mile perimeter of the BMGR (see Figure 1-1). The Tohono O'odham Nation abuts about 7 percent of the BMGR perimeter, and about 30 percent of the perimeter is adjacent to private or State Trust lands. The remaining 11 percent of the perimeter (about 38 miles), which is in BMGR West, is along the international boundary between the United States and Mexico. Most of the adjoining federal, tribal, and Mexican lands are in undeveloped conditions and are dedicated to long-term conservation purposes or are used for a combination of conservation and multiple public use purposes.

Private and State Trust lands are predominant along the northern boundary of the BMGR from Gila Bend to Yuma along Interstate Highway 8 and along western range boundary in the vicinity of Yuma. Many of the private and State Trust parcels adjacent to the BMGR have been converted to agriculture over the past decades. Agricultural crop production is particularly prevalent west of Gila Bend; near Aztec, Tacna, and Wellton, and to the west of the range near Yuma. While most of the area immediately contiguous to the northern border of the BMGR remains in an undeveloped and relatively natural condition, there is some ongoing urban development, particularly in the Foothills community east of Yuma and in the vicinities of Wellton, Tacna, and Gila Bend. Except for two large blocks of BLM-administered land, one near Sentinel and the other at the Gila Bend Mountains, the undeveloped lands along the northern tier are potentially subject to agricultural or urban development. The foreseeable long-term trend, however, generally favors new urban rather than new agricultural development including the conversion of agricultural lands to residential and other urban uses.

From both regional and national perspectives, the BMGR is ecologically critical and significant as a component in the largest remaining tract of relatively unfragmented and undisturbed Sonoran Desert in the United States. As previously noted, the BMGR constitutes about 55 percent of this tract, which also includes Organ Pipe Cactus NM, Cabeza Prieta NWR, Sonoran Desert NM, and other contiguous lands administered by the BLM. The tract, which encompasses approximately 5,000 square miles of federal land south of I-8, is bisected only by State Route (SR) 85 and an inactive mining railroad that generally parallels that highway (see Figure 1-1). The spectrum of biologically diverse, ecological gradients that

characterize the interface between the Arizona Upland and Lower Colorado River Valley subdivisions of the Sonoran Desert is found within this 5,000-square-mile block and most are present within the BMGR. Once considered as a barren wasteland by many, the Sonoran Desert is now recognized as the most biologically diverse of the great North American deserts. In its entirety, the Sonoran Desert Ecoregion encompasses about 55 million acres (almost 86,000 square miles) in southern Arizona, southeastern California, Baja California, and northwestern Sonora. It is the most tropical of the three North American warm deserts (Chihuahuan, Mojave, and Sonoran) and displays the greatest number of plant communities.

The BMGR, Cabeza Prieta NWR, Organ Pipe Cactus NM, Sonoran Desert NM, and contiguous BLM-administered lands occupy landscapes that are ecologically interdependent to a degree that management that conserves ecosystem functions and biological diversity in one of these areas is of benefit to the conservation of these resources in the adjacent areas. In particular, the primary emphasis placed on ecosystem management and biological diversity conservation within the Cabeza Prieta NWR, Organ Pipe Cactus NM, and Sonoran Desert NM directly supports ecosystem and biological diversity conservation in the BMGR. Sizable tracts of BLM-administered lands that are adjacent to BMGR East in the vicinities of Ajo and Sentinel are also managed in a manner in which ecosystem and biological diversity conservation receive high priorities. Further, ecosystem linkages within BMGR East also extend into contiguous areas of the Tohono O'odham Nation, which are generally in a natural and unfragmented condition.

The effective size of the BMGR for supporting military aviation training is larger than its surface area would suggest as the restricted airspace that overlies the range to support aviation training has a surface footprint that exceeds that of the range by about 37 percent. Also contributing to the effective size of the BMGR is the fact that the MLWA of 1999 provides that the adjacent Cabeza Prieta NWR and Cabeza Prieta Wilderness, which encompasses about 95 percent of the refuge, must be managed to support certain military aviation training needs at the BMGR. The Cabeza Prieta NWR, which is about 860,000 acres, is entirely within the footprint of the range restricted airspace, which is about 2,766,700 acres (4,323 square miles). The restricted airspace over the refuge extends from the ground surface to 80,000 feet above mean sea level and is fully incorporated in military aviation training at the BMGR, except that low-level overflights of the refuge below 1,500 feet above ground level (AGL) are limited, at the time of the publication of this 2012 INRMP update, to certain established purposes, corridors, and times. An Air Force proposal to lower the floor of the R-2301E restricted airspace that overlies an eastern portion of the Cabeza Prieta NWR has been addressed in the *Final Environmental Impact Statement for Proposed Barry M. Goldwater Range East Range Enhancements* (56th Fighter Wing, Range Management Office, Luke AFB 2010), but has not yet been implemented through a Record of Decision. The proposed action is to lower the floor from 1,500 feet AGL to 500 feet AGL from the west side of the Growler Mountains west to the R-2301E and R-2301W airspace boundary, and south of the South Tactical Range boundary to a distance of 15 nautical miles. This is proposed to support more realistic training at the South Tactical and Air-To-Air ranges, which are immediately north of the refuge. If this action is implemented, the restricted airspace from 500 feet to 1,500 feet AGL would be used for either regular day or night training missions in association with R-2301E airspace above 1,500 feet AGL. Target impact areas for military weapons use are not designated within the Cabeza Prieta NWR, but portions of the refuge are incorporated in

safety buffers associated with the secondary surface danger areas of target impact areas or air-to-air firing ranges that are located on or over the BMGR.

2.2 BMGR HISTORY

2.2.1 Range Origins and Legal Tenure

The BMGR¹ was initially established on 5 September 1941 to support new Army Air Force² flying training programs at Luke Field³ and Williams Field⁴ as the United States prepared its armed forces prior to deploying them to fight in World War II. The initial parcel of land set aside for the range included most of what is today BMGR East. By March 1943, additional parcels had been added to the range to expand the training capacity of the eastern portion of the range and support flight training programs to the west at Yuma Army Air Base. Three key characteristics of the range were critical to its intended mission. The range was in close flying proximity to the air bases that it served, was uninhabited and undeveloped, and was large enough to be divided into several sub-areas that could safely support simultaneous but independent training missions, which added significantly to the productivity of the overall training program. The proximity of the BMGR to military air bases and its size continue to be two of the most important assets of the range for supporting contemporary military training. Military use has continued to preclude habitation and development, except for infrastructure needed for military use.

The Yuma Army Air Base⁵ was developed as a training command separate from those at Luke and Williams fields. This base and the addition of the western parcels to the gunnery and bombing range established a second area of aircrew training operations that were independent from those conducted in the eastern range areas. This basic east-west split of range resources has been continued ever since and is currently represented by the BMGR East and BMGR West divisions of the range.

¹ The BMGR and its subparts have had a number of official and unofficial names including “Ajo-Gila Bend Aerial Gunnery Range,” “Williams Bombing and Gunnery Range,” “Luke-Williams Bombing and Gunnery Range,” “Gila Bend Gunnery Range,” “Yuma Aerial Gunnery and Bombing Range,” and “Luke Air Force Range.” Barry M. Goldwater Air Force Range became the official name of the range with the passage of the MLWA of 1986. This was shortened to Barry M. Goldwater Range with the passage of the MLWA of 1999. This Act also designated Barry M. Goldwater Range East and Barry M. Goldwater Range West as the names of the eastern (Air Force) and western (Marine Corps) components, respectively.

² The U.S. Air Force was established as an independent service on 18 September 1947. The Air Force evolved from the Army Air Service which became the Army Air Corps in 1926, which in turn became the Army Air Force in June 1941.

³ Luke Field was renamed Luke AFB in January 1951.

⁴ Williams Field was renamed Williams AFB after 1947. Williams AFB was closed in 1993.

⁵ Yuma Army Air Base was renamed as Yuma Air Base in 1951 and then designated as Vincent AFB in 1956. Vincent AFB became Marine Corps Auxiliary Air Station, Vincent Field, Yuma in 1959 and Marine Corps Air Station Yuma in 1962.

President Franklin D. Roosevelt originally designated the BMGR through authority provided to the President at that time to execute federal land withdrawals.⁶ The BMGR remained under administrative withdrawal until 1986 when Congress passed the MLWA of 1986 (P.L. 99-606), which renewed the range for military use for another 15 years and provided guidance for its use and management. The MLWA of 1986 was superseded by the MLWA of 1999, which renewed the range for an additional 25 years (until October 2024).

2.2.2 Military Use History

The training emphasis throughout the range during World War II was on aerial gunnery. The eastern range area was used primarily for advanced aircrew training in fighter aircraft, including air-to-air gunnery, air-to-ground gunnery (i.e., strafing), and air combat flight maneuvers. Training in bombing ground targets was added to the curriculum in the last years of the war. The western range area was also used to some extent for training fighter aircrews, but the principal activity was air-to-air gunnery training for bomber aircrews.

The level of war department development at the BMGR during the second World War was limited principally to three auxiliary air bases—at Gila Bend, Ajo, and Dateland—and 14 outlying auxiliary airfields. Student aircrews were sent to the auxiliary air bases for concentrated periods of instruction in gunnery and, for some classes, bombing training. The base at Gila Bend (now Gila Bend AFAF) is the only one of the three auxiliary air bases that is inside the modern boundaries of the BMGR and that continues to operate as a military installation. The former auxiliary base at Ajo is now Eric Marcus Municipal Airport, which is a public use facility. The former auxiliary base at Dateland is a now a privately owned airport that is restricted to authorized users.

Available evidence indicates that the 14 outlying auxiliary airfields were day use only facilities at which personnel were not permanently stationed. These airfields likely were used as locations to rotate aircrews and possibly to refuel or rearm aircraft between successive gunnery training missions. Eight out of the 14 outlying auxiliary airfields remain within the modern boundaries of the BMGR; the other six are in locations that are no longer a part of the range. Three of the eight outlying auxiliary fields that remain inside of the BMGR continue to be used for military purposes. The Marine Corps continues to use Auxiliary Field 2 (AUX-2), located at the far western end of BMGR West, as a day use facility. Within BMGR East, Stoval Airfield, located southwest of Dateland near the northern BMGR boundary, and AUX-6, located west of Gila Bend AFAF, continue to be used for occasional training activities.

⁶ “Withdrawing” federal lands means to withhold them by executive or legislative action from settlement, sale, location, or entry under some or all of the general land, mining, and mineral laws in order to limit or prohibit activities normally permitted under those laws. Withdrawn lands are then reserved for specified public (or governmental) purposes. For example, military reservations are withdrawn and reserved for national defense purposes. The Defense Withdrawal Act of 1958 (P.L. 85-337) provides that an Act of Congress is required for land withdrawals for military purposes that are more than 5,000 acres in aggregate.

The BMGR fell into a period of low or non-activity for several years following World War II. The outbreak of the Korean War and the growing press of the Cold War prompted reactivation of the gunnery range, Luke AFB (formerly Luke Field), Gila Bend AFAF at the gunnery range, and Yuma Air Base in early 1951. Reactivation of the range required substantial repairs and new construction. New target developments transformed BMGR East from a predominantly aerial gunnery training facility into a complex that could support all phases of tactical air combat training. Instruction in air-to-air gunnery continued to be an important range function, but the new era also brought training in air-to-air missile firing and a greatly expanded emphasis on the use of aircraft for air-to-ground attack using guns, missiles, rockets, and bombs. Development of the range to support these new training missions included: four ground controlled subranges; five independently located vehicle convoy subranges; a camouflage subrange; a realistic tactical subrange; an air-to-air firing subrange; and a napalm (or fire-bomb) subrange.

The primary use of the western range area from 1950 to 1958 was the support of an air-to-air gunnery and air-to-air rocket firing proficiency program of the U. S. Air Force Air Defense Command (ADC). This program was based at the Yuma Air Base. ADC was responsible for training and deploying the fighter interceptor squadrons that defended the United States against airborne attack. The range became the single location to which all ADC units deployed annually for proficiency training. The focus of the proficiency program from 1951 to 1954 was on air-to-air gunnery. No new development of the BMGR West surface area is known to have been necessary to support the ADC proficiency training mission.

Air Force use of the BMGR East area during the middle Cold War and Vietnam War era (1960 to 1974) continued to focus on the training of aircrews to fly fighter and attack aircraft. The tactical, ground-controlled, air-to-air gunnery, and air-to-air maneuvering subranges that had been established during the 1950s continued to provide the necessary training support, although subranges were modified throughout this period to meet evolving training needs. By 1960, North, South, and East tactical (TAC) ranges were well established in terms of the ground surface areas dedicated as ordnance impact locations. By 1974, the partitioning of BMGR East into the four manned ranges, three tactical ranges, and air-to-air range that continue to be in use today had been accomplished.

The Marine Corps became a regular BMGR user in 1959 when Vincent AFB was transferred to the Marine Corps and became Marine Corps Auxiliary Air Station Yuma (MCAS Yuma from 1962 forward). In contrast to Air Force use of the BMGR, which had emphasized and continues to emphasize student aircrew instruction, Marine Corps training focused and continues to focus primarily on operational aircrews and units. Marine Corps training stressed air-to-air tactics, gunnery, and missile firing as well as air-to-ground weapons use. Two target complexes were constructed within the far-western part of the range to support air-to-ground weapons training. A rifle range and a built-up training and administrative site, later called the Cannon Air Defense Complex, were also constructed in this area. These latter two facilities are still in use.

Through the mid-1970s, the area of BMGR West east of the Gila and Tinajas Altas mountains was regularly used as a fallout area for aerial gunnery and missile training. This use now only occurs during

special and infrequent training events. During the mid-1970, electronic tracking and telemetry instruments were installed in the eastern portions of BMGR West to form the electronic architecture of a Tactical Aircrew Combat Training System (TACTS) range that remains in current use. The TACTS range is composed of ground-based, electronic instrument sites that are used to track, record, and replay the simultaneous actions of up to 36 aircraft participating in air-to-air or air-to-ground combat training.

BMGR East was redeveloped and upgraded in the second half of the 1970s to support training that would more realistically resemble potential real world threat areas. East TAC Range was redeveloped to simulate a European theater, North TAC Range to simulate a Korean theater, and South TAC Range to simulate a Middle Eastern theater. An electronic warfare range was installed to realistically simulate the types of air defense threats that aircrews could encounter in actual combat. The Air Force also installed an electronic tracking and telemetry range (now referred to as the Air Combat Tactics System [ACTS] range) similar to the Marine Corps TACTS range. These upgrades and additions generally supported aircrew training needs at BMGR East through the end of the Cold War and the first Persian Gulf War in 1991.

The primary training emphasis within BMGR West during the late Cold War and first Persian Gulf War era continued to be on readiness training for combat qualified aviation units. Ground units with a role to play in the integration of Marine Corps air-ground combat teams were also incorporated in some exercises to enhance the realism of the training.

Since the early 1990s, there has been a decline in the need for live air-to-air gunnery and missile firing exercises at the BMGR but neither the Air Force nor the Marine Corps has seen a reduction in their requirements for live air-to-ground weapons training. Both the Air Force and Marine Corps have added electronic instrumentation that simulates air defense systems and refined their targets to keep pace with evolving air combat tactics and threats, but the basic subrange configurations within the BMGR have otherwise continued to support their training needs.

2.2.3 Land Management History

The natural resource management history of the BMGR has been somewhat unique in contrast to that of most federal public land. Most federal lands—such as those under the jurisdiction of the U.S. Forest Service, National Park Service, BLM, or USFWS—have long been managed by a single federal agency for which resource management is the primary mission. As a result, clear purposes and patterns of management have developed based on the agency's mission, regulations, past management plans and practices, past and current land uses, resource conditions, and public involvement. Management of the BMGR has differed from this model in several important ways. First, primary resource management responsibility for the range has undergone several jurisdictional switches between DoD and DOI agencies with the result that a long-term, comprehensive, resource management program has not yet been fully put in place. The first comprehensive natural resources management plan for the range was not prepared until 1986, and a land management plan was not implemented for the range until 1990. Second, there were no clear DoD or DOI resource management priorities specific for the range until the 1980s. Third, the lack of

a clear authority for resources management for many years led to actions by a number of agencies, at the federal and state levels, that occurred without the development of mutually held goals or coordination of purpose. Fourth, at many points in the range's history these same agencies have found themselves with competing or conflicting responsibilities, legal management guidance, goals, and purposes without an effective means of resolving these issues and coordinating their management efforts.

Primary federal management responsibilities for the lands currently within the BMGR have changed five times since 1940, including:

- prior to September 1941: General Land Office and U.S. Grazing Service (these two agencies were merged in 1946 to form the BLM)
- September 1941 to December 1958: Air Force, full responsibility for entire range
- January 1959 to November 1986: Air Force, administration of the entire range and military operations management of BMGR East; Navy/Marine Corps, military operations management of BMGR West
- November 1986 (MLWA of 1986) to November 6, 2001: Air Force, military administration of the entire range and military operations management of BMGR East; Navy/Marine Corps, military operations management of BMGR West; BLM, land management for entire range
- November 6, 2001 (MLWA of 1999) to November 6, 2024: Air Force, full responsibility for military operations and land management of BMGR East; Navy/Marine Corps, full responsibility for military operations and land management of BMGR West

Considerable progress has been made in recent years towards resolving resource management issues at the BMGR. The MLWA of 1999 clearly established that the Air Force and Marine Corps would be responsible for managing the natural resources of the range in accordance with the Sikes Act. Thus, the 2007 INRMP became the first plan to be developed for the range that fully incorporated the Sikes Act provisions, which has been implemented without conflicting federal management guidance. This 2012 INRMP update represents the continuation of the implementation of the Sikes Act provisions, and provides management guidance for natural resource management for the 2013-2017 timeframe.

2.3 CURRENT AND FUTURE MILITARY MISSION

The current primary mission of both BMGR East and BMGR West is military aircrew training, including advanced training for student aircrews transitioning to frontline combat aircraft and readiness training for aircrews in operational combat units. Training of student and operational aircrews occurs on both sides of the range but student aircrew training is the preeminent activity in BMGR East while readiness training is predominant in BMGR West. The BMGR serves the Air Force, Marine Corps, Navy, AFRC, ANG, and ARNG in these capacities. The range also supports ground troop training functions on a selective and limited basis and periodically is used for testing and some other defense-related purposes. The primacy of the aircrew-training mission at the BMGR is expected to continue into the foreseeable future.

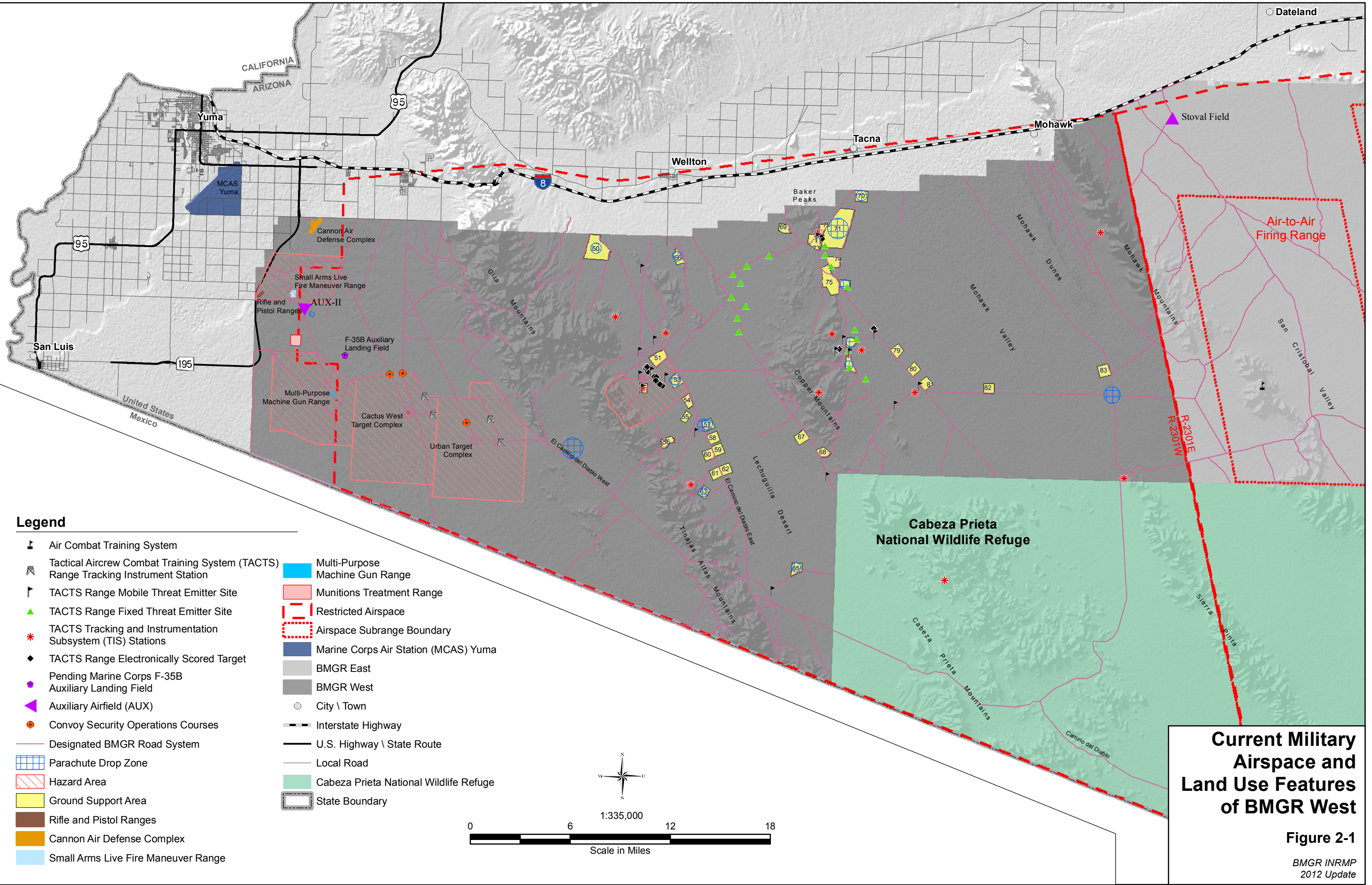
The regular military users of the range originate from the BMGR region and include units from Luke AFB, MCAS Yuma, MCAS Miramar, Davis-Monthan AFB, Silverbell Army Heliport, and Arizona ANG Base at Tucson International Airport. In addition to regular users, “casual user” training deployments that originate from active duty, reserve, and ANG flying units from other areas of the country and from U.S. and allied units from overseas also train at the range.

2.4 MILITARY LAND AND AIRSPACE USE

Although the BMGR is technically a withdrawn land area, from the perspective of supporting military operations, the range is composed of both lands and overlying restricted airspace reserved for military purposes (Figures 2-1 and 2-2). The four restricted airspace areas overlying the range—R-2301W, R-2301E, R-2304, and R-2305—are designated by the Federal Aviation Administration (FAA) to support the military training missions of the range. BMGR East and BMGR West currently support a wide diversity of tactical aviation training activities as well as selected ground training and training support operations. To support these activities and operations, BMGR land and restricted airspace areas are partitioned into a number of smaller subranges or operations areas in order to provide locations where multiple simultaneous training or other operations can be effectively and safely supported.

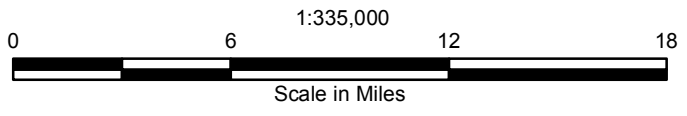
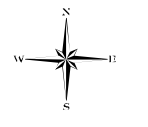
Four key attributes of the natural setting and environment of the BMGR are essential to its overall suitability and capacity for supporting tactical aviation and air defense training, aviation tactics development and testing, and other assigned national defense missions. These attributes include:

- a location away from most major population areas yet within the effective training flight radius of aircraft at Air Force, Marine Corps, Navy, ANG, and ARNG installations in Arizona and California
- the uninhabited and undeveloped expanse of land and overlying airspace necessary to provide either (1) aviation subranges (up to 13) to support multiple, independent training activities simultaneously or (2) large-scale, range-wide exercises
- year-round flying weather that allows most training activities to be efficiently performed as planned without weather delays or postponements
- varied, wide-open terrain that allows development of diverse, tactical air-land combat training scenarios with realistic air-to-ground target simulations



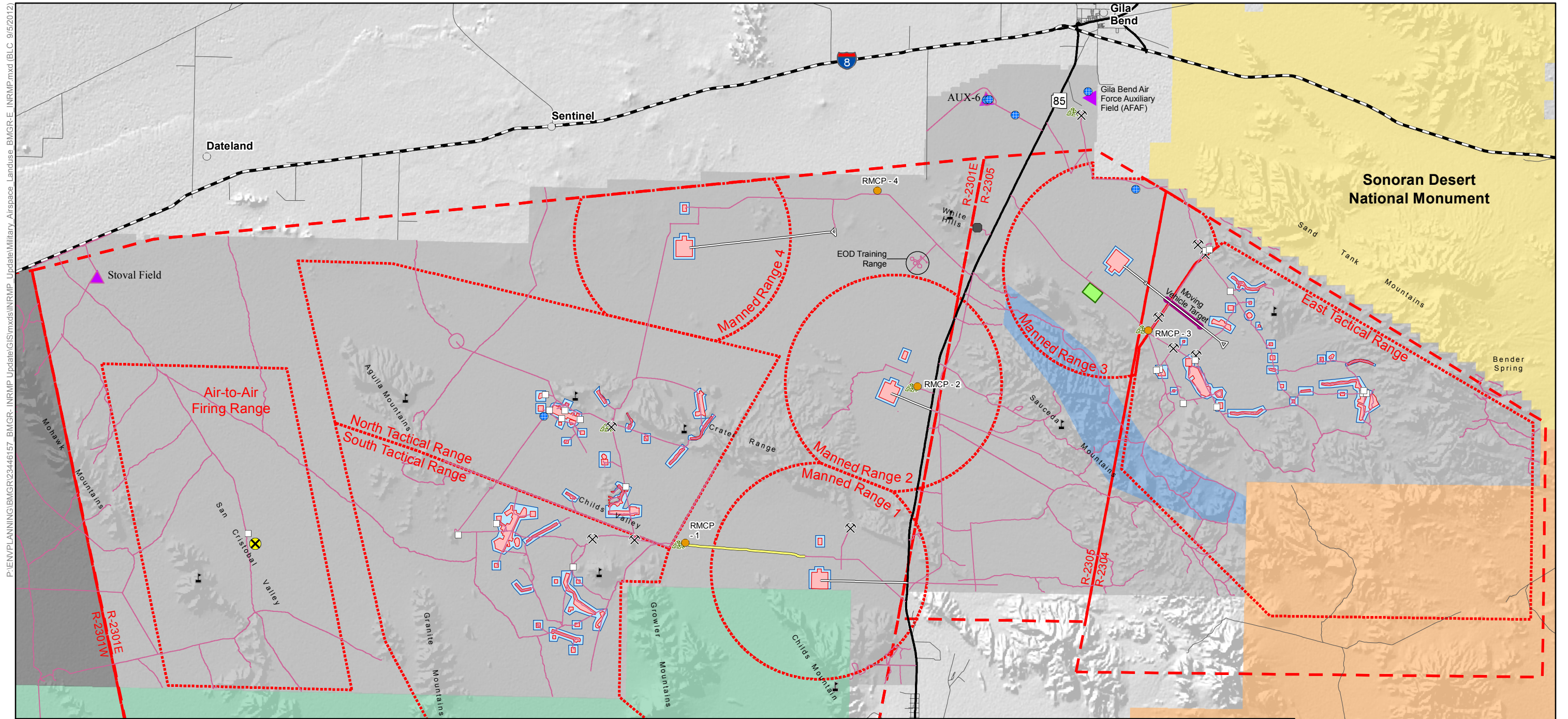
Legend

- ✈ Air Combat Training System
- ✈ Tactical Aircrew Combat Training System (TACTS) Range Tracking Instrument Station
- ✈ TACTS Range Mobile Threat Emitter Site
- ▲ TACTS Range Fixed Threat Emitter Site
- * TACTS Tracking and Instrumentation Subsystem (TIS) Stations
- ◆ TACTS Range Electronically Scored Target
- Pending Marine Corps F-35B Auxiliary Landing Field
- ▲ Auxiliary Airfield (AUX)
- Convoy Security Operations Courses
- Designated BMGR Road System
- Parachute Drop Zone
- Hazard Area
- Ground Support Area
- Rifle and Pistol Ranges
- Cannon Air Defense Complex
- Small Arms Live Fire Maneuver Range
- Multi-Purpose Machine Gun Range
- Munitions Treatment Range
- Restricted Airspace
- Airspace Subrange Boundary
- Marine Corps Air Station (MCAS) Yuma
- BMGR East
- BMGR West
- City \ Town
- Interstate Highway
- U.S. Highway \ State Route
- Local Road
- Cabeza Prieta National Wildlife Refuge
- State Boundary



Current Military Airspace and Land Use Features of BMGR West

Figure 2-1



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Legend

- | | | | |
|--|--|--|--|
| <ul style="list-style-type: none"> Air Combat Training System Air Force Small Arms Range Range Munitions Consolidation Point (RMCP) Parachute Drop Zone Helicopter Landing Zone Sensor Training Area Site Sand and Gravel Extraction Sand and Gravel Stockpile Auxiliary Airfield (AUX) Lead-In-Line | <ul style="list-style-type: none"> Moving Vehicle Target Designated BMGR Road System Approved Paving of Existing Road Helicopter Gunnery Range Explosive Ordnance Disposal (EOD) 2-Year Clearance Area Explosive Ordnance Disposal (EOD) 10-Year Clearance Area Restricted Airspace Airspace Subrange Boundary | <ul style="list-style-type: none"> Conditional Public Access Area—Entry Permitted only with Prior Approval when East Tactical Range is Inactive BMGR East BMGR West City \ Town Interstate Highway U.S. Highway \ State Route Local Road | <ul style="list-style-type: none"> Sonoran Desert National Monument Tohono O'odham Nation Cabeza Prieta National Wildlife Refuge |
|--|--|--|--|

Current Military Airspace and Land Use Features of BMGR East

Figure 2-2

BMGR INRMP
2012 Update

Although the BMGR provides a particular advantage for preparing military personnel to operate in arid, hot, and otherwise austere environments, such as southwest Asia, the range has long proven to be adaptable for training war fighters for air-land combat operations in nearly all global theaters. The key to this capability is the fact that tactical features and emplacements, such as airfields or air defense sites, can be simulated within the expansive BMGR in positions and configurations that realistically replicate diverse, air-land warfare environments. The wide-open and topographically varied desert landscape of the BMGR supports the development of realistic training scenarios generally with little need for modification other than the direct effects of constructing or installing tactical simulations, electronic instrumentation, and other range infrastructure. In a similar fashion, the BMGR landscape has also readily accommodated the infrastructure requirements of the limited ground-based training and support activities that are conducted at the range.

Use of the BMGR for tactical aviation training and associated ground support and training missions has not triggered substantial or large-scale modification of the natural landscape features of the range to directly support its national defense purposes. Rather than substantial landscape modification or manipulation, ongoing and foreseeable military use of the BMGR depends in large part on protecting and conserving natural and cultural resources—including ecosystems, biodiversity, and protected species—and regulating public use to avoid encumbering the training mission because of either environmental compliance or public safety issues. As detailed below in Sections 2.4.1, 2.4.2, and 2.4.3, the aggregate footprint of active and direct military surface use at the BMGR currently encompasses only about 12.8 percent of the range. Of the approximately 12.8 percent of the land subject to direct use, almost 82 percent of the areas support activities that cause negligible physical disturbances of the ground surface and almost 8 percent of the direct use areas support activities that cause only low to moderate levels of disturbance. Military activities that cause moderate to high levels of ground disturbance occur on about 10.3 percent of the aggregate direct use area; an area of disturbance that comprises only about 1.3 percent of the total area of the BMGR.

The over 87 percent of the BMGR that is outside of the surface locations that directly support regular military training activities serves principally to provide:

- the surface space needed to adequately disburse activities so that realistic training can regularly occur either as independent but simultaneous events or as large-scale, combined action events
- the flexibility to host irregularly scheduled training or testing activities, such as air-to-air missile shoots or long-range air-to-ground weapons deliveries, that require restricted air and land space configurations that cannot be accommodated by standard weapons ranges or other activity areas of the BMGR
- buffers that permit independent training events to safely occur simultaneously on a non-interference basis and that also protect public safety

Range Safety and Security

Safety standards for the use of weapons and lasers at U.S. military ranges are both conservative and rigorous. Neither airborne nor ground-based weapons may be employed without prior determination that the expended ordnance or its fragments, debris, and components will be contained within a safe range area. This requirement is met by the calculation of a weapon danger zone (WDZ) for aircraft ordnance deliveries or a surface danger zones (SDZ) for ground-based weapon discharges. A WDZ defines the ground and airspace needed to laterally and vertically contain projectiles, fragments, debris, and components resulting from the firing, launching, and/or detonation of aircraft-delivered ordnance. The DoD standard for WDZs on all ranges is a 99.9999 percent level of containment, which means that the probability of munitions or hazardous fragments escaping the containment area is one in a million. SDZs are similar to WDZs but are prepared to determine the restricted land and airspace requirements to laterally and vertically contain projectiles, fragments, debris, and components resulting from the firing, launching, or detonation of ground-to-ground or ground-to-air weapons such as artillery, mortars, or surface-to-air missiles. SDZs are prepared to provide a 99.9999 percent level of containment for each type of ground-to-ground or ground-to-air weapon employed at a range. Both WDZs and SDZs must be wholly within the lateral and vertical limits of the range installation and overlying special use airspace. WDZs and SDZs can be enormous compared to the size of the target or core impact area in which the great majority of weapons fired at that target will strike. Targets and their core impact areas often occupy less than an acre or a few acres whereas WDZs and SDZs, which must account for the few weapons that will malfunction as well as the majority that will perform properly, can be tens or even hundreds of square miles in size. Similar safety parameters govern the use of military lasers, which are used for determining distances to targets, designating targets for attack, or guiding weapons to a target. The WDZs, SDZs, and/or laser hazards associated with standard training activities at the BMGR are typically contained within the lateral surface limits of the manned and tactical ranges in BMGR East and the designated range hazard areas in BMGR West. Weapons and/or laser use in training or test activities, however, are not limited to the standard operating procedures of these ranges; non-standard employment of weapons and lasers periodically occurs at the BMGR with advanced WDZ, SDZ, and/or laser hazard area determinations and approval. These non-standard activities may affect almost any portion of the range and require the closure of the affected range locations to nonparticipating personnel and the public during the scheduled duration of the activity.

As described in Section 2.2.2, development of the BMGR to support military training has evolved since its inception during World War II primarily in response to the advancing needs of U.S. tactical aviation. Over this time, the BMGR has been used to support various air and/or ground training requirements that have emerged, progressed, and, in some cases, expired. Weapons ranges and other training sites have been correspondingly developed, improved, and, when appropriate, retired. Although substantial changes have occurred over the decades in aircraft, weapons, and warfighting tactics, the corresponding development and improvements in weapons ranges and other training sites at the BMGR generally has led to only a modest and usually incremental expansion in the footprint of surface use needed to directly support training activities. The basic configurations of the weapons ranges established in the 1950s, 1960s, and early 1970s and ground training sites established in the 1980s coupled with necessary upgrades and routine maintenance have enabled many of these facilities to provide long-standing and sustainable training support. As a result, the aggregate footprint of military surface-use after more than 70 years of range use that affects ground surfaces, surface hydrology, or vegetative communities in more than a negligible way encompasses less than 10 percent of the BMGR. Thus, the focus of ecosystem and biodiversity management needed at the BMGR to support sustainable military use primarily requires landscape level protection and conservation rather than manipulation or restoration. Similarly, a primary focus of protected species management on the range involves the protection and conservation of existing natural habitats.

The current endangered or threatened status of protected species at the BMGR results from historic and current losses of off-range habitat, disease, adverse climatic trends, and other depredations from sources other than military use. Military activities at the BMGR pose some adverse risks to certain species but these potential effects are comprehensively mitigated, and military use of the range has not been found to jeopardize any protected species. In fact, the substantial habitat protection effects of the BMGR have contributed markedly to the continued existence and recovery potential of the endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*) and to the continued conservation of the flat-tailed horned lizard (FTHL, *Phrynosoma mcallii*), which was formerly listed as threatened although the listing status was withdrawn on March 15, 2011. Additional information on the Sonoran pronghorn, FTHL, and other protected or sensitive species at the BMGR is provided in Section 3.6.4.

2.4.1 Military Use of BMGR West

The Marine Corps organizes its air and ground combat forces into Marine Air Ground Task Forces (MAGTFs), which form the fundamental cornerstones of modern Marine Corps combat doctrine. MAGTFs are scalable in size and are tailored for specific missions (e.g., humanitarian assistance, emergency response, peacekeeping, specific regional threat, and major war abroad), but, regardless of its size or mission, a MAGTF provides its commander a combined arms/capability force that integrates his air and ground assets to accomplish the assigned mission. BMGR West is configured principally to support the training needs of the aviation element of the MAGTF, but also provides weapons ranges and other sites that support the training of those ground elements that serve as the primary points of integration between its air and ground forces. Development of the BMGR West facilities that support current MAGTF training dates from the 1970s and was substantially achieved by the end of the 1980s, although additions to and updates and refinements of these facilities continued through the 1990s and 2000s. Current and authorized training and support facilities and features at BMGR West are listed below along with notations as to their origins pre- or post-2007 BMGR INRMP. With the exceptions of the division of the R-2301W restricted airspace into up to four aviation subranges, all of the listed training facilities and features are ground-based developments that support aviation and/or ground unit training. Current and authorized training and support features and facilities at BMGR West, which are shown in Figure 2-1, include:

- BMGR West surface area — *present before and unchanged since the 2007 INRMP*
- R-2301W and four aviation subranges — *present before and unchanged since the 2007 INRMP*
- One outlying auxiliary airfield (AUX-II) — *present before and unchanged since the 2007 INRMP*
- F-35B Auxiliary Landing Field (ALF) — *authorized and planned since the 2007 INRMP, but not yet constructed*
- The Cactus West Target Complex and the Urban Target Complex (UTC) for air-to-ground ordnance delivery training — *present before and largely unchanged since the 2007 INRMP*

- An instrumented TACTS Range that supports electronically tracked and scored air-to-air, air-to-ground, and ground-to-air engagements — *present before and largely unchanged since the 2007 INRMP*
- Thirty-three designated, but undeveloped, ground support areas — *present before the 2007 INRMP, but changes in those designated as available and not available for training use and consolidation of multiple sites into one has reduced the number of active support areas from 37 in 2007 to 33 in 2012*
- One parachute cargo drop zone (DZ) and 10 personnel parachute DZs — *cargo DZ present before and unchanged since the 2007 INRMP; 10 personnel DZs are new since 2007; but eliminate unrestricted personnel parachute drops anywhere in BMGR West*
- One rifle qualification range — *present before and unchanged since the 2007 INRMP*
- One pistol qualification range — *present before and unchanged since the 2007 INRMP*
- One small arms live-fire maneuver range — *new since 2007*
- One multi-purpose machine gun range — *new since 2007*
- Four convoy security operations courses — *new since 2007*
- One combat village training site — *present before and unchanged since the 2007 INRMP*
- Five hazard areas that restrict nonparticipating personnel from ground locations where hazardous training activities are scheduled — *two present before but one modified since the 2007 INRMP; three are new since 2007*
- One developed administrative and training site (Cannon Air Defense Complex) — *present before and unchanged since the 2007 INRMP*
- One field ammunition supply point (FASP) — *present before and unchanged since the 2007 INRMP*
- One munitions treatment range — *present before and unchanged since the 2007 INRMP*
- One live ordnance and drop tank jettison area — *present before but relocated since the 2007 INRMP*

Development of the ALF complex to support Marine Corps F-35B training was approved through a Department of the Navy EIS in 2010 for the West Coast basing of the F-35B aircraft; construction of the complex will likely begin before the end of 2013 (Department of the Navy 2010). The F-35 will replace the AV-8B aircraft in Marine Corps squadrons currently home based at MCAS Yuma and F/A-18 aircraft in Marine Corps squadrons currently home based at MCAS Miramar in California. The afore-listed current military features, facilities, and uses at BMGR West are described in additional detail in Table 2-1.

Table 2-1 Current Military Training Facilities, Features, and Use at BMGR West

Range Feature or Facility	Description of Current Training Feature, Facility, and Military Use (see Figure 2-1)
<i>Surface Area and Airspace</i>	
BMGR West Surface Area	BMGR West boundary and land withdrawal area are unchanged since established by the MLWA of 1999.
Restricted Airspace	R-2301W lateral boundaries, altitude floor, and altitude ceiling are unchanged since before 1960. The floor is the ground surface and the ceiling is 80,000 feet above mean sea level (MSL).
Airspace Subranges	Four airspace subranges—TACTS Range High, TACTS Range Low, Cactus West, and AUX-II—are unchanged from 2007. Airspace within R-2301W is allocated to one or more subranges or is aggregated into larger units as needed to support training, which includes, but is not limited to, air-to-air combat tactics, air-to-ground delivery of aircraft ordnance, forward airfield operations, and operations from Landing Helicopter Assault (LHA) ships.
<i>Aviation Training Ranges and Facilities</i>	
AUX-II	AUX-II, which is a small, outlying airfield remaining from the World War II training era that has been redeveloped to support training activities with AV-8B and C-130 aircraft, is unchanged from its 2007 conditions. AUX-II provides (1) a simulated LHA deck for training pilots of AV-8B aircraft and helicopters to operate on and off of a LHA ship and (2) an assault landing zone airstrip for training aircrews of C-130 aircraft to operate in and out of a primitive landing zone in a forward area. AUX-II also continues to be used as a staging area or forward arming and refueling point (FARP) for helicopter operations.
F-35B ALF	Construction of the Marine Corps F-35B ALF is currently authorized and design and construction planning is underway, but construction has not yet been implemented. Like the AV-8B that it will replace, the F-35B is a short take-off and vertical landing aircraft that can operate from LHA and similar ships. The ALF will include three simulated LHA decks, flight control towers, an aircraft maintenance shelter, a refueling apron, a fire and rescue shelter, and a 3,000-foot long road operations training facility where pilots practice landing on a road. Construction of all of the planned ALF facilities is expected to be completed in 2016. Use of AUX-II by AV-8Bs would decline to zero as this aircraft is fully replaced by the F-35B. Helicopter, FARP, and some other training operations would continue at AUX-II.
Cactus West Target Complex	The Cactus West Target Complex is unchanged from its 2007 conditions. Cactus West provides a bull's-eye target, located inside a 1,500-foot radius bladed circle, for conventional bombing practice and two berm and panel targets for strafing practice. Ordnance deliveries are restricted to inert and practice munitions. As described later in this table, the Cactus West Target is also now used as an impact area for the Multi-Purpose Machine Gun Range and as a Live Ordnance and Drop Tank Jettison Area. The Multi-Purpose Machine Gun Range and the relocated Live Ordnance and Drop Tank Jettison Area at Cactus West are new since 2007, but these operations did not require the clearance of any additional land, development of new roads, or expansion of the existing impact area.
Urban Target Complex	The UTC is unchanged from its 2007 conditions. The UTC provides a simulated urban setting with streets, 182 buildings, and vehicles for training aircrews in precision air-to-ground attack in densely developed and populated areas. The UTC Range is located inside the 1,500-foot radius bladed circle of a former bull's-eye target. The complex also continues to provide two berm and panel targets for strafing practice and a Moving Land Target, which consists of a remotely controlled vehicle that pulls a target sled on an oval track.

Range Feature or Facility	Description of Current Training Feature, Facility, and Military Use (see Figure 2-1)
TACTS Range	The TACTS range is unchanged from its 2007 conditions. The TACTS range is an electronically instrumented range that supports air-to-air and air-to-ground combat training. The electronic architecture of the TACTS Range on the ground at BMGR West is composed of 27 fixed-position and 17 mobile-position electronic instrument sites that are used to track, record, and replay the simultaneous actions of up to 36 aircraft and generate electronic simulation and scoring of air-to-air, air-to-ground, and ground-to-air weapons use. The air-to-ground weapons delivery component of the TACTS Range is supported by 112 individual passive tactical target sites situated in 11 complexes that simulate airfield installations, power stations, fuel storage facilities, buildings, railway facilities, anti-aircraft missile and gun positions, and military vehicles. No munitions are fired or otherwise released on this electronically scored range.
<i>Air-Ground Training Facilities</i>	
Ground Support Areas	Thirty-three undeveloped ground support areas are active as locations to which ground units may deploy off-road to participate in training exercises. All 33 support areas were designated before 2007, but four of the areas—57, 58, 59, and 62 on Figure 2-1—were inactive in 2007. These areas, which were in active use prior to 1998 but were inactive from 1998 through 2007, were reactivated for use after 2007. Five other support areas that formed a larger contiguous operating area but that were identified individually in 2007 were consolidated into one area, Site 71, after 2007. Four ground support areas west of the Gila Mountains were approved for use in 2007, but these areas have never been activated or used and are not included in the current active inventory. The active ground support areas in 2007 encompassed about 10,922 acres in aggregate compared to an aggregate of 11,154 acres in the currently active inventory, which constitutes about a 2.1 percent increase in total area. Most ground troop deployments occur in association with aviation training exercises to promote coordination and integration between Marine air and ground elements and to enhance the realism of the training evolution for both elements.
Parachute Drop Zones (DZ)	Eleven parachute DZs are currently designated. The DZ immediately to the east of AUX-II was in service in 2007 and is the only DZ approved for parachute cargo drops, which require retrieval by an off-road combat fork lift. The AUX-II DZ is located within a previously disturbed, inactive bull's-eye bombing target. The other 10 DZs are approved for use by military personnel only and are located at or along roads or in ground support areas so that no off-road driving is required to retrieve these troops. The 10 personnel DZs were designated for use after 2007 in response to new Marine Corps safety criteria that require DZs to be surveyed for potential hazards, certified as approved, and published in the standard operating procedures for a range before they can be activated for use. In 2007 and before, there were no restrictions as to where parachute troops could land within BMGR West.
<i>Ground Combat Training Ranges</i>	
Rifle and Pistol Ranges	The Rifle and Pistol ranges, which are unchanged from their 2007 conditions, are used to train and qualify personnel in the use of small arms.
Small Arms Live-Fire Maneuver Range	The Small Arms Live-Fire Maneuver Range was developed after 2007 in response to a need to provide pre-deployment training to troops from MCAS Yuma that were sent to Iraq or Afghanistan on short notice. This range is located in a retired sand and gravel borrow pit and serves as a close combat maneuvering range for training small teams or individuals in the tactical use of infantry small arms.
Multi-Purpose Machine Gun Range	The Multi-Purpose Machine Gun Range was developed after 2007 to provide pre-deployment training to troops that were deployed to Iraq or Afghanistan on short notice. This range is located at the inactive air-to-ground bombing target at Panel Stager Range 2. Ground-to-ground machine gun fire of .50 caliber and smaller is directed from guns mounted on vehicles traveling on existing access roads at target sets located in the retired bombing impact area.

Range Feature or Facility	Description of Current Training Feature, Facility, and Military Use (see Figure 2-1)
Convoy Security Operations Courses	Four Convoy Security Operations Courses were developed after 2007 in response to a need to provide pre-deployment training to troops from MCAS Yuma that were sent to Iraq or Afghanistan on short notice. These ground ranges are located along the existing access roads in the vicinities of the Cactus West Target Complex and the UTC and along the run-in line to the UTC. Ground-to-ground machine gun fire of .50 caliber and smaller may be directed from guns mounted on vehicles traveling on existing access roads or the existing run-in-line at target sets designed to simulate ambush attacks by hostile forces. The direction of fire from the access roads in the vicinity of the Cactus West complex is generally to the south such that the Cactus West target impact area also serves as an impact area for some of the Convoy Security Operations Courses. The direction of fire from the run-in-line is generally at target sets to the east or west such that the existing target impact areas at the UTC also serve as an impact area for the Convoy Security Operations Courses. The Convoy Security Operations Courses are designed to train troops assigned to protect vehicle convoys in combat theaters how to recognize, counter, and defeat threats from hostile forces. Static and pop-up targets that simulate threats are located in ambush scenarios along the access roads and the run-in line.
Combat Village	Combat Village, which is unchanged from its 2007 conditions, simulates a small building complex adjacent to a railroad. This facility is used as an electronically scored TACTS Range target and for training small units in infantry tactics involving reconnaissance, assaults, or defense at this setting. Only blank small arms munitions are authorized at this infantry tactics training site.
Hazard Areas	Five hazard areas are currently designated, four to the west and one to the east of the Gila and Tinajas Altas mountains, to support use of small arms and/or aircraft lasers in training operations. The hazard areas, located east of the Gila Mountains and at the UTC west of these mountains, were designated before 2007 although the lateral dimensions of the UTC hazard area was modified after 2007 to support changes in laser use. Three additional hazard areas were designated after 2007 in response to regulations governing small arms ranges and laser use. Surface entry to hazard areas is closed to nonparticipating personnel when hazardous activities are scheduled.
<i>Support Areas</i>	
Cannon Air Defense Complex	The Cannon Air Defense Complex, which is unchanged from its 2007 conditions, provides administrative, maintenance, and training areas for a Marine Air Control Squadron. The complex is a permanent built-up facility of about 0.3 square miles in size.
AUX-II FASP	The FASP, which is unchanged from its 2007 conditions, provides temporary secure storage for munitions used by ground units during field exercises, primarily during semi-annual Weapons Tactics Instructors (WTI) Courses. The FASP is located about 1,500 feet northwest of AUX-II.
Munitions Treatment Range	The Munitions Treatment Range, which is unchanged from its 2007 conditions, is used to train personnel in the use of demolition explosives including the demolition of unexploded ordnance.
Live Ordnance and Drop Tank Jettison Area	The Cactus West Target bull's-eye is used as a Live Ordnance and Drop Tank Jettison Area for aircraft experiencing difficulties that warrant a precautionary jettisoning of external stores prior to recovery at MCAS Yuma. The Live Ordnance and Drop Tank Jettison Area was located at the former bull's-eye circle of the inactive Panel Stager Target in 2007, but was subsequently relocated to Cactus West. Panel Stager Range 2 is presently used as the impact area for the Multi-Purpose Machine Gun Range.

2.4.2 Military Use of BMGR East

As already noted, the preeminent activity at BMGR East is the training of student aircrews that are transitioning to frontline fighter or attack aircraft in air-to-air and air-to-ground combat skills and tactics. Some readiness training occurs, but the primary focus on student aircrew training has persisted since the range was established during World War II. BMGR East has been partitioned and developed to provide seven air-to-ground weapons ranges, an air-to-air gunnery range, and an electronically instrumented air-to-air combat tactics (ACT) range. BMGR East also provides outlying auxiliary airfields for training in forward airfield operations and selected other training and training support features and facilities. Current and authorized training and support features and facilities at BMGR East, which are shown in Figure 2-2, include:

- BMGR East surface area — *present before and unchanged since the 2007 INRMP*
- R-2301E, R-2304, and R-2305 restricted airspace — *present before and unchanged since the 2007 INRMP*
- Nine aviation subranges — *present before and unchanged since the 2007 INRMP*
- Four manned ranges for primary instruction in air-to-ground delivery of bombs, rockets, and gunnery — *present before and unchanged since the 2007 INRMP except for the conversion of left side of Manned Range 3 from an air-to-ground gunnery range for fixed-wing aircraft to an air-to-ground gunnery range for helicopters*
- Three tactical ranges for advanced instruction in air-to-ground delivery of bombs, rockets, and gunnery — *present before and unchanged since the 2007 INRMP except for some target upgrades*
- Twenty-one helicopter landing zones — *new since the 2007 INRMP*
- One instrumented air combat tactics system (ACTS) range that supports air-to-air engagements — *present before and unchanged since the 2007 INRMP*
- One air-to-air firing range — *present before and unchanged since the 2007 INRMP*
- Explosive ordnance disposal (EOD) clearance areas — *present before but reduced in size since the 2007 INRMP*
- Four Range Munitions Consolidation Points (RMCP) to demilitarize and process expended ordnance prior to recycling or sanitary disposal — *present before and unchanged since the 2007 INRMP*
- One EOD training range — *present before and unchanged since the 2007 INRMP*
- Gila Bend Air Force Auxiliary Field (AFAF), which serves as the operational support center for BMGR East — *present before and unchanged in operational function since the 2007 INRMP*
- Two outlying auxiliary airfields — *present before and unchanged since the 2007 INRMP*

- One small arms range — *present before and unchanged since the 2007 INRMP*
- Ten sand and gravel excavation and five stockpile areas to procure materials needed to construct, maintain, and/or repair range targets and roads — *new since the 2007 INRMP*

Although the long-established, principal features and facilities of BMGR East have well served the training needs of the Air Force and other military users, periodic modifications or updates of the range infrastructure are necessary to meet emerging training requirements and to improve its training effectiveness and operational productivity. The Air Force addressed 10 proposals for improving the training and operational effectiveness of BMGR East in 2010 in a final EIS titled: *Final EIS for Proposed BMGR East Range Enhancements* (56th Fighter Wing, Range Management Office, Luke AFB2010). A Record of Decision (ROD) issued by the Air Force in May 2011 authorized implementation of six of the 10 proposals pending the availability of funding. See the 2010 Final EIS and the *Barry M. Goldwater Range Integrated Natural Resources Management Plan Public Report on Military Use, Environmental Conditions, Resource Management Activity, and Public Access and Involvement 2007 – 2012* (Department of the Air Force and Department of the Navy 2012) for additional details on the 10 range enhancements proposed for BMGR East. The six range enhancements that have been approved thus far for implementation include:

1. Construction of a Sensor Training Area (STA) under the Air-to-Air Firing Range in the San Cristobal Valley. The planned facility, which would occupy about 640 acres, would be a new target complex that would be used to train aircrews for air-to-ground combat in the modern urban environment. The STA would make use of lasers and electronic emitters and sensors to provide a realistic urban combat training environment and to simulate both air-to-ground and ground-to-air weapons use. No munitions would be fired or released at the STA with the exception of flares. Construction of the STA is pending and, if implemented, would likely occur within the next five years.
2. Development of a new target in East TAC Range for training aircrews in the use of air-to-ground missiles has been approved. The new target would enhance training by supporting attacks with live missiles (i.e., missiles with live explosive versus inert and practice warheads) from multiple, realistic directions and altitudes without compromising range safety. Construction of the new missile target is pending and, if implemented, would likely occur within the next five years.
3. Conversion of the southern portion, or left side, of Manned Range 3 into a helicopter gunnery range to enhance training for the Army National Guard and other units flying rotary-wing aircraft that train at BMGR East. Construction of the new helicopter gunnery range began in May 2012.
4. Construction of a new taxiway and a new air traffic control tower at Gila Bend AFAF. These improvements would enhance the quality of pre-deployment training by tactical aviation units that use Gila Bend AFAF to simulate the operating conditions of a “bare-bones” forward airfield, which are often found in a combat theater, by supporting the higher tempo of airfield operations often required in war fighting theaters of action. The new control tower would meet the minimally acceptable visual surveillance or depth perception standards specified by the Unified

Facilities Criteria for military airfields. The new taxiway and control tower would also improve the effectiveness of Gila Bend AFAF for recovering aircraft experiencing in-flight emergencies while operating in BMGR East. Construction of the new taxiway and control tower is pending and may occur within the next five years.

5. Pavement of approximately 7 miles of an existing graded road within BMGR East between Manned Range 1 and RMCP 1 to eliminate much of the dust generated by the ongoing heavy use of the existing improved dirt road; to decrease road maintenance requirements by providing a cost-effective, durable, and long-lasting maintenance solution; and to reduce the vehicle maintenance burden resulting from disproportionate wear and tear on Air Force vehicles that frequently travel on this road. The paving of this road is anticipated by 2016, but is subject to the availability of funds and may be completed sooner or later than 2016.
6. Excavation and stockpiling of sand and gravel from selected wash sites at BMGR East to provide a more cost effective and ready source of these materials for maintaining roads and targets and reconfiguring targets on the range. These actions have been incorporated as part of the annual range maintenance and improvement cycle.

A ROD is pending for the other four range enhancement proposals addressed in the 2010 EIS. The potential for any or all of proposals actions to be approved and implemented is not addressed here, but any of these actions may be approved and implemented prior to the next scheduled five year update of this INRMP in 2017. The four proposed actions include:

- Lowering the operational floor of R-2301E restricted airspace over the Cabeza Prieta NWR to enable fixed-wing aircraft aircrews to perform realistic low-level attacks on targets located in South TAC Range and realistic low-level air-to-air intercepts in the ACT Range. Some axes of low-level, air-to-ground attacks and air-to-air intercepts in South TAC Range and the ACT Range are currently restricted by an operational floor that limits overflights of the Cabeza Prieta NWR to altitudes of 1,500 feet AGL or above except along mutually approved corridors. The designated floor of R-2301E is the ground surface, but the 1,500 foot AGL limit on military flight operations over the Cabeza Prieta NWR has been in place since 1951 by virtue of agreements between the Air Force and the Department of the Interior. The 2010 EIS assessed proposals to lower the floor to 500 feet AGL (from the west side of the Growler Mountains west to the R-2301E and R-2301W airspace boundary, and south of the South TAC boundary to a distance of 15 nautical miles) to support low-level attack and intercept training that would be realistic to real world combat conditions that aircrews may encounter.
- Developing a moving vehicle target in North TAC Range to provide aircrews with realistic training in attacking mobile ground targets. A moving vehicle target that incorporates portions of both Manned Range 3 and East TAC Range was developed after 2007 along an existing straight road that also serves as a lead-in-line that guides aircrews performing certain types of attacks at Manned Range 3. The 2010 EIS assessed proposals to develop a moving vehicle target in North

TAC Range that would incorporate existing road segments and possibly some new segments to form a loop track for the target vehicle.

- Authorizing additional ground-based training for combat search and rescue teams, special operation teams, Marine Corps units, and potentially other small squads of troops that involve clandestine insertions and extractions from helicopters or vehicles, cross-country land navigation, and other activities while traveling in stealth on foot. The 2010 EIS assessed proposals to expand the opportunities for this type of training. Helicopter insertions and extractions and vehicle movements associated with this training would be restricted to existing helicopter landing zones and roads.
- Establishing streamlined procedures to facilitate environmental reviews and approvals for reconfiguring or otherwise updating tactical range targets on a timely basis to provide training that realistically reflects the combat conditions that U.S. warfighters will encounter when meeting real world threats.

The military features, facilities, and uses at BMGR East that are currently in effect are described in additional detail in Table 2-2.

Table 2-2 Current Military Training Facilities, Features, and Use at BMGR East

Range Facility or Feature	Description of Current Training Facility, Feature, and Military Use (see Figure 2-2)
<i>Surface Area and Airspace</i>	
BMGR East Surface Area	BMGR East boundary and land withdrawal area are unchanged since established by the MLWA of 1999.
Restricted Airspace	R-2301E, R-2304, and R-2305 lateral boundaries, altitude floor, and altitude ceiling are unchanged since before 1960. R-2301E, R-2304, and R-2305 all have a floor at the ground surface; R-2301E has a ceiling of 80,000 feet MSL and R-2304 and R-2305 have ceilings of 24,000 feet MSL.
Airspace Subranges	Nine airspace subranges are generally unchanged from their 2007 conditions. The nine airspace subranges support aircraft weapons and ACTS training and include an air-to-air firing range for aircraft gunnery or missile firing, four manned ranges and three tactical ranges for air-to-ground delivery of aircraft ordnance, and an electronically instrumented ACTS Range. Airspace within R-2301E, R-2304, and R-2305 is reallocated to subranges or is aggregated into larger units as needed to support training.
<i>Manned, Tactical, ACT, and Sensor Training Area Ranges</i>	
Manned Ranges	Manned Ranges 1, 2, and 4 are unchanged from their 2007 conditions. The southern side of Manned Range 3 is being converted to a helicopter gunnery range; the northern side of this range will continue to serve fixed-wing fighter and attack aircraft. Another change at Manned Range 3 since 2007 is the dual use of the lead-in-line to the special weapons delivery target on the north side of the range as a guide for attacks on this target and as a track for the Moving Vehicle Target, which extends into East TAC Range. Manned ranges provide primary instruction for aircrews of fixed-wing fighter and attack aircraft in air-to-ground delivery of bombs, rockets, and gunnery. Manned ranges continue to be restricted to inert and practice ordnance. Ordnance delivery training occurs on an almost daily basis at the manned ranges.
Tactical Ranges	North, South, and East TAC ranges continue with no changes to range surface boundaries, targets, or ordnance delivery authorizations compared to 2007 conditions. The tactical ranges provide advanced instruction in air-to-ground delivery of bombs, rockets, and gunnery in settings that are tactically realistic. A moving vehicle target, which was established after 2007 and uses the lead-in-line to the special weapons delivery target at Manned Range 3, is currently in use in

Range Facility or Feature	Description of Current Training Facility, Feature, and Military Use (see Figure 2-2)
	the northeastern part of East TAC Range for air-to-ground attack training. North, South, and East TAC ranges each continue to provide one target for the delivery of live high-explosives (HE) bombs; North and East TAC ranges each continue to provide one target for live HE air-to-ground missiles. All other targets are restricted to inert and practice ordnance. Tactical ranges continue to be used on a near daily basis for ordnance delivery training.
ACTS Range	The ACTS Range is unchanged from its 2007 conditions and continues to support training in air combat maneuvering, fighter intercepts, and other tactical air combat activities. The airspace assigned to the ACTS Range usually extends to the perimeter of R-2301E but excludes airspace assigned to the Air-to-Air Firing; Manned Ranges 1, 2, and 4; and North TAC and South TAC when these ranges are active. The ACT can be expanded to include R-2304 and R-2305 and/or airspace within the Sells Military Operations Area to the east above the Tohono O'odham Nation. The surface footprint of the ACTS Range is limited to 17 electronic instrument sites of which 9 sites are located within BMGR East and 8 sites are in off-range locations. Fifteen of the instrument sites require an area of no more than 15 feet by 15 feet.
Air-to-Air Firing Range	The Air-to-Air Firing Range is unchanged from its 2007 conditions. This range supports air-to-air gunnery and missile firing. The ground surface below the firing range receives expended gunnery rounds, missiles, and target debris. Firing missions at this range continue to be irregularly scheduled and infrequent (fewer than 10 annually).
<i>EOD Clearance Areas, RMCPs, and EOD Training Range</i>	
EOD Clearance Areas of Manned and Tactical ranges	<p>EOD clearances of target impact areas and range roads have been reduced in size and clearance frequency at each manned and tactical range as compared to 2007 conditions. EOD clearances now occur once a year, every two years, and every 10 years. Expended ordnance and target debris on the surface is cleared annually to 50 feet on either side of roads and target access ways and in the vicinities of targets to provide safe work areas for maintenance, reconstruction, or replacement of targets. Every two years, ordnance and target debris on the surface is cleared to a radius of 300 feet from each inert/practice ordnance target and to a radius of 500 feet from each live ordnance target. Every ten years, ordnance and target debris on the surface is cleared to a radius of 1,000 feet from each inert/practice and live ordnance target. No EOD clearances are conducted within the surface area below the Air-to-Air Firing Range. In contrast, the 2007 clearance criteria included:</p> <ul style="list-style-type: none"> • every year to 50 feet on either side of range roads outside of target impact areas • every year to a radius of 1,000 feet from each target • every five years to a radius of 1,000 meters (3,281 feet) from each target <p>The new biennial EOD clearance area is:</p> <ul style="list-style-type: none"> • 2,456 acres and 32 percent smaller than the 2007 annual clearance areas at all four manned ranges in aggregate • 8,176 acres and 31 percent smaller than the 2007 annual clearance areas at all three tactical ranges in aggregate <p>The new ten-year EOD clearance area is:</p> <ul style="list-style-type: none"> • 4,412 acres and 16 percent smaller than the 2007 five-year clearance areas at all four manned ranges in aggregate • 21,584 acres and 23 percent smaller than the 2007 five-year clearance areas at all three tactical ranges in aggregate
RMCPs 1, 2, 3, and 4	RMCPs 1, 2, 3, and 4 continue to serve as range EOD and maintenance support areas. The RMCPs are unchanged from their 2007 conditions. Expended munitions, munitions scrap, and target debris that is safe for handling is cleared from the three tactical and four manned ranges and transported to the RMCPs for demilitarization and decontamination processing before being released for off-range recycling or disposal. The RMCPs are also used as staging locations for target construction, maintenance, and replacement operations.
EOD Training Range	The EOD Training Range is unchanged from its 2007 conditions and continues to be used for instructing EOD technicians in conducting safe detonations of expended but unexploded ordnance. Detonation of HE charges weighing up to 2,000 pounds net explosive weight is authorized in this area.

Range Facility or Feature	Description of Current Training Facility, Feature, and Military Use (see Figure 2-2)
<i>Auxiliary Airfields, Small Arms Range, and Sand and Gravel Excavation and Stockpile Areas</i>	
Gila Bend AFAF	Gila Bend AFAF continues to serve as the operational support center for BMGR East and includes a 8,500-foot runway for fixed-wing aircraft, a heliport, and a built area that houses office, industrial, storage, temporary housing, and other spaces. These conditions are generally unchanged from 2007. The six-pad heliport is used routinely to support ARNG training operations. No personnel or aircraft are permanently based at Gila Bend AFAF. Construction of a taxiway for the runway and a new air traffic control tower were authorized by the May 2011 ROD for the 2010 EIS, but implementation of these actions has not yet been initiated.
Auxiliary Airfields	AUX-6, AUX-11, and Stoval Airfield are World War II vintage, primitive airfields that continue to be used for certain training activities. These auxiliary airfields are generally unchanged from their 2007 conditions. AUX-6 is used on an irregular schedule as a staging area or FARP for helicopter operations and as a field training/bivouac site for ARNG or Air Force Security Police units. AUX-11 also is used on an irregular schedule as a staging area for helicopter operations or as an artillery firing position. Stoval Airfield is often used during Marine Corps WTI Courses as a FARP, helicopter assault staging area, and bivouac site, as well as for C-130 aircraft forward operating field operations.
Small Arms Range	The Small Arms Range is unchanged from its 2007 conditions. The range continues to be used for small arms training by the U.S. Border Patrol and Air Force Security Police. U.S. Border Patrol use of the small arms range has increased from occasional use in 2007 to near-daily use in 2012.
Sand and Gravel Excavation and Stockpile Areas	The May 2011 ROD for the 2010 EIS authorized excavation of sand and gravel from 10 wash locations in BMGR East and stockpiling of these materials at 5 sites for later on-range use. This action has been initiated. The sand and gravel is used to simulate target features such as aircraft parking revetments, repair/maintain facilities such as berms, fill road ruts, restore at-grade road crossings of washes, and similar on-range needs.

2.4.3 Military Surface Use

All land areas within the BMGR have been allocated to support one or more military uses. The degree of disturbance to soil surfaces, surface drainages, and vegetation communities that results from these uses varies from negligible to complete. About 80 percent of the range surface has received no or negligible levels of disturbance from over 70 years of military use while less than 2 percent of the surface has been highly to completely disturbed. An accounting of the surface disturbance footprint within the BMGR West, BMGR East, and the BMGR in aggregate attributable to the various types of military use identified in Tables 2-1 and 2-2 is provided in Tables 2-3, 2-4, and 2-5. The levels of disturbance attributable to each type of use are classified in accordance with five categories of disturbance to soil surfaces, surface drainages, and vegetation communities, including:

- direct active/inactive surface use areas that cause negligible surface disturbance
- direct active/inactive surface use areas that cause low to moderate surface disturbance
- direct active/inactive surface use areas that cause low to high surface disturbance
- direct active/inactive surface use areas that cause moderate to complete surface disturbance
- direct active/inactive surface use areas that cause complete surface disturbance

A similar accounting was provided in the 2007 INRMP and a direct comparison of the results for 2007 and 2012 is provided in the *Barry M. Goldwater Range Integrated Natural Resources Management Plan Public Report on Military Use, Environmental Conditions, Resource Management Activity, and Public Access and Involvement 2007 – 2012* (U.S. Department of the Air Force and U.S. Department of the Navy 2012).

Table 2-3 Active and Inactive Military Surface Use Footprints at BMGR West in 2012

Active or Inactive Military Surface Use Area	Associated Surface Disturbance ^a	Active Surface Use Area		Inactive Surface Use Area	
		Area in Acres	Percentage ^b	Area in Acres	Percentage ^b
1. AUX-II	L to H	215	0.03		
2. Cactus West Target Complex/Live Ordnance and Drop Tank Jettison Area	C	200	0.03		
3. Urban Target Complex (Moving Sands Target Complex in 2007)	C	205	0.03		
4. TACTS Range targets and instrument sites	C	170	0.02		
5. Ground Support Areas	L to H	11,154	1.61		
6. Parachute Drop Zones	N	4,058	0.59		
7. Rifle and Pistol Ranges	C	37	<0.01		
8. Small Arms Live-Fire Maneuver Range	C	77	<0.01		
9. Multi-Purpose Machine Gun Range	L to H	18	<0.01		
10. Convoy Security Operations Courses	L to H	3,265	0.47		
11. Combat Village	M to C	54	<0.01		
12. Hazard Areas (two in 2007, five in 2012)	N	71,486	10.32		
13. Cannon Air Defense Complex	C	169	0.02		
14. AUX-II FASP	C	4	<0.01		
15. Munitions Treatment Range	M to C	252	0.04		
16. Retired test areas	M to C			841	0.12
17. Pending F-35 B ALF (projected area)	C	320	0.05		
Total direct active/inactive surface use areas at BMGR West that cause no or negligible surface disturbance	N	75,544	10.90		
Total direct active/inactive surface use areas at BMGR West that cause low to moderate surface disturbance	L to M	0	0.00		
Total direct active/inactive surface use areas at BMGR West that cause low to high surface disturbance	L to H	11,369	1.64		
Total direct active/inactive surface use areas at BMGR West that cause moderate to complete surface disturbance	M to C	306	0.04	841	0.12
Total direct active/inactive surface use areas at BMGR West that cause complete surface disturbance	C	1,182	0.17		
Total direct active/inactive surface use areas at BMGR West		88,401	11.13	841	0.12

^a N = No or negligible levels of disturbance to ground surfaces, surface drainages, and vegetative communities.
L to M = Low to moderate levels of disturbance to ground surfaces, surface drainage, and vegetative communities.
L to H = Low to high levels of disturbance to ground surfaces, surface drainages, and vegetative communities.
M to C = Moderate to complete levels of disturbance to ground surfaces, surface drainages, and vegetative communities.
C = Complete levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

^b BMGR West encompasses 692,816 acres by GIS determination.

Table 2-4 Active and Inactive Military Surface Use Footprints at BMGR East in 2012

Active or Inactive Military Surface Use Area	Associated Surface Disturbance ^a	Active Surface Use Area		Inactive Surface Use Area	
		Area in Acres	Percentage ^b	Area in Acres	Percentage ^b
1. Manned Ranges 1, 2, 3, and 4					
1.1 Cleared target areas	C	939	0.09		
1.2 Two-year EOD clearance areas—extends to 300' from targets—active 2007 to present	L to H	2,245	0.21		
1.3 Ten-year EOD clearance areas—extends from 300' to 1,000' from targets—active 2007 to present	L to M	1,857	0.18		
1.4 One-year EOD clearance areas—extended to 1,000' from targets—active 2001 to 2007	L to M			3,834	0.36
1.5 Five-year EOD clearance areas—extended from 1,000' to 1 kilometer (3,281') from targets—active 2001 to 2007	L to M			19,070	1.81
1.6 Five-year EOD clearance areas—extended from 1,000' to 1-nautical mile (6,081') from targets—active 1975 to 2001	L to M			8,168	0.78
2. North, South, and East Tactical Ranges					
2.1 Cleared target simulations	C	430	0.04		
2.2 Two-year EOD clearance areas—extends to 300' from targets—active 2007 to present	L to H	6,580	0.63		
2.3 Ten-year EOD clearance areas—extends from 300' to 1,000' from targets—active 2007 to present	L to M	12,256	1.16		
2.4 One-year EOD clearance areas—extended to 1,000' from targets—active 2001 to 2007	L to M			7,531	0.72
2.5 Five-year EOD clearance areas—extended from 1,000' to 1 kilometer (3,281') from targets—active 2001 to 2007	L to M			40,682	3.87
2.6 Five-year EOD clearance areas—extended from 1,000' to 1-nautical mile (6,081') from targets—active 1975 to 2001	L to M			50,520	4.80
2.7 HE hill target core and dispersed blast impact areas (included in active 2-year EOD areas)	L to C	3,027	0.29		
3. Air-to-Air Firing Range	N	106,956	9.60		
4. ACTS Range instrument sites	C	<1	<0.01		
5. RMCPs 1, 2, 3, and 4 and other maintenance and EOD support areas	M to C	20	<0.01		
6. EOD Training Range	C	145	0.01		
7. Gila Bend AFAF	M to C	3	1.91		
8. AUX-6, AUX-11, and Stoval Airfield	L to H	1,000	0.10		
9. Four <u>inactive</u> auxiliary airfields (AUX-7, -8, -9, and -10)	L to H			1,170	1.11
10. Small Arms Range	C	15	0.01		
11. Sand and gravel excavation and stockpile areas	C	4	<0.01		
12. Pending Sensor Training Area Range (projected area)	M to C	640	0.06		
13. Pending Manned Range 3 Helicopter Gunnery Range (to be located within existing active and inactive EOD clearance areas)	M to C	1,800	0.17		

Active or Inactive Military Surface Use Area	Associated Surface Disturbance ^a	Active Surface Use Area		Inactive Surface Use Area	
		Area in Acres	Percentage ^b	Area in Acres	Percentage ^b
14. Pending North Tactical Range Moving Vehicle Target (to be located in existing active and inactive EOD clearance areas)	M to C				
Total direct active/inactive surface use areas at BMGR East that cause no or negligible surface disturbance	N	106,956	10.16		
Total direct active/inactive surface use areas at BMGR East that cause low to moderate surface disturbance	L to M	14,113	1.34	129,805	12.34
Total direct active/inactive surface use areas at BMGR East that cause low to high surface disturbance	L to H	9,825	0.93	1,170	1.11
Total direct active/inactive surface use areas at BMGR East that cause moderate to complete surface disturbance	M to C	2,463	0.23		
Total direct active/inactive surface use areas at BMGR East that cause complete surface disturbance	C	1,534	0.15		
Total direct active/inactive surface use areas at BMGR East		134,891	12.82	130,975	12.45

^a N = No or negligible levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

L to M = Low to moderate levels of disturbance to ground surfaces, surface drainage, and vegetative communities.

L to H = Low to high levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

M to C = Moderate to complete levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

C = Complete levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

^b BMGR East encompasses 1,052,121 acres by GIS determination.

Table 2-5 Total Active and Inactive Military Surface Use Footprints at BMGR in 2012

Active or Inactive Military Surface Use Area	Associated Surface Disturbance ^a	Active Surface Use Area		Inactive Surface Use Area	
		Area in Acres	Percentage ^b	Area in Acres	Percentage ^b
Total direct active/inactive surface use areas at BMGR that cause negligible surface disturbance	N	182,500	10.46		
Total direct active/inactive surface use areas at BMGR that cause low to moderate surface disturbance	L to M	14,113	0.81	129,805	7.44
Total direct active/inactive surface use areas at BMGR that cause low to high surface disturbance	L to H	21,194	1.21	1,170	1.11
Total direct active/inactive surface use areas at BMGR that cause moderate to complete surface disturbance	M to C	2,769	0.16		
Total direct active/inactive surface use areas at BMGR that cause complete surface disturbance	C	2,716	0.16		
Total direct active/inactive surface use areas at BMGR		223,292	12.80	130,975	7.51

^a N = No or negligible levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

L to M = Low to moderate levels of disturbance to ground surfaces, surface drainage, and vegetative communities.

L to H = Low to high levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

M to C = Moderate to complete levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

C = Complete levels of disturbance to ground surfaces, surface drainages, and vegetative communities.

^b BMGR encompasses 1,744,937 acres by GIS determination.

2.5 NON-MILITARY AGENCY ACTIVITIES AT THE BMGR

2.5.1 Arizona Game & Fish Department

AGFD has management authority for the state's wildlife, which is held in trust for the citizens of the State of Arizona. This authority applies to the BMGR unless otherwise pre-empted by federal law. Established in 1929 under Title 17 of the Arizona revised statutes, AGFD is governed by the Arizona Game and Fish Commission. Under the provisions of Arizona Revised Statutes 17-231, the Arizona Game and Fish Commission establishes policy for the management, preservation, and harvest of wildlife. Under the umbrella of the Commission, the AGFD's mission is:

To conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle (OHV) recreation for the enjoyment, appreciation, and use by present and future generations.

The primary wildlife management responsibilities of AGFD on the BMGR were recognized in the 2007 INRMP and continue without change to include:

- Developing and maintaining habitat assessment/evaluation, protection, management, and enhancement projects (for example, artificial water developments and Sonoran pronghorn food plots)
- Conducting wildlife population surveys
- Managing wildlife predators and endangered species/special status species (management of federally listed endangered species is a responsibility shared with the USFWS)
- Enforcing hunting regulations
- Establishing game limits for hunting, trapping, and non-game species collection
- Issuing hunting permits
- Assisting and advising DoD to manage OHV use in terms of habitat protection and advocating for user opportunities

AGFD management activities on the BMGR typically continue to include conducting wildlife censuses to determine population trends, providing recommendations based on census data for restoring or maintaining resident species, controlling wildlife populations at appropriate sustained levels for protection of other BMGR resources values, and enforcing state game laws. AGFD continues to organize and conduct bighorn sheep and deer censuses on the BMGR at three year intervals. AGFD conducts an annual call-count of mourning and white-winged doves at Range 3 and the East TAC Range and conducts Le Conte's thrasher surveys within BMGR East and BMGR West. The 56 RMO has ongoing partnerships with AGFD in conducting desert tortoise surveys. AGFD performs annual surveys at BMGR West for the FTHL, which is listed as species of concern by the Department.

AGFD also continues as a member of the Sonoran Pronghorn Recovery Team, which consists of representatives from the USFWS, Luke AFB, MCAS Yuma, National Park Service (from Organ Pipe Cactus NM), BLM (from the Lower Sonoran Field Office), the University of Arizona, Sustainable Development for the State of Sonora (CEDES) group (Mexico), Natural Commission for Protected Natural Areas (CONANP) (Mexico), veterinary staff and representatives from regional zoos including Phoenix Zoo and Los Angeles Zoo, and a representative from the U.S. Department of Homeland Security (Atkinson 2012). Although no tribal representatives have committed to be members of the current Recovery Team, Tohono O’odham Nation representatives have occasionally attended the Recovery Team meetings and paperwork to invite the tribe as a member of the recovery team is in progress. AGFD is usually the lead agency for implementing recovery and research actions for the Sonoran pronghorn that are authorized by the Recovery Team.

Luke AFB/56 RMO also partners with AGFD in the Southwestern Bald Eagle Management Committee, which oversees the successful Arizona Bald Eagle Nestwatch Program, and the relatively new Southwest Golden Eagle Management Committee. Luke AFB/56 RMO and MCAS Yuma also partner with AGFD in the Sonoran Desert Conservation Partnership Team.

In managing the state’s wildlife, AGFD continues to make determinations on the appropriateness and need to transplant wildlife, which may include transplants into or out of the BMGR. Should wildlife transplants affecting the BMGR be proposed, appropriate environmental studies and regulatory compliance would be completed, as required, prior to implementing any specific proposal.

2.5.2 U.S. Border Patrol

U.S. Customs and Border Protection (CBP), as a component of the Department of Homeland Security, is charged with controlling and guarding the boundaries and borders of the United States against illegal border crossing activities (undocumented immigrants [UDI]), installing border infrastructure as needed to deter illegal crossings, and obtaining operational control of the border (Homeland Security Act of 2002, P.L. 107-296, codified at 6 U.S. C. §§101 et seq., Section 102 of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, P.L. 104-208, as amended, 8 U.S.C. §1103 and other Acts). Within CBP, the U.S. Border Patrol is charged with “detecting and preventing the entry of terrorists, weapons of mass destruction, and unauthorized aliens into the country, and to interdict drug smugglers and other criminals between official points of entry.” Within BMGR West, CBP also works with the Yuma County Sheriff’s Office and Yuma County Search and Rescue.

In January 2007, the Department of Homeland Security waived numerous environmental, natural and cultural resource conservation, and endangered species protection laws in order to ensure the expeditious construction of the border fence along the international boundary within the BMGR and adjacent public lands (Federal Register 2007a), (Sikes Act, 16 U.S.C. §§ 670 et seq., MLWA P.L. 106-65, 113 Stat. 885 (Oct. 5, 1999), NEPA 16 U.S.C. §§ 4321 et seq., ESA 16 U.S.C. §§ 1531 et seq., Clean Water Act 33 U.S.C. §§ 1251 et seq., Wilderness Act , 16 U.S.C. §§ 1131 et seq., NHPA 16 U.S.C. §§ 470 et seq.,

National Wildlife Refuge System Administration Act, 16 U.S.C. §§ 668dd-668ee, and Administrative Procedure Act 5 U.S.C. §§ 551 et seq.) (Congressional Research Service 2009).

BMGR West shares approximately 38 miles of the international border between the United States and Mexico but the entire range is potentially subject to UDI and smuggling traffic because of its proximity to the international border (see Figure 1-1).

UDI and smuggling traffic across the BMGR was beginning to surge upward as the 2007 INRMP was being finalized. The rise in illegal cross-border traffic at the BMGR was the result of many factors but generally reflected the increased Border Patrol efforts to stem the illegal flow elsewhere along the whole of the southwestern border, which displaced traffic into remote and less well defended areas like the BMGR.

The illegal traffic, which involved border crossers in large numbers both on foot and in vehicles, and the Border Patrol's law enforcement and search and rescue responses resulted in considerable off-road foot and vehicle traffic through the BMGR as well as the adjacent Cabeza Prieta NWR and Organ Pipe Cactus NM. Substantial damage to natural and cultural resources likely occurred in some heavily trafficked areas and dispersed traffic caused impacts in surface locations that had not been previously affected by military or public use. The Border Patrol law enforcement response included greatly expanded ground and aerial surveillance of the border, BMGR, Cabeza Prieta NWR, and Organ Pipe Cactus NM, as well as construction of a vehicle barrier fence. As a result of these measures, declining U.S. economic conditions, and other factors, UDI traffic through the BMGR and adjacent areas has sharply declined in recent years. In February 2012, Organ Pipe Cactus NM and the Border Patrol signed a Memorandum of Understanding (MOU) regarding the repair and maintenance of roads within the monument. In the spring of 2012, MCAS Yuma and the Border Patrol initiated meetings to develop a similar MOU regarding the repair and maintenance of roads within BMGR West.

CHAPTER 3 CHANGES IN LAND AND ENVIRONMENTAL CONDITIONS SINCE THE 2007 INRMP

When considered over the whole of the landscape in which the BMGR occurs, the approximate 1.7 million acres of land at BMGR continues to harbor a relatively unfragmented and undisturbed ecosystem that is recognized for the continuing predominance of natural processes and its rich biodiversity. The BMGR landscape is unfragmented in terms of both land use and management and, with the exception of SR 85, is free of developed structures that may disrupt ecological connectivity across its entire span. The BMGR is central to a larger and principally unfragmented, contiguous land area that also includes the federally managed Cabeza Prieta NWR (860,010 acres) and the Organ Pipe Cactus (330,689 acres) and Sonoran Desert (487,000 acres) NMs, totaling over 3.4 million acres of federally managed unfragmented land. The southeastern corner of BMGR East is also connected to the Tohono O’odham Nation, which contains about 2.7 million additional acres of mostly undeveloped land.

This chapter provides a brief overview of the environmental conditions and public recreation opportunities at the BMGR and an update as to how these conditions and opportunities may have changed since the 2007 INRMP was implemented. The topics addressed include:

- earth resources
- climate
- surface water
- vegetation and invasive plant species
- wildlife
- protected species
- cultural resources
- perimeter land use
- recreation and special uses

3.1 EARTH RESOURCES

3.1.1 Overview

The BMGR is located in the Basin and Range Physiographic Province of Arizona, which is distinguished by broad alluvial valleys separated by steep, discontinuous, northwest to southeast trending mountain ranges. The modern landscape of the BMGR is primarily the result of past mountain building activity and erosion from natural forces. Human activities have caused some accelerated erosion but, so far, such effects are locally isolated. Elevations range from less than 200 feet (61 meters) above mean sea level (MSL) to nearly 3,700 feet (1,128 meters) MSL. The lowest elevations on the range are found within its westernmost extent and rise to the Sand Tank Mountains, the BMGR’s highest mountains in the eastern-

most portion of the range. All or portions of 15 named mountain ranges are found in the BMGR. The westernmost valley plains of the BMGR are within the Gran Desierto dune system, which extends both to the west and south of the BMGR and into Mexico. Smaller sand dune systems have also formed in several other range locations, with the Mohawk Sand Dunes in the central portion of the range being the most expansive.

The alluvial valleys of the BMGR are deep bedrock basins filled with silt, clay, sand, and gravel deposits. These deposits can be more than 10,000 feet (3,048 meters) deep. Along many of the mountain bases, sloping masses of alluvial fill material, known as bajadas, extend outward like fans to taper more gradually than the mountains themselves into the generally flat valley floors.

Extensive sheet-like lava flows occur in some parts of the range. These flows form irregular plains with rough basalt surfaces. Portions of the largest such lava flow in southern Arizona extend into the northern part of the range south of the community of Sentinel. The BMGR region is in a tectonically stable area with few earthquakes and few active faults.

3.1.2 2012 Update

Ground disturbance is one of the key factors influencing soil stability and erosion. On a broad scale, the exclusion of certain surface disturbing activities (such as mining, grazing, off-road recreational driving, etc.) and the limited areas where military surface use occurs minimizes ground disturbance and the associated effects at the BMGR. Decisions implemented by the 2007 INRMP established a designated road system; closed the range to off-road driving except for approved military, resource management, and law enforcement purposes; and established vehicle operating rules. The roads have been posted or otherwise restricted to clearly identify the roads that are (1) open for administrative (i.e., government) and public use, (2) open only for administrative use, or (3) closed to all users. The intent of the road closures was to facilitate natural revegetation and recovery of ground surfaces. Public access to the range is by permit only and all permitted users are provided with current maps that show the roads and areas that are restricted for administrative use, and roads that are open for public use. The extent to which roads closed by the 2007 INRMP have revegetated has not been tracked, but some closed road segments have been observed to have revegetated to the point that they are no longer vulnerable to accelerated erosion.

Although designation of the BMGR road system in 2007 provided an important tool for the control and management of roads and vehicle use, off-road driving and the proliferation of new vehicle routes have been the most notable cause of new ground disturbance at the BMGR over the past five years. This problem resulted from an unanticipated sharp increase in vehicle traffic from UDIs and drug smugglers crossing the international border from Mexico and traveling cross-country through Organ Pipe Cactus NM, Cabeza Prieta NWR, BMGR, and/or the Tohono O’odham Nation. The volume of illegal vehicle traffic



Inappropriate use and management of roads through the BMGR can result in accelerated erosion and affect surface flows.

crossing the international border peaked during the last five years but has been significantly reduced since the completion of a border barrier fence from San Luis, Arizona, to the eastern side of Organ Pipe Cactus NM. Currently, the proliferation of new vehicle routes within the BMGR by illegal cross-border traffic is minimal; however, off-road vehicle driving by the Border Patrol to make apprehensions or perform rescue operations continues to be a source of ground disturbance.

3.1.2.1 BMGR West

BMGR West shares about 38 miles of boundary with Mexico. To construct the border barrier fence in the eastern part of BMGR West and the western part of the Cabeza Prieta NWR, numerous semi- and other heavy trucks hauling equipment, materials, and supplies accessed the boundary by traveling from Interstate 8 (I-8) through BMGR West. The segment of El Camino del Diablo in BMGR West had to be substantially graded, widened, and straightened to support this construction access requirement. Frequent regrading was necessary to keep this earth-surfaced road in a condition to bear the weight of the truck traffic. As a result of repeated grading, the roadbed is now below grade along much of its length and sizable berms have developed along the road sides. Consequently, the road interrupts, impedes, and diverts surface drainage from the many wash channels that it traverses.

Despite the decline in UDI traffic, BMGR West continues to experience an increase in cross-country vehicle trails cut by Border Patrol agents during the pursuit and apprehension of UDIs. The Border Patrol also continues to maintain existing drag roads, has established some new drag roads, and has expanded its network of rescue beacons since 2007. A drag road is a surveillance feature that is created by dragging several bolted-together tires over a dirt road or well-used trail to erase old footprints and vehicle tracks and provide a fresh surface in which evidence of recent (since the last dragging) illegal crossings by people or vehicles is readily apparent. Dragging these roads repeatedly has also contributed to the formation of berms that affect surface water flows following precipitation events. The dirt shoulder adjacent to the paved road to Auxiliary Field II (AUX-II) has been widened considerably from dragging, which has diverted rainfall runoff and created new drainage channels. Rescue beacons are solar powered radio call boxes that allow UDIs or other individuals to signal for help when they are lost or endangered by exposure or other environmental hazards. The Border Patrol periodically smooths out the area around the rescue beacons to monitor for recent foot traffic. These drag areas were originally intended to be minimal in size, but have been steadily enlarged over time. As discussed in Section 2.5.2, in February 2012, Organ Pipe Cactus NM and the Border Patrol signed a Memorandum of Understanding (MOU) regarding the repair and maintenance of roads within the monument. In the spring of 2012, MCAS Yuma and the Border Patrol initiated meetings to develop a similar MOU regarding the repair and maintenance of roads within BMGR West.

The use of off-highway vehicles (OHVs), sand rails, other recreational vehicles, and unauthorized travel off the public road system contributes to ground disturbance that can lead to soil erosion. Excessive speeds and caravanning continually over the same route has added to road degradation. These high use areas require more frequent repairs, which involves dragging and grading, especially during the winter months when there is a higher volume of traffic. In 2007, the Federal Highway Administration approved

the environmental documentation for construction of the Yuma Area Service Highway (SR 195) and construction was completed in 2009. The highway alignment passes through the westernmost part of BMGR West and required approximately 296 acres within the range for new right of way. The highway is a four-lane, divided highway that is paved, which helps to control erosion. However, the areas disturbed for construction have some vulnerability to erosion until revegetation and other reclamation strategies become fully established.

MCAS Yuma has requested funding to conduct an erosion study and map soils within BMGR West. The Marine Corps is also exploring methods of partnering with outside funding sources to investigate natural resource issues.

3.1.2.2 BMGR East

During the last five years, BMGR East also experienced an increase followed by a decline in UDI and smuggler traffic and a resulting proliferation of cross-country vehicle routes. The Border Patrol response has created some new cross-country vehicle routes as well as the creation of a number of new drag roads. A drag road east of Arizona SR 85 near the “temporary” Border Patrol checkpoint on that highway is an example of new drag road disturbance within BMGR East.

3.2 CLIMATE

3.2.1 Overview

Average annual rainfall in the higher elevations of the easternmost portion of the BMGR may approach 9 inches. Average rainfall over the entire range, however, is less than 5 inches per year. Rainfall in the western extremes of the range averages no more than 3 inches annually. These averages are based on long-term weather patterns, and no location within the Sonoran Desert is assured of receiving a given level of rainfall during any season.



Weather stations provide climatic data used to make management decisions.

Annual rainfall within this desert is highly variable in terms of its amount, seasonal timing, and geographic distribution. Most of the annual precipitation typically occurs during mid-winter from frontal types of storms or during a late summer monsoon-type of rainfall period. Because of the irregularity of rainfall patterns, some range locations may receive little or no rain during the same year in which other areas receive average or above-average precipitation.

The Sonoran Desert is subject to frequent and sometimes prolonged droughts that can limit some areas or broad regions to a little or no rainfall for one or more years. As a result, some of BMGR’s interior valleys receive an annual average of only 0.5 inch of rain per year. When the stable weather patterns that enforce the aridity of the BMGR region periodically break down, all or portions of the range may receive two to three times the normal annual rainfall, sometimes in only one or a few storms.

The overall effects of the prevailing low rainfall patterns are exacerbated by high temperatures and regional evaporation potentials that greatly exceed all known rainfall regimes. Summer daytime temperatures on the range often are in excess of 110 degrees Fahrenheit and annual evaporation potentials, which vary from greater than 86 inches in the western part of the range to about 72 inches in the eastern, greatly exceed the available precipitation.

3.2.2 2012 Update

Climatic conditions tend to be persistent, but as noted, rainfall patterns are highly irregular. The Southwest has experienced persistent and reoccurring drought for more than a decade, and some climate models predict continued drought as a result of global climatic change (Seager et al. 2007 *in* Villarreal, Miguel L. et al. 2011). Increased temperatures and variable precipitation events related to drought and climate change could affect the BMGR by decreasing soil moisture, increasing drought stress in vegetation and wildlife, and decreasing the availability of surface-water resources.

3.3 SURFACE WATER

3.3.1 Overview

Surface water at the BMGR is very limited. There are no perennial or intermittent streams present on the range and ephemeral stream flow occurs only in immediate response to sizable rainfall events. Surface water drainage on the BMGR is outward from the mountain ranges and, for most of the area, ultimately northward by numerous feeder washes into the larger washes that flow to the Gila River, which in turn flows west into the Colorado River. Some storms cause flash flooding in the smaller mountain drainages and short-term flooding in the larger valley washes and floodplains.



Some natural and human-made catchments on the range hold water on a near year-round basis, as depicted here at the tinaja at Bender Spring.

Natural flooding events are highly variable in frequency and intensity and can have a large effect on natural community composition, structure, and function. Some rain water collects in natural rock catchments (also known as tanks or tinajas), human-modified natural catchments, or artificially constructed tanks where the water may persist for weeks or months without recharge until it eventually evaporates or is consumed by wildlife.

3.3.2 2012 Update

At the BMGR-wide scale, surface water conditions have generally not changed substantially over the last five years, although drag-road road developments and the proliferation of cross-country vehicle routes have impacted natural surface drainage at localized scales in many locations. Modifications to El Camino del Diablo during the construction of the border barrier fence has likely had a more substantial effect that impacts a larger region of BMGR West than the local road corridor.

3.3.2.1 *BMGR West*

Soil compaction, erosion, and damage to native vegetation resulting from off-road driving can modify the distribution and pattern of overland flow during rain events, reducing available soil moisture for vegetation and causing further erosion by reducing soil cohesion (Brooks and Lair 2009). In addition, soil erosion may directly impact USMC training activities; instances of high wind speeds in areas where heavy soil erosion has occurred can reduce visibility during training activities as well decrease air quality. Soil erosion and air quality may also negatively affect the health of threatened and endangered species on the range, particularly the desert tortoise, which has experienced population decline due to an airborne respiratory virus responsible for the upper respiratory tract disease. While qualitative observations of anthropogenic impacts to soil resources have been noted by range management, there has been no quantitative, data-driven study documenting human and natural impacts to range soil resources, hydrology, overland flow, and air quality.

In the past decade, roads and increasing motor traffic have disturbed the naturally formed desert pavement and has resulted in substantial watershed erosions. Currently, many roads are intercepting the natural ephemeral washes, and serve as man-made drainage channels for the watershed (see the photos below). Because of steep slope and frequent motorized vehicles, many roads surfaces are severely incised. Those incised roads separate the lower and upper portions of the watershed, and disconnect the lower watershed from receiving water flow from the upper watershed. At present, the lower and upper watersheds have distinct vegetation covers as woody riparian vegetation types are disappearing in the lower watershed. The incised roads have also caused headcuts extending to the upper watershed.

Road Influence on Soil Erosion



(a). road and wash



(b). upper watershed



(c). lower watershed



(d). headcut

Drag road operations create berms along the road sides that interrupt and divert overland flows. A number of drag roads in BMGR West exhibit the effects of this phenomenon. In places where roads have been repeatedly drug, the road beds have receded below grade and become small washes during storm events as runoff is captured from multiple natural drainages that are traversed by the road. Drag road berms also act to dam surface runoff in a number of BMGR West locations, which cause runoff from small and moderate storms to pond on the upstream side of the road. As a result, thick stands of vegetation develop in response to the increase soil moisture on the upstream side of the road and the natural vegetation community declines for some distance on the drier downstream side of the road. The dirt shoulder of the paved road to AUX-II, which has been widened considerably and converted into a drag road, now exhibits altered drainage patterns. As already noted in Section 3.1.2.1, the extensive grading modifications of El Camino del Diablo have substantially changed surface water drainage patterns along considerable lengths of this road. The full scope of effects of this recent activity on surface drainage has not yet been determined. Similarly, the consequence of the numerous cross-country vehicle routes that have been created over the last five years as a result of illegal cross-border traffic and law enforcement reactions have not been assessed. In some heavily-used traffic corridors, which are affected by multiple vehicle trails, drainage impacts may be concentrated, but localized effects on surface drainage from cross-country vehicle use are scattered in many locations of BMGR West.

3.3.2.2 BMGR East

During the last five years, surface water drainage at BMGR East has been affected by the development of new drag roads. Ongoing routine road grading and maintenance also affects surface drainage. Surface water drainage impacts in BMGR East from cross-country vehicle routes are likely to be similar to the effects exhibited in BMGR West.

3.4 VEGETATION AND INVASIVE PLANT SPECIES

3.4.1 Overview

Nearly 290 species of plants characteristic of the Arizona Upland and Lower Colorado River Valley subdivisions of the Sonoran Desert are reported to occur at the BMGR. The Arizona Upland Subdivision is restricted principally to the portions of the range east of SR 85 where the slopes and upper bajadas of the Sand Tank and Saucedo mountains provide favorable soils and elevations, and where an adequate precipitation regime prevails. The plant communities within the remaining portion of the range are within the Lower Colorado River Valley Subdivision. The distribution of plant communities within both of these subdivisions is influenced by the diverse landscape of the range, in which the series of widely spaced



The landscape of the range is an exceptional resource because its vast area has been relatively unaffected.

rugged mountain ranges, broad valley plains, sand dune systems, surface water drainages, and playas are the most important features.

As a part of the 2007 INRMP planning process, The Nature Conservancy reviewed the ecological structure, composition, and processes on the BMGR and identified 13 natural community elements. Nine of these 13 natural communities and their estimated areas, based on the best available geographic information system (GIS) information, within the BMGR are as follows:

- Valley Bottom Floodplain Complex—29,000 acres (11,736 hectares)
- Dune Complex and Dune Endemics —30,000 acres (12,141 hectares)
- Creosotebush-Bursage Desertscrub—1,360,000 acres (550,372 hectares)
- Creosotebush-Big Galleta Scrub—24,000 acres (9,912 hectares)
- Paloverde-Mixed Cacti-Mixed Scrub on Bajadas—191,000 acres (77,295 hectares)
- Paloverde-Mixed Cacti-Mixed Scrub on Rocky Slopes—63,000 acres (25,495 hectares)
- Sand Tank Mountains Uplands —10,000 acres (4,047 hectares)
- Elephant Tree-Limberbush on Xeric Rocky Slopes—91,000 acres (36,826 hectares)
- Desert Playa—170 acres (69 hectares)

Two xeroriparian communities are associated with washes. The extent of these communities is best described in the following linear terms:

- Valley Xeroriparian Scrub—2,325 linear miles (3,742 kilometers)
- Mountain Xeroriparian Scrub—400 linear miles (644 kilometers)

Salt Desertscrub and Desert Tinajas/Springs are the twelfth and thirteenth communities. The area occupied by these communities is small and was not estimated as part of the 2007 assessment.

These 13 BMGR natural communities are described in terms of ecological characteristics (composition, structure, function/ecological process, physiographic occurrence, and associated soil characteristics) in Table 3-1 and their locations within the BMGR are illustrated in Figure 3-1. The xeroriparian communities align with the washes shown in Figure 3-1 and the isolated point data for Salt Desert Scrub communities east of the Copper Mountains and east of the Mohawk Mountains are not illustrated.

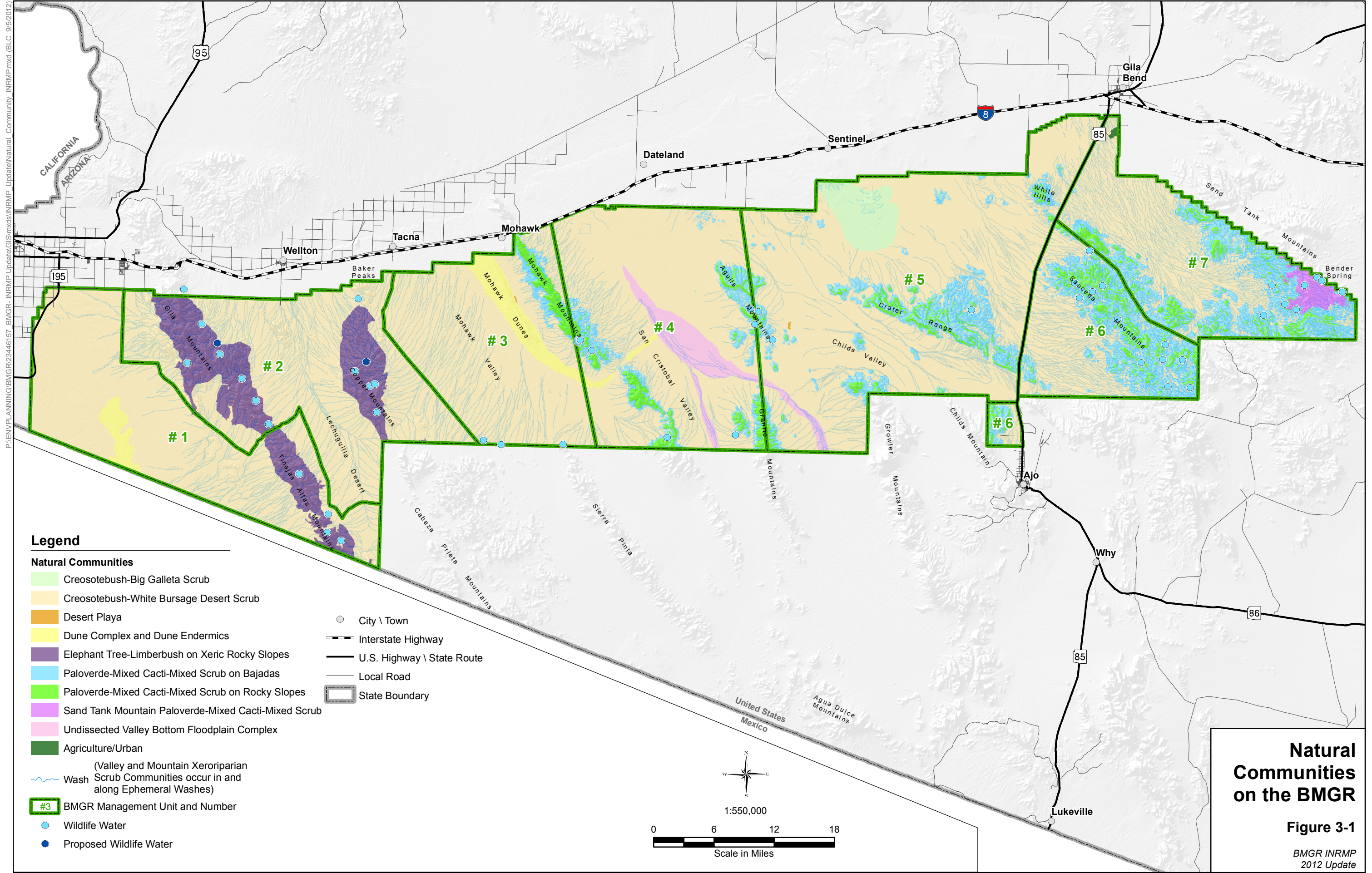
Table 3-1 Ecological Characteristics of BMGR Natural Communities as Assessed by The Nature Conservancy

Natural Community Element	Composition	Structure	Function/Ecological Process	Physiographic Occurrence	Associated Soil Characteristics
Valley Bottom Floodplain Complex	Characteristic vegetation includes creosotebush, triangle-leaf bursage, white bursage, acacias, paloverdes, mesquites, and annual and perennial grasses.	Community occurs as patchy shifting mosaics of sparse vegetation in the relatively dry areas interspersed with dense vegetation within shallow depressions where water accumulates. Linear occurrences of vegetation characteristic of the Valley Xeroriparian Scrub community may be present within this complex.	Forms on nearly flat terrain (valley bottoms) where sheet flow may be an important hydrological phenomenon. Vegetation provides forage, cover, nest sites and perches for wildlife.	Vegetation is located at the base of pediments and extends onto valley floors. Examples within the BMGR are found in the Growler and San Cristobal Valleys.	Generally forms on deep loams and sandy loams that are often prone to accelerated erosion.
Valley Xeroriparian Scrub	Characteristic vegetation is highly variable and includes blue paloverde, ironwood, mesquite, foothill paloverde, herbaceous and woody perennial vines, and sparse annual grasses and forbs.	Found in narrow linear strips in downcut channels with a moderate to dense layer of trees and shrubs that are generally less than five meters tall. Herbaceous layer typically is sparse.	Channel-constricted flow is the dominant ecological process. Frequency and amount of runoff, shading, and channel scouring influence xeroriparian vegetation gradients.	Found on mountain slopes with less than 6 percent grade and extending onto valley bottoms. On the BMGR, this community is most predominant in the more arid areas west of State Route 85. Daniels Arroyo is a good example.	Generally located on course-textured substrates, but also gravelly silty loams.
Mountain Xeroriparian Scrub	Characteristic vegetation is highly variable but typically consisting of paloverdes, ironwood, mesquites, and succulents.	Found in narrow linear strips in downcut channels with a moderate to dense layer of trees and shrubs that are generally less than five meters tall. Herbaceous layer typically is sparse.	Channel-constricted flow is the dominant ecological process.	Community is found on upper bajadas and low- to moderate- elevation mountain slopes with more than a 6 percent grade.	May be on exposed bedrock on upper mountain slopes. Soils are generally not saline.
Dune Complex and Dune Endemics	Complex is generally sparsely vegetated by scattered forbs and grasses. May include shrubs and dwarf-shrubs such as white bursage. Stabilized dunes may support creosotebush and mesquites while active dune fields may lack vegetation.	Community occurs as patchy shifting mosaic within Creosotebush-Bursage Desertscrub. Includes active open dunes, stabilized dunes, and stabilized flat "sand sheets." This complex has a sparse and seasonally variable herbaceous layer with a sparse cover of shrubs that are less than two meters tall.	Contains a high number of endemic species that have adapted to moving sand. Water may be held for long periods just under the surface by sand.	Active, stabilized, and partially stabilized dunes found in valleys. On the BMGR, dune complexes are found west of the Mohawk Mountains, in the Gran Desierto southeast of Yuma, in San Cristobal Valley, and in the northern Growler Valley.	Area consists of sand dune complexes.
Creosotebush-Bursage Desertscrub	Vegetation is primarily dominated by creosotebush. Woody and non-woody cacti and rosette succulents commonly occur on rocky slopes. Seasonally present perennial grasses with some perennial forbs dominate the sparse herbaceous layer.	Includes extensive networks of Valley Xeroriparian Scrub communities with large patches of active and stabilized dune complexes. Vegetation typically includes sparse to moderately dense layers of microphyllous and broad-leaved evergreen subshrubs and shrubs less than two meters tall.	Linear xeroriparian systems and large patch dune fields nested within the creosotebush-bursage "matrix" dominate.	Community is found on lower bajadas and intermountain basins that are generally flat or on gentle to moderate slopes. The lower bajadas and valley west of the Saucedo Mountains is a good example of this community.	Substrate is usually sandy or gravelly alluvium derived from limestone and metamorphic rocks. Soils are typically of low salinity.
Creosotebush-Big Galleta Scrub	Dominant shrub is Creosotebush. Big galleta is the sole or dominant grass in the herbaceous layer. White or triangle-leaf bursage can be a co-dominant.	Scattered shrubs and dense grasses typically form the first two layers of vertical structure of this complex. A tree canopy provides a third layer when mesquite is present.	Located on highly erodible sands around downcutting desert washes. Also sometimes found on hillsides where sand has accumulated downwind and vegetation has been dispersed by birds.	Community may be found growing on flat ridges, low gradient slopes and among stabilized sand dunes in portions of the Mojave and Sonoran deserts. The only mapped occurrence of the community is located in the Sentinel Plain area.	Soils generally consist of sandy loam. These soils are well-drained.

Natural Community Element	Composition	Structure	Function/Ecological Process	Physiographic Occurrence	Associated Soil Characteristics
Paloverde-Mixed Cacti-Mixed Scrub on Bajadas	Vegetation has a conspicuous but relatively sparse layer of saguaro cactus. A sparse to moderately dense short tree/tall shrub canopy is also present consisting of paloverde and creosotebush, along with ironwood and ocotillo in lesser prominence. A sparse herbaceous layer dominated by perennial grasses and forbs with seasonal annuals is present.	The dominant vegetation occurs in sparse to moderately dense woody layers of short shrubs, tall shrubs, and short trees, ranging from one-half to five meters tall. The herbaceous layer is generally sparse with scattered perennial grasses and forbs. The uppermost layer consists of a layer of large columnar cacti.	Linear xeroriparian systems occur nested within the community. Climate extremes may cause die-back of many plant species.	This community typically surrounds rocky slopes of low mountain ranges. The best example of this community on the BMGR occurs on the lower slopes and bajadas of the Sand Tank Mountains.	Soil generally consists of gravelly alluvium that is derived from basalt. Soil substrates are generally coarse-textured, shallow, gravelly clay loams. Caliche is a common characteristic.
Paloverde-Mixed Cacti-Mixed Scrub on Rocky Slopes	This community is of similar composition to that of the Paloverde-Mixed Cacti-Mixed Scrub on Bajadas, but contains additional associates such as <i>Opuntia bigelovia</i> .	This community is found along narrow drainages throughout large patches of sparse to clumped vegetative canopies. It generally occurs on highly irregular bedrock outcrops.	Linear xeroriparian systems are nested with the matrix of this community. Climate extremes may cause die-back of many plant species in this community.	This community is found throughout low mountain ranges, primarily above the major pediments. The best example on the BMGR occurs in the Saucedo Mountains.	This community occurs on highly irregular bedrock outcrops. Soils are generally of the Lithic Camborthids-Rock Outcrop-Lithic Haplargids Association, which are typically composed of very cobbly to cobbly loams, very stony to stony loams, gravelly very fine sandy loams, and rock outcrops. Soils of these mountains are subject to slight water erosion.
Sand Tank Mountains Uplands	Vegetation in this complex includes saguaro cactus and a sparse to moderately dense short tree/tall shrub canopy consisting of paloverde and creosotebush. Typical associates include crucifixion thorn and <i>Vaquelinea californica sonorensis</i> . Also present is a sparse herbaceous layer dominated by perennial grasses and forbs.	Large patches of a sparse to clumped vegetative canopy are found on steep, highly irregular bedrock outcrops. The structure is variable and influenced by aspect, edaphic characteristics, and sheltering cliffs and rocks.	Dynamic processes on landscapes dominated by this community involve linear xeroriparian systems that are nested within the larger community. Climate extremes may result in the periodic die-back of many plant species.	This community occurs at high elevations in and around the Sand Tank Mountains.	The community occurs on steep, rocky slopes. Soils of these mountains are subject to slight water erosion. They are comprised principally of the Lithic Camborthids-Rock Outcrop-Lithic Haplargids Association, which are generally very cobbly to cobbly loams, very stony to stony loams, gravelly very fine sandy loams, and rock outcrops.
Elephant Tree-Limberbush on Xeric Rocky Slopes	The composition of this community is similar to that of the Paloverde-Mixed Cacti-Mixed Scrub system, but is characterized by additional associates. Elephant tree, limberbush, <i>Nolina bigelovii</i> , and <i>Rhus kearnyi</i> are dominant in a mixed canopy. Vegetation of this system may differ with substrate.	This community forms large patches with a sparse to clumped vegetative canopy on highly irregular bedrock outcrops.	Linear xeroriparian systems are nested with the matrix of this community. Climate extremes may result in the periodic die-back of many plant species.	This community is found throughout low mountain ranges in the most arid portions of the Lower Colorado Valley and Arizona uplands of the Sonoran Desert. Mountain Xeroriparian Scrub is found throughout the large patch community along narrow drainages. Examples of this community occur in the Tinajas Altas and Gila Mountains	The community is commonly associated with granite bedrock and granite-derived gravels at the base of the mountains.
Desert Playa	Generally desert playas in the central Sonoran Desert are sparsely vegetated, with periodic emergence of ephemeral species. Large playas in the Sonoran Desert may have surrounding rings of vegetation. Characteristic vegetation differs between playas and unpredictable annuals may emerge.	Large patches are formed on flat plains and basins. Deep ravines may be formed as a result of drainage into the playas, but are subsequently filled in. Desert playas are often located within a matrix of Creosotebush-Bursage Desertscrub and may be associated with active and stabilized sand dunes.	Dominant ecological processes of desert playas are periodic flooding and subsequent evaporation. Large mud cracking at Las Playas may be related to volcanic activity.	Large open expanses that support playa lakes may also serve as sand sources for dunes located down-wind. Rainfall absorbed into dune fields may serve as a water source for seepage into the playa lakes. Many playas include dissected streambeds that are erased through time. Mohawk Playa is the best example on the BMGR.	Playas are typically associated with active and stabilized sand dunes.
Desert Tinaja/Spring	Tinajas are typically small aquatic ecosystems formed through water accumulation in bedrock depressions. Vegetation is typically absent or present as a few individual plants.	The community generally appears in the form of small patches among bedrock exposures.	The periodic inflow and slow evaporation are the primary processes that support tinajas. Tinajas may retain water permanently.	This community may occur in bedrock depressions throughout the desert southwest. Examples on the BMGR include Tinajas Altas and Bender Springs.	The community is commonly associated with bedrock depressions.

Natural Community Element	Composition	Structure	Function/Ecological Process	Physiographic Occurrence	Associated Soil Characteristics
Salt Desertscrub	Two main types of saltbush communities occur. Saltbush communities found along major riverine systems typically have been converted to agriculture. The drier upland type is associated with creosotebush and numerous cactus species. The community is dominated by the xeromorphic shrub <i>Atriplex polycarpa</i> . The sparse to moderately dense graminoid layer may be dominated by warm season medium-tall and short grasses. Forb cover is generally sparse.	This community may form large patches on desert bajadas. Vegetation typically has a sparse to moderately dense layer of shrubs up to two meters in height.	The dominant xeromorphic shrub <i>Atriplex polycarpa</i> is tolerant of saline or alkaline soils, and marks to extent of deep, fine loams soils of significant agricultural value. Periodic flooding, while infrequent, is tolerated by this community.	This community occurs on both upland and lowland sites throughout much of the arid and semi-arid western United States. Lowland sites include alluvial flats, drainage terraces, playas, washes, and interdunal basins while upland sites include bluffs and gentle to moderately steep sandy or rocky slopes. An example of this community occurs within the San Cristobal Valley.	Soils are variable with depths ranging from shallow to moderately deep and textures ranging from sands to loams to clay. Lowland sites may be moderately saline or alkaline.

Source: Hall 2001



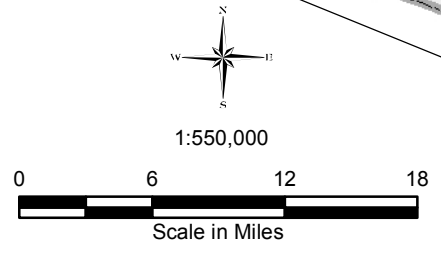
Legend

Natural Communities

- Creosotebush-Big Galleta Scrub
- Creosotebush-White Bursage Desert Scrub
- Desert Playa
- Dune Complex and Dune Endermics
- Elephant Tree-Limberbush on Xeric Rocky Slopes
- Paloverde-Mixed Cacti-Mixed Scrub on Bajadas
- Paloverde-Mixed Cacti-Mixed Scrub on Rocky Slopes
- Sand Tank Mountain Paloverde-Mixed Cacti-Mixed Scrub
- Undissected Valley Bottom Floodplain Complex
- Agriculture/Urban

- City \ Town
- Interstate Highway
- U.S. Highway \ State Route
- Local Road
- State Boundary

- (Valley and Mountain Xeroriparian Scrub Communities occur in and along Ephemeral Washes)
- #3 BMGR Management Unit and Number
- Wildlife Water
- Proposed Wildlife Water



Natural Communities on the BMGR

Figure 3-1

BMGR INRMP
2012 Update

P:\ENVPLANNING\BMGR\23446157_BMGR-INRMP_Update\GIS\mxd\INRMP_Update\Natural_Community_INRMP.mxd (BLC_9/5/2012)

3.4.2 2012 Update

In accordance with the management goals provided by the 2007 INRMP, inventory and monitoring plans have been developed for both BMGR West (Villarreal, Miguel L. et al. 2011) and BMGR East (56th Range Management Office 2007). These plans adopt several protocols from existing regional monitoring programs, allowing for integration of BMGR West and BMGR East monitoring efforts, collaboration, and data sharing. As part of this effort, the range is being inventoried to collect data to verify or update the mapping for the 13 biotic communities identified in the 2007 INRMP. Vegetative mapping is partially completed, but inventory and mapping will continue over the next several years. The inventory and monitoring efforts are intended to establish quantifiable trends, which will require monitoring over multiple seasons of growth.

One of the issues associated with vegetation is the spread of exotic, invasive, or noxious plants. As defined in DoD Instruction 4715.3, exotic plants are “species that occur in a given place, area, or region as the result of direct or indirect, deliberate or accidental introduction of the species by human activity.” Executive Order 13112 requires federal agencies to identify actions that may affect invasive species; use relevant programs to prevent introduction of invasive species; detect, respond and control such species; monitor invasive species populations; provide for restoration of native species; conduct research on invasive species; and promote public education. An invasive species, as defined in Executive Order 13112, is “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.”



Control of exotic, invasive, or noxious plants such as Sahara mustard is managed within BMGR East by physical removal of plants or the application of herbicide.

Exotic, invasive, or noxious plants are all generally characterized by their ability to colonize disturbed areas and their ease of dispersal. Their ability of invading undisturbed habitats differs between species, but invasive species have the potential to strongly impact native species. Roads, livestock grazing (current grazing near the BMGR perimeter and historic grazing within the BMGR), and people are the primary vectors for invasive species on the BMGR. Because roads are an identified contributor to the spread of invasive plants, the proliferation of new roads and similar areas of disturbance are of particular concern. Seeds from invasive species can be caught in wheel wells or in tire tread when vehicles are driven through infested areas; these seeds may later fall in other areas, thereby further spreading the invasive colonies of the species. The 2007 INRMP reported that the density and distribution of non-native species on the BMGR was not accurately known, although BMGR East was estimated to have a comparatively greater distribution of invasive species than BMGR West because of higher annual rainfall amounts and closer proximity to vector sources for invasive species. As reported in 2007, the most widespread invasive plant of those recorded on the BMGR is the Sahara mustard (*Brassica tournefortii*), which is found in sandy soils throughout the BMGR. Buffelgrass (*Pennisetum ciliare*) was identified as a spreading species, particularly along the SR 85 corridor, in Area B, and south of the Crater Range (Whittle 2012). In 2012,

several dozen buffelgrass plants were discovered in the Gila Mountains along an OHV track in Fortuna Canyon along 1.2 miles of the canyon bottom within BMGR West. Other non-native grasses that have been identified include Lehmann lovegrass (*Eragrostis lehmanniana*), red brome (*Bromus rubens*), and Mediterranean grass (*Schismus arabicus* and *S. barbatus*). If left undetected, unmonitored, and unmanaged, nonnative herbaceous species could fundamentally alter BMGR's ecosystem structure through competition with native species, reduction of species diversity, and enhancing the spread of wildfires (Villarreal, Miguel L. et al. 2011).

The spread of the winter annual plant Sahara mustard continues as the most prevalent invasive species at BMGR. The spread of the species is more of a concern on BMGR West because the soil generally contains more sand than on BMGR East and the Sahara mustard favors sandy soil. Differences in winter precipitation between BMGR West and East may also indirectly contribute to the prevalence of this species, and its population usually booms after wet winters. However, with generally lower winter precipitation, BMGR West is more affected by this species than the wetter BMGR East. Habitat type, species competition and some other biotic and abiotic factors are likely having substantial influence on the spread of the species. Sahara mustard has the potential to produce a dense monoculture ground cover that is highly flammable and can alter native plant diversity. Because plant communities in the Sonoran Desert are not adapted to fires, wildfires typically have devastating results, and recovery takes many years.

Besides natural conditions, human activities also strongly influence the Sahara mustard spread. Roads alter drainage patterns and catch water to support Sahara mustard growth, and can provide preferred conditions for germination of this species by burying the seeds (particularly with the use of tire drags to smooth road surfaces). Additionally, seeds may collect in wheel wells or other vehicle parts and then, as vehicles are driven along roads, the seeds may be dispersed.



Sand dunes are unique ecological systems that, within the BMGR, are composed of sediments transported by wind from northern portions of the Gulf of California.

3.4.2.1 BMGR West

Recognizing the need for more detailed vegetation maps that correspond with the National Vegetation Classification Standard, the BMGR managers have supported association level mapping by working with the Desert Southwest Cooperative Ecosystem Studies Unit of the University of Arizona. As of 2012, approximately 75 percent of the BMGR has been mapped (McLaughlin et al. 2007; Osmer et al. 2009; Malusa 2010; Shepard 2011). Virtually all of the range will be mapped by 2014.

Given the current knowledge of the spread of Sahara mustard and the uncertainty of how environmental factors promoting or limiting its invasion, there is an urgent need for studying how variation in complex physical and biotic environmental factors affect the population growth of Sahara mustard and how the

species disperse through natural and human created corridors (e.g., roads). The knowledge gained from such studies will provide strong scientific insight for managing this species on the range. In partnership with Luke AFB, MCAS Yuma also has contracted a three-year study (FY2011-FY2013) with the University of Arizona to characterize and model Sahara mustard invasion throughout the BMGR. This study combines field measurements, controlled experiments, and mathematical modeling to determine environmental factors that affect its success and the long-term impact on native winter annual plants. More specifically, it will examine how spatial variation in both biotic and abiotic environments affect the population growth of Sahara mustard as well as its impact on native annual plants. It will also quantify the natural dispersal range of the species in order to estimate the rate of spread of the species in its nearly established habitats.

While most recreational visitors to BMGR West have been complying with the prohibition on off-road driving, there has been some off-road vehicle use, particularly associated with geocaching. Geocaching is a “treasure” hunt, in which individuals obtain information from geocaching websites about where a “treasure” has been hidden and then attempt to navigate to the location using global positioning system (GPS) coordinates. Some participants in this activity leave the designated road system and drive cross-country in direct pursuit of the geocache. Resource damage, including the spread of invasive plants, from geocaching has not yet reached a level of concern that would warrant new limitations on the activity, but MCAS Yuma Range Wardens have been meeting with geocaching participants and other recreational groups in an outreach effort to curb the off-road driving violations before harsher enforcement becomes necessary. Another factor in the spread of invasive plants in BMGR West over the past five years is the ground disturbance associated with drag roads and the drag areas around rescue beacons and along the border fence. A network of rescue beacons has been installed throughout BMGR West in an effort to mitigate UDI injuries and/or fatalities caused from the region’s extreme environment. The Border Patrol periodically will smooth out the area around the rescue beacons, and along the border fence to monitor for recent traffic. These drag areas were originally intended to be minimal in size, but continue to be enlarged over time from expanded dragging. These disturbance areas, as well drag roads, are of particular concern for the spread of invasive species that thrive in disturbed soils.

Wildfires greater than a few acres were almost unknown at the BMGR until the last 10 years because the low densities of native Sonoran desert vegetation typically do not provide sufficient fuel to carry a fire over large areas. The spread of invasive plants, however, has substantially raised the threat that wildfire poses to native vegetation and wildlife because the invasive species of concern grow in high densities, will readily carry a wildfire, and recover from fire more readily than native species, thereby choking out the native plants. A wildfire that was evidently fueled by Sahara mustard burned approximately 500 acres of native creosote-bursage community at BMGR West in 2008 or 2009. Field inventory showed that the mustard was the only species recovering in the area after the fire (Malusa 2010). In addition to degrading the quality of the range for native plant species and wildlife, wildfires also can interfere with military training activities and readiness.

3.4.2.2 BMGR East

The spread of invasive species is also a concern at BMGR East. There has been an observable expansion of buffelgrass along the SR 85 corridor. The vast majority of this expansion is occurring outside of the BMGR fence line on the highway right-of-way. One notable exception is a portion of Area B, south of the Crater Mountains, where buffelgrass appears to be extending from the highway inside the fence line along several small drainages. There is also a small isolated patch approximately 1,300 feet in length inside the fence where a number of seedlings were observed in October 2011.



An observable expansion of buffelgrass, an invasive species, along SR 85 and outside the BMGR fence line is a concern on the east side of the range.



Aerial application of herbicide can control the spread of invasive vegetation.

Two other invasive species that are widespread at BMGR East are Mediterranean grass (*Schismus spp.*) and Sahara mustard. Mediterranean grass is widespread throughout the range and are most common on fine grained soils. Sahara mustard is most common west of SR 85 and has become well established along many of the North TAC and South TAC roadways and several target areas. Both Mediterranean grass and Sahara mustard are annual weeds that appear to be largely weather dependent and are much more abundant following wet winters.

The Air Force has prepared an Environmental Assessment (EA) for a proposed program to control Sahara mustard at BMGR East, and the Finding of No Significant Impact (FONSI) was signed on 19 July 2012. The purpose of controlling the Sahara mustard is to reduce wildfire risk and improve range quality for wildlife. The proposed action will implement an integrated pest management program consisting of a combination of physical removal of plants by hand in small (< 100 acres), environmentally sensitive areas. Applications of herbicide will be applied by ground equipment for low density stands of invasive weeds in areas that are accessible by vehicles and foot. Ground based equipment could also be used to make targeted applications in accessible infested areas with high densities of environmentally sensitive species. Herbicide would be applied in larger areas by aircraft, including an Air Force C-130 outfitted for pesticide dispersal. Approximately 7,800 acres within North TAC and South TAC Ranges and Manned Ranges 1 and 2 have high densities of Sahara mustard and few environmentally sensitive plant species. Regardless of the manner in which the herbicide is applied, herbicides will be used in a judicious and prudent manner using products that quickly degrade and have little risk of contaminating water or affecting wildlife.

Drag roads and vehicle use can contribute to vegetative disturbance and the spread of invasive species. The rescue beacons near the Range 1 water well and in San Cristobal Valley have not experienced the

level of damage from dragging the areas around the beacons that has occurred in BMGR West. However, off-road driving associated with Border Patrol operations have had more of an impact throughout the San Cristobal Valley, where there are no physical barriers to discourage off-road driving, and at the Mohawk Dunes. No ground or aerial surveys have been conducted to quantify the level of disturbance and the increase has been noted through observations made by range personnel.

A total of 87 wildfires were recorded at BMGR East from 2006-2011. All fires were small in size, and typically located within the target complex. Three grass fires along SR 85 were each about 1/10 acre. Invasive plants did not play a role in the spread of fire. However, wildfires in 2005 burned about 130,000 acres of BMGR East and required emergency intervention from the National Interagency Fire Center. This was considered a rare event attributable to the heavy winter rains that year, but the spread of invasive species may have contributed to the fuel load to carry the fires. In response, the 56 RMO, in its role of natural and cultural resource management at BMGR East for Luke AFB, is teaming with experts from the U.S. Forest Service to begin preparation of the first-ever fire management plan for BMGR East.

3.5 WILDLIFE

3.5.1 Overview

The available inventories currently show that over 200 bird species, more than 60 species of mammals, 10 amphibian species, and over 50 reptile species continue to occur or may potentially occur within the BMGR and the adjacent Cabeza Prieta NWR combined. Available evidence indicates that the diversity of wildlife species and habitats present in 1941 when the BMGR was established continue to be found within the range today in abundances that are relatively stable and typical for this portion of the Sonoran Desert. This may be attributed to several factors including:

- The land is withdrawn for military use, which has excluded or limited other land uses—such as livestock grazing, farming, mining, and intensive off-road vehicle recreation—that potentially would have altered physical and biological systems to a greater extent than has military training
- Ecological interconnections with two national monuments and one national wildlife refuge have remained unfragmented and undiminished
- The primary use of the land, aviation training, has limited on-ground disturbances of soils and vegetation to a relatively small and dispersed proportion of the range
- Restrictions and limits on public access and use have left many portions of the range free of disturbances from intensive and concentrated recreation activities
- The BMGR is far from major metropolitan areas, which has likely minimized public visitation and the effects of prolonged intensive use
- Surface drainage patterns generally isolate the range and its surrounding area hydrologically, which have protected it from upstream water-borne pollutants, sedimentation, and watershed modification

3.5.2 2012 Update

The condition of BMGR's ecosystem and most of its individual resident wildlife populations generally continues to be good. The health and resiliency of most resident wildlife populations continue to be supported by relatively high-quality and secure habitats. Still, some threats to wildlife populations and habitat are of concern including a growing problem with trespass livestock and feral burros at BMGR East (see Section 3.5.2.2), the spread of invasive species and associated increases in vulnerability to wildfire (see Section 3.4.2), and persistent and reoccurring drought, which may be related to climate change (see Section 3.2). For at least the immediate future, the threat to habitat and wildlife from illegal cross-border traffic seems to have been sharply diminished by the completion of the border barrier fence but continuing Border Patrol activities are of some concern (see Section 3.3.2). To date, a need to restrict military use or public recreation activities to conserve or rehabilitate habitat has not been identified. More than 87 percent of the range surface has received no or low levels of disturbance from the past 70 years of military use, and less than 1 percent of the surface has been highly to completely disturbed. Military activities continue to be focused primarily in the same historic areas of use.

The 2007 INRMP provided that new wildlife water developments would be limited to six high-priority sites for the first five years of plan implementation. Water developments for recovering endangered or threatened species are not subject to the six priority waters limit.

Bird/Animal Aircraft Strike Hazard (BASH) reduction plans are developed for DoD military installations where elevated hazards exist and can be controlled. BASH concerns are greatest when aircraft fly at low altitude (including takeoff and landing), rather than for in-flight operations that are typical at the BMGR. MCAS Yuma has not identified a need for a BASH Reduction Plan at BMGR West. A BASH Reduction Plan is in place at BMGR East for Gila Bend Air Force Auxiliary Field (AFAF), where there is a runway.



The Air Force worked together with AGFD to establish one of the six priority wildlife water developments within BMGR East.

3.5.2.1 BMGR West

Plans for installing two of the priority wildlife waters sanctioned for development at the BMGR are underway for sites in BMGR West. Locations of existing and proposed wildlife waters at the BMGR are shown in Figure 3-1.

Monitoring planned in the 2007 INRMP of non-game birds has been initiated. The population data collected thus far indicate that population numbers are healthy and not in decline. Requests for additional monitoring studies are pending approval of funding requirements.

3.5.2.2 BMGR East

One wildlife water was completed in BMGR East in 2012; the new Halliwill water catchment, located in South TAC was developed as a recovery action for Sonoran pronghorn. The old Halliwill water catchment, about 1 mile east of the new catchment, is no longer functional and will be removed. Some established, but deteriorating, wildlife waters within BMGR East have been upgraded or rebuilt. The Air Force has also completed compliance actions related to the installation of a wildlife water at the location of the Site 1B pronghorn feed station. The Air Force continues to support AGFD in the annual maintenance of developed wildlife waters, and supported the renovation of existing and installation of new wildlife water catchments. Maintenance and in-kind-replacement of existing water catchments are not subject to the limits on new catchments provided by the 2007 INRMP.



Trespass livestock continues to be a regional problem.

Trespass cattle, feral burros, and horses from adjacent lands were reported in the 2007 INRMP as a periodic problem at BMGR East, particularly in Management Units 6 and 7 (see Figure 3-1). Plant communities in some locations are affected by grazing pressures by trespass livestock and burros, which can impact native wildlife species. Trespass animals can also deplete water stored for wildlife at developed wildlife drinkers. Trespass livestock and feral burros continue to be a regional problem. Burros, in particular, appear to be expanding in numbers, particularly in Area B, and have caused observable damage to native vegetation. Burro sign (droppings, tracks, and trails) also has been recently noted on the west side of SR 85 on Manned Range 1. AGFD and USFWS personnel reported observing a herd of 20 burros at Manned Range 1 in December 2011 during the aerial census for Sonoran pronghorn.

Trespass cattle are also occasionally observed in Area B, in the Bender Springs/Paradise Well area, and at Manned Range 1, but there is no indication that their numbers are increasing. Likewise, trespass horses have recently been observed during AGFD aerial deer and javelina census flights, and during a 56 RMO reconnaissance flight over the Bender Spring/Paradise Well area, but only a few individuals were sighted.

A BASH Reduction Plan has been prepared for Gila Bend AFAF at BMGR East. In accordance with this plan, the Air Force uses the Avian Hazard Advisory System (AHAS), which is a comprehensive method of remote sensing for birds. The AHAS system evaluates weather and radar data and provides real-time alerts to aviators when concentrations of large birds are in the airspace. The AHAS is available online and coverage includes the entire continental United States. Additionally, as part of the prevention program, AHAS provides pilots and flight schedulers with a near real-time tool when selecting flight routes.

The BMGR East plan is based on Luke AFB's BASH Reduction Plan, 56 FW OPLAN 91-2, and focuses on reducing the BASH threat at the Gila Bend AFAF and at the Manned Range 1 and 2 lead-in-lines. Priority BASH management actions include vigilant threat monitoring and reporting, management of the environment at and surrounding the Gila Bend AFAF, and carrion removal along SR 85 to reduce the abundance of large avian scavengers (e.g., turkey vultures). Bird harassment and depredation at Gila Bend AFAF is authorized by USFWS through a permit issued annually to Luke ABF. Mammal depredation (e.g., rabbits and coyotes) at Gila Bend AFAF is authorized by a permit issued annually by AGFD to 56 RMO.

3.6 PROTECTED SPECIES

3.6.1 Overview

Two species listed under the ESA, Sonoran pronghorn and lesser long-nosed bat (*Leptonycteris curasoae*), are known to occur at the BMGR. Of these, only the Sonoran pronghorn appears to depend upon habitats within the BMGR and the adjacent Cabeza Prieta NWR and Organ Pipe Cactus NM for its continued survival. The lesser long-nosed bat forages but is not known to roost within the BMGR.

The FTHL has no ESA protection but is listed as threatened in Mexico, is protected by Arizona and California, and is a Wildlife Species of Concern in Arizona. The FTHL occurs in BMGR West and is managed in accordance with an Interagency Conservation Agreement and Flat-tailed Horned Lizard Rangewide Management Strategy (RMS) to which the Marine Corps and AGFD are parties.

Peirson's milkvetch (*Astragalus magdalenae peirsonii*) is a dune endemic plant known primarily from the Algodones Dunes in California and the dunes of the Gran Desierto of northwestern Sonora, Mexico. On the BMGR, it was reported from a single 1996 specimen collected near the range's western boundary. However, the specimen was subsequently assigned to a different subspecies, and Peirson's milkvetch is not currently known to exist in Arizona, although it occurs nearby in Sonora and suitable habitat exists in the Yuma Dunes in BMGR West. Surveys during 2003 and 2004 failed to find the species on the range (BMGR Task Force 2005). The only Biological Opinion (BO) addressing effects of the BMGR military activities on Peirson's milkvetch was in 2001. In this opinion, the USFWS found that the actions proposed were not likely to jeopardize the continued existence of Peirson's milkvetch. The rationale for this conclusion was that relatively limited potential habitat existed on the BMGR and the Marine Corps activities were expected to only minimally affect those habitats (BMGR Task Force 2005). The species has not been found during any surveys to date; however, in accordance with the 2001 BO, if the species is found at the BMGR, reinitiation of consultation with the USFWS may be warranted.

3.6.2 2012 Update

The 2007 INRMP provided information for 25 animal and plant species that are either present or potentially present at the BMGR and that are either federally protected in accordance with the ESA and/or are an Arizona listed special status species. Table 3-2 provides the current federal and/or state status of the species.

Arizona also has a State Wildlife Action Plan (SWAP) which, among other goals and programs, rates the vulnerability of species. Table 3-2 has been modified from the 2007 INRMP to include the SWAP rating. The SWAP focuses on identifying and managing the wildlife and biotic communities of greatest conservation need.

As part of the conditions to receive federal funding for conservation programs, the U.S. Congress identified eight required elements to be addressed in each State's wildlife conservation strategy, and directed that the strategies must identify and be focused on the Species of Greatest Conservation Need (SGCN). Arizona's SWAP (previously known as the Comprehensive Wildlife Conservation Strategy) was accepted by the USFWS in 2006 (AGFD 2010a), and the SWAP was updated and approved in August 2012 (AGFD 2012b). As part of the SWAP, and as a funding requirement of the State Wildlife Grants program, the AGFD identified wildlife of conservation priority; these species are described as SGCN for Arizona. A SGCN is a species that are rare, declining, or vulnerable in Arizona, and are not adequately funded, or that were imperiled and in need of conservation attention. The SGCN that are known to occur, or have potential habitat on the BMGR based on the inventory and monitoring, have also been included in Table 3-2; many of the SGCN do not currently have a federal or state protected status.

Table 3-2 Federally and State Protected Species and Species of Greatest Conservation Need in Arizona on the BMGR

Common Name <i>Scientific Name</i>	Federal Status	Arizona Status/ SWAP Score	Species of Greatest Conservation Need	Species or Habitat			Federal Register Reference	Habitat or Potential Habitat at BMGR
				Present	Potential	Not Expected		
MAMMALS								
Lesser long-nosed bat <i>Leptonycteris curasoae yerbabuena</i>	E	WC/1B	✓	✓			53 FR 38456 dated 9-30-88	Summer resident that roosts in caves or mines and forages in desert scrub habitats (BMGR West and East)
Sonoran pronghorn <i>Antilocapra americana sonoriensis</i>	E	WC/1A	✓	✓			32 FR 4001 dated 3-11-67	Habitat in southwestern Arizona: vegetation includes big galleta grass, six week three-awn, six weeks grama, creosote bush, bursage, and saltbush, BMGR West and East east of the Gila and Tinajas Altas mountains
	NEP		✓	✓			76 FR 25593 dated 5-5-11	New breeding pen at Kofa NWR, relocation of some species from existing breeding pen at Cabeza Prieta NWR to BMGR East.
Spotted bat <i>Euderma maculatum</i>	—	WC/1B	✓		✓	✓		Riparian areas, rocky cliffs (BMGR West)
Mexican long-tongued bat <i>Choeronycteris mexicana</i>	—	WC/1C	✓			✓		Cave or mine-nesting/roosting, forages on saguaro and agave (BMGR West and East)
Southern yellow bat <i>Lasiurus ega</i>	—	WC/NR			✓	✓		In association with palm trees, may occur in vicinity (BMGR West and East)
California leaf-nosed bat <i>Macrotus californicus</i>	—	WC/NA	✓	✓				Year round resident that roosts in caves or mines and forages in desert scrub or xeroriparian vegetation (BMGR West and East)
Greater western mastiff bat <i>Eumops perotis californicus</i>		NR/1B	✓	✓				Lower and upper Sonoran desert scrub near cliffs, preferring the rugged rocky canyons with abundant crevices (BMGR West and East)
Canyon Mouse <i>Peromyscus crinitus</i>	—	NR/1C		✓				Rocky habitats or gravel sites adjacent to rocky areas (BMGR West)
Kit fox <i>Vulpes macrotis</i>		NR/1C		✓				In valleys and on sandy plains in the southwestern deserts (BMGR West and East)
Little pocket mouse <i>Perognathus longimembris</i>		NR/1C		✓				Found in various types of desert scrub habitats (greasewood, rabbitbrush, creosote bush, cactus, mesquite, palo verde, etc.). (BMGR West)
Crawford's desert shrew <i>Notiosorex crawfordi</i>	—	NR/NA ¹		✓				Not restricted to any particular vegetation type, so long as there is sufficient cover. They are often found in packrat houses, or under dead agaves, old logs, or other debris (BMGR West)

Common Name <i>Scientific Name</i>	Federal Status	Arizona Status/ SWAP Score	Species of Greatest Conservation Need	Species or Habitat			Federal Register Reference	Habitat or Potential Habitat at BMGR
				Present	Potential	Not Expected		
Desert bighorn sheep <i>Ovis canadensis mexicana</i>	—	NR/NA ¹	✓	✓				Desert mountain ledges and grassy basins (BMGR West and East)
Arizona wood rat <i>Neotoma devia</i> (on the list provided by MCAS Yuma, but not on the SGCN state list)	—	—		✓				Low desert or rocky slopes; sagebrush scrub or areas with scattered cactus, yucca, and other low vegetation. When inactive, occupies elaborate den built of debris among cacti, rocks, etc. Found only in extreme western Arizona (BMGR West)
BIRDS								
Southwestern willow flycatcher <i>Empidonax traillii eximius</i>	E	WC/1A	✓			✓	60 FR 10693 dated 2-27-95 Revised critical habitat: 76 FR 50542-50629 8-15-11	Well-developed riparian areas with cottonwood, willow, or tamarisk are not present on the range
Yuma clapper rail <i>Rallus longirostris yumanensis</i>	E	WC/1A	✓			✓	32 FR 4001 dated 3-11-67	Marsh habitat not found on the BMGR
Sprague's pipit <i>Anthus spragueii</i>	C	WC/1A	✓		✓		Listed as Candidate: 75 FR 56028 dated 9-15-10, Lowered Listing priority number (LPN) from 2 to 8, 76 FR 66370 dated 10-26-11	Winters in grassy fields along lower Colorado River from north of Yuma to Parker. (May be expected occasionally at BMGR West)
Bald eagle <i>Haliaeetus leucocephalus</i>	BGEPA	WC/1A	✓			✓	Proposed for delisting: 64 FR 36453 dated 7-6-99 Delisting: 72 FR 37346 dated 7-9-07	Aquatic habitat not found on the BMGR
Golden eagle (<i>Aquila chrysaetos canadensis</i>)	BGEPA	NA/1A		✓				Cliffs or in large trees that afford an unobstructed view. (BMGR East)
Cactus ferruginous pygmy-owl <i>Glaucidium brasilianum cactorum</i>	—	WC/1A	✓		✓		Delisting: 71 FR 19452-19458 dated 4-4-06, 12-Month Finding – listing not warranted: FR 61856-61894 dated 11-5-11	Xeroriparian areas (BMGR West and East)
Peregrine falcon <i>Falco peregrinus anatum</i>	—	WC/1A	✓		✓		Delisting: 64 FR 46541-46558 dated 8-25-99	Isolated cliffs; winter migrant (BMGR West and East)
Ferruginous hawk <i>Buteo regalis</i>	—	WC/1B	✓	✓			Identified for possible listing, and a request for status information 59 FR 58982 dated 11-15-94	Arid to semiarid regions, as well as grasslands and agricultural areas. (BMGR East).

Common Name <i>Scientific Name</i>	Federal Status	Arizona Status/ SWAP Score	Species of Greatest Conservation Need	Species or Habitat			Federal Register Reference	Habitat or Potential Habitat at BMGR
				Present	Potential	Not Expected		
Belted kingfisher <i>Ceryle alcyon</i>	—	WC/NA	✓		✓			Found near water (fresh or salt). Rare transient at BMGR.
Crested caracara <i>Caracara cheriway</i>	—	WC/NA	✓		✓			Semi-desert, in both arid and moist habitats, but is more commonly in the former. Observed in Sonoran Desert NM near BMGR East
Snowy egret <i>Egretta thula</i>	—	WC/NA	✓		✓			Marshes, lakes, ponds, lagoons, mangroves, and shallow coastal habitats. (May appear during seasonal migration BMGR West and East)
Tropical kingbird <i>Tyrannus melancholicus</i>	—	WC/NA	✓		✓			Situations with scattered trees, savanna, open woodland, forest edge, plantations, residential areas and agricultural lands
Desert Purple Martin <i>Progne subis hesperia</i>		NR/1B	✓	✓				Desert southwest in saguaro cacti cavities (BMGR East)
Gila woodpecker <i>Melanerpes uropygialis</i>		NR/1B		✓				All desert habitats, nesting in saguaro cacti (BMGR West and East)
Gilded flicker <i>Colaptes chrysoides</i>		NR/1B		✓				All desert habitats, nesting in saguaro cacti (BMGR West and East)
Le Conte's Thrasher <i>Toxostoma lecontei</i>		NR/1B	✓	✓				Open desert scrub, alkali desert scrub, and desert succulent scrub (BMGR West and East)
Mountain plover <i>Charadrius montanus</i>		NR/1B	✓	✓			Withdrawal of Proposed Rule to list the Mountain Plover as Threatened 76 FR 27756 dated 5-12-11	Xeric or disturbed uplands; short vegetation, bare ground, and a flat topography. Not on the AGFD Heritage Data Management System for Maricopa, Pima, and Yuma counties. However, known to occur on BMGR East, and surveys in 2011 and early 2012 identified the plover in Maricopa County (Gila Bend AFAF), and Yuma County.
Bendire's thrasher <i>Toxostoma bendirei</i>		NR/1C		✓				Relatively open desert grassland, shrubland or woodland with scattered shrubs or trees (BMGR West and East)
Black-tailed gnatcatcher <i>Poliophtila melanura</i>		NR/1C		✓				Desert brush, dry washes, and mesquite bosques (BMGR West and East)
Brown-crested flycatcher <i>Myiarchus tyrannulus</i>		NR/1C			✓			Found in association with saguaros; also frequents river groves and other areas where trees are large enough to provide sites for cavity nesting (BMGR East)
Common poorwill <i>Phalaenoptilus nuttallii</i>		NR/1C		✓				In all Sonoran Desert habitats, but most common on sparsely vegetated bajadas (BMGR West and East)
Costa's hummingbird <i>Calypte costae</i>		NR/1C		✓				Desert and semi-desert, arid brushy foothills, chaparral; in migration and winter also in adjacent mountains and in open meadows and gardens (BMGR West and East)
Elf owl <i>Micrathene whitneyi</i>		NR/1C		✓				Deserts, dry shrublands, riparian woodlands, and open pine-oak forests (BMGR West and East)

Common Name <i>Scientific Name</i>	Federal Status	Arizona Status/ SWAP Score	Species of Greatest Conservation Need	Species or Habitat			Federal Register Reference	Habitat or Potential Habitat at BMGR
				Present	Potential	Not Expected		
Gray vireo <i>Vireo vicinior</i>		NR/1C		✓				Non-breeding winter resident found in desert and arid scrub, semi-open areas with scattered scrub and semi-open arid brushland (BMGR West)
Hooded oriole <i>Icterus cucullatus</i>		NR/1C		✓				Favors groups of palms for nesting (BMGR East)
Lucy's warbler <i>Vermivora luciae</i>		NR/1C						Mesquite bosques and edges of riparian woods in desert zones (BMGR West and East)
Phainopepla <i>Phainopepla nitens</i>		NR/1C		✓				Scrub habitats, with desert mistletoe present (for foraging) (BMGR West and East)
Prairie falcon <i>Falco mexicanus</i>		NR/1C		✓				Canyons, open country, grasslands, and deserts, (BMGR West and East)
Scott's Oriole <i>Icterus parisorum</i>		NR/1C		✓				Yucca gardens on desert grassland prairies, but they have been found wherever yucca is growing, even on the hillsides of mountain canyons (BMGR West and East)
Varied bunting <i>Passerina versicolor</i>		NR/1C		✓				Streamside thickets, brush mostly in areas of dense thorny brush, often with an upper story of scattered trees. (BMGR East)
Western screech-owl <i>Megascops kennicottii</i>		NR/1C		✓				Southern populations inhabit lowland riparian forests, oak-filled arroyos, desert saguaro and cardon cacti stands, Joshua tree and mesquite groves, and open pine and pinyon-juniper forests. (BMGR West and East)
White-throated swift <i>Aeronautes saxatalis</i>		NR/1C		✓				Rocky cliffs and canyons, typically found nesting in arid regions, but near major rivers. (BMGR West and East)
Pyrrhuloxia <i>Cardinalis sinuatus</i>		NR/NA		✓				Desert scrub and mesquite thickets (BMGR East)
REPTILES								
Desert tortoise (Sonoran population) <i>Gopherus agassizii</i>	C	WC/1A	✓	✓			Listed as Candidate: 76 FR 66370 dated 10-26-11	Sonoran desertscrub and semidesert grassland, prefers rocky slopes and bajadas. (BMGR East)
Flat-tailed horned lizard <i>Phrynosoma mcallii</i>	CA	WC/1A	✓	✓			Withdrawal of proposal to list 76 FR 14210 dated 3-15-11	Creosote flats, sand dunes, and mud hills in southeastern California, southwestern Arizona, and northwestern Mexico (BMGR West)
Desert rosy boa <i>Lichanura trivirgata gracia</i>	SC	NR/NA ¹	✓	✓				Rocky areas in desert ranges, especially in canyons with permanent or intermittent streams. (BMGR West)
Mexican rosy boa <i>Lichanura trivirgata trivirgata</i>	SC	NR/NA ¹	✓	✓				On or near rocky mountains or hillsides in desert ranges, where they inhabit the granite rock outcroppings that absorb the sun's rays providing heat and cover (BMGR West)

Common Name <i>Scientific Name</i>	Federal Status	Arizona Status/ SWAP Score	Species of Greatest Conservation Need	Species or Habitat			Federal Register Reference	Habitat or Potential Habitat at BMGR
				Present	Potential	Not Expected		
Yuman Desert fringe-toed lizard <i>Uma notata rufopunctata</i>	—	WC/NR	✓	✓				Restricted to sparsely vegetated windblown sand dunes and sandy flats; it requires fine, loose sand for burrowing; vegetation is usually scant, consisting of creosote bush or other scrubby growth. (BMGR West and East)
Desert night lizard <i>Xantusia vigilis</i>		WC in Mohave County only /NA		✓				Arid and semiarid, among fallen leaves and trunks of yuccas, agaves, cacti, and other large plants, also in crevices of rock outcroppings and under logs and bark of foothill pines; it ranges locally into pinyon-juniper, sagebrush-blackbrush, and chaparral-oak. (BMGR West)
Colorado Desert fringe-toed lizard <i>Uma notata</i>		NR/NA ¹		✓				Restricted to sparsely vegetated windblown sand of dunes, flats, riverbanks, and washes. (BMGR West)
Long tailed brush lizard <i>Urosaurus graciosus</i>		NR/NA ¹		✓				The Lower Colorado River Sonoran Desertscrub community and can be a common sight in creosotebush-lined desert flats with sandy soil and along tree lined drainages (BMGR West)
AMPHIBIANS								
Western (or Great Plains) narrow-mouthed toad <i>Gastrophryne olivacea</i>	—	WC/IC	✓		✓			Moist crevices or burrows, near ephemeral water sources (BMGR West and East)
PLANTS								
Peirson's milkvetch <i>Astragalus magdalenae</i> var. <i>peirsonii</i>	T	—			✓		63 FR 53596-53615 dated 10-6-98; critical habitat 64 FR 47329-47351 dated 8-4-04, Petition to remove from listing not warranted; 73 FR 41007, dated 7-17-08	Slopes of mobile sand dunes in the Sonoran desert scrub plant community. No confirmed occurrences but Yuma Dunes in BMGR West are potential habitat
Acuña cactus <i>Echinomastus erectocentrus</i> var. <i>acunensis</i>	C	HS/		✓			64 FR 57533, dated 10-25-99. High Priority for listing (LPN #3), 76 FR 66370 dated 10-26-11 Proposed Rule to list as endangered, and designate habitat, 77 FR 60510 dated 10-3-12	The Arizona Upland Subdivision of the Sonoran Desertscrub biotic community, tending to be located at the western, warmer, drier perimeter of the Subdivision within the Palo-Verde Saguaro Association Only one confirmed individual observed in BMGR East. USFWS is conducting analyses under Section 4 of the Endangered Species Act to list and determine critical habitat. The USFWS published a Proposed rule to list as an endangered species in the Federal Register on 3 October, 2012 (Vol. 77, No. 192), along with a proposal to designate critical habitat. The USFWS is accepting comments on the Proposed Rule until 3 December, 2012 (Federal Register 2012).

Common Name <i>Scientific Name</i>	Federal Status	Arizona Status/ SWAP Score	Species of Greatest Conservation Need	Species or Habitat			Federal Register Reference	Habitat or Potential Habitat at BMGR
				Present	Potential	Not Expected		
Sand food <i>Pholisma sonorae</i>	—	HS		✓				Drifting sand below 500 ft. elevation in creosote bush scrub (Yuma Dunes in the extreme southwestern portion of BMGR West)

The Yuma puma has been omitted from the table. While the Yuma puma had been listed as a wildlife species of concern, genetic research completed subsequent to the creation of the wildlife species of concern list showed that the subspecies ranking was not correct.

A list of migratory birds protected by the Migratory Bird Treaty Act can be found at 50 CFR 10.13.

Except for the mountain plover and golden eagle, the species listed on Table 3-2 were derived from the 2007 INRMP Table 4.

Order of Presentation and list of acronyms:

Federal

- E=Endangered
- T=Threatened
- C=Candidate
- CA=Species managed under Conservation Agreement with the USFWS
- BGEPA=Species protected by provisions in the Bald and Golden Eagle Protection Act.
- SC=Species of Concern
- NEP=Nonessential Experimental Population

Arizona Status/SWAP Score

- WC=Wildlife Species of Concern in Arizona – WC species are the same as those in Threatened Native Wildlife in Arizona (1988)
- HS=Highly Safeguarded
- NR=Not Rated
- NA=Not Applicable

Within the Arizona Status/SWAP Score: Arizona score of vulnerability criteria:

- 1A=Scored “1” for vulnerability in at least one of nine vulnerable categories, or is a T, C species, or is covered under a signed conservation agreement, or protected under the BGEPA, or requires post-delisting monitoring, or is petitioned for listing
- 1B=Scored “1” for vulnerability, but match none of the listing criteria under 1A.
- 1C=Unknown status species.

SOURCES: AGFD 2012b, USFWS 2012b, AGFD 2010a, MCAS Yuma 2012, Luke AFB 2012, NatureServe 2012.

¹ The species is not on the Arizona lists, but identified by MCAS Yuma as a SGCN

The U.S. Air Force, U.S. Marine Corps, USFWS, and AGFD all have responsibilities for the management and recovery of species at the BMGR that are protected in accordance with the ESA. On 11 August 2008, the USFWS (Region 2) and the Arizona Game and Fish Commission entered into an MOU with the purpose of facilitating joint participation, communication, coordination, and collaboration between the USFWS and AGFD for implementing the ESA within the State of Arizona. The MOU is applicable to the species for which both parties have management authorities.



Wildlife surveys are important biological resource management tools. Range biologists continue to study the distribution and behavior of the desert tortoise.

More than 800 migratory bird species are protected by the Migratory Bird Treaty Act (MBTA) (1918), which makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird, or the parts, nests, or eggs of such a bird; except as authorized under a valid permit. The MBTA defines “Take” as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.” The USFWS issued a Final Rule on the Take of Migratory Birds by the Armed Forces wherein, the Final Rule authorizes a take, with limitations, that result from military readiness activities of the Armed Forces (Federal Register 2007).

Executive Order 13186 directs agencies to take certain actions to further strengthen migratory bird conservation under the conventions under the MBTA, the Bald and Golden Eagle Protection Act (BGEPA), and other pertinent statutes. It requires the establishment of MOUs between the USFWS and other Federal agencies. Accordingly, DoD and USFWS implemented an MOU in 2010 to promote the conservation of migratory birds (DoD and USFWS 2006). This MOU describes specific actions that should be taken by DoD to advance migratory bird conservation; avoid or minimize the take of migratory birds; and ensure DoD operations-other than military readiness activities-are consistent with the MBTA.

Most species of birds found at the BMGR are provided MBTA protection. MCAS Yuma and Luke AFB have prepared a Bird Check List that is provided to visitors if requested. The list identifies species that may be sighted at the BMGR; the species list is extensive and is not repeated in this document.

The BGEPA (16 U.S.C. 668) as amended in 1972 prohibits any form of possession or taking of bald or golden eagles (including any part, nest, or egg), unless allowed by permit. The BGEPA defines “take” as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” In September 2009, the USFWS announced a final rule on two new permit regulations that would allow for the take of eagles. The permits will authorize limited, non-purposeful take of bald and golden eagles, which include authorizing government agencies to disturb or otherwise take eagles in the course of conducting lawful activities, such as operating airports. Most permits issued under the new regulations would authorize disturbance, and in limited cases, a physical take (USFWS 2011a).

3.6.3 Changes in the Protection Status of Species since the 2007 INRMP

Changes over the last five years in protection status of five species at or potentially at the BMGR are summarized in this section.

Bald Eagle. On 9 July 2007, the USFWS announced that the bald eagle has recovered, and removed the threatened status of the species from the lower 48 states Federal List of Endangered and Threatened Wildlife (Federal Register 2007). The bald eagle remains a wildlife species of concern in Arizona, and is protected under the BGEPA; however, the eagle is not expected to occur at the BMGR.

Golden Eagle. The golden eagle is protected under the BGEPA, and is identified on the BMGR Bird Checklist as a probable breeding species. Prior to 2007, the golden eagle had been considered a rare species at the BMGR. However, BMGR East biologists have observed the golden eagle regularly at BMGR East since 2007, and there has been one to three nesting pairs sighted each year.

Sprague's Pipit. The Sprague's pipit (*Anthus spragueii*) has been listed as a federal species of concern, and continues to be considered a wildlife species of concern in Arizona; however, the species is not listed as occurring in Maricopa, Pima, or Yuma counties, which are the counties in which the BMGR is located.

Desert Tortoise. On 26 October 2011, the Sonoran population of the desert tortoise (*Gopherus agassizii*) was identified by the USFWS as a candidate for listing as threatened (Federal Register 2010a). The Sonoran population of the desert tortoise also is categorized as a wildlife species of special concern by the State of Arizona. The tortoise is known to occur at BMGR East, and Luke AFB has provided funding for the AGFD to continue a study on the distribution and behavior of the desert tortoise on the BMGR. A desert tortoise was sighted on BMGR West in the 2008-2009 timeframe. AGFD was subsequently awarded a Legacy grant to develop a landscape-level model to predict desert tortoise occurrences on the BMGR (as well as the Yuma Proving Grounds), but there were no actual sightings (Grandmaison 2012).

Acuña Cactus. On 12 December 2011, the USFWS announced a pre-proposal notification and information request for acuña cactus (*Echinomastus erectocentrus* var. *acunensis*) to review information on the species to determine if the acuña cactus warrants protection under the ESA. The acuña cactus is currently protected by the Arizona Native Plant Law as a highly safeguarded protected native plant. USFWS has conducted analyses under Section 4 of the Endangered Species Act to list and determine critical habitat. The USFWS published a Proposed Rule to list the acuña cactus as an endangered species in the Federal Register on 3 October 2012 (Vol. 77, No. 192), along with a proposal to designate critical habitat. Following the 60-day comment period, there will be a final decision by the USFWS. At the time of the release of this document, a final decision had not been announced.

Section 4(a)(3)(B)(i) of the ESA was amended by the 2004 National Defense Authorization Act to state “[t]he Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan [INRMP] prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is

proposed for designation.” There is one confirmed sighting of an acuña cactus in BMGR East; this sighting was made during surveys conducted in 1995-1996 in the southeast corner of Area B. The sighting was in an extremely remote mountainous location that is not impacted by military training, and is unlikely to be affected by border activities, law enforcement, or public recreation. The plant has not been detected in BMGR West, nor is it expected to occur.

An assessment of vulnerability of threatened, endangered, and at-risk species to climate change at the BMGR was published in August 2012 (Bagne, Finch 2010). The acuña cactus was the only plant species that was assessed at the BMGR in relation to climate change, and was found to have an increased vulnerability to population declines with projected climate change. The study also identified species vulnerability at BMGR in relation to off-highway vehicle use, illegal immigrant traffic, and associated Border Patrol activities. The largest threat to the species may be the interaction of invasive grass species with fire, with the spread of buffelgrass identified as the main invasive species to spread following wildfire.

The Inventory and Monitoring Plan for BMGR East provides monitoring protocols for the inventory and monitoring of the acuña cactus that uses the same protocol as is currently being conducted within the Organ Pipe Cactus NM (56 RMO 2007). The protocol is designed to assess population dynamics of acuña cactus by monitoring growth, mortality, recruitment, and reproductive status of any populations that occur on BMGR East. The current protocol for monitoring of the acuña cactus provides for monitoring once every five years beginning in mid-March, and continuing once per week for the remainder of the flowering phenology. The acuña cactus is also monitored for regulatory status and, should the species be listed by the USFWS, the 56 RMO would consult with USFWS to verify that monitoring and conservation actions are appropriate for the species.

Data on locations of individual plants would be used to further define the habitat conditions most suitable to the species, including drained knolls and gravel ridges between major washes and on hilltops in granite substrates. Models of areas with suitable habitat would be used to identify areas to survey and monitor. Data from the monitoring will be compiled into reports on an annual basis and the data will be analyzed to determine trends (positive or negative) for the species, which may lead to implementation of adaptive management actions, such as road closures or fire suppression activities (56 RMO 2007). The annual reports will be shared with the AGFD’s Heritage Data Management System, and it is anticipated that there will be annual meetings of all natural resource management agencies to discuss species trends. Additionally, wildlife biologists at the 56 RMO have been communicating with the USFWS to identify possible additional survey locations within BMGR East.

Due to increased concern regarding acuña cactus, in September 2012 the 56 RMO funded a systematic survey for the species. Work will begin with a visit to known acuña cactus locations to record relevant physical characteristics of the site, such as elevation, slope, aspect, soil type, etc. This information will be used to refine the species occurrence model used by USFWS to identify likely suitable habitat areas on BMGR East. The survey will be concentrated in areas where there is the highest probability of occurrence with 75 percent of the effort in these areas. The medium and low probability areas will also be examined

(with 15 percent and 10 percent levels of effort, respectively) to test the predictive model. At this time it is expected that the cacti would be found along gravelly ridges, which likely would not coincide with East TAC target areas. It is anticipated that surveys of high probability habitat would continue at two-year intervals, depending on availability of funds.

The 56 RMO also is conferring with the USFWS to ensure that the activities at BMGR East will avoid adverse modification of any proposed critical habitat; the 56 RMO would reinstate consultation if a military training or law enforcement need would require a new ground-disturbing activity within the proposed critical habitat area.

In addition to conducting surveys of habitat area, other conservation measures will be taken to minimize the potential for disturbance of acuña cactus and its habitat. Some of these measures are embedded in Table 6-2, INRMP BMGR East 5-Year Action Plan: 2013-2017. These actions include monitoring and controlling invasive species; developing and implementing a fire management plan (to include assessing fire risk and maintaining a firefighting agreement with BLM); developing and implementing procedures to control trespass livestock (including removal of feral burros); and monitoring illegal immigration, contraband trafficking, and border-related law enforcement as well as continuing informal coordination with law enforcement authorities (see Table 6-2 in Chapter 6). Controlling invasive species helps to maintain quality habitat and prevent unnatural fire.

Mining and agriculture are prohibited within the BMGR, thus eliminating these threats to acuña cactus. Most of the area proposed for critical habitat is not authorized for recreational use, though unauthorized trespass may occur with illegal immigration and contraband trafficking. It is believed that acuña cactus and its habitat is being protected from disturbance by the rugged terrain and hilltop locations where it occurs. The systematic survey described above may yield important information regarding that belief. The 56 RMO will continue to report observed incidents and coordinate with the Border Patrol and law enforcement authorities to prevent or minimize such trespass. Mining on the range is prohibited, further limiting the types of activities that could affect the species and its habitat.

The Air Force agrees to continue its protection of acuña cactus habitat. It will prevent new impacts (such as establishment of new military targets and off-road vehicle use) in the proposed critical habitat area, avoid disturbance of vegetation and pollinators within 900 meters of known or newly discovered acuña cactus plants, and continue to monitor and control invasive plant species. Detailed vegetation mapping has been completed on about half the BMGR East, and these data might contribute to more precise acuña habitat modeling efforts. Furthermore, when resources are available the Air Force may aid or enable with *ex situ* conservation efforts to establish new populations of acuña cactus on BMGR and other areas as appropriate.

3.6.4 Federally Listed Threatened and Endangered Species

Threatened and endangered species at both BMGR West and East are managed in accordance with the ESA. The 26 August 2005 BO for the 17 proposed actions for the 2007 INRMP (AESO/SE 02-21-05-F-0492) addresses both BMGR East and BMGR West with regard to the Sonoran pronghorn, lesser long-nosed bat, and cactus ferruginous pygmy-owl. The review of the possible effects found that the 17 proposed INRMP actions were not likely to jeopardize the continued existence of the Sonoran pronghorn, and were not likely to adversely affect the bat or the pygmy-owl.

The Arizona population of cactus ferruginous pygmy-owl was added to the Federal endangered species list in March 1997 as a distinct population segment, but was delisted as of 15 May 2006. A 12-month finding issued from the USFWS on 5 October 2011 reaffirmed that the listing of the species was not warranted (USFWS 2012b). The species retains its protected status under the MBTA, and is a wildlife species of concern in Arizona. The cactus ferruginous pygmy-owl may potentially occur within the easternmost portions of the BMGR, but this species has not yet been confirmed as utilizing the range and is not further addressed here. The current status of the Sonoran pronghorn and lesser long-nosed bat management at the BMGR are addressed in the following subsections. The FTHL is also addressed as conservation of this species at BMGR West has been an important factor in preventing a decline in the population of this species that likely would trigger reconsideration for ESA protection.

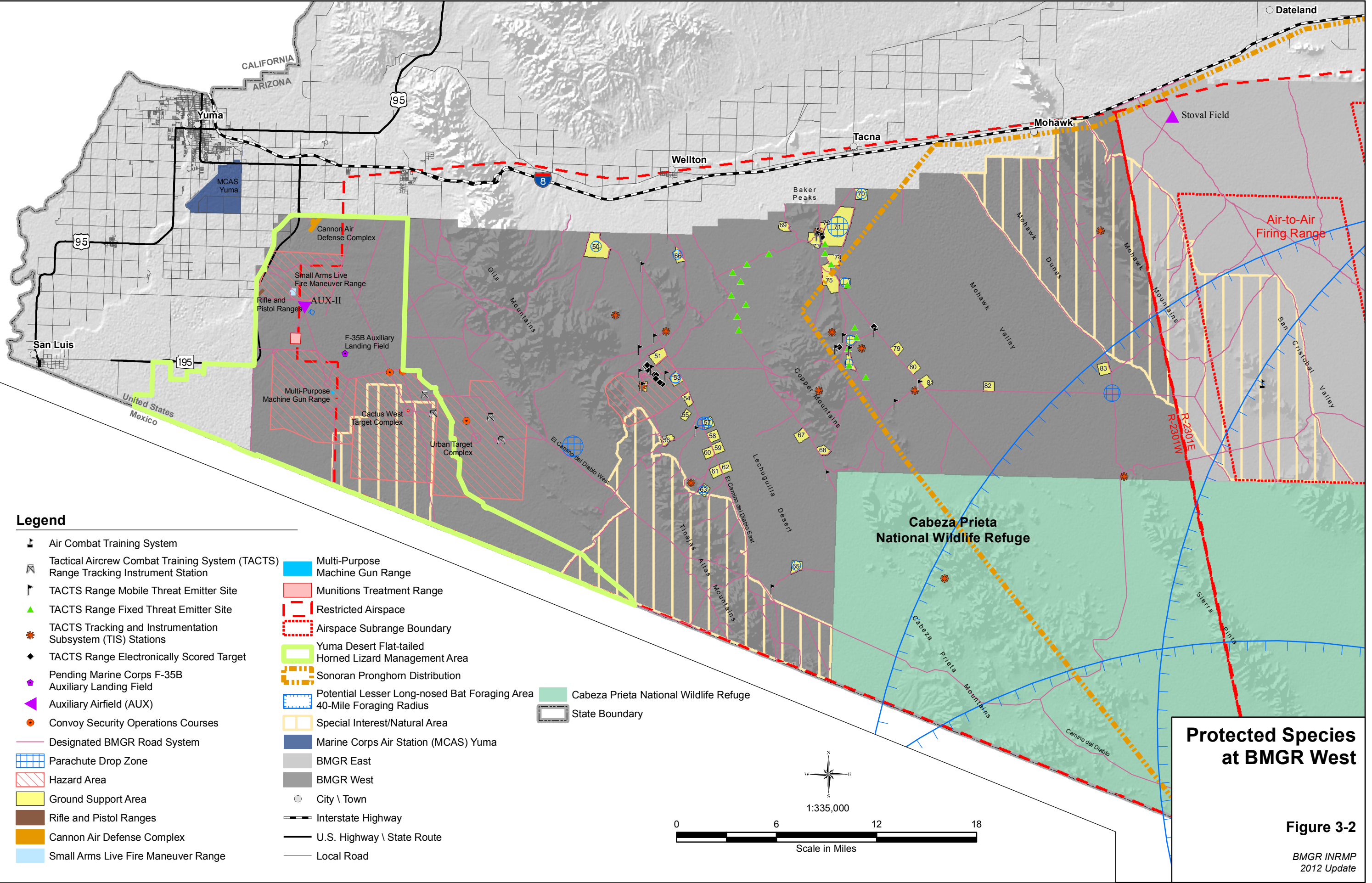
3.6.4.1 *Sonoran Pronghorn*

The current range of the Sonoran pronghorn includes portions of BMGR West (Figure 3-2) and BMGR East (Figure 3-3). The Air Force and Marine Corps continue to actively participate in and financially support the Sonoran Pronghorn Recovery Plan and the actions of the recovery team.

While methods and geographic study areas used to estimate the Sonoran pronghorn population have varied over time, estimates from 1925 through 1991 indicate that relatively low numbers of pronghorn (approximately 50 to 150 animals) have been present in southwestern Arizona, and that the area of distribution became smaller over the years. AGFD initiated regular biennial aerial surveys of the Sonoran pronghorn population in 1992 using standardized techniques. Based on these surveys, the peak for the U.S. population was estimated at 282 animals in 1994, and the population low was estimated at 21 to 33 animals in 2002. Population estimates in 2004 and 2006 were 58 and 68 pronghorn, respectively. The free roaming Sonoran pronghorn population in the United States was an estimated 100 animals in 2011.



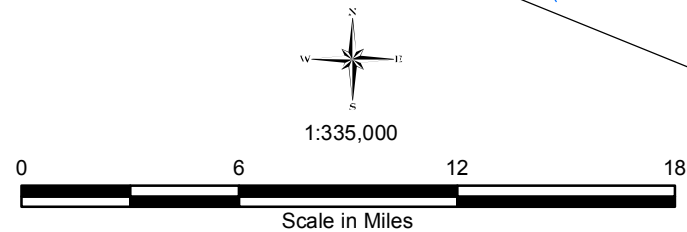
These Sonoran pronghorn fawns are being raised in the captive-breeding pen that was built at Cabeza Prieta NWR in 2003.



Legend

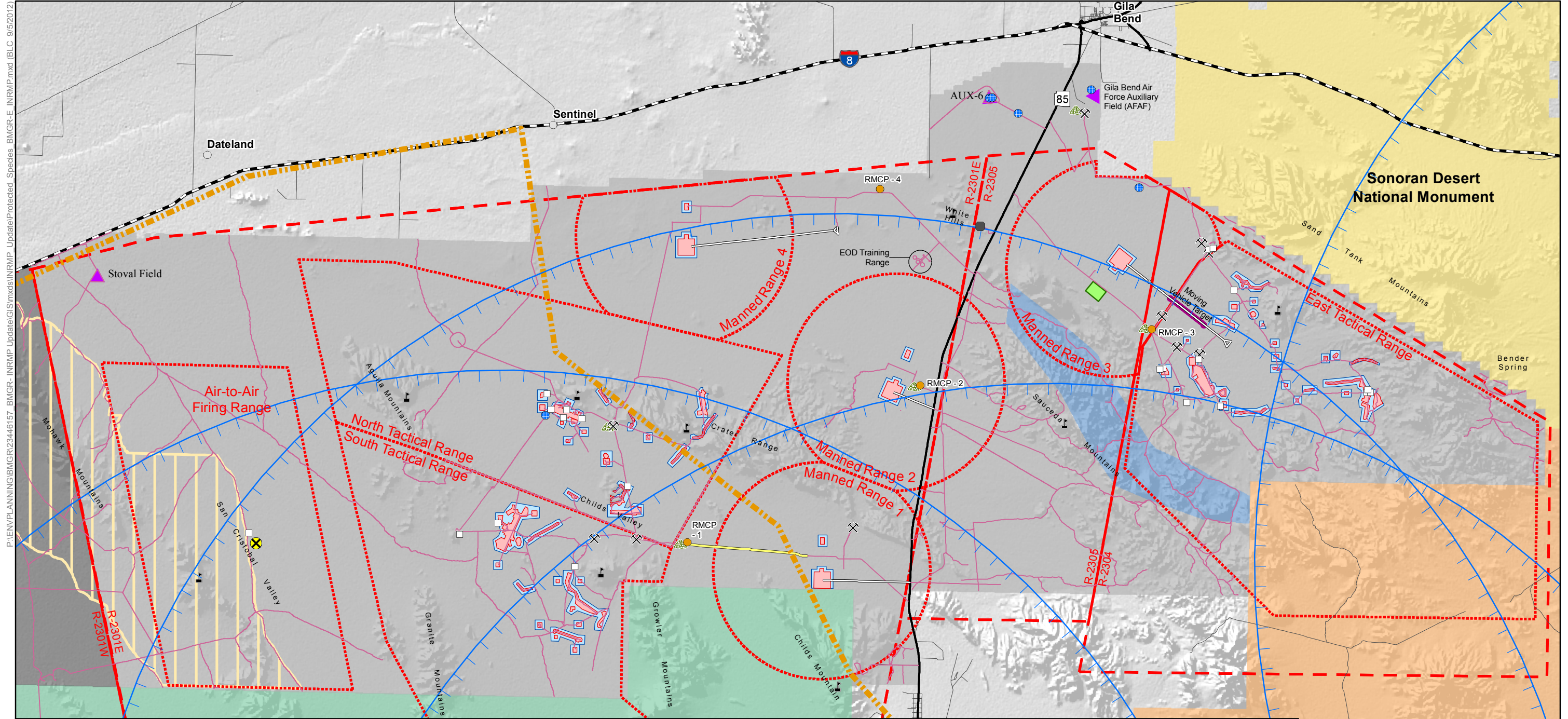
- ✈ Air Combat Training System
- ✈ Tactical Aircrew Combat Training System (TACTS)
- 📡 Range Tracking Instrument Station
- 📡 TACTS Range Mobile Threat Emitter Site
- 📡 TACTS Range Fixed Threat Emitter Site
- 📡 TACTS Tracking and Instrumentation Subsystem (TIS) Stations
- 📡 TACTS Range Electronically Scored Target
- 📡 Pending Marine Corps F-35B Auxiliary Landing Field
- 📡 Auxiliary Airfield (AUX)
- 📡 Convoy Security Operations Courses
- 📡 Designated BMGR Road System
- 📡 Parachute Drop Zone
- 📡 Hazard Area
- 📡 Ground Support Area
- 📡 Rifle and Pistol Ranges
- 📡 Cannon Air Defense Complex
- 📡 Small Arms Live Fire Maneuver Range
- 📡 Multi-Purpose Machine Gun Range
- 📡 Munitions Treatment Range
- 📡 Restricted Airspace
- 📡 Airspace Subrange Boundary
- 📡 Yuma Desert Flat-tailed Horned Lizard Management Area
- 📡 Sonoran Pronghorn Distribution
- 📡 Potential Lesser Long-nosed Bat Foraging Area 40-Mile Foraging Radius
- 📡 Special Interest/Natural Area
- 📡 Marine Corps Air Station (MCAS) Yuma
- 📡 BMGR East
- 📡 BMGR West
- 📡 City \ Town
- 📡 Interstate Highway
- 📡 U.S. Highway \ State Route
- 📡 Local Road

- 📡 Cabeza Prieta National Wildlife Refuge
- 📡 State Boundary



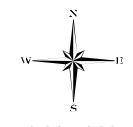
Protected Species at BMGR West

Figure 3-2

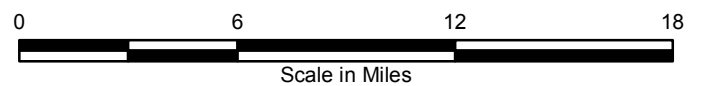


Legend

- | | | | |
|--|--|--|---|
| <ul style="list-style-type: none"> Air Combat Training System Air Force Small Arms Range Range Munitions Consolidation Point (RMCP) Parachute Drop Zone Helicopter Landing Zone Sensor Training Area Site Sand and Gravel Extraction Sand and Gravel Stockpile Auxiliary Airfield (AUX) Lead-In-Line | <ul style="list-style-type: none"> Moving Vehicle Target Designated BMGR Road System Approved Paving of Existing Road Helicopter Gunnery Range Explosive Ordnance Disposal (EOD) 2-Year Clearance Area Explosive Ordnance Disposal (EOD) 10-Year Clearance Area Restricted Airspace Airspace Subrange Boundary | <ul style="list-style-type: none"> Conditional Public Access Area—Entry Permitted only with Prior Approval when East Tactical Range is Inactive Sonoran Pronghorn Distribution Potential Lesser Long-nosed Bat Foraging Area 40-Mile Foraging Radius Special Interest/Natural Area BMGR East BMGR West | <ul style="list-style-type: none"> City \ Town Interstate Highway U.S. Highway \ State Route Local Road Sonoran Desert National Monument Tohono O'odham Nation Cabeza Prieta National Wildlife Refuge |
|--|--|--|---|



1:335,000



Protected Species at BMGR East

Figure 3-3

BMGR INRMP
2012 Update

P:\ENV\PLANNING\BMGR\23446157_BMGR-INRMP Update\GIS\mxd\INRMP_Update\Protected_Species_BMGR-E_INRMP.mxd (BLC_9/5/2012)

One of the key recovery actions for Sonoran pronghorn was the initiation of semi-captive breeding program for this species located at the Cabeza Prieta NWR. In the fall of 2003, a captive-breeding pen was built in the Cabeza Prieta NWR. The semi-captive breeding program was initiated in an effort to stabilize and increase the size of the populations in the U.S. and Mexico, increase the genetic diversity within both the U.S. and Mexican populations, and provide breeding stock for the establishment of additional populations within the United States. Sonoran pronghorn captured from wild and free roaming populations were placed in the pen beginning in January 2004. Over the next approximately four-and-one-half years, wild male and female Sonoran pronghorn both from Mexico and the United States were periodically added to the pen. Not all animals survived the relocation process, and the pen population has fluctuated due to births of fawns and removals for release within Cabeza Prieta NWR, as well as mortality in the pen (USFWS 2010a). As of May 2011, the population of captive Sonoran pronghorn at the breeding facility was 70 animals (USFWS 2011b).

In February 2010, the USFWS proposed to reestablish the Sonoran pronghorn under Section 10(j) of the ESA, and to classify the reestablished population as a nonessential experimental population (NEP) (Federal Register 2010b). The designation of a NEP provides for allowable legal incidental taking of the species within the defined NEP area. Under a Section 10(j) rule, the USFWS has much more leeway to take local concerns into account when preparing management strategies and thus can avert restrictions on current and future land uses and activities. An EA for the Sonoran Pronghorn Reintroduction and Final 10(j) Rule was prepared by the USFWS, and a FONSI was signed on 19 April 2011 (USFWS 2012a). The approved action consists of two components: (1) construction and operation of a captive-breeding pen at Kofa NWR, and (2) relocation of some Sonoran pronghorn from the existing captive-breeding pen at Cabeza Prieta NWR to a new holding and release pen at BMGR East, which would be located in Area B. The 0.5 square mile captive breeding and release facility in King Valley within Kofa NWR were completed in December 2011. Twelve pronghorn (two bucks and ten does) from the captive breeding facility at the Cabeza Prieta NWR, which was constructed in 2003, were transferred to the captive breeding pen at Kofa NWR on 15 December 2011 (AGFD 2012a). Environmental and cultural surveys of the proposed location for the holding and release pen in Area B have been completed (cultural surveys are discussed in Section 3.7.2.2 of this INRMP); however, because use of the holding pen depends on strength of the U.S. Sonoran pronghorn population numbers, installation and use of the pen is currently projected to be initiated within the 2017-2022 timeframe. The USFWS has reported that potential release of Sonoran pronghorn into Area B would only occur after current recovery efforts produce strong results; such results are not anticipated for at least five years.

The AGFD distributes a monthly Sonoran pronghorn update, which summarizes the captive breeding program, wild pronghorn, water projects, forage enhancements, and other related pronghorn projects. The AGFD pronghorn update covers the entire U.S. pronghorn distribution, and certain aspects of the monthly update pertain to the BMGR.



Survey techniques such as acoustic monitoring, mist net traps, and roost assessments are used to monitor bats on the BMGR.

3.6.4.2 Lesser Long-nosed Bat

The lesser long-nosed bat is migratory and found throughout its historical range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. Lesser long-nosed bat maternity colonies occupy caves and abandoned mine shafts in southwestern and south-central Arizona from about mid-April through late July or August. The lesser long-nosed bat forages but does not roost on the BMGR. Maternity roosts are located near the BMGR in the Cabeza Prieta NWR, Organ Pipe Cactus NM, and Tohono O’odham Nation (see Figure 3-2 and Figure 3-3).

3.6.4.3 Flat-tailed Horned Lizard

The FTHL is a small horned lizard that inhabits creosote flats, sand dunes, and mud hills in southeastern California, southwestern Arizona, and northwestern Mexico. Much of the FTHL’s historic habitat (possibly as much as 50 percent) in the United States has been lost due to agricultural and residential development (Flat-tailed Horned Lizard Interagency Coordinating Committee [ICC] 2011). At this time, the majority of the FTHL’s range in Arizona is restricted to the Yuma Desert area within BMGR West (see Figure 3-2) (AGFD 2009).



The Interagency Conservation Agreement has been a successful management approach for protecting the Flat-tailed Horned Lizard.

The proposed rule for listing the FTHL as threatened has been withdrawn and reinstated several times since it was first proposed in 1993. Most recently, in March 2011, the USFWS withdrew the proposed rule to list the FTHL because threats to the species identified in the 1993 rule were not as significant as earlier believed, and data do not indicate that the threats to the species and its habitat were likely to endanger the species in the foreseeable future (Federal Register 2011).

The FTHL is managed in accordance with an Interagency Conservation Agreement and FTHL Range Management Strategy (RMS) to which the Marine Corps and AGFD are parties (FTHL Interagency Coordinating Committee 2003). The RMS was last updated in 2003. Five FTHL management areas, encompassing about 485,000 acres in aggregate, were established under the original RMS and retained by the 2003 RMS update. The Yuma Desert Management Area includes about 114,800 acres of FTHL habitat in BMGR West. BMGR West provides almost 24 percent of the five management areas in aggregate. The 2007 BMGR INRMP management elements and prescriptions fully incorporate the RMS and provide the guidance for implementing the strategy. The INRMP also designates the portion of the Yuma Desert Management Area that is in BMGR West as the Yuma Desert Flat-tailed Horned Lizard Habitat Special Interest/Natural Area (see Figure 3-2).

To support training with the F-35B aircraft at the BMGR, the Department of the Navy has approved construction of an auxiliary landing field (ALF) in BMGR West (see Section 2.4.1 and Figure 2-1). In total, this project will affect about 255 acres of FTHL



Baseline surveys for the Flat-tailed Horned Lizard provide valuable information for the management of this species on BMGR.

habitat. The environmental effects of the ALF were evaluated in an EIS (U.S. Department of the Navy 2010) and an associated Biological Assessment. The USFWS reaffirmed its previous conference opinions that the proposed ALF and F-35B training operations at BMGR West would not be likely to jeopardize the continued existence of the FTHL (AESO/SE 22410-1995-0114-R006) (USFWS 2010b). The 2010 Biological Opinion specifies that:

- 1) MCAS Yuma will conduct a multi-year survey and monitor FTHL behavior, habitat use, effects of increased road traffic, and exposure to noise prior to, during, and for three years after construction.
- 2) Prior to construction, operation, and maintenance of the ALF, a worker education program will be developed and implemented by MCAS Yuma.
- 3) A barrier fence may be constructed at the ALF and access road, and FTHLs will be captured and relocated outside of the fence prior to construction activities.
- 4) Biological monitors will be present during all construction-related surface disturbing activities to search for and remove FTHLs from the area.

The Marine Corps has agreed to implement conservation measures to avoid and minimize impacts to the FTHL with respect to construction and subsequent operation of the proposed ALF, and in accordance with the Conservation Agreement and RMS (USFWS 2010b). The two primary issues raised in the Biological Opinion were potential impacts of jet noise on hearing and behavior, and potential effects of increased traffic on both existing and newly built roads in the vicinity of the new ALF (USFWS 2010). Potential impacts of F-35B operations are of heightened concern at BMGR West, because FTHL densities are among the highest known for the species throughout its entire range.

In May 2011, the University of Arizona was awarded a three-year contract to investigate the potential impacts of the F-35B as identified in the 2010 Biological Opinion. The study will place mark-recapture plots in areas of interest, resurvey existing plots to document seasonal fluctuations in FTHL populations, and conduct radiotelemetry on FTHLs for the duration of the project to evaluate potential behavioral impacts of the F-35B program. The project will examine the effects of infrastructure such as roads and power poles using a variety of surveys methods including scat surveys and mark-recapture plots. Finally, the project will document any changes in road mortality due to increased traffic associated with the F-35B operations, as supported by road surveys and traffic counter data. The first year of the study has resulted in baseline abundance, demographic, and natural history data on FTHLs on the BMGR.

The RMS specifies removal of FTHL from disturbed areas (on lands administered by signatory agencies) and relocation to suitable secure areas (FTHL ICC 2003). The RMS's planning action item 8.7 requires that participating agencies shall, "...determine the effectiveness of the proposed mitigation measures" (FTHL ICC 2003). Although translocation is used for FTHL mitigation, it is controversial and results have not been properly monitored or evaluated (Rosen and Goode 2011). The construction of the F-35B ALF provides an opportunity to investigate translocation impacts on the FTHL, and the ICC has partnered with MCAS Yuma to fund a translocation study.

In the past five years, MCAS Yuma has invested \$232,000 for FTHL surveys associated with the F-35B ALF project and \$233,000 for FTHL occupancy and demographic surveys. MCAS Yuma also has published a poster illustrating procedures for protecting FTHLs as part of its public education and outreach program.

3.6.4.4 BOs Issued for Actions at the BMGR 2007 -2012

Three BOs have been issued for actions at the BMGR since the 2007 INRMP was implemented. These BOs include:

- The USFWS issued a BO on the effects of the proposed West Coast Basing of the MV-22 tilt-rotor aircraft and MV-22 flight training operations at BMGR West in October 2009 (AESOS/SE 22410-1995—F-0114-R005). The USFWS found that the effects to the Sonoran pronghorn from the proposed flight training operations would not be greater than those of the CH-46 helicopter that the MV-22 will replace and that the action is not likely to jeopardize the continued existence of this species (USFWS 2009). The USFWS also reaffirmed its earlier opinion that MV-22 operations would not likely to jeopardize the continued existence of the lesser long-nosed bat.
- The USFWS issued a BO on the effects of the proposed West Coast Basing of the F-35B aircraft and F-35B flight training operations at BMGR West in September 2010 (AESO/SE 22410-1995-0114-R006). The USFWS found that the project is not likely to jeopardize the continued existence of either the Sonoran pronghorn or the lesser long-nosed bat (USFWS 2010b). As already noted, the USFWS also reaffirmed its previous conference opinions that the proposed ALF and F-35B training operations at BMGR West would not be likely to jeopardize the continued existence of the FTHL.
- The USFWS issued a BO on the effects of ongoing operations and proposed enhancements of training and support infrastructure at BMGR East in May 2010 (AESO/SE 22410-1996-F-0094-R003). The USFWS found that the ongoing operations and proposed enhancements were not likely to jeopardize the continued existence of either the Sonoran pronghorn or the lesser long-nosed bat.

3.6.5 State of Arizona Wildlife Species of Special Concern

The State of Arizona also has identified a number of wildlife species of special concern to the state that are present or potentially present within the BMGR. The state list includes the aforementioned species. Other wildlife of special concern in Arizona present within the BMGR, and not previously discussed, include the California leaf-nosed bat (*Macrotus californicus*), and the Yuman Desert fringe-toed lizard (*Uma notata rufopunctata*). State listed plant species present on the range and not previously discussed include sand food (*Pholisma sonora*) (AGFD 2012c). State listed wildlife and plants of special concern may be locally abundant within a given area, but are in need of special management consideration to assure the continued survival and health of their statewide populations.

3.7 CULTURAL RESOURCES

3.7.1 Overview

The same factors that have helped to preserve the natural resources of the BMGR—exclusion of surface disturbing, non-military land uses and correspondingly limited land surface disturbance by military activities—have also helped to protect cultural resources. As a result, well-preserved cultural resources remain, providing a remarkable record that tells of thousands of years of human habitation and use of this region.

Federal law protects cultural resources that satisfy the government’s criteria for being listed on the National Register of Historic Places. Archaeologists, historians, Native Americans, and federal agencies, including the Air Force and Marine Corps, work with the Arizona State Historic Preservation Officer (SHPO) in Phoenix to decide which resources are eligible for listing. The Air Force and Marine Corps are responsible for protecting and managing the cultural resources within the BMGR in accordance with a suite of federal laws and regulations.

Cultural resource inventories conducted by the Air Force and Marine Corps prior to the 2007 INRMP, identified more than 1,200 archaeological sites and other cultural resource features. During the course of the INRMP planning process, certain gaps were identified in the availability of resource information that would be relevant to the management of cultural resources. As part of the 2007 INRMP planning process, more than 20 tribes were invited to participate in the development and implementation of the INRMP. One of the findings in the planning process was that less than a quarter of the BMGR had been systematically surveyed for cultural resources. Before implementing the 2007 INRMP, and to comply with Section 106 of the NHPA of 1966 and the Archaeological Resources Protection Act of 1979 (ARPA), the Air Force and Marine Corps entered into a programmatic agreement with the Arizona SHPO, several tribes, and the AGFD on 24 October 2005. The programmatic agreement covers actions described in the INRMP that do not require further analysis under NEPA, which include permitted public access. Resource management goals to develop a plan for determining the limits of acceptable change, and implement the provisions of the cultural resources programmatic agreement were identified.

3.7.2 2012 Update

An ICRMP was implemented for the BMGR in 2009. The ICRMP provides guidance for managing cultural resources at the BMGR in accordance with the NHPA and other applicable law and regulation. The ICRMP addresses both BMGR West and BMGR East. Volume 1 addresses the issues common to both BMGR East and BMGR West—the physical setting, resource laws, culture history, and other landscape-scale elements. Volume 2 specifically addresses BMGR East and Volume 3 specifically addresses BMGR West.



Distinct pottery styles can help to date archaeological sites on the BMGR.

3.7.2.1 BMGR West

A number of cultural resource studies have been conducted at BMGR West, but the western portion of the BMGR displays a relative scarcity of cultural resources compared to the central and eastern portions of the range. The scarcity of cultural sites may be due, in part, to the marginally suitable habitation areas in BMGR West. The Marine Corps has completed cultural surveys and the associated final survey reports for the roads authorized in the 2007 INRMP for BMGR-West, and has started on other area surveys. Between 1995 and 2003, major surveys of BMGR-West covered more than 167,000 acres, and documented 1,142 sites. The total number of sites recorded now exceeds 1,500, with the vast majority of cultural resources found on BMGR-West being archaeological sites. Since 2005, approximately 57,000 acres have been surveyed for cultural resources, which resulted in the documentation of 87 new sites as eligible for the National Register of Historic Places. Of the 57,000 acres surveyed since 2005, approximately 54,500 acres were surveyed after 2007.

The earlier surveys conducted within BMGR West, which yielded the documentation of more than 1,000 sites, were for areas that were anticipated to be culturally sensitive, especially compared to the more recent surveys of areas that have experienced repeated use, which may have destroyed evidence of potential sites. In addition, documentation methods were changed so that isolates are no longer being documented as sites, which also contributes to the accounting of far fewer sites per 1,000 acres compared to the pre-2005 findings.

Archaeological surveys have been conducted on approximately 10 percent of BMGR West, in both military use zones and public access areas. Survey reports completed since 2007 include the following:

- 2007; An Archaeological Inventory of the Historic Fortuna Mine and Campsite, 852.43 acres
- 2008; A Cultural Resource Survey for the Proposed Murrayville Range Complex, Barry M. Goldwater Range-West, 893.6 acres
- 2008; Cultural Resource Survey of Approximately 12 Miles and Damage Assessment of Four Cultural Resource Sites Along the Camino del Diablo Within the Barry M. Goldwater Bombing Range, 143.16 acres
- 2008; Cultural Resources Survey along 173 miles of Roadway near Wellton Hills, Barry M. Goldwater Range West, 2,763 acres
- 2008; Cultural Resources Survey along 92 miles of Roadway in Mohawk Valley, Barry M. Goldwater Range West, 2,240 acres
- 2009; Lonesome Dove Landing Zone Survey, 18 acres
- 2010; Archaeological Survey of Barry M. Goldwater Range West Training Areas in support of MV-22 Training EIS, 7,123 acres
- 2010; Archaeological Survey of 16 Ground Support Areas on the Barry M. Goldwater Range West in support of the MV-22 Osprey Project, 5,206 acres

- 2010; Cultural Resources Survey of the Proposed Auxiliary Land Field Yuma, Arizona, 2,470 acres
- 2011; Cultural Resources Survey of 10,000 acres of Roads and Trails on the Barry M. Goldwater Range West, 10,000 acres
- 2012; Cultural Resources Survey of 22,865 Acres on the Barry M. Goldwater Range-West, 22,865 acres

In addition to the cultural resource and archaeological surveys, studies and agreements have been completed. The Marine Corps has also implemented and maintained a cultural resources monitoring plan. The activities that have been completed since 2007 at BMGR West include:

- Completed a Native American Cultural Affiliation Study
- Completed an Historic Mining Context Study
- Entered into an MOU with Arizona SHPO for “Section 106 Compliance Consultation Process for Negative Findings”
- Entered into an Memorandum of Agreement with MCAS Twentynine Palms for the curation of artifacts
- Entered into a programmatic agreement with the Arizona SHPO for the West Coast basing of the MV-22
- Continued to maintain an annual Monitoring Plan involving a minimum of ten sites per year



Cultural survey of the BMGR continues with areas most used as the priority.

Although much cultural resources work has been completed to date, forming a substantial base of knowledge for BMGR West, data gaps and the potential for discovery of additional historic properties remain. Table 6-1 in Chapter 6 identifies the planned activities involved with cultural resource survey and monitoring requirements for the 2012-2017 timeframe.

3.7.2.2 BMGR East

Archaeological surveys have been conducted in both military use zones and public access areas on BMGR East. The majority of the projects are related to military actions that require surveys of large contiguous areas. Surveys of military impact areas and 95 percent of the roads on the three tactical ranges have been completed. Surveys of nearly 40 percent of the roads in the public access area, the new pronghorn pen site, AGFD water catchments, and other small projects have been completed in the last five years. Corridors along roads in areas open to the public, where impacts associated with permitted vehicle-based camping are likely, have been identified as high priorities for cultural resource surveys in accordance with the terms of the INRMP programmatic agreement. Since 2007, approximately 11,100 acres have been surveyed for cultural resources. Survey reports completed since 2007 include the

following with the report date listed in parentheses; some of the reports were for surveys that were conducted in earlier years:

- ETAC 1999: Intensive Archaeological Survey of 2,900 Acres on the East Tactical Range (2008)
- NTAC 2002: Intensive Archaeological Survey of 5,594 Acres on the North Tactical Range (2007)
- ETAC 2002: Intensive Archaeological Survey of 2,296 Acres on the East Tactical Range (2007)
- NTAC 2003: Intensive Archaeological Survey of 2,009 Acres on the North Tactical Range (2008)
- STAC 2003: Intensive Archaeological Survey of 4,945 Acres on the South Tactical Range (2008)
- ETAC 2003: Intensive Archaeological Survey of 2,372 Acres on the East Tactical Range (2008)
- Intensive Archaeological Survey of 164 Acres for a Pronghorn Forage Plot in the Southern San Cristobal Valley (2009)
- NTAC 2004: Intensive Archaeological Survey of 58.8 Miles of Roads and Assessment of 35 Sites on the North Tactical Range (2009)
- ETAC 2009: Intensive Archaeological Survey of 1,763 Acres on the East Tactical Range (2011)
- Area B Roads: Intensive Archaeological Survey of 62.5 Miles (2,516 Acres) in the Saucedo Mountains (2011)
- Stoval Road and Sensor Training Area: Intensive Archaeological Survey of 2,464 Acres in the San Cristobal Valley (2011)
- Stoval Airfield: Archaeological Survey of 1,639 Acres and Limited Testing in the San Cristobal Valley (2011)
- Area B Roads: Intensive Archaeological Survey of 15 Miles (595 Acres) (2011)
- Manned Range 3 and ETAC: Intensive Archaeological Survey of 1,948.32 Acres (2011)

The Site Stewards program for the Western Papaguería currently has 30 certified members that are monitoring highly visible sites. This site steward program is one of the most active in Arizona. Highly visible sites may be visited daily or weekly and the stewards take repeat photography to compare with baseline photos taken over the past 15 years. Some site stewards have received additional training and are certified to assist with surveys and site recording when a professional archaeologist is present.



Archaeological site stewards monitor highly visible cultural sites and document changes by comparing effects to baseline photography.

Every other year, the Air Education and Training Command (AETC) and other Air Force commands award an installation with the General Thomas D. White Environmental Award for excellence in their

cultural resource program. BMGR East received the award for AETC in 2009, and also received another General Thomas D. White Environmental Award for best cultural resource program in the Air Force.

BMGR East archaeologists also edited and wrote a book, *Fragile Patterns; The Archaeology of the Western Papageria*, that received an award as one of the top 12 books on the Southwest in 2008. The book was written for professionals and the public, and contains many reports on projects that the Air Force has completed in the past 15 years.

The NHPA and AFI 32-7065, which codifies the NHPA for Air Force operations, require that artifacts be curated in perpetuity. In 2005, the Air Force completed a cost benefit analysis of storing artifacts at an approved curation facility, such as Arizona State Museum, or an Air Force facility. The analysis indicated that the Air Force would benefit, both in terms of cost savings and accessibility, from having a repository at Gila Bend AFAF. A building at Gila Bend AFAF was remodeled to National Archives Standards, and a portion of the building is the artifact repository. Access to the facility is by a separate entrance with a coded lock. This is reportedly the first repository that the Air Force has approved in the last 15 years.

3.8 PERIMETER LAND USE ENVIRONMENT

As was reported in the 2007 INRMP, existing land use on the perimeter of the BMGR continues to include communities, industry, range land for livestock grazing, agricultural land, Native American reservation land, BLM public land managed for multiple uses, Sonoran Desert NM, and Cabeza Prieta NWR. The largest communities near the BMGR identified in the 2007 INRMP are listed in Table 3-3, along with the 2000 and 2010 Census data.

Table 3-3 Comparison of Populations 2000-2010

City	2000 Census Data ¹	2010 Census Data ²
Yuma (City), Yuma County	77,515	91,179
Wellton, Yuma County	1,829	2,730
Tacna, Yuma County	555	389
Gila Bend, Maricopa County	1,980	1,922
Ajo, Pima County	3,705	3,206

SOURCES:

¹ BMGR INRMP, 2007

² 2010 Census Data. URL: <http://2010.census.gov/2010census/data/>

The majority of the human populations near the BMGR are located in Yuma County. The housing crash and recession that began in 2007 has dramatically reduced population and housing growth in Yuma County, to an annual growth rate between 2007 and 2009 of 0.3 percent. Whereas between 1980 and 2000 the average annual growth rate for Yuma County was 3.84 percent (Yuma County Department of Development Services 2011).

Outside of the incorporated town of Gila Bend in Maricopa County, the human population is 1,069 in the Census Block Group located north of the BMGR (Tract 723305, Block Group 2). Approximately

5,259 people are located in the Census Block Group located east of the BMGR (Tract 723306, Block Group 1), but that block group is 894.5 square miles (Maricopa Association of Governments 2010).

The existing industrial and commercial land uses in Yuma County are located in relation to the I-8 corridor, MCAS Yuma, and Mexico. Large industrial land uses near the range include the Gila Bend Regional Landfill (located north of Gila Bend on the east side of SR 85), Copper Mountain Landfill (near Wellton), automobile testing facility (south of Tacna), Gila Bend electrical substation (west of Gila Bend), and Gila and North Gila electrical substations (east of Yuma). There are several canals, transmission lines, and pipelines on the lands adjacent to the range. The 2,100-megawatt Panda Gila River Power Station is located north of Gila Bend on the west side of SR 85. The inactive Phelps Dodge Ajo Incorporated copper mine is located near Ajo.

Immediately south of MCAS Yuma, there is a large area designated as Agriculture/Industrial that is primarily intended to allow continued agricultural uses, site built residences with noise attenuation, and aviation-compatible industrial uses (Yuma County Department of Development Services 2011). Agricultural uses near the BMGR include irrigated cropland and orchards with the most common crops including citrus, cotton, vegetables, and small grains. Agricultural land uses are most common in the fringes of the Yuma metropolitan area, but are also located north of the western half of the BMGR along I-8 and near Gila Bend.

The Tohono O’odham Nation is located to the southeast of the BMGR. The Hicquiwan District is the nearest district, with an on-reservation population of 903, and off-reservation population of 829 (Tohono O’odham Nation 2011). Other land use on the Tohono O’odham Nation is typically associated with ranching and the grazing of livestock, and may include seasonal cattle camps. In March 2010, the 56th Fighter Wing and the Tohono O’odham Nation signed an MOU to create a framework for consultation on DoD activities at BMGR East. The MOU formalizes the consultation process, but recognizes that the consultation process in connection with the INRMP and ICRMP are not included in the purview. The MOU was signed on 22 March 2010, and is in effect for five years.



The Cabeza Prieta NWR was part of the BMGR until 1999 and the overlying airspace continues to be used for aviation training.

Lands adjacent to the BMGR that offer the most recreational opportunity include the Sonoran Desert NM, Cabeza Prieta NWR, and Reserva de la Biosfera de El Pinacate y El Gran Desierto de Altar in Mexico. The Sonoran Desert NM is located along the northeast corner of the range near East TAC (see Figure 1-1); the portion of the monument adjacent to the range was formerly part of the BMGR, but was relinquished to the BLM with the passage of the MLWA of 1999. This area is currently being managed by the BLM for semi-primitive recreational opportunities and includes motorized access to some of the land. The Cabeza Prieta NWR and Wilderness is located along portions of the BMGR’s southern border (see Figure 1-1).

All of the areas in which recreation is most likely to occur are predominantly undeveloped desert. Most of the other non-agricultural areas are undeveloped desert, including the land in Mexico that is south of the BMGR boundary and much of the land north of the BMGR along I-8, particularly between Gila Bend and Mohawk.

3.9 RECREATION AND SPECIAL USES

3.9.1 Overview

Historically, recreation use of the BMGR occurred at relatively low levels in comparison to the nearby areas such as Organ Pipe Cactus NM and Imperial Sand Dunes Recreation Area. However, with population growth, particularly in communities near the range, recreation use of the BMGR has increased steadily in recent years. About 62 percent of the BMGR is regularly restricted from recreational access because of safety hazards presented by the military mission. Those areas of the BMGR that can generally accommodate public visitation on a regular basis as long as certain necessary restrictions are observed include Area B within BMGR East and most of the eastern portion of BMGR West.



Desert bighorn sheep populations on BMGR East have declined over the past 5 years, affecting hunting opportunities.

However, even these areas are sometimes unavailable to recreational users because some special training exercises require temporary closure to recreation use for safety and security purposes. In the areas generally unavailable for recreation use, some special use recreation is allowed when compatible with the military mission (for example, during bighorn sheep hunting season, hunter access may be granted, on a case-by-case basis, to areas normally closed to recreational access). Without exception, all BMGR recreation users are required to obtain an access permit for entry to the range.

3.9.2 2012 Update

Range entry permits help to account for the number of individuals visiting the BMGR, but the type of activities visitor engage in are not tracked. Range entry permits are issued for the period of 1 July to 30 June of the following year and are tracked by this reporting period. Table 3-4 provides the number of recreation permits that were issued during each reporting year:

Table 3-4 Range Entry Permits for BMGR 2006-2011

Reporting Year	Season of 2006-2007	Season of 2007-2008	Season of 2008-2009	Season of 2009-2010	Season of 2010-2011
Totals	5,332	7,190	8,069	8,515	8,533

From the reporting season of 2006-2007 to the 2010-2011 season, there has been a 62 percent increase in the number of recreation permits that have been issued.

While recreational activities are not formally tracked, range wardens and range management staff have observed some trends in use. Geocaching (which is described in Section 3.4.2.1) and OHV use have

increased within BMGR West. There has also been an increase in the use of metal detectors, which is not allowed on the BMGR because of the safety hazards associated with subsurface ordnance. Currently, the user receives a warning on the first violation and a second violation results in seizure of the range access permit and may result in a trespass citation.

3.9.2.1 BMGR West

Hunting within BMGR West remains an approved recreational activity, although individuals must have a valid range access permit, a current Arizona hunting license issued by AGFD, and a proper tag/stamp for the specific species they are hunting. In addition to a valid hunting license, bighorn sheep hunters must also obtain a permit, or tag, to hunt that species in AGFD’s Game Management Unit (GMU) 40B. Bighorn sheep permits for BMGR West are split between the Gila Mountains, Tinajas Atlas Mountains, and a combination of the Mohawk and Copper mountains. Table 3-5 provides the number of permits issued for bighorn sheep by location for the period of 2007-2011.

Table 3-5 Hunting Permits Issued for Bighorn Sheep by Year within BMGR West

Mountain Range	Year				
	2007	2008	2009	2010	2011
Gila	2	2	2	2	2
Tinajas Atlas	2	2	2	2	2
Mohawk/ Copper	2	3	2	2	2
Totals	6	7	6	6	6

SOURCE: Henry 2012

Requests for Special Use Permits are received from researchers seeking access to portions of BMGR West that are closed to public access, and any access permits to restricted areas require an on-line and in-person safety brief. In addition, research staff members are required to schedule their surveys and notify the Range Safety personnel when they enter and exit the BMGR West.

3.9.2.2 BMGR East

Hunting areas east of SR 85, including Area B, are within AGFD’s GMU 40A. The distribution of desert bighorn sheep includes mountain ranges throughout GMU 40A; however, the unit has been closed to bighorn sheep hunting because the sheep population has declined significantly. AGFD is studying the possible reasons for the collapse of this population. A survey was conducted in 2010, but data from the survey are not yet available (AGFD 2010b).



The BMGR includes rocky habitat for desert bighorn sheep.

Range management staff members working in BMGR East have noted that all-terrain vehicle activity may have increased slightly in the past five years. Compared to previous years, BMGR staff observed an increase in authorized use in the Area B Public Use Area, as well as unauthorized driving on administrative use only roads in the San Cristobal Valley.

Some camp sites are intensively used (such as the hunt camp in Ryan's Canyon), but no discernible trend has developed over time. Also, during the late winter and early spring, especially in years of good wildflower blooms, there is a notable increase in passenger vehicle traffic on the road leading from SR 85 (Gate 9) to Hat Mountain, and the area north of Hat Mountain. Requests to enter the conditional public access area in Area B have not changed in number or nature in the past five years.

Year to year data on Special Use Permits are not retained, but in 2011 BMGR East issued 14 Special Use Permits, and this number is considered fairly representative of prior years. The Special Use Permits are primarily for scientific studies and the annual bighorn sheep permits. Most projects or studies on the range are scheduled to last more than a year with Air Force coordination being mandatory each time a team wants to access to the Range. Further, each member of the research team must undergo a background check prior to the permit being issued.

CHAPTER 4 BMGR ROAD SYSTEM AND PUBLIC ACCESS

The 2007 INRMP designated a road system within the BMGR that classified all inventoried roads at the range in one of three categories:

- roads open for administrative (i.e., government) and public use
- roads open for administrative use only
- roads closed to administrative and public use

Roads designated as closed were allowed to naturally recover. Closed roads remained available, however, for temporary and limited administrative reuse for high-priority and time-critical safety, law enforcement, or management purposes when no other access alternatives are available.

The 2007 INRMP designated 1,606 miles of existing roads as open to support military purposes, resource management activities, non-military agency actions, and public access. All public access to the BMGR continues to be by permit only. The publically accessible areas of the BMGR include approximately 678 miles of road that are usually open for public use. General public access is not allowed to the remaining about 72 percent of the BMGR where hazardous military activities or security requirements preclude public use. The 2007 INRMP also designated 616 miles of existing roads as closed to government or public use with a contingency for government reuse where necessary to support emerging military, management, or law enforcement requirements.

At the time of this INRMP Update, the designated road system and public access opportunities at the BMGR are mostly unchanged from 2007. However, findings from additional survey and continuing monitoring of the road system in the BMGR have prompted Luke AFB and MCAS Yuma to propose changing the classifications of some designated roads and adding some recently created roads to the designated road system to support military training, resource management, and Border Patrol law enforcement purposes. The current status of the BMGR road system and public access opportunities at BMGR West and BMGR East are addressed in the following sections.



Continuing survey and monitoring of the road network on BMGR is important to address changing needs for the military mission and public access to the range.

4.1 BMGR WEST ROAD SYSTEM AND PUBLIC ACCESS

The designated road system at BMGR West continues to function as documented in 2007 with no notable changes in the roads needed to support military activities. For the most part, public access roads remain the same with the exception of a slight decrease in access resulting from expanding the laser hazard area on the east side of the Gila Mountains (Figure 4-1). Additional hazard areas have been designated to the west of the Gila Mountains but public access to the affected areas has been restricted since well before the 2007 INRMP; consequently, this change has had no effect on public use opportunities at BMGR West.

The area of BMGR West available for general public access continues to include about 75 percent of BMGR West. All or portions of the public use area continues to be subject to occasional temporary closures to support military activities that present safety hazards and/or have security requirements. A portion of BMGR West located to the east of the Copper Mountains is subject to a seasonal closure each year—generally from 15 March to 15 July—to minimize disturbances during the Sonoran pronghorn fawning season when does and their fawns are most vulnerable. The Sonoran Pronghorn Recovery Team determines the onset of the seasonal closure based upon rainfall and resulting forage conditions available for this endangered species.

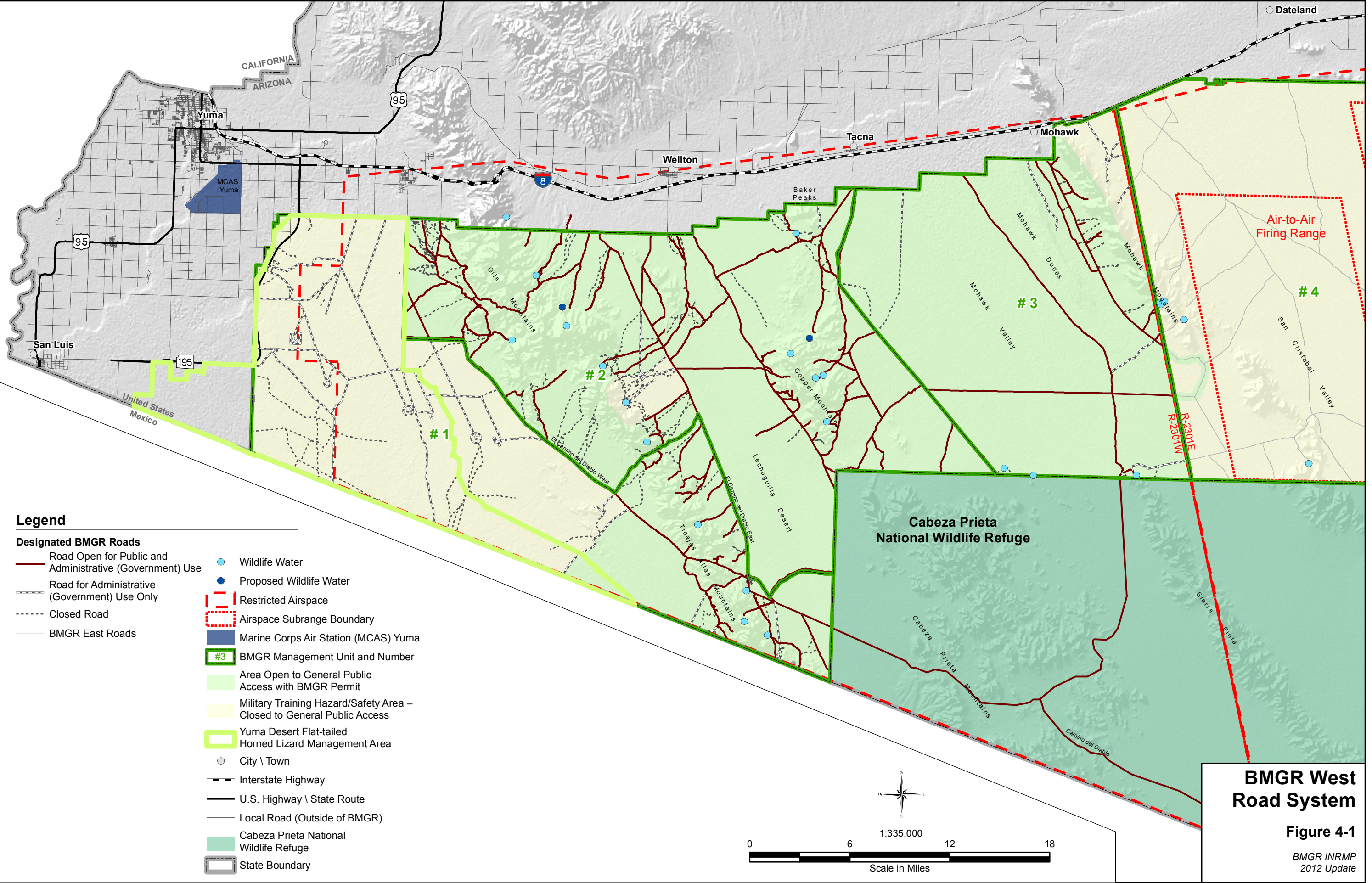
All visitors are required to obtain a BMGR Visitor’s Permit, which is valid from 1 July to 30 June of the following year. BMGR West visitors are not required to view the Air Force Visitor Safety Video that is compulsory for visitors prior to entering BMGR East.

The active road system documented in the 2007 INRMP for BMGR West included a total of 665 miles of active roads which included 490 miles of public access roads (Table 4-1 and see Figure 4-1). An additional 353 miles of roads were designated as closed in the 2012 data. The 2007 INRMP identified the potential development of two new bypass roads along the BMGR West – Cabeza Prieta NWR boundary. These proposed roads would provide the Border Patrol with a means of patrolling the area without having access to closed roads with the Cabeza Prieta Wilderness Area. These bypass roads were not constructed because their development was not pursued by the Board Patrol or USFWS.

Table 4-1 Designated Road System at BMGR West in 2007 and 2012

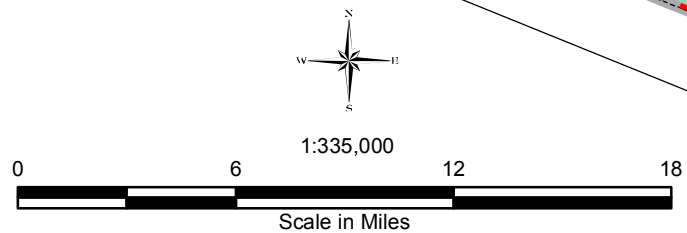
Road Category	2007	2012
Miles of roads classified for administrative use only inside military hazard/security areas that are restricted from general public access	136	159
Miles of roads classified for administrative use only outside of restricted military hazard/security areas	39	36
Miles of roads classified for administrative or public use outside of restricted military hazard/security areas but subject to temporary closure for military purposes	490	427
Total miles of roads	665	622

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Legend

- Designated BMGR Roads**
- Road Open for Public and Administrative (Government) Use
 - - - Road for Administrative (Government) Use Only
 - . . . Closed Road
 - BMGR East Roads
- Wildlife Water
 - Proposed Wildlife Water
 - - - Restricted Airspace
 - . . . Airspace Subrange Boundary
 - Marine Corps Air Station (MCAS) Yuma
 - #3 BMGR Management Unit and Number
 - Area Open to General Public Access with BMGR Permit
 - Military Training Hazard/Safety Area – Closed to General Public Access
 - Yuma Desert Flat-tailed Horned Lizard Management Area
 - City \ Town
 - = Interstate Highway
 - U.S. Highway \ State Route
 - Local Road (Outside of BMGR)
 - Cabeza Prieta National Wildlife Refuge
 - State Boundary



BMGR West Road System
Figure 4-1
 BMGR INRMP
 2012 Update

4.2 BMGR EAST ROAD SYSTEM AND PUBLIC ACCESS

The approved BMGR East road network defined in the 2007 INRMP was developed over a 10-year period from multiple sources and through a series of progressive refinements that included the use of historic maps, GPS-based field surveys, and aerial and satellite imagery. Since 2007, 56 RMO personnel have continued to monitor and assess the BMGR East road system through additional field observations; GPS surveys of road conditions and alignments; and analysis of newly available, higher resolution overhead imagery.

The road system decisions made in the development of the 2007 INRMP included the closure of 262 miles of identified roads in BMGR East that were not needed to either support military or administrative activities or to provide public access. Closure of unneeded roads was also pursued in the interests of protecting both ecosystem functions and certain resources. Most of the closed roads had not been used for a number of years prior to 2007 and had already experienced some levels of revegetation, sedimentation, erosion, or other natural processes that had obscured or were beginning to obscure segments of these routes as former vehicle travel ways. The progression of recovery of closed roads by natural processes has been an interest of the continuing 56 RMO review of the BMGR East road system and ongoing observations have shown that revegetation and other signs of recovery continue to progress along many segments of these roads. In fact, certain closed roads have recovered to the extent that they are no longer distinguishable as roads along much of their length to surface users, and revegetation, sedimentation, or erosion have rendered many segments as impassable to vehicles. These observations both (1) demonstrate that natural processes alone can lead to the recovery of closed routes and (2) indicate that closed roads that are sufficiently recovered may be reclassified in the road system database as recovered former roads.

More than 90 percent of the 262 miles of roads closed in BMGR East by the 2007 INRMP have been reclassified by the 56 RMO as recovered former roads. No roads currently available for motorized vehicle access by the public were affected by this action. Closed roads reclassified as recovered former roads would no longer be available for foreseeable but limited and temporary reuse, as provided by the 2007 INRMP, without a prior and appropriate level of environmental assessment. Closed roads and closed roads reclassified as recovered former roads would continue to be available for emergency administrative reuse for public safety, law enforcement, or other management purposes for which the time-critical nature of the circumstances may preclude the planning and compliance steps that would customarily preclude reopening or temporary reuse of a closed road or recovered former road. Reuse of a closed road or former road would only occur when the closed or former road way provides the most serviceable and least environmentally harmful surface access that is required to address the emergency.

The 2007 INRMP included the approximately 34 miles of State Route 85 that traverses BMGR East. Although State Route 85 provides essential access to BMGR East entry points for both government and permissible public use of the range, the fact that the Air Force does not either ordinarily control the use of State Route 85 or maintain this highway has led to a decision to no longer include this route in the classified BMGR East road system and to eliminate it from current and future road mileage calculations

for the system. Road mileage calculations for the 2007 and 2012 BMGR East road systems are provided in Table 4-2. The miles of administrative use roads is less in 2012 than in 2007 because some roads have been reclassified and/or eliminated from the inventory because they have revegetated from lack of routine use. The 2012 BMGR East road system is shown in Figure 4-2.

The 2012 road system includes maintained roads through active target complexes, but does not include all of the vehicle routes that are used within the complexes to construct and maintain individual targets or that are used for EOD clearance activities. The surface areas within target complexes affected by construction, maintenance, and EOD clearance vehicles are located in open areas that are already heavily disturbed by bombing and strafing. Vehicle operations associated with this necessary construction, maintenance, and EOD clearance work contribute to the ground disturbance; this is accounted for in Chapter 2, Table 2-2, in the ground disturbance associated with EOD clearance areas of manned and tactical ranges. This method of accounting for the roads contributes to some of the differences in the total miles of administrative use roads between 2007 and 2012.

As indicated above and as provided by the 2007 INRMP, in infrequent circumstances the Air Force may need to reuse a closed road when it is the only means of accessing a specific location for conducting certain management activities, such as conducting a Native American group visit to a remote cultural resource site or transporting equipment to an isolated location. The closed road would be used for that occasion, but would not be otherwise mapped, marked, or signed for other government agency use, as is done with roads classified for regular administrative use. The road would remain classified as closed and would be treated as closed for all routine government uses. When the need to reuse a closed road is identified, the Air Force would evaluate the proposed use for compliance with environmental laws (for example, to verify no species newly listed or proposed for listing on the Endangered Species Act are likely to occur in the area). Closed roads that have been reclassified as recovered former roads would require careful assessment of the potential effects of the proposed reuse on their recovered status before reuse of these former routes could be approved.

As indicated in Table 4-2, the active road system provided by the 2007 INRMP for BMGR East included a total of 941 miles of roads, of which 188 miles were designated as available to provide public access. Because extensive areas of BMGR East continue to be used on a regular basis for hazardous military activities, general public access continues to be limited to less than about 13 percent of the range located in Management Unit 6 (see Figure 4-2). Public access to Management Unit 6 (which includes what is known as Area B) is subject, however, to temporary closures as needed for military purposes. Areas currently open to the public also may be closed to protect vulnerable natural or cultural resources from damage.

Table 4-2 Designated Road System at BMGR East in 2007 and 2012

Road Category	2007	2012
Miles of roads classified for administrative use only inside military hazard/security areas that are restricted from general public access	741	570
Miles of roads classified for administrative or public use inside military hazard/security areas that are restricted from general public access	0	5
Miles of roads classified for administrative use only outside of restricted military hazard/security areas	12	11
Miles of roads classified for administrative or public use outside of restricted military hazard/security areas but subject to temporary closure for military purposes	188	170
Total miles of roads	941	756

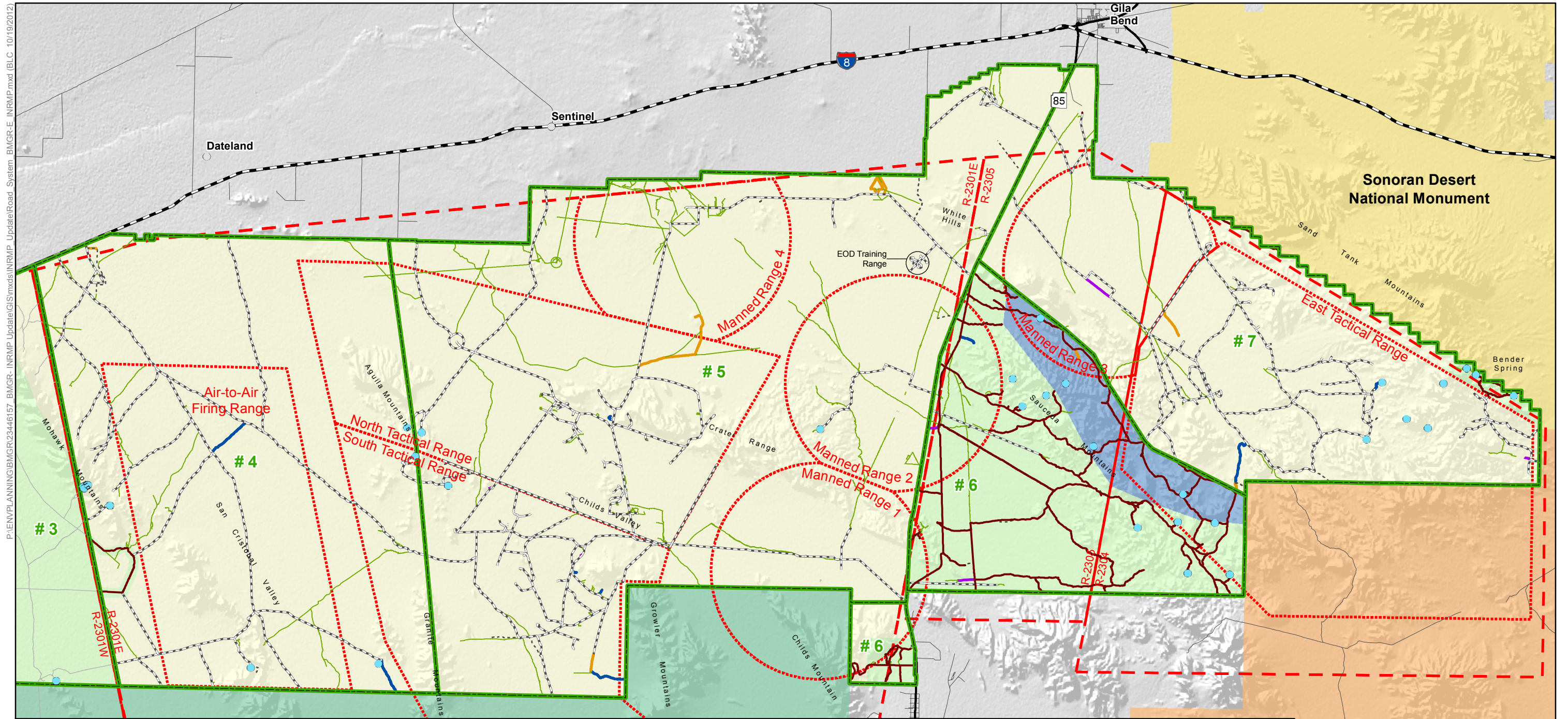
As already indicated, additional survey and monitoring of roads in BMGR East have led the Air Force to (see Figure 4-2):

- Establish an additional classification for closed roads that have either substantially revegetated or otherwise naturally recovered and can no longer be either reliably recognized or followed along major portions of their length. In some cases, revegetation, erosion, and/or sedimentation have made segments of these roads impassable. The recovered former road category would differ from the closed category in that recovered former roads would no longer be depicted on range maps and would not be recognized candidates for time-critical safety, law enforcement, or management purposes. No roads currently available for motorized vehicle access by the public would be affected by the proposed action.
- Reclassify about 14 miles of closed roads in BMGR East as available for administrative use only. The affected road segments are needed to support regular military training activities, monitoring and maintenance of existing wildlife waters, and Border Patrol operations. The Border Patrol is already using some of the affected segments. No roads currently available for motorized vehicle access by the public would be affected by the proposed action.
- Reclassify about 3.9 miles of road currently open for administrative or public use as closed. The affected east-west road segment is in Area B just north of the lead-in-line to Manned Range 1. This segment leads to a dead-end, but is used by some visitors to connect to a closed road that links the segment to the Range 1 lead-in-line, which is limited to administrative use. Closure of the 0.9-mile segment would help to limit unauthorized use of the lead-in-line, but would not affect either public access to Area B or travel circulation within Area B.
- Add about 12 miles of new roads to the designated road system. The added road segments would be classified as available for administrative use only and would be used for military training, wildlife management including recovery of the Sonoran pronghorn, and Border Patrol operations. The proposed additions to the designated road system were created during Sonoran pronghorn recovery activities or other wildlife management operations—such as the placement of emergency water and forage or construction of permanent wildlife waters, as a result of illegal UDI and drug smuggler traffic and necessary Border Patrol law enforcement responses to the

designated road network, or during historic military activities. No roads currently available for motorized vehicle access by the public would be affected by the proposed action.

The Air Force has changed the terminology applied to some roads in this 2012 INRMP update as compared to the terminology used in the 2007 INRMP. In the 2007 INRMP, roads approved as a part of the designated road system in areas of BMGR East closed to public access were identified as “open to general public access” (page 3-23) even though they were available only to military and other government users. In the 2012 updated road network, those roads are included in the “Administrative (Government) Use Only” category, Figure 4-2. This is a change in terminology that does not change the public access opportunities provided by the 2007 INRMP. Some road segments in areas not open to the public are seldom if ever traveled. These road segments are not maintained, and many have revegetated to such an extent that they are no longer clearly identifiable from the ground. These segments are shown on Figure 4-2 as “Closed Road.”

Finally, since 2007, surveys along or near some segments of approved roads in Area B have identified numerous archaeological sites. Based on the information provided in survey reports, and in accordance with the stipulations of the INRMP programmatic agreement, the Air Force and consulting parties have determined that 39 newly recorded sites are eligible for inclusion on the National Register of Historic Places. The agreement requires the Air Force to continue consultation with the parties to develop measures to avoid, minimize, or mitigate adverse effects on eligible properties to the fullest extent possible. As specified in the programmatic agreement and ICRMP, closing roads and restricting public access are among the measures that must be considered in developing historic property treatment strategies (see BMGR ICRMP, pp. I-33 and II-50). Implementation of these measures may result in changes to the approved road network in Area B and elsewhere on the BMGR East, which may have a limited effect on public access opportunities.



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Legend

Designated BMGR Roads

- Road Open for Public and Administrative (Government) Use
- - - Road for Administrative (Government) Use Only
- - - - Closed Road
- BMGR West Road

Changes to the BMGR Designated Road System

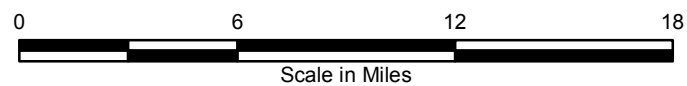
- 2007 Closed Road Reclassified as Recovered Former Road
- 2007 Closed Road Reclassified as a Road for Administrative (Government) Use Only
- 2007 Road for Administrative/Public and Administrative Use Reclassified as a Closed Road
- Unauthorized Route Added as Road for Administrative (Government) Use Only

- Wildlife Water
- Restricted Airspace
- - - Airspace Subrange Boundary
- #6 BMGR Management Unit and Number
- Area Open to General Public Access with BMGR Permit
- Military Training Hazard/Safety Area – Closed to General Public Access
- Conditional Public Access Area— Entry Permitted only with Prior Approval when East Tactical Range is Inactive

- City \ Town
- Interstate Highway
- U.S. Highway \ State Route
- Local Road (Outside BMGR)
- Sonoran Desert National Monument
- Tohono O'odham Nation
- Cabeza Prieta National Wildlife Refuge



1:335,000



Tohono O'odham Nation

BMGR East Road System

Figure 4-2

BMGR INRMP
2012 Update

CHAPTER 5 RESOURCE MANAGEMENT GOALS

Goals are the focal points for implementation of the INRMP and they reflect the values and desired future condition of the natural resources. The 2007 INRMP identified management issues and established management goals, responsibilities, implementation schedules, and funding requirements for each of the five natural resources management goals that were established at that time. In this 2012 update to the INRMP, the established goals remain valid for five-year review cycle. Both the policy and resource-specific management goals have range-wide application. The five overarching policy goals are non-resource-specific and are in support of and consistent with the military mission, protection and conservation of natural and cultural resources, and public access to the BMGR. In no implied order of importance, the five management policy (MP) goals remain as discussed in the 2007 INRMP:

- MP1. Maintain and enhance the natural resources to ensure that these resources are sustained in a healthy condition for compatible uses (for example, low-impact recreation) by future generations, while supporting the existing and future military purposes of the BMGR.
- MP2. Manage cultural resources in accordance with the BMGR ICRMP.
- MP3. Provide for public access to BMGR resources for sustainable multipurpose use, consistent with the military purposes of the range (including security and safety requirements) and ecosystem sustainability.
- MP4. Apply ecosystem management principles through a goal-and-objective-driven approach that recognizes social and economic values; is adaptable to complex, changing requirements; and is realized through effective partnerships among private, local, state, tribal, and federal interests.
- MP5. Meet or exceed the statutory requirements of the MLWA of 1999, Sikes Act, and other applicable resource management regulatory requirements.

The resource-specific (RS) goals address earth, water, vegetation, wildlife, and visual resources; transportation; recreation; Native American access; non-military and perimeter land use; and special natural/interest areas. The resource-specific based goals, presented in Table 5-1, are in no implied order of importance.

Table 5-1 Resource-Specific Management Goals

Resource Goal #	Resource Management Category	Management Goal(s)
RS1	Earth Resources	.1 Implement best management practices to control and prevent soil erosion, implement soil conservation measures, and restore or rehabilitate degraded landscapes wherever practicable, subject to budgetary constraints.
RS2	Water Resources	.1 Manage water resources to protect, maintain, and improve water quality; to conserve water to prevent lowering of the water table levels; and to ensure compliance with regulatory requirements while maintaining unrestricted access for military purposes.
RS3	Vegetation Resources	.1 Protect and conserve plant communities and species diversity. .2 Identify, protect, conserve, manage, and comply with regulatory requirements for threatened and endangered plant species or otherwise important or sensitive plant species. .3 Continue to inventory the range for occurrence and distribution of exotic plant species and implement management measures for their removal or control. .4 Restore or rehabilitate altered or degraded plant communities wherever practicable, subject to budgetary constraints. .5 Continue to incorporate the principles of ecosystem management and promote biodiversity.
RS4	Wildlife Resources	.1 Protect and conserve wildlife habitat, species diversity, and viable populations. .2 Identify, protect, conserve, manage, and comply with regulatory requirements for federally threatened and endangered wildlife species or otherwise significant or sensitive species. .3 Restore or rehabilitate human-altered or degraded wildlife habitats wherever practicable, subject to budgetary constraints. .4 Continue to incorporate the principles of ecosystem management and promote biodiversity. .5 Remove privately owned animals from the BMGR.
RS5	Visual Resources	.1 Protect or enhance the integrity and diversity of visual resources (including scenic qualities of the landscape) on the BMGR.
RS6	Transportation	.1 Continue to implement a BMGR transportation plan that addresses continued land-based access to the BMGR for military training and testing; provides access for wildlife research and wildlife habitat management, land management, and law enforcement by federal and state agencies; and provides access for wildlife-oriented recreation and sustainable multipurpose use by the public, including access to sacred sites and traditional cultural places. .2 Implement established policies and procedures that ensure that vehicle use on the BMGR will be controlled and directed so as to protect resources, promote safety, and minimize conflicts among the various uses of the BMGR.
RS7	Recreation	.1 Provide for public access and use of natural resources/BMGR lands for sustainable multi-purposes when such activities are compatible with mission activities and other considerations such as security, safety, and resource sensitivity. .2 Manage all activities in accordance with the ICRMP for the BMGR.
RS8	Native American Access	.1 Provide for Native American access to Traditional Cultural Places and sacred sites, consistent with the military mission and natural resource management goals.
RS9	Non-Military Land Use	.1 Maintain a program for addressing rights-of-way on the BMGR. .2 Participate in local initiatives to advance ecoregional planning and biodiversity goals.
RS10	Perimeter Land Use	.1 Cooperate with land managers of adjoining property for conservation, public relations, and compliance benefits. .2 Develop strategies, in coordination with ranchers when feasible, to reduce trespass livestock occurrences.
RS11	Special Natural/Interest Areas	.1 Recognize existing special resources and/or areas in which special resources are identified; consider the applicability of special management provisions for the protection of these areas.

CHAPTER 6 RESOURCE MANAGEMENT PRESCRIPTIONS

6.1 MANAGEMENT PROGRAM AND OBJECTIVES

Many of the action steps identified as priority range management tasks in the 2007 INRMP have been completed, as reported in the Public Report on Military Use, Environmental Conditions, Resource Management Activity, and Public Access and Involvement 2007 – 2012. Some are ongoing actions that will continue in the next five-year period. In planning for the next five years, MCAS Yuma and Luke AFB have each developed a preliminary list of proposed action steps for 2013-2017. These action steps were identified by considering data acquired through inventory and monitoring activities in the past five years, changes that have occurred in the past five years (as reported in earlier chapters of this INRMP update), emerging management issues, and input from other agencies with land management or regulatory authority in the BMGR region.

In the development of the 2007 INRMP, the 17 management elements listed below were identified as factors to consider in a management program for the range. Each of these elements was evaluated in detail for effects on the environment in the EIS that was completed in 2006. The resource management program was selected based on the environmental analysis, public comments, and military requirements and policy to protect natural infrastructure assets. While not every management element requires action in each five-year period of the plan, each element is considered. In the action items for 2013-2017 listed in Tables 6-1 and 6-2, the resource management elements are referenced by number in the first column of table.

1. Resource Inventory and Monitoring
2. Special Natural/Interest Areas
3. Motorized Access and Non-roaded Area Management
4. Camping and Visitor Stay Limits
5. Recreation Services and Use Supervision
6. Rock hounding
7. Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants
8. Hunting
9. Recreational (Target) Shooting
10. Utility/Transportation Corridors
11. General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters
12. Special Status Species
13. Soil and Water Resources
14. Air Resources

15. Visual Resources
16. Wildfire Management
17. Perimeter Land Use, Encroachment, and Regional Planning

6.2 PLANNED MANAGEMENT PROJECTS AND IMPLEMENTATION SCHEDULE

In this update of the INRMP, the Air Force and Marine Corps have developed lists of actions planned to be implemented during the next five years. The 17 management elements have been categorized in five general types of actions:

1. Resource management – includes continuing the implementation of the natural resources inventory and monitoring plans
2. Motorized access – includes some modifications of the existing road network to better meet management needs that have been identified in the past five years, as described in Chapter 4, and continuing programs to direct the public to use roads remaining open to public access
3. Public use – includes several management elements for providing recreational opportunities while protecting resources
4. Manage realty – includes addressing the public utility and transportation corridors that pass through the range and managing new right-of-way requests
5. Perimeter land use – involves monitoring land uses beyond the range to prevent encroachment, and working with other agencies in regional planning

In some cases, the Air Force and Marine Corps propose the same or similar processes and may work together for a range-wide application. In other cases, the issues associated with BMGR East and BMGR West differ or the priorities are dissimilar. Several projects will require an interagency effort in which DoD will work with the partner agencies involved in the INRMP or other agencies, as appropriate.

Tables 6-1 and 6-2 provide the Marine Corps and the Air Force actions plans, respectively. Each table includes the management element that is being addressed (see Section 6.1) as well as the year of funding, frequency of the action, partners likely to be involved, and the goals addressed (see the management policy [MP] goals and resource specific [RS] goals listed in Chapter 5). The Marine Corps has elected to track the status of the action plans for the past five years in Table 6-1 together with future actions, while the Air Force has elected to focus Table 6-2 just on the planned actions for the next five years; the status of the actions from the past five years are documented in the Public Report. Before proposed action steps, priorities, funding requirements, or other factors for the next five years are finalized, range managers will consider the public input, consultations with Native Americans, and any additional partner agency feedback. These lists will be reviewed annually to evaluate progress completed and to adapt the lists, when appropriate, to address emerging issues, changing priorities, availability of funds, or other issues.

Table 6-1 2012 INRMP Update; BMGR West 5-Year Action Plan: 2013-2017

*2007 INRMP Resource Management Actions
(for 2008-2012)*

2007 Action Number	INRMP Element ¹	Action	Status ¹	Progress By 2012	Follow-On 2012 INRMP Resource Management Action(s)
07-1	1, 7, 12	Develop an ecosystem inventory and monitoring program for wildlife and habitat.	C	USGS completed the I&M Plan and published it as an Open-File Report http://pubs.usgs.gov/of/2011/1232/ .	None; task completed
07-2	1, 7, 12	Implement an ecosystem inventory and monitoring program for wildlife and habitat.	I	The following projects funded include: 1) the evaluate landscape changes/disturbances (\$90K), the findings from the landscape evaluation will provide a baseline for habitat monitoring; 2) FTHL occupancy and demographic surveys (\$233K) and JSF FTHL survey (\$232K); 3) rangewide vegetation map (\$232K); 4) Brassica research (\$90K); and 5) rangewide bird survey (\$60K per year).	12-1, 12-3, 12-4, 12-5, 12-6, 12-7, 12-8, 12-19
07-3	1	Implement a cultural resources monitoring program.	I	Monitoring of select sites on an annual basis has been implemented.	12-13
07-4	1	Implement the provisions of the cultural resources programmatic agreement, which includes a phased cultural resource inventory based on prioritized survey areas.	O	All phases of the inventory have been completed as of the end of FY 2011. The Reporting Phase, discussing results and management recommendations is completed.	12-13
07-5	1	Develop and implement systems to monitor the effectiveness of compliance actions.	O	Initial survey was initiated and is ongoing.	12-2, 12-22
07-6	1, 5, 7, 8, 11	Develop a plan for determining the limits-of-acceptable change for recreational, natural and cultural resources.	N	Range Management has initiated baseline surveys to collect data necessary for the development of a plan.	12-23
07-7	1	Construct adaptive management strategies for maintaining acceptable limits of change.	N	Range Management has initiated baseline surveys to collect data necessary to determine the need for adaptive management strategies.	12-24
07-8	1	Allow maintenance and development of existing water sources supporting wildlife.	O	AGFD maintains 18 wildlife waters.	12-25
07-9	11	Support AZGFD installation of up to a total of six high-priority wildlife waters on the BMGR*	I	Request from agencies or public did not materialize as previously expected. Awaiting AGFD initiation. A new Halliwill catchment was installed in Feb 2012. AGFD has identified a second proposal for a wildlife water catchment, but its development has not been scheduled; natural/cultural resource compliance assessments for both locations are complete.	12-26
07-10	1, 12	Participate in and implement recovery actions for special status species (e.g., Sonoran Pronghorn and Flat-tailed Horned Lizard).	O	Sonoran Pronghorn - \$315K, participate in Recovery Team Meetings; FTHL - \$465K, serve on ICC and Management Oversight Group (MOG); provide support for AGFD's LeConte's Thrasher surveys.	12-2, 12-9, 12-12, 12-15, 12-17
07-11	2	Redesignate ACECs and HMAs as special natural interest areas and expire Backcountry Byways.	C	The ACECs and HMAs were redesignated as special natural interest areas and the Backcountry Byway designation expired.	None warranted
07-12	2	Evaluate potential for altering existing or establishing additional special natural interest areas.	N	No need for establishing additional special natural interest areas has been identified to date.	12-14
07-13	1, 11, 13	Develop an invasive species management program.	I	1) Finalizing vegetation map 2) remove invasive species when feasible 3) partnered with LAFB to fund (\$90K) characterize and model brassica invasion throughout the BMGR. The study will examine the affect brassica invasion, long-term coexistence between brassica and native annual plants, and suggest management strategies.	12-1, 12-4, 12-5, 12-12,12-16
07-14	1, 11, 13	Conduct habitat restoration efforts for damaged areas.	O	Installed 3 bat gates to protect maternal colonies and enforce closed roads.	12-4, 12-5, 12-16, 12-17
07-15	10	Establish best management practices to mitigate impacts to range resources.	I	The on-going baseline survey will provide data to draft Statement of Work and BMPs for vegetation, wildlife, road, and third party disturbances. These documents will outline methods to monitor, mitigate, and/or restore areas of concern.	12-1, 12-3, 12-4, 12-6, 12-7, 12-8, 12-12, 12-16, 12-19
07-16	11	Develop procedures to control trespass livestock.	N	Trespass livestock is not a problem.	None warranted
07-17	11	Evaluate benefits and adverse effects of wildlife waters.	N	The controversy concerning wildlife waters has settled and sponsoring a symposium to discuss the benefits/detriments was unwarranted.	None warranted
07-18	13	Conduct a range-wide soil survey following NRCS standards.	I	AGFD funded a preliminary soil map using remote sensing. A Level 2 soil map has been considered, but funding is not available.	12-19
07-19	16	Develop a range-wide fire management plan.	N	Historically, wildfires were not a concern. However, brassica invasion has the increase the potential for wildfires but no plan has been developed.	12-18

¹ Status: C = Completed; O = Ongoing and Expect to continue; I = Initiated but Incomplete; N = Not initiated

Table 6-1 2012 INRMP Update; BMGR West 5-Year Action Plan: 2013-2017

2012 INRMP Resource Management Actions (for 2013-2017)												
2012 Action Number	INRMP Element ¹	Action ²	Fiscal Year ³	Funding ⁴	Frequency ⁵	Partners ⁶	Comments	Year 1	Year 2	Year 3	Year 4	Year 5
12-1	1	Brassica study	Years 1	Varies	One-time	CESU	Characterize and model brassica invasion throughout the range.	\$38,460				
12-2	1	FTHL JSF Impact Study	Years 1, 2	Varies	One-time	CESU	Evaluate the potential impacts of JSF operations on FTHL as identified by the USFWS's BO.	\$135,000	\$128,000			
12-3		FTHL occupancy surveys	Years 1, 5	\$77,000	Varies	In-house / AGFD	Support AZGFD in conducting demographic and occupancy surveys as outlined in the FTHL Monitoring Plan developed by the FTHL Interagency Coordinating Committee					
12-4	1	Complete range wide vegetation map	Year 1	\$100,000	One-time	CESU	Complete range wide vegetation map	\$100,000				
12-5	1	Identify and monitor vegetation plots in several plant communities	Years 2, 3, 4	Varies	Annual	In-house / Contractors	Each plot is assessed at 5-year intervals					
12-6	1	Reptile, small mammal, and amphibian surveys and monitoring	TBD	Varies	One-time	In-house / Contractors	inventory distribution and abundance of the reptiles, amphibians, and small mammals 2)develop monitoring protocols for reptiles and amphibians	\$155,000	\$200,000			
12-7	1	General bird surveys	Year 1	\$60,000	Every 5 years	AGFD	New protocol under development by AZ Bird Conservation Initiative; survey 3 consecutive years, pause 5 to 10 years, repeat	\$60,000				
12-8	1	Bat surveys	Annual	In-kind	Annual	In-house / AGFD	Assist AZGFD in conducting bat surveys at the Betty Lee and Wellton Hill Mines					
12-9	1	Collaborate with AGFD to identify and maintain important wildlife connectivity corridors on BMGR East	Annual	Varies	Varies	AGFD	Collaborate with AGFD to identify and maintain important wildlife connectivity corridors on BMGR East					
12-10	1	Installation and maintenance of weather stations and rain gauges	TBD	Varies	Varies	In-house	Operate 10 existing remote-access stations, plus several dozen rain gauges at specific study locations	\$75,000	\$2,000	\$2,000	\$2,000	\$2,000
12-11	1	Medium and low priority actions as resources allow	Annual	Varies	Varies	TBD	Some lower-priority actions may be completed based on adaptive management concerns or availability of resources					
12-12	1	Support special studies to address specific management issues, such as invasives, species of concern, climate change, etc.	Annual	Varies	Annual	In-house / Interagency / University	Supports research proposals developed by universities, AGFD, USGS, or others that address various issues of concern	\$75,000	\$75,000	\$75,000		
12-13	1	Implement cultural resource survey and monitoring requirements for INRMP - related actions	Years 2, 4	\$150,000	Annual	In-house / Contractors	Continue surveys along roadways and nearby potential cultural sites in Area B; includes recording of camp sites					
12-14	2	Identify and evaluate other possible Special Natural / Interest Areas	Varies	TBD	Varies	In-house						
12-15	12	Participate and implement actions per the Sonoran Pronghorn Recovery Plan	Annual	\$80,000	Annual	Interagency	Pronghorn recovery actions as stipulated in the Biological Opinion, recovery plan, or as determined by the interagency Recovery Team	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000
12-16	13	Comprehensive erosion assessment to prioritize the sites with severe erosion, and examine available engineering management practice that can mitigate erosion	TBD	Varies	One-time	Interagency / University	This study aims to assess current erosion status within the watershed and evaluate possible engineering management practices that will mitigate erosion.	\$100,000	\$100,000	\$100,000		
12-17	11	Partner w/Border Patrol to identify and implement habitat restoration	TBD	Varies	Annual	In-house	Active and passive restoration of degraded areas					
12-18	16	Complete and subsequently implement fire management plan	Years 1-4	TBD	One-time	Interagency	Assess fire risk and implement restrictions as appropriate					
12-19		Rangewide soil map	Years 2, 3	TBD	One-time	Interagency		\$439,290	\$245,548	\$228,109	\$222,584	
12-20		Aerial imagery for range and base	Year 3	TBD	One-time	Interagency			\$300,000	\$300,000		
12-21		Characterization of Anthropogenic Impacts								\$150,000		
12-22	1	Develop and implement systems to monitor the effectiveness of compliance actions.	TBD	Varies	As Needed	In-house/ Interagency	Continue to collect data; develop systems as needed					
12-23	1, 5, 7, 8, 11	Develop a plan for determining the limits-of-acceptable change for recreational, natural and cultural resources.	TBD	Varies	As Needed	In-house/ Interagency	Use baseline survey data to determine the degree of change and develop a plan appropriate to the findings					
12-24	1	Construct adaptive management strategies for maintaining acceptable limits of change.	TBD	Varies	As Needed	In-house/ Interagency	Use baseline survey data to determine the need for adaptive management strategies					
12-25	1	Allow maintenance and development of existing water sources supporting wildlife.	As Needed	TBD	As Needed	AGFD	As needs and funding are identified					
12-26	11	Support AZGFD installation of up to a total of six high-priority wildlife waters on the BMGR*	As Needed	TBD	As Needed	AGFD	As needs and funding are identified					

Table 6-1 2012 INRMP Update; BMGR West 5-Year Action Plan: 2013-2017

2007 INRMP Motorized Access Actions (for 2008-2012)												
2007 Action Number	INRMP Element ¹	Action	Status	Progress By 2012							Follow-On 2012 INRMP Resource Management Action(s)	
07-19	3	Retain the majority of existing motorized access roads and close redundant roads	C	Action Completed							Action completed	
07-20	3	Temporarily close selected roads to the public when an agency mission or resource protection issue arises	O	Partial range closures continue for the pronghorn fawning season and twice a year for laser training during WTI							12-27	
07-21	3	Evaluate site-specific proposals for future need and impacts of developing additional roads for agency purposes *	O	The creation of new roads is avoided to the greatest extent possible. The JSF project will upgrade the existing road and its EIS authorized the construction of a 1.1 mile road.							12-28	
07-22	3, 5	Install signs, gates, and fences to support road infrastructure and public access	C	Installed signs for restricted areas, bilingual laser warning signs, and landing zones							Action completed	
07-23	3	Implement site specific planning for two bypass roads that would reroute vehicle traffic around the northwest corner of the Cabeza Prieta NWR	N	The need for the bypass road has dissipated w/completion of the border fence.							None warranted	
2012 INRMP Motorized Access Actions (for 2013-2017)												
2012 Action Number	INRMP Element ¹	Action ²	Fiscal Year ³	Funding ⁴	Frequency ⁵	Partners ⁶	Comments	Year 1	Year 2	Year 3	Year 4	Year 5
12-27	3	Close selected roads to public access where an agency mission or resource protection issues conflict with public use				As-required	TBD	As-required	In-house			
12-28	3	Evaluate site-specific proposals for future need and impacts of developing additional roads for agency purposes *	As Needed	TBD	As Needed	In-house	Evaluate as proposals are identified					

Table 6-1 2012 INRMP Update; BMGR West 5-Year Action Plan: 2013-2017

2007 INRMP Public Use Actions (for 2008-2012)												
2007 Action Number	INRMP Element ¹	Action	Status	Progress By 2012							Follow-On 2012 INRMP Resource Management Action(s)	
07-24	3-9	Publish a public brochure and map detailing retained road access and outlining range rules (e.g., camping rules, off-road vehicle travel, rockhounding, firewood collection, hunting, native plant or wood collection, mine entry, recreational shooting, trash disposal)	C	Completed in 2008 and is available at the Permitting Office or Range Management							12-30	
07-25	3-12	Codify rules and establish schedule of fees for enforcing regulations	O	The range wardens now have concurrent jurisdiction to write tickets under state law							Action completed	
07-26	4, 5	Maintain recreational use database to determine public use of natural resources, roads and compliance of rules for future action	O	Permit office records the number of range passes issued per month							12-33	
07-27	5	Develop a special use permit (e.g., education, scientific research, large groups of people)	O	1) Hold harmless agreement is required to obtain range passes 2) instructions/outline for range access is provided to special interest groups							12-30, 12-31	
07-28	5	Implement public education and information programs	O	Published a FTHL poster and a bird brochure; completed an interruptive trail was completed for the Fortuna Mine; and the range wardens provide tours (e.g., geocaching, rock collectors, off road users) upon request							12-31	
07-29	5	Retain a minimum of four full-time law enforcement positions	C	Four full-time law enforcement positions filled in 2005.							Four law enforcement positions filled in 2005; positions being retained	
07-30	8	Assess the need for a special hunting permit program that requires payment of nominal fees to be used for the protection, conservation, and management of wildlife and habitat	N	Managed through the state.							Not warranted	
07-31	8	Evaluate the effects of non-game species collection on wildlife, habitat, and other resources. Limit or restrict collection activities within the authority of state law	N	Monitoring has been initiated; no population data has been collected to indicate declines due to overharvesting							12-33	
07-32	9	Assess importance and character of recreational shooting as an activity/issue to determine the appropriateness of this activity on BMGR and implement a decision based on the findings	O	No special use permits have been requested for recreational shooting.							12-33	
2012 INRMP Public Use Actions (for 2013-2017)												
2012 Action Number	INRMP Element ¹	Action ²	Fiscal Year ³	Funding ⁴	Frequency ⁵	Partners ⁶	Comments	Year 1	Year 2	Year 3	Year 4	Year 5
12-29	4	Assess benefits and effects of establishing designated camping areas and implement a decision based on the findings	Year 5	\$-	One-time	In-house	Incomplete information available to make an assessment; existing camp sites are being recorded as part of cultural resources surveys along road corridors; survey work is about 50% complete.					
12-30	5	Revise visitor map	Year 3	\$3,000	One-time	In-house / USMC	Revise public visitation maps and rules for public education and recreation use; would inform the public about road restrictions and resource sensitivities					
12-31	5	Public outreach	Annual	\$5,000	Annual	In-house	Supports public awareness projects to educate base personnel / public about BMGR cultural resources, natural resources, historical preservation, and conservation activities.					
12-32	5	Install signs, gates, and fences to support road infrastructure and public access	TBD	\$5,000	Reoccurs as needed	In-house	Install and maintain signage at range entry points, along perimeters, and at all road intersections.					
12-33	5	Compile recreation use statistics. Analyze patterns, identify heavily used areas. Monitor those areas to identify any resource concerns	Annual	\$5,000	Annual	In-house						

Table 6-1 2012 INRMP Update; BMGR West 5-Year Action Plan: 2013-2017

2007 INRMP Manage Realty Actions (for 2008-2012)													
2007 Action Number	INRMP Element ¹	Action	Status	Progress By 2012							Follow-On 2012 INRMP Resource Management Action(s)		
07-33	10	Establish a protocol consistent with NEPA and other regulatory requirements for reviewing/approving proposed actions within existing utility/transportation corridors	C	All projects consistent w/NEPA							12-34		
2012 INRMP Manage Realty Actions (for 2013-2017)													
2012 Action Number	INRMP Element ¹	Action ²	Fiscal Year ³	Funding ⁴	Frequency ⁵	Partners ⁶	Comments	Year 1	Year 2	Year 3	Year 4	Year 5	
12-34	10	Cooperate with ADOT, US Border Patrol, and utility companies regarding proposed actions within existing utility/transportation corridors	Ongoing	\$-	As required	ADOT, USBP	Continuation of dialogue and partnership with proponent and supporting action agencies						
2007 INRMP Perimeter Land Use Actions (for 2008-2012)													
2007 Action Number	INRMP Element ¹	Action	Status	Progress By 2012							Follow-On 2012 INRMP Resource Management Action(s)		
07-34	17	Monitor land use changes in perimeter areas	O	Cooperate w/ Community Planning and Liaison Office w/regards to public outreach and joint use.							12-36		
07-35	17	Monitor illegal immigration to anticipate how BMGR resources may be affected	O	Trespassing and apprehension of UDAs has dramatically reduced w/ the completion of the border fence; continue to work with USBP to monitor illegal alien traffic							12-36		
07-36	17	Participate and coordinate management activities with adjoining property owners that benefit natural resource management and participate in regional land-use planning opportunities to ensure consequences to BMGR natural and cultural resources are minimized	O	The Department works in cooperation with the BEC, ICC, MOG, and Pronghorn Recovery Team, and local, state, and federal governments revise and improve management actions and policies							12-35		
07-37	17	Work with the county agricultural extension agents to determine the extent and danger of pesticide drift into BMGR and any associated resource issues	N	This is no longer an issue because the ASH provides a buffer and there are no agricultural fields on the northern border of the BMGR West.							Not warranted		
2012 INRMP Perimeter Land Use Actions (for 2013-2017)													
2012 Action Number	INRMP Element ¹	Action ²	Fiscal Year ³	Funding ⁴	Frequency ⁵	Partners ⁶	Comments	Year 1	Year 2	Year 3	Year 4	Year 5	
12-35	17	Participate in local and regional planning and monitoring land use patterns	As required	\$-	As required	In-house / Interagency	Participate in development or review of environmental assessments or impact statements, resource management plans						
12-36	17	Monitor illegal immigration, trafficking, and border-related law enforcement to anticipate how BMGR resources may be affected	Ongoing	\$-	Annual	In-house / Interagency	Continuation of informal coordination with law enforcement authorities and anecdotal evidence of border-related impacts	\$862,337	\$589,400	\$346,158	\$311,400	\$311,400	
2012 INRMP Funding Totals													
								FUNDING TOTALS BY YEAR	\$2,120,087	\$1,719,948	\$1,281,267	\$615,984	\$393,400

¹ INRMP Resource Management Element addressed
² Fulfill requirement of resource management element
³ Year of funding and completion of action
⁴ Estimate of required funding amount to complete project
⁵ How often action will occur
⁶ Responsible parties for completing the action
* May require further NEPA review and / or Section 106 consultation.

Table 6-2 INRMP BMGR East 5-Year Action Plan: 2013-2017

Element ¹	Action Step ²	Fiscal Year ³	Funding ⁴	Frequency ⁵	Partners ⁶	Comments	Year 1	Year 2	Year 3	Year 4	Year 5
Resource Management											
1	Implement inventory and monitoring plan:										
1, 11	Monitor and control invasive species	Annual	\$50,000	Annual	In-house / Interagency	Ongoing monitoring occurs while driving range roads, control measures performed when necessary and appropriate	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
1	Monitor 92 vegetation plots in several plant communities	Annual	\$10,000	Every 5 years	In-house / Contractors	Each plot is assessed at 5-year intervals	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
1	Desert tortoise surveys	Year 5	\$50,000	Every 5 years		Re-survey known occupied and suitable habitat identified during previous surveys					\$50,000
1	Raptor management surveys and monitoring	Annual	\$10,000	Annual	In-house / AGFD	Support bald eagle nest watch, golden eagle surveys, raptor surveys, assess potential for powerline electrocution, etc.	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
1	Bird surveys	Years 1, 2	\$35,000	Varies	In-house / AGFD	New protocol under development by AZ Bird Conservation Initiative; survey 3 consecutive years, pause 5 to 10 years, repeat	\$35,000	\$35,000			
1	Support AGFD surveys for game ungulates	Varies	\$-	Varies by species	AGFD	Support and participate in surveys performed by AGFD					
1	Support AGFD surveys for gamebirds	Annual	\$-	Annual	AGFD	Support and participate in surveys performed by AGFD					
1	Collaborate with AGFD to identify and maintain important wildlife connectivity corridors on BMGR East	Annual	\$-	Annual	AGFD	Collaborate with AGFD to identify and maintain important wildlife connectivity corridors on BMGR East					
1	Kit fox population monitoring	Years 1, 4	\$5,000	Every 3 years	In-house	Continuation of population monitoring using scent stations	\$5,000			\$5,000	
1	Bat surveys; evaluate, monitor and protect important bat roosts	Annual	\$25,000	Annual		Various survey techniques: acoustic monitoring, mist net traps, roost assessments, etc.	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
1	CFPO survey (low priority)	Years 1, 3, 5	\$5,000	Every 2 years		Low priority: no CFPO detected on BMGR East during repeated surveys over past 20 years; marginal habitat	\$3,000		\$3,000		\$3,000
1	Weather stations and rain gauges	Annual	\$-	Annual	In-house	Operate 10 existing remote-access stations, plus several dozen rain gauges at specific study locations					
1	Monitor use of wildlife waters	Annual	\$15,000	Annual	In-house / AGFD	Continuation of program using wildlife cameras to record usage during summer months; evaluate resulting thousands of photographs to build database of species, abundance, location, etc.	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
1	Medium and low priority actions as resources allow	Annual	\$10,000	Varies	TBD	Some lower-priority actions may be completed based on adaptive management concerns or availability of resources	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
1	Vegetation mapping	Years 3, 5	\$25,000	Annual	In-house / Interagency / University	Continuation of vegetation mapping project being performed by University of Arizona; uses standardized method in use by regional land managers			\$25,000		\$25,000
1	Support special studies to address specific management issues, such as invasives, species of concern, climate change, etc.	Annual	Varies	Annual	In-house / Interagency / University	Supports research proposals developed by universities, AGFD, USGS, or others that address various issues of concern	\$19,000	\$27,000	\$34,000	\$37,000	\$19,000
1	Implement cultural resource survey and monitoring requirements for INRMP - related actions	Years 2, 4	\$150,000	Annual	In-house / Contractors	Continue surveys along roadways and nearby potential cultural sites in Area B, including recording of camp sites; use resulting information to assess potential adverse effects from INRMP-related activities including motorized access and public use.		\$150,000		\$150,000	
2	Identify and evaluate other possible Special Natural / Interest Areas	Year 4	\$20,000	One-time	In-house	Bender Spring and Paradise Well are candidate areas, also contemplating a nature trail in Crater Range				\$20,000	
11	Habitat restoration *	As needed	\$25,000	Annual	In-house	Active and passive restoration of degraded areas	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
11	Evaluate benefits and adverse effects of wildlife waters	Year 5	\$50,000	One-time	In-house / Interagency / University	Perform a holistic review based on previous studies on BMGR and relevant literature.					\$65,000
11	Develop and implement procedures to control trespass livestock	Annual	\$5,000	Annual	In-house	Address burgeoning burro population in Area B and trespass cattle	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
11	Allow for the maintenance and repair of existing water developments *	As needed	TBD	Reoccurs as needed	AGFD	Support AGFD annual maintenance of all waters and redevelopment as required					
12	Participate and implement actions per the Sonoran Pronghorn Recovery Plan	Annual	\$220,000	Recurring actions	Interagency	Pronghorn recovery actions as stipulated in the Biological Opinion, recovery plan, or as determined by the interagency Recovery Team	\$220,000	\$220,000	\$220,000	\$220,000	\$220,000
13	Evaluate erosion conditions of range roads; repair or temporarily restrict use *	Annual	\$-	Annual	In-house	Annual driving inspection of the most heavily-used range roads; secondary and tertiary roads driven at least every 3 years					
13	Evaluate erosion problems in specific areas, develop plans for repair	Year 3	\$100,000	One-time	Interagency / University	Road maintenance practices in many areas are non-sustainable			\$100,000		

Table 6-2 INRMP BMGR East 5-Year Action Plan: 2013-2017

Element ¹	Action Step ²	Fiscal Year ³	Funding ⁴	Frequency ⁵	Partners ⁶	Comments	Year 1	Year 2	Year 3	Year 4	Year 5	
13	Monitor water table levels	Annual	\$-	Annual	In-house	Performed by range operations contractor						
14	Control excessive fugitive dust at permitted construction sites and recreation activity areas	As-required	\$-	TBD	In-house	Performed by range operations contractor as part of recurring maintenance work						
16	Complete and subsequently implement fire management plan	Annual	\$-	One-time	In-house	Assess fire risk, implement campfire restrictions as appropriate; maintain firefighting agreement with BLM						
Motorized Access												
3	Close selected roads to public access where an agency mission or resource protection issues conflict with public use	As-required	TBD	As-required	In-house	Access restrictions may be imposed due to evolving weapons safety footprints, protection of natural or cultural resources, law enforcement concerns or other management actions						
Public Use												
4	Assess benefits and effects of establishing designated camping areas and implement a decision based on the findings	Year 5	\$-	One-time	In-house	Incomplete information available to make an assessment; existing camp sites are being recorded as part of cultural resources surveys along road corridors; survey work is about 50% complete.						
5	Revise public visitation maps and rules for public education and recreation use; would inform the public about road restrictions and resource sensitivities	Annual	\$3,000	Annual	In-house / USMC	Annual revisions based on results of area monitoring and clarifications of rules printed on the map reverse.	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	
5	Public outreach	Annual	\$5,000	Annual	In-house	Supports public awareness projects to educate base personnel / public about BMGR cultural resources, natural resources, historical preservation, and conservation activities. Includes brochures such as the BMGR East bird checklist and a 'benefits of non-lead ammo' brochure.	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	
5	Hire law enforcement officers to be retained and dedicated to the BMGR East; interim measure consists of contract security guards with detention authority	TBD	TBD	One-time	In-house	Contract security guards are in place. Continue working with Manpower office to establish authorizations for federal law enforcement officers. Outlook is uncertain given projected AF-wide funding and manpower reductions.						
5	Install signs, gates, and fences to support road infrastructure and public access	Annual	\$5,000	Reoccurs as needed	In-house	Install and maintain signage at range entry points, along perimeters, and at all road intersections.	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	
5	Compile recreation use statistics. Analyze patterns, identify heavily used areas. Monitor those areas to identify any resource concerns	Annual	\$5,000	Annual	In-house	Range Security personnel to track call-on and call-off data from recreational visitors. Use vehicle traffic counters to quantify intensity of use at general and specific areas.	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	
7	Monitor native wood supplies in high-use areas; restrict wood collection if resource conditions dictate	Year 1	\$-	Recurr every 5 years	In-house	Use completed cultural resources surveys in Area B to identify high-use areas; assess in Year 1						
Manage Realty Property												
10	Cooperate with ADOT, BLM, US Border Patrol, and utility companies regarding proposed actions within existing utility/transportation corridors	Ongoing	\$-	As required	ADOT, BLM, USBP	Continuation of dialogue and partnership with proponent and supporting action agencies						
10	Coordinate with CE Real Property to restrict future utility and transportation corridors to the existing State Route 85 and railroad rights of way	Ongoing	\$-	As required	In-house	Activities within the ROW include operation and maintenance of overhead power lines, buried fiber optic lines, and a Border Patrol checkpoint						
Perimeter Land Use												
17	Participate in local and regional planning and monitoring land use patterns	As required	\$-	As required	In-house / Interagency	Participate in development or review of environmental assessments or impact statements, resource management plans; serve as DOD clearinghouse for energy development proposals in AZ						
17	Monitor illegal immigration, trafficking, and border-related law enforcement to anticipate how BMGR resources may be affected	Ongoing	\$-	Annual	In-house / Interagency	Continuation of informal coordination with law enforcement authorities and anecdotal evidence of border-related impacts						
							FUNDING TOTALS BY YEAR	\$450,000	\$600,000	\$550,000	\$600,000	\$550,000

¹ Resource Management Element from INRMP

² Fulfill requirement of resource management element

³ Year of funding and completion of action

⁴ Estimate of required funding amount to complete project

⁵ How often action will occur

⁶ Responsible parties for completing the action

* May require further NEPA review and / or Section 106 consultation.

CHAPTER 7 REFERENCES

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