EXTENSION OF THE BARRY M. GOLDWATER RANGE LAND WITHDRAWAL AND PROPOSED GILA BEND ADDITION LAND WITHDRAWAL

FINAL LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

SEPTEMBER 2021





LEAD AGENCIES:

U.S. Department of the Air Force

U.S. Department of the Navy, U.S. Marine Corps

COOPERATING AGENCIES:

U.S. Department of the Interior

Bureau of Land Management

Fish and Wildlife Service

Arizona Game and Fish Department

Final Legislative Environmental Impact Statement for the Extension of the Barry M. Goldwater Range Land Withdrawal and Proposed Gila Bend Addition Land Withdrawal

Lead Agency:	U.S. Department of the Air Force U.S. Department of the Navy, U.S. Marine Corps
Cooperating Agencies:	U.S. Department of the Interior, Bureau of Land Management U.S. Department of the Interior, Fish and Wildlife Service Arizona Game and Fish Department
Title of the Proposed Action:	Extension of the Barry M. Goldwater Range Land Withdrawal and Proposed Gila Bend Addition Land Withdrawal
Location of the Proposed Action:	State of Arizona, Counties of Yuma, Pima, and Maricopa
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ABSTRACT

This final LEIS addresses the proposed extension of the military land withdrawal and reservation for the approximately 1.7-million-acre Barry M. Goldwater Range (BMGR) in southwestern Arizona. In order for the Air Force and the Marine Corps to continue military use of the lands withdrawn under the Military Lands Withdrawal Act of 1999 (Public Law 106-65) after October 4, 2024 Congress must extend the withdrawal. The purpose of and need for extending the BMGR is to maintain the readiness of the nation's air forces by retaining one of its premier ranges for training tactical air combat aircrews and other personnel to fight, survive, and win in the air-ground battlespace. This final LEIS also evaluates the proposed withdrawal of about 2,366 acres of public land adjacent to the Gila Bend Air Force Auxiliary Airfield (AFAF), referred to as the Gila Bend Addition. The proposed Gila Bend Addition would enhance the security and safety of flight operations at Gila Bend AFAF, as well as allow the Air Force to control land use and access to ensure surface activities remain compatible with training operations in the overlying airspace. This final LEIS analyzes two sets of four action alternatives. One set of alternatives would extend the land withdrawal without changes to the BMGR boundary and the second set would withdraw the existing range and include the Gila Bend Addition. Under the no action alternative, the public land in the BMGR would not be withdrawn and the Gila Bend Addition would not be added to BMGR East. The effects on military land and airspace use, civil aviation, perimeter and non-military land use, utilities, ground transportation and traffic, recreation resources, earth resources, water resources, air quality, climate change, biological resources, cultural resources, noise, visual resources, hazardous materials and waste, public health and safety, socioeconomics, and environmental justice are discussed.

PRIVACY ADVISORY: This Final EIS is provided in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 Code of Federal Regulations [CFR] 1500–1508), and 32 CFR 989, Environmental Impact Analysis Process (EIAP). As required by law, comments provided have been addressed in the LEIS and made available to the public. Providing personal information is voluntary. Only the names of the individuals making comments and specific comments are disclosed. Personal home addresses and phone numbers are not published in the Final EIS.

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List of Acronyms

Acronym	Definition
°F	Degrees Fahrenheit
µg/m^3	Microgram(s) per Cubic Meter
56 FW	56th Fighter Wing
56 RMO	56th Fighter Wing Range Management Office
AAF	Army Airfield
AATC	Air Force Reserve Command Test Center
ACAM	Air Conformity Applicability Model
ACE	Aviation Combat Element
ACTS	Air Combat Training System
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AFAF	Air Force Auxiliary Field
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	Aqueous Film-Forming Foam
AFRC	Air Force Reserve Command
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zone
Air Force	U.S. Air Force
ALZ	Assault Landing Zone
ANG	Air National Guard
AOC	Area of Concern
Army	U.S. Army
ARNG	Army National Guard
ARPA	Archaeological Resource Protection Act
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
AUM	Animal Unit Month
AUX	Auxiliary

Acronym	Definition
AZGFD	Arizona Game and Fish Department
BEC	Barry M. Goldwater Range Executive Council
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
BO	Biological Opinion
CAA	Clean Air Act
CAR	Contamination Analysis Report
CBP	U.S. Bureau of Customs and Border Protection
CDNL	C-Weighted Day-Night Average Sound Level
CDP	Census-Defined Place
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CMAGR	Chocolate Mountain Aerial Gunnery Range
CO_2e	Carbon Dioxide Equivalent
CPNWR	Cabeza Prieta National Wildlife Refuge
CPW	Cabeza Prieta Wilderness
CSAR	Combat Search and Rescue
dB	Decibel(S)
dBA	A-Weighted Decibel(S)
DNL	Day Night Level
DoD	Department of Defense
DOI	Department of the Interior
DON	Department of the Navy
DZ	Drop Zone
ECTRC	El Centro Training Ranges Complex
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FLPMA	Federal Land Policy and Management Act of 1976, As Amended
FW	Fighter Wing

Acronym	Definition
GHG	Greenhouse Gases
GIS	Geographic Information System
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HAWK	Hercules Airborne Weapons Kit
ICE	Internal Combustion Engine
ICRMP	Integrated Cultural Resources Management Plans
IEC	Intergovernmental Executive Council
IFR	Instrument Flight Rules
INRMP	Integrated Natural Resources Management Plan
IPCC	Intergovernmental Panel on Climate Change
JTAC	Joint Terminal Air Controller
Ldn	Day-Night Average Sound Level
Ldnmr	Onset Rate-Adjusted Monthly Day-Night Average Sound Level
LEIS	Legislative Environmental Impact Statement
LHA	Landing Helicopter Assault
LHD	Landing Helicopter Dock Ship
LSDZ	Laser Surface Danger Zone
MAG	Marine Aircraft Group
MAGTF	Marine Air-Ground Task Force
Marine Corps	U.S. Marine Corps
MC	Munitions Constituents
MCAS	Marine Corps Air Station
mg/m^3	Milligram(s) per Cubic Meter
MLWA	Military Lands Withdrawal Act
MOA	Military Operations Area
MOU	Memorandum of Understanding
MRA	Mineral Resources Assessment
MSL	Above Mean Sea Level
MTR	Military Training Route
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act Of 1990, As Amended

Acronym	Definition
NEPA	National Environmental Policy Act Of 1969, As Amended
NHPA	National Historic Preservation Act Of 1966, As Amended
NOI	Notice of Intent
NPS	National Park Service
NRHP	National Register of Historic Places
NTTR	Nevada Test and Training Range
NWR	National Wildlife Refuge
OHV	Off-Highway Vehicle
OPCNM	Organ Pipe Cactus National Monument
ORA	Operational Range Assessment
P.L.	Public Law
PFAS	Per- And Polyfluorinated Alkyl Substances
PM_{10}	Particulate Matter Less Than 10 Microns in Aerodynamic Diameter
$PM_{2.5}$	Particulate Matter Less Than 2.5 Microns in Aerodynamic Diameter
ppm	Parts Per Million
RCRA	Resource Conservation and Recovery Act Of 1976, As Amended
Reclamation	Bureau of Reclamation
REVA	Range Environmental Vulnerability Assessment
RMCP	Range Munitions Consolidation Point
RMO	Range Management Office
RMP	Resource Management Plan
RMZ	Recreation Management Zone
RNAV	Recently Implemented Area Navigation
SAM	Surface-To-Air Missile
SDNM	Sonoran Desert National Monument
SDZ	Surface Danger Zone
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SpecOps	Special Operations
SUA	Special Use Airspace
TACTS	Tactical Aerial Combat Training System
TCP	Traditional Cultural Property

Acronym	Definition
TCTS	Tactical Combat Training System
U.S.	United States
U.S.C.	United States Code
UAS	Unmanned Aerial Systems
UNESCO	United Nations Educational, Scientific and Cultural Organization
USFWS	United States Fish and Wildlife Service
VFR	Visual Flight Rules
VMX-1	Marine Corps' Marine Operational Test and Evaluation Squadron 1
VOR	Very-high frequency Omnidirectional Range
VRM	Visual Resources Management
WDZ	Weapons Danger Zone
WSMR	White Sands Missile Range
WTI	Weapons and Tactics Instructor
YPG	Yuma Proving Ground

Note:

This document contains many acronyms that exceed four letters, if using a screen reader, adjustment to your default settings may be required.

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Glossary of Terms

Aircraft Types. Fixed-wing aircraft have conventional airframes in which wings provide lift and support aircraft directional control surfaces, and engines provide thrust through a propeller or jet turbine. Helicopters, or rotary-wing aircraft, are propelled by one or more horizontally oriented, engine-driven rotor(s) (also referred to as a rotary wing) that provides lift, thrust, and directional control. Tiltrotor aircraft combine capabilities of both fixed-wing and rotary-wing aircraft. The MV-22, a tiltrotor aircraft, can fly like a conventional fixed-wing aircraft or like a helicopter; its turboprop engines, which are at the ends of its wings, can be rotated vertically to allow its two propellers to function like rotors and give the aircraft the ability to fly like a helicopter, including performing vertical takeoffs and landings. The F-35—which is the nation's most recent "fifth-generation" jet that is being acquired by the Air Force, Marine Corps, and Navy to replace older legacy aircraft such as the A-10 and AV-8B and variants of the F-15, F-16, and F/A-18. Three variants of the F-35 are being produced. The F-35A is a conventional takeoff and landing aircraft designed to operate from conventional air bases and fulfill the mission requirements of the Air Force. The F-35B is a short takeoff/vertical landing aircraft designed to be operated from austere forward bases with short runways and from amphibious assault ships to support the Marine Corps' expeditionary warfighting mission. An internal lift fan and downward-vectored main engine thrust provide the short takeoff/vertical landing capabilities of this fixed-wing fighter. The F-35C is designed for the Navy to be operated from aircraft carriers as a long-range stealth strike fighter.

Air Traffic Control Assigned Airspace (ATCAA). An ATCAA is a block of airspace with a floor normally at or above 18,000 feet above mean sea level (AMSL), but it can be lower. An ATCAA, which is not depicted on aeronautical charts, is typically designated directly above a Military Operations Area (MOA), which is depicted on aeronautical charts, to provide additional vertical airspace for military training activities. Air Traffic Control provides separation between civil aviation and military aircraft participating in operations within an active ATCAA. An ATCAA is not Special Use Airspace (SUA). ATCAAs are established by a Letter of Agreement between the using Department of Defense (DoD) agency and the Federal Aviation Administration (FAA).

Alert Area. An alert area is a block of SUA designated to alert all pilots of an area that may contain a high volume of aircrew training activities, or an unusual type of aerial activity. All activities within an alert area are conducted in accordance with Federal Aviation Regulations and all pilots are equally responsible for collision avoidance.

Barry M. Goldwater Range Executive Council (BEC). The BEC was first formed in 1997 by the Air Force, Marine Corps, Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), and Arizona Game and Fish Department at the local management level as an informal ad hoc council designed to facilitate better collaborative management of BMGR resources. The BEC was formally established in March 1998 through an Memorandum of Understanding among the member agencies. The membership of the BEC was expanded, through an amended February 2001 Memorandum of Understanding, to include the U.S. Border Patrol, and Organ Pipe Cactus National Monument in addition to the original five members. The council membership consists of the senior functional manager of each agency's local unit(s). No single agency serves as the council lead. Rather, the organization operates to exchange

information and provide recommendations to the agencies with primary responsibility for the needed action. These recommendations are intended to integrate long-term management plans across jurisdictional and administrative boundaries. Once the BMGR Integrated Natural Resources Management Plan was implemented in 2007, the BEC continued serve as an executive forum for involved agencies to discuss adaptive management proposals in accordance with the provisions of the plan.

Emergency Divert Field. An airfield designated for the emergency recovery of aircraft that suffers an inflight malfunctions or other emergencies that requires an immediate or precautionary landing.

Fee-Acquired. Fee-acquired land means that full ownership, including the underlying title, of real property *has been transferred from one party (in this case, private owners and the State of Arizona)* to another party *(in this case, the federal government)*. In granting transfer of land, the former landowner generally retains no ownership of the property and gives up all interests in or rights to the property. All federal lands are owned by the United States of America rather than by the department that administered acquisition of the land.

Field Carrier Landing Practice (FCLP). FCLP consists of touch-and-go operations on a runway designed to simulate aircraft carrier landings or a deck for vertical landings. Aircraft will touch down on a simulated carrier deck and take off again into a left-hand pattern. The pilots are graded on their landings by the Landing Signals Officer and must qualify with FCLPs before landing on a carrier.

Flight Level. Altitudes of 18,000 feet and above are referred to as Flight Levels and are stated in three digits that represent hundreds of feet. Flight Level 450 is 45,000 feet. Flight Level altitudes are measured by setting a barometric altimeter to a standard atmospheric pressure of 29.92 inches of mercury regardless of the local atmospheric pressure. As a result, Flight Level altitudes vary, in contrast to AMSL altitudes, as regional atmospheric pressure varies. All aircraft at a given Flight Level will follow the same atmospheric pressure surface over the long distances typically flown at high altitudes and airspeeds and will, thus, retain their relative vertical separations. Altitudes are stated in this LEIS in feet AMSL unless otherwise noted.

Hazard Area. The Military Lands Withdrawal Act of 1999 uses the generic term “surface safety zones” to define surface areas that are subject to hazards to personnel from live-fire use of air-to-ground, ground-to-ground, or ground-to-air weapons or from the use of lasers used to designate targets for attack. The operational terminology used to define “surface safety zones” includes weapons danger zone (WDZ) for air-to-air or air-to-ground weapons delivered by aircraft, surface danger zone (SDZ) for ground-to-ground or ground-to-air weapons use such as artillery or missiles, and laser surface danger zone (LSDZ) for the area in which lasers are used to designate targets for air-to-ground or ground-to-ground attack. WDZs and SDZs are very similar concepts in that they both encompass the ground and airspace needed for the lateral and vertical containment of weapons, munitions, projectiles, fragments, components, and debris resulting from the firing, launching, and/or detonation of ordnance of demolitions. The DoD standard for risk acceptance used at the BMGR requires a 99.9999 percent level of containment, which means the probability of munitions, demolitions, or hazardous fragment escaping the containment area is one in a million. Target locations and weapons use at a range, including the BMGR, must be planned so that the WDZs and SDZs are completely contained within the range

boundary unless authorization has been obtained to permit a WDZ or SDZ to extend into adjacent land. The vertical projection of a WDZ or SDZ must be completely contained within the SUA authorized for the associated firing mission. Unauthorized personnel are restricted from entering land that is encompassed within an active WDZ or SDZ. Nonparticipating aircraft are prohibited from entering the active restricted area a WDZ or SDZ is projected. An LSDZ is defined as the designated region or ground area where laser radiation levels may exceed maximum permissible exposure levels, thereby requiring control of the area during laser operation. Unauthorized personnel are not permitted to enter an active LSDZ, and laser eye protection is required for personnel in the LSDZ to prevent exposure of their eyes to all or part of a laser beam. The term "hazard area" is the generic term used in this Legislative Environmental Impact Statement (LEIS) to refer to a surface safety zone or a WDZ, SDZ, or LSDZ.

Intergovernmental Executive Committee (IEC). The IEC is an intergovernmental body composed of representatives from Luke Air Force Base, Marine Corps Air Station Yuma, BLM Phoenix and Colorado River District Offices, USFWS/Cabeza Prieta National Wildlife Refuge (CPNWR), Arizona Game and Fish Department, Organ Pipe Cactus National Monument, and the Yuma and Tucson Sectors of U.S. Border Patrol, as well as five Native American Tribal Nations. The IEC was formed in accordance with the Military Lands Withdrawal Act of 1999 (Public Law 106-65 Section 3031(d)) and was established solely for the purpose of exchanging views, information, and advice relating to the management of natural and cultural resources of the BMGR. IEC meetings, which are open to the public, are held three times annually on a rotating basis in Yuma, Glendale, and Tucson, Arizona.

Joint Terminal Air Controller (JTAC). The U.S. Armed Forces and some other military forces refer to a JTAC as a qualified service member who directs the action of combat aircraft engaged in close air support and other offensive air operations from a forward position. This function is also performed by personnel/units referred to as Tactical Air Control Party, Forward Air Controller, and fire control officer; throughout the remainder of this document, the term "JTAC" will be used to refer to all ground personnel on range that control aircraft engaged in air-to-ground attack training.

Live-Fire Training. Live-fire training includes aircraft gunnery of towed aerial targets; aircraft strafing attacks on ground targets; aircraft bomb, rocket, and missile attacks on ground targets; ground-to-air missile firings at aerial target drones; or launches of simulated anti-aircraft missiles to provide realistic air defense threats to training aircrews. Air-to-air gunnery firing at towed targets or target drones occurs infrequently at irregularly scheduled times. Surface-to-surface weapons use includes artillery and mortar fire that is used to mark designated targets for coordinated attack by aircraft. The majority of ordnance employed on the BMGR is practice ordnance that is either completely inert or contains a small spotting charge. Some training using high explosive ordnance, which includes full-sized, warfighting munitions with armed (exploding) warheads—also occurs at six designated target locations.

Military Operations Area (MOA). A MOA is a block of SUA with a defined altitude floor and ceiling that in almost all cases, including in the BMGR region, is up to but does not include 18,000 feet AMSL. MOAs are designated to separate/segregate certain military aviation activities—such as high-speed flight and abrupt aerobatic maneuvers—from air traffic flying on the Instrument Flight Rules (includes most scheduled airline flights) and to identify where these activities are conducted to Visual Flight Rules traffic. No aviation or ground-based weapons may be fired in, into, or through a MOA.

Military Training Route (MTR). An MTR is a low-level training route that is generally established at an altitude below 10,000 feet AMSL. MTRs are used to train military aircrews to conduct low-altitude navigation and tactical flight maneuvers at high subsonic airspeeds, in instrument and visual weather conditions. Aircraft operating below an altitude of 10,000 feet AMSL are generally restricted to a 250-knot airspeed limit unless authorized to operate within an active restricted area, MOA, or MTR, or under an FAA waiver that permits military aircraft to operate at higher airspeeds that are necessary for the safe operation of the aircraft. Knot is a short-hand expression for nautical miles per hour, a measure of speed that is an international standard in aviation and seafaring. A speed of 250 knots equals 287.5 miles per hour. Supersonic airspeeds are not authorized on MTRs. MTRs are made up of several route segments with each individual segment having a designated route width and vertical altitude block within which the aircraft using the route must remain. MTRs are not considered SUA.

Nautical Mile. The nautical mile is the standard unit of distance used in air and maritime navigation. One nautical mile equals 1.15 statute miles or 1.85 kilometers.

Precautionary Flameout Pattern. See Simulated Flameout Pattern**.**

Public Land. For the purposes of this document and as described in the public land laws, the term public land generally means any land and interest in land owned by the United States and administered by the Secretary of the Interior through the BLM (43 United States Code 1702(e)).

Reserved Land. Reserved Federal land is withdrawn land that is then designated for specified public (or governmental) purpose(s) or program(s). The BMGR comprises withdrawn Federal land that has then been reserved for the public purpose of national defense.

Restricted Area. A block of regulatory SUA with a defined altitude floor and ceiling (the assigned altitudes can vary, depending on the use, from a floor at the ground surface to an unlimited ceiling) and lateral boundaries designed by the FAA through the federal rulemaking process. Often also referred to as restricted airspace, the purpose of a restricted area is to contain or segregate activities that would be hazardous to nonparticipating aircraft. Examples of hazardous activities include firing of aircraft cannons, rockets, or missiles; aircraft delivery of aerial bombs; firing artillery; ground-to-air or ground-to-ground missile launches; or training aircrews at night in the use of night vision goggles with the external lights of the participating aircraft extinguished. No aircraft may enter an active restricted area without prior Air Traffic Control authorization.

Simulated Flameout Pattern/Precautionary Flameout Pattern. A practice approach by a jet aircraft (normally military) at idle thrust to a runway. The approach may start over a runway and may continue on a relatively high and wide downwind leg with a continuous turn to final. It terminates in landing or low approach. The purpose of this approach is to simulate a flameout.

Smokey Surface-to-Air Missile **(SAM).** A Smokey SAM is a small (approximately 40 centimeters in length) rocket that is used to simulate the launch of a SAM during training exercises. The Smokey SAM, which flies to a height of about 1,000 feet, produces a column of exhaust smoke that appears to aircrews like the launch of an actual SAM. Smokey SAMs are used as a training tool to teach aircrews to respond evasively to SAM launches.

Special Use Airspace (SUA). Airspace of defined dimensions wherein activities must be confined because of their nature, and/or wherein limitations may be imposed upon nonparticipating-aircraft. Types of SUA include restricted areas, controlled firing areas, MOAs, and warning areas.

Sortie. A sortie is a deployment of a single military aircraft from take-off through landing, and including a flying mission. For this LEIS, the term sortie is commonly used to summarize an amount of flight activity occurring at the BMGR.

Tactical Aviation. Tactical aviation refers to the whole spectrum of moves, counter-moves, and weapons engagements that aircrews and aircraft perform within the air-to-air (i.e., aircraft versus aircraft) and air-to-ground (i.e., aircraft versus ground forces) combat environments or to provide airlift support to friendly ground forces in the battle area. Contemporary fixed-wing tactical aircraft include fighters such as the F-16, F-15, F/A-18, F-22, and the three models of the F-35 (F-35A, F-35B, and F-35C) as well as close air support aircraft such as the A-10 or A/V-8B. Tactical helicopter (also called rotary-wing aircraft) gunships include the AH-1 or AH-64. Airlift aircrews fly fixed-wing transport aircraft such as the C-130 or C-17, the MV-22 tiltrotor aircraft or helicopters such as the CH-53 or UH-60.

Touch-and-Go Landing. A touch-and-go is a landing on a runway followed by an on-the-runway rollout during which the pilot configures the aircraft for takeoff and then applies power and performs a takeoff to resume flight. Touch-and-go landings are often performed in a series of landing and takeoff cycles, during which the aircraft remains in the airport traffic pattern, to provide student aircrew practice or maintain qualified aircrew currency.

Unmanned Aerial Systems (UAS). An unmanned aerial system generally consists of a remotely piloted, or controlled unmanned aircraft and a remotely located ground-based or airborne controller that operates the unmanned aircraft through a radio link. The unmanned aircraft may be referred to as an unmanned aerial vehicle. The term “drone” is also often used to refer to these aircraft in both civilian and military aviation nomenclature.

Very-high frequency Omnidirectional Range (VOR). A VOR is an electronic facility that transmits radio navigation signals, which are received and interpreted by equipment on the aircraft. VOR airways, which were established in the 1950s, are based on the centerline that extends from one VOR station to another. VOR airways are generally 4 nautical miles wide on either side of the centerline or 8 nautical miles in total width. VOR airways are depicted on low-altitude aeronautical charts.

Withdrawn Land. Withdrawn land is federal land that is withheld by executive or legislative action from settlement, sale, location, or entry under some or all of the general land, mining, and mineral laws to maintain other public values in the withdrawn area, reserve the withdrawn area for a particular public purpose or program, or to transfer jurisdiction over the withdrawn area between federal departments, bureaus, or agencies. The Defense Withdrawal Act of 1958 (also referred to as the Engle Act, Public Law 85-337, 43 United States Code 155-158; hereinafter referred to as the “Defense Withdrawal Act”) provides that only Congress can withdraw federal land of more than 5,000 acres in aggregate for military purposes.

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Executive Summary

Introduction

(Refer to Section 1.1)

The Barry M. Goldwater Range (BMGR), located in southwestern Arizona (Figure ES-1), has served as a military training range since it was first established to train United States (U.S.) pilots and other aircrew members during World War II. As the nation's fourth largest land-based range, and the largest at which tactical aviation training is the predominant mission, the BMGR remains indispensable to the ability of the U.S. Armed Forces to produce the combat-ready aircrews needed to defend the nation and its interests. The range is also vital for preparing other personnel and units that perform a wide diversity of missions relevant to the air-ground battlefield and is routinely used for operational testing activities (also referred to as "operational test" or "testing and evaluation").

The BMGR boundary encompasses approximately 1,743,677 acres, of which about 1,659,622 acres of federal public land are withdrawn from public use and reserved for military training and testing, approximately 1.5 acres are non-federally owned inholdings, and approximately 84,054 acres are Department of Defense (DoD)-acquired lands. Although the BMGR has been in operation since it was established in 1941, authorization for the range is not permanent and requires periodic extensions. Most recently, the Military Lands Withdrawal Act (MLWA) of 1999 (Public Law 106-65) extended authorization for the BMGR for 25 years. The MLWA of 1999 withdrew the federal public land that comprises more than 95 percent of the BMGR as one military range but reserved the eastern and western portions of the range for separate use by the Secretaries of the Air Force and Navy, respectively. The eastern and western portions of the range are designated as BMGR East and BMGR West (Figure ES-1).

The MLWA of 1999 provides that the lands withdrawn for the BMGR are reserved 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
- Other defense related purposes

The U.S. Air Force (Air Force) is the administrator and primary user of BMGR East, and the U.S. Marine Corps (Marine Corps), a component of the Department of the Navy, is the administrator and primary user of BMGR West. BMGR East encompasses approximately 60 percent of the total range, and BMGR West includes the remaining 40 percent (Figure ES-1). BMGR East is administered by the Air Force, Air Education and Training Command, 56th Fighter Wing, which is also the host command at Luke Air Force Base, Glendale, Arizona. The 56th Fighter Wing Range Management Office manages and operates BMGR East. BMGR West is administered by Marine Corps Air Station Yuma, in Yuma, Arizona. The Marine Corps Air Station Yuma Range Management Department manages and operates BMGR West.

In accordance with the MLWA of 1999, the current land withdrawal and reservation of the BMGR will terminate on October 4, 2024. The MLWA also provides that the Secretaries of the Air Force and Navy shall notify Congress and the Secretary of the Interior, by no later than October 2021, concerning whether the Air Force or Department of the Navy will have a continuing military need for part or all of the BMGR after the current withdrawal terminates. The Secretaries of the Air Force and Navy have determined that both BMGR East and BMGR West will remain indispensable for developing and maintaining warfighting skills of Air Force, Marine Corps, Navy, U.S. Army (Army), National Guard, and allied nations' aviation forces. Secretaries of the Air Force and Navy provided notice of the continuing military need for the BMGR to Congress and the Secretary of the Interior in December 2017.

The process to keep the BMGR available for national defense purposes after October 2024 was continued through the submission of an Application for Withdrawal Extension by the Secretaries of the Air Force and Navy to the Secretary of the Interior in December 2018. A companion land withdrawal application for an addition to BMGR East of approximately 2,366 acres of public land was submitted by the Secretary of the Air Force to the Secretary of the Interior in April 2019.

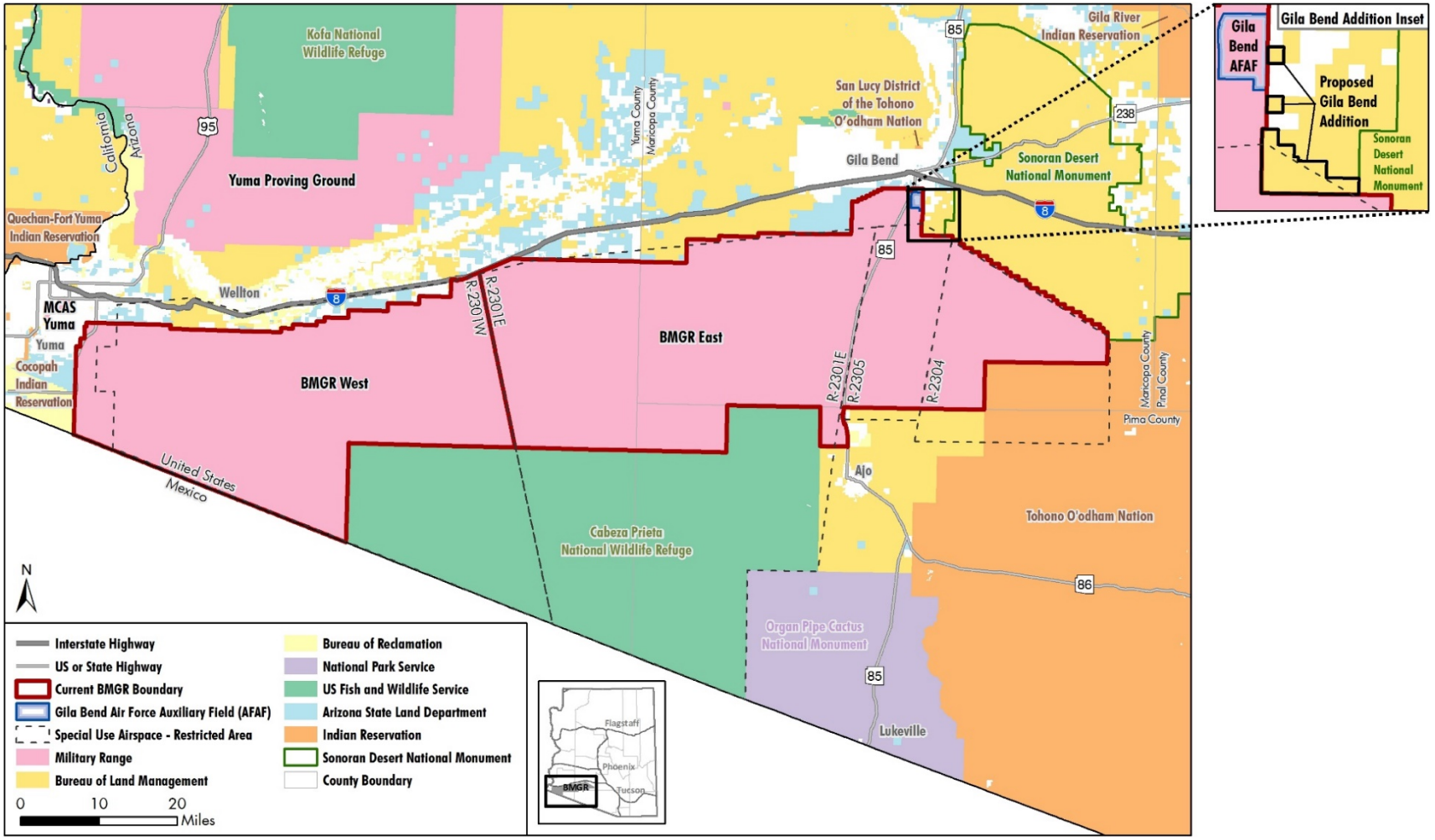
Decisions to Be Made

Congress will be asked to make two decisions, which are addressed as proposed actions in this Legislative Environmental Impact Statement (LEIS), regarding the continuing military need for the BMGR after the expiration of the current land withdrawal and reservation. Congress will be asked to:

- Extend the use of the BMGR for the same military training and testing purposes for which it is currently withdrawn and reserved
- Expand BMGR East through the addition of about 2,366 acres of public land adjacent to Gila Bend Air Force Auxiliary Airfield (AFAF) (hereafter, Gila Bend Addition), if military use of the BMGR is extended

Congress may authorize continued use of the BMGR for tactical air combat training and other defense-related purposes by extending the existing land withdrawal and reservation for either a defined or indefinite period of time. Congress could also keep the BMGR available for national defense purposes by transferring administrative jurisdiction for the public land in the range from the Secretary of the Interior to the Secretaries of the Air Force and Navy. This action would keep the BMGR in service, without either a predetermined termination date or requirement for future congressional action, until such time that the military need for the range ends.

Figure ES-1. BMGR Vicinity



A decision to allow the current withdrawal and reservation to expire would require military use of the BMGR land surface to cease after October 4, 2024. Although the airspace overlying the BMGR could continue to be used for some military aviation training and test activities, the loss of the land withdrawal and reservation would severely impact the abilities of the Air Force and Marine Corps to support the training necessary to prepare U.S. Armed Forces to fight effectively and decisively in air-ground warfare. The Air Force, Department of the Navy, and Marine Corps would be responsible for decommissioning range infrastructure, including Gila Bend AFAF, and decontaminating and cleaning up the expired BMGR in accordance with applicable law. Ultimately, the expired rangelands would likely be returned to Department of the Interior and Bureau of Land Management (BLM) administration to plan and manage future civil land use consistent with applicable law, environmental conditions, and public safety.

A congressional decision to approve the Gila Bend Addition to BMGR East would make this area available to support military operations at the Gila Bend AFAF and in other contiguous portions of BMGR East. The additional withdrawal would also have the effect of eliminating land use encroachment that may conflict with military uses. If Congress declines to authorize the Gila Bend Addition, the subject public lands would remain under Department of the Interior jurisdiction and continue to be managed by BLM for non-military purposes.

Process for Extending the BMGR Land Withdrawal

Extending the BMGR land withdrawal for military use and expanding BMGR East to include the Gila Bend Addition involves interconnected processes that are guided by the MLWA of 1999, Defense Withdrawal Act of 1958, Federal Land Policy and Management Act (FLPMA) of 1976 as implemented in accordance with 43 Code of Federal Regulations (CFR) Subpart 2310, and National Environmental Policy Act of 1969 (NEPA).

The Air Force and Marine Corps prepared this LEIS as co-lead agencies to address the potential environmental impacts of the proposed renewal of the land withdrawal for the BMGR. This final LEIS addresses comments received on the draft, and will be forwarded to Congress as part of the case file that will be submitted for congressional action on the proposed extension of the BMGR withdrawal and reservation and the addition to BMGR East.

Purpose of and Need for the BMGR

(Refer to Section 1.2)

The primary purpose of securing the BMGR for continuing national defense use after October 2024 is to maintain the readiness of the nation's air forces by retaining one of its premier ranges for training tactical air combat aircrews and other personnel to fight, survive, and win in the air-ground battlespace. Combat flying and other essential aircrew skills can be effectively developed and maintained only through ongoing training programs that are realistic and relevant to the tactical missions that aircrews are expected to perform. Likewise, continuous operational aviation testing is necessary to maintain and advance the capabilities of the tools available to aviators in combat. U.S. warfighting doctrine also

recognizes that success in the air-ground battlespace can only be achieved through an integrated and well-coordinated partnership between air and ground forces.

The BMGR, as one of the most capable and productive tactical aviation ranges available to U.S. Armed Forces, is needed to continue to provide essential support to U.S. Armed Forces both now and into the foreseeable future. The nation's investments in new types of tactical aircraft and the development of infrastructure to support tactical aviation training and other military purposes indicate that there is no foreseeable end to the continuing military need for the BMGR. The exceptional combination of assets that make the BMGR so valuable in supporting the contemporary and future training requirements of aircrews and associated ground-based combatants include:

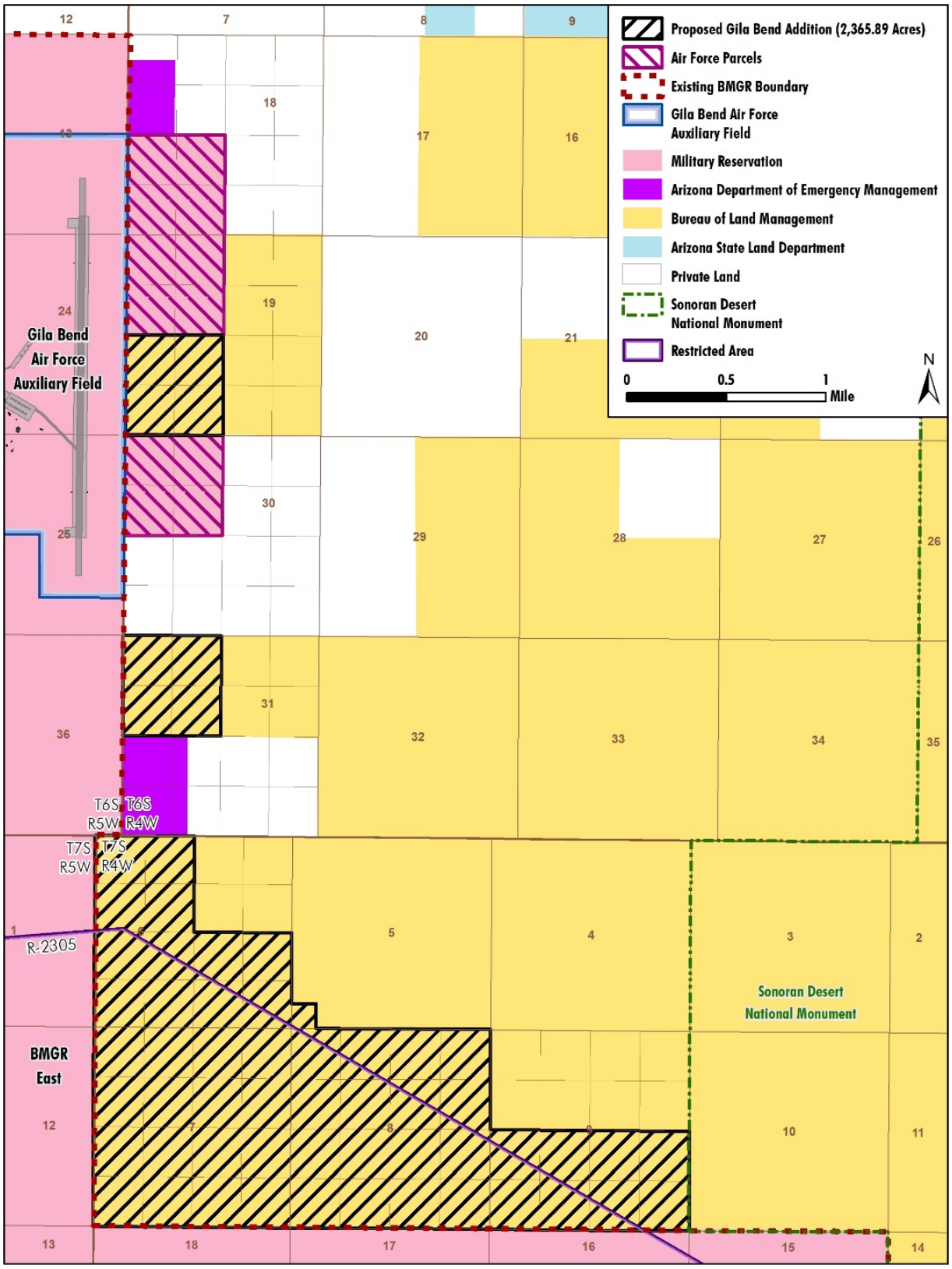
- Proximity to military aviation assets and regional Special Use Airspace
- Expansive restricted land and overlying Special Use Airspace
- Year-round flying weather
- Electronic training instrumentation
- Varied terrain

Purpose of and Need for the Gila Bend Addition to BMGR East

(Refer to Section 1.3)

The Gila Bend Addition to BMGR East would serve three distinct purposes. First, the quarter-section adjacent to Gila Bend AFAF (southwest quarter of Section 19) would enhance the security and safety of flight operations at Gila Bend AFAF. Second, the northwest quarter of Section 31 would encompass a portion of Accident Potential Zone-1 for Runway 17/35 at Gila Bend AFAF. Third, the remaining parcels of the Gila Bend Addition underlie the R-2305 restricted area and would provide the Air Force with land use and access control so that surface activities in these parcels remain compatible with training operations in the overlying airspace (Figure ES-2). The areas of the addition adjacent to Gila Bend AFAF are needed to meet airfield and anti-terrorism and force protection standards and requirements pursuant to Unified Facility Code 3-260-01, Airfield and Heliport Planning and Design; provide adequate operational security; ensure safety of flight operations; and protect the airfield from encroaching land use. The parcels underlying R-2305 are needed to ensure the full operability of R-2305 for supporting air-to-ground weapons training at Range 3 and East Tactical Range.

Figure ES-2. Proposed Gila Bend Addition



Public Scoping Process and Comments

(Refer to Chapter 6)

Preparation of an LEIS need not have a scoping process, per 40 CFR Section 1506.8(b)(1), but the Air Force and Marine Corps elected to provide for a public scoping period and announced this in the March 18, 2020, Federal Register Notice of Intent (NOI). While the planned public scoping meetings were cancelled because of the March 13, 2020 Presidential Proclamation declaring a national crisis due to COVID-19, a virtual version was provided by placing the scoping materials on the project website. Using an amended NOI and other notices, the public was encouraged to review project materials. The 77-day comment period extended through June 3, 2020.

During the scoping period, the Air Force and Marine Corps supported BLM in hosting two virtual public meetings on the land withdrawal application. Comments submitted on the proposed action to extend the land withdrawal and to expand the land withdrawal by about 2,366 acres as well as comments submitted to BLM on the withdrawal applications and land segregation process were considered in this LEIS.

Description of the Proposed Action and Alternatives

(Refer to Chapter 2)

The proposed actions addressed in this LEIS include extending the BMGR land withdrawal for continued military use after the current land withdrawal and reservation expires in October 2024 and expanding BMGR East to include the Gila Bend Addition. Two sets of four action alternatives are considered for implementing this proposed action. The four action alternatives in one set would each extend the existing BMGR land withdrawal without changes to its land area or boundary. The four action alternatives in the second set would each extend the existing land withdrawal of the range and would also extend the boundary of BMGR East to incorporate the Gila Bend Addition. The four action alternatives within each of the two sets differ from each other only as to the duration for which the BMGR land withdrawal and reservation would be extended (25 years, 50 years, or indefinitely) or as a result of transferring administrative jurisdiction for BMGR East and BMGR West from the Secretary of the Interior to the Secretaries of the Air Force and Navy, respectively.

Transferring administrative jurisdiction would make the BMGR a permanent DoD facility equivalent to the status of military bases. Like all permanent DoD facilities and installations, the BMGR would be retained until it is no longer needed for military purposes, at which time the range would be closed and transferred back to the Department of Interior. Transferring administrative jurisdiction would provide sustained, operational support for aviation and training, allow access to additional budgeting and DoD administrative processes, provide full accountability for the sustainable management of the land, and eliminate the expensive and time-consuming process of extending the reservation in the future.

Eliminating the need to process land withdrawal extensions for the BMGR would not reduce other ongoing and frequent processes for reassessing the continuing military need for the range including Integrated Natural Resources Management Plan (INRMP) updates, periodic Public Reports that

document military changes and proposed management actions, and NEPA documents when new actions are proposed. Existing natural and cultural resource protection, conservation, and management measures would continue to apply. Likewise, opportunities for Tribal, intergovernmental, and public review and comment on either the continuing need for the range or the quality of stewardship afforded to its resources would remain, including the Intergovernmental Executive Council that offers a collaborative forum for natural and cultural resource management concerns.

The alternatives analyzed in this LEIS include:

- Alternative 1: Extend the existing land withdrawal and reservation of the BMGR for 25 years (until 2049) with no boundary changes. The Secretary of the Air Force and the Secretary of the Navy would continue to manage the withdrawn public lands in BMGR East and BMGR West and consult the Secretary of the Interior before using the BMGR for non-reserved purposes.
- Alternative 1A: Alternative 1A proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 1, but the duration of the BMGR land withdrawal and reservation would be 50 years.
- Alternative 1B: Alternative 1B proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 1, but the duration of the BMGR land withdrawal and reservation would continue for an indefinite period of time until the Secretaries of the Air Force and Navy determine that the range is no longer needed for national defense purposes.
- Alternative 1C: Permanently transfer administrative jurisdiction of the lands currently comprising BMGR East and BMGR West from the Secretary of the Interior to the Secretary of the Air Force and the Secretary of the Navy, respectively.
- Alternative 2: Extend the existing land withdrawal and reservation of the BMGR for 25 years, but the BMGR East boundary would be extended to include the Gila Bend Addition. Management of the withdrawn public lands in the BMGR would continue as described for Alternative 1.
- Alternative 2A: Alternative 2A proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 2, but the duration of the BMGR land withdrawal and reservation, including the Gila Bend Addition, would be 50 years.
- Alternative 2B: Alternative 2B proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 2, but the duration of the BMGR land withdrawal and reservation, including the Gila Bend Addition, would continue for an indefinite period of time until the Secretaries of the Air Force and Navy determine that the range is no longer needed for national defense purposes.
- Alternative 2C: Permanently transfer administrative jurisdiction of the public lands comprising BMGR East and the Gila Bend Addition from the Secretary of the Interior to the Secretary of the Air Force and BMGR West to the Secretary of the Navy.

This LEIS also considers the No Action Alternative, which would allow the current land withdrawal to terminate in October 2024, as provided by the MLWA of 1999. The No Action Alternative would be

implemented if Congress decides the BMGR is no longer needed and chooses to neither extend the land withdrawal and reservation for the range nor transfer administrative jurisdiction for the public lands in the range from the Secretary of the Interior to the Secretaries of the Air Force and Navy. As previously stated, military use of the BMGR land surface would cease upon the expiration of the current withdrawal and reservation in October 2024, although military aviation training and test activities in the restricted airspace over the BMGR and Cabeza Prieta National Wildlife Refuge (CPNWR)/Cabeza Prieta Wilderness (CPW) could continue. The Gila Bend Addition would not be needed.

The Air Force's and Navy's preferred alternative is Alternative 2, which would extend the existing land withdrawal and reservation of the BMGR for 25 years, include the Gila Bend Addition in the new land withdrawal area, and maintain current land management responsibilities. Refer to LEIS Section 2.7 for details.

Existing Conditions

(Refer to Chapter 3)

The existing environment of the BMGR was inventoried so that the effect of each alternative could be assessed for their effects on the environment. Data collection included military airspace and range operations, civil air transportation, non-military and perimeter land use, utilities, ground transportation, traffic and traffic circulation, public access and recreation, earth resources, water resources, air quality, climate change, biological resources, cultural resources, noise, visual resources, hazardous materials and waste, public health and safety, socioeconomics, and environmental justice. This information describes the existing condition of these resources on the BMGR and Gila Bend Addition and provides a basis of comparison for determining and describing potential impacts.

Environmental Impacts

(Refer to Chapter 4)

Section 4 of the LEIS describes the potential environmental consequences for the considered alternatives. Table ES-1, Summary of Impacts, provides a brief description of the potential impacts associated with each alternative. Impacts that would occur under Alternatives 1, 1A, 1B, and 1C to the renewal of the BMGR land withdrawal equally apply as a result of Alternatives 2, 2A, 2B, and 2C, respectively. Consequently, the Alternatives 2, 2A, 2B and 2C column in Table ES-1 only reflects the impacts associated with the withdrawal of the Gila Bend Addition.

Table ES-1. Summary of Impacts

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Military Range and Airspace Operations	No changes in the use of the military land and airspace (major, beneficial, direct effect).	The Gila Bend Addition would allow full use of existing restricted airspace and prevent encroachment on Gila Bend AFAF (major, beneficial, direct impact).	All ground-based military operations would cease (major, adverse, direct impact). Military use of the airspace that does not require use of the range surface could continue (no impact). Testing/training would be relocated affecting other locations and increasing costs for travel (major indirect adverse impact).
Civil Air Transportation	No changes to regional airspace, air traffic control or flight procedures, or civil aviation access (no impact).	Same effects as Alternatives 1, 1A, 1B, and 1C (no impact).	No changes to regional airspace, air traffic control or flight procedures, or civil aviation access (no impact). Changes in the use of the BMGR Special Use Airspace (unknown effect).

[1] Impacts identified for Alternative 1 associated with extending the land withdrawal for the existing BMGR would also apply with Alternative 2. Similarly, impacts for Alternatives 1A, 1B, and 1C would also apply to Alternatives 2A, 2B, and 2C, respectively. All the Alternative 2 variants include extending the existing BMGR land withdrawal in addition to the impacts associated with the proposed withdrawal of the Gila Bend Addition, which are stated in the Alternatives 2, 2A, 2B, and 2C column of Table ES-1.

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Non-Military and Perimeter Land Use	No changes to existing non-military land uses within the BMGR. Existing INRMP processes would continue (no impact). Alternative 1C, the BLM would be relieved of its administrative obligations at the BMGR. The Department of the Interior would remain involved in the development and updates to the BMGR INRMP and in regional collaborative efforts including the BMGR Executive Council and Intergovernmental Executive Council (no impact).	Land management transfer to Air Force (no impact). Alternative 2C, administrative jurisdiction would transfer to the Air Force. Managed through the INRMP and Integrated Cultural Resources Management Plan (ICRMP) (no impact). The grazing allotee would be notified of the intent to not renew the permit, although grazing could continue for two years following this notification. No other appropriative land uses allowed (negligible, adverse, direct effect).	Management by BLM in accordance with FLPMA and a resource management plan (no impact).
Utilities	No direct or indirect impact to existing utilities would occur. DoD would not have the authority to pursue energy development under Alternatives 1, 1A, and 1B but could under Alternative 1C (no impact). Utilities cannot site facilities on BMGR which could result in additional costs (minor, adverse, indirect effect).	No utilities occur on the Gila Bend Addition (no impact). All other impacts same as Alternatives 1, 1A, 1B, and 1C.	Utility projects allowable at BLM discretion (nature and intensity of impact cannot be determined at this time).

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Ground Transportation, Traffic, and Traffic Circulation	There would be no changes to road use, traffic patterns, or public travel restrictions (no impact). Future development of public or private transportation systems precluded. Changes in technology could change in the hazard areas/use of publicly accessible roads (minor, adverse, direct impact).	The 5.72 miles of unpaved roads within the Gila Bend Addition would be closed to public travel except for grazing management (negligible, adverse, direct impact).	Current traffic patterns/public travel restrictions on former BMGR during decontamination (no impact). Future changes would be determined through the BLM planning process (nature and intensity of the impact cannot be determined at this time).
Public Access and Recreation	Existing public access and recreation would continue with a valid permit (no impact). Management of public access and recreational opportunities in accordance with the INRMP (no impact).	Recreational use of the Gila Bend Addition, if any, is minimal but would no longer be permitted (negligible, adverse, direct impact). Little to no change in demand because of abundant, higher quality recreational opportunities nearby (negligible, adverse, indirect impact).	Once decommissioned, access to new recreational areas may be available after all necessary decontamination (beneficial direct impact).

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Earth Resources	Less than 9 percent of BMGR subject to surface disturbance and most ground disturbance resulting in erosion is low intensity (minor, adverse indirect impact). Approximately 11 percent of the range was considered disturbed in the 1999 LEIS. The current 9 percent disturbance is due to the reduction in the Explosive Ordnance Disposal clearance areas and closure of roads. While mining is precluded from the BMGR, no rare earth elements with high potential to occur at the BMGR (negligible, adverse, direct impact).	Limited driving on unpaved roads could contribute to erosion on the Gila Bend Addition (negligible, adverse, indirect impact). No mineral extraction would be allowed (negligible, adverse, direct impact).	Substantial ground disturbance associated with decommissioning (minor to major, adverse direct impact). Other ground-disturbing uses could be permitted including mineral extraction (nature and intensity of these future impacts cannot be determined at this time).
Water Resources	Ongoing activities contributing to erosion/sedimentation would continue to affect surface water quality (minor, adverse, indirect effect). Potential for groundwater contamination would be unchanged (negligible, adverse, direct impact). Water rights for wildlife management would continue (no impact).	No new activities/infrastructure that would affect water quantity, groundwater, or water rights (no impact). Use of dirt roads could affect surface water quality due to increased sedimentation (negligible, adverse, indirect impact). No new water rights would be sought (no impact).	Military water use would reduce and eventually cease (minor, beneficial, direct impact). Ground disturbance from decommissioning BMGR could result in decreased surface water quality due to sedimentation (major, adverse, indirect impact). Ground-disturbing activities currently precluded may be permitted (nature and intensity of these future impacts cannot be determined at this time). Water rights for wildlife management would continue (no impact).

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Air Quality	Current operations to remain the same, including emissions and dust from ongoing operations; no changes in criteria pollutant, hazardous air pollutant, or greenhouse gas emissions would occur (ongoing minor, adverse, direct impact).	No air quality impact associated with the withdrawal of the Gila Bend Addition (no impact).	Military-generated emissions would be reduced. Necessary training relocated to other facilities increasing travel or relocations. Emissions at BMGR would be displaced rather than eliminated. Nature and intensity of these future impacts cannot be determined at this time. New activities could affect air quality in the future (context and intensity of these impacts is also unknown at this time).
Climate Change	Climate change could exacerbate conditions that affect military training and individual resources (e.g., wildfire risk, extreme temperatures, etc.) (minor, adverse, indirect impact).	While climate change would continue to increase stress on wildlife and vegetation and make soils more vulnerable to erosion within the Gila Bend Addition, such effects would not be the result of withdrawing the land. Because the Air Force proposes no development or use of the land, climate change would have no effect on the proposed action to withdraw it.	Reduction of greenhouse gas emission due to military activities. Determining future use and impacts on or contribution to climate change is speculative (context and intensity of these impacts is also unknown at this time).

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Biological Resources	Military surface use moderately or completely disturbs 33,000 acres of vegetation. Major to complete loss of vegetation is limited to less than 2 percent of the range (minor to major, adverse, direct and indirect impact). Military activities result in mortality, injury, or disturbance to wildlife and their habitat (minor, adverse, direct impact); bird strikes near auxiliary fields/airports (negligible, adverse, direct impact). Military activities disturb, startle, and may injure/kill Sonoran pronghorn; conservation measures developed with USFWS/recovery team reduce the potential for affecting this species (minor, adverse, direct impact). No activity where acuña cactus occurs (no direct impact); fires could affect habitat (negligible, adverse, indirect impact). Limited to no activities in Peirson's milk-vetch habitat (no impact to negligible adverse direct impact). Training and noise affect flat-tailed horned lizard; impacts managed through conservation agreement (minor adverse direct impact). Military activities can harm/kill Sonoran desert tortoise by disturbing burrows, startling, and direct contact; conservation measures minimize effect (minor, adverse, direct, impact).	No military activity on the Gila Bend Addition; withdrawal would preclude other ground-disturbing activities; grazing would be phased out (negligible, beneficial, indirect impact to vegetation). Cessation of grazing and reduced human activity would benefit the Sonoran pronghorn (negligible, beneficial, indirect impact). Peirson's milk-vetch, acuña cactus, flat-tailed horned lizard, and Sonoran desert tortoise habitat does not occur (no impact).	Military activities would cease as would military-supported conservation measures supporting wildlife and special-status species which could affect funding to continue these measures. Arizona Game and Fish Department maintenance of wildlife resources, including water catchments, hunting programs, and surveying for species would continue (moderate, adverse, direct impact). Decommissioning activities may adversely affect vegetation, wildlife, habitat, and special status species (context and intensity of these impacts is unknown at this time). Potential future use, assuming multiple-use management under the public land laws, would likely have a greater adverse effect on biological resources than military use by impacting land presently in a native desert condition.

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Cultural Resources	No change in treatment of/coordination regarding cultural resources. Disturbance to cultural resources could occur (moderate, adverse, direct impact). Recreational use could result in activities such as vandalism, looting, and parking or camping on sites. Based on a survey of roads in Area B and Bender Springs, approximately 50 percent of cultural sites have been adversely affected by recreational activities (moderate, adverse, indirect impact).	No military operations aside from use of dirt roads would occur; restricted public access limits disruption of resources (minor to moderate beneficial, direct impact). Trampling of intact resources due to grazing could occur (negligible to low, adverse direct impact).	Extent of decontamination and future uses under BLM management are unknown (effect on cultural resources cannot be determined at this time).
Noise	No changes to the existing operational noise footprint; ongoing noise would continue to extend outside the range affecting a residential area (moderate, adverse, direct impact) Use of Military Training Routes would continue (minor, adverse, indirect impact).	No expansion of existing noise footprint (no impact). Withdrawal would inhibit encroachment of incompatible land uses (minor, beneficial, indirect impact).	Aviation training would be reduced; use of Military Training Routes could continue. The noise footprint would be reduced (minor to moderate, beneficial, direct and indirect impact).
Visual Resources	No change in the visual character of BMGR (ongoing minor, adverse, direct impact). Preservation of large tracts of native Sonoran Desert would continue (moderate, beneficial, direct impact).	No change to the landscape of the Gila Bend Addition; withdrawal would preclude other uses that could alter the landscape (minor to moderate, beneficial, direct impact).	Infrastructure would be removed but decommissioning could introduce new roads/disturbance; full rehabilitation to a natural landscape unlikely (minor, beneficial, direct impact). Future permissible activities could affect visual resources (nature and intensity of the impact cannot be determined at this time).

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Hazardous Materials and Waste	Ongoing hazardous waste/material generation, storage, and management would continue, along with the managing programs and practices for safe use, storage, transport, and disposal (no impact based on ongoing practices; minor adverse impact from past or potential accidental releases until fully mitigated). Munitions Constituents (MC) releases do not extend off the BMGR; future releases unlikely (ongoing negligible, adverse direct effect).	No hazardous materials or hazardous waste sites present on the Gila Bend Addition; no military use, generation, or storage would occur (no impact).	Hazardous material storage and waste removed during decommissioning (minor, beneficial, direct impact). Future uses permitted could use/ generate hazardous materials/waste (nature and intensity of the impact cannot be determined at this time).
Public Health and Safety	Ongoing training and testing and existing environmental hazards that may pose a risk to public health and safety would continue; risks are minor unless the public or border crossers access unauthorized use areas (ongoing minor, adverse direct and indirect impact).	The Gila Bend Addition would enhance the safety of flight operations (moderate, beneficial direct effect).	Military hazards would be reduced (major, beneficial, direct effect), but the extent and effectiveness of decontamination is unknown resulting in an unknown degree of risk. Non-military hazards would continue to exist (ongoing minor, adverse, indirect impact).
Socioeconomics	Growth and urbanization would lead to more diversified regional economy reducing relative BMGR contribution over time. The ongoing employment, economic activity, and services associated with BMGR would continue (major, beneficial, direct and indirect impact).	Gila Bend Addition would not affect the socioeconomics of the area (no impact).	Elimination of the BMGR would affect employment, economic activity, and services in perimeter communities and communities with military installations that regularly use the BMGR (major, adverse, direct and indirect impact).

Resource	Alternatives 1, 1A, 1B, and 1C	Alternatives 2, 2A, 2B, and 2C[1]	No Action
Environmental Justice	Military operations at the Gila Bend AFAF would continue to generate noise levels that affect up to 15 residences in an area with a disproportionate percentage of minority populations. While this is a moderate effect on the residences affected, the overall environmental justice impact is minor because less than 1 percent of the residences in the minority community are affected (minor, adverse, indirect impact).	Gila Bend Addition would not affect the minority population or noise generation (no impact).	Military noise footprint would be greatly diminished and would no longer extend to the minority residential area percentage (minor, beneficial, direct impact). Future uses and associated potential noise are unknown (nature and intensity of the impact cannot be determined at this time).

1 Purpose of and Need for Action

1.1 Introduction

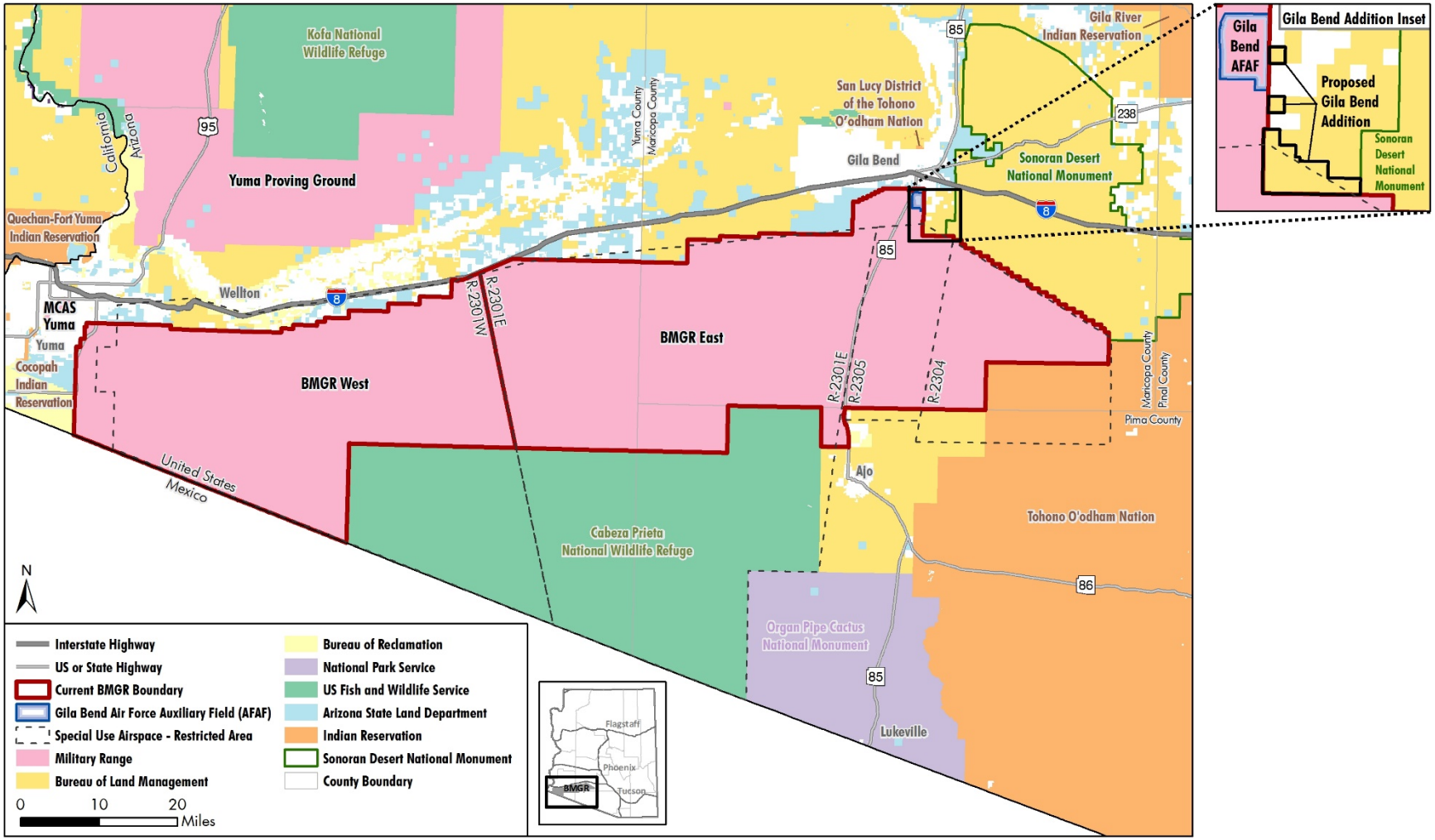
The Barry M. Goldwater Range (BMGR), located in southwestern Arizona (Figure 1.1-1), has served as a military training range since it was first established to train United States (U.S.) pilots and other aircrew members during World War II. Eighty years later, the BMGR is one of the nation's most capable and productive training ranges and remains indispensable to the ability of the U.S. Armed Forces to produce the combat-ready aircrews needed to defend the nation and its interests. Although aircrew training is the predominant mission of the BMGR, the range is also vital for preparing other personnel and units that perform a wide diversity of missions relevant to the air-ground battlefield and is routinely used for operational testing activities (also referred to as operational test or testing and evaluation).

The BMGR boundary encompasses approximately 1,743,677 acres (about 2,724 square miles), of which about 1,659,622 acres of federal public land are withdrawn from public use and reserved for military training and testing, approximately 1.5 acres are non-federally owned inholdings, and approximately 84,054 acres are Department of Defense (DoD) lands. Although the BMGR has been in operation since it was established in 1941, withdrawal of the range is not permanent and requires periodic extensions. Most recently, the Military Lands Withdrawal Act of 1999 (MLWA), (Public Law [P.L.] 106-65) extended the BMGR withdrawal for 25 years. The MLWA of 1999 withdrew the federal public land that comprise more than 95 percent of the BMGR as one military range but reserved the eastern and western portions of the range for separate use by the Secretaries of the Air Force and Navy, respectively. The eastern and western portions of the range are designated as BMGR East and BMGR West (Figure 1.1-1).

The MLWA of 1999 provides that:

> The lands withdrawn … for the Barry M. Goldwater Range East are reserved for use by the Secretary of the Air Force, and for the Barry M. Goldwater Range West are reserved for use by the Secretary of the Navy, for—
>
> (A) an armament and high-hazard testing area;
>
> (B) training for aerial gunnery, rocketry, electronic warfare, and tactical maneuvering and air support;
>
> (C) equipment and tactics development and testing;
>
> (D) other defense-related purposes consistent with the purposes specified in this paragraph (P.L. 106-65 Section 3031(a)(2)).

Figure 1.1-1. BMGR Vicinity



The U.S. Air Force (Air Force) is the administrator and primary user of BMGR East, and the U.S. Marine Corps (Marine Corps), a component of the Department of the Navy, is the administrator and primary user of BMGR West. BMGR East encompasses approximately 60 percent of the total range, and BMGR West includes the remaining 40 percent (Figure 1.1-1). BMGR East is administered by the Air Force, Air Education and Training Command, 56th Fighter Wing (56 FW), which is also the host command at Luke Air Force Base (AFB), Glendale, Arizona. The 56th Fighter Wing Range Management Office (56 RMO) manages and operates BMGR East. BMGR West is administered by Marine Corps Air Station (MCAS) Yuma, in Yuma, Arizona. The MCAS Yuma Range Management Department manages and operates BMGR West. BMGR East and BMGR West support other branches of the U.S. Armed Forces, as well as the U.S. National Guard, U.S. Reserves, and select allied military forces to meet critical training requirements of aircrews and other personnel.

In accordance with the MLWA of 1999, the current land withdrawal and reservation of the BMGR will terminate on October 4, 2024. The Act also provides that the Secretaries of the Air Force and Navy shall notify Congress and the Secretary of the Interior, by no later than October 2021, concerning whether the Air Force or Department of the Navy will have a continuing military need for part or all of the BMGR after the current withdrawal terminates (P.L. 106-65 Section 3031(e)). The Secretaries of the Air Force and Navy have determined that both BMGR East and BMGR West will remain indispensable for developing and maintaining warfighting skills of Air Force, Marine Corps, Department of the Navy, U.S. Army (Army), National Guard, and allied nations' aviation forces. Secretaries of the Air Force and Navy find that there is no foreseeable end for the continuing military need for the BMGR and provided notice of this need to Congress and the Secretary of the Interior in December 2017.

The process to keep the BMGR available for national defense purposes after October 2024 was continued through the submission of an Application for Withdrawal Extension by the Secretaries of the Air Force and Navy to the Secretary of the Interior in December 2018. A companion land withdrawal application for an addition to BMGR East of approximately 2,366 acres of public land was submitted by the Secretary of the Air Force to the Secretary of the Interior in April 2019. Both applications were prepared in accordance with P.L. 106-65 Section 3031(e), the Defense Withdrawal Act of 1958 (43 United States Code [U.S.C.] Section 156), and federal regulations for processing land withdrawal applications (43 *Code of Federal Regulations* [CFR] Subpart 2310).

1.1.1 Decisions to Be Made

Congress will be asked to make two decisions, which are addressed as proposed actions in this Legislative Environmental Impact Statement (LEIS), regarding the continuing military need for the BMGR after the expiration of the current land withdrawal and reservation. Congress will be asked to:

- Reauthorize the BMGR for the same military training and testing purposes for which it is currently reserved
- Expand BMGR East through the addition of about 2,366 acres of public land adjacent to Gila Bend Air Force Auxiliary Airfield (AFAF) (hereafter, Gila Bend Addition), if military use of the BMGR is reauthorized

Congress may authorize continued use of the BMGR for tactical air combat training and other defense-related purposes by extending the existing land withdrawal and reservation for either a defined or indefinite period of time. Congress could also keep the BMGR available for national defense purposes by transferring administrative jurisdiction for the public land in the range from the Secretary of the Interior to the Secretaries of the Air Force and Navy. This action would keep the BMGR in service, without either a predetermined termination date or requirement for future congressional action, until such time that the military need for the range ends.

A decision to allow the current withdrawal and reservation to expire would require military use of the BMGR land surface to cease after October 4, 2024. Although the airspace overlying the BMGR could continue to be used for some military aviation training and test activities, the loss of the land withdrawal and reservation would severely impact the abilities of the Air Force and Marine Corps to support the training necessary to prepare U.S. Armed Forces to fight effectively and decisively in air-ground warfare. The Air Force, Department of the Navy, and Marine Corps would be responsible for decommissioning range infrastructure, including Gila Bend AFAF, and decontaminating and cleaning up the expired BMGR in accordance with applicable law. Ultimately, the expired range lands would likely be returned to Department of the Interior (DOI) and Bureau of Land Management (BLM) administration to plan and manage follow-on civil land use consistent with applicable law, environmental conditions, and public safety.

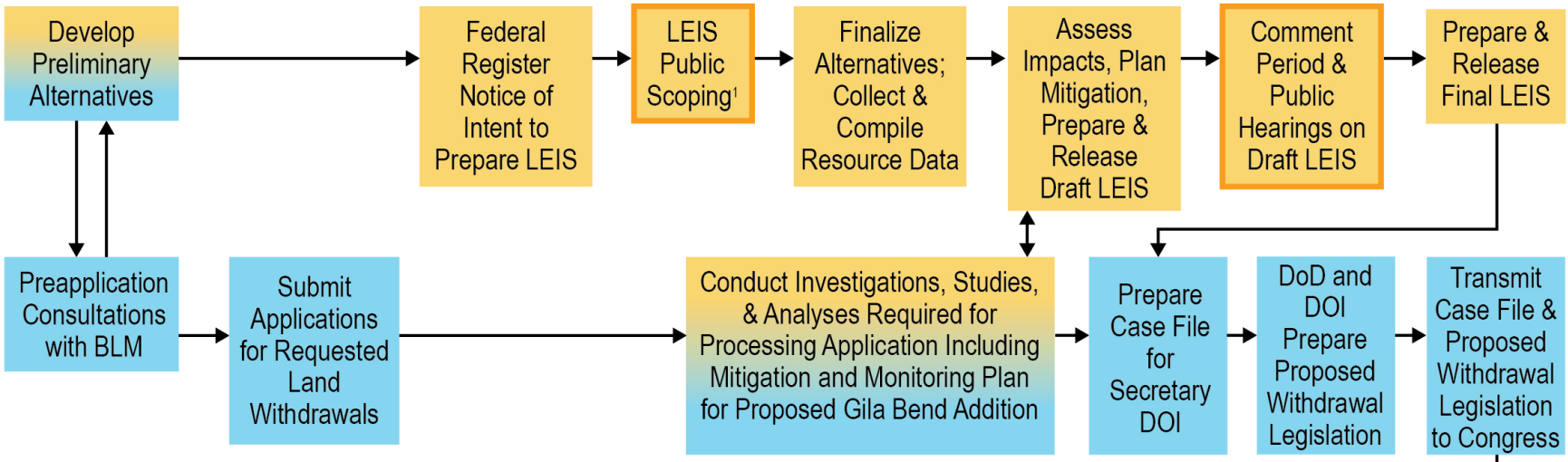
A congressional decision to approve the Gila Bend Addition to BMGR East would make this area available to support military operations at Gila Bend AFAF and in other contiguous portions of BMGR East. If Congress declines to authorize the Gila Bend Addition, the subject public lands would remain under DOI jurisdiction and continue to be managed by BLM for non-military purposes.

1.1.2 Process for Reauthorizing the BMGR

Reauthorizing the BMGR for military use and expanding BMGR East to include the Gila Bend Addition involves interconnected processes that are guided by the MLWA of 1999, Defense Withdrawal Act of 1958, Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. Sections 1701-1787 and as codified at 43 CFR Subpart 2310), and National Environmental Policy Act of 1969 (hereafter, NEPA [42 U.S.C. 4321-4370(h)]).

These interconnected processes share certain functions, are mutually supportive, and afford the public with opportunities to comment on the proposed reauthorization and expansion of the BMGR (Figure 1.1-2). The public may also comment on the content and suitability of the assessment processes.

Figure 1.1-2. Process for the Proposed Reauthorization and Expansion of the BMGR



LEGEND

DOI Land Withdrawal Process (43 Code of Federal Regulations 2300)

National Environmental Policy Act Process (42 U.S. Code 4332)

Public Involvement Opportunity

Congressional Action

BLM - Bureau of Land Management
BMGR - Barry M. Goldwater Range
DOI - Department of the Interior
LEIS - Legislative Environmental Impact Statement

[1] Not required for an LEIS per 40 CFR §1506 8(b)(1), but an opportunity for public scoping input was provided.

This LEIS was prepared in accordance with the Council on Environmental Quality (CEQ) Regulations (40 CFR Part 1500) for Implementing NEPA and satisfies the 40 CFR 1506.8(a) requirement for a proposal for legislation. The 1978 version of the CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508) was used because the Notice of Intent (NOI) and scoping had been previously issued on this LEIS prior to the September 14, 2020 implementation of the CEQ's updated NEPA regulations. The Air Force and Marine Corps prepared this LEIS as co-lead agencies. An LEIS, rather than an administrative Environmental Impact Statement (EIS), has been prepared because the proposed extension of the withdrawal and reservation requires congressional action for implementation. A Record of Decision, the decision-implementing instrument for an administrative EIS, will not be prepared for this action. For the LEIS process, Congress is the decision maker. Congress will express its decision by either passing legislation to address its selected alternative or declining to take action, allowing the existing withdrawal and reservation to expire without extension.

The LEIS is one component of the land withdrawal case file to be submitted to Congress. Other components of the case file include:

- A report identifying the present users of the lands involved, explaining how the users will be affected by the proposed use and analyzing the manner in which existing and potential resource uses are incompatible with or conflict with the proposed use of the lands and resources that would be affected by the requested action
- A report specifying water requirements and if the applicant has acquired or proposes to acquire water rights to use water
- A report on cultural resources prepared in accordance with 36 CFR Part 800 or incorporation of such in the NEPA document
- The identification of roadless areas or roadless islands having wilderness characteristics as described in the Wilderness Act of 1964 (16 U.S.C. 1131, *et seq.*), which exist within the area covered by the requested withdrawal action
- A mineral resource analysis prepared by a qualified mining engineer, engineering geologist, or geologist
- A letter to the U.S. Fish and Wildlife Service (USFWS) Arizona Ecological Services Office confirming compliance with Section 7 of the Endangered Species Act regarding listed or proposed endangered or threatened species at the BMGR
- An analysis of the economic impact of the proposed uses and changes in use associated with the requested action on individuals, local communities, and state and local government interests
- A statement as to the extent and manner in which the public participated in the environmental review process, or incorporation of such in the NEPA document
- A statement as to whether the lands involved are floodplains or are considered wetlands and whether the existing and proposed uses would affect or be affected by such floodplains or wetlands

- A statement of the consultation which has been or will be conducted regarding the requested action, or incorporation of such in the NEPA document

Most of the other components, including the separate land withdrawal applications for the existing BMGR and the proposed Gila Bend Addition that were submitted to BLM, were prepared in accordance with 43 CFR Subpart 2310 (Figure 1.1-2). The MLWA of 1999 requires preparation of an Integrated Natural Resources Management Plan (INRMP) and a Public Report for the BMGR and updates of these documents on an approximately 5-year cycle (P.L. 106-65 Section 3031(b)(3) and (5)). In accordance with the MLWA of 1999, the application for extending the existing BMGR land withdrawal will include the most recent Public Report (P.L. 106-65 Section 3031(e)(2)(B)).

The Public Report is a regularly scheduled stewardship reporting requirement, unique to the BMGR. The most recent edition of the Public Report is available by accessing the Luke AFB website[1], selecting 56th Range Management Office from the "Units" drop-down menu, clicking on Environmental Sciences Management, and selecting 2018 Public Report[2].

Upon completing their reviews of the Final LEIS and other components of the case file, DoD and DOI will jointly prepare proposed land withdrawal legislation for the BMGR and Gila Bend Addition for submittal to Congress (Figure 1.1-2).

1.2 Purpose of and Need for the BMGR

1.2.1 Continuing and Future Requirements for the BMGR

The primary purpose of securing the BMGR for continuing national defense use after October 2024 is to maintain the readiness of the nation's air forces by retaining one of its premier ranges for training tactical air combat aircrews and other personnel to fight, survive, and win in the air-ground battlespace. Air combat is among the most technologically advanced and tactically challenging forms of warfare. No participant in any form of tactical aviation is likely to survive, much less prevail in combat, without superior training. Combat flying and other essential aircrew skills can be effectively developed and maintained only through ongoing training that is realistic and relevant to the tactical missions that aircrews are expected to perform. Likewise, continuous operational aviation testing is necessary to maintain and advance the capabilities of the tools available to aviators in combat. U.S. warfighting doctrine also recognizes that success in the air-ground battlespace can only be achieved through an integrated and well-coordinated partnership between air and ground forces. The level of training needed for ground-based warfighters to achieve operational readiness in this partnership must be no less realistic or rigorous than that required for the aviation element.

The BMGR, as one of the most capable and productive tactical aviation ranges available to U.S. Armed Forces, is needed to continue to provide essential support to U.S. Armed Forces both now and into the foreseeable future.

[1] https://www.luke.af.mil/

[2] https://www.luke.af.mil/Portals/58/Documents/2018%20BMGR%20Public%20Report_Final_092518-ilovepdf-compressed%20(1).pdf

The nation's investments in new types of tactical aircraft and the development of infrastructure to support tactical aviation training and other military purposes indicate that there is no foreseeable end to the continuing military need for the BMGR. The Air Force has embarked on a long-term program to eventually replace its legacy F-15, F-16, and A-10 aircraft with the new F-35A, a 5th Generation jet fighter aircraft. In 2012, the Air Force decided to relocate F-16 primary training from Luke AFB to other installations to make room for the F-35A primary training program at Luke AFB.

Luke AFB is home to the 56 FW, which currently operates a combination of F-16s and F-35As. The 56 FW produces approximately 225 pilot graduates annually. By 2025, the 56 FW is projected to operate a total of 26 F-16s and 144 F-35As. The F-35A will be called upon to dominate the aerial combat battlespaces for at least the next two decades, ensuring U.S. air superiority during times of conflict. F-35A pilot graduates at Luke AFB must be proficient in a variety of complex mission sets, many of which call for engaging enemy assets at much greater distances than was possible in the past. This combined with the F-35A's highly advanced and long-range engagement capabilities drive a need for large volumes of airspace and range areas to support training. The proximity of the BMGR and its associated special use airspace (SUA) was a major factor in the F-35A basing decision. Although the F-35 is expected to remain in frontline service for a number of decades, the development of sixth generation, manned-fighter aircraft to maintain U.S. air dominance continues unabated. Aircrews piloting these follow-on aircraft, together with the continuing active fleet, will continue to require the training capabilities at BMGR East into the future.

The F-16 will continue to impact future combat operations as one of the most versatile air-to-air and air-to-ground platforms ever built. The 162nd Wing, at Morris Air National Guard (ANG) Base in Tucson, will continue to be the host for all F-16 primary training for the ANG, and will continue to be a regular user of BMGR East. Since 1981, the 162nd Wing has also been home to the ANG - Air Force Reserve Command (AFRC) Test Center (AATC), which conducts testing and tactics development and evaluation. Several types of AATC aircraft regularly fly test missions at BMGR East. These missions are environmentally indistinguishable from those flown by training and operational units flying the same type of aircraft.

The 355th Wing at Davis-Monthan AFB in Tucson is the center for primary and operational readiness training of A-10/OA-10 pilots and a regular daily user of BMGR East. Tenant units at Davis-Monthan, which are also regular BMGR East users, include the AFRC 924th Fighter Group, 563rd Rescue Group and AFRC 943rd Rescue Group. The AFRC 924th Fighter Group supplements the 355th Wing in providing primary and operational readiness training of A-10/OA-10 pilots. The two rescue groups are critical components of the Air Force's personnel recovery capability. Their comprehensive training includes both air and ground activities, and the BMGR East provides a variety of facilities and capabilities to support them.

Several recent Marine Corps aircraft replacement and upgrade programs demonstrate a significant national defense reinvestment, which in turn signifies a long-term need for the BMGR. In 2010, the Marine Corps decided to base six F-35B squadrons each at MCAS Yuma and MCAS Miramar (near San Diego, California), replacing legacy AV-8B and F/A-18A/C/D aircraft. One year earlier, the Marine Corps decided to base up to two squadrons of MV-22 tiltrotor aircraft at MCAS Camp Pendleton (near Oceanside, California) and eight squadrons at MCAS Miramar, replacing legacy CH-46E helicopters.

Other upgrade programs for Marine Corps aircraft include ongoing replacements of older KC-130F/R/T Hercules tanker/transports with the KC-130J Super Hercules, replacements of AH-1W Super Cobra attack helicopter with the AH-1Z Viper, and replacement of the UH-1N Huey utility helicopter with the UH-1Y Venom. Further, the Marine Corps has embarked on a program to install all KC-130Js with surveillance and targeting systems and precision-guided bombs and/or air-to-ground missiles and 30-millimeter cannons. These weapons would allow equipped KC-130Js to provide airborne overwatch surveillance and, if necessary, ground support fire to ground troops in locations that would present minimal air defense threats to these aircraft. Finally, the Marine Corps has embarked on a program to replace its CH-53E Super Stallion heavy lift helicopters with the upgraded CH-53K King Stallion. All of these new aircraft types have replaced or will replace older variants based at MCAS Yuma, MCAS Miramar, and/or MCAS Camp Pendleton. Major infrastructure investments and improvements have been implemented at these air stations to support these aircraft.

Additionally, construction of an Auxiliary Landing Field with support facilities was completed in BMGR West in 2015 to support F-35B Field Carrier Landing Practice training. When completed, the aforementioned aircraft replacement and upgrade programs will redefine the Marine Corps' tactical aircraft fleet. These investments demonstrate the Marine Corps' continuing need for the highest quality of tactical aviation training for decades to come.

Congress took action in 2014 to address a part of this need by transferring administrative jurisdiction for 225,651 acres of public lands from the Secretary of the Interior to the Secretary of the Navy to secure the availability of the Chocolate Mountain Aerial Gunnery Range (CMAGR) to support tactical aviation training (Public Land Order No. 7861). The CMAGR is a live-fire training range located in Imperial and Riverside counties in California about 35 miles northwest of Yuma, Arizona. The transfer had the effect of ensuring the availability of the CMAGR for training until such time that the Department of the Navy and Marine Corps determine that there is no longer a need for the range. However, transfer of the CMAGR addresses only a part of the long-term training support needs of Marine Corps tactical aviation. The CMAGR can support certain essential training requirements, but the long-term availability of BMGR West is also critical if the Marine Corps is to continue to have the training capabilities and capacities to provide combat-ready aircrews, Aviation Combat Elements, and Marine Air-Ground Task Forces.

Like the AATC, the Marine Corps' Marine Operational Test and Evaluation Squadron 1 (VMX-1) conducts testing and tactics development and evaluation at the BMGR. VMX-1 supports F-35B, MV-22, and CH-53K aircraft test functions including building operational tactics guides, and developing tactics, techniques, and procedures for tactical aircraft.

Yuma Proving Ground (YPG) has used the BMGR to test long-range artillery (refer to Table 5.1-1 for additional information regarding YPG's use of BMGR). As the next generation of long-distance weapons is developed to address the battlefield needs of the services, very few ranges in the DoD inventory could support their test and evaluation requirements. A proposed expansion beyond current parameters would necessitate its own NEPA analysis.

The foregoing assessment of future training and testing requirements demonstrates that the foreseeable need for the BMGR would continue for many decades. This conclusion is based not only on the projected service lives of the fighter, attack, tactical airlift, and combat search and rescue aircraft currently in or entering the nation's air combat fleets, but also on planning and active development that

is ongoing for the next generation of manned aircraft that will begin to replace current aircraft within two or more decades. The concepts for future combat aircraft that are emerging show that the airborne and ground-based personnel that will operate these aircraft and associated systems will continue to need training in realistic range environments -- a need that extends the foreseeable requirements for the BMGR well into the next century.

1.2.2 Significant Attributes of the BMGR

The exceptional combination of assets that make the BMGR so valuable in supporting the contemporary and future training requirements of aircrews and associated ground-based combatants include:

- Proximity to military aviation assets and regional SUA
- Expansive restricted land and overlying SUA
- Year-round flying weather
- Electronic training instrumentation
- Varied terrain

1.2.2.1 Proximity to Military Aviation Assets and Regional Special Use Airspace

The BMGR is centrally located within a regional complex of military air bases, other ranges, and other SUA that provide diverse and integrated support for tactical aviation and related training (Table 1.2-1 and Figure 1.2-1). A comprehensive Air Force study showed that from World War II through 2000, proximity of air bases to airspace and ranges was among the most important elements for supporting cost effective and high-quality training (Shaw 2004). Air bases provide the academic, technical, materiel, command and control, military and nonmilitary community, and other support functions necessary to keep aircrews and aircraft flying. Military ranges support training for tactical aircrews and facilitate the development of air combat tactics needed to meet emerging threats. Shaw's work showed that air bases and ranges located in proximity to each other optimize productive training time and minimize expensive, noninstructional flight time to and from the range. Ideally, air bases and ranges should be close enough for an aircraft to depart its home installation, sortie to the range, have sufficient training flight time (typically 40 to 50 minutes at the BMGR), and return to base without the need to refuel.

Each air base can host only a limited number of aircraft types, personnel and dependents, and provide needed infrastructure, service, and administrative support. Fixed-wing aircraft from two Air Force bases, two ANG bases, and two Army Airfields (AAFs), two MCASs, one Naval Air Station, one Naval Air Facility, and Department of the Navy aircraft carriers off the Pacific Coast can reach the BMGR, train, and return without refueling (Table 1.2-1 and Figure 1.2-1).

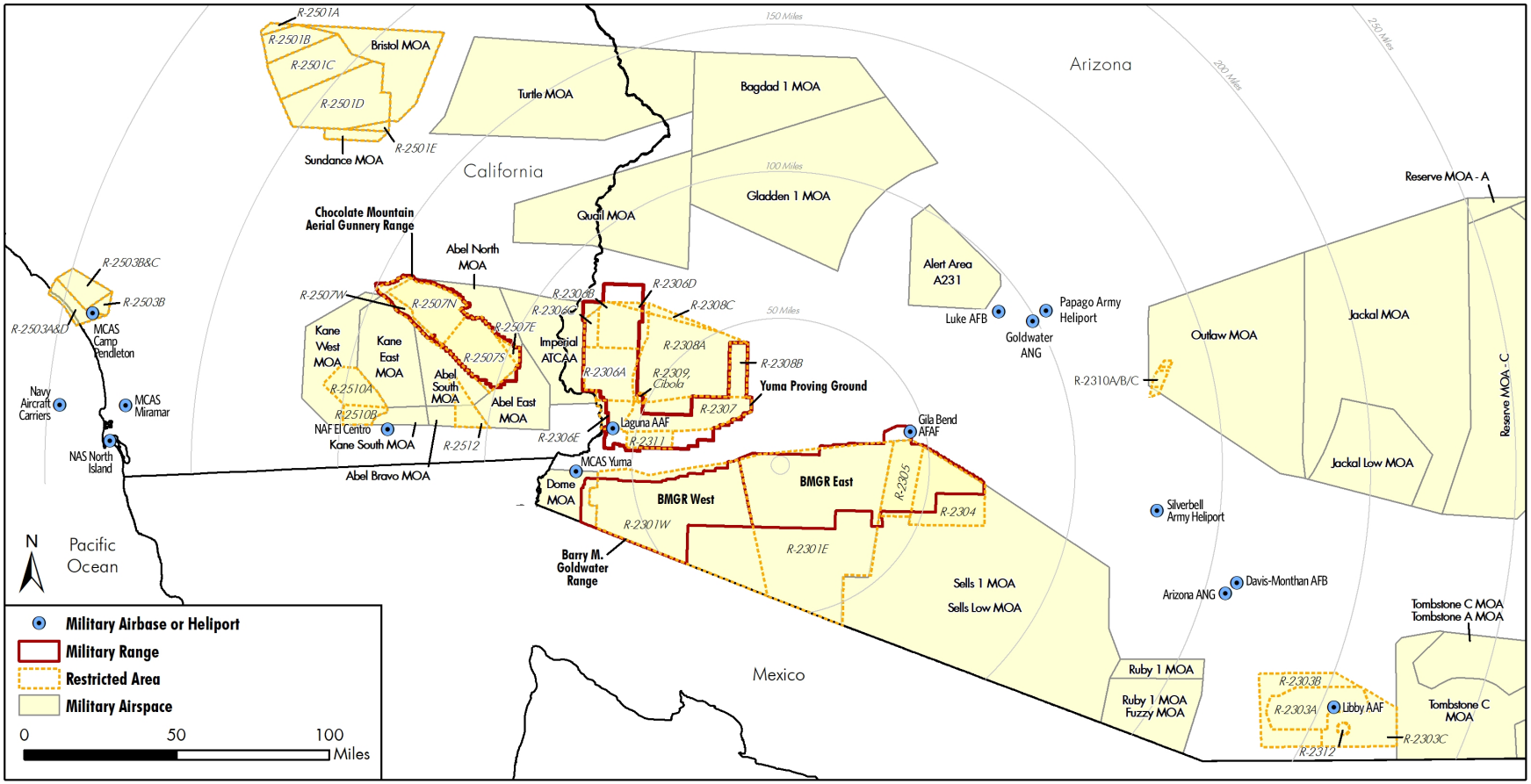
Table 1.2-1. Military Air Bases and Auxiliary Airfields within the BMGR Operating Region

Military Branch	Military Air Base/Facility	Remarks
Air Force	Luke AFB, 56 FW, Glendale, Arizona, BMGR East Host Command	56 FW and AFRC 944th FW – BMGR East regular user
	Davis-Monthan AFB, Tucson, Arizona	355 Wing, 944th FW, AFRC 924th Fighter Group, 563rd Rescue Group, AFRC 946rd Rescue Group – BMGR East regular user
	Gila Bend AFAF, Gila Bend, Arizona	BMGR operations and maintenance, emergency aircraft recoveries, forward airfield for fixed-wing aircraft training, forward heliport for helicopter training
Marine Corps	MCAS Yuma, Yuma, Arizona, BMGR West Host Command	Marine Aircraft Group-13, Marine Corps Forces Reserve VMFT-401 – BMGR West regular user
	MCAS Miramar, San Diego, California	3rd Marine Aircraft Wing – BMGR West regular user
	MCAS Camp Pendleton, Oceanside, California	Marine Aircraft Group-39 – BMGR West regular user
Navy	Naval Air Station North Island, San Diego, California	Homeport for Navy aircraft carriers, BMGR West periodic user
	Naval Air Facility El Centro, California	Forward deployment airfield for Navy/Marine Corps pilot training, BMGR West periodic user
	Pacific Fleet Aircraft Carriers	BMGR West user
Army	Libby AAF, Fort Huachuca, Arizona	Forward/outlying AAF for ARNG airlift training and Air Force fighter aircrew training, BMGR periodic user
	Laguna AAF, YPG, north of Yuma, Arizona	Supports exercises, such as the Marine Corps Weapons and Tactics Instructor (WTI) course, conducted at BMGR
Arizona ANG	Goldwater Arizona ANG Base, Phoenix, Arizona	ANG 161st Air Refueling Wing, BMGR training support, but not an in-range user
	Morris ANG Base, Tucson, Arizona	ANG 162nd Wing – BMGR East regular user
Arizona ARNG	Silverbell Army Heliport, Marana, Arizona	ARNG helicopter training – BMGR East regular user
	Papago Heliport, Papago Military Reservation, Phoenix, Arizona	Arizona ARNG 2-285th Assault Helicopter Battalion – BMGR East regular user

Note:

For additional information, refer to Figure 1.2-1

Figure 1.2-1. Military Air Bases, Airspace, and Ranges in the BMGR Operation Region



The BMGR regularly supports helicopter aircrew training from two Army National Guard (ARNG) heliports and helicopter and tiltrotor aircraft aircrew training from two Marine Corps air stations. In addition to Gila Bend AFAF in BMGR East, the Marine Corps has two developed auxiliary airfields in BMGR West to support training in forward, or expeditionary, airfield operations. Finally, two primitive auxiliary airfields within the BMGR are used for training and operating fixed-wing aircraft, tiltrotor aircraft, and helicopter from forward, bare-bones airfields. The BMGR has sufficient land, airspace, and facilities to support the diverse training load generated from the multiple air bases in its operational region.

A distinct and unique advantage of the BMGR is its central position in the aforementioned complex of military airbases, SUA, other military use airspace, and other ranges that provides an integrated and highly flexible set of resources with the capacities to meet a full spectrum of tactical aviation and other training needs (Figure 1.2-1). Additional airspace contiguous with or in the nearby BMGR region that supports military aviation includes military operations areas (MOAs), air traffic control assigned airspaces (ATCAAs), restricted areas overlying other ranges, an alert area, and military training routes (MTRs).

The Dome and Sells MOAs/ATCAAs are contiguous with the BMGR and are periodically used as staging areas in which flights of multiple aircraft assemble and, if appropriate, loiter until their scheduled time to enter the BMGR airspace. The Sells MOA/ATCAA is also used in combination with BMGR restricted areas for missions that involve aircraft maneuvering for long-range air-to-air engagements or long-range approaches to BMGR tactical targets. MTRs provide special corridors for high-speed, low-altitude training flights. Military aircrews use the MTRs leading to the BMGR to practice long-distance, low-level approaches to the air-ground battlespaces simulated on the range.

While SUAs in the BMGR region provide needed and important training airspace, the training capacities at these SUAs are generally restricted to individual flying skills and air combat maneuvers and tactics. Opportunities to improve aircrew proficiency in integrating terrain in their tactical decisions or maneuvering in close reference to the ground are limited. In contrast, the BMGR provides the restricted land and airspace resources needed to support highly realistic training in the air-ground battlespace for aircrews alone or for aircrews and ground forces together in combined arms exercises.

In addition, the military aviation complex of which the BMGR is a principal component also includes other ranges—YPG in Arizona, and the CMAGR and El Centro Training Ranges Complex in California. YPG is a major DoD test range operated by the Army. The CMAGR, which is about two-thirds the size of BMGR West, is a tactical aviation range that has been configured largely to support air-to-ground weapons training, including live ordnance delivery. The El Centro Training Ranges Complex includes two basic bulls-eye ranges, which are used similarly to the BMGR East manned ranges for primary air-to-ground weapons training using inert practice ordnance. The CMAGR, El Centro Training Ranges Complex, and YPG ranges and the associated airspace (SUA, MTRs, and ATCAAs) comprise the Bob Stump Training Range Complex, as designated by Congress. The Marine Corps and Department of the Navy regularly use the Bob Stump Training Range Complex to support training of individual aircrews and various air unit combinations up to a fully integrated Aviation Combat Element of a Marine Air Ground Task Force.

1.2.2.2 Expansive BMGR Restricted Land and Associated Airspace Areas

From an operational standpoint, the BMGR is composed of both restricted-access land and Federal Aviation Administration (FAA)-designated restricted airspace areas. Combined, the land and airspace access restrictions provide operational security to exclude unauthorized persons, vehicles, and aircraft from ground and airspace areas where military operations involving live-fire weapons employment, laser use, and other hazardous activities occur (Figure 1.2-1). Restricted entry to and use of rangeland and airspace are essential to protect nonparticipants from hazards that they cannot see, detect, or avoid. Restricted entry also prevents disruptions in military training that occur when nonparticipants intrude into active land and/or airspace operations.

While the land area of the BMGR is approximately 1.743 million acres (about 2,724 square miles), the effective restricted airspace available for air operations is roughly 1 million acres larger. The four contiguous BMGR restricted areas have lateral dimensions that encompass about 2,766,720 acres (4,323 square miles) and lateral and altitude dimensions that contain about 57,000 cubic miles. The portions of the restricted areas that extend beyond the BMGR land boundaries overlie all of the adjacent Cabeza Prieta National Wildlife Refuge (CPNWR)/Cabeza Prieta Wilderness (CPW), some adjacent BLM public land, portions of the Tohono O'odham Nation adjacent to the range, and other smaller areas (Figure 1.1-1). The restricted airspace overlying off-range locations is essential for supporting training and testing activities at the BMGR. The portion of the R-2301E and R-2301W airspace that extends beyond the BMGR land boundary and overlies the CPNWR/CPW, comprises approximately 31 percent of the restricted airspace at the BMGR. In extending the BMGR land withdrawal through the MLWA of 1999, Congress found the following:

- Military use of the CPNWR/CPW has historically been integral to the effective operation of the BMGR.
- Continued use of the CPNWR/CPW to support military aviation training would remain necessary to ensure the readiness of the Armed Forces (P.L. 106-65 Section 3032(a)(1) and (2)).

These findings remain fully relevant to the current continuing need for the BMGR.

The BMGR is the fourth largest land-based range in the U.S. and is the largest at which tactical aviation training is the predominant mission. The expanse of the restricted land and airspace of the BMGR is fundamental to the diversity, quality, and cost- and time-effective productivity of the training and testing activities that occur there. The size of the range is such that it was subdivided into BMGR East and BMGR West to create two independently operated ranges to support Air Force and Marine Corps aviation training needs. BMGR East and BMGR West have each been further subdivided into multiple air-to-ground weapons ranges, air-to-air combat maneuvering ranges, and other air and ground training ranges and sites. As a result, BMGR East and BMGR West can each simultaneously host multiple independent air, ground, or combined air-ground training activities. Many of the subranges support training at or near the full capabilities of tactical aircraft and weapons systems, but when necessary, subranges can be combined to support weapons training at greater distances from the target or air intercept and other tactics that require larger blocks of maneuvering airspace. Subranges within BMGR East or BMGR West can also be combined in various groupings to provide a variety of realistic training

scenarios that may require more diverse landscapes, target selections, maneuvering area, or electronic instrumentation in addition to larger operating spaces.

Use of the BMGR for combined air-ground training has always been important, and the amount and diversity of combined operations is increasing. The BMGR is experiencing increased activity as the Marine Corps continues to develop and integrate Unmanned Aerial Systems (UAS) into its aviation arsenal. A UAS squadron based at MCAS Yuma and deployed units frequently operate from the ground in BMGR West and fly their remotely controlled aircraft in BMGR airspace. Ground units are also enhancing their combat capabilities by utilizing UAS for "in close" surveillance of enemy positions. Assigned users of the BMGR East include several units that are key components of the Air Force's personnel recovery capability and the availability of restricted land areas and associated restricted airspace supports essential operational training for those units. Joint Terminal Air Controllers (JTACs) routinely schedule training on BMGR East, where they operate from observation points on the tactical ranges, and their close coordination with flying units on the range provides valuable training for both. The capacity to combine air operations with limited ground-based activity in varied situations is increasingly important to U.S. and allied military services.

Finally, BMGR East and BMGR West can be combined to support large-scale and highly complex training exercises or other activities, including the final training evolution of the Marine Corps semi-annual Weapons and Tactics Instructor (WTI) course, which provides the Marine Corps' most advanced training for employing aviation weapons and tactics in combat. The final WTI exercise involves up to 100 tactical aircraft of many types; complex combinations of offensive and defensive air-to-air combat, air-to-ground weapons deliveries, assault landings and other types of forward landing zone operations; and ground troops performing air control, air defense, command and control, and other functions. The size and capabilities of the BMGR are essential for supporting realistic and effective exercises like WTI that require commanders and combatants to engage adversary objectives and forces in air-ground battlespaces that extend far beyond their immediate visual horizons. The size of the BMGR provides aviation training capacities, capabilities, flexibility, diversity, and productivity that is achievable only at the largest of U.S. ranges.

1.2.2.3 Electronic Training Instrumentation

BMGR East and BMGR West are each equipped with electronic instrumentation systems used to observe, measure, record, and replay the simultaneous actions of aircraft participating in air-to-air and air-to-ground training engagements. The Air Combat Training System (ACTS) on the BMGR East and the Tactical Combat Training System (TCTS) within BMGR West are each capable of supporting training and exercises that involve up to 72 aircraft at a time. In addition to simultaneously tracking multiple aircraft maneuvers, the TCTS can simulate air-to-air weapons use, enabling aircrews to receive feedback on the effectiveness of their decisions and maneuvers to attack or evade adversary aircraft. Both instrumentation systems are also able to electronically simulate, track, and score air-to-ground attacks on designated targets. The ACTS and TCTS observe, measure, and record the abilities of training aircrews to detect and evade the air defense threats simulated by this equipment.

1.2.2.4 Year-Round Flying Weather

Since before World War II, local flying weather has continuously been among the top criteria considered for locating or retaining tactical aircrew training bases and ranges (Shaw 2004). The climate of southern Arizona provides some of the most reliable visual flying weather in the country. Favorable climate contributes to the efficiency of aviation training in the BMGR region and benefits tactical aviation in at least five ways:

- Dependable weather supports a high-tempo flight training schedule, which in turn provides the capacity to accommodate the combined training requirements of the many BMGR users. Good weather allows users to plan and fly their missions in cost- and time-effective manners.
- Both student and qualified operational aircrews benefit from flying frequently enough to develop and retain the highly refined skills their profession demands. Experience clearly shows that these skills are quickly eroded by inactivity.
- The climate supports important training deployment programs for active duty, reserve, and ANG flying units from areas with severe winter weather. MCAS Yuma, which is the most active deployment site for Marine aviation units from both the east and west coasts, hosts between 50- and 70-unit deployments annually. Visiting and deployed U.S. flying units and those of allied nations use both BMGR East and BMGR West.
- The warm and dry climate means that many aircraft maintenance tasks can be performed outside under parking canopies. Aircraft can also be stored out of doors without the deterioration or malfunctions caused by high humidity, freezing temperatures, or other inclement weather. The result is savings in aircraft ground-handling time and hangar-space costs.
- Maintenance costs for BMGR roads and facilities are kept relatively low due to slow growth of desert vegetation, low humidity, and infrequent rain or freezing temperatures.

1.2.2.5 Varied Terrain

The BMGR is characterized by broad alluvial valleys punctuated by a series of rugged mountain ranges that typically rise 1,000 to 2,000 feet above the intervening valley plains. This landscape has allowed many varied tactical circumstances to be created by placing simulated military targets, such as airfields or vehicle convoys, in realistic settings. Simulated air defense systems, including air defense artillery and missiles, have been emplaced around target features, such as airfields, to further enhance the realism of the battlespace. The effect is a tactical landscape that provides diverse air-ground combat challenges for aircrews. Aircrews must learn to quickly recognize, understand, and solve the challenges presented by each of the many available target settings. Because of the diversity that has been generated through the use of terrain in target development, aircrews find each training sortie to be fresh and instructional, not repetitious. The cumulative experience aircrews gain by facing the tactical diversity of the BMGR provides essential preparation for combat.

1.3 Purpose of and Need for the Gila Bend Addition to BMGR East

The Gila Bend Addition would serve three distinct purposes. First, the quarter-section adjacent to Gila Bend AFAF (southwest quarter of Section 19) and the northwest quarter of Section 31 would enhance the security and safety of flight operations at Gila Bend AFAF (Figure 1.3-1). Second, the northwest quarter of Section 31 is needed because a portion is within Accident Potential Zone-1 for Runway 17/35 at Gila Bend AFAF. Third, the remaining parcels of the Gila Bend Addition underlie the R-2305 restricted area and would allow the Air Force to control land use and access so that surface activities in these parcels remain compatible with training operations in the overlying airspace.

Gila Bend AFAF is a unique support asset integral to the daily operation of the range. Used for practice touch-and-go landings, simulated flameout patterns, precautionary flameout patterns, and as emergency divert field, Gila Bend AFAF provides the facilities required to support maintenance and operations of both the airfield and BMGR East. The areas of the addition adjacent to Gila Bend AFAF are needed to meet airfield and anti-terrorism and force protection standards and requirements pursuant to Unified Facility Code 3-260-01, Airfield and Heliport Planning and Design; provide adequate operational security; ensure safety of flight operations; and protect the airfield from encroaching land use. As illustrated on Figure 1.3-1, the three Air Force-acquired parcels[3] (two parcels north of Section 19 and one south of Section 19) and the Arizona Department of Emergency and Military Affairs parcels (one each in Sections 18 and 31) serve as a safety buffer to Gila Bend AFAF airfield. Securing the parcel adjacent to Gila Bend AFAF perimeter would allow the Air Force to provide a more complete safety buffer boundary.

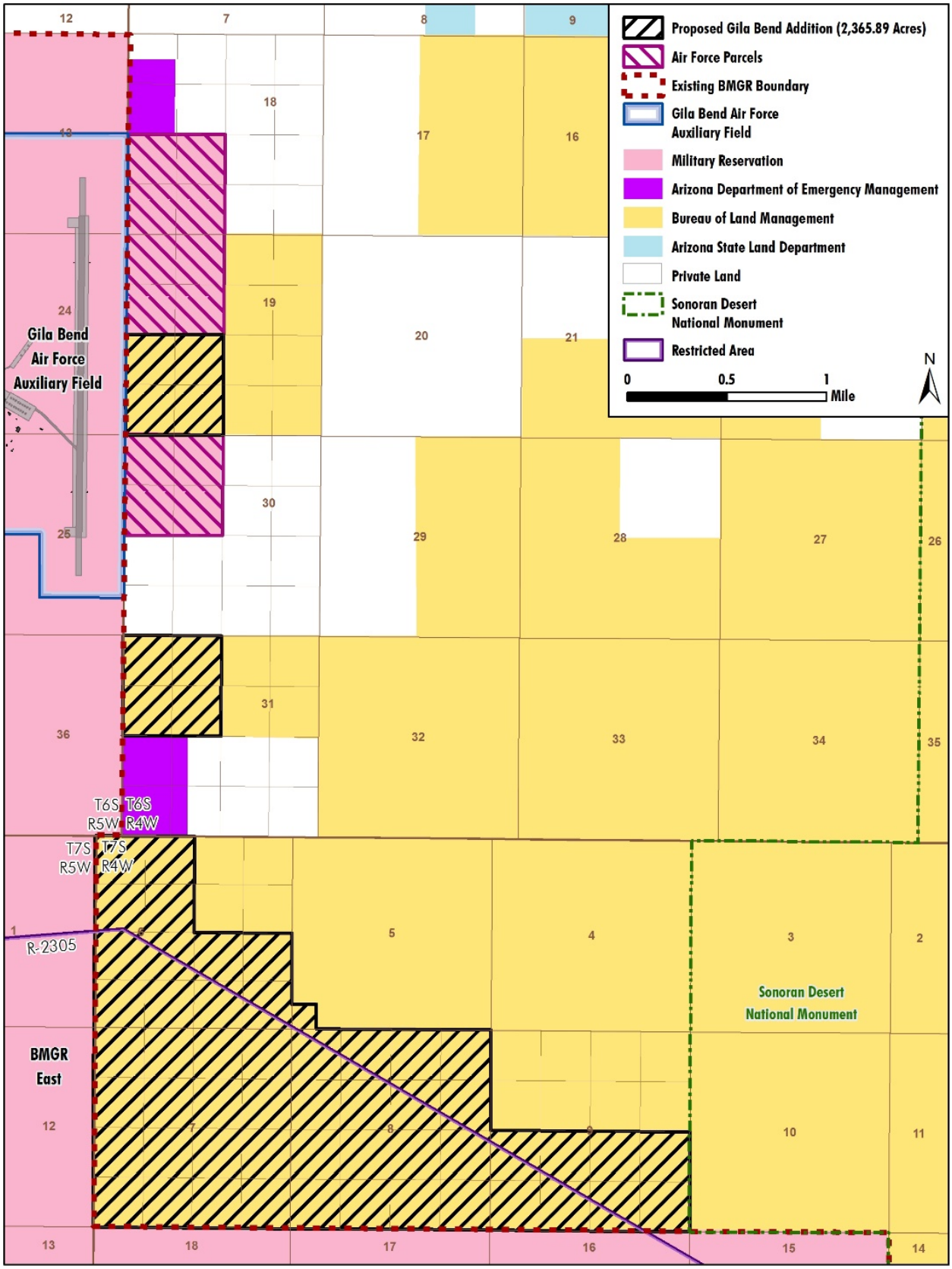
The withdrawal action would better secure the airfield and enhance flight safety by removing a remaining potential for incompatible activities or land uses to occur in or near the runway environment.

Accident Potential Zones are based upon statistical analysis of past DoD aircraft accidents. The first 3,000 feet from a runway threshold is designated as a clear zone and is the area with the highest potential for takeoff or landing accidents. Accident Potential Zone-1 extends from 3,000 to 8,000 feet from the end of a military airport runway and, although the risk of aircraft accidents in this area is reduced from that in the clear zone, the risk is still heightened and significant compared to areas further from the runway. Adding the northwest quarter of Section 31 to BMGR East would ensure that land use within this area would remain compatible with this heightened accident potential.

The public land underlying the R-2305 restricted airspace is needed to provide the Air Force with an extended safety buffer along the existing range perimeter and positive control of land directly underlying the R-2305 restricted area. The R-2305 airspace is a primary aviation entry and exit route connecting BMGR restricted areas with the Gila Bend AFAF, supporting more than 21,000 airfield operations in calendar year 2019. The airspace also serves aircraft accessing and utilizing Range 3 and East Tactical Range. Control of the land underlying R-2305 would allow the Air Force to ensure that land use remains compatible with the operational requirements of military aviation.

[3] These parcels were acquired during the 1940s and serve as safety buffer lands. These parcels have not been formally appended to the BMGR East.

Figure 1.3-1. Proposed Gila Bend Addition



The Gila Bend Addition would increase the area of the BMGR by only about 0.14 percent, but it would nevertheless contribute to the safe and effective operation of the range and its capacity to support national security objectives. Although the Gila Bend Addition is needed to provide the specific aforementioned benefits at the auxiliary field and R-2305 airspace, the proposed addition would be reserved for the same broad purposes as the rest of the BMGR (Section 1.1). If the proposed withdrawal for the Gila Bend Addition is granted, any proposed security measures would be assessed in future NEPA or other compliance procedures, as applicable.

1.4 Cooperating Agency and Intergovernmental Consultation

1.4.1 Cooperating Agencies

In August 2018, letters of invitation to be a cooperating agency were sent to the BLM Arizona State Office in Phoenix; USFWS Southwest Region Office in Albuquerque, New Mexico; and Arizona Game and Fish Department (AZGFD) in Phoenix. The BLM agreed to become a cooperating agency in the preparation of this LEIS on 18 March 2019 and noted an understanding that a Memorandum of Understanding would be prepared. Similarly, the USFWS agreed to cooperate with the Refuge Manager at CPNWR, serving as the point of contact. The AZGFD accepted the invitation on 14 March 2019 and assigned Region IV in Yuma as the office handling the coordination. The Air Force and Marine Corps have worked cooperatively with the three Cooperating Agencies to obtain technical input in preparing this LEIS, and to ensure that adoption of the findings of this LEIS consider each agencies regulatory and management authority. BLM has offered expertise in reviewing Cadastral survey data and validating the Land Surveyor Report; providing data regarding the public land comprising the Gila Bend Addition; and reviewing documents prepared to support the case file for the legislation. USFWS representatives have reviewed documents pertinent to the CPNWR and participated in renegotiations of the 1994 Memorandum of Understanding regarding military operations involving the CPNWR. AZGFD also has reviewed documents and has provided expertise pertinent to wildlife management, including recovery actions associated with the endangered Sonoran pronghorn.

1.4.2 Agency Scoping

Federal, state, and local agencies with jurisdiction that could be affected by the alternative actions were notified and consulted during the development of this LEIS. Details on the public outreach and scoping are documented in the Scoping Summary Report that was prepared for this project and is incorporated herein by reference (AFCEC et al. 2020). This report, available on the project website[4], identifies the agencies who have participated in this process and contains correspondence.

1.4.3 Government to Government Consultation

The National Historic Preservation Act (NHPA), sec. 106 (54 U.S.C. 306108, et seq.) and its implementing regulations at 36 CFR Part 800 require federal agencies to engage in government-to-government consultation with federally recognized Native American Tribal Nations to identify Tribal properties of cultural and religious significance. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (6 November 2000), directs federal agencies to coordinate and consult with Native

[4] https://barry-m-goldwater-leis.com/public-documents/

American Tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. To comply with legal mandates, federally recognized Tribal Nations that are affiliated historically with the BMGR geographic region will be invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the Tribal Nations. The Tribal coordination process is distinct from NEPA consultation or the Interagency/Intergovernmental Coordination for environmental planning processes and requires separate notification of all relevant Tribal Nations. Additional information on government-to-government consultation and a listing of the Native American Tribal governments that have been consulted regarding this action are listed in Section 3.13.2.

1.5 Applicable Regulatory Requirements

The umbrella authority for the current BMGR land withdrawal and reservation extension is the Defense Withdrawal Act of 1958. Withdrawing more than 5,000 acres of public land for any one DoD-planned project requires an Act of Congress pursuant to the Engle Act.

To extend the land withdrawal, the DoD must submit an application for the extension to the Secretary of the Interior. The application must be prepared in accordance with the rules and procedures for land withdrawals (43 CFR Chapter II Part 2300).

This LEIS has been prepared in accordance with:

- NEPA (42 U.S.C. Sections 4321-4347, as amended)
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508 [the 1978 version of this rule was used because a NOI and scoping had been previously issued on this LEIS issued prior to the 23 October 2020 implementation of the CEQ's updated NEPA regulations])
- Air Force Environmental Impact Analysis Process (32 CFR Part 989)
- Navy Procedures for Implementing the National Environmental Policy Act (32 CFR Part 775), Marine Corps Environmental Compliance and Protection Program, Volume 12 Environmental Planning and Review (Marine Corps Order 5090.2 – V12)
- Marine Corps NEPA Manual.

The LEIS has also been prepared in accordance with other applicable statutes, regulations, ordinances, rules, and/or policies and instructions, including, but not limited to:

- American Indian Religious Freedom Act (P.L. 95-341; 42 U.S.C. Sections 1996 and 1996a)
- Archaeological Resource Protection Act (16 U.S.C. Sections 470aa-470mm; P.L. 96-95 and amendments)
- Bald and Golden Eagle Protection Act (16 U.S.C. Section 668 *et seq.*)
- Clean Air Act (CAA), 42 U.S.C. Sections 7401-7671q

- Comprehensive Environmental Response, Compensation and Liability Act, 1980 (42 U.S.C. Sections 9601-9675)
- Endangered Species Act (ESA), 16 U.S.C. Sections 1531-1544
- Energy Independence and Security Act of 2007, P.L. 110-140
- Executive Order 11988 Floodplain Management, 1977 (42 FR 26951)
- Executive Order 11990 Protection of Wetlands, 1977 (42 Federal Register 26961)
- Executive Order 12898 Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994 (59 Federal Register 7629)
- Executive Order 13007 Indian Sacred Sites, 1996 (61 Federal Register 26771)
- Executive Order 13045 Environmental Justice for Children, 1997 (62 Federal Register 1985)
- Executive Order 13123 Greening the Government Through Efficient Energy Management, 1999 (64 Federal Register 30851)
- Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds and the Migratory Bird Treaty Act, Amended October 30, 1998 (66 Federal Register 3853 and 16 U.S.C. Sections 701-712)
- Executive Order 13352 Facilitation of Cooperative Conservation, 2004 (69 Federal Register 52989)
- Executive Order 13693 Planning for Federal Sustainability in the Next Decade
- FAA Order 7400.2 (49 U.S.C. Section 40103(b))
- Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. Sections 1251-1387
- Federal Wetland Regulations, 33 CFR Part 328
- Migratory Bird Treaty Act of 1918 (16 U.S.C. Sections 703-712)
- NHPA of 1966 as amended, 1994 (54 U.S.C. Section 300101 et seq.)
- National Register of Historic Places (NRHP), Regulations, 1977 (36 CFR Part 60)
- Native American Graves Protection and Repatriation Act (P.L. 101-601; 25 U.S.C. Sections 3001-3013)
- Pollution Prevention Act of 1990 (42 U.S.C. Sections 13101-13109)
- Resource Conservation and Recovery Act (RCRA), 1976 (42 U.S.C. Sections 6901-6992k)
- Sikes Act (16 U.S.C. Sections 670-670f, 74 Statute 1052), as amended, P.L. 86-797, approved September 15, 1960

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2 Description of the Proposed Action and Alternatives

2.1 Introduction

The proposed actions addressed in this LEIS include extending the BMGR land withdrawal for continued military use after the current land withdrawal and reservation expires in October 2024 and expanding BMGR East to include the Gila Bend Addition. Two sets of four action alternatives are considered for implementing this proposed action. The four action alternatives in one set would each extend the existing BMGR land withdrawal without changes to its land area or boundary. The four action alternatives in the second set would each extend the existing land withdrawal of the range and would also expand the boundary of BMGR East to incorporate the Gila Bend Addition. The four action alternatives within each of the two sets differ from each other only as to the duration for which the BMGR land withdrawal and reservation would be extended (25 years, 50 years, or indefinitely) or as a result of transferring administrative jurisdiction for BMGR East and BMGR West from the Secretary of the Interior to the Secretaries of the Air Force and Navy, respectively.

The action alternatives were developed in consideration of:

- The continuing military need for the BMGR
- Scoping comments received from the public, Native American Tribal Nations, and cooperating and reviewing agencies[1]
- Environmental, technical, and other factors

Each of the action alternatives would fulfill the basic continuing military need for the BMGR identified by the Air Force and Marine Corps. The Air Force's and Navy's preferred alternative is identified in Section 2.12.

This LEIS also considers the No Action Alternative, which would allow the current land withdrawal to terminate in October 2024, as provided by the MLWA of 1999 (P.L. 106—65 Section 3031(d)). The No Action Alternative would be implemented if Congress decides the BMGR is no longer needed and chooses to neither extend the land withdrawal and reservation for the range nor transfer administrative jurisdiction for the public lands in the range from the Secretary of the Interior to the Secretaries of the Air Force and Navy. Military use of the BMGR land surface would cease upon the expiration of the current withdrawal and reservation. Military use of the restricted airspace over the BMGR and CPNWR/CPW, MOAs, and ATCAAs that are contiguous to the range, and MTRs that terminate in the range, could continue, but aviation training or test missions that involve live-fire weapons use or other use of the expired range surface would end. The Gila Bend Addition would not be needed.

[1] Per CEQ regulations implementing NEPA at 40 CFR §1506.8(b)(1), an LEIS need not provide for a scoping process; however, as described in Chapter 6, a scoping period was provided.

The reasonable range of the alternatives was determined by identifying standards to ensure that each selected alternative would be consistent with the purpose of and need for extending the BMGR land withdrawal. The selection standards specify that each reasonable alternative must, at a minimum:

- Retain the full geographic and operational dimensions of the BMGR to support the training and test missions assigned to this range
- Continue to adhere to the existing provisions of the MLWA for natural and cultural resource management and preserve the existing jurisdictions and authorities of Secretaries of the Air Force and Navy to administer and operate the BMGR to support the national defense purposes of the range

2.2 Characteristics Common to All Action Alternatives

The eight action alternatives would each keep the BMGR available for continuing military use after October 2024 consistent with the four national defense purposes, provided by the MLWA of 1999 (P.L. 106—65 Section 3031(a)(2)) (Section 1.1). Future military land use at the BMGR would be the same regardless of which alternative is selected. The current subranges, roads, air-to-ground targets, electronic instruments, and other facilities are generally appropriately configured to support most foreseeable training and other mission requirements. Additionally, Air Force, Marine Corps, and Department of the Navy tactical aircraft based within the BMGR operating region continue to be extensively modernized and will form the backbone of U.S. combat airpower for the next five to seven decades. The training capabilities and capacities at the BMGR were significant factors in the decisions to base these aircraft in its region.

The existing facilities at the BMGR generally would be able to support the requirements for aircrew training in the upgraded or new aircraft that are replacing legacy types in the fleet. Certain infrastructure deficiencies, such as the recently developed Auxiliary Landing Field in BMGR West for F-35B training, have been resolved with new construction and, at this time, the BMGR appears to be prepared to support the foreseeable needs of tactical aviation training. This is not to say that future changes in military land use or infrastructure at the BMGR would not be required to meet emergent training needs. Future requirements to modify BMGR land use or infrastructure would likely be needed as a result of the never-ending evolution of air combat tactics, aircraft capabilities, aircraft weapons, air defense threats, or some other factors. Potential future changes in land use may include development or modification of targets, training or operations support areas, electronic instrumentation, roads, or other facilities or discontinued use of existing facilities. Such changes would be assessed in accordance with NEPA and other applicable environmental compliance laws and regulations when the need is identified. The alternatives for retaining the BMGR would generally have no effect, however, on future military land use other than keeping the range available for such use.

A more detailed description of existing military land use at the BMGR is provided in Appendix B. This description provides an accounting of the military land use that would be in place should the BMGR land withdrawal be extended in accordance with any of the action alternatives.

Also common to all action alternatives would be the continued use of the CPNWR/CPW to support the national defense purposes of the BMGR. Military use of the CPNWR/CPW is authorized by the MLWA of

1999 (P.L. 106—65 Section 3032) and was previously sanctioned by the Arizona Desert Wilderness Act of 1990 (P.L. 101—628 Section 301(f)), which designated the CPW. The MLWA of 1999 directs the Secretary of the Interior, in coordination with the Secretaries of the Navy and Air Force, to manage the CPNWR/CPW for the purposes for which the refuge and wilderness were established as well as to support current and future military aviation training needs consistent with the Memorandum of Understanding (MOU),[2] signed November 21, 1994, among the DOI, Department of the Navy, and Air Force (Appendix C). The 1994 MOU is the fifth in a series of similar MOUs dating from August 1951. Among other provisions, the 1994 MOU recognizes that the primary purpose of the CPNWR is to protect and conserve wildlife and wilderness resources, acknowledges that the CPNWR and the overlying airspace are essential for supporting the military mission of the BMGR, and identifies and regulates the military activities permitted on the CPNWR surface and in the overlying airspace. The FAA-designated restricted airspace overlying the CPNWR/CPW extends from the ground surface to 80,000 feet above mean sea level (MSL).

Finally, the BMGR would continue to be managed in accordance with the Sikes Act and other applicable resource management and environmental statutes under all of the action alternatives. Public Reports would continue to be prepared in conjunction with each 5-year update of the BMGR INRMP. The Barry M. Goldwater Range Executive Council (BEC) and Intergovernmental Executive Council (IEC) would continue to function as collaborative forums for supporting natural and cultural resource management and the public outreach and involvement function of the IEC would be maintained (refer to Section 2.6 for additional information regarding the members and roles of the BEC and IEC). USFWS, AZGFD, and BLM involvement in updating the INRMP and Public Report would continue. Proposed major federal actions concerning the use or management of the BMGR would be assessed in accordance with the NEPA and through the cooperative agency relationships that have been established through current practice. In accordance with the Sikes Act, public access to the BMGR would continue to be permitted to the extent that it would be consistent with the safety and security requirements of the military purposes of the range.

2.3 Alternative 1—Continue BMGR Existing Conditions

2.3.1 Alternative 1: BMGR Boundary and Land Area

Alternative 1 would extend the BMGR land withdrawal and reservation without change to its land area or boundary as provided by the MLWA of 1999. The range would continue to be comprised of about 95.15 percent withdrawn and reserved public lands and about 4.84 percent DoD-acquired land (Figure 2.3-1). About 1.5 acres of non-federally owned inholdings would remain within the BMGR boundary.

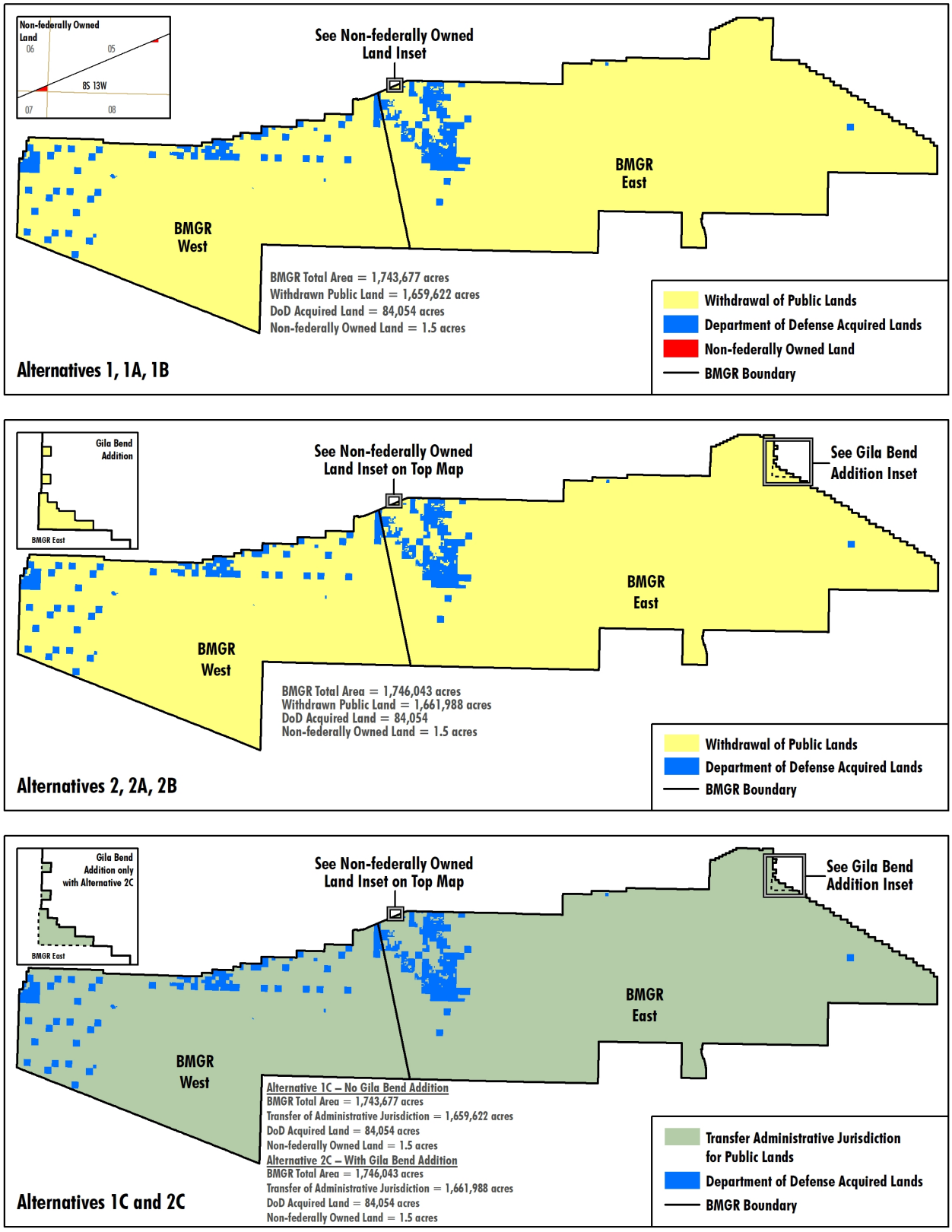
2.3.2 Alternative 1: Duration

The duration of the proposed extension of the BMGR land withdrawal and reservation under Alternative 1 would be 25 years. The Secretary of the Air Force and/or Navy would have the option to

[2] Including any extension or other amendment of the MOU.

request a subsequent extension of the land withdrawal and reservation should there be a continuing military need for BMGR East and/or BMGR West beyond the termination of the 25-year withdrawal.

Figure 2.3-1. Land Withdrawals or Transfers of Administrative Jurisdictions by Alternative



2.3.3 Alternative 1: Administrative Jurisdiction

Alternative 1 would continue the existing administrative jurisdictions of the Secretaries of the Air Force, Navy, and Interior for the BMGR. The MLWA of 1999 (P.L. 106—65 Section 3031(a)(1)) transferred jurisdiction over and interests in the withdrawn public lands in the BMGR from the Secretary of the Interior to the Secretaries of the Air Force and Navy. The effect of this provision was to transfer responsibility for managing the land and natural and cultural resources of BMGR East and BMGR West from the Secretary of the Interior, acting locally through BLM, almost exclusively to the Secretaries of the Air Force and Navy, respectively, acting locally through the commanding officers of the 56 FW at Luke AFB and MCAS Yuma. Although the Air Force and Marine Corps would continue to hold primary, day-to-day management responsibility for the military operations, land, and natural and cultural resources at the BMGR, the Secretary of the Interior, BLM, and USFWS would also continue to have several roles, including, but not limited to:

1. Consulting with Secretary of the Air Force and/or Navy before the BMGR may be used by the Air Force and/or Navy for any purpose other than the purposes for which it was reserved (P.L. 106—65 Section 3031(a)(5))

2. Consulting on any nonemergency closure of the range or a portion of the range planned by the Air Force or Marine Corps that is not specified in the INRMP (P.L. 106—65 Section 3031(b)(2)(C))

3. Participating jointly with the Air Force and Marine Corps in preparing the INRMP for the BMGR and in periodic reviews of the plan (P.L. 106—65 Section 3031(b)(3)(E)(ix))

4. Participating jointly with the Air Force and Marine Corps in preparing the Public Report that is to be prepared concurrently with each review of the INRMP (P.L. 106—65 Section 3031(b)(5)(A))

5. Participating as an establishing member of the BMGR IEC (P.L. 106—65 Section 3031(b)(6)(A))

6. Transferring management responsibility for the natural and cultural resources of the BMGR to the Secretary of the Interior if the Air Force and Marine Corps have failed to manage in accordance with the INRMP until such time that the Air Force and Marine Corps have made appropriate corrections (P.L. 106—65 Section 3031(b)(7)). This contingency role has never been exercised.

7. Determining whether to accept jurisdiction over all or portions of the BMGR that the Air Force and/or Marine Corps may intend to relinquish before the termination of the withdrawal (P.L. 106—65 Section 3031(f)). Because the Air Force and Marine Corps have not relinquished any portion of the BMGR during the current withdrawal period, this activity has not occurred.

2.4 Alternative 1A

Alternative 1A proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 1, but the duration of the BMGR land withdrawal and reservation would be 50 years. The Secretary of the Air Force and/or Navy would have the option to request a subsequent extension of the land withdrawal and reservation should there be a continuing military need for BMGR East and/or BMGR West beyond the termination of the 50-year withdrawal.

A duration of 50 years would provide two benefits. First, discussed in Section 1.2.1, the foreseeable continuing need for the military aviation training conducted at the BMGR is based on numerous existing and emerging aircraft types and models, including fifth generation fighters that will be mainstays of U.S. air power for many decades. A withdrawal duration of 50 years would more closely reflect the long-term training requirements to support these aircraft.

Second, a duration of 50 years would reduce the time consuming and expensive process required to extend the BMGR land withdrawal by half. The process for requesting Congressional extension of the land withdrawal for a major military range typically requires 8 to 9 years and does not contribute to either more effective military operations or better environmental stewardship. The effort for the BMGR land withdrawal requires engagement of range, airspace, conservation, real estate, legal counsel, and other technical support personnel at the local installation, major command, and headquarters levels of the Air Force and Department of the Navy, as well as technical contributions from the ANG. The hours that will be invested by Air Force, Marine Corps, and Department of the Navy personnel by the time Congress approves extension of the land withdrawal is estimated at 21,682 hours. Cooperating Agencies also invest many hours of time as agency representatives participate in monthly coordination calls, review documents, and provide data and other support in their areas of expertise. In addition, contract support together with real estate and cadastral survey costs for the land withdrawals total $3,871,424, but there are other expenses such as travel.

Changing the land withdrawal duration to 50 years would not change other ongoing and frequent processes for reassessing the continuing military need for the range. The DoD reviews the continuing need for its installations and other facilities to some degree with every budgeting cycle and more comprehensively with quadrennial defense reviews and other review cycles. Each BMGR Public Report, which is issued approximately every 5 years, updates how the range is being used for military purposes and how military use had changed over the previous 5 years; the Public Report also serves as a comprehensive 5-year update of the continuing military need for the range.

If the demonstrated military need for the BMGR should end before 50 years, the military departments would notify Congress and the Secretary of the Interior of their intent to relinquish the land withdrawn. Unless Congress provided for an alternative use for the land, the Secretary of the Interior would determine whether the land was suitable for restoration to the public domain, should be withdrawn for other purpose, or disposed of through the General Services Administration. This would be the same early relinquishment process as provided by the MLWA of 1999 at P.L. 106—65 Section 3031(f)).

2.5 Alternative 1B

Alternative 1B proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 1, but the duration of the BMGR land withdrawal and reservation would continue for an indefinite period of time until the Secretaries of the Air Force and Navy determine that the range is no longer needed for national defense purposes. A withdrawal and reservation of indefinite duration would fully match the currently foreseeable need for the BMGR and would directly reflect the military need for a range as it unfolds into the future. The indefinite duration would also eliminate any reoccurrences of the time consuming and expensive processes required to extend the BMGR land withdrawal as described for Alternative 1A.

The continuing military need for the BMGR would continue to be assessed as described for Alternative 1A. If the Secretary of the Air Force and/or Navy should determine at some date that all or part of the BMGR would no longer required for military purposes, Congress and the Secretary of the Interior would be notified and the processes for terminating the land withdrawal and reservation and relinquishing jurisdiction for and interests in public lands in the BMGR to DOI administration and management would be initiated, as described for Alternative 1A.

2.6 Alternative 1C

Alternative 1C proposes that administrative jurisdiction for the public lands that are currently withdrawn and reserved for the BMGR be transferred from the Secretary of the Interior to the Secretaries of the Air Force and Navy. The transfers would endure until such time that the BMGR is no longer needed for national defense purposes, which would fully encompass the current foreseeable need for the range. Federal mineral estate underlying the existing BMGR would be withdrawn from all forms of appropriation under the public land laws, including the mining laws, the mineral leasing laws, and geothermal leasing laws. The withdrawal of the mineral estate would endure for as long as the BMGR is under the administrative jurisdiction of the Secretary of the Air Force or Navy.

Under the 1958 Engle Act, only Congress can withdraw more than 5,000 acres of land for any one defense project or facility, and the conventional approach for authorizing the use of public lands for national defense purposes is through the land withdrawal and reservation process provided by 43 CFR Subpart 2310, albeit with Congress, rather than the Secretary of the Interior, as the decisionmaker. In the MLWA of 1999, Congress transferred jurisdiction over and interests in the public lands comprising the BMGR to the Secretaries of the Navy and Air Force, giving DoD authority for using and managing the withdrawn lands, but the Secretary of the Interior retained underlying administrative jurisdiction for those lands. As proposed by Alternative 1C, however, Congress could choose to extend the BMGR land withdrawal by transferring administrative jurisdiction for the affected public lands from the Secretary of the Interior to the Secretaries of the Navy and Air Force rather than by extending the current withdrawal and reservation for the range.

As noted in Section 1.2, Congress authorized continuing military use of the CMAGR in 2014 by transferring administrative jurisdiction of approximately 228,324 acres of public land from the Secretary of the Interior to the Secretary of the Navy. This example, from the MLWA of 2014, illustrates four key provisions that would be relevant for implementing such a transfer for the BMGR:

- First, the Secretary of the Interior was directed to transfer the public lands to the administrative jurisdiction of the receiving department, which in the case of the CMAGR was the Secretary of the Navy.
- Second, Congress provided that the transferred land was to be treated as property under the administrative jurisdiction of the receiving department and directed how the transferred land was to be used, which in the case of the CMAGR was for continuing military purposes.
- Third, the transferred land was withdrawn from all forms of appropriation under the public land laws, including the mining laws, the mineral leasing laws, and geothermal leasing laws.

- Fourth, upon determination that there was no longer a military need for a portion or all of the transferred land, administrative jurisdiction for the land would be transferred back to the Secretary of the Interior provided that decontamination of the land would be practicable and economically feasible.

Transferring administrative jurisdiction for BMGR East and BMGR West to the Secretaries of the Air Force and Navy, respectively, would affect the relative roles of the DOI agencies as described for Alternative 1. Of the seven roles listed, 1, 2, 6, and 7 would no longer be in effect. The USFWS, along with AZGFD, would participate in the preparation of the BMGR INRMP, as referenced in Role 3, but they would serve as cooperating agencies as provided by the Sikes Act rather than as a joint preparer as provided by the MLWA of 1999. The BLM would no longer have a consulting role for resolving disagreements among the preparers of the INRMP regarding the contents of the plan. The USFWS would also serve in a cooperating, rather than joint, role in the preparation of the Public Report, Role 4, but the BLM would have no legally mandated role in preparing the Public Report. The USFWS and BLM would continue to serve as members of the BMGR BEC and IEC along with the other current member agencies.

Transferring administrative jurisdiction would make the BMGR a permanent DoD facility equivalent to the status of military bases, such as Luke AFB and MCAS Yuma, which have no set expiration date and are not closed unless no longer needed. Like all permanent DoD facilities and installations, the BMGR would be retained until it is no longer needed for military purposes, at which time the range would be closed and the military departments would relinquish administrative jurisdiction over the land to DOI. Benefits of making the BMGR a permanent DoD facility would include:

- Placing the BMGR on the same footing as the regional air bases with which it is paired would provide sustained, operational support for aviation and associated training.
- Providing access to budgeting and other DoD administrative processes that are not as readily available for facilities on land classified as withdrawn; an action that would especially facilitate administrative support for Gila Bend AFAF, which is an installation with an operational airfield and heliport, air traffic control tower, billeting for deployed personnel, and administrative offices and maintenance facilities for the AFAF and BMGR.
- Providing the Secretaries of the Air Force and Navy with fully accountable authority for conserving, rehabilitating, and protecting its natural and cultural resources and providing for appropriate, sustainable, multipurpose use of those resources consistent with the military purposes of the BMGR and in accordance with applicable laws and regulations.
- Eliminating the reoccurring, time consuming, and expensive need to process extensions of the BMGR land withdrawal and reservation. This would be the same benefit as described for Alternative 1B, but the cost savings would be permanent because there would be no future land withdrawal process.

Although transferring administrative jurisdiction would eliminate any further need to process land withdrawal extensions for the BMGR, this action would neither eliminate or diminish other processes, as described for Alternatives 1A, that reassess the continuing military need for the range on an ongoing and frequent basis. If the demonstrated military need for the range should end, the military departments would relinquish their administrative jurisdiction for public lands in the BMGR to the

Secretary of the Interior. As demonstrated by the CMAGR model provided by the MLWA of 2014, the Secretary of the Interior would not have to accept a return transfer of those portions of the BMGR that could not be practicably and economically decontaminated to an extent that it could be opened to the operation of some or all of the public land laws, including the mining laws.

Transferring administrative jurisdiction for the BMGR to the Secretaries of the Air Force and Navy would also not compromise natural and cultural resource protection, conservation, and management or inhibit opportunities for Tribal, intergovernmental, and public review and comment on the continuing military need for the range, or quality of stewardship afforded to its resources, or compliance with the many other processes legally required of federal land managers.

The public, Tribal Nations, and state and local government administrations or agencies currently have frequent opportunities to review and comment on how public access as well as the natural and cultural resources of the BMGR are being managed. In addition to public reviews of NEPA documents for new proposed actions, public review and comment opportunities would continue if administrative jurisdiction were transferred through the reoccurring updates of the INRMP and Public Report at 5-year intervals. The Sikes Act sets forth the Nation's resource management policies and guidance for all U.S. military installations and provides that the Secretary of Defense is to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. An INRMP is prepared to facilitate implementation of that program and provides detailed guidance on how the natural resources of the installation (in this case, the BMGR) will be managed. While the Sikes Act requires that an INRMP be reviewed by its signatories (Air Force, Marine Corps, USFWS, and AZGFD in the case of the BMGR) no less than every 5 years, DoD Manual 4715.03 Enclosure 3 requires that the INRMP be reviewed annually by DoD agencies to ensure that it is current. When an annual review reveals that a revision is needed, the public, Tribal Nations, and local government are invited to review and comment on the proposed changes.

Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Sikes Act program for natural resources conservation and rehabilitation is 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

C. Subject to safety requirements and military security, public access to military installations to facilitate the use [16 U.S.C. 670a (a)(3)]

USFWS describes the collaborative management approach provided by the Sikes Act for military installations as a dynamic partnership for ensuring that important ecosystems are protected and enhanced while allowing military lands to suffer no net loss in meeting its national defense needs (USFWS 2020a)[3]. INRMPs are distinct from the RMPs prepared for lands managed by BLM, USFWS, and the National Park Service (NPS); the planning processes provided for those agencies lack both the

[3] The BMGR received the annual Military Conservation Partner Award in 2016, which is presented by the USFWS in recognition of a military installation whose efforts represent significant conservation accomplishments achieved in partnership with the USFWS and other conservation agencies.

collaborative planning approaches and frequent, regularly-scheduled updates as mandated by the Sikes Act, and by default the BMGR INRMP.

In addition to Sikes Act management guidance, the use and management of military ranges are subject to the requirements of all other federal applicable environmental laws and regulations including, but not limited to, NEPA, ESA, and NHPA. All major federal actions at the BMGR proposed by the Air Force or Marine Corps must be assessed in accordance with the NEPA including its mandates for public disclosure, review, and comment.

Two important regional multiagency groups, the BEC and IEC, would continue their current function if administrative jurisdiction were transferred. The BEC was founded in 1997 on the initiative of the Air Force and Marine Corps as an informal ad hoc council designed to facilitate better collaborative management of natural and cultural resources at the BMGR and enhance communication. The BEC membership includes the Air Force, Marine Corps, BLM, USFWS, AZGFD, Organ Pipe Cactus National Monument (OPCNM), and U.S. Border Patrol. The IEC was established in 2001 in accordance with the MLWA of 1999 as an outgrowth of the BEC concept to provide an official forum for exchanging views, information, and advice relating to the management of the natural and cultural resources of the BMGR that is open to the public. The IEC membership includes the BEC members and other agencies and Native American Tribal Nations that may have a direct responsibility for, potential impact upon, or direct interest in the lands or resources of the BMGR. IEC meetings—which are held three times annually on a rotating basis in Yuma, Glendale, and Tucson, Arizona—provide the public with unique opportunities to evaluate ongoing resource management activities and to present their recommendations regarding management policies and procedures to the IEC for discussion and possible implementation.

While environmental protection, natural and cultural resource management, and public access issues at the BMGR are comprehensively addressed on an ongoing or frequent basis through Sikes Act procedures, INRMP and Public Report updates, and IEC forums, the scope of the land withdrawal extension process for the BMGR is narrowly focused on the question of whether the land withdrawal should be extended or be allowed to expire and the range closed. In accordance with the guidance provided by the MLWA of 1999, the Defense Withdrawal Act of 1958, and federal regulations for processing land withdrawal applications, the question of extending the BMGR land withdrawal is focused principally on the evidence of the continuing military need for the range and the likely environmental effects of this extension. Neither the LEIS nor other elements of the extension process are appropriate decision-making conduits for considering either plans or implementation actions for natural or cultural resources management.

2.7 Alternative 2

Alternative 2 proposes that in addition to the existing lands that comprise BMGR East and BMGR West, BMGR East would be expanded with the withdrawal and reservation of the public lands in the proposed Gila Bend Addition. This action would add about 2,366 acres of public lands to BMGR East (Figures 1.3-1 and 2.3-1). The duration of the withdrawal and reservation for the BMGR, including the Gila Bend Addition, would be 25 years. The Secretary of the Air Force and/or Navy would have the option to request a subsequent extension of the land withdrawal and reservation should there be a continuing military need for BMGR East and/or BMGR West beyond the termination of the 25-year withdrawal.

Alternative 2 would continue the same existing administrative jurisdictions of the Secretaries of the Air Force, Navy, and Interior for the BMGR as described for Alternative 1 and extend those jurisdictions to the Secretary of the Air Force for the withdrawn lands in the Gila Bend Addition. CPNWR and CPW would continue to be used to support the national defense purposes of the BMGR in accordance with the provisions of Section 3032 of the MLWA of 1999 and the MOU among the DOI and the Departments of the Navy and Air Force for regulating such use.

The proposed Gila Bend Addition would increase the total area of the BMGR by 0.14 percent to roughly 1,746,043 acres. The public land parcels in Sections 19 and 31 would be used in conjunction with existing Air Force-acquired[4] lands located to the north and south of the parcel along the Gila Bend AFAF east perimeter and Arizona Department of Emergency and Military Affairs land located north and south of the airfield. This would allow the Air Force to establish a complete security perimeter adjacent to the airfield and enhance flight safety by increasing the area in which security could be enforced and by removing the potential for incompatible activities or land uses to occur in or near the runway environment and within the Accident Potential Zone. The public lands underlying the R-2305 airspace would provide the Air Force with the ability to control land use and access, ensuring surface activities in this area remain compatible with training operations in the overlying airspace.

After consideration of the comments received on the Draft LEIS and review of the purpose of and need for the BMGR, Alternative 2 is identified in this Final LEIS as the preferred alternative. As documented in Section 1.2.2.2, Section 3.2, and Appendix B, the full area of the existing BMGR land withdrawal would continue to be needed to support ongoing military training and test activities after October 2024 and to provide the resources and flexibility necessary to support training and test requirements that will inevitably emerge over the duration of the withdrawal. The foreseeable continuing military need for the BMGR already exceeds the proposed 25-year duration of the withdrawal (as discussed in Section 1.2.1); however, this timeframe would provide adequate planning and operational support for the training and test missions that are projected for the range and regional military installations that depend on the BMGR. The finite duration of the withdrawal would also pre-establish a timeframe for a subsequent Congressional review of the continuing military need for the range.

2.8 Alternative 2A

Alternative 2A proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 2, but the duration of the BMGR land withdrawal and reservation, including the Gila Bend Addition, would be 50 years. As described for Alternative 1A, Alternative 2A would more fully address the foreseeable continuing military need for the BMGR and reduce the administrative costs consumed by processing more frequent land withdrawal extensions for the range. The Secretary of the Air Force and/or Navy would have the option to request a subsequent extension of the land withdrawal and reservation should there be a continuing military need for BMGR East and/or BMGR West beyond the termination of the 50-year withdrawal.

[4] These parcels were acquired during the 1940s and serve as safety buffer lands. These parcels have not been formally appended to the BMGR East.

2.9 Alternative 2B

Alternative 2B proposes the same land area, range boundary, and administrative jurisdiction provisions as Alternative 2, but the duration of the BMGR land withdrawal and reservation, including the Gila Bend Addition, would continue for an indefinite period of time until the Secretaries of the Air Force and Navy determine that the range is no longer needed for national defense purposes. If the Secretary of the Air Force and/or Navy determine that all or part of the BMGR is no longer required for military purposes, the Secretary of the Interior would be notified and the process for relinquishing the subject BMGR lands to DOI administration and management would be initiated. Alternative 2B would fully match the currently foreseeable need for the BMGR and would eliminate any further administrative costs for processing land withdrawal extensions for the range.

2.10 Alternative 2C

Alternative 2C proposes to transfer administrative jurisdiction of the currently withdrawn and reserved public lands in BMGR East and BMGR West from the Secretary of the Interior to the Secretaries of the Air Force and Navy respectively, except that the public lands comprising the Gila Bend Addition would be transferred from the Secretary of the Interior to the Secretary of the Air Force. Alternative 2C proposes that the federal mineral estate underlying the existing BMGR and Gila Bend Addition be withdrawn from all forms of appropriation under the public land laws, including the mining laws, the mineral leasing laws, and geothermal leasing laws. The Secretaries of the Air Force and Navy would assume the sole authority for administering BMGR East and BMGR West, respectively, and for managing the natural and cultural resources of these ranges (Figure 2.3-1). The Secretary of the Interior, USFWS, and BLM would have the same roles under Alternative 2C as described for Alternative 1C, except that those roles would also be extended to the Gila Bend Addition.

2.11 No Action Alternative

Under the No Action alternative, Congress would not extend the BMGR land withdrawal. Consequently, the current withdrawal and reservation of public lands of the BMGR would expire in October 2024 (P.L. 106—65 Section 3032(e)). Military training and testing use of the range surface would end, including missions involving live-fire use of air-to-air, air-to-ground, ground-to-ground, or ground-to-air munitions.

The No Action Alternative would not necessarily lead to an end of military use of the SUA overlying the current range. Military flight operations that do not require weapons use or an air-to-ground or ground support component could be performed in the absence of the BMGR land withdrawal. Thousands of aircrews and hundreds of aircraft would continue to be stationed at the military bases in the BMGR region at the time that the BMGR would be closed under the No Action Alternative. Closure of the BMGR would critically diminish the aviation training and operational testing capabilities and capacities in the region, including the Bob Stump Training Range Complex of which BMGR West is a major component. However, the closure would not reduce the instructional and readiness training requirements and operational test missions assigned to these personnel and bases. As a result, training and test sorties that would not require use of the ground surface would continue to be flown in the SUA overlying the closed BMGR on a daily basis for some undetermined period of time after the closure of

the range. No change in the status of the R-2301E, R-2301W, R-2304, or R-2305 airspace would be expected in the near-term if the land withdrawal were not extended. There would be some potential, however, that these SUA areas and other airspace in the region would eventually be reconfigured and/or reclassified to conform to future requirements as the long-term disposition of military personnel, aircraft, and training and test missions in the region were sorted out following closure of the BMGR. These eventualities cannot be realistically predicted or characterized at this time and the No Action Alternative does not propose to change either the structure or classification of the R-2301E, R-2301W, R-2304, or R-2305 airspace.

Should Congress allow the withdrawal to expire in October of 2024 and the range to be closed, and not provide for other use for the 95.15 percent of the land that currently makes up the range, it would be up to the Secretary of the Interior to determine whether the land is suitable for restoration to public land status, or should be withdrawn for other specific public purpose, or should be disposed of out of Federal ownership through the General Services Administration. Should the land be restored to public land status, the BLM would manage the land in accordance with the FLPMA or other applicable authorities. In such instance, where Congress allows the withdrawal to expire, absent further direction from Congress, and pending the Secretary of the Interior's determination regarding the future status and management of the land, protection of cultural sites and biological resources would continue in accordance with the current INRMP and ICRMP.

The approximately 84,054 acres of former state and private lands that have been fee-acquired by DoD would at least initially remain under the administrative jurisdiction of the Secretaries of the Air Force and Navy. The AZGFD, which administers the state's interests in wildlife and habitat management, would continue to serve in that role following expiration of the land withdrawal.

Should Congress allow the legislative withdrawal to expire, the DoD would have to prepare plans for mission changes that would be necessary to compensate for the loss of the BMGR, prepare appropriate environmental documentation, and drawdown and relocate selected missions from the BMGR. The scale of operations at the BMGR is of such proportions that the loss of the range would have far-reaching effects on military bases and other ranges throughout the Air Force, Marine Corps, Department of the Navy, Army, ANG, ARNG, and Air Force Reserves. To characterize the magnitude of the effects, the BMGR regularly supports aircrew training flying from seven military air bases and heliports located within its local operating area and supports training from six other close-by bases as well as from Navy aircraft carriers. These installations collectively support the equivalent of more than 40 home-based squadrons (more than 600 aircraft) and host training involving about 1,200 additional aircraft annually from units around the country that deploy to the region to take advantage of the reliable flying weather and premium range facilities. The specific military bases, ranges, and airspace affected, and the impacts of realignment missions cannot be projected in advance of such a planning process; therefore, the environmental impacts of this course of action would be addressed in future studies if the withdrawal is allowed to expire.

Planning and actions to decontaminate, decommission, and formally close the BMGR would begin if Congress decides that the range is no longer needed. Gila Bend AFAF, other auxiliary airfields, and other developed facilities within the BMGR would also be subject to closure planning and decommissioning.

Planning for the potential reuse of these facilities as well as planning for the reuse of the closed range in general would not begin unless and until Congress determines to terminate the BMGR.

When an operational DoD range is closed, the eligible closed former range lands are entered into the Military Munitions Response Program and subjected to an evaluation and scoring process using the Munitions Response Site Prioritization Protocol. The Munitions Response Site Prioritization Protocol score reflects the relative potential for the site to be a danger to human health and the environment and would contribute to decisions regarding locations where the range is safe for reuse or could be adequately decontaminated for safe reuse. The cost to decontaminate the land and the suitable potential types of land use also would be considered. The environmental impacts of this course of action would be addressed in future studies.

3 Affected Environment

3.1 Introduction

The BMGR is situated in the Sonoran Desert and is adjacent to the U.S.-Mexico border (Figure 3.1-1). The Sonoran Desert encompasses about 100,000 square miles that roughly covers the southwestern third of Arizona and southeastern corner of California, most of the Baja California peninsula, and much of the state of Sonora in Mexico. Of the four great desert ecoregions of North America, the Sonoran Desert is the hottest and most biologically diverse. The BMGR, together with CPNWR and major portions of OPCNM, Sonoran Desert National Monument (SDNM) and BLM public lands, encompass one of the largest (about 5,000 square miles), least fragmented, and best-preserved tracts of Sonoran Desert in the U.S. (Figure 1.1-1). An estimated 60 species of mammals, over 200 species of birds, and about 50 reptile species are present within the BMGR. Most species are adapted to drought; historically, only the Colorado and Gila Rivers flowed perennially across the Sonoran Desert and today the Gila River is mostly dry, and the Colorado River water infrequently reaches the Sea of Cortez as it once did.

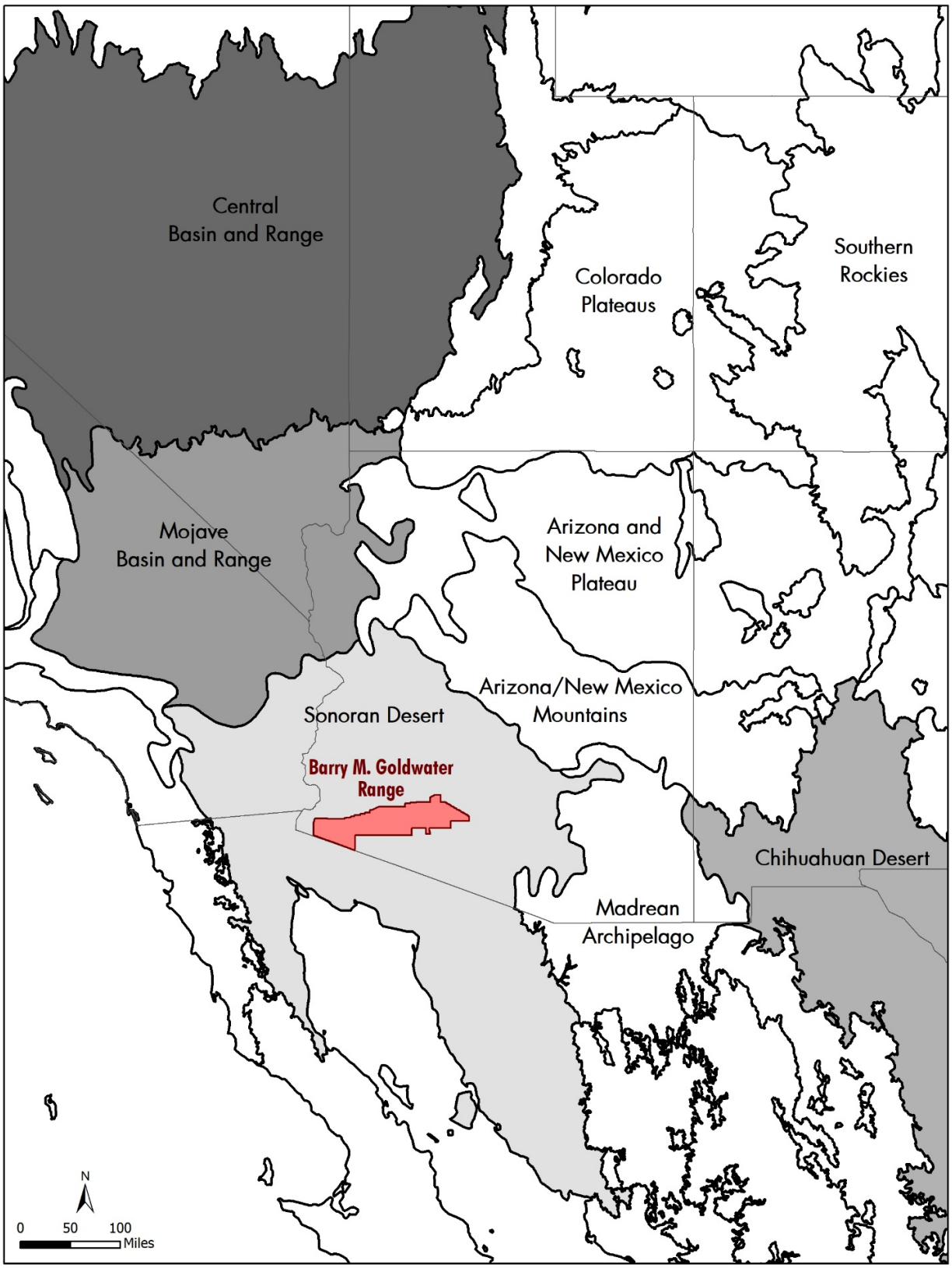
The harsh environment also influenced human use and the structure of the regional landscape. Some mineral prospecting and cattle grazing occurred in the region in the late 1800s and early 1900s, but the region was largely recognized for its biodiversity and unique features that led to special designations and uses that have, in many ways, preserved this large expanse of the Sonoran Desert.

On May 27, 1907, Theodore Roosevelt proclaimed that the 60-foot-wide strip of U.S. land that runs along the U.S.-Mexico border to be free from obstruction as a protection from smuggling. This area is referred to as the Roosevelt Reservation. The Roosevelt Reservation includes all areas that border Mexico in California, Arizona, New Mexico, and Texas. Where the border is comprised by a river or stream, the reservation extends 60 feet from the margin of the river/stream. The Roosevelt Reservation is a land withdrawal that overlaps with the BMGR; the Roosevelt Reservation is to be kept free from obstruction as a protection against the smuggling of goods between the United States and the Republic of Mexico. Patrolling this area is the responsibility of the U.S. Bureau of Customs and Border Protection (CBP) (Roosevelt 1907).

OPCNM and CPNWR were designated in 1937 and 1939, respectively, and SDNM was designated in 2001. Approximately 95 percent of OPCNM was designated as wilderness in 1977 and more than 95 percent of CPNWR was designated as wilderness in 1990. OPCNM was also designated as a Biosphere Reserve in 1976 and as a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site in 2013. Located just south of the international border, El Pinacate Y El Gran Desierto de Altar was declared a natural protected area in 1993 and designated as a Biosphere Reserve in 2013.

In 1941, civilian economic use and development of the BMGR were legally excluded and have remained so ever since. During World War II, the BMGR was used by the Army Air Forces primarily to train student aircrews in air-to-air gunnery. Training use of the BMGR diminished sharply following the end of World War II and portions of the range fell into disuse. However, the advent of the Korean War in 1950 and the beginning of the Cold War prompted the Air Force to reestablish use of the entire military reservation. The Air Force used the entire BMGR to train aircrews until 1959 when the western side of the range was

Figure 3.1-1. Sonoran Desert Ecoregion



assigned to the Marine Corps for aircrew training. The Air Force and Marine Corps have remained the operators and primary users of BMGR East and BMGR West, respectively, since that transition was completed. The BMGR has supported military training and test activities without interruption to the present.

With this context of the regional landscape, Chapter 3 describes the human, physical, biological, and cultural environments that may be affected by the alternative actions considered in this LEIS (described in Chapter 2). For many resources, the geographic study area, or region of influence, is the BMGR and the proposed Gila Bend Addition. The region of influence for some resources, such as socioeconomics, is entirely outside of the existing range. Therefore, rather than defining a single study area, the region of influence is defined at the beginning of each resource section.

The principal actions being evaluated in this LEIS would either extend the BMGR land withdrawal for continuing military training and testing purposes or lead to the closure, decommissioning, and eventual conversion of the range to non-military uses. Either outcome would be a landscape-scale, land-use decision with long-term implications for the BMGR and associated affected environments. The level of detail provided in the affected environment descriptions is scaled to support assessment of the likely environment effects of these decisions. Whether the effects reflect the BMGR as a single landscape or as a composite of several large landscape units defined or connected by topography, hydrology, ecosystem characteristics, cultural relevance, or some combination of these factors is often more important than political boundaries alone.

The affected environment descriptions for the proposed Gila Bend Addition are generally more detailed because this would be a new land withdrawal that is smaller in geographic scale and not previously considered in past evaluations of the BMGR land withdrawal or in periodic INRMP updates.

The BMGR INRMP is an installation-specific environmental management plan that undergoes internal review annually and is revised if necessary. Every 5 years the INRMP is reviewed with USFWS and the AZGFD and, if necessary, updated for operation and effect in reaching identified management goals. The most recent version was published in 2018. The Air Force, Marine Corps, USFWS, and AZGFD all participate in the development and implementation of the goals and procedures. The management approach focuses on the ecosystem to promote effective habitat, species, and natural process conservation and management. The document provides an overview and history of the installation and baseline conditions of the physical and biotic/ecosystem environments along with information about transportation, public access, land use, and natural resources needed to support the military mission. Key impacts that occur due to the ongoing mission are identified, and ongoing management actions and activities and possible future impacts are presented. The Natural Resources Program Management section provides information pertaining to survey or observed conditions and trends, responsibility and agency coordination and agreements, and strategies and rules for managing resources for the next 5 years. This information feeds the specific goals laid out at the end of the document.

The 2018 INRMP is incorporated by reference in this LEIS to provide a wealth of additional information about physical, biological, and some social resources. The goals allow for a more complete understanding of potential goals and measures that are ongoing to help reduce and mitigate ongoing impacts and reduce the potential for future impacts. The INRMP document can be accessed on the BMGR website at www.barry-m-goldwater-leis.com/public-documents. Incorporating the 2018 INRMP

by reference also reduces the length of this Final LEIS, in accordance with the 1978 version of the CEQ regulation, 40 CFR section 1502.21, Incorporation by reference, and the 2020 version of CEQs regulation at 40 CFR section 1501.12.

3.1.1 BMGR Perimeter Land Use

Land use factors in 1941 that favored using the BMGR location for military aviation training were the availability of a large expanse of principally federal land that had not been dedicated to or developed for purposes that precluded the military range, and large undeveloped tracts of land used principally for farming or ranching in the surrounding areas. Yuma, Gila Bend, and Ajo were the only notable communities in the region. The greater Yuma area has experienced considerable urban growth adjacent to the northwesternmost flanks of the range, but Gila Bend and Ajo have remained small (Figure 1.1-1). Most of the remaining BMGR perimeter continues to be sparsely occupied or uninhabited. Private and State Trust lands to the west and north of the range generally include undeveloped areas and retired and active agricultural lands. The Tohono O'odham Nation to the east and south of the BMGR is used principally for grazing and is occupied by scattered settlements. BLM multiple-use lands to the north and south of the range primarily support outdoor recreation and some grazing. Adjacent to the BMGR, the SDNM and CPNWR/CPW are also dedicated to environmental conservation and preservation. Finally, the south perimeter of BMGR West includes a segment of the Roosevelt Reservation, which borders between the U.S. and Mexico. Except for Mexican Highway 2, which traverses the area roughly parallel to the international border, no development or permanent habitation occurs in the vicinity of BMGR West in Mexico. About three quarters of the area in Mexico adjacent to BMGR West is part of the El Pinacate Y Gran Desierto de Altar Biosphere Reserve, a protected natural conservation area.

3.2 Military Land and Airspace Use

3.2.1 BMGR

As noted in Sections 1.1 and 1.2.1, the primary mission of the BMGR throughout its 80 years of history has been training of tactical aircrews, including providing advanced training for student aircrews transitioning to frontline combat aircraft and readiness training for aircrews in operational combat units. Both sides of the range are used for student and operational aircrew training, but BMGR East primarily focuses on student training, and the emphasis at BMGR West is readiness training. The BMGR has also long provided and continues to provide training for ground troops that participate in forward support for combat aviation or perform other air-ground warfare functions. Operational testing of aircraft and air and air-ground combat tactics is another essential activity that has a long legacy at the BMGR and continues in tandem with the training functions. Finally, a variety of defense-technology test programs have periodically been conducted at the range. The BMGR will likely be considered in the future as a site for new test activities that would not be related to its training mission; however, to be accommodated at the range, tests would have to be compatible with the primacy of training priorities and schedules and consistent with management practices that are essential for sustaining the capacity of the range to support training. Any new proposed test activities would be subject to evaluation under NEPA, with an opportunity for public input on the proposal, prior to its implementation.

3.2.1.1 BMGR Land and Airspace Subranges and Facilities

The first comprehensive inventory of military land and airspace use at the BMGR was presented in the 1999 LEIS (Air Force 1999) that addressed the proposed extension the BMGR land withdrawal and reservation that was later provided by the MLWA of 1999. In accordance with the MLWA of 1999, military use of the BMGR and changes in that use were subsequently tracked and reported in the BMGR INRMP in 2007 (Air Force and Navy 2007), BMGR INRMP Update and BMGR Public Report of 2012, and BMGR INRMP Update and BMGR Public Report of 2018 (Luke AFB and MCAS Yuma 2018a, 2018b). The 1999 LEIS anticipated that some training requirements at the BMGR would change during the proposed withdrawal period in response to factors such as upgrades of existing aircraft and weapons, introductions of new aircraft and weapons, and advances in warfighting tactics. The 1999 LEIS also concluded that, although some range infrastructure enhancements would likely be needed, the BMGR generally would have sufficient size, existing infrastructure, capacity, and other resources to support emerging training requirements without necessitating substantial changes in military land use. These projections have been validated by the tracking provided by the periodic INRMP and Public Report updates through 2018. Some new facilities have been developed, some existing infrastructure has been upgraded, and some ground-based activities have been discontinued, but the overall pattern of military land use at the BMGR changed minimally over the current withdrawal period.

As noted, the land and restricted airspace that comprises BMGR East and BMGR West has been subdivided into multiple subranges to support diverse types of training and provide robust training capacities (Figure 3.2-1). BMGR East supports a combination of two air-to-air and eight air-to-ground subranges for tactical aviation training, two ranges for training ground personnel, two forward assault landing zones, and several other facilities that facilitate training in air-ground combat. BMGR West provides one air-to-air and three air-to-ground subranges for tactical aviation training, six ranges for training ground forces, two assault landing zones for training with helicopters and KC-130s, an auxiliary airfield that supports both assault landing zone training and training in F-35B operations from a simulated deck of a Navy Landing Helicopter Assault or Landing Helicopter Dock ship, and several other facilities that facilitate combat training. While allocation of land and airspace for ongoing military use at BMGR East and BMGR West has been tracked through the series of Public Report updates, including in Tables 2.1 and 2.2 of the most recent 2018 Public Report (Luke AFB and MCAS Yuma 2018b), the allocations have been updated with a listing of the overall changes that have occurred during the current land withdrawal period in Appendix B.

3.2.1.2 Military Surface-Use Footprint

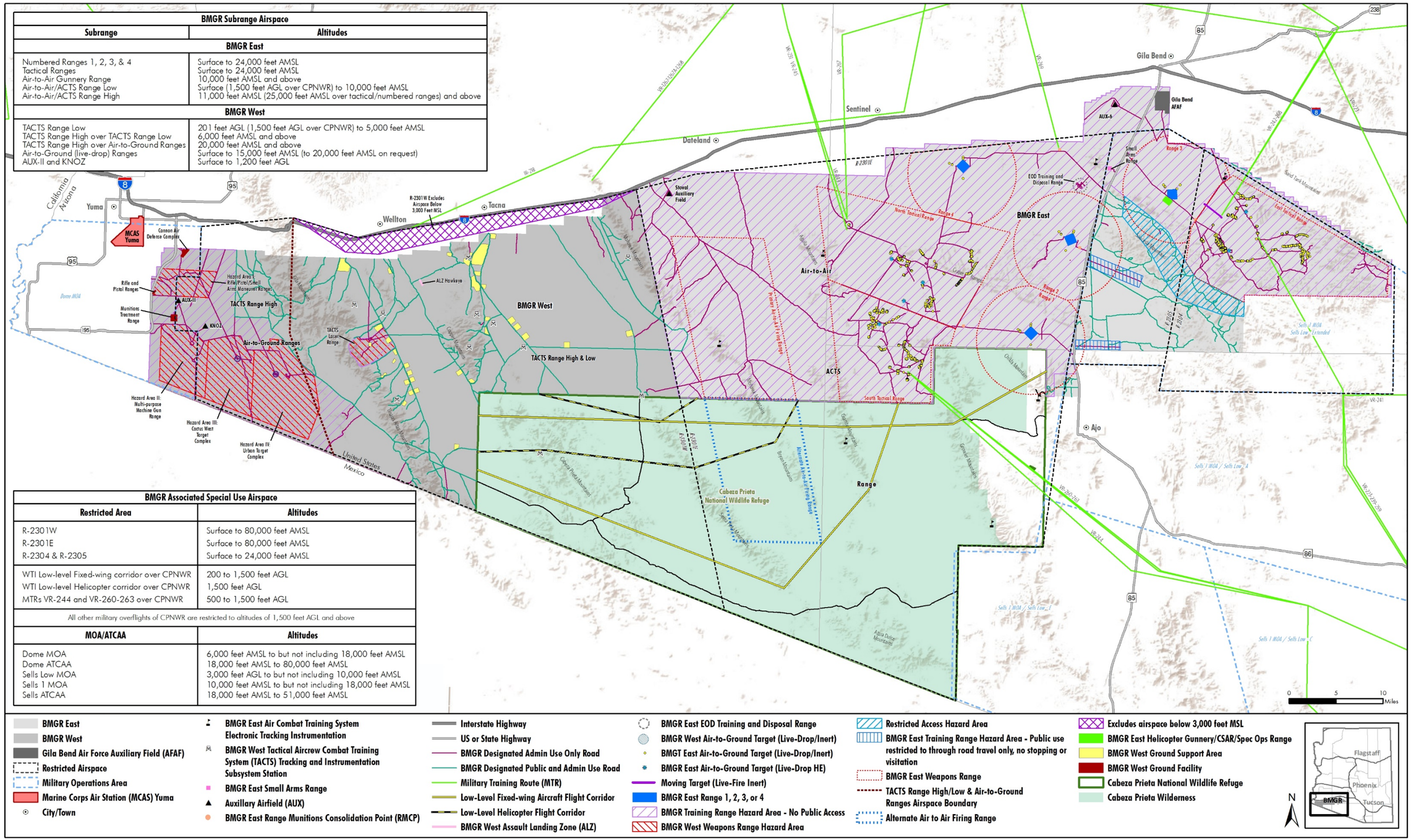
Although the entire BMGR land and airspace complex is needed to support military training and test activities, current and past military activities performed on a sustained basis directly use and have affected a relatively small proportion of the range land surface. Most of the rest of the range serves primarily as hazard areas that are configured relative to air-to-ground, air-to-air, or ground-to-ground targets, or other detonation sites, to contain 99.9999 percent of munitions, munitions fragments, or other dangers associated with ordnance use, or to contain direct or reflected laser energy that is not eye safe. Any part of the range may be activated as a location to either directly support a training or test activity or serve as part of a hazard area. Military use at the BMGR causes a wide spectrum of physical disturbances to the ground. At one end of the spectrum, the ground surface is completely disrupted by

activities such as construction of roads, some target simulations, auxiliary airfields, buildings, or high-intensity weapons impact areas. At the other end, expansive locations that are encompassed in hazard areas—such as the area under the Air-to-Air Firing Range or the portions of air-to-ground subranges that are outside of designated target impact areas and locations subject to explosive ordnance disposal (EOD) clearances—experience negligible to low levels of surface disturbance. The physical surface-use footprint of military activities that existed at the beginning of the current BMGR withdrawal was reported in the 1999 LEIS. The surface area directly affected by each activity was quantified and the physical extent of disturbance was characterized. The military surface-use footprint at the BMGR was subsequently tracked through the 2007 INRMP, 2012 INRMP Update and Public Report, and 2018 INRMP Update and Public Report and has been brought up to date for this LEIS. Appendix B describes military training and test areas and areas that support range maintenance, operations, and administration that physically affect the BMGR surface in 2020. Most of these locations are depicted on Figure 3.2-1, but Appendix B Figures B-1 and B-2 provide more refined detail on the military subranges and operating areas at the BMGR. Tables 3.2-1, 3.2-2, 3.2-3, and 3.2-4 report the size and character of the military surface-use footprint in 1999, 2007, 2012, and 2020. The military surface use areas included in the footprint data do not include the military use roads. Data for the designated BMGR road network is provided in Table 3.2-5. For the entire BMGR, the military surface-use footprint has been reduced by 121,987 acres from a total of 271,144 acres in 1999 to 149,157 acres in 2020. For BMGR East, it decreased from 258,907 acres in 1999 to 128,959 acres in 2020. For BMGR West, it increased from 12,237 acres in 1999 to 20,198 acres in 2020.

The current total military surface-use footprint at BMGR East in 2020 is half of what it was at the beginning of the current withdrawal (Tables 3.2-1 and 3.2-2). This reduction is attributable to changes in Air Force requirements for EOD surface clearances of numbered and tactical ranges (Air Force 2000, 2010). EOD surface clearances are conducted to keep ranges in a safe operating condition by periodically eliminating the build-up of unexploded ordnance as well as ordnance and target scrap metal. As shown in Table 3.2-1, EOD clearances from 1975 (which is when EOD clearance work began at BMGR East) to 2001 at the numbered ranges occurred out to 4,000 feet from the targets annually and out to one nautical mile every 5-years (Figure 3.2-2). The numbered range clearance requirements were reduced in two steps, 2001 to 2007 and 2007 to the present, to out to 300 feet from the targets every 2 years and out to 1,000 feet every 10 years. Similar reductions occurred in the EOD clearance areas at the tactical ranges. Annual clearances, which were conducted out to 1,000 feet from the targets from 1975 until 2007, were replaced in 2007 with clearances conducted every 2 years out to 300 feet from the targets (Figure 3.2-2). The 5-year clearances were reduced from 1 nautical mile (1975 to 2001), to 1 kilometer (2001 to 2007), to 1,000 feet every 10 years (2007 to the present). The Air Force found that EOD clearance areas could be reduced in size without compromising safe operating conditions as improvements in aircraft weapons systems markedly enhanced the precision with which ordnance could be delivered on-target.

The estimated military surface-use footprint at BMGR West in 2020 has increased 1.7-fold from that in 1999 (Tables 3.2-3 and 3.2-4). The proportion of BMGR West encompassed in the footprint remains relatively small, however, at just 2.9 percent of the range as compared to a 1.8 percent footprint in 1999. Over 46 percent of the increase occurred as a result of developing the four Convoy Security Operations Courses, Multi-Purpose Machine Gun Range, and Small Arms Live-Fire Maneuver Range and

Figure 3.2-1. BMGR Airspace, Subranges, and Operating Areas



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Table 3.2-1. Military Surface-Use Footprint at BMGR East

Designated BMGR East Surface Area that Directly Supports a Military Use		Levels of Surface Disturbance[a]	Area of Disturbance in Acres by Year			
			1999	2007	2012	2020
Numbered Ranges 1, 2, 3, and 4	Cleared and graded range and target areas	Complete	939	939	939	939
	Annual EOD clearance: area out to 4,000 feet from target edges (1975 to 2001)	Low to High	7,615	Retired[b]	Retired	Retired
	Annual EOD clearance: includes area out to 1,000 feet from target edges (2001 to 2007)	Moderate to High	Not Applicable[c]	3,834	Retired	Retired
	2-year EOD clearance: includes area out to 300 feet from target edges (2007 to present)	Moderate to High	Not Applicable	Not Applicable	2,245	2,245
	5-year EOD clearance: area 4,000 feet to 1 nautical mile (6,081 feet) from target edges (1975 to 2001)	Low	27,238	Retired	Retired	Retired
	5-year EOD clearance: area 1,000 feet to 1 kilometer (3,281 feet) from target edges (2001 to 2007)	Low to Moderate	Not Applicable	19,070	Retired	Retired
	10-year EOD clearance: area 300 to 1,000 feet from target edges (2007 to present)	Moderate to High	Not Applicable	Not Applicable	1,857	1,857
North, South, and East Tactical Ranges	Cleared and graded target simulations	Complete	430	430	430	430
	Annual EOD clearance: excluding graded areas, includes core target impact area out to 1,000 feet from targets (1975 to 2007)	Moderate to Complete	25,494	26,447	Retired	Retired
	2-year EOD clearance: excluding graded areas, includes core target impact area out to 300 feet from targets (2007 to present)	Moderate to Complete	Not Applicable	Not Applicable	6,580	6,580
	5-year EOD clearance: area 1,000 feet to 1-nautical mile (6,081 feet) from targets (1975 to 2001)	Low to Moderate	92,548	Retired	Retired	Retired
	5-year EOD clearance: area 1,000 feet to 1 kilometer (3,281 feet) from targets (2001 to 2007)	Low to Moderate	Not Applicable	42,028	Retired	Retired
	10-year EOD clearance: area 300 to 1,000 feet from target edges (2007 to present)	Moderate to High	Not Applicable	Not Applicable	12,256	12,256
Primary Air-to-Air Firing Range		Negligible	101,040	101,040	101,040	101,040
ACTS Range instrument sites		Complete	1	1	1	1
Auxiliary Airfields (AUX-6, AUX-11, and Stoval Auxiliary Airfield)		Moderate to Complete	1,000	1,000	1,000	1,000
Small Arms Range		Complete	15	15	15	15
EOD Training Range		Complete	145	145	145	145

Designated BMGR East Surface Area that Directly Supports a Military Use	Levels of Surface Disturbance[a]	Area of Disturbance in Acres by Year			
		1999	2007	2012	2020
Gila Bend AFAF	Moderate to Complete	2,007	2,007	2,007	2,012
RMCPs 1, 2, 3, and 4 and other EOD and range maintenance areas	Moderate to Complete	435	435	435	435
Range maintenance sand and gravel excavation and stockpile areas	Complete	Not Established	Not Established	4	4
Total Direct Military Surface-Use Areas at BMGR East		**258,907**	**197,391**	**128,954**	**128,959**

Notes:

[a] Levels of disturbance, including negligible, low, moderate, high, and complete, at BMGR East are defined as:

- Negligible Disturbance: Military use in this category, principally air-to-air gunnery, may cause or has caused scattered spot impacts from ordnance or aerial target fallout. Across the affected area military use causes negligible levels of disturbance to soil surfaces, vegetation communities, and surface drainages.
- Low Disturbance: Military use at BMGR East in this category may cause or has caused scattered spot impacts from off-target air-to-ground inert-practice ordnance and effects from infrequent dispersed EOD off-road vehicle use and activities. Across the affected area, military use causes low levels of disturbance to soil surfaces, vegetation communities, and surface drainages.
- Moderate Disturbance: Military use at BMGR East in this category may cause or has caused impacts from off-target air-to-ground ordnance (principally practice ordnance but could include live [high-explosives] ordnance near selected tactical range targets) that are present in increased numbers and densities and from an increased frequency and density of EOD off-road vehicle traffic and activities. Across the affected area, military use causes moderate levels of disturbance to soil surfaces, vegetation communities, and surface drainages.
- High Disturbance: Military use at BMGR East in this category may cause or has caused impacts from off-target air-to-ground ordnance (principally practice ordnance but includes live [high-explosives] ordnance at selected tactical range targets) that are present in increased numbers and densities including in core target areas where impact ordnance impacts can coalesce and from an increased frequency and density of EOD activities and off-road EOD and maintenance vehicle traffic. Across the affected area, military use causes high levels of disturbance to soil surfaces, vegetation communities, and surface drainages.
- Complete Disturbance: Military use at BMGR East in this category may cause or has caused complete disruption or removal of the original soil surfaces and vegetation communities and extensive or complete disruption of the original surface drainages from:
  - Air-to-ground ordnance (practice or live [high-explosives] ordnance at selected tactical range targets) impacts in core target areas that coalesce into a continuous area
  - High-intensity EOD operations and maintenance vehicle traffic
  - Cleared and graded target features, or other cleared, graded, paved, and/or built facilities.

[b] EOD clearance areas were retired from further regularly scheduled clearance work as the distance and frequency requirements for clearances were reduced. For example, the distance for the annual clearance area from 1975 to 2001 was reduced from out to 4,000 feet to out to 1,000 feet in 2001. The area retired from EOD clearance was the area from between 1,000 and 4,000 feet from the target edges while the area within 1,000 feet of the target continued to be cleared. Vegetation, soils, and drainages in retired areas incur no further disturbance from regularly scheduled EOD work and are allowed to recover naturally from previous disruption.

[c] Not applicable means that the referenced EOD clearance standards are not yet in effect; the affected range areas, however, were subject to ongoing EOD clearances in accordance with the previous standards.

Table 3.2-2. Military Surface Disturbance Areas at BMGR East

Surface Disturbance Areas at BMGR East Caused by Military Uses Identified in Table B-1	1999 Acres	1999 Percentage[a, b]	2007 Acres	2007 Percentage[a]	2012 Acres	2012 Percentage[a]	2020 Acres	2020 Percentage[a]
Total BMGR East direct use areas that incur negligible surface disturbance	101,040	9.6	101,040	9.6	101,040	9.6	101,040	9.6
Total BMGR East direct use areas that incur low surface disturbance	27,238	2.6	0	0	0	0	0	0
Total BMGR East direct use areas that incur low to moderate surface disturbance	92,548	8.8	61,098	5.8	0	0	0	0
Total BMGR East direct use areas that incur low to high surface disturbance	7,615	0.7	0	0	0	0	0	0
Total BMGR East direct use areas that incur moderate to high surface disturbance	0	0	3,834	0.4	16,358	1.6	16,358	1.6
Total BMGR East direct use areas that incur moderate to complete surface disturbance	28,936	2.8	29,889	2.8	10,022	1.0	10,027	1.0
Total BMGR East direct use areas that incur complete surface disturbance	1,530	0.1	1,530	0.1	1,534	0.1	1,534	0.1
Total Direct Military Surface-Use at BMGR East	258,907	24.6	197,391	18.7	128,954	12.3	128,959	12.3

Notes:

[a] The area of the BMGR has been determined through cadastral assessment to be 1,743,677 acres, but the areas of BMGR East and BMGR West have not been so determined. Geographic Information System (GIS) analysis shows BMGR East and BMGR West to encompass 60.28 percent and 39.72 percent of the BMGR, respectively. Using these proportions, the areas of BMGR East and West are estimated to be 1,051,088 acres and 692,589 acres, respectively.

[b] These percentages are higher than reported in 1999 because the area of the BMGR East at the time included part of the CPNWR and was about 1,608,331 acres. Adjusting the 1999 disturbance estimates to the current area of BMGR East makes these figures directly comparable to the 2007, 2012, and 2020 estimates.

Table 3.2-3. Military Surface-Use Footprint at BMGR West

Designated BMGR West Surface Area that Directly Supports a Military Use	Levels of Surface Disturbance[a]	Area of Disturbance in Acres by Year			
		1999	2007	2012	2020
AUX-2 and AUX-2 Bivouac Area	Moderate to Complete	215	215	215	215
AUX-2 Forward Ammunition Supply Point	Complete	Not Established	4	4	4
Auxiliary Landing Field (KNOZ)	Complete	Not Established	Not Established	Not Established	320
Cactus West Target Complex/Live Ordnance and Drop Tank Jettison Area	Complete	200	200	200	200
Urban Target Complex (Moving Sands Target Complex in 1999 and 2007)	Complete	200	200	205	205
TACTS Range Targets and Instrument Sites	Complete	170	170	170	170
Ground Support Areas	Low to High	10,922	10,922	11,154	11,154
Parachute Drop Zones	Low to High	18	18	4,058	4,058
Rifle and Pistol Ranges	Complete	37	37	37	37
Small Arms Live-Fire Static and Maneuver Range	Complete	Not Established	Not Established	77	77
Multi-Purpose Machine Gun Range	Moderate to Complete	Not Established	Not Established	18	18
Convoy Security Operations Courses	Moderate to Complete	Not Established	Not Established	3,265	3,265
Combat Village	Moderate to Complete	54	54	54	54
Cannon Air Defense Complex	Complete	169	169	169	169
Munitions Treatment Range	Moderate to Complete	252	252	252	252
Total Direct Military Surface-Use Areas at BMGR West		12,237	12,241	19,878	20,198

Notes:

[a] Levels of disturbance, including low, moderate, high, and complete, at BMGR West are defined as:

- Low Disturbance: Military use in this category at BMGR West may cause or has caused scattered impacts from small arms fire (inert) or effects from infrequent and dispersed foot traffic from individual or small groups of ground troops. Across the affected area, military use causes low levels of disturbance to soil surfaces, vegetation communities, and surface drainages.
- Moderate Disturbance: Military use at BMGR West in this category may cause or has caused impacts from dispersed ground troop and off-road vehicle traffic use in training area peripheries or EOD training activities. Across the affected area, military use causes moderate levels of disturbance to soil surfaces, vegetation communities, and surface drainages.
- High Disturbance: Military use at BMGR West in this category may cause or has caused impacts from concentrated ground troop activities or off-road vehicle use or core target impact areas at small arms weapons ranges. Across the affected area, military use causes high levels of disturbance to soil surfaces, vegetation communities, and surface drainages.
- Complete Disturbance: Military use at BMGR West in this category results from cleared, graded, paved, and/or built facilities that have caused complete disruption or removal of the original soil surfaces and vegetation communities and extensive or complete disruption of the original surface drainages.

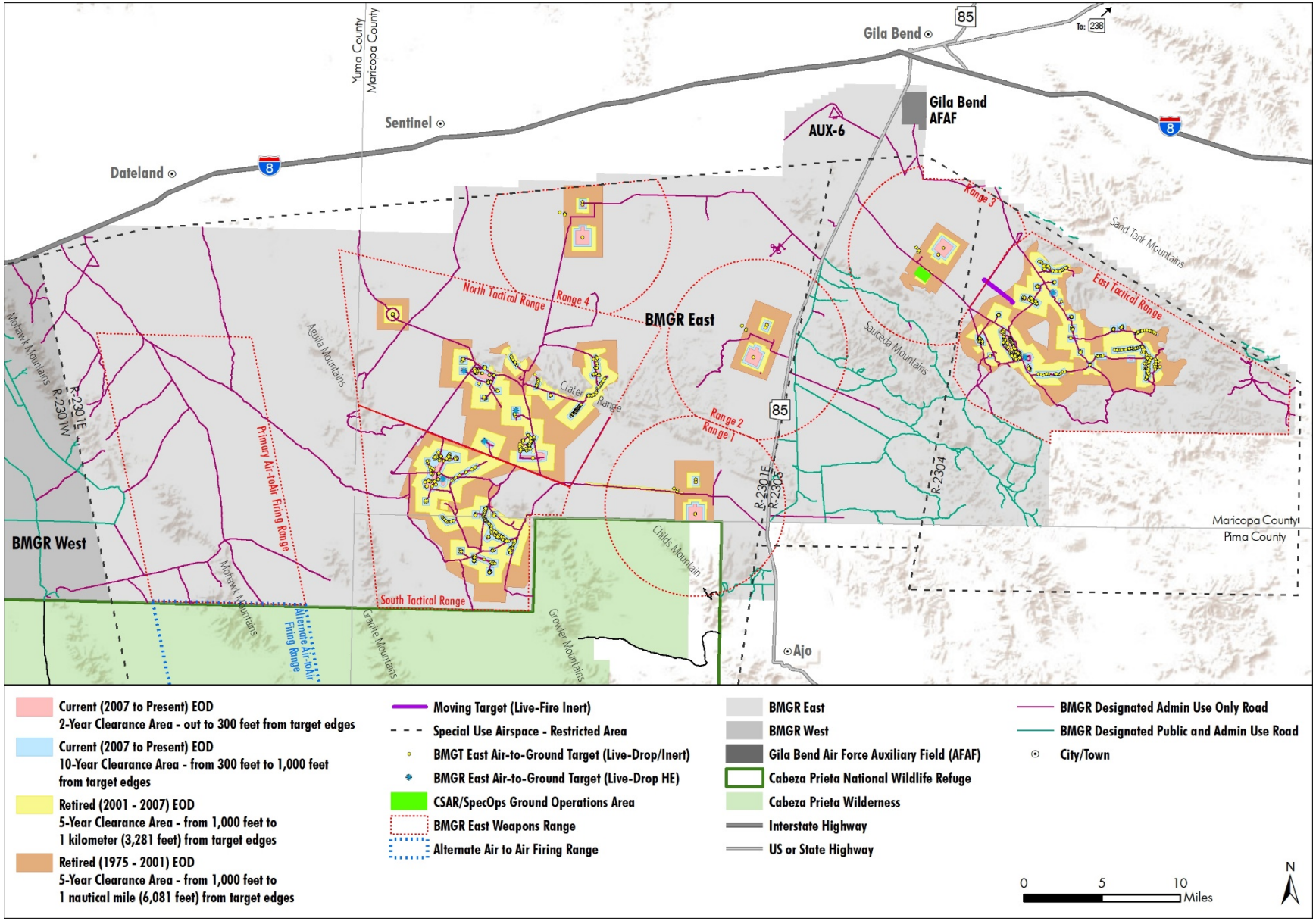
Table 3.2-4. Military Surface Disturbance Areas at BMGR West

Surface Disturbance Areas at BMGR West Caused by Military Uses Identified in Table B-2	Area of Disturbance in Acres and Percentage of Total BMGR West Area							
	1999 Acres	1999 Percentage[a]	2007 Acres	2007 Percentage	2012 Acres	2012 Percentage	2020 Acres	2020 Percentage
Total BMGR West direct use areas that incur low to high surface disturbance	10,940	1.6	10,940	1.6	18,495	2.7	15,212	2.2
Total BMGR West direct use areas that incur moderate to complete surface disturbance	521	<0.1	521	<0.1	521	<0.1	3,804	0.5
Total BMGR West direct use areas that incur complete surface disturbance	776	0.1	780	0.1	862	0.1	1,182	0.2
Total Direct Military Surface-Use at BMGR West	12,237	1.8	12,241	1.8	19,878	2.9	20,198	2.9

Notes:

[a] These percentages are higher than reported in 1999 because the area of the BMGR West at the time included part of the CPNWR and was about 1,059,769 acres. Adjusting the 1999 disturbance estimates to the current area of BMGR West, 692,589 acres, makes these figures directly comparable to the 2007, 2012, and 2020 estimates.

Figure 3.2-2. Reductions in EOD Clearance Areas in BMGR East



constructing the F-35B auxiliary landing field (KNOZ) (Figure 3.2-2 and Figure B-2). These are facilities that cause moderate to complete disturbance of the ground surface. Locating the live-fire ranges in areas of prior disturbance helps to mitigate these increases. The Convoy Security Operations Courses were sited along lead-in lines to the Cactus West and Urban Training Complex targets in areas that had been previously disturbed, the Multi-Purpose Machine Gun Range is located at a former air-to-ground target impact area, and most of the Small Arms Live-Fire Maneuver Range occupies a former sand and gravel borrow pit. Another almost 51 percent of the increase in the military uses footprint at BMGR West is attributable to an expansion in the areas designated as parachute drop zones. The parachute cargo drop zone southeast of AUX-2 was located within another former air-to-ground target impact area. Other drop zones were sited in or near ground support areas or along existing roads.

Most of the road network at the BMGR is unpaved and developed over many years at the initiative of users. An inventory of the network was not available at the beginning of the current withdrawal, but the Air Force and Marine Corps completed an inventory as part of their process for developing the EIS for the first INRMP for the range (Air Force et al. 2006).

The subsequent INRMP, completed in 2007, designated a road system for the BMGR to support the military purposes and sustainable management of the range, provide authorized public access, and accommodate other federal and state agencies with missions on the range. The INRMP established processes for sustaining the road system and for expanding or contracting it consistent with the needs of the military mission, other agency missions, protection and conservation of natural and cultural resources, and legitimate public access. The designated road system inventory was updated in the 2012 and 2018 INRMP Updates and Public Reports (Luke AFB and MCAS Yuma 2012, 2018a, 2018b) (Table 3.2-5). There are currently 744 miles of roads in the designated BMGR East system, which is about a 21 percent decrease since 2007, and 636 miles of roads in the designated BMGR West system, an almost 5 percent decrease since 2007 (Figures 3.2-2 and 3.2-3).

Table 3.2-5. Designated BMGR Road System

Road Category	Miles of Roads in 2007	Miles of Roads in 2012	Miles of Roads in 2020[a]
Miles of BMGR East roads classified for administrative-use-only inside military hazard/security areas that are restricted from general public access	741	570	555
Miles of BMGR East roads classified for administrative or public use inside military hazard/security areas	0	5	6
Miles of BMGR East roads classified for administrative-use-only outside of restricted military hazard/security areas	12	11	13
Miles of BMGR East roads classified for public use outside of restricted military hazard/security areas, but subject to temporary closure for military purposes	188	170	170
Total Miles of BMGR East Roads	941	733	744
Miles of BMGR West roads classified for administrative-use-only that are restricted from general public access	175	195	209
Miles of BMGR West roads classified for administrative or public use	490	427	427

Road Category	Miles of Roads in 2007	Miles of Roads in 2012	Miles of Roads in 2020[a]
Total Miles of BMGR West Roads	665	622	636
Total Miles of BMGR Roads	1,606	1,355	1,380

Note:
[a] As reported in the 2018 INRMP Update and Public Report (Luke AFB and MCAS Yuma 2018a, 2018b)

Off-road vehicle trails, some that have evolved into road-level features from frequent use, have been created in the BMGR during the current withdrawal by illegal smuggler and migrant traffic from Mexico and by CBP actions to interdict smugglers and migrants and provide search and rescue services for border crossers in distress. Vehicle trails created by and associated with cross-border traffic are outside of the authorities of the Air Force and Marine Corps to control and manage and are not part of the approved road system.

3.2.1.3 Military Operations

Aviation training is the priority and most prevalent military activity at the BMGR. As previously noted, BMGR East is used principally for training student aircrews transitioning to front-line aircraft, but also supports readiness training for operational aircrews and other personnel. BMGR West is used primarily for aircrew readiness training by operational squadrons, but it is also a key range training area for the Marine Corps WTI Course, which imparts highly advanced tactical instruction to aircrews from aviation squadrons throughout the Marine Corps as well as aviation-supporting ground units. Regular aviation training users of BMGR East currently include:

- Luke AFB, 56 FW and AFRC 944 FW – transition training to F-35A and F-16
- Davis-Monthan AFB, 355th Wing and AFRC 924th Fighter Group – transition and operational readiness training to/in A-10/OA-10
- Davis-Monthan AFB, 55th Electronic Combat Group – operational readiness training in EC-130H
- Davis-Monthan AFB, 563rd Rescue Group and AFRC 943rd Rescue Group – operational readiness training in HC-130P/E and HH-60G
- Morris ANG Base, 162nd Wing, all ANG transition training to F-16
- Silverbell Army Heliport, Peace Vanguard and B Co 2-285th Aviation Regiment– transition and operational readiness training to/in AH-64A/D and UH-60A
- Papago Heliport, Papago Military Reservation, ARNG 2-258th Assault Helicopter Battalion – operational readiness training in UH-60

Another regular aviation user of BMGR East is the AATC at Morris ANG Base. AATC conducts operational tests on behalf of each Air Force major command, including supporting operational flight program testing for the F-16. Additionally, AATC performs testing on a wide variety of other aircraft, including A-10, F-15A/B, HH-60, and HC-130 and electronic combat systems for those aircraft.

BMGR East is used for aviation readiness training on a periodic but frequent basis by ANG, AFRC, ARNG, and foreign ally squadrons that conduct what are typically 1- to 2-week training deployments to

southern Arizona, particularly during the winter, to take advantage of the available SUA, BMGR, and reliable flying weather.

These deployments are often hosted at Davis-Monthan AFB. Other periodic BMGR East users include Marine Corps and Navy air units based in the region. One of the most well-known periodic users of BMGR East is the semiannual WTI Course (Section 1.2.2.2). Each course typically lasts 6 weeks and may include scheduling of individual BMGR East ranges on a number of occasions. The capstone of the course is a final large-force exercise that typically utilizes the entire BMGR over 2 days and nights for a complex training scenario that incorporates every aviation and aviation-supporting ground function of a MAGTF. Although usually not as complex as the WTI final exercise, other large-force aviation exercises[1] that require combined range areas or all of BMGR East are periodically scheduled by various components of the armed services.

Regular ground training users of BMGR East currently include JTAC and CSAR personnel. JTACs are integral to applying the precision air-to-ground strike capabilities of U.S. air power in close support of U.S. or allied ground forces. During the current BMGR withdrawal, JTACs have been extensively integrated in air-to-ground attack training at North, South, and East tactical ranges. Whether they are involved in transition or readiness training, aircrews place a priority on opportunities to work with JTACs when delivering weapons on targets in the tactical ranges. The pairings enhance the realism of the training for both the aircrews and JTACs. JTACs from all branches of the armed services and some allied nations schedule deployments to BMGR East to take part in this training. As a result, many air-to-ground attack missions at the tactical ranges involve combined aircrew and JTAC training.

The 563rd and AFRC 943rd Rescue Groups conduct CSAR readiness training at BMGR East regularly and the Rescue Range is their most frequently used asset. Helicopter gunnery practice is the most common CSAR activity at the Rescue Range, but the helicopter landing zones and ground operations area are also used by pararescuemen, combat rescue officers, and other special operators for readiness training in helicopter supported infiltration and exfiltration, tactical ground maneuvers, and small arms use. CSAR teams and other special operators periodically access the tactical ranges for more complex and realistic exercises potentially involving parachute-simulated rescue subjects, parachute or helicopter inserts, land navigation and tactical maneuvering by inserted ground parties, helicopter extractions of rescue subjects and rescuers, and integration of overhead close air support by A-10s or other aircraft.

The regular aviation training users of BMGR West currently are drawn from squadrons located at MCAS Yuma, MCAS Miramar, and MCAS Camp Pendleton (Figure 1.1-2):

- MCAS Yuma currently hosts:
  - Two fighter attack squadrons flying F-35B
  - One fighter attack squadron transitioning to F-35B
  - Two attack squadrons flying AV-8B pending later transition to F-35B
  - One Marine Corps Reserve fighter attack training squadron flying F-5F/N
  - One operational test and evaluation squadron flying various aircraft
  - One unmanned aerial vehicle squadron flying RQ-21A

[1] Large-force exercises are those with more than 10 participating aircraft in the assigned range airspace area.

- MCAS Miramar currently hosts:
  - Two fighter attack squadrons flying F/A-18C/D
  - One fighter attack squadron flying F-35C
  - One fighter attack training squadron flying F/A-18C/D
  - One aerial refueler transport squadron flying KC-130J
  - Five medium (lift) tiltrotor squadrons flying MV-22B
  - Four heavy (lift) helicopter squadrons flying CH-53E
- MCAS Camp Pendleton currently hosts:
  - Four light attack helicopter squadrons flying AH-1W/Z
  - One light attack helicopter training squadron flying AH-1W
  - Two medium (lift) tiltrotor squadrons flying MV-22B

Although squadrons from these three MCASs are regular users of BMGR West, they do not all use the range with the same frequency. The close proximity of MCAS Yuma to the range provides the squadrons stationed there with daily access to its training areas. Fighter squadrons from MCAS Miramar have the unrefueled flight radius and speed to also make frequent use of BMGR West. The tiltrotor and helicopter squadrons stationed at MCAS Miramar and MCAS Camp Pendleton are regular users of BMGR West, but, because of the distance between these installations and BMGR West (Figure 1.1-2), they use the range on a more periodic basis, principally for combined arms exercises involving ground troops. The proximity of MCAS Yuma to BMGR West and the full air station support available there make these types of training evolutions possible, valuable, and cost-effective on a routine basis. In fact, MCAS Yuma is the most active deployment site in the U.S. for Marine aviation units from both the east and west coasts. The air station hosts between 50 and 70 units that deploy to train at the BMGR annually.

Ground troop training at BMGR West is conducted:

- Regularly to maintain the individual small arms qualifications and individual and small team tactical skills of Marines stationed at MCAS Yuma
- Periodically to prepare Yuma or other regionally based units, such as Marine Wing Support Squadron-371, more comprehensively for upcoming deployments
- Periodically for combined arms training exercises involving local and/or deployed Marines that integrate the air and ground functions of the Aviation Combat Element of a MAGTF

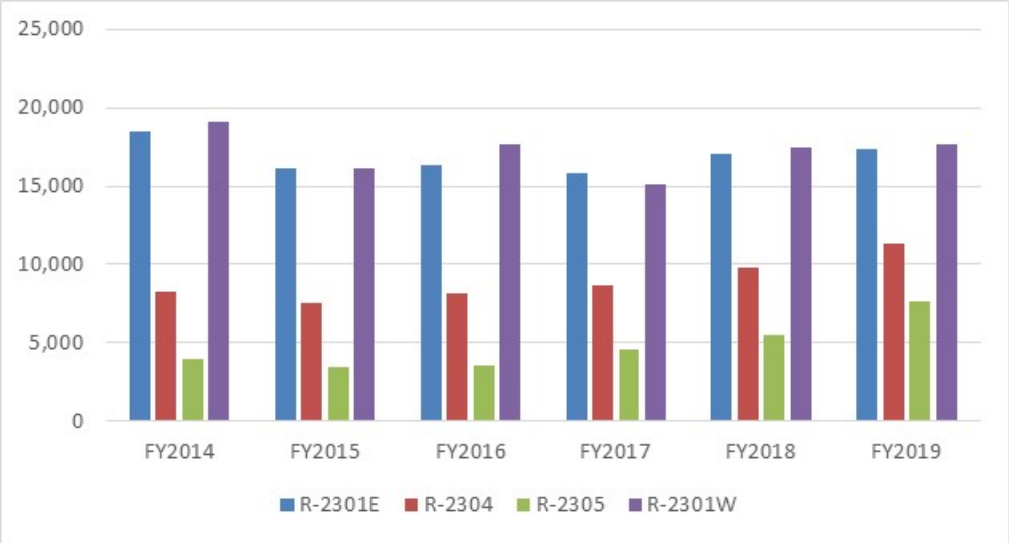
Regular small arms qualification and tactical skills training occurs principally at the Known-Distance Rifle and Pistol Ranges and Small Arms Live-Fire Static and Maneuver Ranges. These ranges are also used for pre-deployment readiness training as are the Multi-Purpose Machine Gun Range and Convoy Security Operations Courses. AUX-2 or certain ground support areas may be selected as sites for pre-deployment training involving integration of aviation and ground support functions such as forward arming and refueling of aircraft or radar air surveillance and ground control of aircraft. Complex combined arms training exercises, such as the semiannual WTI Course, draw from the full selection of BMGR West air and ground training ranges and ground support areas as needed to realistically support the particular training scenarios of the exercise.

The BMGR is not used for training involving force-on-force land combat, large infantry or mechanized ground forces, armored-combat vehicles, or mechanized maneuvers. Vehicles used to transport and support ground troops are restricted to the designated BMGR road system except in designated ground support areas or an auxiliary airfield where vehicles may be driven off-road to bivouac or operational work areas. All ground-based training activities within BMGR West must comply with standard environmental protection procedures. Human sewage at base camps and other locations of troop concentrations is contained in portable toilets and removed by commercial contractor to approved off-range sewage treatment facilities. All litter is policed and contained daily to be carried off-range to approved landfill sites. Fuel tankers, vehicles being fueled, and other stationary equipment such as generators that may leak fuels or lubricants are placed over temporary containment aprons formed by plastic sheeting and sandbags to catch inadvertent spills. A hazardous materials response plan and team is in place at MCAS Yuma to respond immediately to any spills. Troops that move cross-country, such as a small reconnaissance team, carry out all litter generated by their activities.

3.2.1.4 BMGR Utilization

Aviation training and test missions are flown at the BMGR throughout the year. An exact breakdown of the numbers of missions flown for training versus test purposes is not available, but training accounts for more than 99 percent of the annual sorties. Total aviation activity at the BMGR varies from year to year, but the range is consistently busy, and the patterns of annual use are similar (Figure 3.2-3). On BMGR East, the three tactical ranges supported roughly even volumes of training, as did the four numbered ranges, which demonstrates that each of these training areas provides a significant contribution to the air-to-ground training capacity. Federal fiscal year 2019 use data for BMGR West show that about 60 percent of the aviation training was supported by the TACTS Range or TACTS Range airspace and the remaining 40 percent, combined, utilized the Urban and Cactus West air-to-ground target complexes or the KNOZ and AUX-2 auxiliary airfields. Although the distribution of aviation training among BMGR East and BMGR West subranges varies from year to year, the federal fiscal year 2019 data is nonetheless representative of the ongoing pattern of training use for recent years. The volume of military flight activities at the BMGR in the foreseeable future would be expected to continue at rates similar to those experienced in the last 6 years (Figure 3.2-3). However, changes in aviation training or test requirements would likely emerge from time-to-time causing the volume of flight activity at the BMGR to increase or decrease from the trend indicated by the last 6 years of record.

Figure 3.2-3. Annual Sorties Flown in BMGR Restricted Areas Federal Fiscal Year 2014 through 2019



A wide variety of ordnance reflective of much of the U.S. inventory of air-to-ground bombs, rockets, missiles, and gunnery rounds used in warfighting is dispensed in training at the BMGR. As already noted, more than 99 percent of the munitions delivered on the tactical ranges in BMGR East are inert-practice variants that nevertheless accurately simulate delivery of warfighting ordnance. Live high-explosives ordnance deliveries are restricted to six designated tactical range targets. Only inert-practice ordnance may be delivered at the numbered ranges or fired in the air-to-air range in BMGR East or delivered at the Urban or Cactus West target complexes in BMGR West. The use of depleted uranium projectiles, cluster submunition dispensing ordnance, or high-explosive incendiary bullets is prohibited at the BMGR. See also Section 3.16.1.2 on Munitions Constituents.

3.2.2 Gila Bend Addition

The BLM public land proposed as the Gila Bend Addition land withdrawal currently has no military use (Figures 1.1-1 and 1.3-1). Gila Bend AFAF is in BMGR East, but it is located north of the restricted airspace at the range (Figure 3.2-1). The airspace overlying Gila Bend AFAF to a radius of 3 statute miles from the center of the runway (excluding the airspace in R-2305 when that restricted area is active) and from the ground surface to 3,900 feet MSL (about 3,000 feet above ground level [AGL] over the runway) is designated as Class D airspace when the control tower at the auxiliary airfield is active. The entire proposed Gila Bend Addition is either within the lateral dimensions of the Class D airspace or R-2305 when these airspace areas are active. Military or civil aircraft can operate in this Class D airspace in accordance with Federal Aviation Regulations (14 CFR Part 91.129) if they have established two-way radio communications with the control tower and proceed in accordance with tower directions. Military aircraft operating in Gila Bend AFAF Class D airspace may fly over the proposed Gila Bend Addition. Civil aircraft are generally restricted to through flight of the Class D airspace and may not operate in or out of Gila Bend AFAF without prior authorization. Civil aircraft are generally restricted from operating in R-2305 over the Gila Bend Addition when R-2305 is active.

3.2.3 Military Use of the CPNWR and CPW

As noted in Section 2.2, guidance for the use of the CPNWR and CPW to support current and future military aviation training needs consistent with the MOU of November 21, 1994 (Appendix C) is provided by the MLWA of 1999 (P.L. 106-65 Section 3032). The MOU of 1994, in turn, was prepared in accordance with the Arizona Desert Wilderness Act of 1990 (P.L. 101—628 Section 301(f)), which provides that the designation of roughly 95 percent of the CPNWR as wilderness could not be construed as:

- Precluding or otherwise affecting continued low-level overflights by military aircraft over such refuge or the maintenance of existing associated ground instrumentation, in accordance with any applicable interagency agreements in effect on the date of enactment of this Act.
- Precluding the Secretary of Defense from entering into new or renewed agreements with the Secretary of the Interior concerning use by military aircraft of airspace over such refuge or the maintenance of existing associated ground instrumentation, consistent with management of the refuge for the purpose for which such refuge was established and in accordance with laws applicable to the National Wildlife Refuge System.

In accordance with the MLWA of 1999 and the MOU of 1994, current use of the CPNWR and CPW to support ongoing military aviation training includes:

- Restricting military overflights of the CPNWR and CPW at altitudes below 1,500 feet AGL by participants in the semiannual WTI Courses to two low-level routes for fixed-wing aircraft and two low-level routes for helicopters (Figure 3.2-1). The fixed-wing routes extend upward from 200 to 1,500 feet AGL and the helicopter routes extend upward from 50 to 1,500 feet AGL; all four routes are 4 nautical miles wide. These routes are typically used at specific pre-scheduled times during the final exercise of a WTI Course to provide aircrews with realistic low-level ingress and egress options from a simulated battlespace located in BMGR East. The requirement that low-level overflights of the CPNWR be restricted to mutually approved corridors was established through an MOU of 24 March 1975 among the Air Force, Navy, and USFWS. (The 1975 MOU was later superseded by the MOU of 1994.) Low-level corridors were first established to support the WTI Course in February 1988. The CPW was designated in November 1990.
- Restricting military overflights of the CPNWR and CPW at altitudes below 1,500 feet AGL for purposes of low-level ingress to South Tactical Range to two closely overlapping MTR corridors that traverse the northeastern area of the CPNWR and CPW (Figure 3.2-1); these MTRs are in addition to the low-level flight corridors used for WTI. These MTR corridors are flown in one direction and have an altitude floor of 500 feet AGL and an altitude ceiling of 3,000 feet AGL; the lateral limits are 2 nautical miles to the right and 3 nautical miles to the left of the centerlines. These MTR corridors have been in operation over the CPNWR since 1976 and are available to be scheduled for training use throughout the year.
- Restricting military overflights of the CPNWR and CPW that are not scheduled to use either the WTI Course low-level routes or the MTRs to altitudes of 1,500 feet AGL or above. All of the airspace overlying the CPNWR and CPW from the ground surface to 80,000 feet AMSL is within either R-2301W or R-2301E, and the Marine Corps and Air Force are the using or scheduling

authorities for these restricted areas, respectively. DOI and USFWS have no authority to regulate airspace use over the CPNWR, but the Air Force and Navy agreed with USFWS to restrict its overflights of the refuge to altitudes of 1,500 feet AGL or above except as described previously.

- Operating and maintaining three ground-based, electronic instrument installations in the CPNWR/CPW that are components of the ACTS in BMGR East and one ground-based, electronic instrument installation in the CPNWR/CPW that is a component of the TACTS in BMGR West (Figure 3.2-1).

The MLWA of 1999 and the MOU of 1994 also provide the authority to allow an Alternate Air-to-Air Firing Range that overlies a roughly 100,000-acre area in the CPNWR and CPW to be used to support live air-to-air firing exercises with 60 days of written notice to the Refuge Manager (Figure 3.2-1). The Alternate Air-to-Air Firing Range has not been used since the MOU of 1994 was executed. If it became necessary to use the Alternate Air-to-Air Firing Range, the portion of the CPNWR and CPW underlying the Air-to-Air Firing Range that would also be reactivated as a hazard area would have to be closed to entry by all persons during the scheduled activation period.

The MOU of 1994 also:

- Prohibits development of air-to-ground targets in the CPNWR and CPW.
- Prohibits military personnel on the ground from entering the CPNWR or CPW without authorization from the Refuge Manager except in emergencies, such as a military aircraft crash, involving the safety and welfare of human life, or the protection of Government property.
- Prohibits construction of new roads, structures, or facilities or the placement of structures or facilities in the CPNWR or CPW for military purposes without authorization from the USFWS.

Although the MLWA of 1999 (P.L. 106-65 Section 3032(b)(1)(B)) provides that the CPNWR and CPW be managed, in part, to support current and future military aviation training needs consistent with the MOU of 1994, it also stipulates that when determined essential to support military aviation training needs, the Secretaries of the Navy, Air Force, and Interior shall negotiate amendments to the MOU for the following purposes:

- To revise existing or establish new low-level training routes or to otherwise accommodate low-level overflight
- To establish new or enlarged areas closed to public use as surface safety zones
- To accommodate the maintenance, upgrade, replacement, or installation of existing or new associated ground instrumentation (P.L. 106-65 Section 3032(d)(1)(A))

The MLWA of 1999 further provides that such amendments to the MOU of 1994 would not be subject to determinations of compatibility with the National Wildlife Refuge System Improvement Act of 1997 or of the Arizona Desert Wilderness Act of 1990. Designating lands within the CPNWR as wilderness could not preclude military use.

Development of air-to-ground targets in the CPNWR and CPW is prohibited, but a need to establish new or enlarged surface safety zones (generally referred to as hazard areas in this LEIS) in the refuge or wilderness is acknowledged in and supported by the MLWA of 1999 (P.L. 106-65 Section 3032(e)). Any new proposed hazard area would be subject to evaluation under NEPA, with an opportunity for public input on the proposal, prior to its implementation. In such instances, the affected area would be closed to public access for the duration of the event.

In accordance with the MLWA of 1999, amendments to the MOU of 1994 to upgrade or replace existing ACTS or TACTS ground instrumentation or to install new ground instrumentation also cannot be precluded by the designation of most of the CPNWR as wilderness. However, these actions can only be approved if the Secretary of the Interior, after consultations with the Secretaries of the Navy and Air Force, determines that the impacts from such actions, considered both individually and cumulatively, would be similar or less than the impacts caused by the existing ground instrumentation permitted by the Arizona Desert Wilderness Act of 1990. While four ACTS instrument sites were located in the CPNWR when the CPW was designated in 1990, the instrument installed in the Sierra Pinta Mountains was later eliminated as a component of the ACTS during the current withdrawal.

Use of the two low-level routes for fixed-wing aircraft and two low-level routes for helicopters over CPNWR can vary from one WTI Course to the next but use data for these low-level routes during the fall 2019 course provides a representative example. During the fall 2019 course, fixed-wing use (including a mix of principally F-35Bs, F/A-18E-Fs, and AV-8Bs) amounted to 367 sorties, which would translate to approximately 734 sorties annually. Helicopter and tiltrotor use (including a mix of principally CH-53s, AH-1Zs, and MV-22Bs) included 182 sorties in the fall 2019 course, which would translate to about 364 sorties annually. The use for each course would typically occur during the final exercises over a few days and nights in the last week of the course.

Three recent years of use data are available for the two overlapping MTR corridors that traverse the northeastern area of the CPNWR and CPW. The two corridors combined carried an average of 291 sorties per year for federal fiscal years 2017, 2018, and 2019. Most of traffic on these corridors was dominated by F-35A and F-16 aircraft followed by A-10Cs.

3.3 Civil Aviation

In addition to its importance for supporting military training and testing, the BMGR region is also significant as a heavily traversed air transport corridor that connects the West Coast and trans-Pacific airways with the interior and eastern regions of the U.S. Private sector through-flight of the BMGR region, whether long-haul or regional, is typically channeled by the prevalence of active SUA at or in association with the BMGR, YPG, CMAGR, and El Centro Ranges, and other regional SUA through two east-west corridors.

- The southern corridor lies south of the CMAGR and El Centro Training Ranges and between the BMGR and YPG.
- The northern corridor runs north of the CMAGR and El Centro Training Ranges and between YPG and the Quail and Gladden MOAs/ATCAAs.

Two types of low-altitude fixed airways and two types of high-altitude fixed airways currently provide en route navigation guidance for airlines, air freight carriers, business aviation, and cross-country general aviation in the vicinity of the BMGR and greater region. Low-altitude fixed airways (Figure 3.3-1) generally begin at 1,200 feet AGL and extend up to, but do not include, 18,000 feet AMSL. High-altitude fixed airways begin at 18,000 feet AMSL and extend up to Flight Level 450 (approximately 45,000 feet; refer to glossary), inclusive.

The two types of low-altitude airways include long-serving Very-high frequency Omnidirectional Range (VOR) airways (identified by a "V" followed by a number and referred to as Victor Routes) and recently implemented area navigation (also known as RNAV[2]) airways (identified by a "T" followed by a number and referred to as T-routes). The two types of high-altitude airways are analogous to their low-altitude counterparts and include long-established jet routes (identified by a "J" followed by a number) that also follow course guidance provided by VOR stations and the recently implemented high-altitude RNAV airways (identified by a "Q" followed by a number and referred to as Q-routes).

For the last three decades, the FAA has been proceeding with a plan to reduce the operational network of VORs in many parts of the U.S. and transition from VOR-based Victor Routes and Jet Routes with RNAV-based T-routes and Q-routes, which provide more direct routing, reduce flight time and aircraft fuel consumption, and reduce VOR maintenance costs. The currently ongoing part of this plan involves decommissioning about one-third of the almost 1,000 VORs nationwide and transitioning to newly published and charted T-routes and Q-routes (FAA 2016). This process began in 2016, but none of the VORs in Arizona or southern California are scheduled to be shutdown. New T-routes and Q-routes may be published and charted in the BMGR region, but there are no announced plans to reduce or otherwise modify the Victor and Jet route systems in the region for the foreseeable future.

The distribution of civil airports in the BMGR region is generally sparse. Yuma International Airport is the nearest commercial service airport to the BMGR. MCAS Yuma/Yuma International is a "shared-use" airport that had a total of 200,879 aircraft operations (defined as the number of takeoffs plus the number of landings) in 2016, but only 10.8 percent of those operations were classified as commercial flights; another 37.2 percent of the operations were by general aviation aircraft and 52 percent were by military aircraft (Table 3.3-1). Phoenix Sky Harbor International was the 13th busiest airport in the United States in 2018 based on the number of passengers boarded, which the FAA records as enplanements. Commercial service at Phoenix Sky Harbor accounted for over 94 percent of the aircraft operations in 2016 while general aviation and military flights contributed less than 5 and 1 percent, respectively. Tucson International Airport is a joint-use facility shared with the Morris ANG Base. Military aircraft accounted for about 19 percent of the operations at Tucson International in 2016, and general aviation and commercial service accounted for about 45 and 36 percent of the operations, respectively.

[2] RNAV airways, which have been established since the early 2000s, support direct routing using global positioning system (GPS) or other specialized equipment to navigate between published waypoints. RNAV airways eliminate the need to navigate between fixed-position VOR stations.

Figure 3.3-1. Low-Altitude Federal Airways

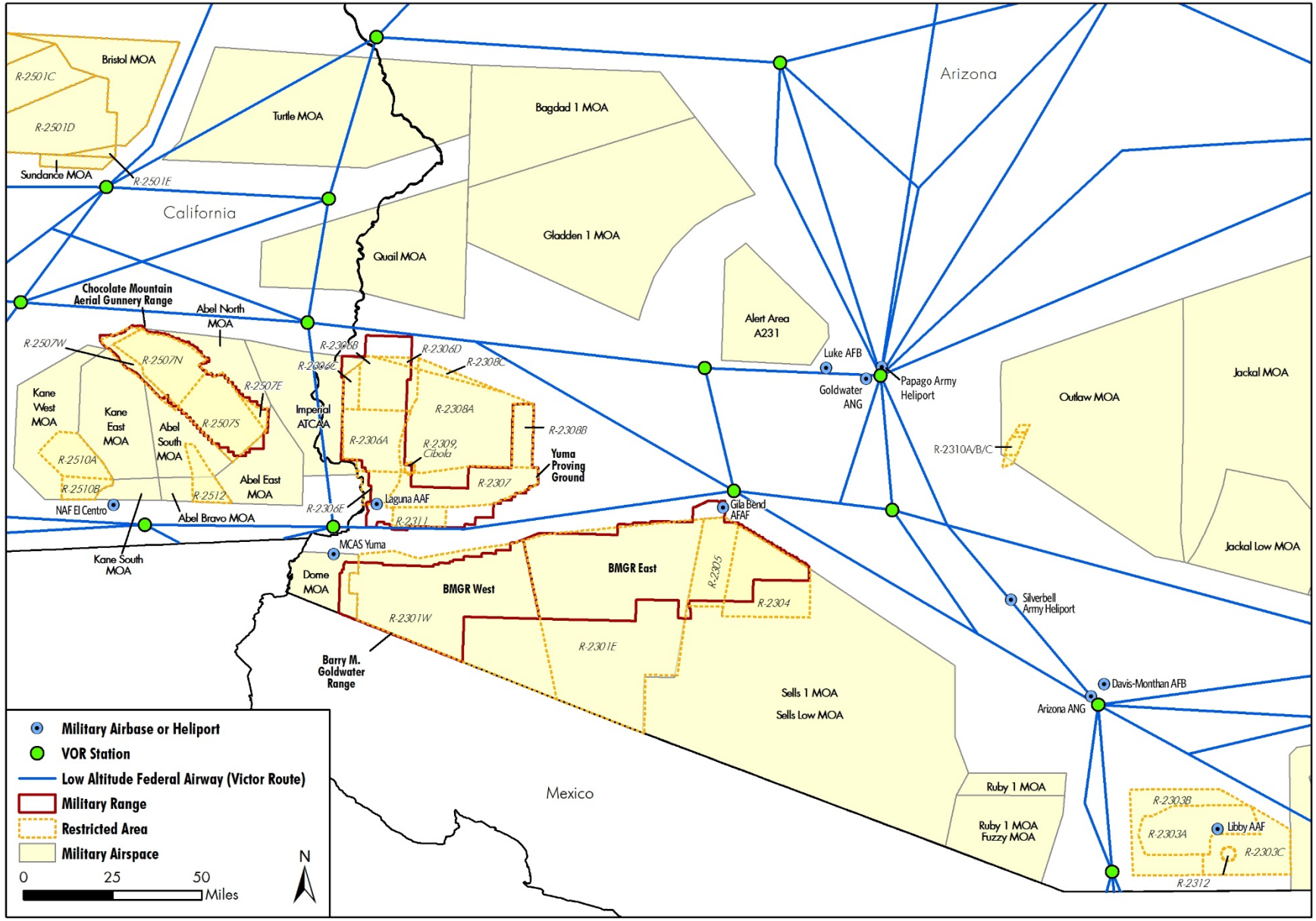


Table 3.3-1. Commercial Service Airports in or near the BMGR Region

Commercial Service Airport	Total 2016 Operations[a]	Total 2018 Enplanements[b]	Projected 2036 Operations[a]	Projected 2036 Enplanements[a]
Phoenix Sky Harbor International	442,322	21,622,580	619,146	31,148,339
Tucson International	139,555	1,753,227	160,380	2,311,489
Phoenix-Mesa Gateway	235,790	778,972	286,292	1,078,624
MCAS Yuma/Yuma International	200,879	79,731	200,879	72,795

Sources: [a] ADOT 2018a [b] FAA 2018

Since before the current BMGR withdrawal, MCAS Yuma Approach Control has provided all air traffic control service to military and civil aviation alike in the vicinity of Yuma. The Los Angeles Air Route Traffic Control Center has delegated authority to MCAS Yuma Approach Control to act as the controlling agency for the airspace that extends south to the international border and for the airspace from the surface to 23,000 feet MSL around MCAS Yuma for about 45 nautical miles to the east, 30 nautical miles to the west, and 50 nautical miles to the north. MCAS Yuma Approach Control executes both en route and terminal (at MCAS Yuma/Yuma International) air traffic control functions for all military and civil flights within this area. The Los Angeles Air Route Traffic Control Center delegated this authority to MCAS Yuma to increase the efficiency of both military and civil traffic flow within and through an airspace region without loss of safety margins in an area that is often constrained by active SUA. En route air traffic control functions in the BMGR region outside of the MCAS Yuma Approach Control area of responsibility are split between the Los Angeles and Albuquerque Air Route Traffic Control Centers.

As one of the busiest airports in the country, the Phoenix Sky Harbor terminal area is designated as Class B airspace, the only such designation in Arizona. Tucson International and Davis-Monthan AFB are both supported by Class C airspace, but the rest of Arizona's airports with control towers and airports in southeastern California with control towers are designated Class D airspace areas. The only airports near the BMGR with Class D airspace are MCAS Yuma/Yuma International, Laguna Army Airfield at YPG, and Gila Bend AFAF.

MCAS Yuma/Yuma International is a public airport that supports both commercial service and general aviation. All other charted civil airports near the BMGR lack control towers. Rolle, which is south of MCAS Yuma, Gila Bend Municipal, and Eric Marcus Municipal in Ajo are public use, general aviation airports with paved runways.

Private, general aviation airports in the BMGR region include:

- Tri-Rotor Ag, west of the range between Rolle and MCAS Yuma (unpaved runway).
- Somerton, west of the range between Rolle and MCAS Yuma (unpaved runway).
- Dusty Wings, north of Tacna and the Gila River (unpaved runway).
- Paloma Airport, about 9 miles west of Gila Bend and south of Interstate 8 (paved runway).

- Morton Ultralight Flight Park, 2 miles east of Dateland, south of Old Highway 80 (unpaved runway).
- A cluster of 11 small private charted airports and 1 public glider airport is located about 30 to 40 miles east of Gila Bend. The Phoenix Sectional Aeronautical Chart identifies this location as an area of intensive aerobatic flying, parachuting, and gliding activities.

Eric Marcus Municipal in Ajo is a public use airport, but civil airspace access at its location is constrained by the SUA at the BMGR and Sells Low and Sells 1 MOAs. A General Aviation/Air Evacuation corridor that transects R-2301E and R-2305, has been established to provide restricted airspace transit for civil air traffic. The corridor extends between Gila Bend AFAF and Eric Marcus Municipal along State Route 85. Procedures for requesting activation of the corridor and transiting the corridor are published and made available to civil aviation users.

3.4 Perimeter and Non-Military Land Use

This section on non-military land jurisdiction, land management, and land use discusses the use of surface lands for residential, economic, and recreational purposes, and non-military governmental purposes. This includes non-military land uses compatible with military operations within the range.

The region of influence includes a 5-mile perimeter study area outside of the BMGR boundary (Figure 3.4-1), public land within the BMGR, and the proposed Gila Bend Addition to BMGR East. The BMGR is part of a large geographic area in southwest Arizona (and northern Sonora, Mexico) that includes extensive tracks of federal, state, and Tribal lands. Portions of some of these perimeter lands underlie airspace used by military operations (Figure 3.4-2).

3.4.1 Perimeter Lands

3.4.1.1 Land Jurisdiction and Planning

U.S. perimeter lands surrounding the BMGR include lands under the jurisdiction of BLM, Bureau of Reclamation (Reclamation), USFWS, Arizona State Land Department, and the Tohono O'odham Nation as well as private land. Mexico and El Pinacate Y Gran Desierto de Altar Biosphere Reserve lie south of BMGR West and the Roosevelt Reservation. El Pinacate is managed by the Secretariat of the Environmental and Natural Resources, in collaboration with the state government of Sonora's Institute of the Environment and Sustainable Development (Instituto del Medio Ambiente y el Desarrollo Sustentable del Estado de Sonora) and the Tohono O'odham Nation. Other entities with land within 5 miles of the BMGR include MCAS Yuma; International Boundary and Water Commission; AZGFD; Pinal, Yuma, and Maricopa counties; and the City of San Luis, City of Somerton, City of Yuma, Town of Wellton, and the Town of Gila Bend. Most, if not all, have one or more land use planning document regulating or guiding land use activities. Each jurisdiction has processes in place to coordinate land use activities directly with the BMGR managers and/or through regional planning efforts.

Figure 3.4-1. Land Use in the BMGR Perimeter Study Area

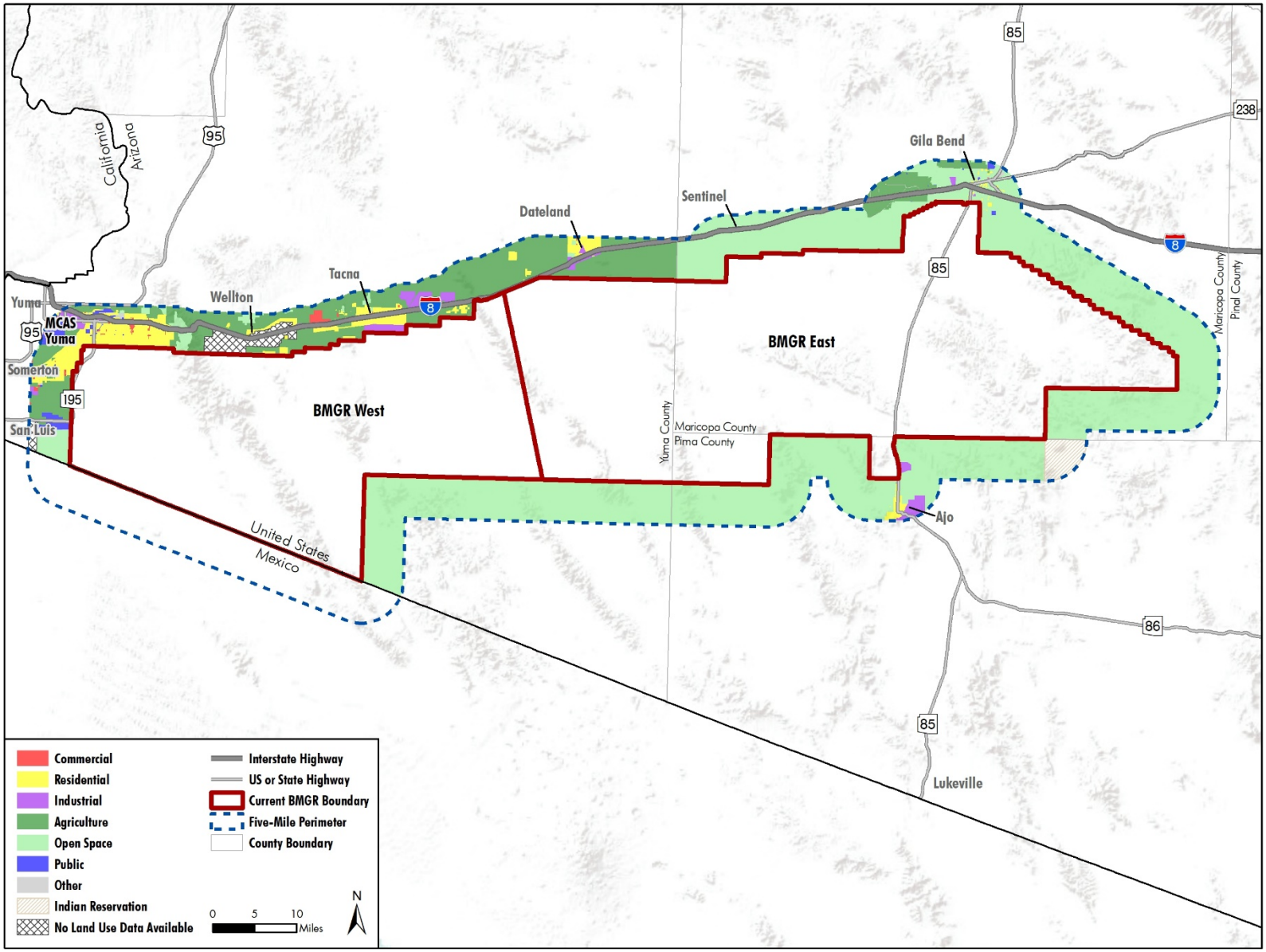
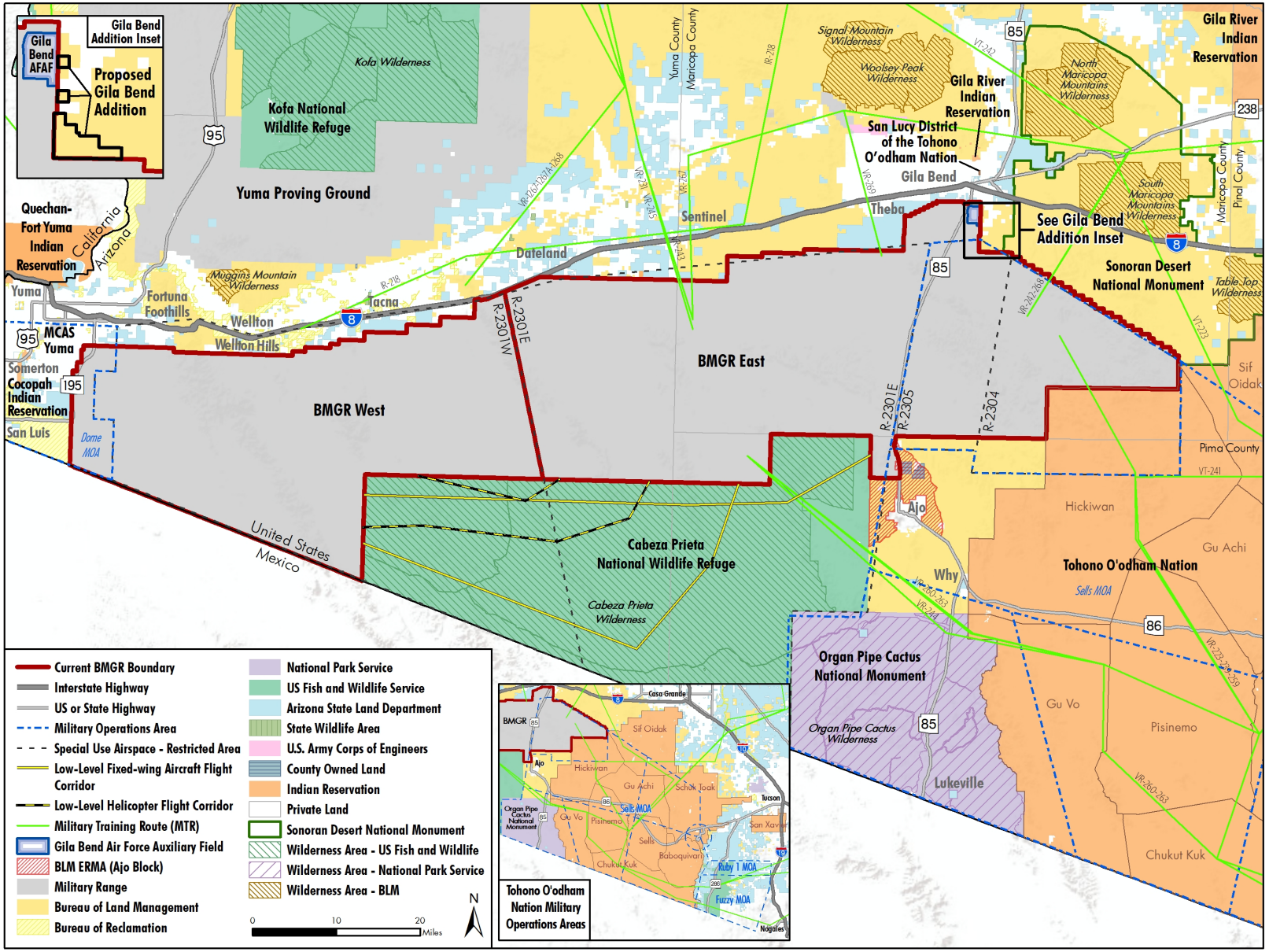


Figure 3.4-2. Land Use Jurisdictions and Airspace Designations in the BMGR and Perimeter



Bureau of Land Management, U.S. Department of the Interior

BLM is the largest jurisdictional entity in the vicinity of the BMGR (Figure 3.4-2). BLM-administered lands are generally managed for multiple use in accordance with the FLPMA of 1976, as amended (P.L. 94-579). Within the perimeter study area, BLM manages its public lands in accordance with three resource management plans: the *Yuma Field Office Resource Management Plan* (BLM 2010), the *Lower Sonoran Resource Management Plan* (BLM 2012b), and the *Sonoran Desert National Monument Resource Management Plan* (BLM 2012a). The *Yuma Field Office Resource Management Plan* (BLM 2010) governs BLM land in Yuma County, including lands surrounding the perimeter communities of San Luis, Somerton, Yuma, and Wellton. *The Lower Sonoran Resource Management Plan* (BLM 2012a) applies to 8.9 million acres of BLM lands in south-central Arizona, including Maricopa County and a small portion of land in Yuma County along the northeast and east boundaries of the BMGR; including lands surrounding the Town of Gila Bend, the proposed Gila Bend Addition, and the community of Ajo. This BLM planning area is managed by the Lower Sonoran Field Office, BLM Phoenix District. Small portions of these BLM lands underlie restricted airspace and military training routes (Figure 3.4-2).

Some BLM-administered land carries special designations for more focused resource management, use exclusion and/or resource protection. The largest special designation area in the perimeter is the 486,400-acre SDNM (Figure 3.4-2). President Clinton established the SDNM by Presidential Proclamation 7397 in 2001 (to protect "a magnificent example of untrammeled Sonoran Desert landscape"). SDNM is managed in accordance with the *Sonoran Desert National Monument Resource Management Plan* (BLM 2012b). Approximately 107,800 acres of BLM land in SDNM between Interstate 8 and the southern boundary of SDNM is managed to protect wilderness characteristics. The SDNM Proclamation provides for continued military use of airspace over the SDNM, including the Table Top Wilderness. Four military training routes cross over the SDNM.

BLM also manages four wilderness areas within the BMGR perimeter vicinity (Figure 3.4-2). The four wilderness areas were designated as part of the 1990 Arizona Desert Wilderness Act (P.L. 101-628) and include the 34,400-acre Table Top Wilderness in SDNM, 64,000-acre Woolsey Peak Wilderness and 13,350-acre Signal Mountain Wilderness northwest of Gila Bend, and the 8,855-acre Muggins Mountain Wilderness northwest of Wellton. Recognizing the presence of pre-existing land uses "…that could be seen or heard from within a wilderness," Congress noted in the legislation that these wilderness areas were designated without the creation of protective perimeters or buffer zones around the wilderness boundary. Additionally, the 1990 legislation did not preclude "…low level overflights of military aircraft, the designation of new units of special airspace, or the use or establishment of military flight training routes over wilderness areas designated by this title."

Fish and Wildlife Service, U.S. Department of the Interior

The USFWS has jurisdiction over the CPNWR and CPW (Figure 3.4-2). The CPNWR was originally established as the "Cabeza Prieta Game Range" by Executive Order 8038 in 1939. Title III of the Arizona Desert Wilderness Act of 1990 (P.L. 101-628) created an 803,418-acre wilderness within the CPNWR in accordance with the Wilderness Act of 1964 (P. L. 88-577). Management of both areas is governed by the agency's *Comprehensive Conservation Plan Wilderness Stewardship Plan and Environmental Impact Statement* (USFWS 2006).

The CPNWR and CPW underlie military restricted airspace, two MTRs (Figure 3.4-2), and four low-level flight corridors used for the semi-annual WTI course. These areas experience occasional overflight activity related to military training. The Arizona Desert Wilderness Act of 1990 provides for military use over the CPNWR and CPW.

National Park Service, U.S. Department of the Interior

The NPS has jurisdiction over OPCNM, which borders the southeast boundary of the CPNWR (Figure 3.4-2). OPCNM was established by Presidential Proclamation in 1937 to preserve more than 330,000 acres of Sonoran Desert including the organ pipe cactus (*Stenocereus thurberi*) and also supports a diversity of cultural resources that are culturally and spiritually important to the O'odham people (NPS 1997, 2016). In 1978, Congress designated 312,600 acres (95 percent) of the OPCNM as the Organ Pipe Cactus Wilderness Area and an additional 1,240 acres as potential wilderness (P. L. 95-625).

OPCNM and Organ Pipe Cactus Wilderness are outside of the BMGR perimeter study area, but its western boundary is contiguous to Restricted Area R-2301 overlying the CPNWR/CPW and it underlies the Sells MOA and three MTRs (Figure 3.4-2). Military aviation training in the airspace over the OPCNM and Tohono O'odham Nation began during World War II and has continued without interruption since 1951 (Air Force 1999).

Bureau of Reclamation, U.S. Department of the Interior

Within the perimeter area, Reclamation lands are primarily associated with irrigated agriculture along the Gila River in the Wellton-Mohawk area and south of Yuma. The Reclamation lands in the southwest perimeter area are managed in accordance with the *5-Mile Zone Protective and Regulatory Pumping Unit Resource Management Plan/Environmental Assessment* (Reclamation 2004) to help achieve a 1944 water rights treaty between the U.S. and Mexico (International Boundary and Water Commission 1973). Within this southwest perimeter area, Reclamation manages 16,000 acres of flat-tailed horned lizard habitat as part of the Yuma Desert Management Area.

International Boundary Water Commission

The International Boundary and Water Commission has jurisdiction for about 75 acres in the southwest corner of the BMGR perimeter study area. The International Boundary and Water Commission's Yuma Field Office ensures that Mexico receives water from the Colorado River in accordance with the 1944 water treaty (International Boundary and Water Commission 2020).

U.S. Customs and Border Protection

The Roosevelt Reservation provides a 60-foot-wide area north of the U.S.-Mexico border for its entire length that is set aside from other uses to maintain an obstruction-free area to protect against smuggling between countries. This area is patrolled by the CBP.

Arizona State Land Department

Arizona State Trust land is managed by the Arizona State Land Department in accordance with a 5-year strategic plan to generate revenue for 13 specific beneficiaries (Arizona State Land Department 2019).

State lands may be leased for many types of land uses, including agricultural production, grazing, commercial, and industrial. The most proximate State Trust lands are located along the northern and western portions of the BMGR with the largest blocks of land located near the communities of Gila Bend, Dateland, and Yuma (Figure 3.4-2). Within the north perimeter study area, some Arizona State Land Department lands are located under restricted airspace. Three MTRs cross State Trust land in this area.

Local Counties and Municipalities

Three counties, five incorporated municipalities, and several smaller unincorporated communities are within the BMGR perimeter study area in Arizona. The five incorporated municipalities in the study area include the City of San Luis, City of Somerton, City of Yuma, and Town of Wellton in Yuma County, and the Town of Gila Bend in Maricopa County (Figure 3.4-1). Each of these municipalities has a long-range general plan to guide land use and development.

Tribal Lands

Parts of the Tohono O'odham Nation and the San Lucy District of the Tohono O'odham Nation are within the BMGR East 5-mile perimeter study area (Figure 3.4-2). The Cocopah Tribe of Arizona and Quechan Tribe of the Fort Yuma Indian Reservation are in the vicinity of BMGR West. Each Tribal community is recognized as a sovereign nation with its own land use policies and regulations. Portions of the Tohono O'odham Nation underlie the Sells MOA, and six MTRs cross the Nation (Figure 3.4.2).

Mexico

BMGR West shares 37.39 miles of its southern boundary with Mexico, of which 26.80 miles are shared with El Pinacate Y Gran Desierto de Altar Biosphere Reserve. El Pinacate Y Gran Desierto de Altar Biosphere Reserve comprises about 666,000 acres of a 1.76-million-acre UNESCO World Heritage Site (UNESCO 2013b).

3.4.1.2 Land Use

A description of the perimeter land use is provided in Section 2.1.3 in the INRMP and is incorporated by reference. The following land uses occur within the non-Tribal lands in the perimeter study area and the percentage of the perimeter that they comprise: residential (6 percent); recreation/open space/public (70 percent); commercial (less than 1 percent); industrial (2 percent); rangeland for livestock grazing/agricultural crop and orchard land (21 percent); and other (less than 1 percent) (Figure 3.4-1).

Approximately 52 percent of the land within the 5-mile perimeter is under federal management, 7 percent within the Tohono O'odham Nation, 11 percent within Mexico, and the remaining 30 percent is private or State Trust land. Federal public lands in the perimeter study area are mostly undeveloped open space managed for multiple land uses or for congressionally designated resource management purposes, including wilderness, recreation, wildlife management, and cultural resources among others.

Industrial and commercial land uses are primarily located along the major highway corridors. The largest industrial land uses in the perimeter study area include landfills, an automobile testing facility, irrigation and utility facilities, and mines. This includes four utility-scale solar projects currently operating within the Town of Gila Bend's planning area, one utility-scale solar project near Dateland, a smaller solar project at

Ajo, and three power generation facilities in the Yuma area that operate with natural gas or fuel oil. Power from some of these facilities interconnects with the four transmission lines in the perimeter study area and one 69-kilovolt sub-transmission line that parallels State Route 85 through the range. Three natural gas and two petroleum pipelines in the range perimeter move product from New Mexico and Texas to Arizona. Irrigation canals north and west of the BMGR support irrigated agriculture near Yuma, Wellton, and Gila Bend. Agricultural uses in the BMGR perimeter study area include irrigated cropland and orchards. The inactive Phelps Dodge Ajo Incorporated copper mine is located near the community of Ajo.

3.4.2 BMGR

3.4.2.1 Land Jurisdiction

More than 95 percent of the BMGR is comprised of BLM public lands that the U.S. Congress withdrew and reserved for use as a military range; however, in the late 1980s and early 1990s, the Air Force acquired about 84,000 acres of state and private lands within the BMGR (Air Force 1999). The acquired parcels in BMGR West were transferred to the Department of the Navy in 2019. The acquired lands are managed in the same manner as the withdrawn land within the BMGR.

3.4.2.2 Land and Resource Management

Land and resources within the BMGR that are not associated with military operations are cooperatively managed by the Air Force, Marine Corps, BLM, USFWS, and AZGFD. The primary non-military land uses are focused on natural and cultural resource management, law enforcement related to resource conservation, and CBP enforcement at the Roosevelt Reservation area of U.S.-Mexico border. Section 1.3 of the 2018 INRMP provides more detailed information on land and resource management on the BMGR. Natural resources goals focusing on conservation, rehabilitation, and sustainable multipurpose use of resources are established in the INRMP and implemented by the Air Force and Marine Corps. Conservation law enforcement officers are responsible for conservation enforcement activities. These officers also assist in wildlife surveys, habitat restoration, water projects, formulating hunting objectives, monitoring protected species, resolving nuisance and human/wildlife conflicts, and participating in public education and outreach activities.

AZGFD has primary authority and public trust responsibilities for the management of state fish and wildlife resources throughout the State of Arizona, including the BMGR, through the Arizona Game and Fish Commission under Title 17 of the Arizona Revised Statutes, Section 6 authorities, and a 10(a)(1)(A) permit. Responsibilities include developing and maintaining habitat protection, management, and enhancement projects; surveying wildlife populations, governing hunting, and participating on the Sonoran Pronghorn Recovery Team. Refer to Section 1.3.2 of the INRMP for more details.

Finally, the Roosevelt Reservation, which the BMGR overlaps, along the international boundary is under the jurisdiction of the DOI. CBP patrols within the Roosevelt Reservation and within portions of the range and other federal lands near the border for illegal activities. In addition, CBP is responsible for installing border infrastructure as needed to maintain operational control of the border. More information is available in Section 1.3.3 of the INRMP.

3.4.3 Gila Bend Addition

3.4.3.1 Land Jurisdiction and Management

The proposed Gila Bend Addition comprises approximately 2,366 acres of federal public land under the jurisdiction of the BLM, Lower Sonoran Field Office, Phoenix District Office. Land use, including natural and cultural resource management, is administered in accordance with the *Lower Sonoran Decision Area Record of Decision and Approved Resource Management Plan* (BLM 2012a). The BLM coordinates with the BMGR Interagency Executive Committee as part of its resource management planning process.

3.4.3.2 Land Use

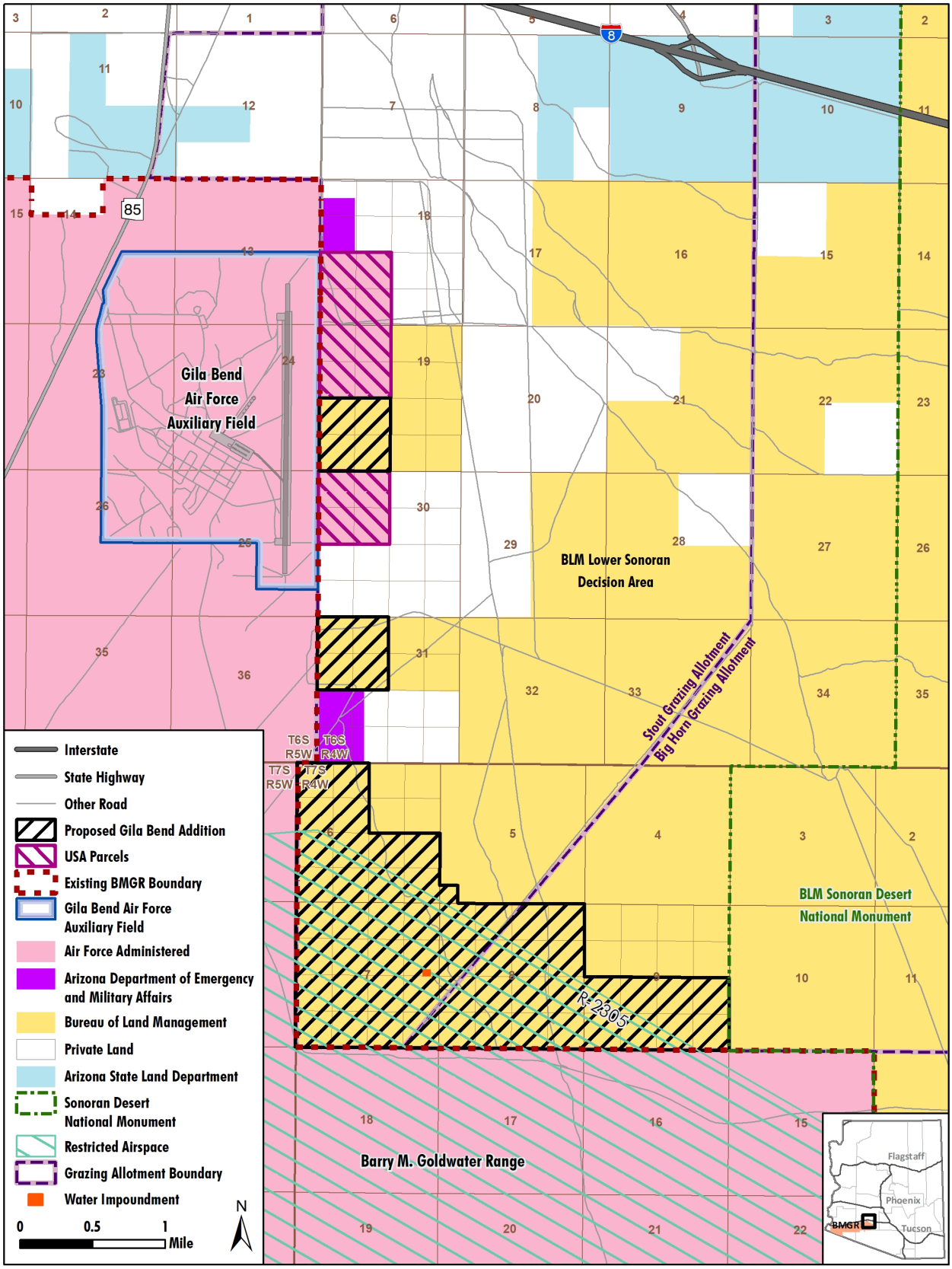
The Gila Bend Addition lands are generally undeveloped and in a natural state except for past livestock grazing improvements (including fencing and a watering area) and unpaved travel routes. BLM has historically leased the proposed Gila Bend Addition for livestock grazing. There are two grazing allotments that intersect the Gila Bend Addition (Figure 3.4-3). Both allotments were established under Section 3 of the Taylor Grazing Act of 1934 (43 U.S.C. 315 - 315r) and have been administered by BLM since the BLM was established in 1946 (BLM no date[a]; no date[b]).

The Stout allotment (00118) is roughly 13,600 acres with approximately 1,516 acres overlapping the Gila Bend Addition. The Stout allotment is considered active; its 10-year BLM permit is scheduled to expire in 2029. This allotment has an ephemeral classification (BLM 2012a), which means that the BLM will only authorize livestock grazing when acceptable soil moisture, forage, water and monitoring conditions are met. It was last grazed in 1989. The allotment's perimeter is entirely fenced (Whitbeck, personal communication 2020b), and the land area includes a developed surface water impoundment (AFCEC and 56 RMO 2019a). At 169,300 acres, the Big Horn allotment (03009) is classified as perennial (BLM 2012a), or rangeland that consistently produces adequate perennial forage to support a year-round livestock operation (BLM 2011b). The Big Horn allotment was last grazed in 2008. Its 10-year permit expired in 2009 and is considered inactive. The 853-acre portion of the Big Horn allotment that is within the proposed Gila Bend Addition lacks fencing or a developed water source outside of SDNM to support cattle grazing. This area cannot be grazed by livestock until water and fencing infrastructure are installed to support grazing and prevent livestock from drifting onto the SDNM (Whitbeck, personal communication 2020a).

Temporary Land Segregation

The 20 April 2020 *Federal Register* Notice for the pending land withdrawal application for the proposed Gila Bend Addition triggered a temporary segregation of the affected BLM lands from all forms of appropriation under public land laws (including the mining and mineral leasing laws) to allow time for the land withdrawal issue to be decided. These lands are normally open for surface and sub-surface mining and mineral leasing (BLM 2012a).

Figure 3.4-3. Grazing Allotments in Proposed Gila Bend Addition



3.5 Utilities

The affected environment region of influence for utilities includes the BMGR and the proposed Gila Bend Addition.

3.5.1 BMGR

One utility corridor passes through BMGR East with a 69-kilovolt transmission line, operated and maintained by Arizona Public Service. The transmission line passes through the Crater Range in Area B and generally runs parallel to State Route 85 between the communities of Gila Bend on the north and Ajo on the south (56 RMO 2010). An overhead power distribution line connects this line to the Gila Bend AFAF (56 RMO 2005). The utility infrastructure associated with the Gila Bend AFAF also includes water, wastewater, electrical, propane gas, and communications systems. Power lines operated by Western Area Power Administration parallel portions of the western boundary of BMGR West and pass through the range west of State Route 195. Additionally, Wellton-Mohawk Irrigation and Drainage District has two electrical circuits and a power line on the east side of the Gila Mountains that provide electrical service to four threat emitters. A few distribution lines within the range provide power to other military facilities, such as the West Coast Tactical Aircrew Combat Training System Target Site.

Production wells at Gila Bend AFAF and Cannon Air Defense Complex supply potable water for selected facilities and maintenance activities (Luke AFB and MCAS Yuma 2018a). Six non-potable groundwater supply wells are also present at BMGR West (refer to Section 3.9.1.2 for additional information regarding these wells). Marines or other personnel using BMGR West bring potable water to the range to support ground activities.

3.5.2 Gila Bend Addition

The proposed Gila Bend Addition is in a relatively natural state and contains no existing utilities.

3.6 Ground Transportation, Traffic and Traffic Circulation

The affected environment for ground transportation is focused on major roads and railroad lines. The region of influence includes the designated road system within the BMGR and the proposed Gila Bend Addition. Beyond the boundary of the BMGR, major transportation routes that provide access to BMGR and the Gila Bend Addition lands include Interstate 8, U.S. Highway 95, and State Routes 85 and 195. Additional information about transportation in the perimeter is included in Appendix D.

3.6.1 BMGR

Ground transportation routes within the BMGR are generally restricted to a road system that was designated in 2007 as part of the first BMGR INRMP to support military mission requirements, non-military agency resource management and law enforcement missions (Air Force and Navy 2007). Portions of the BMGR road system are open to the public where permissible and consistent with the military mission and the management needs of cooperating agencies. The conditions of and operational requirements for the road system are reviewed and updated every 5 years concurrent with the INRMP

updates (Air Force 2012, Luke AFB and MCAS Yuma 2018b). Additional information about the BMGR Road System can be found in Section 2.3.6 of the INRMP and is incorporated by reference.

The 2007 road inventory and classification system established three road categories in the BMGR:

- Roads open for government administrative and public use
- Roads open for administrative use only
- Roads closed to administrative and public use

The 2018 INRMP (Luke AFB and MCAS Yuma 2018a) provides the most recent published information about the BMGR road system and changes that have occurred since the 2012 INRMP was completed. The designated road system and public access opportunities remain mostly unchanged. However, continued surveys and monitoring of the road system have prompted Luke AFB and MCAS Yuma to propose changing the road classifications and adding roads to support military training, resource management, and law enforcement related to the international border with Mexico.

Table 3.6-1 summarizes road miles by category in 2007, 2012, and 2018. Road use in the interior of the BMGR is generally for authorized personnel, and public access is limited; thus, traffic is minimal, and the roadway network functions adequately. Figure 3.6-1 shows the 2020 roads by category within restricted, unrestricted, and/or conditional use areas in the BMGR.

Table 3.6-1. 2018 and Historical Authorized Road System Miles for BMGR East and BMGR West

Road Category	East			West		
	2007	**2012**	**2018**	**2007**	**2012**	**2018**
Administrative-use-only, inside restricted military hazard/security areas, no public access	741	570	555	136	159	209
Administrative and public use, inside military hazard/ security areas	0	5	6	0	0	0
Administrative-use-only, outside restricted military hazard/security areas	12	11	13[a]	39	36	47
Administrative and public use, outside restricted military hazard/security areas but subject to temporary closure for military purposes	188	170	170[b]	490	427	427
Total road miles	**941**	**733**	**744**	**665**	**622**	**636**

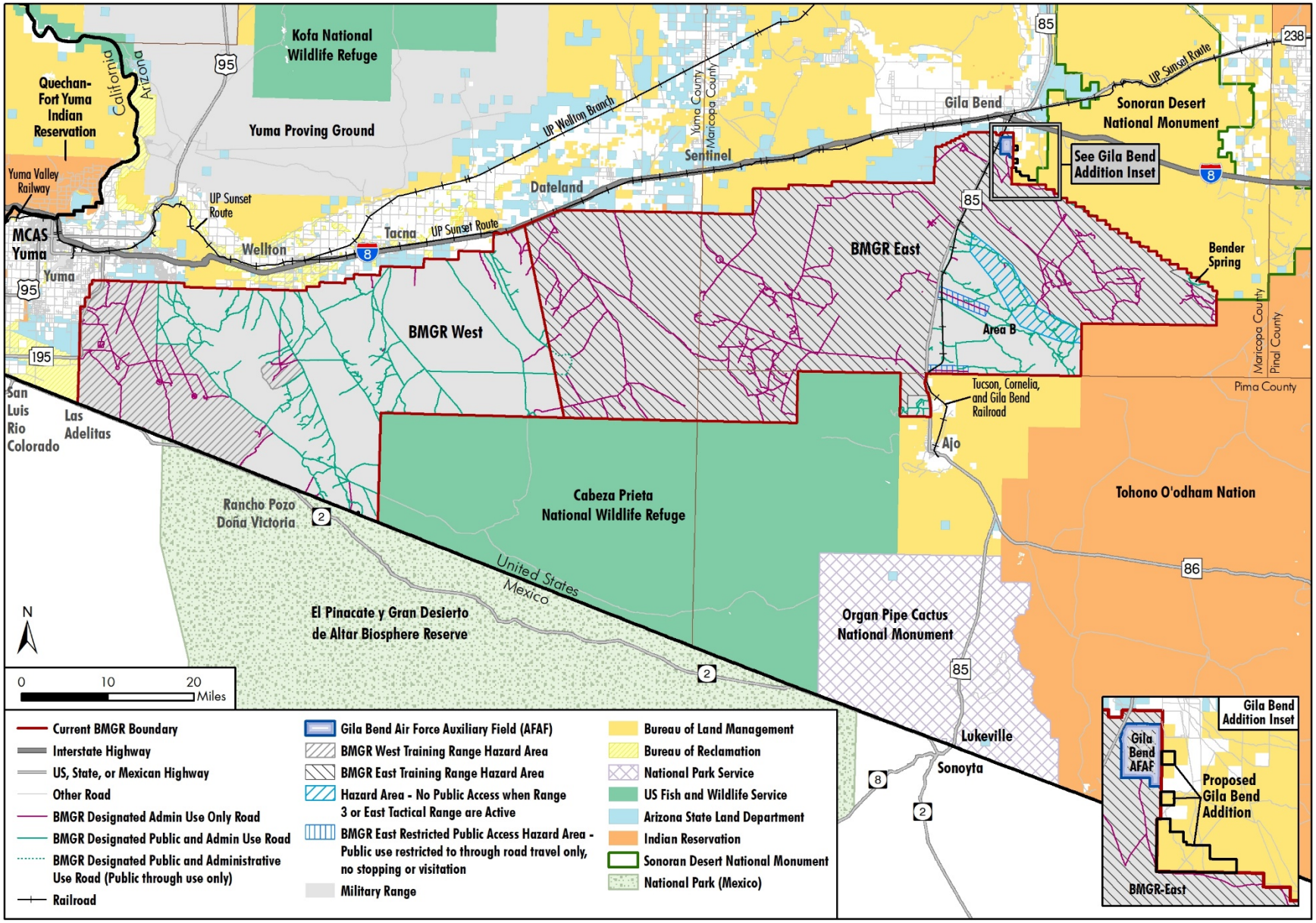
Notes:

[a] Includes approximately 11 miles of road within BMGR East "Restricted Public Access Hazard Area – Public use restricted to through road travel only, no stopping or visitation" area and 0.61 mile of road in the "Hazard Area – No Public Access when Range 3 or East Tactical Range are Active" area.

[b] Includes approximately 31 miles of road within the BMGR conditional use "Hazard Area – No Public Access when Range 3 or East Tactical Range are Active" area.

Sources: Luke AFB and MCAS Yuma 2018a, 2018b

Figure 3.6-1. BMGR East and West Roads System



Illegal cross-border traffic has prompted CBP to expand their activities into new areas where illegal vehicles had not previously traveled. Attempts to apprehend and rescue undocumented immigrants have also increased new vehicle routes and off-road driving in these areas and increased use of drag roads, which are prepared by dragging several bolted-together tires across a dirt road or well-used trail to assist agents in detecting evidence of illegal crossings by people or vehicles for monitoring purposes (Luke AFB and MCAS Yuma 2018a). Humanitarian groups have increased their vehicle activity to drop supplies along foot trails.

In response to public concerns about CBP dragging roads to detect fresh tracks from unauthorized immigrants and smugglers in the BMGR, the Air Force initiated a drag road monitoring project at BMGR East. Drag road elevations and conditions are monitored annually to document changes. In 2014, the U.S. Geological Survey mapped vehicle disturbance on BMGR West, identifying approximately 6,077 miles of unauthorized off-road tracks (Villarreal 2014). Areas of major disturbance were identified along the U.S.-Mexico border. The area with the most repeated number of disturbances were found in the southern part of the BMGR West hazard area.

While the Union Pacific railroad is located just north of BMGR, only one set of tracks is located on the BMGR. The 43-mile Tucson, Cornelia and Gila Bend Railroad extends from Ajo to Gila Bend through BMGR East. Historically used to support the New Cornelia Copper mine, these tracks have been placed out of service.

3.6.2 Gila Bend Addition

The Gila Bend Addition (inset in Figure 3.6-1) incorporates 5.72 miles of existing unpaved roads that connect to an administrative-use-only roadway in BMGR East; Figure 3.4-3 offers an enlarged view of the roads in the area. The BLM Travel Management Plan for the Gila Bend Mountains/Sentinel Travel Management Area indicates travel is limited to designated routes within the Gila Bend Addition. Roads extending from State Route 85 and State Route 238 on public land near Gila Bend provide access to the Gila Bend Addition.

No railroad tracks extend through the Gila Bend Addition study area.

3.7 Recreation Resources

Recreational opportunities within the vicinity of the BMGR occur within the range itself, CPNWR, SDNM, OPCNM, El Pinacate Y Gran Desierto de Altar Biosphere Reserve, and Kofa National Wildlife Refuge (NWR). In addition, other federal, state, and local lands accommodate recreation as well as other possible multiple uses. The range, these designated recreation areas, and other land under federal jurisdiction within 5 miles of the BMGR constitute the region of influence for recreation. Table 3.7-1 identifies the size, visitation estimates, and recreational opportunities for the larger designated places.

Table 3.7-1. Recreational Opportunities Available at BMGR and its Vicinity

Place	Jurisdiction	Acreage	Visitation (per year)	Recreational Opportunities
BMGR	Air Force and Marine Corps	646,000[a]	8,683[b]	Hunting, hiking, camping, sightseeing, mountain biking, target shooting, and four-wheel driving/off-highway vehicle (OHV) riding.
CPNWR	USFWS	860,010[c]	2,000 – 2,500[d]	Hunting, hiking, camping, mountain biking, four-wheel driving/OHV riding, and wildlife viewing.
SDNM	BLM	930,200[e]	24,000[e]	Hunting, hiking, camping, mountain biking, target shooting, four-wheel driving/OHV riding, and horseback riding.
OPCNM	NPS	330,688[f]	260,375[g]	Hiking, mountain biking, horseback riding, wildlife viewing, camping, and scenic driving.
El Pinacate Y Gran Desierto de Altar Biosphere Reserve	Secretariat of the Environment and Natural Resources	1,765,781[h]	17,504[i]	Hiking, camping, mountain biking, four-wheel driving.
Kofa NWR	USFWS	665,400[j]	95,404[k]	Hunting, hiking, camping, rockhounding, and wildlife viewing.

Notes:

[a] Acreage of land accessible by the public for recreational opportunities (not of the entire range). Luke AFB and MCAS Yuma 2018b.

[b] Source: O'Berry, personal communication 2020a.

[c] Source: USFWS 2006.

[d] Source: Slone, personal communication 2020.

[e] Source: BLM 2012a.

[f] Source: NPS 2001.

[g] Source: NPS 2018.

[h] Source: UNESCO 2013b.

[i] Source: UNESCO 2013a.

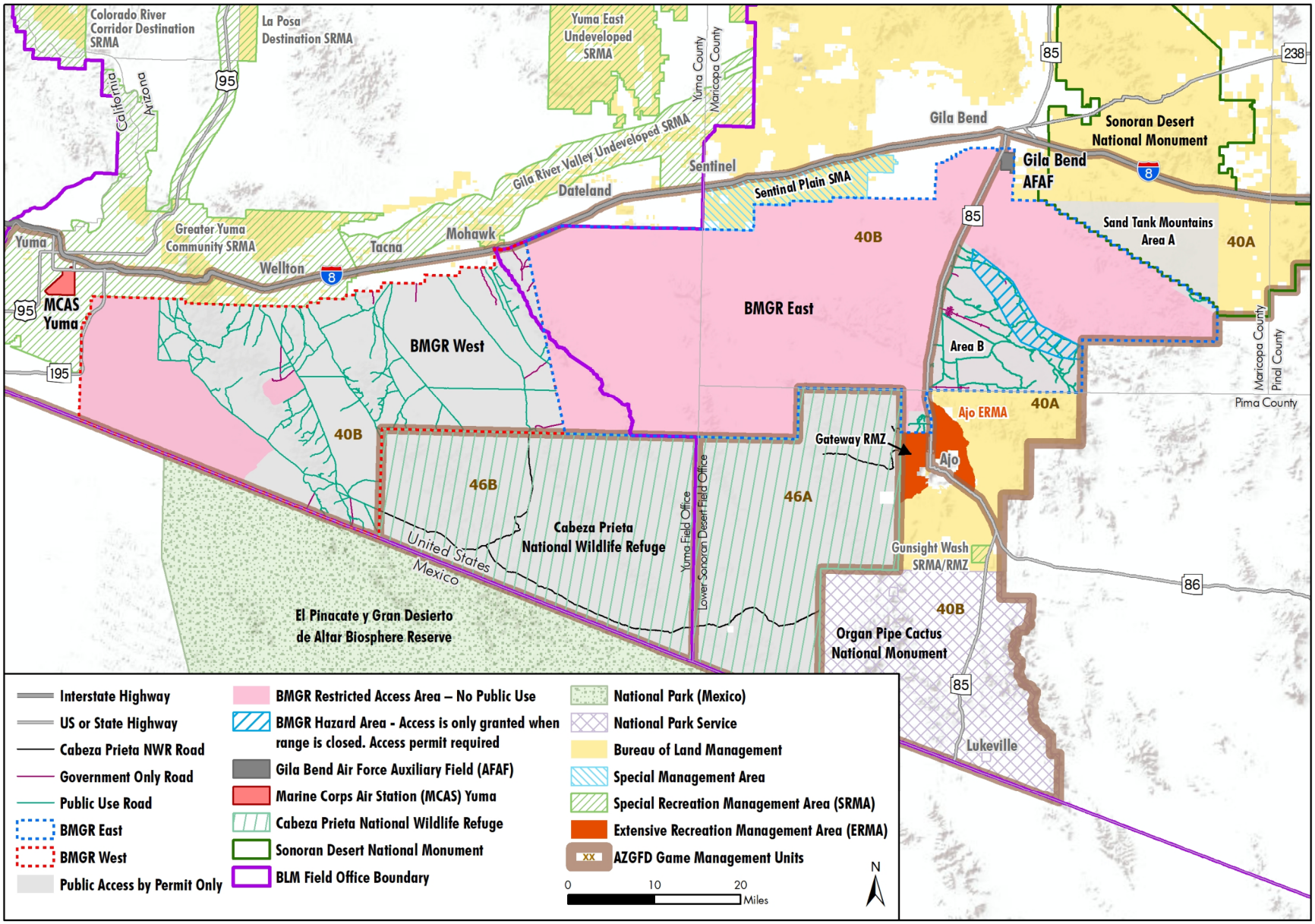
[j] Source: USFWS 1996a.

[k] Source: USFWS 2019b.

3.7.1 BMGR

Approximately 38 percent of the BMGR, including about 137,000 acres in BMGR East and 527,000 acres in BMGR West, is open to public recreation access through a range access permit system (Luke AFB and MCAS Yuma 2018b) (Figure 3.7-1). Recreational opportunities include hunting, hiking, camping, sightseeing, mountain biking, target shooting, and high-clearance vehicle use (e.g., all-terrain vehicles, dirt bikes, and four-wheel drive vehicles). All motorized vehicle use by the public is restricted to the BMGR designated road system. Information regarding access to and recreation on BMGR is addressed in

Figure 3.7-1. Recreational Use Areas within the BMGR and its Vicinity



Section 7.2 of the INRMP and is hereby incorporated by reference. The INRMP provides the policies for public use of the range and defines how the Air Force and Marine Corps manage and support recreational opportunities. In addition, Section 7.2 describes the procedures for obtaining a BMGR access permit and provides details on permitted and prohibited recreational activities, including hunting information. AZGFD issues hunting licenses and establishes big game limits.

3.7.2 Gila Bend Addition

BLM's Lower Sonoran Field Office manages the public lands comprising the Gila Bend Addition in accordance with the *Lower Sonoran Resource Management Plan* (BLM 2012b). These public lands are available for OHV riding, hiking, camping, hunting, recreational target shooting, horseback riding, and mountain biking, but are not part of a formalized or designated recreational area such as a Special Recreation Management Area, Extensive Recreation Management Area, Recreation Management Zone, or Special Management Area (BLM 2012b).

3.7.3 BMGR Perimeter

The BMGR is located within an area with vast tracks of federally managed contiguous lands that also provide recreational opportunities for visitors to the region. Within the BMGR vicinity, USFWS manages the CPNWR and Kofa NWR, BLM manages the SDNM, and NPS manages the OPCNM. In addition, the Secretariat of the Environment and Natural Resources manages El Pinacate Y El Gran Desierto de Altar, located adjacent to the range in Mexico near the U.S.-Mexico border.

3.7.3.1 Cabeza Prieta National Wildlife Refuge

CPNWR is the third largest wildlife refuge in the contiguous U.S. and provides visitors opportunities to view wildlife, such as Sonoran pronghorn, lesser long-nosed bats, desert bighorn sheep, desert tortoise, and elf owl (USFWS 2019a). Recreational opportunities include hiking, camping, mountain biking, hunting, and four-wheel driving. Prior to the 2020-2021 hunting season, hunting within the CPNWR was limited to bighorn sheep. However, in its 2020-2021 Station-Specific Hunting and Sport Fishing Regulations issued on 31 August 2020, USFWS expanded available hunting opportunities within CPNWR. The new hunting rules permit hunting of several additional species such as mule deer, mountain lion, rabbits, coyote, bobcat, foxes, quail, and doves.

Although not required in recent years, certain past activities have required temporary closures of portions of the CPNWR to protect visitors from hazards that extend from military weapons use at the BMGR or in BMGR airspace. As provided by the MLWA of 1999, temporary closures of the CPNWR and CPW could also be implemented to support hazard areas generated by future training activities at the BMGR. As a consequence, visitors to the CPNWR and CPW are required to first obtain a BMGR access permit, which provides information on hazard area restrictions that may require temporary closures of areas of the refuge.

3.7.3.2 Sonoran Desert National Monument

SDNM is a popular destination for winter visitors and residents in the growing Phoenix metropolitan area. The large expanse of undeveloped Sonoran Desert landscape within SDNM includes an immense

saguaro cactus forest, as well as three mountain ranges: the Maricopa, Sand Tank, and Table Top Mountains. Most recreational visitors to SDNM engage in OHV riding, four-wheel driving, hiking, camping, hunting, target shooting, horseback riding, and mountain biking. The Sand Tank Mountains portion of SDNM was formerly part of the BMGR (known as Area A) and expended unexploded ordnance may be encountered in this area although records of historic military use and reconnaissance surveys indicate that the probability of encounters is very low. Nevertheless, visitors are required to obtain a BMGR access permit before entering this area so that they may be informed of hazards that may be present as a result of historic military use.

3.7.3.3 Organ Pipe Cactus National Monument

OPCNM borders the southeast corner of CPNWR (Figure 3.7-1). OPCNM was established in 1937 to preserve a pristine example of Sonoran Desert habitat and the organ pipe cactus, which reaches its northernmost habitat in this area of the United States. The national monument was named a UNESCO Biosphere Reserve in 1976. Recreational opportunities available at OPCNM include hiking, scenic driving, biking, horseback riding, and camping.

Most of OPCNM was closed to the public between 2003 to 2014 due to public safety concerns related to smuggling traffic across the border. Since then, OPCNM has reopened and visitation has resumed although the monument's proximity to the U.S.-Mexico border has led to the creation of unauthorized roads and trails, causing damage to soils and vegetation, disturbance to wildlife, and an increase in litter and trash (NPS 2011).

OPCNM has two camping areas, with one near the monument's eastern border in the Ajo Range mountains and one near the visitor center located nearer to the international border and State Route 85. OPCNM is located adjacent to the R-2301 restricted area and the entire monument underlies the Sells MOA, so recreational visitors may also observe military aerial operations.

3.7.3.4 El Pinacate Y Gran Desierto de Altar Biosphere Reserve

El Pinacate Y Gran Desierto de Altar Biosphere Reserve, south of BMGR West in Mexico (Figure 3.7-1), was originally designated as a Biosphere Reserve and in 2013 was designated a UNESCO World Heritage Site. El Pinacate Y Gran Desierto de Altar Biosphere Reserve is comprised of Sonoran Desert ecosystem that includes a dramatic landscape with sand dunes that reach heights of up to 650 feet, deep volcanic craters, and a dormant shield volcano (UNESCO 2013b). The recreational opportunities that exist on the reserve are similar to those found elsewhere in the region; however, the experience differs due to the unique geologic features and landscape.

3.7.3.5 Kofa National Wildlife Refuge

Kofa NWR is north of BMGR West and is managed by USFWS in accordance with its Kofa National Wildlife Refuge and Wilderness interagency management plan (USFWS 1996a). Kofa NWR offers hiking, camping, limited rockhounding, wildlife viewing, and hunting (governed by AZGFD).

3.7.3.6 BLM Public Lands

Within the vicinity of the BMGR, BLM land is managed out of the Lower Sonoran Field Office and Yuma Field Office. Recreational opportunities on these public lands include camping, hiking, OHV riding, hunting, shooting, wildlife viewing, photography, mountain biking, horseback riding, and rockhounding.

3.8 Earth Resources

Aspects of earth resources addressed in this LEIS include physiography, soils, and mineral resource potential.

A Final Mineral Resources Assessment (MRA) for the BMGR (AFCEC and 56 RMO 2018a), was prepared to provide an update to the previously completed MRA Report dated 22 September 1998 for the BMGR Land Withdrawal area. The Final MRA addresses BMGR East, BMGR West, and the proposed Gila Bend Addition. The Final MRA is incorporated by reference in this LEIS in accordance with Title 40 CFR Part 1502.21. Unless otherwise cited, the Earth Resources discussion for BMGR East, BMGR West, and the Gila Bend Addition, which is the region of influence for this analysis, is summarized from the Final MRA.

3.8.1 BMGR

3.8.1.1 Physiography

Most of the BMGR is in the Sonoran Desert section of Basin and Range Physiographic Province. The area west of the Gila and Tinajas Altas mountains in BMGR West is the exception and is located within the Salton Trough subprovince of the Basin and Range Physiographic Province. The rest of BMGR West and all of BMGR East lies within the Sonoran Desert subprovince of the Basin and Range Physiographic Province. The Sonoran Desert subprovince is characterized by roughly parallel, rugged, and sharply rising mountain ranges separated by broad alluvium-filled valleys. Mountain crests generally rise to heights that are 1,500 feet to 2,000 feet above the adjacent valley bottoms. The axes of the mountain ranges trend predominantly northwest to southeast. The deep, alluvium fill in the intervening valleys has been derived by eons of erosions from the surrounding mountains (Fenneman 1931). Most of the mountain ranges have been formed by faulting, folding, or volcanism and consist of all three types of rock (igneous, metamorphic, and sedimentary). Information about nearby mountain ranges and heights can be found in Section 2.2.2 of the INRMP. Valley fill material consists of unconsolidated to moderately consolidated silts, clays, sands, and gravels (Air Force 1999).

3.8.1.2 Geology and Soils

Geology and soils on BMGR are addressed in Section 2.2.3 of the INRMP. This includes a general description of the types of formations and composition, soil moisture (hot and dry soils) and composition (chalky and water-retentive) characteristics. The soils on the BMGR are quite variable ranging from fine-grained sands and silts on the valley floors to very gravelly soils in the mountainous regions. Water erosion potential typically increases with greater slope, while wind erosion potential is greater where soils are fine-grained sands and silts. Many of the valley soils are subject to moderate or high wind erosion potential. Rill and gulley erosion are also common in some of the valleys. In some ground support locations with fine-grained soils, years of repeated use has caused considerable ground disturbance and

has pulverized the soils, making them highly erodible. Small portions of the BMGR have cryptobiotic soils, consisting primarily of cyanobacteria along with algae, lichens, mosses, fungi, and bacteria that form a thin, fragile crust on sandy soils. This crust protects the underlying soils from erosion, absorbs water, and sustains the biological ecosystem. When these soils are disturbed, such as by heavy foot traffic or vehicle traffic, they may take more than a decade to re-establish (Air Force 1999).

3.8.1.3 Mineral Resources Potential

The MRA evaluates the potential occurrence of mineral resources on the BMGR on a scale of no potential, low potential, moderate potential, high potential, and not determined for situations where data are not available or the data are unable to support or refute the possible existence of mineral resources. As described in the 2018 Final MRA (AFCEC and 56 RMO 2018a), minerals with a high potential found within the BMGR include rare earth elements; quartz, feldspar, and mica; marble; aggregate and riprap; pegmatites; porphyry copper; and specialty sand. The Yuma Desert has a moderate to high potential for geothermal resources.

The Strategic and Critical Materials Stock Piling Act (50 U.S.C. Section 98 *et seq*.) mandates that a stock of strategic and critical materials be maintained to decrease and preclude, where possible, dependence on foreign sources of supply in times of national emergency.

The following mineral resources at BMGR are considered critical based on the Final Critical Minerals List 2018 issued by DOI (Federal Register Volume 83, Number 9).

- Strontium – Sauceda Valley
- Tin – Crater Range and Sauceda Mountains
- Tungsten – Mohawk Mountains

Mining and mineral leasing have been excluded from the range since it was withdrawn in 1941 (Air Force 1999). As a result, there are no active mines or mining claims on the BMGR.

3.8.2 Gila Bend Addition

3.8.2.1 Physiography

The proposed Gila Bend Addition, like the BMGR, lies within the Sonoran Desert subprovince of the Basin and Range Physiographic Province. The topography across the proposed expansion area is typical of the alluvial plain/valley floor found in the basin and range physiographic province. Elevations range from a high of approximately 1,050 feet above mean sea level in the southeastern corner of the expansion area to approximately 800 feet above mean sea level at the northern boundary. The area has very little topographic relief. No mountains, hills, or defined playas are present within the proposed expansion area, which is dissected by sandy ephemeral washes.

3.8.2.2 Soils

The Gila Bend Addition lands are completely covered by quaternary alluvial deposits. The various soils have developed on these deposits and are characterized by being hot and dry. Soils are primarily reddish

brown and generally uniform throughout the Gila Bend Addition. The soils are easily friable and fine-grained with large amounts of silt and fine sand (Natural Resources Conservation Service 2017).

3.8.2.3 Mineral Resources Potential

The potential for the occurrence of mineral resources on the Gila Bend Addition lands, summarized from the Final MRA (AFCEC and 56 RMO 2018a), is presented in Table 3.8-1.

Table 3.8-1. Summary of Mineral Resources Potential within the Gila Bend Addition

Potential Resource	Level of Potential	Level of Certainty
Coal	Low	B
Oil and gas	Low	B
Geothermal	Moderate	B
Sodium and potassium	High	D
Metallic minerals	Not determined	A
Uranium and thorium	Moderate	B
Non-metallic minerals/industrial minerals	Low	B
Sand and gravel	High	D
Strontium (as celestite)	High	D

Minerals included in the Final Critical Minerals List 2018 with potential to occur in the Gila Bend Addition include uranium with a moderate potential to occur and strontium (in the form of celestite which is a major source of strontium) with a high potential to occur.

Only one mine, Peoria Seven, has been identified within the boundaries of the Gila Bend Addition near the southeastern border. This long-inactive site has been reclaimed (Arizona Geological Survey 1999). The mining operator claimed to have recovered gold and platinum group metals; however, this claim was not verified. No other mine claims, mining leases, mineral material sale contracts, unpatented mining claims, mill sites, or other valid existing rights within the Gila Bend Addition have been identified.

3.9 Water Resources

Water resources include surface water, groundwater, and water rights. Description of the water resources within BMGR are addressed in Sections 2.2.4 and 7.5 of the INRMP and is incorporated here by reference. Short summaries of the information are provided below along with additional information that is not included in the INRMP. Wetlands are discussed in Section 3.13 of this LEIS.

3.9.1 BMGR

3.9.1.1 Surface Water

Surface water on the BMGR consists of springs, *charcos*, *tinajas*, and *playas,* and ephemeral washes (only flow due to rain) that flow to the Gila River. Surface water flows in the washes are not used by the

Air Force or Marine Corps as a potable water source, an irrigation water source, or for known recreational activities, either on- or off-range (Marine Corps Installations Command 2015). Perennial springs, such as Burrow Spring and Bender Spring in the Sand Tank Mountains, are found in the far eastern portion of the range, as well as Dripping Springs in the eastern Gila Mountains on BMGR West (Bryan 1925). Surface water collects in natural or human-made catchments or tanks where the water may persist for weeks or months without recharge until it eventually evaporates or is consumed by wildlife or people (Luke AFB and MCAS Yuma 2018a).

Charcos are natural or artificial waters found in relatively impermeable soils in adobe flats and washes or human-made troughs. *Tinajas* are depressions that are typically formed by water on bedrock and hold water for a few days to months. Perennial *tinajas* present on the range include Tinajas Altas on BMGR West and Aguila *tinajas* on BMGR East. Tinajas Altas is considered the most significant of all tinajas in southwestern Arizona and northern Mexico. *Playas* are shallow, dry lakebeds resulting from internal drainage patterns within closed basins. Mohawk Playa on BMGR West, and North Tactical Range Playa and Lago Seco Playa on BMGR East, can hold water for long periods in a wet year (Bryan 1925).

Natural flooding events are highly variable in frequency and intensity. Some storms cause flash flooding in the smaller mountain drainages and short-term flooding in the larger valley washes and floodplains. Rapidly moving water stirs up sediment from the ground it crosses and carries it down stream. Greater levels of erosion and siltation occur in areas where the soils are loose or disturbance has occurred. Although these floodplains are subject to short-term flash flooding from storm events, the Federal Emergency Management Agency has not delineated 100-year floodplains on the BMGR (Luke AFB and MCAS Yuma 2018a).

3.9.1.2 Groundwater

BMGR is located primarily in the Gila Bend, Lower Gila, and Yuma groundwater basins. Groundwater occurs in floodplain, streambed alluvium, and the basin-filled depositions. Streambed deposits consist of sand, gravel, and boulders that can range from 10 feet thick in the smaller washes, to as much as 110 feet thick in the Gila River floodplain. Groundwater conditions are largely unconfined but may be locally confined due to inter-bedded clay layers or lava flows. Groundwater data collected by the Arizona Department of Water Resources indicates that local groundwater is approximately 300 to 325 feet below ground surface (Air Education and Training Command 2018).

Groundwater is found primarily in tertiary volcanic rocks and alluvial deposits. Recharge occurs via infiltration of rainfall runoff and underflow from adjacent alluvial basins (Luke AFB and MCAS Yuma 2018a). However, groundwater recharge is extremely limited because of low precipitation, high evaporation rates, and the large depth to groundwater. Recharge is further limited in broad, flat, sandy lowland areas because of the high average temperatures and low rainfall (Marine Corps Installations Command 2015). Groundwater quality is poor and typically includes high concentrations of total dissolved solids and fluoride (Luke AFB and MCAS Yuma 2018a).

On BMGR East, groundwater generally flows north-northwest towards the Gila River and into the Gila Valley aquifer (Air Force 2020). Groundwater in the Mohawk Valley, as well as Coyote Wash, on BMGR West flow north toward the Gila River.

Wells registered to the Air Force are located at Gila Bend AFAF, North Tactical Range, and RMCP 1. Production wells at Gila Bend AFAF and RMCP 1 currently supply water for construction, dust control, potable water supply for selected facilities, and maintenance activities (Luke AFB and MCAS Yuma 2018a). Historical period wells include Stouts Well (permanent water), Midway Well associated with the Tucson and New Cornelia Railroad, Well No. 3 on Manned Range 1, and Pimera Well, Garcia Well, and Papago Well located in the San Cristobal Valley. Additional wells on the BMGR were developed to provide a source of water to support Sonoran pronghorn recovery; developed water catchments on the range also provide water for other wildlife. Current groundwater use on the BMGR is approximately 70.7 million gallons (or 217 acre-feet) per year (Air Force and Navy 2018). To put this in perspective, it is about the amount of water it would take per year to irrigate 46 acres of agricultural land in Arizona (U.S. Department of Agriculture 2017). Groundwater usage in the region is expected to remain relatively consistent as neither residential populations nor agricultural activities are anticipated to change significantly in the future (Air Force 2020).

Eight groundwater supply wells are present at BMGR West. One well located at Cannon Air Defense Complex provides potable water. Two nonpotable water wells are located at the F-35B Auxiliary Landing Field. One supplies water for construction and the other provides water for fire suppression and also for a restroom at the facility. Another 4 wells supply nonpotable water for construction. Three are located along the international border and the other is at the Tracker Site. A monitoring/observation well used to collect groundwater elevation data is located at the Munitions Treatment Range. AZGFD also uses a well near Devil Hills to irrigate a forage enhancement plot to support Sonoran pronghorn recovery efforts. In addition, Reclamation owns a water well on BMGR West that the military does not have access to (McClary, personal communication 2020). Marines or other personnel using BMGR West bring potable water to the range to support ground activities.

3.9.1.3 Water Rights

The Air Force has 12 active surface water rights associated with the BMGR ranging from about 5,000 to 19,000 gallons per year (Arizona Department of Water Resources 2020b). These water rights are used to support wildlife water catchments. The Marine Corps has approximately 19 water catchments on BMGR West.

3.9.2 Gila Bend Addition

The proposed Gila Bend Addition land withdrawal is subject to the regulations at 43 CFR Subpart 2310.3-2(b)(2). These regulations require preparation of a water resource report for the proposed withdrawal area. A *Water Requirements/Resource Report for the Barry M. Goldwater Range Proposed Gila Bend Addition* has been prepared in accordance with these regulations (AFCEC and 56 RMO 2020). That report is part of the case file for the proposed land withdrawal application. The following section is summarized from the report.

3.9.2.1 Surface Water

The Gila Bend Addition is located in the Lower Gila-Painted Rock Reservoir Surface Water Sub-Basin on a lower alluvial fan. Drainage flows from the south to the north. The topography is flat; major stream channels have cut-banks to a depth of approximately 2 to 3 feet in the southern portion of the proposed

addition. The washes have much lower energy when they reach the northern boundary, and some channels appear only as rills or drainage depressions. Washes that flow through the Gila Bend Addition include Pioneer Cemetery, Evans, Quilotosa Main and its tributaries, and several unnamed washes.

An ephemeral surface water feature is located in the southwestern portion of the proposed addition area where a human-made earthen dike retains rainwater after significant storms.

Floodplain mapping of the Gila Bend Addition was conducted in 2019. The 100-year and 500-year recurrence intervals were selected as the major storm events to be modeled and mapped. These recurrence intervals represent the probability of a storm event equaling or surpassing a certain precipitation. As such, the 100-year event has a 1 percent chance of being equaled or exceeded in any given year, while the 500-year event has 0.2 percent chance of being equaled or exceeded. Mapped floodplains on the Gila Bend Addition lands are shown on Figure 3.9-1.

3.9.2.2 Groundwater

The Gila Bend Addition is located within the Gila Bend Groundwater Basin. The Arizona Well Registration Database lists two water wells identified as exploration wells owned by the Maxam Gold Corporation as occurring in the Gila Bend Addition. No information on the depth of these wells or depth to groundwater is available. Data from other wells located within 1 mile of the Gila Bend Addition boundary shows depth to groundwater in the area ranges from approximately 180 feet to 500 feet below ground surface.

3.9.2.3 Water Rights

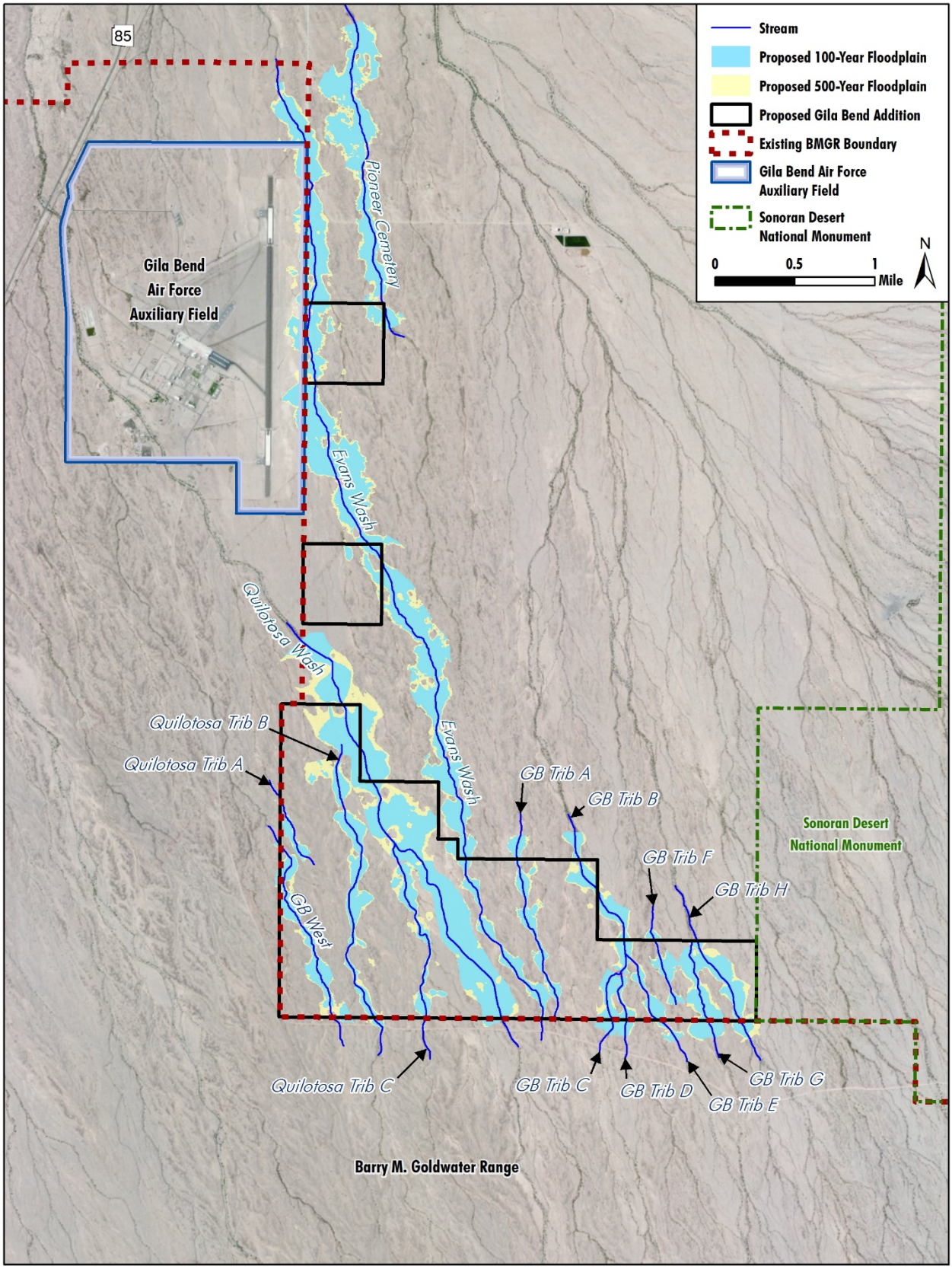
Within the proposed Gila Bend Addition land, the Quiotosa Ranch Company has active surface water rights to 20 acre-feet per year of water for irrigation purposes (Arizona Department of Water Resources 2020b). Although the use of this water right is identified as “irrigation” no irrigated areas are present on or adjacent to the proposed withdrawal lands.

3.10 Air Quality

3.10.1 BMGR and the Gila Bend Addition

The primary factors that influence the air quality of a region are the local climate and meteorological conditions, the locations of air pollution sources, and the amounts and types of pollutants emitted. Study areas for air quality are large to account for how pollutants disperse in air and are influenced by wind and atmospheric conditions. The region of influence for this analysis includes Yuma, Maricopa, Pinal, and Pima counties in southwestern Arizona. Appendix E provides a description of climate, air quality standards and regulations, applicable air quality management plans, and ambient air quality monitoring data in the region of influence for the BMGR. The following sections summarize other key aspects of air quality associated with the BMGR.

Figure 3.9-1. Floodplains on the Gila Bend Addition



3.11.1 Existing Air Quality

Under the Federal Clean Air Act (CAA), EPA promulgates National Ambient Air Quality Standards (NAAQS) for "criteria" pollutants to protect public health (primary standards) and public welfare (secondary standards). Criteria pollutants include carbon monoxide, oxides of nitrogen as nitrogen dioxide, ozone, particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), sulfur dioxide, and lead. The Arizona ambient air quality standards adopted and enforced by the Arizona Department of Environmental Quality (ADEQ) are identical to the NAAQS. Additional information about the criteria pollutants and a table listing the primary and secondary NAAQS for each pollutant are provided in Table E-1 in Appendix E.

In addition to establishing the NAAQS, EPA promulgates air quality regulations, permitting programs, and air quality planning processes to protect and maintain air quality. In Arizona, EPA has delegated responsibility for overseeing compliance with the NAAQS and applicable regulations to ADEQ. EPA works with the states to classify or designate air basins (or portions thereof) as either "attainment" or "nonattainment" with respect to the NAAQS.

Areas with air quality better than the NAAQS are designated as attainment areas. Areas of the country where air quality does not meet the NAAQS for one or more pollutants are identified as nonattainment areas. For these areas, the states are required to formulate and submit a State Implementation Plan (SIP) to EPA to detail how the state will reduce emissions and attain and maintain the NAAQS within the required time frame. Once a nonattainment area has improved air quality and demonstrated compliance with the applicable NAAQS, EPA revises the area's classification to "attainment/maintenance," and the area must submit a maintenance plan sufficient to show that the standard will be maintained for the next 10 to 20 years. Applicable SIPs and air quality management plans in the region of influence for the BMGR are discussed in Appendix E.

To characterize the air quality in the study area, ambient air quality data collected during the 4-year period from 2016 to 2019 at four locations adjacent to or within the study area are presented in Table E-3 in Appendix E. The locations of the monitoring sites are illustrated on Figure 3.10-1. Much of the area is very remote with little development. Located south and west of the Phoenix metropolitan area, the air quality in the BMGR region is generally well within federal and state regulatory standards. There are a few exceptions in more urbanized areas near the BMGR, such as Yuma, where developed areas are designated nonattainment.

The existing nonattainment areas in or near the BMGR region are listed in Table 3.10-1. Of the six criteria pollutants addressed by the NAAQS, only ozone and PM_{10} either approach or exceed the NAAQS in the vicinity of the study area. Only the Yuma PM_{10} nonattainment area, which extends roughly 10 to 15 miles east of the greater Yuma metropolitan area, overlaps with a small portion of the westernmost part of the BMGR region. A smaller part of the Yuma metropolitan area located north and west of the BMGR region and air quality study area is nonattainment for the 2015 8-hour ozone standard. Larger areas in western Pinal County outside the BMGR region have been designated as nonattainment for particulate matter ($PM_{2.5}$ and PM_{10}). In addition to the areas listed in the table, the Phoenix metropolitan area in Maricopa County, well outside the BMGR region, is nonattainment for ozone and PM_{10}, and is a maintenance area for carbon dioxide. The general outlines of the existing federal and state nonattainment areas in and near the study area are illustrated on Figure 3.10-1.

Table 3.10-1. Federal and State Nonattainment Areas in or Near the BMGR Region

Area	Pollutant	Classification	Nonattainment Area Location Relative to the BMGR Region
Yuma, Arizona	PM_{10}	Moderate	Nonattainment area partially overlaps with westernmost part of the BMGR region
Yuma, Arizona	Ozone	Marginal	Nonattainment area is in the City of Yuma outside the BMGR region to the north and west
Ajo, Arizona	PM_{10}	Moderate	Small maintenance area nearly adjacent to the BMGR region
West Central Pinal County, Arizona	$PM_{2.5}$	Moderate	Nonattainment area is outside the BMGR region to the north and east
West Pinal County, Arizona	PM_{10}	Serious	Nonattainment area is outside the BMGR region to the north and east

Sources: EPA 2019; ADEQ 2020a.

To protect and support the states in achieving and maintaining the NAAQS, the Clean Air Act stipulates that the federal government may not engage, support, or provide financial assistance or approve licensing or permitting for any activity not conforming to the applicable SIP. Under the general conformity rule (40 CFR Part 51 Subpart W, and Part 93), federal actions must be evaluated to assess whether direct and indirect emissions associated with the project would interfere with an area's approved SIP or air quality improvement plan. The general conformity rule applies only to federal actions that would result in a net increase in emissions of a criteria pollutant (or a precursor pollutant) for which an area has been designated as nonattainment or maintenance. The rule requires that the net air emissions associated with a federal action be quantified and compared to established pollutant-specific de minimis threshold values using a method referred to as a conformity applicability analysis. For the purpose of this document, the de minimis level is emissions of 100 tons per year for any nonattainment criteria pollutant or precursor. If implementation of the project would generate net emissions increases exceeding the pollutant-specific de minimis value, a more detailed assessment, referred to as a conformity determination, would be required prior to approval by the federal agency. If the increase in net emissions from a proposed action would be below the de minimis level, the project would be assumed to conform, and no further study is required.

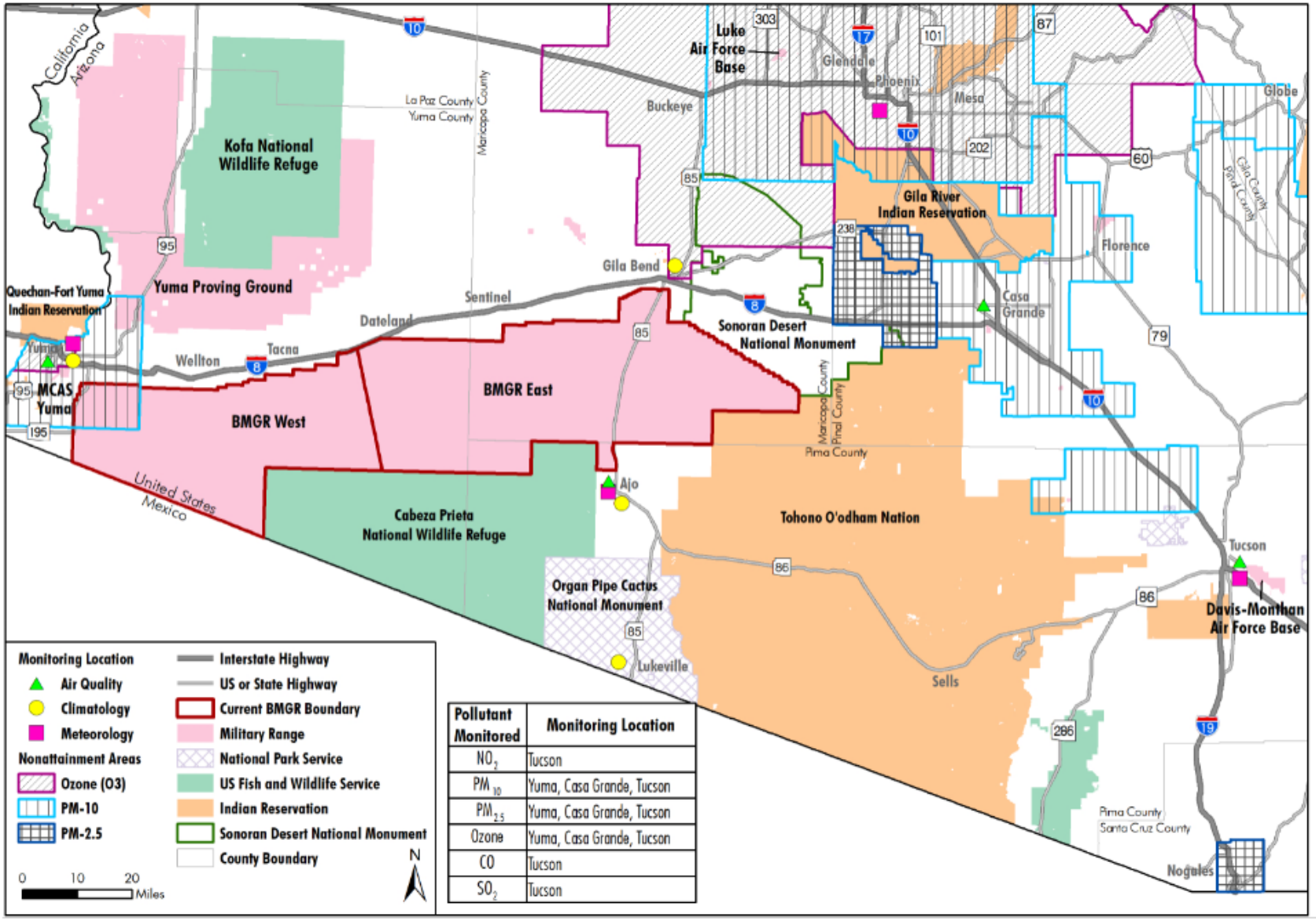
3.11.2 Pollutants of Concern in the BMGR Region

This section summarizes information on pollutants of concern in the BMGR Region, common emission sources, and current air quality monitoring results for each pollutant.

3.11.2.1 Particulate Matter

Sources of PM_{10} include agricultural activities, resuspension of road dust by vehicular traffic, wind-blown dust, engine exhaust, open burning, material handling, major point sources such as power plants, or any activity that forces the suspension of small particles. Levels of PM_{10} associated with fugitive dust are highest when high wind events coincide with ground-disturbing activities, such as agricultural tilling, or vehicular travel on paved or unpaved roads.

Figure 3.10-1. Locations of Air Quality Data Sources and Nonattainment Areas in the BMGR Region



Fine particulates, or $PM_{2.5}$, are caused by a combination of particles emitted from fuel combustion sources (usually carbon particles), and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, and sulfur and nitrogen oxides.

PM_{10} and $PM_{2.5}$ can have damaging effects on health by getting deep into lungs and interfering with the body's mechanism for clearing the respiratory tract; some particles may also get into the bloodstream. Exposure to particulate matter is linked to a variety of problems including aggravated asthma, increased respiratory symptoms, decreased lung function, chronic bronchitis, irregular heartbeat, nonfatal heart attacks, and premature death in people with heart or lung disease. $PM_{2.5}$ is also a major cause of reduced visibility.

PM_{10} is monitored at four air monitoring locations in or near the BMGR region (Figure 3.10-1). Values from the Yuma monitoring location are significantly higher than the values observed at the other locations. The higher concentrations of PM_{10} and $PM_{2.5}$ are associated with urbanized activity. Areas where wood is burned for residential heating may have elevated levels of $PM_{2.5}$.

3.11.2.2 Ozone

Ozone forms in the atmosphere as a result of photochemical reactions of previously emitted pollutants, called precursors. Ozone precursors are predominantly oxides of nitrogen and volatile hydrocarbons, also known as volatile organic compounds. The reaction that forms ozone is promoted by the presence of sunlight and high air temperatures. Because ozone formation results from the mixing of precursors, which may happen hours after the pollutants are emitted and miles from the source, ozone is more of a regional concern than that associated with more localized pollutants such as PM_{10}. Motor vehicles are the predominant source of ozone precursors, especially in urban areas. Secondary sources include gasoline marketing and fuel storage areas for the volatile organic compounds, and power plants and industrial boilers for the oxides of nitrogen.

Short-term and long-term exposure to ozone produces alterations in respiration, resulting in shallow, rapid breathing, and a decrease in pulmonary performance. Exposure can also result in increased susceptibility to infections, inflammation of lung tissue, and immunological changes. In addition, ozone can cause substantial damage to leaf tissues of crops and natural vegetation, and damage to many building materials by acting as a chemical-oxidizing agent.

Levels of ozone measured at the Yuma, Casa Grande, and Tucson monitoring stations during 2016 to 2019 are near the NAAQS standard, but no nonattainment areas for ozone have been designated by EPA in the BMGR region. The ozone nonattainment area in the City of Yuma is located outside of the BMGR and the BMGR region.

3.11.2.3 Other Criteria Pollutants

Other criteria pollutants include carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. All areas within the study area are designated as "attainment" for the NAAQS established for carbon monoxide and nitrogen dioxide. Data on lead concentrations in air are not collected at the monitoring stations near the study area, but it may be assumed that levels of lead in the study area are very low. The Ajo area previously was a nonattainment area for sulfur dioxide but was re-designated as attainment in 2004. In the 1980s, a smelter (a potential major source of sulfur dioxide) in the area was deactivated and

monitoring was discontinued. The effective maintenance period for sulfur dioxide in the Ajo area was from 2004 through 2015. A subsequent SIP revision provided for maintenance of the NAAQS for an additional 10 years after the expiration of the first 10-year maintenance period (through 2025). Levels of sulfur dioxide in the study area are very low due to the lack of major sources.

3.11.2.4 Hazardous Air Pollutants

In addition to the criteria pollutants subject to the NAAQS, hazardous air pollutants (HAPs), also known as toxic air contaminants, are regulated by EPA and ADEQ. These pollutants may pose risks or threats to human health or cause or contribute to serious illnesses or death, where risks are evaluated using results of human and animal exposure studies. For many HAPs and toxic air contaminants, no threshold level exists below which adverse health impacts would not be expected. This contrasts with the criteria air pollutants, for which acceptable levels of exposure have been evaluated and for which the federal and state agencies have set ambient air quality standards. HAPs and toxic air contaminants are regulated through a combination of control technology requirements for large stationary sources, fuel composition requirements, and emission reduction programs for specific types of stationary and mobile sources.

3.11.2.5 GHGs

GHGs are regulated air pollutants that trap heat in the atmosphere by absorbing infrared radiation. Scientific evidence indicates a relationship between the increase in GHG emissions from human activities and increasing global temperatures over the past century. This global warming and the associated changes in global climate are predicted to result in negative environmental, economic, and social consequences. Carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and per- and polyfluorinated alkyl compounds are all GHGs that contribute to global climate change. The most common GHGs from natural processes and human activities are carbon dioxide, methane, and nitrous oxide. Emissions of carbon dioxide occur largely from combustion of fossil fuels.

3.11.3 Air Pollutant Emissions

Existing criteria air pollutant, HAP, and GHG emissions resulting from aircraft and ground operations at the BMGR have been estimated based on reporting year 2019 military operations. Types of operations and activity data for BMGR East and BMGR West were provided by the Air Force and Marine Corps. For aircraft, emissions have been calculated for operations of fixed-wing aircraft, helicopters, and UASs from ground surface to 3,000 feet AGL, because the emissions that tend to affect ground-level air quality are those emitted from the surface to the estimated average atmospheric mixing height of 3,000 feet AGL (Department of the Navy 2009). Ground operations include fuel combustion in diesel and propane boilers, operation and maintenance of diesel internal combustion engine (ICE) generators, ordnance (munitions) detonations, and ground vehicle travel on paved and unpaved roads. Estimated 2019 emissions are summarized in Table 3.10-2. The emissions reported in the table are all in units of short tons per year, not metric tons. A brief overview of the methods, calculations, emissions factors, and supporting data used to estimate emissions for BMGR aircraft and ground operations is provided in the following subsections. More detailed information on the methodology, calculations, and supporting materials, including the Air Conformity Applicability Model (ACAM) reports, are provided in Appendix F.

Table 3.10-2. Summary of Total Estimated Emissions (tons per year)

Based on 2019 Aircraft and Ground Operations at the BMGR

Pollutant	Carbon Monoxide	Oxides of Nitrogen	Volatile Organic Compounds	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	GHGs as CO_2e	Total HAPs
Aircraft Operations	219.7	1,382.7	24.8	92.8	69.6	93.1	280,041	2.6
Boilers	0.24	0.48	0.03	0.03	0.02	0.25	479	0.01
Internal Combustion Engine Generators	0.20	0.29	0.07	0.06	0.06	0.06	34	0.00
Munitions/Ordnance Detonations	1.86	0.77	0.02	24.2	0.73	0.01	68	0.02
Ground Operations - Vehicles	0.97	1.04	0.12	38.8	3.9	0.00	323	0.01
Total Emissions	223.0	1,385.3	25.0	156.0	74.3	93.4	280,946	2.6

Note:

To support the BMGR LEIS, the Air Force's ACAM and emission factors from the Air Force Civil Engineer Center (AFCEC) Air Emissions Guide for Air Force Mobile Sources and the AFCEC Air Emissions Guide for Air Force Stationary Sources were used to calculate emissions for 2019 aircraft and ground operations at the BMGR (AFCEC 2017a, 2018a, 2020a, 2020b). The ACAM Summary Report in Appendix F only reports emission results for the sources that have been modeled using ACAM. As a result, the total emission rates presented in this table differ from the emission results presented in the ACAM Summary Report, because the totals in this table include both the source emissions modeled in ACAM and the source emissions estimated using AFCEC emission factors.

CO_2e = carbon dioxide equivalent

3.11.3.1 Aircraft Operations

Most of the pollutant emissions estimated for operations at the BMGR result from fuel combustion in aircraft engines during military flights, testing, and training activities conducted in the airspace. Aircraft, including manned aircraft and large UAS, use JP-8 jet fuel, and small UAS use gasoline as fuel. Emissions from fuel combustion in aircraft engines include carbon monoxide, oxides of nitrogen, volatile organic compounds, PM_{10}, $PM_{2.5}$, sulfur dioxide, GHGs, and HAPs. Emission factors for HAP emissions were not provided for many types of aircraft, so the reported HAP emissions in Table 3.10-2 represent the available information.

The Air Force's ACAM and emission factors from the AFCEC Air Emissions Guide for Air Force Mobile Sources were used to calculate emissions for aircraft operations at the BMGR (AFCEC 2017a, 2020a). Total activity data in hours for each aircraft type used at BMGR East and BMGR West for the reporting year 2019 were provided by the Air Force and Marine Corps. If available, engine power settings and flight profiles for use in ACAM were taken from noise studies conducted to support two prior environmental studies relevant to the BMGR: the 2020 Draft *Air Force Reserve Command (AFRC) F-35A Operational Beddown Environmental Impact Statement* (Air Force et al. 2020) and the F-35B West Coast Basing EIS (Department of the Navy 2010). Power settings and flight profiles were available in noise studies for the following aircraft: F-18, F-16, F-15, F-5, A-10, AV-8, C-130J, EA-6, AH-1, AH/CH-64, and UH-60. For aircraft not addressed in the cited noise studies, power settings were estimated using touch-and-go sortie profiles and emission factors found in the AFCEC Mobile Guide (AFCEC 2020a).

Emissions were calculated in ACAM for most aircraft operations. A few aircraft could not be modeled in ACAM, including helicopters, the AV-8 Harrier, and small UAS. For the AV-8 and helicopters, emissions were estimated based on AFCEC Mobile Guide (AFCEC 2020a) emission factors. For small UAS, such as the RQ-21A, emissions were estimated using surrogate emission factors for a small, non-road gasoline engine found in the AFCEC Mobile Guide (AFCEC 2020a). Each aircraft type was modeled separately, assuming no use of auxiliary power units (APUs). Detailed emission results for aircraft are presented Appendix F, Air Quality Emissions Calculations and Air Conformity Applicability Model Reports.

Except for sulfur dioxide and GHGs, the emission rates (mass over time) of these pollutants are influenced primarily by the power setting of the aircraft engines. Carbon monoxide, volatile organic compounds, and HAP emissions are higher during low power settings for taxiing and idling; as the power setting increases, the emission rates decline. Oxides of nitrogen emission rates are directly proportional to the power setting. During periods of low settings, oxides of nitrogen emissions are low when engine power and combustion temperatures are low. Oxides of nitrogen emissions are higher for the higher power settings during take-off and climb-out. GHG emissions are directly proportional to fuel use and vary by type of fuel.

Emissions of sulfur dioxide are related more to the sulfur content of the fuel and the amount of fuel burned per hour than the operating temperature of the engine. Although these emissions are highest during take-off and climb-out, there is not as much difference in emission rates among the power settings as there is for carbon monoxide or oxides of nitrogen. Emissions of PM_{10} are the result of incomplete combustion and are slightly higher at low power settings; however, total particulate emissions are highest during take-off and climb-out because fuel consumption is highest during these periods.

Carbon monoxide and oxides of nitrogen are the predominant criteria pollutants emitted by aircraft engines. Although EPA has established some standards to limit emissions from aircraft engines, aircraft operations are not typically subject to as many compliance requirements as stationary, area, or point sources that release pollutants at or near ground levels.

Aircraft engines emit several GHGs; emissions of carbon dioxide, nitrous oxide, and methane have been estimated. Emissions of individual and total GHGs are summarized and reported in Table 3.10-2 as carbon dioxide equivalents (CO_2e). Different GHGs have varying climate change impacts, so grouping and reporting results as CO_2e provides a metric for total climate change impact. This method uses the most commonly accepted metric for the radiative forcing (heat trapping) impact of GHGs, i.e., the global warming potential (GWP), which is a ratio intended to quantify the mass of carbon dioxide that would produce the same impacts over 100 years as one-unit mass of the GHG. Most current regulatory and voluntary reporting programs in the U.S. use the 100-year GWP estimates from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report as a measure of the relative impacts of different GHGs (IPCC 2007).

As an example, per the IPCC Fourth Assessment Report, the 100-year GWP of methane is 25. By definition, the GWP of carbon dioxide is 1. As a result, emissions of 1 ton of CH_4 and 1 ton of carbon dioxide would total 26 tons of CO_2e using the IPCC Fourth Assessment Report GWPs. The fluorinated gases and nitrous oxide have much higher GWPs; the 100-year GWP for nitrous oxide is 298 (IPCC 2007).

The annual total aircraft emissions estimated for each pollutant for all the BMGR areas combined are presented in Table 3.10-2. Fixed-wing aircraft provide a large percentage of the total estimated emissions. This is due primarily to the higher emission factors for the fixed-wing aircraft engines in comparison to helicopter engines, although the larger inventory of the fixed-wing aircraft and their higher usage rate also contribute to the higher total emissions.

3.11.4 Ground Operations

Table 3.10-2 provides total emissions from all BMGR ground activities, including fuel use in boilers and ICE generators, munitions/ordnance detonations, and vehicular traffic on paved and unpaved roads and open ground.

Air Force operations at BMGR East use approximately 20 small ICE generators rated at less than 2 kilowatts per hour and four small boilers rated at less than 2 million British thermal units per hour. The ICE generators are typically operated far less than 50 hours per year, with a few exceptions. The generators and boilers are operated under permits issued by the Maricopa County Air Quality Department. Two of the boilers use No. 2 diesel fuel and two use propane. All of the generators use No. 2 diesel fuel. The calculations for the Air Force generators were based on reported actual hours of operation in 2019. Actual hours of operation were not available for boilers, so emissions were estimated using AFCEC guidance and an assumption of 111 heating days per year for the BMGR. No fixed generators or boilers are used on BMGR West. Emissions for boilers and ICE generators were estimated in ACAM, and emission results are presented in the ACAM Detail Report in Appendix F.

Annual emissions from munitions/ordnance detonations were based on reported types, numbers, and the weight of the detonated munitions. Emission factors from EPA's AP-42 Compilation of Air Emission Factors and from the AFCEC Air Emissions Guide were used for estimation of emissions from munitions/ordnance detonations (EPA 2009; AFCEC 2020b). Detailed emission calculations are presented in Appendix F.

Vehicular emissions were estimated using the vehicle types and vehicles miles traveled reported for 2019 operations on the BMGR. There are 21 types of vehicles used on BMGR East, and 7 types of vehicles commonly used on BMGR West. All vehicle types can be classified into three categories, light-duty diesel truck, light-duty diesel vehicle, and heavy-duty diesel vehicle. Emission factors from the AFCEC Air Emissions Guide for Air Force Mobile Sources for these vehicle categories were used to calculate exhaust emissions, which include carbon monoxide, nitrogen oxides, volatile organic compounds, PM_{10}, $PM_{2.5}$, sulfur dioxides, GHGs, and HAP. In addition, fugitive dust emissions were estimated as PM_{10} and $PM_{2.5}$ from travel on paved and unpaved roads and open ground (AFCEC 2018a).

3.11.5 Air Quality Management Plans and SIPs in the BMGR Region

Over time, the ADEQ has prepared, submitted, and revised SIPs for the nonattainment areas listed in Table 3.10-1, and shown on Figure 3.10-1.

EPA designated the Yuma area as a moderate PM_{10} nonattainment area, and ADEQ completed a SIP for the Yuma Moderate PM_{10} Nonattainment Area in 1991 and updated the plan in 1994 with additional control measures. EPA has never approved the SIP for the Yuma area. Since 1991, the Yuma area had

not violated either the 24-hour or annual PM_{10} NAAQS up until 2002. As a result of several years of "clean data," ADEQ began developing a maintenance plan and redesignation request for the Yuma area, and continued to do so until an exceedance of the 24-hour NAAQS occurred on 18 August 2002, as a result of a massive thunderstorm that generated strong winds and windblown dust.

High wind events are a type of natural event covered by EPA's Natural Events Policy (updated in 2018 to the Exceptional Event Mitigation Plan: Phoenix, Rillito, West Pinal and Yuma PM_{10} Nonattainment Areas [ADEQ 2018b]). As a result of 2002 exceedances, the maintenance plan was temporarily postponed until ADEQ completed a Natural Events Action Plan for the Yuma area and submitted it to EPA on 17 February 2004. Subsequently, ADEQ submitted a Natural Events Action Plan implementation report to EPA on 17 February 2005. The Natural Events Action Plan contains strategies and best available control measures being implemented in the Yuma area to reduce particulates in the event of future high wind conditions. The plan was determined adequate by the EPA on 27 June 2007 (EPA 2007b).

EPA designated a portion of Yuma County as marginal nonattainment for the 2015 Ozone NAAQS on 4 June 2018. ADEQ is working on an ozone SIP with plans to submit it to the EPA in August 2020. Sources of ozone precursors in the area include vehicle travel, industrial solvent and coating use, fuel combustion, and pollutant transport (ADEQ 2019b).

In November 1990, EPA designated the Ajo area in northwest Pima County as a moderate nonattainment area for the 1987 PM_{10} NAAQS. ADEQ submitted nonattainment area plans for the Ajo PM_{10} planning area in 1988 and 1991. In May 2019, the ADEQ Air Quality Division submitted a SIP revision to the EPA (ADEQ 2019a). ADEQ stated that the SIP revision demonstrated satisfaction of all the CAA requirements for redesignation to attainment and requested EPA's concurrence. New Pima County fugitive dust rules ensure that the emission reductions from local sources needed to maintain air quality will continue into the future. Recent data show the area has been in compliance with the PM_{10} standards in 2014, 2015, 2016, and 2017 (ADEQ 2019a). EPA approved ADEQ's request to redesignate the Ajo area as an attainment area and approved the Ajo PM_{10} Maintenance Plan on August 4, 2020 (EPA 2020d).

On 31 May 2012, EPA redesignated an area in western Pinal County, Arizona, from "unclassifiable" to "nonattainment" for the 1987 PM10 NAAQS. The "West Pinal County PM10 Nonattainment Area" was classified as a "moderate area" under CAA. The CAA imposes certain planning requirements for moderate nonattainment areas to reduce PM10 emissions and attain the NAAQS. On 30 December 2013, ADEQ submitted a revision to the Arizona SIP to meet CAA obligations for PM10 nonattainment areas (emissions inventory, ambient monitoring data, and base year modeling) and commitments to comply with additional requirements. Because the 2013 revision did not contain all required elements for nonattainment area SIP, ADEQ withdrew the plan from consideration for EPA action in February 2014. ADEQ submitted the Final 2015 West Pinal Moderate PM10 Nonattainment Area SIP revision in December 2015. Final rules submitted for approval with the SIP document included the applicable Arizona rules for agricultural best management practices and Pinal County regulations for construction and general fugitive dust (ADEQ 2015). The applicable PM10 attainment date for West Pinal County was December 31, 2018 (EPA 2020c). The EPA determined on June 24, 2020 that the West Pinal County nonattainment area did not attain the requisite PM10 attainment standard by the December 31, 2018 attainment date (EPA 2020c). Accordingly, the EPA concluded the West Pinal County area is a serious

PM10 nonattainment area. ADEQ is also in the process of preparing SIP supporting documentation for PM2.5 moderate nonattainment area in West Central Pinal County (EPA 2020b).

3.12 Climate Change

The region of influence for the discussion of climate change focused on the BMGR, although surrounding lands experience similar effects. Scientists attribute climate change to the "greenhouse effect," which results when the atmosphere traps heat and keeps it from radiating toward space. Certain gases in the atmosphere block heat from escaping. Section 3.10 discuss greenhouse gases in the affected environment and Section 4.10 addresses potential greenhouse gas environmental impacts from the alternatives.

The process outlined in the *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide - Fundamentals* (AFCEC 2017b) guides this discussion, starting with the identification of state- and location-specific potential impacts of climate change. Existing management strategies are also presented, where available.

3.12.1 Arizona-Specific Potential Impacts of Climate Change

EPA's factsheet, *What Climate Change Means for Arizona*, identifies state-specific potential impacts of climate change. Per EPA, Arizona has already warmed and annual precipitation has decreased in the last century (EPA 2016b). Additional state-specific climate change impacts include:

- A *decreasing snowpack* in mountainous areas since the 1950s, which can lead to a decrease in water supplies.
- *Rising temperatures*, leading to increases in water evaporation (or transpiration) from plants, soils and surface waters as well as decreases in precipitation, leading to droughts and an increase in the need for water coupled with *reduced water supply.*
- *Agriculture impacts* (from high temperatures and drought) on Arizona's top agricultural products: cattle, dairy, and vegetables. High temperatures threaten cattle health. Livestock operations can also be affected by fire and lack of water.
- An increase in the severity, frequency, and extent of *wildfires* with potential impacts to property, livelihood, and human health. On average, more than 2 percent of the land in Arizona has burned per decade since 1984. More fires and drier conditions would expand the desert landscape and change plant communities affecting plants and animals.
- Warmer and drier conditions that enable seasonal pests to persist year-round and new *pests and diseases* to establish.
- *Human health concerns* like heat stroke and dehydration resulting from higher temperatures, exacerbated in vulnerable people with pre-existing health issues. Rising temperatures can also increase the formation of ground-level ozone that can aggravate lung diseases like asthma and lead to premature death.

- *Tribal community impacts* from rising temperatures and drought, leading to:
  - Decreases in the availability of animals and plants traditionally used for sustenance and cultural practices
  - Limited water availability for native people who are not connected to municipal systems or reliable groundwater wells
  - Health issues for people without electricity required for cooling during periods of extreme heat

Arizona is the third fastest warming state in the country, with a temperature increase of 3.23 degrees Fahrenheit (°F) between 1970 and 2018 (Climate Central 2019). During that same time period, Tucson and Phoenix were America's third and fourth fastest warming urban areas, increasing 4.48°F and 4.35°F, respectively (Climate Central 2019). The U.S. Global Change Research Program's third national climate assessment for the Southwest U.S. projects regional annual average temperatures increases from 2.5 to 5.5°F by 2041 to 2070, and from 5.5 to 9.5°F by 2070 to 2099 if growth in global emissions continues, with the greatest increases in temperature occurring during the summer and fall (Garfin et al. 2014). Summertime heat waves are projected to become longer and hotter, whereas the trend of decreasing wintertime cold air outbreaks is projected to continue.

Throughout the desert, increases in temperatures are forecast to lead to drier soils (Garfin 2018). Additionally, as air temperature rises, the atmosphere's ability to hold moisture increases. As a result, extreme precipitation events are more likely. Annual precipitation typically occurs during mid-winter and summer monsoons. During the past 20 years, the monsoon season has seen an increase in extreme monsoon season precipitation and intensity. The Southwest U.S. is projected to receive 10 to 20 percent more precipitation in larger storms that recur every 20 years (Garfin 2018).

3.12.2 Assessing Climate Change Threats and Management Strategies

The DoD recognizes that a changing climate will impact the military and the way it executes its mission (DoD 2014). As such, DoD conducted baseline surveys of all of its bases, installations and facilities to assess their vulnerability to climate change. The DoD assessment covered:

- Plans and operations to prepare for and carry out the full range of military operations
- Training and testing to maintain a capable and ready Air Force
- Built infrastructure to stage national defense and humanitarian missions
- Natural infrastructure to support military combat readiness
- Acquisition and supply chain to develop, acquire, field, and sustain equipment and services and to leverage technologies and capabilities

From this assessment, DoD identified four climate change phenomena that are likely to affect its activities: rising global temperatures; changing precipitation patterns; increasing frequency or intensity of extreme weather events; and rising sea levels and associated storm surge. The first three phenomena are consistent with the potential climate change impacts identified for Arizona and are also applicable to the BMGR and its perimeter. Both the Air Force and Marine Corps monitor weather stations on the

range and participate in a regional climate monitoring network. This information aids in understanding and adapting to climate change.

3.12.3 Location-Specific Potential Climate Change Effects and Management Strategies

3.12.3.1 Biological Resources

Of all federal landholdings, DoD landholdings like the BMGR harbor the most threatened or endangered species, as well as large numbers of species at risk (imperiled, but yet to be federally listed by USFWS per the ESA) (Bagne and Finch 2012). The vulnerability of species to climate change is a function of sensitivity, exposure, and adaptive capacity (Glick et al. 2011). Bagne and Finch (2012) conducted a 50-year assessment of threatened, endangered, and at-risk species on BMGR East to address the vulnerability of individual species to population declines associated with projected changes in climate. Of the 15 vertebrate species assessed, Sonoran pronghorn (*Antilocapra americana sonoriensis*) and Sonoran desert tortoise (*Gopherus morafkai*) were determined to be the most vulnerable to climate change. The acuña cactus (*Echinomastus erectrocentrus* var. *acunensis*) was the only vascular plant species assessed in the BMGR East study and determined to have increased vulnerability to population declines with projected climate change.

Management Strategies

The BMGR's INRMP process considers climate change impacts on biological and other natural resources. Additionally, USFWS and AZGFD have published management strategies to help address climate change impacts on biological resources. *Arizona's State Wildlife Action Plan 2012-2022* (AZGFD 2012) identifies possible impacts of climate change to wildlife and describes actions being taken by the AZGFD and partner organizations to address those impacts. USFWS published its first climate change strategic plan in 2010, and in response to a Congressional request, that plan was followed by the *National Fish, Wildlife and Plants Climate Adaptation Strategy* in 2012 (National Fish, Wildlife and Plants Climate Adaptation Partnership 2012).

3.12.3.2 Wildfires and Invasive Species

In the Sonoran Desert, fires have historically been infrequent, occurring subsequent to periods of high precipitation that resulted in more herbaceous plant growth that could transport fire across a normally sparse landscape (McLaughlin and Bowers 1982). Warmer temperatures coupled with climate variability (high precipitation periods followed by drought) are projected to increase environmental conditions promoting fuel accumulation and the potential for fire ignition. Changes in the landscape composition of plant communities, particularly invasive plant species, also influence wildfire.

A study of climate change impacts on invasive species and wildfire in western U.S. deserts suggests widespread changes in the length of the freeze-free season that may favor cold-intolerant annual grasses, changes in the frequency of wet winters that may alter the potential for establishment of invasive annual grasses, and an earlier onset of the fire season coupled with a lengthened period of time when conditions are conducive to fire ignition (Abatzoglou and Kolden 2011). The spread of invasive plants can enhance the spread of fire through sparsely vegetated lands (Brown and Minnich 1986). In

addition to competing with native plants for water and nutrients, common invasive plants like Mediterranean grass (*Schismus barbatus*) and Sahara mustard (*Brassica tournefortii*) can increase quickly during wet periods and then die to leave dry, flammable foliage (Bagne and Finch 2012).

Buffelgrass (*Pennisetum ciliare, Syn. Cenchrus ciliaris*), another regional invasive species, is known to promote a frequent high severity fire regime (Williams and Baruch 2000). Fires fueled by buffelgrass tend to burn faster, longer, and at higher temperatures resulting in more plant and animal deaths than fires fueled only by native plants (U.S. Department of Agriculture, Forest Service 2010). Buffelgrass is found across the BMGR (Luke AFB and MCAS Yuma 2018a) and is expanding in areas of BMGR East along State Route 85 (Whittle and Black 2014; Damery-Weston 2016). It is also found along Interstate 8 (Van Devender and Dimmitt 2006). Mediterranean grass is also widespread throughout the range, most commonly on fine-grained soils. Sahara mustard is most common west of State Route 85 and is well established along North Tactical Range and South Tactical Range roadways and within target areas. Fountain grass (*Pennisetum setaceum*) is also present in BMGR East and West. Like buffelgrass and Sahara mustard, fountain grass is fire-tolerant and could lead to altered fire regimes if left unmanaged (California Invasive Plant Council 2006). Buffelgrass and Sahara mustard also occur on the CPW (McCarter 2011). Buffelgrass and fountain grass are well-established in OPCNM (NPS 2013).

Since 2011, there have been 126 fires ranging in size from a few square yards to several hundred acres on BMGR East. Generally speaking, invasive plants did not play a critical role in the spread of many of these fires. Wildfire risk is much lower at BMGR West than it is at BMGR East because precipitation patterns support only minimal vegetation growth on the west side of the range. However, in 2008 or 2009, a 500-acre wildfire occurred in the area, burning a native creosote-bursage community (Luke AFB and MCAS Yuma 2018a). That fire was fueled by Sahara mustard and a post-fire field inventory concluded that Sahara mustard was the only species to recover in the burned area (Malusa 2010).

Management Strategies

A wildfire management plan is in progress for BMGR East (Alvidrez, personal communication 2020) and one has been completed for BMGR West (Hercules Joint Venture 2018). The plans define roles and responsibilities and pre-fire suppression and suppression strategies and actions. Additionally, vegetation inventory and monitoring plans have been developed and implemented for both BMGR East and BMGR West and include ongoing inventory, monitoring, and removal efforts related to the spread of exotic, invasive, or noxious plants and their impacts to native Sonoran Desert vegetation communities (Luke AFB and MCAS Yuma 2018a). An Integrated Pest Management Program, including guidance and protocols for invasive species removal and management, has also been prepared for BMGR East (Luke AFB 2015). Invasive species management strategies are maintained on the BMGR to protect the quality of the range for native plants and wildlife and to prevent deleterious impacts to military training activities and readiness mission (Luke AFB and MCAS Yuma 2018a).

3.12.3.3 Water Availability

A summary of climate change impacts on water resources in BMGR East was provided by Bagne and Finch (2012). Climate change effects on the headwater sources of BMGR East will largely result from changes in precipitation and temperature. Surface water is limited and mostly ephemeral in the BMGR. As such, rain catchment basins, including *tinajas*, *charcos*, and stock tanks, have been modified in certain

areas to retain water for longer periods of time. In the BMGR, the presence of surface water depends on precipitation (rather than on groundwater baseflow) and is vulnerable to considerable alteration with warming temperatures and changes in circulation patterns. Because precipitation is hard to project, it is challenging to predict future changes in natural water sources and surface run-off. Increased variability in precipitation will likely lead to greater interannual variation in the number and longevity of surface water sources. Additionally, projections for higher temperatures will result in increased evaporation rates, resulting in less moisture available for plants and animals. This poses threats to *tinajas* (rock depressions that naturally collect water) and other temporary water sources on the range.

Management Strategies

The *Colorado River Basin Water Supply and Demand Study* (Reclamation 2012) was prepared with a 50-year timeframe (to 2060) for the purpose of defining current and future imbalances in water supply and demand in the Colorado River Basin and the adjacent areas of states receiving Colorado River water. No single strategy or portfolio was recommended, but the study process and results provide a framework for decision-making moving into the future. Much of the BMGR is contained within the Colorado River Basin and portions of the Lower Gila River (Painted Rocks segment); Lower Gila River, downstream of the Painted Rocks segment; Lower Santa Cruz River; San Cristobal Wash; Santa Rosa Wash; and Tenmile Wash hydrological subbasins.

3.12.3.4 Livestock

While the BMGR land withdrawal excludes grazing within the BMGR, two historic livestock allotments have been identified within the proposed Gila Bend Addition (as discussed in Section 3.4). Climate change effects on rising temperatures and water availability are projected to affect livestock operations in the Southwest in four ways: feed grain production, availability and price; lower forage quality and quantity; animal health, growth and reproduction; and disease and pests (U.S. Department of Agriculture 2020). The Stout allotment is classified as ephemeral, meaning it can be grazed only when forage conditions satisfy rangeland health standards. In many years, drought conditions limit the option to graze livestock in ephemeral allotments.

3.12.3.5 Public Health and Safety

Extreme heat events are of particular concern for public health and safety (Chuang et al. 2015). Climate-related public health and safety concerns would apply to ground personnel and to visitors to the BMGR as well as to residents in perimeter communities. Urban areas in the BMGR perimeter that are projected for continued population growth (Section 3.18) may be more likely to experience an urban heat island effect such as what is experienced in Phoenix while small rural communities like Gila Bend may be less vulnerable to heat extremes.

While Phoenix has seen an increase in the number of days with extremely high daytime temperatures from 18 in the 1980s to over 25 or more, Gila Bend has seen no trend for the past 70 years (Chuang et al. 2015). Phoenix and Gila Bend have both experienced increases in nighttime minimum temperatures since 1960, but Gila Bend's increases have been at or below 80°F with only one or two days of nighttime minimum temperatures at or above 90°F. Without cooling options, continual high nighttime lows do not allow the body to recover from high daytime temperatures.

In 2017, Yuma experienced its warmest year on record (since 1878), and five months of that year were the driest on record (National Weather Service 2020). Between 2008 and 2012, Yuma County experienced a rise in heat-related hospital emergency room visits and in-patient admissions as did Maricopa, Mohave, and Pima counties (Arizona Department of Health Services 2020a).

Vector-Borne Disease

Yuma was one of six urban areas in Arizona studied for climate impacts on vector-borne diseases, including West Nile Virus, from mosquitoes and other sources (Roach et al. 2017a). Currently, Yuma experiences two distinct mosquito seasons each year with some mid-summer reduction and a break in the West Nile Virus season in December and January. By mid-century the mosquito seasons are projected to extend and potentially crash mid-summer.

Management Strategies

Arizona Department of Health Services has identified extreme weather events, including heat waves, wildfires, dust storms, flooding, drought, and adverse air quality events as climate-sensitive public health hazards. *Arizona's Climate and Heath Adaptation Plan* is intended to provide public health guidance for the State of Arizona and local communities (Roach et al. 2017b). *Climate and Health Strategic Plan for Maricopa County: 2016-2021* addresses climate-sensitive public health issues (Maricopa County Department of Health 2016). Yuma County's Health District provides information about the health dangers associated with extreme heat and establishes water sites and cooling centers for vulnerable residents (Yuma County 2020).

3.12 Biological Resources

Biological resources include general wildlife; plant and animal species that have been assigned special designations by a federal, state, or local governmental agency, and the vegetative communities that provide habitat for these species. These topics are covered in some detail in the 2018 INRMP, and the information is incorporated herein by reference. A summary and information supplemental to the INRMP is included in this section.

While a wider area is considered to identify regional context and movement patterns, the region of influence for biological resources is confined to the limits of the BMGR and the Gila Bend Addition.

3.12.1 BMGR

The Sonoran Desert Ecoregion encompasses about 100,000 square miles in southern Arizona, southeastern California, Baja California, and northwestern Sonora. The BMGR, CPNWR, OPCNM, SDNM, and the BLM-administered Sentinel Plain area occupy about 5,000 square miles of lands in southwestern Arizona and are a component of one of the largest remaining expanses of relatively unfragmented Sonoran Desert Ecoregion in the U.S. The BMGR accounts for almost 55 percent of the land area within this expanse (Luke AFB and MCAS Yuma 2018a).

3.12.1.1 Vegetation

The BMGR is within the Sonoran Desert Scrub biotic community (Brown 1994). Vegetation is predominantly characteristic of the Lower Colorado River Valley subdivision of the Sonoran Desert, which occurs throughout the range, mostly on the valley floors. Dominate species are represented by creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) associations, often with or replaced by several species of saltbush. The Arizona Upland subdivision of the Sonoran Desert occurs primarily in the eastern portion of the BMGR on the bajadas and mountainous areas. These habitats are characterized by greater diversity of vegetation and more complex vertical structure than the Lower Colorado River Valley subdivision (Brown 1994). Vegetation characteristic of the Arizona Uplands include palo verde (*Parkinsonia florida)*, creosotebush, white bursage, and cacti species such as saguaro (*Carnegiea gigantea*), cholla (*Cylindropuntia*), and prickly pear (*Opuntia*). Areas within the range where ground activities occur and where ordnance is dropped have relatively low densities of vegetation. Invasive species are more frequently found along roads and in disturbed areas. Species being actively managed on the BMGR include Sahara mustard (*Brassica tournefortii*), buffelgrass (*Pennisetum ciliare*), fountain grass (*Pennisetum setaceum*), Mediterranean grass (*Schismus arabicus and S. barbatus*), colocynth (*Citrullus colocynthis*), Lehmann lovegrass (*Eragrostis lehmanniana*), salt cedar (*Tamarix ramosissima*), Athel tamarisk (*Tamarix aphylla),* Russian thistle *(Salsola tragus)*, and red brome *(Bromus rubens)*. More information on invasive species and current trends can be found in the Public Report (Luke AFB and MCAS Yuma 2018b) Section 3.3.2, and is incorporated here by reference. On the BMGR, in response to rainfall patterns, the Arizona Upland Subdivision reaches its greatest development on the bajadas, foothills, and slopes of the Sand Tank, Sauceda, and Batamote mountains, but is still largely transitional with the Lower Colorado River Valley Subdivision (Marine Corps 1997). Vegetation associations that occur are identified in Section 2.1.3.2 of the INRMP, including a listing of the associations, association characteristics (including composition, structure, function, physiographic occurrence, and soil characteristics), and mapping and acreage of the associations. For additional information, see Section 2.3.5 of the INRMP.

The Mohawk Dunes are the largest aeolian (wind-blown) dune field in the BMGR. Located principally in BMGR West, the dune field, which is roughly 22 miles long and up to about 4.3 miles wide, generally parallels the west side of the Mohawk Mountains. The southern end of the dune field extends eastward into a pass in the Mohawk Mountains that enters the San Cristobal Valley, which is located in BMGR East. A detached but associated extension of the Mohawk Dunes is located about 1.8 miles to the northeast from the end of the main dune field in the pass. This much smaller field is narrow and only about 2.3 miles in length. Additional smaller and scattered dune fields are found in various locations of BMGR East including in the central and northern portions of the San Cristobal Valley, on the Sentinel Plain, in North Tactical Range surrounding *playas*, and in South Tactical Range immediately north and east of Growler Wash. Vegetation in the various dune fields often has a clumped distribution and is composed of a variety of shrubs. Vegetation associated with dunes is identified in Table 2.3 of the INRMP.

Xeroriparian communities that occur along the edges of desert washes generally include many of the same plant species found in upland areas, achieving more lush growth and greater densities due to the increased availability of surface and/or subsurface water. Its dense, clumped growth form captures soils and reduces the potential for soil erosion and provides cover for small mammals, reptiles, and birds. Although the USFWS National Wetlands Inventory classifies these features as “riverine wetlands,” they

are dry washes, not wetlands, as defined by Section 404 of the Clean Water Act. The National Wetlands Inventory data indicate 22 depressional features within the BMGR that are classified as "freshwater ponds" and a "lake." These areas may contain occasional standing water from rain events, but soils in these areas are not classified as hydric (Natural Resources Conservation Service 2017) and the vegetation is not likely to include hydrophytic plants. The only pond with perennial waters is an artificially created and maintained pond at the Gila Bend AFAF.

3.12.1.2 Wildlife

The intact desert ecosystems of the Lower Colorado River Valley Subdivision and Arizona Upland habitats, including desert washes and unique sand dune habitats, support a diverse wildlife community. Numerous species of wildlife occur within the BMGR and adjacent CPNWR, with inventories estimating more than 200 bird species, 60 mammal species, 10 amphibian species, and 50 reptile species (Luke AFB and MCAS Yuma 2018a). Past and ongoing military activities have affected desert habitats in localized areas. However, most land on the BMGR is undisturbed; military-related-disturbances have little influence on the biotic communities at a landscape level, and natural ecological processes are the primary influence on native biological communities across the expanse of the BMGR with similar processes represented at the CPNWR and OPCNM.

AZGFD maintains management authority for the state's wildlife, including the BMGR. Numerous wildlife management programs are jointly organized between the military and AZGFD, including ungulate surveys, bird call-counts, and bat and lizard surveys (Luke AFB and MCAS Yuma 2018a). With no permanent flowing water on the BMGR, wildlife, such as bighorn sheep, deer, Sonoran pronghorn, coyote, and various other species, is restricted to managed and natural catchment tanks, *tinajas*, *playas*, ephemeral washes, and roadbeds that may flood during heavy rain. AZGFD monitors and maintains artificial water catchments and regulates all hunting on the BMGR. Additional information on surveys and management goals and activities is found in Section 7.1 of the INRMP.

Military features and activities sometimes provide artificial wildlife habitat or influence wildlife behavior. For instance, elevated military structures are sometimes used as perch sites for raptors and other bird species. Small mammals burrow in target areas where soil has been loosened by target construction and maintenance as well as munitions impacts. Surface disturbing activities that alter natural runoff patterns, such as collection of rainwater in disturbed soils (e.g., bomb craters, along roadsides) and application of water for dust suppression can create more mesic microhabitats in localized areas that support more lush vegetation that attracts foraging wildlife. Reptiles, small mammals, and invertebrates may use targets (e.g., vehicle bodies, and simulated tanks and structures) and/or munitions debris (e.g., expended munitions casings, and parachutes) for cover.

Wildlife Movement Corridors

Large mammals, such as mule deer, desert bighorn sheep, javelina, bobcat, and mountain lion may range widely across the landscape in search of food and water or in response to changing environmental factors, often following seasonal movement patterns. Drainage channels lined with dense vegetation are often used as corridors for wildlife movement providing both cover and forage. Mountain passes, including the Mohawk Pass and Cipriano Pass, provide important corridors for movement of some wildlife species between major valleys within the BMGR. Desert riparian areas are also used as corridors

for wildlife movement as they provide more cover and forage than adjacent habitats and have terrain that supports the movement for many species.

Natural and man-made barriers to wildlife movement (such as fences, highways) may prevent animals from reaching important resources and/or limit the availability of habitats that may otherwise become occupied. Abrupt escarpments, mountain ridges, and even open valley floors are types of natural barriers (Lee et al. 1998) that may discourage or prevent movement of some species. Human-made obstacles such as highways, fences, railroads, and irrigation canals that are found in association with or adjacent to the BMGR are partial or complete barriers to movement of some wildlife species. Surrounding land may also have reduced wildlife due to wildlife access to historic water sources adjacent to the BMGR (e.g., the Gila River) being limited by human-made obstacles.

3.12.1.3 ESA-Listed Species Evaluated for Occurrence within the BMGR

Federally listed species and species of greatest conservation need were reviewed. Fifty-eight species were identified. These species, their status, habitat, and presence are provided in Table 2.6 of the INRMP. Five species are listed as threatened or endangered, including the Sonoran pronghorn, southwestern willow flycatcher (*Empidonax traillii extimus*), Yuma Ridgway's rail (*Rallus obsoletus [longirostris] yumanensis*), acuña cactus, and Peirson's milkvetch (*Astragalus magdalenae* var. *peirsonii*). Of these, only two, the Sonoran pronghorn and acuña cactus, occur on the BMGR (Table 3.12-1).

Table 3.12-1. ESA-Listed Species and their Known Occurrences within the BMGR

Class	Species Name	Status*	Habitat	Known Occurrences
Mammals	Sonoran pronghorn *(Antilocapra americana sonoriensis)*	ESA-E XN	Broad inter-mountain alluvial valleys in low elevation Sonoran desertscrub with creosote-bursage and paloverde-mixed cacti associations at elevations between 400 and 1,600 feet above mean seal level.	Known to occur east of Gila and Tinajas Altas mountains to Area B and south of Interstate 8; also on CPNWR and OPCNM.
Plants	Acuña cactus *(Echinomastus erectocentrus acunensis)*	ESA-E	Occurs along rocky hillsides and ridges on soil overlaying various bedrock at elevations between 1,200 and 3,800 feet above mean seal level.	Confirmed individuals located on BMGR East in the Sauceda Mountains; also on OPCNM.

Sources: USFWS 2020a; Luke AFB and MCAS Yuma 2018a; AZGFD 2019a
* E = ESA Endangered; XN = Experimental/Nonessential Population.

The Air Force and Marine Corps have previously consulted with USFWS on 10 occasions to address potential project-related adverse effects to species associated with military training activities on the BMGR. USFWS has issued a series of Biological Opinions providing mandatory terms and conditions for the Air Force and/or Marine Corps to implement. These Biological Opinions provide ESA compliance for current, ongoing military training activities on the BMGR. A list of the Biological Opinions and the conservation measures identified within them can be found in Appendix G.

Acuña cactus

Information on the acuña cactus can be found in Section 7.4.5 of the INRMP. This species occurs under specific and limited habitat requirements, resulting in its rarity, and is protected under the ESA and

Arizona Native Plant Law. Three clusters of acuña cactus populations on BMGR East have seen a slight increase in the past few years (Luke AFB and MCAS Yuma 2018a). However, overall population trends indicate a decline of the cactus. Critical habitat was designated for the cactus in 2016; however, the USFWS exempted lands on the BMGR (USFWS 2016a) because the Air Force had existing and planned conservation measures in place as noted in the 2012 INRMP Update. Good habitat occurs in the far eastern and northeastern portions of BMGR East, and habitat worsens to the north and west within the range as elevations decrease; this species does not occur on BMGR West. Based on predictive modeling, no new acuña cactus habitat is anticipated to occur on BMGR East near the Gila Bend Addition; no occurrences were documented in the Sand Tank Mountains surveys of habitat that was predicted to have high likelihood of occurrence.

Peirson's milk-vetch

Peirson's milk-vetch is a 1-foot-tall to 2-foot-tall herbaceous perennial in the Fabaceae (pea) family; it is described in Section 3.7 of the INRMP. This subspecies of milk-vetch was originally thought to occur on BMGR West from a specimen collected in 1996; however, the specimen was later determined to be a different subspecies (Luke AFB and MCAS Yuma 2018a). Subsequent surveys on the BMGR for the plant in 2003 and 2004 (BMGR Task Force 2005) and a comprehensive, multi-year vegetation survey and mapping effort found no Peirson's milk-vetch (Malusa and Sundt 2015). However, USFWS believes that this species is likely to be found in the Yuma Dunes west of the BMGR.

Sonoran Pronghorn

Information on the population, distribution, and management of the Sonoran pronghorn can be found in Section 7.4.1 of the INRMP. The animal has a semi-nomadic behavior that allows it to find sufficient food and moisture across a harsh landscape. The distribution of the Sonoran pronghorn includes the Sonoran Desert in areas north of the Gila River and south of Interstate 10 on the Kofa NWR, YPG, and surrounding areas, as well as south of the Gila River and east of the Colorado River in Arizona, including CPNWR, OPCNM, BMGR East, BMGR West, and into Mexico. Previously holding at 50 to 100 animals, the Arizona population dropped to an estimated 21 to 33 animals following a severe drought in 2002 (Luke AFB and MCAS Yuma 2018a).

Based on Recovery Team efforts, the Sonoran pronghorn has been reintroduced to its historic range. Areas within BMGR East (east of State Route 85 and south of Interstate 8), Gila Bend AFAF, areas south and east of the BMGR (including the Gila Bend Addition lands), the SDNM, Kofa NWR, and YPG are part of the Sonoran pronghorn ESA Section 10(j) Reintroduction Area (USFWS 2011). The reintroduced population is designated as experimental/nonessential, allowing flexibility in management and limited consultation requirements with USFWS.

The Air Force and Marine Corps have been, and continue to be, members of the Sonoran Pronghorn Recovery Team and provide funding and support for Sonoran Pronghorn Recovery Plan efforts. Implementation of recovery actions, such as placing artificial water sources and feed stations, conducting population surveys, monitoring for Sonoran pronghorn prior to initiating air-to-ground activities, and other management programs have been beneficial to pronghorn numbers within Arizona and Mexico (Luke AFB and MCAS Yuma 2018a).

In the Air Force and Marine Corps consultation histories regarding proposed military training activities on the BMGR, each of the biological opinions listed in Appendix G considered the scope and magnitude of possible adverse effects to the Sonoran pronghorn. USFWS concluded that these actions would *not jeopardize the continued existence of the Sonoran pronghorn*. Mandatory terms and conditions were included in these BOs to avoid and minimize incidental take of the species. These measures include an intensive monitoring program based on visual observations as well as telemetry surveillance as part of the BMGR activities to avoid conflicts between pronghorn and training activities, as discussed in the INRMP (Luke AFB and MCAS Yuma 2018a).

While roadways themselves may not impede pronghorn movements, right-of-way fences constructed adjacent to roadways are often a barrier to pronghorn. Unlike deer, pronghorn rarely jump fences and their primary means to cross fences is to move underneath them.

Fences are located along the southern border of the range, State Route 85 corridor, and within other operational areas of the BMGR to protect military assets, such as sensitive equipment, or to exclude nonauthorized personnel from certain areas for safety purposes. The border fence and wall as well as Mexico Highway 2 isolate the Arizona population from the larger Mexican population.

Other Special Status Species

Two additional species that occur on the BMGR, flat-tailed horned lizard (*Phrynosoma mcallii*) and Sonoran desert tortoise (*Gopherus morafkai*), are managed in accordance with Candidate Conservation Agreements (1997 and 2015, respectively); the Air Force and Marines work with USFWS and AZGFD to address the conservation needs of the two species. In addition, flat-tailed horned lizards are also managed in accordance with the 2003 Flat-tailed Horned Lizard Rangewide Management Strategy. The occupancy survey protocols were updated in 2015. Flat-tailed horned lizards occur primarily in stabilized sand dunes and flats in desert scrub habitat dominated by creosotebush within BMGR West as part of their range. Extensive studies have been conducted to evaluate military activities and impacts on the lizards, and annual surveys are conducted to assess the population on the BMGR (see INRMP Section 7.4.4). Sonoran desert tortoise occur primarily on BMGR East within Sonoran desertscrub, preferring rocky slopes and bajadas. Approaches to conservation include habitat improvements, management of suitable habitat, and data collection of tortoises (surveys every 3 years) to evaluate the populations on the range (Luke AFB and MCAS Yuma 2018a) (see INRMP Section 7.4.2).

3.12.2 Gila Bend Addition

The Gila Bend Addition lands have not been previously withdrawn for military purposes and, as such, have not been the subject of past impact analysis or ESA consultation.

3.12.2.1 Vegetation and Soils

The proposed addition lands occur within the Lower Colorado River Valley Subdivision of the Sonoran Desert Ecoregion (Brown 1994). Located on a lower alluvial fan, the topography is flat with an elevation range between 800 and 1,000 feet above mean sea level. Four primary vegetation associations/habitat types are represented on the Gila Bend Addition, generally referred to as “Broad Desert Wash,” “Narrow Desert Wash,” “Creosotebush Flat,” and isolated stands of “Mesquite Woodland” (AFCEC and 56 RMO

2019a). Approximately 90 percent of the proposed Gila Bend Addition consists of flats dominated solely by creosotebush, generally widely spaced apart. Arizona barrel cactus (*Ferocactus wislizenii*) is occasionally found in some locations within the flats. Broad wash habitat occupies approximately 4.6 percent and narrow wash habitat occupies about 5 percent of the land. Broad washes are characterized by large trees along the edges of well-defined cobble and coarse sand channels. Trees lining the banks of broad washes include primarily blue paloverde, velvet mesquite (*Prosopis velutina*), catclaw acacia (*Acacia greggii*), and ironwood, with an understory of shrubs including wolfberry (*Lycium fremontii*), triangle leaf bursage, cheesebush (*Ambrosia salsola*), and canyon ragweed (*Ambrosia ambrosoides*). The narrow washes contain creosotebush plus several other species, primarily triangle leaf bursage, cheesebush, and big galleta grass. Occasionally, a solitary ironwood tree will occur along the narrow wash habitat. Approximately 12 saguaro cacti were seen, primarily in the southern portion of the proposed addition lands near broad wash habitat.

Moderate amounts of biological soil crusts (cryptobiotic) occur throughout the Gila Bend Addition lands. Signs of loss of crusts from soil erosion, primarily wind erosion associated with blowing sands are evident. In general, the pattern and amount of cryptobiotic crust indicates that past soil surface disturbance by large grazing animals, off-road vehicle use, and other land uses is localized.

A unique feature within the proposed addition lands is a man-made earthen dike with a mesquite *bosque* habitat (occupying 0.08 percent [less than 2 acres] of the area); vegetation is primarily velvet mesquite with blue paloverde and catclaw acacia. The interior floor may occasionally flood, is bare of woody plants, and is covered with nonnative canary grass (*Phalaris canariensis*) and a few annuals. The hydrology, soil, and vegetation within the *bosque* do not provide sufficient saturation of surface or ground water to support wetland habitat.

Special Status Plant Species

The USFWS Information for Planning and Consultation System (2020a), and the AZGFD Heritage Data Management System were reviewed to determine if any federally listed species potentially occur in the vicinity of the proposed land withdrawal extension. Thirteen special status plant species as designated by state or federal land and resource management agencies were identified as having the potential to occur on the Gila Bend Addition (BLM 2017a; Arizona Department of Agriculture 2016). Table H-2 providing descriptions of each species' habitat requirements and whether suitable habitat is present on the Gila Bend Addition lands can be found in Appendix H. Based on elevation ranges, two of the species, California Flannelbush (*Fremontodendron californicum*) and Tumamoc Globeberry (*Tumamoca macdougalii*), could potentially occur. However, the Gila Bend Addition lands are too dry for these species to occur.

3.12.2.2 Wildlife

The physical features occurring within the area strongly influence the diversity, distribution, and abundance of wildlife across the Gila Bend Addition. The BMGR, SDNM, CPNWR, and BLM lands are predominantly undeveloped, which can contribute to the diversity of species found on a landscape level in the vicinity of the Gila Bend Addition. However, fences, roadways, canals, and development often restrict wildlife access and movement and can contribute to fragmentation of habitat and disturbance to wildlife.

Special Status Wildlife Species Evaluated for Occurrence within the Gila Bend Addition

The INRMP (Luke AFB and MCAS Yuma 2018a), BLM Sensitive Species List (2017b), species listed by the AZGFD as Wildlife of Special Concern in Arizona (2019a), and DoD priority species are included in the evaluation of special status species with potential to occur on the Gila Bend Addition. Species occurrence records from the AZGFD's Heritage Data Management System were reviewed to determine if any federally listed species potentially occur in the vicinity of the proposed land withdrawal expansion. A full accounting of these species and their corresponding status; a brief description of habitat; and the potential for occurrence of the species or its habitat on the Gila Bend Addition can be found in Table H-2 in Appendix H. Species that are aquatic obligates (i.e. native fishes) are not included because no potential habitat is found within the expansion lands. Wildlife species with the potential to occur within the Gila Bend Addition are listed in Table 3.12-2 and those that were eliminated because required habitat does not exist are included in Table H-2 in Appendix H.

Sonoran Pronghorn

Habitat in the Gila Bend Addition lands is mostly composed of Sonoran desertscrub, with flat to rolling terrain and expansive views, constituting suitable habitat for the Sonoran pronghorn (AFCEC and 56 RMO 2019b). However, several factors limit the potential for pronghorn to thrive on these lands. Chainfruit cholla were not observed on the addition lands (AFCEC and 56 RMO 2019a). Fencing is adjacent to the airfield and along Dart Drop Road at the southern boundary of the Gila Bend Addition, creating a barrier that limits pronghorn mobility; in addition, active deterrents are in place to keep animals off the airfield. AZGFD telemetry data from February 2016 through August 2019 were analyzed to determine locations of Sonoran pronghorn in relation to the Gila Bend Addition lands. Based on these data:

- Between 5 and 14 pronghorn were recorded within 5 miles of the Gila Bend Addition.
- Two pronghorn were recorded on the Gila Bend AFAF in June 2016 (AZGFD 2018b).
- No pronghorn were observed on the Gila Bend Addition lands during a 12-month survey period from January to December 2018 as part of an evaluation of these lands (AFCEC and 56 RMO 2019b).

Pronghorn within the Gila Bend Addition lands are considered a reintroduced population designated as experimental/nonessential, and as such, has a relaxed threshold for requiring consultation with USFWS.

3.13 Cultural Resources

This section summarizes cultural resources on the BMGR and provides an overview of applicable policies, existing conditions, and current background data relevant to the LEIS. While the context of the cultural resources and cultural history considers a broad area, the region of influence for this analysis is limited to the BMGR and the Gila Bend Addition.

Table 3.12-2. Special Status Wildlife Species and their Potential to Occur within the Gila Bend Addition

Class	Species Name	Status*	Habitat	Potential to Occur
Birds	American Kestrel (*Falco sparverius*)	PIF	Ranges from deserts and grasslands to alpine meadows; prefers open setting with scattered trees. Nest site is in a cavity, usually in a dead tree, snag, or large cactus such as a saguaro.	Yes. Tree cavities, saguaros, and snags are present. Kestrels were observed in the southern section during spring and fall field visits.
Birds	Golden Eagle (*Aquila chrysaetos*)	BGEPA BLM-S PIF SGCN 1B	Range from desertscrub to open conifer forests with open areas to forage. Nest in cliffs, tall trees, rock outcrops, and other tall structures.	Unlikely. No suitable nesting habitat would be present within the Gila Bend Addition. Golden Eagles have been reported along Sauceda Wash, less than 2 miles west of the Gila Bend Addition. Potential foraging habitat is present.
Birds	LeConte's Thrasher (*Toxostoma lecontei*)	PIF SGCN 1B	Sparsely vegetated lower Sonoran Desert flats and shallow braided washes.	Yes. Suitable nesting habitat within desert flat and wash vegetation. Ten LeConte's thrashers were observed during surveys in both flats and wash habitat.
Birds	Loggerhead Shrike (*Lanius ludovicianus*)	PIF	Sonoran desertscrub, semiarid grasslands, juniper woodlands.	Yes. Occupied nesting habitat within desert flats and washes vegetation. Adults observed feeding fledgling.
Birds	Prairie Falcon (*Falco mexicanus*)	PIF SGCN 1C	Sonoran desertscrub, cold-temperate desertscrub, grasslands, pinyon-juniper woodlands, Madrean evergreen oak woodlands. Nests on ledges along cliffs, canyon walls, and rocky ridges. Forages on small mammals, birds, and lizards.	Unlikely. Suitable nesting habitat is present. Poor quality foraging habitat is present; potential prey (small birds) in low density.
Birds	Western Burrowing Owl (*Athene cunicularia hypugaea*)	BLM-S PIF SGCN 1B	Occur in low-stature grasslands, sparsely vegetated desertscrub, and agricultural fields, irrigation and canal embankments, and open disturbed areas. Utilize fossorial mammal burrows for nesting.	Unlikely. Suitable burrow habitat is present within the Gila Bend Addition based on abandoned Kit Fox and Kangaroo Rat dens. Prey populations are limited. No Burrowing Owls were seen during monthly surveys in 2018.

Class	Species Name	Status*	Habitat	Potential to Occur
Birds	Harris's Hawk (*Parabuteo unicinctus*)	SGCN 1C	Semiopen, arid desert lowlands including Sonoran desertscrub with large, many-armed saguaros and mesquite, paloverde, and ironwood trees in abundance. Forage on medium-sized mammals and birds, and reptiles.	Unlikely. Suitable nesting habitat may be present within the Gila Bend Addition; of the approximately 12 saguaros in the area, few (2 to 3) saguaros have any arms to provide preferred nesting substrate, though scattered paloverde and ironwood may be used. Prey populations are present but too limited to support hawks in most years. Although Harris's Hawks have been documented east of the Gila Bend Addition, no Harris's Hawks were seen during monthly surveys in 2018.
Birds	Western Screech-Owl (*Megascops kennicottii*)	SGCN 1C	Occurs in Sonoran Desert uplands of saguaro, ironwood, and paloverde, adjacent to densely wooded dry washes, and pinyon-juniper woodlands. Nest in abandoned woodpecker holes or in natural cavities.	Yes. Natural cavities and holes are present within the Gila Bend Addition. Western Screech Owl was identified near the mesquite bosque tank and along broad washes during summer field activities.
Invertebrates	Monarch Butterfly (*Danaus plexippus plexippus*)	BLM-S	Adult and juvenile host plants include milkweed and fennel and night roost trees such as eucalyptus.	Yes. Species has potential to migrate in the vicinity of the Gila Bend Addition. Monarchs have been seen within the greater Phoenix area near water sources (Salt River and agricultural canals) as well as residential backyards as they migrate to/from Mexico and California (Morris et al. 2015).
Mammals	California Leaf-nosed Bat (*Macrotus californicus*)	BLM-S SGCN 1B	Roosts in caves and mines. Forages for insects often along desert washes.	Yes. Potential foraging habitat occurs within the Gila Bend Addition. This species was documented utilizing BMGR East for foraging and roosting. No caves or mines for roosting are present within the Gila Bend Addition.
Mammals	Lesser Long-nosed Bat (*Leptonycteris curasaoe yerbabuenae*)	BLM-S SGCN 1A	Nectar feeder on saguaro and agaves. Roosts in mines.	Yes. Potentially passing through the area. Very limited suitable foraging habitat with approximately 12 saguaros documented within the Gila Bend Addition (most only being single column) and no agaves. No mines within the Gila Bend Addition. Bats documented utilizing and roosting on BMGR East.
Mammals	Greater Western Mastiff Bat (*Eumops perotis californicus*)	BLM-S SGCN 1B	Roosts in rocky outcrops, crevices, cliffs. Forages in woodlands, forests, scrub, chaparral, grasslands, and agricultural fields.	Yes. Potential foraging habitat occurs within the Gila Bend Addition. May be present in very low populations within BMGR East.

Class	Species Name	Status*	Habitat	Potential to Occur
Mammals	Townsend's Big-eared Bat (*Corynorhinus towsendii*)	BLM-S	Roosts in caves and mines.	Yes. Potential foraging habitat occurs within the Gila Bend Addition. This species was documented utilizing BMGR East for foraging and roosting. No caves or mines for roosting are present within the Gila Bend Addition.
Mammals	Cave Myotis (*Myotis velifer*)	BLM-S SGCN 1B	Roosts in caves and mines. Forages for insects.	Yes. Potential foraging habitat occurs within the Gila Bend Addition. This species was documented utilizing BMGR East for foraging and roosting. No caves or mines for roosting are present.
Mammals	Sonoran Pronghorn (*Antilocapra americana sonoriensis*)	ESA-E/XN SGCN 1A	Prefers broad, alluvial valleys separated by granite mountains and mesas; needs sufficient moisture source from grasses, forbs, and chain-fruit cholla.	Yes. Has been reintroduced to areas east of State Route 85 on BMGR East, though fencing and human activity may preclude the animal from using the Gila Bend Addition. In most years, vegetation resources, especially chain-fruit cholla, are limited or lacking in the Gila Bend Addition.
Reptiles	Sonoran Desert Tortoise (*Gopherus morafkai*)	ESA-C BLM-S SGCN 1A	Arizona upland, Mojave desertscrub, semi-desert grassland and oak woodland with options for burrow and cover sites that include rocky slopes, boulder piles, or caliche caves.	Very unlikely. Habitat lacks quality forage, burrow options limited to wash banks, no rocky slopes or outcrops. Extremely xeric site. Tortoises were not observed during recent field surveys.

Sources: AZGFD 2019c; BLM 2017b; Corman and Wise-Gervais 2005; DoD 2015

* BLM-S = BLM sensitive species on BLM lands
BGEPA = protected under the Bald and Golden Eagle Protection Act
ESA-E = listed as Endangered under the ESA
PIF = Partner's in Flight mission-sensitive priority bird species for DoD (that is, species [and their habitats] having the highest potential to impact the military mission should they become federally listed)
SGCN = Arizona Species of Greatest Conservation Need
1A = Vulnerable as determined by SGCN categories and matches one of several criteria under the State Wildlife Action Plan
1B = Vulnerable as determined by SGCN categories but does not match any criteria
1C = Unknown status species

Cultural resources are any prehistoric or historical period remains or indicators of past human activities, including artifacts, sites, structures, landscapes, and objects of importance to a culture or community for scientific, traditional, religious, or other reasons, physical evidence or place of past human activity. The NHPA of 1966, as amended, provides the framework for the evaluation of cultural resources for NRHP significance. Those cultural resources that demonstrate significance are designated as *historic properties* and must be considered during project planning to minimize potential effects. Cultural resources that have not been previously evaluated for NRHP eligibility are treated by BMGR policy as eligible for the NRHP for planning purposes.

Traditional Cultural Properties (TCPs) and Sacred Sites are separate classifications of cultural resources. TCPs are defined as properties eligible for inclusion in the NRHP, "based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of the community" (NPS 2012). Unlike other types of cultural resources, TCPs may be intangible. They represent areas of cultural importance to specific contemporary groups and are considered to be exceptionally important in maintaining traditional values. TCPs may include sacred sites, as well as other traditional use areas. Sacred sites are not specifically defined within the framework of the NHPA but are the subject of Executive Order 13007, which defines a "sacred site" as a location of religious importance and/or ceremonial use by Indian religious practitioners. As defined in the MLWA 1999, "... 'sacred site' means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or its designee, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion, but only to the extent that the tribe or its designee, has informed the Secretary of the Navy or the Secretary of the Air Force of the existence of such site."

DoD does not request information about the location of sacred sites unless that information is necessary. When such information is necessary, DoD collects locational information only in general terms of broadly identified areas of sensitivity within which one or more sacred sites are known to be located by a Tribal Nation, and avoids these areas of sensitivity. DoD does not record discrete and specific locational information for sacred sites in writing unless absolutely required to support a critical decision.

Historic properties, cultural resources not previously evaluated for NRHP eligibility, TCPs, and Sacred Sites are managed under the stewardship of the 56 RMO at Luke AFB and the Range Management Department at MCAS Yuma. Management of these resources complies with the provisions and requirements outlined in the Integrated Cultural Resources Management Plans (ICRMP). The development of ICRMP documents conforms with cultural resources legislation codified in NHPA, NEPA, Archaeological Resource Protection Act, and Native American Graves Protection and Repatriation Act. While the MLWA of 1999 specifies that the INRMP, developed in accordance with the Sikes Act, includes provisions for the protection of cultural resources, the Sikes Act itself does not implicitly include cultural resources within in its regulatory scope. As a result, ICRMP provisions are included in the INRMP by reference only.

ICRMP documents are thus developed as standalone cultural resources management documents. The BMGR West ICRMP (MCAS Yuma 2019) and the BMGR East ICRMP (56 RMO 2020) provide baseline information for this discussion of the affected environment.

3.13.1 Laws, Regulations, and Guidelines

Numerous federal laws, regulations, Executive Memoranda and Orders, and DoD requirements apply to the management of cultural resources on the BMGR. Regulatory summaries derived from the BMGR West ICRMP (MCAS Yuma 2019) and the BMGR East ICRMP (56 RMO 2020) are presented in Table I-1 in Appendix I.

3.13.2 Cultural Background

Human occupation of the Western Papaguería, which encompasses the BMGR, spans the Pre-Paleoindian period through the present day. An overview of human occupation of the BMGR is summarized in Appendix I and is derived from extensive culture histories of the Western Papaguería and the BMGR available in Ahlstrom (2000), Altschul and Rankin (2008), and Heilen and Vanderpot (2013) as well as in the BMGR East ICRMP (56 RMO 2020).

3.13.2.1 Affiliated Tribal Groups

Numerous Native American groups have utilized the BMGR throughout history and prehistory. Their ancestral use of the area is documented in the oral history of Tribal people, as well by historic and prehistoric cultural resources sites, TCPs, and sacred sites on the landscape. Part of the responsible stewardship of these resources by the Marine Corps and Air Force is achieved through continuing government-to-government consultation according to the regulations established for Section 106 of the NHPA of 1966, as amended (36 CFR 800). Those Tribal Nations that are established consulting parties for activities on BMGR East and BMGR West are outlined in Table 3.13-1.

Tribal consultation guidelines specific to the development of the BMGR LEIS are outlined in a project-specific *Updated Tribal Consultation Plan for the Barry M. Goldwater Range Land Withdrawal and Addition* developed jointly by 56 RMO, Luke Air Force Base, and MCAS Yuma (2018). This plan outlines agency and Tribal consultation participation, an approach to consultation, and communication protocols. Table 3.13-1 lists other Tribal groups that have been invited to participate in the development of this LEIS. Table I-2 in Appendix I provides a table of Section 106 Tribal consultation and responses received to date.

Table 3.13-1. Consulting Tribal Nations for Activities on BMGR West, BMGR East, and for the BMGR LEIS.

Tribal Government	Consultation Status
Ak Chin Indian Community	Consulting Tribal Nation for activities on BMGR (East and West)
Chemehuevi Indian Tribe of the Chemehuevi Reservation	Consulting Tribal Nation for BMGR LEIS

Tribal Government	Consultation Status
Cocopah Tribe of Arizona	Consulting Tribal Nation for activities on BMGR (East and West)
Colorado River Indian Tribes of the Colorado River Indian Reservation	Consulting Tribal Nation for activities on BMGR (East and West)
Fort McDowell Yavapai Nation	Consulting Tribal Nation for BMGR East
Fort Mojave Indian Tribe	Consulting Tribal Nation for BMGR (East and West)
Quechan Tribe of the Fort Yuma Indian Reservation	Consulting Tribal Nation for activities on BMGR (East and West)
Gila River Indian Community of the Gila River Indian Reservation	Consulting Tribal Nation for activities on BMGR (East and West)
Havasupai Tribe of the Havasupai Reservation	Consulting Tribal Nation for BMGR LEIS
Hualapai Indian Tribe of the Hualapai Indian Reservation	Consulting Tribal Nation for BMGR LEIS
Hia-Ced Hemakajam, LLC[a]	Consulting Tribal Nation for activities on BMGR (East and West)
Hia-Ced O'odham Alliance[a]	Consulting Tribal Nation for activities on BMGR (East and West)
Hopi Tribe of Arizona	Consulting Tribal Nation for activities on BMGR (East and West)
Pascua Yaqui Tribe of Arizona	Consulting Tribal Nation for activities on BMGR East
Zuni Tribe of the Zuni Reservation	Consulting Tribal Nation for activities on BMGR (East and West)
Kaibab Band of Paiute Indians of the Kaibab Indian Reservation	Consulting Tribal Nation for BMGR LEIS
Salt River Pima-Maricopa Indian Community of the Salt River Reservation	Consulting Tribal Nation for activities on BMGR (East and West)
San Carlos Apache Tribe of the San Carlos Reservation	Consulting Tribal Nation for activities on BMGR East
Tohono O'odham Nation	Consulting Tribal Nation for activities on BMGR (East and West)
Torres-Martinez Desert Cahuilla Indians	Consulting Tribal Nation for BMGR LEIS
White Mountain Apache Tribe of the Fort Apache Reservation	Consulting Tribal Nation for activities on BMGR East
Yavapai-Apache Nation of the Camp Verde Indian Reservation	Consulting Tribal Nation for activities on BMGR (East and West)
Yavapai-Prescott Indian Tribe	Consulting Tribal Nation for activities on BMGR (East and West)
InterTribal Council of Arizona[a]	Consulting Tribal Nation for BMGR LEIS

[a] Tribal organizations that are not federally recognized

3.13.2.2 Tribal Consultation Protocols–BMGR East

Tribal consultation protocols for activities on BMGR East are outlined in the BMGR East ICRMP (56 RMO 2020) and follow the policies contained in Air Force Manual 32-7003; the Air Force Cultural Resources Management Playbook; and Department of the Air Force Instruction 90-2002, *Interactions with Federally Recognized Tribes*. Tribal consultation is initiated by the Installation Commander; the 56 RMO Director often serves as the Installation Commander's designated representative in government-to-government consultation with Tribal Nations.

The Sells Military Operating Area, a type of military airspace, overlies lands of the Tohono O'odham Nation. Pursuant to the terms of the 1988 Record of Decision addressing the use of this military airspace, the position of the Installation Tribal Liaison Officer was developed. The Installation Tribal Liaison Officer serves as the point of contact to address Tribal concerns specific to use of the Sells Military Operating Area, compiles and maintains records specific to military use of the area and is responsible for maintaining open lines of communication between the Air Force and the 11 Tohono O'odham Nation districts through consultation and meetings. The role of the Installation Tribal Liaison Officer has expanded over time to include serving as the point of contact with other Tribal groups and facilitating government-to-government consultation with all affiliated Tribal Nations.

Tribal Concerns

Ongoing Tribal consultation with the Tohono O'odham Nation and other affiliated Tribal groups has identified numerous general and specific natural resources that are important to them. These are designated as elements of Traditional Ecological/Environmental Knowledge and considered when INRMP and ICRMP activities are planned for BMGR East. The natural resources of Tribal importance are listed in the BMGR East ICRMP (56 RMO 2020) and include:

- Natural water sources (such as *tinajas* and springs)
- Specific plants used for basketry, building materials, food, and medicine
- Specific animals
- Specific minerals of traditional use
- Mountains, especially mountain tops
- Specific geological resources
- Trails

Ongoing consultation with affiliated Tribal Nations has further defined the NRHP eligibility criterion as applied to specific types of sites on the BMGR East. Ancestral archaeological sites are of great importance to the Tribal Nation, who consider these locations eligible for inclusion in the NRHP under Criterion B for their connection with Tribal ancestors. The Tohono O'odham Nation believe that ancestral archaeological sites are still inhabited by, and embody the spirits of, their ancestors and that these spirits impact the O'odham people into the modern day. Additionally, the Tribal Nation considers ancestral archaeological sites to be eligible for inclusion in the NRHP under Criterion D for their potential to contain important information about past ancestral life.

Ancestral archaeological sites that contain geoglyphs are additionally considered to be eligible for NRHP inclusion under Criterion A for their association with important events of the O'odham past as well as

present important spiritual events, such as vision quests. Along with petroglyphs, geoglyphs are also considered to be eligible for inclusion in the NRHP under Criterion C for their embodiment of distinctive characteristics of a type, period, method of construction, their association with the work of a master, and their high artistic value. Sites that contain geoglyph and/or petroglyphs either alone or as a site component are of great cultural significance to the O'odham because they tell a story of the ancestral past. Additionally, the creation of petroglyphs was a specific skill that not all people were entrusted with. The Tribal Nations have also indicated that rock image sites are eligible for inclusion in the NRHP under Criterion B for their association with the lives of persons significant in their past.

A total of 23 historic ranches and 43 historic wells have been identified by the Tohono O'odham Nation as significant to the theme of ranching on the BMGR East. Tribal Nations recognize trails as important because they represent the footprints of their ancestors. A total of 7 historic travel routes and 65 trails have been identified through ongoing consultation with the Tohono O'odham Nation. These routes are considered to be eligible for NRHP inclusion under Criterion A for their association with O'odham regional travel and land use; Criterion B for their association with O'odham ancestors; and Criterion D for their potential to provide important information about the historic and prehistoric past.

Natural waters are of special significance to all Tribal Nations. Natural waters provide life to people, plants, and animals in the desert, and supported the people in their travels. Natural water sources are the home of spirits and are used in cleansing ceremonies. As a result, natural water sources are considered by all Tribal Nations to be eligible for NRHP inclusion under Criterion A and B, regardless of whether cultural materials are in association with them.

A total of 57 mountains (including 5 on BMGR East), rock shelters, and other specific landforms and landmarks have been identified by the Tohono O'odham Nation as named places of significance in Tribal history. These are all considered to be eligible for NRHP inclusion due to their cultural and natural integrity and their association with important past events (Criterion A) or people (Criterion B).

Affiliated Tribal Nations have identified Rankin Valley as a TCP eligible for NRHP inclusion under Criterion B for its association with O'odham ancestors and Criterion D for its potential to provide important information about the prehistoric past.

Tribal Access

P.L. 106-65 Section 3031(b)(3)(E)(ii)(II) directs the Air Force to "allow for access to and ceremonial use of sacred sites to the extent consistent with the military purpose for which such lands are withdrawn and reserved." Protocols to facilitate requests by Tribal members to visit sacred sites and traditional use areas are contained in Standard Operating Procedure 7-5 and expanded on in Tab 7 to the BMGR East ICRMP (56 RMO 2020). Under these protocols and guidance points, specific access requests are conveyed via phone communication or email and coordinated between the 56 RMO cultural resources manager at Luke Air Force Base, Installation Tribal Liaison Officer, and affiliated Tribal Nations.

Relatively unrestricted access to areas of Tribal interest in recreational areas is possible. However, sacred sites and traditional use areas located in the three tactical ranges, the four manned ranges, and the air-to-air range are constrained due to operational and hazardous conditions. Access to these areas

is allowed when it is safe to do so. While access to these areas is restricted; no instances have been logged of denying access to these areas when it was safe to enter.

Resource Monitoring and Security Measures

The Air Force participates in the Arizona Site Steward monitoring program, administered through Arizona State Parks. Through this program, volunteers are trained by SHPO and Air Force cultural resources staff how to monitor and log any disturbance to sensitive cultural resources on BMGR East. These volunteers are then assigned to regularly visit and report on specific cultural resource sites. Site Steward activity logs are submitted on a monthly basis to the Site Steward Coordinator at the Arizona SHPO. Currently, up to 30 volunteer Site Stewards are working at BMGR East. Between 1 October 2019 and 1 April 2020, BMGR East Site Stewards logged 442 hours of monitoring cultural resources sites. No new vandalism was reported.

3.13.2.3 Tribal Consultation Protocols–BMGR West

Tribal consultation initiated by activities on BMGR West is guided by Standard Operating Procedure 7, as outlined in the BMGR West ICRMP (MCAS Yuma 2019). Government-to-government consultation on specific activities is initiated by the installation commander. The designated Tribal liaison coordinates ongoing activities and communications with affiliated Tribal groups. For MCAS Yuma, the designated Tribal liaison is the MCAS Yuma Cultural Resources Manager.

Tribal Concerns

Tribal concerns noted on BMGR West are specific to damage of sensitive cultural resources resulting from CBP vehicles, vehicle staging, and border fence construction. The Quechan Cultural Committee has held training sessions for CBP administration and field staff to emphasize the importance of staying within approved areas and travelling on approved roads. However, damage to sensitive cultural areas is ongoing.

The Marine Corps does not ask for, collect, or retain any information specific to TCPs or sacred sites. However, a cultural affiliation study (Fortier and Schaeffer 2010) identified features on the landscape–such as natural landforms, trails, and water sources–that are spiritually important to affiliated Tribal groups. When the Air Force sponsored a survey of Tinajas Altas in 1996 and 1997, Tribal Nations indicated the cultural importance of this site and indicated an interest in being involved in the development of any future management plan for the site.

Tribal Access

The Tribal Nations may access areas on BMGR West that are open to the public following the same procedures as for public access under P.L. 106-65 Section 3031(b)(3)(E)(ii)(II). While no specific Tribal requests to enter other areas of BMGR West have been received, the MCAS Yuma Cultural Resources Manager would facilitate and schedule requested access to restricted access area when safe to do so.

Resource Monitoring and Security Measures

No established Arizona Site Steward monitoring program is currently in place on BMGR West. The Marine Corps employs four, full-time conservation law enforcement officers who monitor natural and cultural resource security.

3.13.3 Background Information

The professional cultural resource staff of the Air Force and Marine Corps along with their consultants have prepared numerous reports to document the inventory and evaluation of cultural resources located on-range lands. These inventory reports have been developed in response to specific planned activities on the range that are subject to compliance review, as well as to satisfy BMGR East and BMGR West inventory goals as presented in ICRMP documents (56 RMO 2020; MCAS Yuma 2019). The Air Force and Marine Corps maintain cultural resources databases to track these inventory documents and their results. Tribal affiliation studies and historic context studies have also been prepared as companion frameworks to provide guidance for the NRHP evaluation of identified cultural resources and potential TCPs and sacred sites.

Additionally, NHPA agreement documents have been developed to streamline and standardize cultural resources compliance activities. Appendix I provides an overview of range-wide background documents, as well as those specific to BMGR East and BMGR West.

3.13.4 BMGR

In total, the BMGR is comprised of more than 1.7 million acres. Approximately 406,645 acres, or 23 percent, of the BMGR have been investigated for cultural resources. A total of 1,911 cultural resources sites have been recorded. These consist of prehistoric, protohistoric, historical period, and multicomponent resources, as well as resources of unknown age.

3.13.4.1 BMGR East

As of 2019, more than approximately 202,000 acres (about 20 percent) of BMGR East land has been investigated by intensive cultural resources inventory survey (56 RMO 2020). The majority of these surveys have been conducted for specific activities requiring cultural resources compliance. However, several large inventory surveys have also been completed (Ahlstrom and Lyon 2000; Slaughter et al. 2000; Tucker 2000). These intensive surveys have identified over 1,500 cultural resources sites; these are predominately resources of prehistoric age. Five of the WW II Auxiliary Airfields have been determined to be eligible for listing on the NRHP.

In addition to the cultural resources sites, eight buildings and structures on BMGR East that are 50 years of age or older have been evaluated for NRHP significance. Of these, seven historic structures have been recommended eligible for inclusion in the NRHP. A single historic structure has been determined ineligible for inclusion in the NRHP.

Seven executed agreement documents are currently in place that address the mitigation of adverse effects related to specific undertakings on BMGR East. Descriptions of each are included in Appendix I.

3.13.4.2 BMGR West

As of May 2019, approximately 142,448 acres (20 percent) of BMGR West land has been investigated through work on approximately 92 cultural resources projects (MCAS Yuma 2019). The majority of these investigations have been conducted for specific activities requiring cultural resources compliance. However, several large inventory surveys have also been completed (Hart and Hart 2011; Hlatky et al. 2016; Keur et al. 2015; Laine and Seymour 2016; Neuzil 2012). The inventories have identified 414 cultural resources sites; these are relatively evenly split between resources of prehistoric and historical period age. Of the 414 previously recorded cultural resources sites, 1 (SON C:1:15[ASM]/El Camino del Diablo) is listed in the NRHP. This site consists of an overland trail between Sonoyta, Mexico, and the Tinaja Altas Mountains. The site includes the trail itself as well as associated artifact scatters, trails, and roads. Of the other 413 sites, 97 are unevaluated for NRHP significance, 203 have been determined ineligible for inclusion in the NRHP, and 113 have been determined eligible for inclusion in the NRHP under various eligibility criteria.

In addition to the cultural resources sites, all buildings and structures on BMGR West constructed prior to 1969 have been evaluated for NRHP significance. All seven of these have been either determined ineligible for inclusion in the NRHP or determined to be non-structural elements of a type that are not generally considered for NRHP listing. One executed agreement document is currently in place that standardizes BMGR West cultural resources compliance activities (Appendix I).

All buildings and structures constructed on the BMGR during the Cold War era (pre-1990) have been evaluated for NRHP significance under Criterion Consideration G, which pertains to the evaluation of buildings and structures that are less than 50 years in age. A total of 17 buildings and structures were evaluated under Criterion Consideration G; of these, 8 were determined ineligible for inclusion in the NRHP, and 9 were determined to be non-structural elements of a type that are not generally considered for NRHP listing. The eight structures determined ineligible will be revaluated for NRHP significance once they hit the 50-year age threshold.

3.13.5 Gila Bend Addition

Approximately 252.70 acres representing 10.67 percent of the proposed Gila Bend Addition land withdrawal area have been investigated for cultural resources by five projects. Three cultural resources sites have been previously documented on the land, demonstrating a site density of 0.012 cultural resources sites/acre. Based on this density and assuming consistent density across the land, a total of 28 cultural resources sites are projected to occur within the Gila Bend Addition.

One of the previously conducted cultural resources projects is a sample survey of drainages and a historic General Land Office road alignment conducted in support of the Gila Bend Addition land withdrawal area (Schilling and Luhnow 2018). This survey investigated 200 acres of BLM land and identified three cultural resources sites in the Gila Bend Addition.

One of the sites recorded by Schilling and Luhnow (2018) is a Short-Range Electronic Positioning Equipment triangulation site of unknown military function. This site is recommended as unevaluated for NRHP under Criterion A for its potential association for Cold War activities on BMGR East. A second site is a prehistoric flaked stone scatter and trail segment that is considered to be eligible for inclusion in the

NRHP under Criterion D for its association with Native American infrastructure on the landscape. The third site, a historic General Land Office road segment, is recommended as ineligible for inclusion in the NRHP.

3.14 Noise

3.14.1 Fundamentals of Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement.

3.14.1.1 A-weighted Metric

The most common metric is the overall A-weighted sound level measurement that has been adopted by regulatory bodies worldwide. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the human ear. How an individual reacts to the sound depends on both acoustic and non-acoustic factors. Acoustic factors include intensity (loudness or volume), frequency (high pitched such as bird chirps or low pitched such as rumble or roar) and duration (time, short duration such as a passing vehicle, continuous such as a power plant). Non-acoustic factors include the listeners attitude towards the sound source, past experiences with similar sounds, and the listeners current activity. Sounds becomes noise when they are unwanted and interfere with activities such as conversation or sleep.

Decibel (dB)

The intensity of sound is measured in decibels (dB). A-weighted decibels are noted as dBA and C-weighted sound levels are noted as dBC. A sound level of 0 dBA is the approximate threshold of hearing for a healthy ear while a typical conversation at 3 feet is in the 60 to 65 dBA range. Sound levels above 120 dBA are generally the onset of physical discomfort.

Day-Night Average Sound Level (DNL)

Noise from aircraft operations may be of concern to surrounding communities and land users. The day-night average sound level (DNL, sometimes abbreviated Ldn) is a noise metric that accounts for the greater annoyance of noise during the nighttime hours (10:00 p.m. to 7:00 a.m.) by including a 10-dB penalty to sounds during these hours. Annual average A-weighted DNL is the relevant metric for this study as it is used in the U.S. to assess noise from aircraft operations. Annual average DNL values are A-weighted (dBA) unless specifically noted otherwise (i.e.,65 DNL or a DNL of 65 both mean the DNL is 65 dBA) and are calculated by dividing annual flight operations by 365 days. While annual aircraft operations may change from year to year, if operating characteristics are similar (altitude, power or thrust level, flight path, time of day, type of aircraft), a doubling of operations is required for there to be a 3 dBA increase in the DNL.

Onset Rate-Adjusted Monthly Day-Night Average Sound Level (Ldnmr)

An additional metric, the Onset Rate-Adjusted Monthly Day-Night Average Sound Level (Ldnmr), includes an additional penalty of up to 11 dBA to account for the potential startle effect when military aircraft fly low and fast, resulting in a rapid rise in sound level as they approach and pass over a receptor. All Ldnmr values are expressed as A-weighted decibels.

3.14.1.2 C-weighted Metric Measures Low Frequency Events

C-weighted Day-Night Average Sound Level (CDNL) uses the C-weighted (dBC) sound level rather than the A-weighted sound level as the C-weighting accounts for the low frequencies that are dominant in sounds from aircraft sonic booms and ordnance detonation noise.

3.14.1.3 Land Use Compatibility Guidelines

At military airfields, where aircraft takeoffs and landings follow a distinct pattern, Air Installations Compatible Use Zone(s) studies are prepared to identify noise level contours and to evaluate the compatibility of land uses within those contours. When developing Air Installations Compatible Use Zone evaluations, noise exposure is generally categorized based into the following three DNL categories:

- Less than 65 DNL (low or no noise impact)
- 65 to 75 DNL (moderate impact, some land use controls suggested)
- Greater than 75 DNL (greater potential for impact and suggestions of additional land use controls)

3.14.2 BMGR

The types of aviation training activities occurring at the BMGR have remained fairly consistent during the current land withdrawal period, but the mix of aircraft employed in that training has been changed markedly with the introductions of several new aircraft types and models. The key aircraft changes to date at BMGR West has been the replacement of most AV-8Bs and F/A-18A/C/Ds with F-35Bs. The key aircraft changes to date at BMGR East has been the replacement of most of the Air Force F-16s with F-35As. Some F-16s are still flown at BMGR East on a regular basis in ANG training and in continuing training of foreign U.S. military allies. The introductions of the F-35B and F-35A aircraft at BMGR were analyzed in the *F-35B West Coast Basing Environmental Impact Statement* (Department of the Navy 2010) and *F-35A Training Basing Environmental Impact Statement* (Air Force 2012), respectively. Noise conditions generated by aircraft operations at the AUX-2 and KNOZ airfields in BMGR West were also recently assessed in the *Air Installations Compatible Use Zones Update for MCAS Yuma, Arizona* (Naval Facilities Engineering Command, Southwest and Marine Corps Installations Command 2019). Additional noise evaluations of BMGR were conducted in the 2020 Draft *F-35A Operational Beddown – Air Force Reserve Command Environmental Impact Statement* (Air Force et al. 2020).

These EIS documents and the Air Installations Compatible Use Zones Update provide the most recent and comprehensive estimates of the current noise environment at the BMGR. The discussion here summarizes noise in the context of:

- Tactical air combat training operations in BMGR West and aircraft operations at AUX-2 and KNOZ airfields
- Air combat training operations at BMGR East tactical, numbered, and air-to-air ranges as well as aircraft operations at Gila Bend AFAF
- MTR-related noise
- Supersonic noise (i.e., sonic booms) and ordnance detonations

Aircraft noise at the BMGR is generated by subsonic and supersonic operations that are conducted in restricted areas R-2301W, R-2301E, R-2304, and R-2305and flight operations at Gila Bend AFAF and the AUX-2 and KNOZ airfields. Operations involving live ordnance delivery are limited to BMGR East and occur within the three tactical ranges, that are located in the interior of the range, the closest of which is in East Tactical Range 14 miles from the nearest occupied buildings at Gila Bend AFAF. The closest live ordnance target to a residence is 18 miles, but there is an intervening mountain range between the target and residence. As shown in Figure 3.2-1, 14 MTRs enter BMGR East to support low-level ingress to tactical ranges by aircraft flying at high subsonic airspeeds (faster than 250 knots but slower than 650 knots). In addition, Figure 3.2-1 illustrates the authorized low-level flight corridors over the CPNWR that may contribute to noise heard by individuals visiting the refuge. There are no residences within the BMGR or CPNWR.

3.14.2.1 BMGR West

In assessing the likely noise effects at BMGR West resulting from proposal to base the F-35B at MCAS Yuma and MCAS Miramar, the Marine Corps projected that R-2301W would experience about 20,000 flight operations annually (Department of the Navy 2010). F-35Bs were expected to contribute about half of these projected operations and legacy AV-8Bs and F/A-18A/C/Ds as well as various helicopters, MV-22Bs, and other fixed-wing aircraft were expected to account for the remaining operations.

The noise that would be generated at BMGR West from the 10,000 F-35B operations alone was projected to result in a maximum Ldnmr of 60 dBA. When combined with the additional about 10,000 annual operations flown by other aircraft, the noise effects were projected to increase to between 65 dBA and 70 dBA in some BMGR West locations. The modeling indicated that no off-range communities or housing would be subject to noise exposures equal to or greater than 65 dBA Ldnmr. The actual number of operations flown by all types of aircraft in R-2301W for Fiscal Year 2019 was 17,380, which is about 13 percent less than the projected rate of use on which the 2010 noise assessment was based. Actual F-35B operations in Fiscal Year 2019 accounted for only about one-third, rather than one-half, of all flight activity in R-2301W. Therefore, the noise generated by all current flight operations at R-2301W can be presumed to be less than the modeled projections reported in the 2010 EIS.

The 2010 EIS study projected that noise from flight training in R-2301W would result in exceedances of 65 dBA Ldmnr in some locations of the CPNWR, particularly along some segments of the fixed-wing,

low-level corridors used during the WTI Courses. These effects were neither new or of a greater magnitude than those that were already being generated by at the CPNWR by legacy aircraft that preceded the introduction of the F-35B. Modeled noise levels below the Dome MOA/ATCAA adjacent to R-2301W (Figure 1.2-1) were projected in the 2010 EIS to be 51 dBA Ldmnr after the introduction of the F-35B. The current numbers of flight operations flown in the fixed-wing, low-level corridors at CPNWR and in the Dome MOA/ATCAA are within the estimates used to model noise in the 2010 EIS.

AUX-2 and KNOZ Airfields

The 2010 F-35B West Coast Basing EIS proposed construction of the KNOZ airfield in BMGR West and anticipated changes in the use of AUX-2 as a result; both events have been implemented. AUX-2 was used for AV-8B field carrier landing practice until the 2015 completion of the new KNOZ airfield. AUX-2 is currently used for training involving helicopter, tiltrotor, and KC-130 operations at a forward airfield and KNOZ, with two simulated Landing Helicopter Dock ship decks, is currently used for F-35B and AV-8B field carrier landing practice (Naval Facilities Engineering Command, Southwest and Marine Corps Installations Command 2019). No F-35B or AV-8B operations currently occur at AUX-2. In 1999, when the current BMGR withdrawal went into effect, AV-8B operations at AUX-2 generated noise exposures in excess of 65 dB DNL that exceeded the western boundary of the range (Air Force 1999). By the time that the 2010 EIS for the F-35B was prepared, AV-8B operations at AUX-2 had been reconfigured so that the 65 dBA DNL noise contour did not extend beyond the BMGR West boundary (Department of the Navy 2010). As shown on Figure 3.14-1, noise exposures at AUX-2 were further reduced by the elimination of AV-8B operations in 2015; noise exposures from F-35B and AV-8B operations at the KNOZ airfield also do not exceed the BMGR West boundary (Naval Facilities Engineering Command, Southwest and Marine Corps Installations Command 2019).

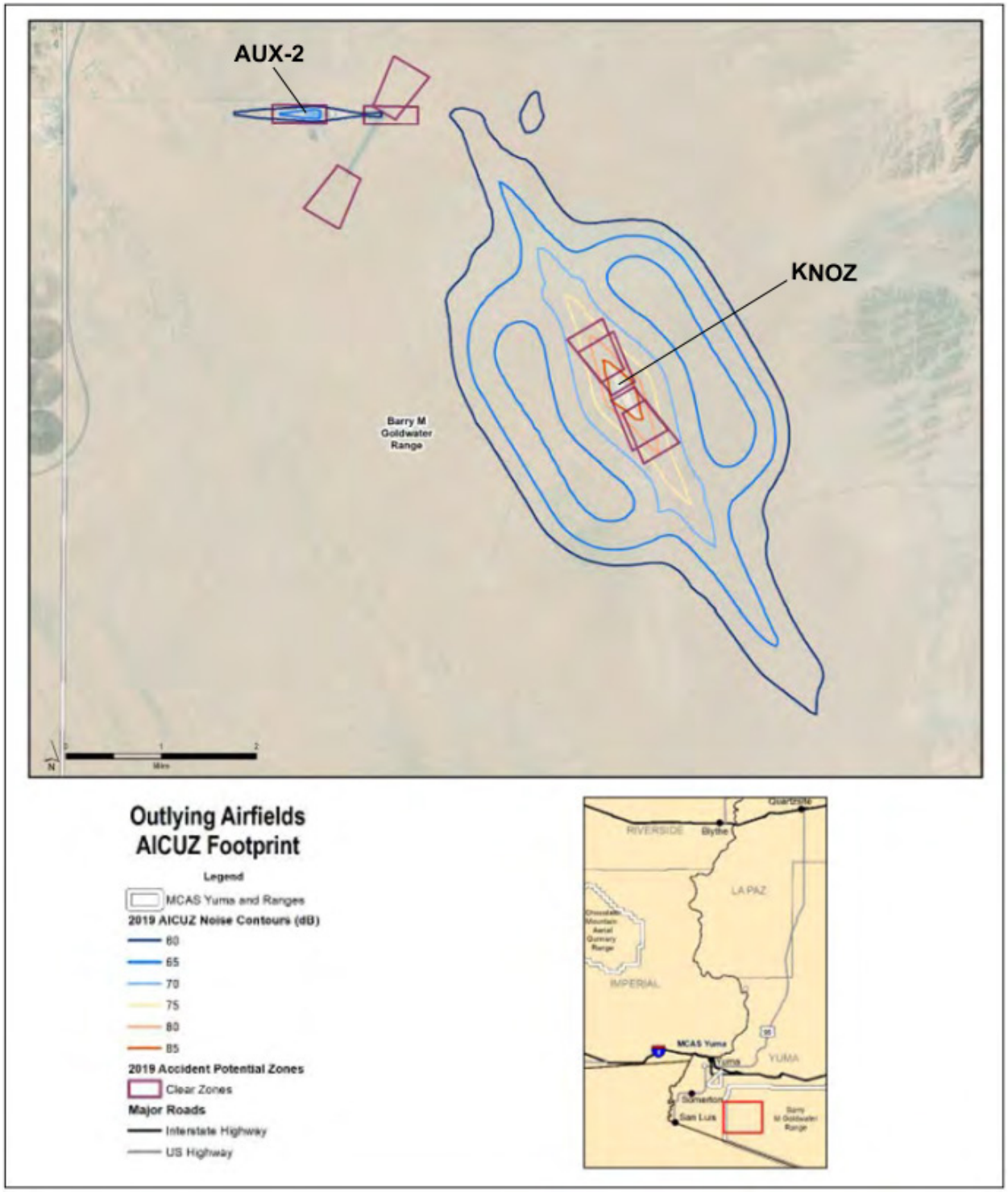
3.14.2.2 BMGR East

Tactical, Numbered, and Air-to-Air Ranges

Air combat flight training in BMGR East currently includes ordnance delivery training at the four numbered and three tactical ranges, and air-to-air combat tactics training in the air-to-air high and low ranges (refer to Appendix B, Table B-2). More than 99 percent of the ordnance used in training is inert (non-explosive); limited quantities of live ordnance is delivered on six designated targets in the three tactical ranges. The Air-to-Air Firing Range was used occasionally at the beginning of the current withdrawal period, but that activity now occurs infrequently. The noise generated by the aircraft participating in these training operations was modeled for the 1999 Land Withdrawal LEIS (Air Force 1999), the 2012 EIS that addressed the proposed basing of F-35As at Luke AFB (Air Force 2012), and the AFRC 2020 Draft EIS for the proposed operational beddown of F-35As, which includes a beddown alternative at Davis-Monthan AFB (Air Force et al. 2020).

Aircraft generated noise at the tactical ranges reported in the 1999 LEIS did not equal or exceed 65 dBA Ldnmr. The 60 dBA Ldnmr noise contour for South Tactical Range extended 3 to 4 miles southward into the CPNWR. Noise generated by aircraft around and between the numbered ranges was reported as between 55 and 60 dBA Ldnmr. Aircraft noise levels elsewhere in BMGR East and in the CPNWR were found to be below 55 dBA Ldnmr. The modeling indicated that no off-range communities or housing would be exposed to noise levels greater than 55A dB Ldnmr.

Figure 3.14-1. Outlying Airfields Air Installations Compatible Use Zone Footprint



Source: Image adapted from Naval Facilities Engineering Command, Southwest and Marine Corps Installations Command 2019

Noise modeling for the introduction of the F-35A indicated that noise at the tactical ranges would increase from between 60 and 65 dBA Ldnmr to between 65 and 70 dBA Ldnmr, but no off-range exceedances of 65 dBA Ldnmr or above were projected (Air Force 2012).

An assessment of the baseline noise conditions at BMGR East was included in the Draft EIS for the beddown of the AFRC F-35 training mission (Air Force et al. 2020). The assessment considered all ongoing flight operations, including Air Force F-35A training activity. The assessment findings confirm that noise exposures from current flight operations remain consistent with the exposure forecasts for the beddown of the Air Force F-35A training mission at Luke AFB and BMGR East (Air Force 2012).

Gila Bend AFAF

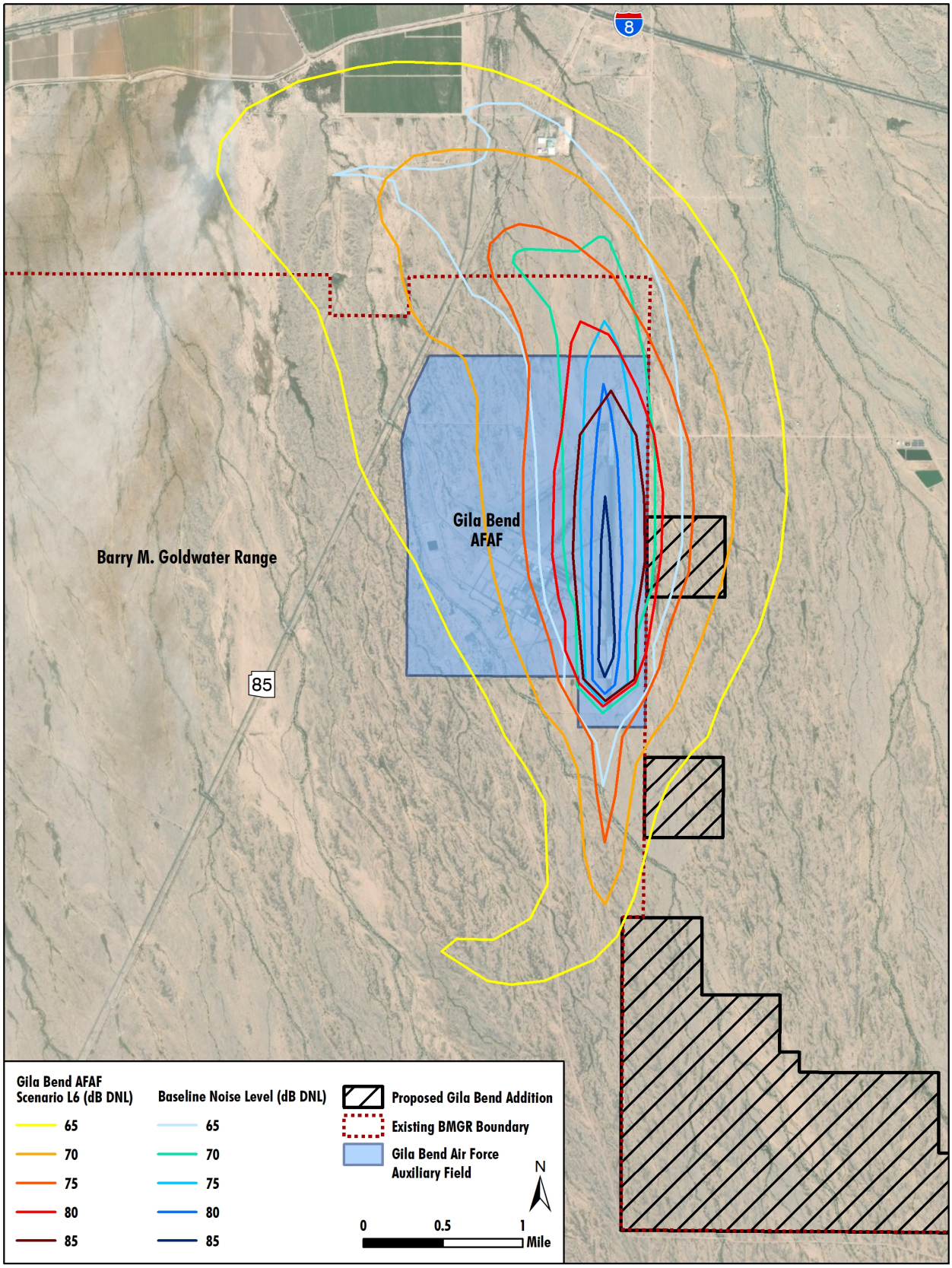
Gila Bend AFAF has an 8,500-foot runway, six helipads, control tower, and other airfield facilities. It is used as a staging area for helicopter training operations in BMGR East, for fixed-wing aircraft touch-and-go and simulated flame-out training, and as an emergency recovery airfield for aircraft that suffer an inflight malfunctions or other emergencies that require an immediate or precautionary landing.

Noise exposures that would be generated at Gila Bend AFAF were modeled for the proposed beddown of the Air Force F-35A training mission at Luke AFB and BMGR East (U.S. Air Force 2012). The alternative selected for the F-35A beddown proposed basing 144 aircraft at Luke AFB, which is a close approximation of the number of F-35As that are typically stationed at this base. Noise modeling presented in the 2012 EIS showed that under the prevailing baseline conditions in 2012 (continued F-16 pilot training and no training of F-35A pilots) three off-range, residential address locations were exposed to aircraft noise exceeding 65 dBA DNL. Under the proposed F-35A loading at Luke AFB that matches the current number of aircraft home based there, the model showed that up to 15 residential address locations would be exposed to aircraft noise generated by Gila Bend AFAF operations that would exceed 65 dBA (Figure 3.14-2). Six of these address locations are in the projected 70 to 74 dBA DNL range. Personnel within the 56 RMO report that some of the address locations identified in the 2012 analysis are presently abandoned or unoccupied.

Ordnance Noise

Ordnance noise evaluations use the CDNL noise metric. Noise from live ordnance detonations at the six live-ordnance targets in BMGR East was conservatively analyzed in the 2012 F-35A Training Basing EIS to ensure that the projected noise exposures would not underestimate the effects of these detonations (Air Force 2012). The 2012 assessment modeled baseline and proposed live ordnance use as if all live ordnance deliveries by F-35A aircraft would occur at the live ordnance target located closest to the BMGR East boundary, which is in East Tactical Range. Further, baseline deliveries were not scaled back in the assessment to account for the drawdown in F-16 training as F-35A training was ramped up. Under this conservative scenario, modeled noise levels from live ordnance detonations did not exceed 62 dBC CDNL at the BMGR East boundary.

Figure 3.14-2. Scenario L6 and Baseline Noise Contours at Gila Bend AFAF



Source: Air Force 2012

MTR-Related Noise

Fourteen MTRs provide tactically realistic, low-level approaches to target complexes in BMGR East tactical ranges (Figure 3.2-1). Noise conditions beneath these MTRs were assessed for the 1999 LEIS (Air Force 1999). According to that study, none of the flight operations on these MTRs generated noise levels above 55 dBA Ldmnr, and approximately half of the operations resulted in levels below 45 dBA. The numbers of annual sorties on the 14 MTRs in federal fiscal year 1996, which was the data assessed in the 1999 LEIS, and the sorties recorded for these MTRs in federal fiscal year 2019 are shown in Table 3.14-1. The number of sorties flown on each of the 14 MTRs varies annually, but data for the last 10 years show that these MTRs have not been used as heavily as they were at the start of the current withdrawal period and the 2019 numbers are representative of this trend.

Table 3.14-1. Annual Sorties in Federal Fiscal Year 1996 and 2019 for MTRs that Enter BMGR East

MTR	Federal Fiscal Year 1996	Federal Fiscal Year 2019
VR-223	5,554	412
VR-231	1,778	765
VR-239	321	536
VR-241	798	212
VR-242	107	130
VR-243	563	415
VR-244	390	392
VR-245	3,087	156
VR-259	942	182
VR-260	608	121
VR-263	1,074	399
VR-267	255	55
VR-268	89	30
VR-269	111	94

The 2012 EIS for basing F-35As at Luke AFB projected that F-35As would use the MTRs slightly more than two sortie-operations per average operational day. The use reported for the MTRs in federal fiscal year 2019, which includes all aircraft types and not just F-35As, did not exceed the projected F-35A values, except possibly on VR-23. On the rest of the MTRs, F-35A use fell below the forecasted levels. Additionally, the 2010 F-35B EIS identified that F-35Bs would fly less than 1 percent of their annual operations in occasional use airspace, including MTRs.

Detailed noise contours were not developed for current MTR operations. However, fiscal year 2019 MTR use compared to the findings of MTR noise modeling for the 1999 land withdrawal and for the 2010 and 2012 F-35 beddowns indicates that current noise exposures associated with MTR use likely remains

below 55 dBA Ldmnr. In fact, current aircraft sortie numbers would need to increase substantially to result in significant changes to noise exposures.

Supersonic Noise and Sonic Booms

Supersonic flight can cause a sonic boom that propagates to the ground. Portions of BMGR airspace are approved for supersonic operations.

The booms per day baseline for R-2301E associated with training in the Air-to-Air Range and at North and South tactical ranges was between 2.3 and 2.7 in 2012 (Air Force 2012). The baseline CDNL for these ranges was calculated to be between 52 to 54 dBC. The daily sonic boom rates in R-2301E following the introduction of the F-35A, which relies on supersonic airspeeds less often in combat than its predecessors, and drawdown of F-16s were projected to decrease to between 1 to 2 dB resulting in CDNL values between 49 and 53 dBC. The subsequent Air Force Reserve Command EIS determined, however, that 3.1 booms per day propagated to ground level as a result of 2019 training operations, which would yield a CDNL of 56 dBC (Air Force et al. 2020).

For BMGR West, the 2010 EIS for basing F-35Bs at MCAS Yuma and MCAS Miramar projected that number of on-range sonic booms in R-2301W that would reach the ground would be up to 30 per month in the center of a corridor approved for supersonic operations. The corridor in R-2301W extends to 10 nautical miles north from the international border and overlies the CPNWR and a portion of southwestern BMGR West. Up to 6 booms per month were expected to reach off-range locations, principally in the unoccupied area along the border to the west of the BMGR. The maximum CDNL from R-2301W supersonic flight operations was expected to be 55 dBC CDNL and the 62 dBC CDNL contour was expected to continue to be wholly contained within BMGR West or the portion of the CPNWR within the lateral boundaries of R-2301W.

Noise Complaints

Noise is typically assessed as an average sound level over a period of time (e.g. annually). An individual may be startled or otherwise annoyed, however, by sudden onset noise associated with nearby low-level overflights, such as along an MTR. Noise from low-level overflights is of short duration but can be quite loud. Such an experience may trigger a noise complaint. Sonic boom noise that is propagated off range also triggers periodic noise complaints. In addition, complaints from communities adjacent to the BMGR about noise are at times the result of aircraft operations in the Sells MOA, Dome MOA, or on MTRs that do not utilize BMGR airspace.

Noise complaints at the BMGR are tracked, recorded, and periodically reviewed. This allows for the identification of locational trends in the complaints and to gather information about the noise event, such as whether the installation was responsible for the noise complaint and whether it was a one-time or recurring concern. There were 18 complaints specific to BMGR West in 2018 and 15 complaints in 2019 associated with BMGR East (four complaints in 2019 were related to a single sonic boom).

Between January 2019 and June 2020, five sonic boom complaints were received from residents in Ajo, Arizona, 25 from Why, Arizona, and two from individuals at OPCNM. Three complaints about a sonic boom were received on a single day from Ajo, but records indicate supersonic capable aircraft were not

operating in the area. The source of this noise complaint was hypothesized to be flight activities on the North Tactical Range.

3.14.2.3 Gila Bend Addition

The proposed Gila Bend Addition land is unoccupied and undeveloped desert. Unpaved roads allow for vehicular travel, but the area has no unique features or through-road travel to attract people to the land. No other sources of man-made noise are known for this land. The portion of the proposed addition in the vicinity of Gila Bend AFAF is within the 65 dB DNL noise contour for flight operations at the airfield.

3.15 Visual Resources

The region of influence for visual resources includes the BMGR and Gila Bend Addition, as well as portions of Gila Bend, Ajo, and Yuma from which the range is visible. In addition, portions of the public roadways adjacent to the BMGR that serve as a viewing platform are included in the region of influence.

3.15.1 BMGR

Prior to the withdrawal of BMGR, BLM managed the visual resources of the current day BMGR; however, the MLWA of 1999 delegated natural and cultural resource management responsibilities to the Air Force and Marine Corps. Accordingly, the Sikes Act, INRMP, and ICRMPs guide the Air Force and Marine Corps' management of visual resources on the BMGR. Neither the Sikes Act nor the INRMP preclude the development of new military infrastructure or operational activities that support the range's mission due to visual resource concerns. In general, preservation of visual resources is subordinate to necessary developments that improve the military training and testing operations at BMGR.

Nevertheless, the land withdrawal of the BMGR has precluded mining, livestock grazing, and agriculture, and some other land uses that, if they had occurred, could have affected existing visual resources. Military modifications such as roads, target simulations, observation towers, auxiliary airfields, and instrumentation sites have modified the landscape, but the majority of the BMGR's landscape has remained in its natural state. The modifications are generally subordinate to the existing natural landscape and do not affect the overall scenic quality of the BMGR.

Visual intrusion on cultural resources is considered a type of disturbance under the NHPA. Affiliated Tribal Nations have indicated that placement of communication equipment on mountain tops are disturbances that require mitigation. Affiliated Tribal Nations have requested that equipment not be placed on mountain tops, which they consider sacred sites, and in some instances also TCPs.

While much of the range is obscured from public view due to its distance from publicly accessible roads and the regional topography, areas open for recreation, areas along the range's perimeter, and some areas near communities adjacent to the BMGR can be seen by the public. Residences in the southern portion of Gila Bend have middleground views (that is, visible areas less than 3 to 5 miles away [BLM 1986]) of Gila Bend AFAF, including its airfield beacon; however, the Gila Bend AFAF is not a dominant feature in the viewshed of these residents. With the exception of aircraft operations, range activities are not visible to residents of Sentinel, Dateland, Tacna, Wellton, and the dispersed residences

between these communities. The middleground and background views from Ajo include some buildings located on the range near Ajo. Residents along the southeastern edge of Yuma have foreground views of the Cannon Air Defense Complex and the rifle range. These facilities dominate views into the BMGR due to their size and height.

3.15.2 Gila Bend Addition

The landscape of the proposed Gila Bend Addition is part of a broad, alluvial valley populated with Sonoran Desert scrub vegetation. The area's landscape is undeveloped.

The BLM manages visual resources of public lands through its Visual Resources Management system, which establishes visual management objectives based on scenic quality, viewer sensitivity, and distance zones. Scenic quality considers the character and diversity of landform, vegetation, color, and the presence of man-made features. Viewer sensitivity considers the level of anticipated public concern for change to the scenic quality. Distance zones evaluate the visibility of landscapes from major travel routes or observation points.

In the BLM's process, the ratings of an area's scenic quality, viewer sensitivity, and distance zones are analyzed to classify an area as either a Class I, II, III, or IV visual resource. Visual resources that are classified as Classes I and II have comparatively more appealing scenic quality, higher viewer sensitivity, and/or more visible distance zones than Classes III and IV. The Visual Resources Management classes direct the respective management objectives for the visual resources within that class.

The proposed Gila Bend Addition encompasses lands that BLM classifies as Visual Resources Management Class III, which directs that changes in the landscape caused by management activities may be evident, but the changes should remain subordinate to the existing landscape character (BLM 2012a).

3.16 Hazardous Materials and Waste

A Final Contamination Analysis Report (CAR) for the Barry M. Goldwater Range, dated June 2018, addresses BMGR East, BMGR West, and the proposed Gila Bend Addition (AFCEC and 56 RMO 2018b). The CAR was prepared to review the current extent of contaminated land or groundwater resulting from identified use, storage, or disposal of hazardous materials for the BMGR East and BMGR West areas, and to determine the existence of any potential environmental liabilities and the nature of those potential environmental liabilities, and whether further investigation is warranted for the proposed Gila Bend Addition.

The 2018 CAR is incorporated by reference in this LEIS in accordance with Title 40 CFR Part 1502.21. Unless otherwise cited, the Hazardous Materials and Waste discussion for BMGR East, BMGR West, and the Gila Bend Addition, which is the region of influence for this analysis, is summarized from the CAR.

3.16.1 BMGR

Potential hazardous waste generation or source areas at the BMGR include septic fields, inactive landfills, aircraft mishaps, fuel storage tanks for emergency generators, electrical transformers, and facility operations shops. In addition, hazardous wastes may have been generated during past mining

operations. Hazardous or potentially hazardous materials stored and transported at the BMGR have included solid wastes; petroleum, oils, and lubricants; various chemicals (paints, thinners, cleaning solvents, etc.); pesticides and herbicides; and munitions. Unexploded ordnance occurs primarily in designated target areas, but also may occur in scattered locations remote from target areas from errant bomb drops. Waste processing at the BMGR has included wastewater treatment lagoons, incinerators, burn pits, septic systems, and the treatment and removal of expended munitions and unexploded ordnance.

Hazardous constituents contained in munitions delivered to the air-to-ground ranges are usually consumed in a series of chemical reactions that occur upon detonation. Occasionally, the munitions do not fully detonate or do not detonate at all. If EOD teams do not recover these unexploded munitions and the munitions case is damaged or eventually corrodes, the hazardous constituents could potentially contaminate the environment.

EOD clearances are conducted regularly on BMGR East. Spent ordnance and target debris on the surface is cleared each year to 50 feet on either side of roads and target access ways and in the vicinity of targets. Every 2 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 10 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.

3.16.1.1 BMGR East

The Environmental Element of the 56th Civil Engineering Squadron manages hazardous substances on BMGR East. The *Luke Air Force Base Hazardous Waste Management Plan* (56 Civil Engineering Squadron 2020) establishes guidance and assigns responsibility for the proper management of hazardous waste generated by Luke AFB and the Gila Bend AFAF. The plan addresses the handling, accumulation, transportation, turn- in, and storage of hazardous waste and outlines the procedures necessary to comply with the hazardous waste management provision of the RCRA and applicable state status contained in the Arizona Administrative Codes and Arizona Revised Statues. Luke AFB, including Gila Bend AFAF, is a RCRA Large Quantity Generator (generates 2,200 pounds [1000 kilograms] or more of hazardous waste or 2.2 pounds [1 kilogram] of acute hazardous waste per month) and a Small Quantity Handler of Universal Wastes (accumulates less than 11,000 pounds [5,000 kg] onsite at any one time).

A minimal amount of hazardous waste is generated at Gila Bend AFAF. Used oil, anti-freeze, and small amounts of jet fuel are reused or collected for recycling (Carr, personal communication 2020). Universal wastes such as used batteries and light bulbs that are generated on Gila Bend AFAF are handled by the 56th Civil Engineering Squadron Hazardous Waste Management Office at Luke AFB (Treece, personal communication 2020).

Luke AFB Instruction 13-212, *Range Planning and Operation* provides specific guidance in accordance with Air Force Manual 13-212V1 *Range Planning and Operations* applicable to BMGR East. Luke AFB Instruction 13-212 identifies the types of weapons (rockets, air-to-ground missiles, gun systems, guided and unguided bombs) that are allowed on each of the tactical ranges (North, South, and East Tactical Ranges) and on the four numbered ranges on BMGR East. The 56th Civil Engineering Squadron is

responsible for providing range clearance and EOD support on BMGR East, and for preparing the annual Range Clearance Report.

Hazardous Materials Storage

With the exception of fuel storage tanks, there are no hazardous material storage areas on BMGR East.

Environmental Restoration Program

Several former waste debris disposal sites on BMGR East have been identified as Areas of Concern (AOCs). One AOC at a munitions burial site on North Tactical Range has been identified for RCRA investigation by ADEQ; however, investigation has been deferred indefinitely because the site is on an active range (Rothrock, personal communication 2020). Nine AOCs were investigated at the Gila Bend AFAF. All have been closed with no further action required (Rothrock, personal communication 2020).

Four solid waste management units were designated at AUX-6. All have been closed by ADEQ (ADEQ 2018).

Storage Tanks

Two underground storage tanks containing jet fuel and 23 aboveground storage tanks containing gasoline, diesel, jet fuel, and used oil are located at Gila Bend AFAF. An additional eight aboveground storage tanks containing diesel are associated with generators on BMGR East test ranges (Rothrock, personal communication 2020). In addition, tanks associated with four boilers fueled by diesel and propane are located at facilities at Gila Bend AFAF (Davis, personal communication 2020).

Resource Conservation and Recovery Act Permitted Facilities

A treatment unit at the Munitions Treatment Range (refer to the following) is the only RCRA-permitted facility within BMGR East.

Per- and Polyfluorinated Alkyl Compounds

The Air Force began purchasing and using aqueous film-forming foam (AFFF) containing per- and polyfluorinated alkyl substances (PFAS) (perfluorooctanesulfonic acid and/or perfluorooctanoic acid) for extinguishing petroleum fires and during firefighting training activities in 1970. AFFF was primarily used on Air Force installations at fire training areas, but may have also been used, stored, or released from hangar fire suppression systems, at firefighting equipment testing and maintenance areas, and during emergency response actions for fuel spills and/or aircraft mishaps.

Five potential AFFF release sites were identified on Gila Bend AFAF and investigated for PFAS in surface and subsurface soils, sediment, and groundwater. PFAS exceeding screening criteria were identified in soils and sediments at two of the sites. No exceedances were identified in any media at the remaining three sites. No exposure pathways for drinking water were identified at any of these sites (Air Force 2019). Based on the findings of the investigation, further investigation at the two sites is planned to delineate the nature and extent of PFAS contamination to include the lateral and vertical extent of PFAS in PFAS-impacted media (e.g., soil, groundwater, surface water, and sediment) (U.S. Army Corps of Engineers 2020).

Munitions Treatment Facilities

The Munitions Treatment Range, sometimes referred to as the EOD Range, consists of eight former treatment units and two detonation areas. The treatment units and one detonation area have all been closed by ADEQ; however, one of the treatment units requires periodic inspections and maintenance of an engineered landfill cap that controls the migration of contaminants per the ADEQ RCRA Post-Closure Permit. The remaining detonation area is used for emergency response actions and training exercises that are exempt from RCRA. No onsite burning or munitions debris disposal occurs on BMGR East.

Munitions Constituents

The Operational Range Assessment (ORA) conducted for Luke AFB in 2019 includes BMGR East (Air Force 2020). The ORA Program is part of a sustainability initiative to assess the potential impacts of military munitions use on operational ranges. Program efforts aim to ensure the long-term viability of operational ranges while protecting human health and the environment and enhance the ability to prevent or respond to migration of munitions constituents (MC) from an operational range to off-range areas.

The ORA considered potential off-range receptors of MC and possible source-receptor interactions. Off-range human receptors considered those that could be exposed to MC transported by:

- wind – for human receptors within 4 miles downwind from BMGR East
- soil – for human receptors within 200 feet from source areas
- surface water – for drinking water supplies within 15 miles downstream of BMGR East
- potable water – for wells within 4 miles downgradient of BMGR East

Off-range ecological receptors are identified as special status species, species or attributes considered essential to the health/integrity of the habitat; species valued for their religious, cultural, or economic characteristics; environmental areas that provide federal or state listed critical or distinct habitats; and distinct/sensitive environmental areas such as refuges, sanctuaries, and wetlands within 1 mile of a source area.

According to the ORA, laboratory results from 10 discrete soil samples taken within or along the BMGR East perimeter found concentrations of metal or perchlorate that exceeded background levels:

- Three samples with chromium concentrations ranging from 17.5 to 18.6 mg/kg[3] (background = 16.8 mg/kg)
- Four samples with copper concentrations ranging from 24.6 to 31.4 mg/kg (background = 19.6 mg/kg) and one sample above the ecological (wildlife) project action limits of 28 mg/kg
- One sample with iron concentrations at 18,100 mg/kg (background = 17,300 mg/kg)

[3] mg/kg = milligram per kilogram

- Three downstream samples with lead concentrations ranging from 12.9 J+[4] to 36.2 J mg/kg (background = 12.1 mg/kg) and four downstream samples where lead was above the ecological project action limit of 11 mg/kg

- Three downstream samples with zinc concentrations ranging from 56.6 J+ to 59.1 J+ mg/kg (background = 56.3 J+ mg/kg) and five samples above the ecological project action limits of 46 mg/kg
- Six downstream samples with perchlorate concentrations ranging from 0.0041 J[5] to 0.0097 mg/kg (background = 0.0043 mg/kg

While human receptors were identified within 4 miles downwind of BMGR East, no MC were detected above human health project action limits in downwind soil samples. No human receptors were identified for the soil pathway within 200 ft of the on-range source areas. No surface water intakes are located within 15 miles downstream of BMGR East. Multiple potable water wells were identified within the potential groundwater receptor zone of up to 4 miles downgradient of BMGR-East; however, off-range MC migration via groundwater is unlikely based on the depth to groundwater, limited groundwater basin recharge, and soil and climatic conditions (Air Force 2020).

Although lead was detected in downwind soil samples above the ecological project action limit, all downwind lead concentrations were below the background level. Additionally, perchlorate was detected at a low-level, estimated concentration in one downwind soil sample above the background level (non-detect). However, no screening level exists for perchlorate; thus, no project action limit exists for perchlorate for ecological receptors. As such, no unacceptable risk to ecological receptors was identified for exposure to lead or perchlorate via the air pathway based on the analytical results. While the metals copper, lead, and zinc were detected in downstream samples above the ecological project action limit, all detections were below background or within the range of background variations. Based on the analytical results, no MC are migrating off-range that pose an unacceptable risk to downstream ecological receptors (Air Force 2020).

The ORA concluded that no MC are migrating off range via the air pathway. A potentially complete pathway to ecological receptors was identified via surface water/sediment; however, based on the weight of evidence, no potential risk to ecological receptors was identified. All other mechanisms to transport MC through soil and groundwater to off-range areas were deemed unlikely (Air Force 2020).

3.16.1.2 BMGR West

The MCAS Yuma Environmental Department manages hazardous substances on BMGR West in accordance with Marine Corps Order 5090.2. *Volume 9, Hazardous Waste Management* establishes policy and responsibilities for compliance with statutory and regulatory requirements for hazardous material and hazardous waste management and minimization, as well as requirements for hazardous material and hazardous substance spills. *Volume 21, Environmental Management of Munitions on Operational Ranges* establishes policies and responsibilities for proper management of waste military

[4] J+ = estimated concentration biased high

[5] J = estimated concentration

munitions and material potentially posing an explosive hazard, as well as for identifying the presence of or potential for munitions constituents to migrate off an operational range.

Hazardous Materials Storage

Hazardous materials stored at BMGR West generally consist of strong chemicals, petroleum products, and paint for target maintenance and repair. Fuel tanks and maintenance stations are placed temporarily on plastic sheeting with secondary containment in areas that have the possibility of leaking. Contaminated soil is placed in secured containers and transported off range for treatment/disposal. Hazardous waste satellite accumulation points are located at the Cannon Air Defense Complex and at the auxiliary landing field identified as KNOZ; temporary accumulation sites are established at designated training areas during the WTI courses.

Environmental Restoration Program

No Installation Restoration Program or Munitions Response Program sites remain open within BMGR West. All site investigations previously identified have been closed with no further action required beyond required maintenance at closed sites.

Storage Tanks

Approximately 29 aboveground storage tanks, including one deactivated tank, are present on BMGR West; approximately half of these are located at the Cannon Air Defense Complex. Products stored in aboveground storage tanks include liquefied petroleum gas (or propane), diesel, automotive fuel, used oil storage, and potable and non-potable water. No underground storage tanks have been reported for BMGR West.

Resource Conservation and Recovery Act Permitted Facilities

The Munitions Treatment Range (refer to the following section) is the only RCRA-permitted facility within BMGR West.

Per- and Polyfluorinated Alkyl Compounds

No recent usage or releases of AFFF containing PFAS has been identified on BMGR West (Sellars, personal communication 2020a). Historical records may be incomplete, but no reports suggest more than minor trace amounts of PFAS are likely to occur.

Munitions Treatment Facilities

One Munitions Treatment Range is present within the western portion of BMGR West (Figure 3.2-1). This is a RCRA-permitted facility operated by MCAS Yuma under an ADEQ-issued hazardous waste permit and is used to destroy unserviceable, outdated, or obsolete munitions generated at MCAS Yuma, other military bases and bombing ranges, and local government-owned manufacturing facilities and from local manufacturers under contract to the U.S. Government located in Arizona and California. The explosive ordnance treated at the Munitions Treatment Range is located approximately 12 miles southeast of the MCAS Yuma Main Base and is categorized as reactive and ignitable hazardous waste. It

includes Class A and B explosives (e.g., bomb and rocket fuses, projectiles, missiles, bombs), and white phosphorus (ADEQ 2020b).

Munitions Constituents

Under the Range Environmental Vulnerability Assessment (REVA) the Marine Corps conducted a review from 2007 to 2013 for the MCAS Yuma training ranges on BMGR West, with the next REVA scheduled for 2021. The purpose of the REVA is to determine if a release or substantial threat of release of MC from operational ranges to off-range areas creates an unacceptable risk to human health or the environment.

Screening-level fate and transport assessment were conducted for nine MC loading areas throughout BMGR West to determine conservative estimates of MC concentrations in surface water, sediment, and groundwater at identified downgradient potential off-range receptor locations. The MC loading areas are within the Yuma desert watershed and were selected based on range use and their potential for MC migration to receptor locations. The downgradient ecological receptor location for these MC loading areas was considered the installation boundary. The screening-level estimates of annual average MC concentrations in surface water entering downstream receptor locations were 0.0002 µg/L (micrograms per liter) for cyclotetramethylene tetranitramine, 0.001 µg/L for cyclothimethylene trinitramine, 0.002 µg/L for trinitotoluene, and approximately 0 µg/L for perchlorate; none of these values are above median method detection limits (detectable concentrations) of laboratory equipment and processes. Sediment screening-level results also predicted that concentrations in sediment were below detectable concentrations. The REVA screening-level groundwater assessment was a three-step process that included estimating maximum concentrations in infiltrating water at each MC loading area, modeling the potential for MC to migrate vertically to groundwater, and modeling the potential for MC to migrate horizontally to non-potable wells. No known drinking water wells exist downgradient of the range areas at BMGR West. Three water supply wells for the city of Yuma are located approximately 15 miles north of and upgradient of BMGR West and so were not considered in this modelling. Based on the predicted MC concentrations compared to median method detection limits in each step in the process, only perchlorate was found necessary to model. Modeled concentrations of perchlorate were estimated to be 0.230 and 0.0480 µg/L at two non-potable wells, but the model predicted it would take 130 years or more to reach these concentrations because of the low infiltration rate and depth to groundwater. The predicted perchlorate concentrations potentially reaching the groundwater wells are at least two orders of magnitude below the Arizona drinking water standard of 14 µg/L (Marine Corps Installations Command 2015).

In summary, surface water, sediment and groundwater assessments including field sampling did not indicate off-installation releases of MC from operational ranges at BMGR West. An imminent threat to human health or the environment is not indicated by this review. Monitoring efforts are conducted as needed, and a full re-evaluation of all operational ranges will be conducted in the REVA periodic review cycle (Marine Corps Installations Command 2015).

3.16.2 Gila Bend Addition

For preparation of the CAR, available federal and state information sources were reviewed. The environmental database search was conducted for the Gila Bend Addition and adjacent areas. No sites from the various databases searched are located within the proposed expansion area. The only sites

listed in the 2018 databases are to the west and are associated with Gila Bend AFAF, but as described for BMGR East Environmental Restoration Program, all AOCs associated with Gila Bend AFAF have been closed with no further action required.

Based on the findings of the CAR, no evidence of past releases of hazardous substances or petroleum products was identified on or adjacent to the Gila Bend Addition lands. Although no locations of hazardous substance or petroleum product releases were identified, old homesteads, one of which appeared to be occupied, were observed north of the proposed Gila Bend Addition lands. Although residential properties may have septic systems or generate small quantities of potentially hazardous wastes, the residential properties are not associated with proposed land withdrawal.

3.17 Public Health and Safety

The affected environment for public health and safety includes ground, airspace, and munitions safety related to military operations. Ground safety is associated with training operations and wildfire management. Airspace safety addresses potential flight risks, such as aircraft mishaps from bird/wildlife-aircraft strikes. Munitions safety considers the use and handling of ordnance associated with military operations and training. The region of influence for public health and safety includes the BMGR ground surface and the immediate vicinity and military training airspace.

3.17.1 BMGR

The BMGR was withdrawn and reserved by Congress to provide a secure location in which military training activities can be conducted without endangering the safety of military personnel or civilians and without interference or interruption (Luke AFB and MCAS Yuma 2007). The MLWA of 1999 and the Sikes Act provide for the sustainable public use of the BMGR subject to safety and security considerations. The BMGR is structured for safety. The airspace is divided into subranges to allow for multiple concurrent training events and keeping non-participants out of the scheduled training airspace. Likewise, surface infrastructure is designed to serve the aircrew training needs with diverse targets and levels of complexity. The type of infrastructure on the ground is completely relevant to the airspace subranges. Even though vast areas of the range surface have a negligible military surface footprint, positive control of the land underlying a restricted area is intended to minimize the risk to persons and developed features on the land to avoid loss of life or property if there is a malfunction of an aircraft, weapons system, or a student error. The location of the range, away from population centers, has supported the military's health and safety operational objectives.

The operating procedures that address safety for BMGR West and overlying airspace are described in Station Order 3710.6J (Marine Corps 2013). The Commanding Officer is responsible for information, instructions, and procedures governing the use of all ranges, training areas, and airspace operated and controlled by MCAS Yuma. Personnel operating within BMGR West must operate in a safe manner, preserving life, equipment, and natural resources. The Installation Range Safety Officer and range inspectors serve as the direct representatives of the Commanding Officer for enforcement of the station order and safety standards. All personnel are required to complete Range Safety Certification Training.

Instructions and procedures for weapon systems and military units operating in BMGR East are described in Luke AFB Instruction 13-212 (Air Force 2015). All units of the 56 FW, military contractors,

and range users are responsible for understanding and abiding by applicable laws, regulations, and instructions. The Director of the 56 RMO is the Range Operating Authority. The Director's responsibilities include appointing a Range Safety Officer, Range Operating Officer, and Laser Safety Officer, as well as ensuring compliance with Luke AFB Instruction 13-212 and 19 March 2020 Luke AFB Guidance Memorandum to Luke AFB Instruction 13-212, *Range Planning and Operations*, 29 September 2015. The 56 RMO is responsible for all safety aspects of range and Special Use Airspace operations. As needed, the 56 FW Safety monitors, investigates, and coordinates with concerned/involved units, all reports of violations, incidents, or accidents in BMGR East that affect safety of air or ground operations.

3.17.1.1 Aviation Safety

Within BMGR East, the 56 RMO is responsible for scheduling, authorizing, and coordinating all military and non-military air operations and activities. Within BMGR West, the Commanding Officer is responsible for scheduling and authorizing all air operations. Both the RMO and Commanding Officer ensure the safety of BMGR's airspace and that no conflicts exist between military and non-military air operations.

Aircraft mishaps can occur due to weather, mechanical failure, pilot error, collisions with terrain or manmade structures, or bird-aircraft collisions. Adherence to safety protocols minimizes the risk of aircraft mishaps; however, it is impossible to entirely eliminate the risk of an accidental aircraft mishap. Those mishaps that result in $2.5 million or more in property damage are considered a Class A mishap. Since 2004, three Class A aircraft mishaps have been reported within BMGR West (Sellars, personal communication 2020b). Since 2007, no Class A aircraft mishaps have occurred within BMGR East (Buchanan, personal communication 2020).

Aircraft mishaps from bird strikes can be an issue for low-flying aircraft participating in military training activities (Air Force 2012). Bird and Wildlife Aircraft Strike Hazard concerns are greatest when aircraft fly at low altitudes such as during takeoff and landing. Within the BMGR environment, this primarily includes fixed-wing auxiliary airfields including Gila Bend AFAF, AUX-6, Stoval Landing Field, and AUX-2. Bird and Wildlife Aircraft Strike Hazard Reduction Plans have been developed and implemented for BMGR West (Marine Corps 2014) and BMGR East, including Gila Bend AFAF (56 FW 2013). As described in the INRMP (Luke AFB and MCAS Yuma 2018a), a key feature of the Bird and Wildlife Aircraft Strike Hazard program is the Avian Hazard Advisory System. This data-driven, remote sensing system provides real-time alerts to pilots for the presence of birds in the airspace.

3.17.1.2 Ground Safety

For military security and public safety, all visitors must obtain a range permit for access to the BMGR, CPNWR, and SDNM (Section 3.7). About 62 percent of the BMGR is restricted from public access because of ongoing highly hazardous operations such as munitions delivery training and laser use, potential for unexploded ordnance on the ground surface, airfield safety and security, or other safety or security requirements (Luke AFB and MCAS Yuma 2018a). In other areas, safety hazards and security may exist at select times or in select locations. In these areas, access permits are required for non-participating military personnel and the general public.

The 38 percent of the range that is open to permitted public access also has safety hazards, such as unexploded ordnance from historic training activities and microwave, radio, and radar energy used at temporary and permanent instruments. Warning signs are posted where hazards are known to occur, and access is controlled by fencing.

3.17.1.3 Non-Military Hazards and Safety Issues

The BMGR's vast size, primitive character, environmental conditions, and historic land use can pose potential safety issues for military personnel and visitors, such as environmental hazards, abandoned mines, road hazards, international border issues, and wildland fires.

Environmental hazards include extreme temperatures, sunburn, lack of potable water, inadequate fluid intake that may contribute to dehydration and heat exhaustion, and venomous snakes and insects. Addressing these hazards, when encountered, can be exacerbated by the remoteness of the range because most ground areas used by recreational visitors are more than an hour's travel time by vehicle to a medical care center outside of the range.

Abandoned mines and wells are scattered throughout the BMGR, including in areas accessible to the public. Some sites are posted with warning signs about the dangers of abandoned and inactive mines, including deep shafts, potential for cave-ins, unsafe or broken ladders, poisonous gasses, discarded explosives, venomous snakes, and flooded tunnels. Range managers have fenced or gated some of the more hazardous mines to discourage or prevent unauthorized human entry. Other abandoned mine locations may be unknown and remain unmarked.

When traveling on the range, all vehicles must remain on designated roads. Most roads on the BMGR are unpaved and seldom maintained. Four-wheel drive vehicles are generally required for travel. Navigation can be challenging for those who are unfamiliar with the area. During dry weather, dust from traveling on the dirt roads can obscure views. During wet weather, roads may wash out, become impassable, and cause vehicles to become stuck in mud. In low-lying road-wash crossings, vehicles can be swept away by flash flood waters. Damage to the vehicle tires can result from rutted roads or sharp rocks or debris.

The BMGR's proximity to the international border has attracted significant numbers of undocumented immigrants and persons smuggling contraband. The BMGR is patrolled by CBP agents with a mission to find and apprehend smugglers and illegal entrants. BMGR recreationists perceived as a threat may be at risk from border crossers. Cases of criminal activity have previously included narcotics trafficking, burglary, assault, weapons offenses, robbery, larceny, and stolen vehicles (Luke AFB and MCAS Yuma 2007).

Since 2011, 126 fires have occurred at BMGR East ranging in size from a few square yards to several hundred acres (Luke AFB and MCAS Yuma 2018b). Very few wildland fires have occurred on BMGR West. One significant fire, the 2005 Triangle Fire, burned 410 acres as a result of human causes, and it was extinguished the same day it began. A Wildland Fire Management Plan is being developed for BMGR East and one has been completed for BMGR West. These plans describe fire mitigation actions for strategic and tactical bases, guide wildfire response protocols, and propose mitigation measures to minimize fire risk and recommendations for fire suppression.

3.17.2 Gila Bend Addition

No specific public health and safety issues were identified for the Gila Bend Addition beyond common environmental risks associated with temperature extremes and potentially venomous wildlife. The BLM's *Lower Sonoran Resource Management Plan* (BLM 2012c) actions to provide for public safety on public lands include:

- Provide public safety information through BLM visitor-use brochures, websites…and various direct contacts with members of the public. Include information on hazards associated with abandoned mines, recreational shooting, unexploded ordnance, smuggler and undocumented alien traffic, other criminal activities, natural resource conditions, or other conditions.
- Post signs in the field to identify certain hazardous situations when warranted to protect public safety. Emphasize visitor acceptance of the risks of entering public lands and responsibility for their own safety.
- To reduce human-caused fires, the BLM will undertake education, enforcement, and administrative fire prevention measures.

The proposed Gila Bend Addition lands share some of the environmental, wildfire, and border-related hazards described for the BMGR, but visitors to this area are only a short drive from the Town of Gila Bend if public services or assistance are required.

3.18 Socioeconomics

This section presents information on the socioeconomic characteristics of the BMGR, proposed Gila Bend Addition and perimeter communities in Maricopa, Pima, and Yuma counties, Arizona, which form the region of influence. Within the BMGR perimeter study area, there are five incorporated communities (Gila Bend, San Luis, Somerton, Wellton and Yuma [Figure 3.4-2]). Census-defined places (CDPs) in the BMGR perimeter that are discussed in this report include Ajo, Dateland, Fortuna Foothills, Tacna, Theba, Wellton Hills, and Why. Four Native American communities in the periphery of BMGR include the Tohono O'odham Nation, Cocopah Tribe of Arizona, Colorado River Indian Tribes of the Colorado River Indian Reservation, and Quechan Tribe of the Fort Yuma Indian Reservation. For the purpose of the socioeconomic analysis, Native American Reservations within the study area are treated as communities even though they are federally recognized as sovereign entities.

The data used are predominantly from the U.S. Census which is conducted every 10 years and is currently being updated. Data for years between official census counts is from the U.S. Census Bureau's American Community Survey database, which is updated annually. Additional tables and information can be found in Appendix J.

3.18.1 BMGR

3.18.1.1 Population Trends

Between 2010 and 2018, the population in Arizona grew 12.2 percent. Between 2017 and 2018, Arizona was the fastest growing state, and Maricopa County was the fastest growing county in the nation (Archer 2019). Of the three counties surrounding the BMGR, Maricopa County's growth rate

(15.6 percent) exceeded Arizona's population growth, while Yuma County (8.4 percent) and Pima County (6.0 percent) also grew, but at a slower pace.

The populations of local communities surrounding the BMGR have also increased since 2010 with the exception of the smaller unincorporated areas of Why (-10.2 percent), Dateland (-14.4 percent), and Theba (-52.5 percent). Increases in most communities was between 5 and 9 percent. The largest increase was in Wellton Hills CDP, with an increase of 49.6 percent.

The populations have increased for the Cocopah Tribe of Arizona (64.1 percent), the Colorado River Indian Tribes of the Colorado River Indian Reservation (10.1 percent), and the Tohono O'odham Nation (4.9 percent), while the Quechan Tribe of the Fort Yuma Indian Reservation lost 34.4 percent of its population since 2017. The population totals for each BMGR perimeter community are provided in Appendix J.

3.18.1.2 Employment

From 2013-2017, unemployment in the State of Arizona (4.2 percent) was lower than Maricopa (6.0 percent), Pima (8.4 percent), and Yuma (10.9 percent) counties. The incorporated communities in the BMGR perimeter experienced unemployment rates ranging from 0 percent (Theba, Wellton Hills, Why) to 26.3 percent (Ajo). Unemployment in the four Native American communities surrounding the BMGR ranged from 9.9 percent on the Colorado River Indian Tribes of the Colorado River Indian Reservation to 26.8 percent on the Tohono O'odham Nation.

3.18.1.3 Income Characteristics

In 2017, the median household income in Arizona was $53,510. While Maricopa County had a higher median household income than Arizona as a whole ($59,580), the median household income was lower in Pima ($48,676) and Yuma ($43,676) counties and in all incorporated areas in the BMGR perimeter. The communities of Why, Yuma, Fortuna Hills, Wellton, and Wellton Hills had median household incomes that exceeded the counties in which they occur. The Town of Gila Bend has the lowest median household income ($29,771) of the BMGR communities, with the exception of the Quechan Tribe of the Fort Yuma Indian Reservation. The median household income for the four Native American communities in the BMGR perimeter area were generally lower than neighboring non-native communities, ranging from $28,646 at the Quechan Tribe of the Fort Yuma Indian Reservation to $32,352 at the Colorado River Indian Tribes of the Colorado River Indian Reservation.

3.18.1.4 Economic Profiles

Generally speaking, the leading industry sectors of Maricopa and Pima counties reflect a more economically diverse and urbanized workforce, while agriculture plays a significant role in Yuma County. In the smaller perimeter communities surrounding the BMGR there are fewer industries and many of these communities rely on agriculture. Prominent industries within the Native American communities in the BMGR perimeter area include arts, entertainment, recreation, accommodation, and food service as their leading industry sector.

3.18.1.5 Housing

Between 2017 and 2018, the state's homeownership rate was 65.7 percent. In response to rapid growth, high demand and other economic factors, the cost of owning and renting a home have increased. In the fourth quarter of 2018, Arizona ranked fifth nationally for annual housing price appreciation at 8.17 percent. Small rural communities, including those surrounding the BMGR are more affordable in comparison to the larger metropolitan areas in Pima and Maricopa counties. While housing prices may be lower in rural communities, housing availability can be limited, particularly in Gila Bend, Ajo, and Dateland. Additionally, the cost of buying or renting a home is often outpacing the annual salary or hourly wage required to qualify. For many households, housing is the greatest single expense. Arizona has a shortage of affordable rentals available to extremely low-income households.

3.18.1.6 Public Services

Law enforcement and other public services in the BMGR perimeter communities are provided as a public service in incorporated areas (Appendix J). The DoD encourages military installations to enter into mutual aid agreements with local fire protection agencies for fire response (Hercules Joint Venture 2018). Mutual aid agreements have been formed between MCAS Yuma and the City of Yuma, as well as the Town of Gila Bend and Gila Bend AFAF. Yuma, San Luis, Somerton, Wellton, and the Native American communities on the BMGR periphery have police departments, while county sheriff departments respond to Gila Bend and the CDPs. Similarly, the cities, Native American communities, Gila Bend, and Ajo all have fire departments. Rural Metro Corporation provides fire and emergency medical services to other areas in the three counties (Arizona Department of Health Services 2020).

3.18.1.7 Socioeconomic Contribution of Arizona Military Installations that Regularly Use the BMGR

The socioeconomic conditions of communities in the BMGR perimeter and beyond are directly and indirectly affected by factors related to the presence of BMGR as an active military training range. More than a dozen military installations in Arizona and California regularly or periodically use the BMGR for training purposes (Table 1.2-1).

The 2017 study sponsored by the Arizona Military Affairs Commission (The Maguire Company 2017), assessed the direct, indirect, and induced economic impact of the six major military installations and four principal National Guard operations in Arizona. Four of Arizona's six military installations evaluated in the study regularly use the BMGR for their military training needs. These installations include Luke AFB, MCAS Yuma, Davis-Monthan AFB and Silver Bell Army Heliport. Additionally, of the four National Guard operations, Arizona ANG's 162 FW and the Papago Heliport, Papago Military Reservation regularly use BMGR for their training activities.

Almost 5 percent of Yuma County's year-round population, approximately 4,500 active duty marines and sailors, serve at MCAS Yuma. Throughout the year, the installation also hosts approximately 70 aviation units that include an average of 600 aircraft and 14,000 personnel for year-round training at the BMGR (Military Installations 2020a). Yuma County is also home to the YPG. Together, MCAS Yuma and YPG are the top two employers in Yuma Country, providing 4,723 and 2,510 employees, respectively (Yuma Metropolitan Planning Organization 2017). The two military installations collectively contribute

$900 million to the economy, the second largest contributor behind agriculture, valued at $3.3 billion (Yuma County Chamber of Commerce 2020).

Luke AFB is home to 26 squadrons and the 56 FW, which oversees BMGR East and the Gila Bend AFAF. Luke AFB employs more than 5,500 military and civilian staff and supports 65,000 military retirees who live in the area (Military Installations 2020b).

Gila Bend AFAF is staffed by 135 contract and 6 government employees. Gila Bend AFAF is also used by military personnel and military retirees for camping and related recreational uses, particularly from October through April (Luke AFB 2005).

Summary tables for 2017 data addressing the number of personnel, payroll, direct spending, and local economic impact are available in Appendix J and summarized here. Direct economic contributions are the result of purchases and sales. Indirect economic effects include economic activities undertaken by vendors and suppliers within the supply chain of the direct activity. Induced economic contributions result from the spending of wages paid to employees involved in direct and indirect activities. The 2017 study also evaluated the economic impact of military retirees who choose to reside close to full-service military installations; consequently, table data for the BMGR and for Gila Bend AFAF may include personnel on these installations who are not directly involved with BMGR or Gila Bend AFAF operations.

In Arizona in 2017, approximately 54,000 personnel reported to military installations around the state, including active duty, reserves, military students, and civilians. In addition, approximately 12,650 retirees linked to military installations were documented. Of the personnel, approximately 14,657 come from the Tucson area, based out of Davis-Monthan AFB, Silver Bell Army heliport, or Arizona Army National Guard 162nd; approximately 14,100 from the Phoenix area out of Luke AFB and with Papago Park Army National Guard; and 5,410 out of MCAS Yuma in Yuma.

Payroll represents the gross income that is available for the recipient to spend, contributing to the economic activity in their region. In Arizona, approximately $2.4 billion in military payroll is distributed annually. Additionally, 289 million in retirement benefits is distributed to military retirees. Personnel who regularly work at BMGR contribute approximately $988 million in spendable funds to the Tucson area, $206 million to the Yuma area, and $622 million to the Phoenix area, based on their home installations (The Maguire Company 2017).

Direct spending by the military operations results in additional activity in the economy as stores and vendors who supply military operations subsequently pay their employees who then purchase items and services to meet their production needs. Because there is a wider option of goods and services in the larger population centers, a greater percentage of direct spending funds will recirculate in these areas over the more rural areas. The bases that regularly train at BMGR accrue approximately $1.3 million in the Tucson area, $428,300 in the Yuma area, and $856,600 in the Phoenix area in direct spending. For the breakdown by expenditure, see Appendix J.

Spending by Arizona military operations that is not tied to payroll amounted to approximately $11.5 billion and the generation of over 76,000 jobs in 2017. Of this, the installations that regularly use the BMGR generated 45,425 jobs and $6.9 billion in economic output. Approximately 19,991 of the jobs

and $3.1 billion were in the Tucson area, 17,615 jobs and $2.9 billion in the Phoenix area, and 7,819 jobs and $888 million in the Yuma area. A breakdown of direct, indirect and induced jobs, wages and output can be found in Appendix J.

3.18.2 Gila Bend Addition

The affected environment of Socioeconomic resources proximate to the proposed Gila Bend Addition focuses on the Town of Gila Bend and unincorporated portions of Maricopa and Pima Counties near the Gila Bend AFAF, but also considers Ajo and nearby Tribal communities. The closest Tribal communities include the San Lucy District (north of Gila Bend) and the Hickiwan District (east of Ajo) of the Tohono O'odham Nation (Figure 3.4-2). Population, employment, and income data for Gila Bend, Ajo and the Tohono O'odham Nation are provided in Section 3.18.1 and Appendix J.

The land within the Gila Bend Addition is undeveloped. It is available for grazing and recreation, but as discussed in Sections 3.4 and 3.7, the land has not been grazed in decades and has no particular features to draw recreational visitors to the area. As the land is not part of the BMGR, it does not contribute to direct, indirect, or induced economic conditions attributable to military installations or the use of them.

3.19 Environmental Justice

Environmental justice is defined as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (EPA no date). Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of proposed programs, policies and activities on population groups of concern, including minority populations, low-income populations, and indigenous peoples. The DoD strategy and implementation plan for Executive Order 12898 calls for NEPA to be the primary mechanism for identifying the impacts of DoD activities on minority and low-income populations (DoD 1995). In addition to the DoD strategy, which the Marine Corps uses as its guide, this assessment also follows the Department of the Air Force *Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process (EIAP)* (Air Force 1997) and CEQ's *Environmental Justice Guidance Under the National Environmental Policy Act* (CEQ 1997a).

The region of influence for Environmental Justice includes the communities and Tribal nations in the near vicinity of the BMGR boundary, described in Section 3.18.

3.19.1 Population Groups of Concern

For the purpose of this analysis, two population groups of concern are defined.

A low-income population is defined by U.S. Census Bureau's annual poverty measure. This metric uses a set of income thresholds that vary by family size and composition. A family whose income falls below the annual threshold is defined as being in poverty, including all individuals within that family (EPA 2016a).

A minority person includes individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not Hispanic origin; or Hispanic" (CEQ 1997a). A minority population is defined as occurring within a designated area when the minority population exceeds 50 percent, or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997a).

Data on minority and low-income populations in the BMGR perimeter communities were taken from the American Community Survey 5-year estimates (2013-2017) provided by the U.S. Census Bureau (2018) (Table 3.19-1). The American Community Survey data are provided for incorporated communities and, if unincorporated, for a CDP.

3.19.2 Community of Comparison

Environmental justice assessments are commonly evaluated against a community of comparison to determine whether there are disproportionate effects on populations of concern. For this analysis, the county in which a local community within the BMGR perimeter is located would be considered the community of comparison. This includes Maricopa, Pima and Yuma counties, Arizona.

3.19.3 BMGR

3.19.3.1 Low-income Populations

Five communities in the perimeter of the BMGR have a higher percentage of their population living below the poverty level than the percentage reported for their respective community of comparison (county). These communities include Gila Bend (37.8 percent) in Maricopa County (15.7 percent); Ajo (32.8 percent) in Pima County (18.3 percent); and Tacna (20.8 percent), San Luis (27.5 percent), and Somerton (29.2 percent) in Yuma County (19.7 percent) (Figure 3.4-1). All four of the Native American communities in the BMGR perimeter have a higher percentage of their population living below the poverty level than their respective community of comparison (county).

Table 3.19-1. Population and Percentage of Individuals Living Below the Poverty Line in the BMGR Perimeter Communities, 2017

Affected Area	Population for whom poverty status is determined	Population below poverty level	Percent below poverty level
Arizona	6,654,096	1,128,046	17.0
Maricopa County	4,101,308	644,476	15.7
Town of Gila Bend	1,882	711	37.8*
Pima County	979,062	179,569	18.3
Ajo CDP	3,509	1,150	32.8*
Why CDP	150	0	0
Yuma County	198,624	39,161	19.7
Dateland CDP	356	39	11.0
Fortuna Foothills CDP	28,118	3,030	10.8

Affected Area	Population for whom poverty status is determined	Population below poverty level	Percent below poverty level
Tacna CDP	732	152	20.8*
Theba CDP	75	8	10.7
City of San Luis	29,556	8,122	27.5*
City of Somerton	15,491	4,528	29.2*
City of Yuma	90,722	15,365	16.9
Town of Wellton	2,949	578	19.6
Tribal	Not applicable	Not applicable	Not applicable
Cocopah Tribe of Arizona, Arizona	1,341	536	40.0*
Colorado River Indian Tribes of the Colorado River Indian Reservation, Arizona/California	9,652	2,625	27.2*
Quechan Tribe of the Fort Yuma Indian Reservation, Arizona/California	1,442	483	33.5*
Tohono O'odham Nation Reservation and Off-Reservation Trust Land, Arizona	10,703	4,827	45.1*

Source: U.S. Census Bureau 2018, No date

Notes:

Gray shading and * indicate locations that have a greater percentage of people living below the poverty level than the communities to which they are compared

CDP communities are not incorporated.

The population in poverty for Tribal communities is derived from the percent of all people below the poverty level in My Tribal Area data.

3.19.3.2 Minority Populations

Within the BMGR perimeter area in Maricopa County, Gila Bend has a minority population that exceeds 50 percent, and its minority population is meaningfully greater than the county as a whole (Table 3.19-2). In Pima County, Ajo has a minority population that exceeds 50 percent and its minority population is meaningfully greater than the county as a whole. In Yuma County, all communities listed in Table 3.19-2 except for Wellton, have minority populations that exceed 50 percent. Theba, San Luis, and Somerton have minority populations that are meaningfully greater than Yuma County as a whole. All of the Tribal communities contain minority populations.

3.19.4 Gila Bend Addition

Gila Bend and Ajo are the closest communities to the proposed Gila Bend Addition. The Gila San Lucy District and Hickiwan Districts of the Tohono O'odham Nation are the closest Native American communities. Data on low-income populations, minority populations, and limited English proficiency for Gila Bend, Ajo, and the Tohono O'odham Nation are provided in Section 3.19.3.

Table 3.19-2. Total Population and Percentage of Minority Populations in the BMGR Perimeter Communities, 2017

Affected Area	Total population	Racial Minority Population*	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian or Pacific Islander	Some other race	Two or more races	Hispanic and Latino (any race)
Arizona	6,809,946	22.5	4.3	4.4	3.1	0.2	7.0	3.5	30.9
Maricopa County	4,155,501	22.0	5.4	1.9	3.9	0.2	7.1	3.5	30.6
Town of Gila Bend	1,882	14.9	2.5	4.5	0.3	0.0	7.2	0.4	67.2
Pima County	1,007,257	23.3	3.5	3.5	2.8	0.2	8.8	4.5	36.6
Ajo CDP	3,525	26.2	0.0	16.4	1.8	0.0	4.9	3.1	43.6
Why CDP	150	40.0	0.0	40.0	0.0	0.0	0.0	0.0	15.3
Yuma County	204,281	26.9	2.1	1.3	1.3	0.1	19.6	2.5	62.9
Dateland CDP	356	51.1	0.0	0.0	0.0	0.0	51.1	0.0	66.6
Tacna CDP	742	37.2	0.0	0.0	0.0	0.0	36.3	0.9	54.3
Theba CDP	75	2.7	0.0	0.0	2.7	0.0	0.0	0.0	97.3
City of San Luis	31,509	24.8	0.7	0.3	0.0	0.0	23.3	0.5	96.3
City of Somerton	15,508	15.6	0.6	0.4	0.0	0.0	14.2	0.4	96.9
City of Yuma	93,851	28.7	3.4	1.0	1.9	0.0	19.2	3.2	59.1
Town of Wellton	2,950	34.0	0.0	0.9	0.0	0.0	28.9	4.2	45.2
Tribal									
Cocopah Tribe of Arizona, Arizona	1,341	61.0	11 (0.8)	714 (53.2)	0 (0.0)	55 (4.1)	9 (0.7)	30 (2.2)	109 (8.1)
Colorado River Indian Tribes of the Colorado River Reservation, Arizona/California	9,652	44.4	185 (1.9)	2,597 (26.9)	49 (0.5)	39 (0.4)	872 (9.0)	552 (5.7)	3,748 (38.8)

Affected Area	Total population	Racial Minority Population*	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian or Pacific Islander	Some other race	Two or more races	Hispanic and Latino (any race)
Quechan Tribe of the Fort Yuma Indian Reservation, Arizona/California	1,442	77.2	28 (1.9)	812 (56.3)	42 (2.9)	0 (0.0)	97 (6.7)	136 (9.4)	522 (36.2)
Tohono O'odham Nation and Off-Reservation Trust Land, Arizona	10,703	90.7	27 (0.3)	9,197 (85.9)	80 (0.7)	23 (0.2)	93 (0.9)	294 (2.7)	917 (8.6)

Source: U.S. Census Bureau 2018, No date

* Racial minority is comprised of all categories in the table except for Hispanic or Latino origins, because the data is from a different Census dataset. The U.S. Census Bureau considers race and ethnicity to be separate. Ethnicity describes whether a person is of Hispanic or Latino origin. Those of Hispanic or Latino origin may identify as any race.

Notes:

CDP communities not incorporated.

The population percentage is derived from total population estimates provided in My Tribal Area data.

4 Environmental Consequences

4.1 Introduction

This chapter addresses the potential environmental impacts to the existing environment, described in Chapter 3, as a result of implementation of the considered alternatives. The resources are addressed in the same sequential order as presented in Chapter 3.

For most resources, the environmental effects between the variations of each alternative (i.e., Alternatives 1, 1A, 1B, and 1C or Alternatives 2, 2A, 2B, and 2C) are indistinguishable because the proposed withdrawal period or a transfer of administrative jurisdiction does not influence the potential impacts to resources. In general, the duration of the proposed withdrawal does not in and of itself affect resources, except to provide a point in time at which the impacts described might potentially end if Congress does not extend the land withdrawal after the time period identified for the alternative expires (that is, 25 years with Alternatives 1 and 2 or 50 years with Alternatives 1A and 2A). Likewise, as described in Chapter 2, a change or continuation of the agency with administrative jurisdiction would differ very little from existing management of the range and would not directly affect most resources. Therefore, unless there is a distinction between the variants of Alternative 1 or 2, the impact analysis for each alternative is grouped under one subheading. The impacts to resources within the existing range would be the same under Alternative 1 and 2 and their variants; therefore, only the impacts associated with the Gila Bend Addition are addressed for Alternative 2 variants, but the effects described for Alternative 1 also would apply.

Potential impacts of alternatives are described in terms of type (beneficial or adverse and direct or indirect); context (global, national, regional, or local scale of the impact); and intensity (negligible, minor, moderate, or major). Beneficial impacts are positive changes to a resource, while adverse impacts are negative changes that degrade a resource. Direct impacts are “caused by the action and occur at the same time and place” (40 CFR 1508.8). Indirect impacts are “caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable” (40 CFR 1508.8). Context is the setting within which an impact could occur and describes whether the alternative would impact the resource on a local, regional, or global scale (40 CFR 1508.27[a]). Intensity describes the severity or magnitude of the impact (40 CFR 1508.27[b]). The intensity of impacts varies between negligible, minor, moderate, or major effects. Impact thresholds are dependent upon each individual resource and are largely qualitative determinations. In general, the impact thresholds as a result of an alternative are defined as follows:

- Negligible impacts are effects that are either not detectable or barely perceptible.
- Minor impacts are effects that are detectable and/or measurable but would be slight.
- Moderate impacts are effects that are readily apparent but, in most cases, could be mitigated if the impacts are adverse.

- Major impacts are effects that would result in drastic and substantial consequences to a resource. Mitigation measures to completely offset major adverse effects are unlikely to be feasible or effective.

Under all action alternatives, military land and airspace use at the BMGR would continue as necessary to meet DoD training and test objectives. The Air Force would use the Gila Bend Addition to control land use and surface access. Military activities would be limited to those associated with controlling access to the area and preventing the potential for encroachment from incompatible land uses.

Under the No Action Alternative, Congress would not extend the BMGR land withdrawal or approve the Gila Bend Addition. Missions with a surface use would end; ground support training and certain flight training operations, including live-fire use of air-to-air, air-to-ground, ground-to-ground, or ground-to-air munitions, would have to relocated to other ranges to satisfy training requirements. However, military use of the SUA overlying the current range could continue with a military presence and activities remaining until such time as the long-term disposition of military personnel, aircraft, and training and test missions in the region were sorted out following closure of the BMGR. While impacts associated with existing on-the-ground military activities would no longer occur, there would be impacts associated with decommissioning or removing existing military facilities.

Land management would revert to BLM and, after being decontaminated and accepted by DOI, subject to a planning process to determine future use of the land. It is anticipated the BLM-administered public lands would be subject to the multiple resource management objectives of FLPMA, and likely incorporated into an RMP and associated resource management directives. Activities currently precluded on the BMGR, such as agriculture, grazing, mining, and mineral or geothermal leasing may occur subject to BLM review and approval in consideration of safety risks. Changes to the land use and management of the previously withdrawn lands over time would be addressed in applicable NEPA evaluations. Impacts to resources from alternative land uses and associated mitigation measures would be addressed in these documents and be subjected to public and agency review.

4.2 Military Land and Airspace Use

4.2.1 Alternatives 1, 1A, 1B, and 1C

Alternatives 1A, 1B, and 1C would provide DoD a longer period of certainty when investing in infrastructure, equipment, and resource management, and provide greater assurance that BMGR subranges would remain available to support training and test programs. Longer extension periods or transferring administrative jurisdiction to the Air Force and Marine Corps would also lend credibility to plans to select military bases in the operating region as host installations for training or test activities. All alternatives to extend the BMGR land withdrawal would have a major beneficial and direct effect on military operations through continued use of the land and airspace.

4.2.2 Alternatives 2, 2A, 2B, and 2C

Expanding BMGR East to include the Gila Bend Addition would further assure that Gila Bend AFAF in general, and runway operations in particular, would be more effectively secured from trespass and

future land use encroachment, and that land in the accident potential zone would be limited to compatible uses.

Acquisition of the land within the Gila Bend Addition that underlies portions of R-2305 would allow aircraft training at Range 3 and aircraft operating in the combined R-2304 and R-2305 airspace to fully use the restricted airspace for training operations. The acquisition would also have the effect of eliminating land use encroachment that may conflict with military use of R-2305.

Withdrawing the Gila Bend Addition and reserving it for military purposes would have a major beneficial and direct effect on military operations, including land and airspace use.

4.2.3 No Action Alternative

The No Action Alternative would result in major direct adverse impacts on ground-based military training and test operations at the BMGR. All training and test activities at the BMGR that require the use or support of the ground surface would end if the current BMGR land withdrawal and reservation were not extended.

Expiration of the land withdrawal and reservation would not have a direct or immediate effect on military airspace, including the SUA, MTRs, and ATCAAs that currently support training or test activities associated with the BMGR. Training or test activities that are conducted in these airspace areas, but do not require either the range surface or its ground-based facilities in some manner, could continue.

The continuing need for military ground and air training and testing in the region would not end as a consequence of closing the range. Rather, closure of the BMGR would require finding an alternative location for military training and test capabilities and capacities elsewhere within the operating region, establishing a new range elsewhere within the region or finding replacement training and test resources outside of the region. This would result in a major indirect adverse impact on the capacity of other training locations as well as an increase in the cost of training and testing due to the need to relocate training.

4.3 Civil Aviation

4.3.1 Alternatives 1, 1A, 1B, and 1C

Extension of the existing BMGR land withdrawal and reservation in accordance with Alternatives 1, 1A, 1B, or 1C would have no effect on the structure of regional airspace, air traffic control procedures, en route or terminal flight procedures, or civil aviation access to airspace in the region as compared to current conditions. Although there may be some dissatisfaction on the part of some civil airspace users with the volume of SUA and other airspace committed to national defense priorities, the extension of the BMGR would not alter those circumstances because the airspace exists apart from the withdrawal.

4.3.2 Alternatives 2, 2A, 2B, and 2C

Expanding BMGR East to include the Gila Bend Addition would have no effect on civil aviation.

4.3.3 No Action Alternative

Closure of the BMGR under the No Action Alternative would have no direct or immediate effects on the structure of regional airspace, air traffic control procedures, en route or terminal flight procedures, or civil aviation access to airspace, but the loss of the range would sharply curtail the types of aviation training and test activities that could be supported in BMGR SUA. Curtailment of missions that involve air-to-ground deliveries of ordnance or laser use or that would otherwise require ground-based resources or activities may reduce the numbers of training and test sorties flown in R-2301W, R-2301E, R-2304, and R-2305. It is also possible that curtailing these missions may trigger a redistribution of training activities from MOAs/ATCAAs in the region to these restricted areas. The frequency and duration of SUA activation in the region would likely change from ongoing norms. The long-term disposition of military training and test aviation that would emerge in the region as a result of the No Action alternative cannot be reliably assessed in this LEIS, but outcomes that would impose additional constraints on civil aviation would appear to be unlikely.

4.4 Non-Military Land Use

4.4.1 Alternatives 1, 1A, and 1B

Land jurisdiction and land management within the BMGR boundaries would remain unchanged under Alternatives 1, 1A, and 1B, so there would be no effect. The federal (Air Force, Marine Corps, BLM, USFWS) and state (AZGFD) agencies currently authorized to cooperatively manage natural and cultural resources, provide law enforcement related to resource conservation, and maintain their current administrative roles and responsibilities. The existing interagency natural and cultural resource management planning processes, established by the 1999 MLWA, would likely be extended by the length of the land withdrawal determined by Congress.

Existing non-military land uses within the BMGR, including public access and recreation, would continue (Section 4.7) and could potentially increase commensurate with population growth. No changes to the land area available for recreation are proposed, and military operations and safety considerations would remain the priority and could prompt changes in the future. CBP would continue its role in securing the U.S.-Mexico border and would continue patrol and law enforcement activities within the BMGR. No changes to non-military land uses in the 5-mile perimeter study area are anticipated as a result of the extension of the land withdrawal, regardless of its duration. The airspace overlying the CPNWR would continue to be used for military purposes in accordance with regulatory agreements and the terms of the 1994 MOU (Appendix C), or any agreement that supersedes this MOU. With no substantial change in non-military land use, extending the land withdrawal itself would have no impact.

4.4.2 Alternative 1C

The impacts of Alternative 1C on land management and non-military land uses would be the same as described for Alternatives 1, 1A, and 1B. Alternative 1C, which would transfer administrative jurisdiction from the Secretary of the Interior to the Secretaries of the Air Force and Navy, would relieve the BLM of administrative obligations at the BMGR.

The BLM would no longer have a legislatively mandated administrative role in land use management. The DoD, AZGFD, and DOI (acting through USFWS) would continue to cooperatively manage land use and resources per their legislative mandates and administrative regulations through the INRMP process established in the 1999 MLWA. BLM would be invited to continue participating in collaborative efforts including the BEC and IEC.

4.4.3 Alternatives 2, 2A, and 2B

The Gila Bend Addition would transition from BLM jurisdiction and management through the Lower Sonoran Resource Management Plan (BLM 2012b) to Air Force jurisdiction and management in accordance with the INRMP (Luke AFB and MCAS Yuma 2018a) and ICRMP (56 RMO 2020).

Surface access by the public would not be allowed within the withdrawn Gila Bend Addition. Access would be controlled through new entry control signs and patrols by range security officers. The (Stout) livestock grazing allotment would be allowed to continue through its current term but would not be renewed. Upon notifying the allottee of the intent to not renew the permit, the allotment could continue to be grazed for two years after the notification date. BLM would continue to administer the permit. Grazing could continue on the allotment outside of the withdrawal area following the end of the notification period. After the permit expires, it would not be renewed, and the opportunity for grazing the withdrawn lands would end. Because this allotment was last grazed in 1989, cancellation of the permit when it expires would have a negligible adverse direct effect on the permittee.

Withdrawal and reservation of the proposed Gila Bend Addition would preclude appropriations by the public under the general land laws, including federal mining laws and mineral leasing and geothermal leasing laws for the duration of the withdrawal. Because no mining or leasing claims have been filed for these parcels, the effect of withdrawing the land from appropriative uses would be a negligible direct effect, but adverse to appropriative land uses because the effect would be long term to coincide with the length of the land withdrawal.

4.4.4 Alternative 2C

Transferring the administrative jurisdiction to the Secretary of the Air Force would be equivalent to withdrawing the Gila Bend Addition indefinitely, until the DoD determines the BMGR is no longer needed for military purposes. BLM would have no administrative responsibility for the land. However, because the Stout grazing allotment retains an active grazing permit, the Air Force would establish an agreement with the BLM to continue to administer the permit through the end of the two-year prior notification period.

Like Alternatives 2, 2A, and 2B, land use would change indefinitely by closing the approximately 2,366 acres to public access and use, phasing out the potential for grazing, and precluding appropriations by the public under the general land laws, including federal mining laws and mineral leasing and geothermal leasing laws. While the changes would be minimal in the context of a change in use over the last few decades, the limitations on public use would be a negligible, adverse direct effect because of their near permanent status with the transfer of administrative jurisdiction.

4.4.5 No Action Alternative

Under BLM jurisdiction, it is anticipated that the public lands would be managed for multiple use in accordance with FLPMA (P.L. 94-579) and other relevant land use laws and administrative regulations. However, before opening the lands to non-military use, DoD would need to decontaminate the land and put areas determined too contaminated to cost-effectively render safe for use into DoD custodial care in perpetuity. Decontamination costs would be extensive. The DOI would need to accept the decontaminated lands and initiate a planning process for their future use. The former BMGR lands could be incorporated by amendment into one or more of the three existing BLM RMPs for southwest Arizona (BLM 2010, 2012a, 2012b). Alternatively, a new RMP could be developed for the area. Land uses such as mining, grazing, and recreation could be reinstated to the former range, subject to the outcome of the planning process for the land and safety assessment.

Some may view opening the land to multiple uses as a positive effect for land use, but the alternate uses may have effects on natural and cultural resources that are substantially more adverse than the relatively small military surface use footprint. The costs to decontaminate the land for other uses would be significant. If Congress does not allocate sufficient funding for decontamination and future land use planning, the potential benefits of multiple use could be delayed for decades.

4.5 Utilities

The potential for impacts on utilities within the BMGR and its perimeter from the various alternatives is evaluated within the context of current laws and policy. There may be changes to laws, regulations, and policy over the duration of the withdrawal periods and/or due to changes in the jurisdictional management proposed under each alternative.

Presently, DoD has authority to develop renewable or other energy facilities in accordance with the guidance on development of energy projects (Office of the Assistant Secretary of Defense 2016). This guidance applies to projects that provide energy security in support of the DoD's mission. Pursuant to Title 10 U.S.C. Section 2922a *Contracts for Energy or Fuel for Military Installations,* DoD may pursue development of any type of energy production facility on DoD real property with government or third-party financing. The energy facility may have an operation contract of up to 30 years, including the time required to remove or demolish.

4.5.1 Alternatives 1, 1A, and 1B

Under Alternatives 1, 1A, and 1B, the BMGR would continue to be administered as a military reservation on withdrawn public land. As such, DoD would not have authority to pursue energy development under Title 10 U.S.C. Section 2922a. Energy development is unlikely to be included as a stated purpose of the new withdrawal legislation and would require coordination with and approval by BLM. Additionally, any DoD proposal for an energy project on the BMGR would need to support the agency's mission and be developed and operated congruent with the existing INRMP. An energy project proposal would require, among other things, appropriate NEPA documentation to evaluate environmental and social impacts, prior to review and approval. Existing utilities on the range would be unaffected by the extension of the land withdrawal. Commercial and public utility companies seeking to route new facilities through the BMGR may be denied because the land would continue to be reserved for military purposes, and buried

utilities may pose a safety concern because of the potential for ordnance and aboveground structures to interfere with flight operations. Companies seeking to potentially site utilities through the range may consider this a minor adverse effect on their operations because alternative routes may be less direct, but the routing decisions would be made early in the planning phase mitigating the investment costs for exploring siting alternatives.

4.5.2 Alternative 1C

With the transfer of administrative jurisdiction, DoD could pursue development of an energy production facility on the BMGR under Title 10 U.S.C. Section 2922a without coordination with and approval from the BLM. However, any proposed energy project must be compatible with the primary mission of the range. Development of an energy project on the BMGR would likely be triggered by future policy considerations and energy needs rather than current statutory law.

Existing utilities on the range would be unaffected by extending the land withdrawal. Because of incompatibilities with the military mission and the BMGR being reserved for military purposes, commercial utilities proposals for utilities within the BMGR may be denied, which could be a minor adverse effect to their operations as alternative routes may be more costly.

4.5.3 Alternatives 2, 2A, 2B, and 2C

No utilities currently occur within the proposed 2,366-acre Gila Bend Addition, so there would be no direct or indirect impact on utilities. Alternative 2 would withdraw the Gila Bend Addition from all forms of appropriation under the general land laws, so no new utilities would be developed except to the extent to which the BLM authorizes such actions, and that they are compatible with BMGR's military purposes. For Alternatives 2, 2A, and 2B, authorization for future utilities would have to be coordinated with and approved by BLM; DoD could pursue utility development without BLM approval with Alternative 2C. However, utility development within the Gila Bend Addition is unlikely because the purpose and need for the Gila Bend Addition is to prevent incompatible uses in this area.

4.5.4 No Action Alternative

Utility projects may be allowed on the former BMGR at BLM's discretion. Preference would be given to projects in BLM-designated energy zones such as the Agua Caliente Solar Energy Zone near Dateland (BLM 2019a) and West-wide "Section 368" Energy Corridors (BLM 2020a); none occur within the BMGR. The BLM would have to consider the context of the prior use of the range and other safety and environmental considerations through a NEPA evaluation of an application for a new utility on former range lands. The nature and intensity of the impact, which would undergo a BLM planning and approval process, cannot be determined at this time.

4.6 Ground Transportation, Traffic and Traffic Circulation

4.6.1 Alternatives 1, 1A, 1B, and 1C

Alternatives 1, 1A, 1B, and 1C would not change road use, traffic patterns, or public travel restrictions within the BMGR. Future changes in war-fighting technologies could influence military training and change the size of hazard/security areas; this could potentially close or restrict public use of publicly

accessible roads in BMGR East and BMGR West in the future. These types of changes have been minimal during the current withdrawal period and effects are projected to be direct, minor, and adverse to public use.

The extension of the BMGR withdrawal under Alternatives 1, 1A, 1B, and 1C would preclude nearly all future development of any public or private transportation systems for non-governmental purposes within the BMGR. Possible exceptions would be improvements to existing transportation infrastructure within an existing easement (such as widening State Route 85 to increase future traffic capacity or reopening the abandoned Tucson, Cornelia, and Gila Bend Railroad line); such actions would be subject to NEPA analysis prior to implementation. The Arizona Department of Transportation (ADOT) Revised 2021 to 2025 Tentative 5-Year Program (ADOT 2020) does not include any capacity expansion on State Route 85, and there are no known plans to re-open the Tucson, Cornelia, and Gila Bend Railroad line between Ajo and Gila Bend. Because the transportation system external to the BMGR sufficiently supports travel demand, extending the BMGR land withdrawal would have no near-term effect and no more than a negligible potential indirect effect on the transportation system in the long term.

4.6.2 Alternatives 2, 2A, 2B, and 2C

Currently, 5.72 miles of unpaved roads occur within the proposed Gila Bend Addition, but they are truncated by high-hazard areas of BMGR East that are closed to public access. This combined with the elimination of recreation in the area would render the roads essentially useless for public travel. The exception would be that some use of these roads may be allowed to support management of the grazing allotment through the end of the two-year prior notification period. Closing the roads within the Gila Bend Addition to public access would be a negligible, adverse, direct effect on the traveling public.

4.6.3 No Action Alternative

Current road use could remain, including public travel restrictions, within the former range boundary until the environmental impacts of the No Action Alternative were addressed in future studies. The potential development of public or private transportation systems would be determined through a BLM planning process to determine future use of the former range. The nature and intensity of the impact cannot be determined at this time but would require NEPA analysis if proposed.

4.7 Public Access and Recreation Resources

4.7.1 Alternatives 1, 1A, 1B, and 1C

Public access for recreation with a valid range permit (and hunting license, if applicable) would continue unchanged for the foreseeable future per the current provisions of the INRMP, so there would be no impact to recreational opportunities. This assumes recreational uses are consistent with BMGR's military mission and public safety. Recreational users would continue to experience aircraft noise and visible military modifications of the natural landscape as a result of the ongoing military training and testing that occurs at the BMGR. No operational or infrastructure changes are proposed or currently planned that would impact recreation or public access. However, changes in mission or training needs potentially could impact recreational opportunities or public access in the future. A NEPA analysis, including opportunities for public input, would occur prior to any changes to existing recreational opportunities

and public access on the range. Minor adjustments in access could be positive or negative depending on the change. Visitation levels at adjacent recreation areas within the vicinity of BMGR would be unaffected.

4.7.2 Alternatives 2, 2A, 2B, and 2C

Recreational use on the Gila Bend Addition would no longer be permitted. If any recreational use of the Gila Bend Addition currently occurs, it is limited. Considering the proximity of other extensive areas of land with higher quality recreational opportunities available for visitors, eliminating the 2,366 acres of land from recreation be would a negligible, adverse, and direct effect on recreation. Withdrawing the Gila Bend Addition would not cause a substantial displacement of visitors to other nearby recreation sites because this land does not provide features such as trails or scenic qualities that would attract visitors to regularly use this land for recreation. Therefore, indirect effects would be negligible.

4.7.3 No Action Alternative

Under the No Action Alternative, BLM would assume responsibility for managing public access for recreation on the former BMGR. Until BLM completes a planning process on the future use of the land, it is anticipated that the Air Force and the Marine Corps would continue to manage recreation in accordance with the INRMP and without change from current conditions.

Upon acceptance of the lands within the existing BMGR, BLM would identify management prescriptions for recreational opportunities on the former BMGR through an RMP process, including a NEPA analysis with public input. To the extent practicable and economically feasible, range decontamination could make additional lands safe for recreation. Therefore, under the No Action Alternative, areas open for recreational opportunities on the former BMGR could potentially increase, which would be a direct positive effect for recreation.

4.8 Earth Resources

4.8.1 Alternatives 1, 1A, 1B, and 1C

4.8.1.1 Physiography and Soils

Ongoing military and CBP activities such as vehicle travel on unpaved surfaces and training activities result in ground disturbance, which increases the potential for soil erosion in these areas. Inappropriate road siting, engineering, maintenance, and use of roads, as well as the creation and use of unauthorized roads and trails by drug smugglers, illegal migrants, CBP, and recreationists are the leading causes of accelerated erosion at the BMGR (Luke AFB and MCAS Yuma 2018a). The completion of vehicle barriers along the international border has helped to curtail illegal cross-border vehicle traffic from Mexico. Authorized road use continues to be restricted to the designated road system, which is monitored for serviceability and erosion problems. Unauthorized roads are closed and obscured as practicable. Roads within the designated system that are contributing to severe erosion problems are being reengineered or realigned where appropriate and closed if necessary.

The military surface use of the range fluctuates with mission requirements but has remained relatively static over the past 20 years; Tables 3.2-1 and 3.2-3 demonstrate this. In BMGR East, technological

advances in weaponry have resulted in more precise weapons delivery on targets and a corresponding decrease in the amount of land subject to EOD clearance. Within BMGR West, the need for ground support training and for additional parachute drop zones and convoy security operations courses have slightly increased the surface-use footprint. While the size of hazard areas that are unsafe for non-participant entry have increased, the targets within these areas are relatively unchanged. Collectively, approximately 149,000 acres of the BMGR in aggregate (less than 9 percent of the range land) are subject to surface disturbance from military use and most disturbance is low intensity. Less than 2 percent of the BMGR in aggregate is currently subject to military use that causes moderate to complete disturbance of the ground surface and most of those impacts are skewed towards the moderate levels of disturbance. Through the INRMP, work plans to control erosion include evaluating erosion conditions of range roads and repairing or temporarily restricting use when needed. Erosion is also evaluated in other specific problem areas and recommendations for repairs are developed.

Recreational use of the BMGR is limited in location and activities. No substantial expansion in the extent of or changes in the types of activities that would increase the potential for soil disturbance is expected to occur. Ground disturbance and subsequent erosion would result in an adverse indirect impact that is minor in intensity.

4.8.1.2 Mineral Resources Potential

Under the MLWA of 1999, BMGR lands would continue to be precluded from mining, mineral leasing, and geothermal leasing laws; military use of sand and gravel for target and road maintenance on the range would continue to be allowed in locations with previously approved environmental clearance. While extraction of critical mineral resources is prohibited, based on the findings of the MRA (AFCEC and 56 RMO 2018a), most mineral resources with a high potential to be found on the BMGR, as identified in Table 3.8-1, such as aggregate and specialty sand, are fairly common and are not on the 2018 Critical Minerals List. Mineral resources on the BMGR that are on the 2018 Critical Minerals List include rare earth elements, strontium, tin, and tungsten. None of these, has a high potential to occur at the BMGR, so direct impact of inaccessibility to these resources would be a direct adverse impact but would be negligible in intensity.

4.8.2 Alternatives 2, 2A, 2B, and 2C

4.8.2.1 Physiography and Soils

Driving on unpaved surfaces as part of patrol activities could result in ground disturbance and could contribute to erosion on the Gila Bend Addition. However, public use of the roads would be expected to cease, and patrol activities would be infrequent. The potential for erosion would be a negligible indirect adverse effect.

4.8.2.2 Mineral Resources Potential

Withdrawing the proposed Gila Bend Addition lands and reserving them for military purposes would preclude development of the mineral resources on these lands. However, no mineral resource extraction activities currently occur, and no mineral deposits have been identified that would suggest the lands within the Gila Bend Addition would be likely to be mined. Given the limited size of the

withdrawal, removing these lands from mining would have negligible adverse to no effect on mining in the region.

4.8.3 No Action Alternative

Ground disturbance from military training activities that could contribute to erosion would end, although CBP activities would continue to occur for the long term. While the extent of decontamination and range restoration activities are currently unknown, substantial ground disturbance of intact soil crusts could occur if transect surveys are required to search for errant ordnance in areas with negligible surface use. Decommissioning of military equipment or target features also could also result in substantial ground disturbance in localized areas. Depending on the extent of decontamination required, adverse impacts to soils could be minor to significant and would not be uniform across the range. Allowable future activities under BLM management are unknown, but land uses typically permitted on public land could affect earth resources. Once decontamination and safety are assessed, the BLM could reopen the land for mineral resource development, depending on the future demand for and value of the resources; such actions would be subject to NEPA analysis prior to implementation. The nature and intensity of these future impacts cannot be determined at this time.

4.9 Water Resources

4.9.1 Alternatives 1, 1A, 1B, and 1C

4.9.1.1 Surface Water

Surface water on the BMGR is minimal and generally unaffected by military operations; extending the land withdrawal would not change this. Stormwater runoff in areas where erosion is occurring can result in suspended sediment in surface water and degrade its quality. However, this indirect impact is minor because the limited disturbance footprint minimizes the disruption of soils that would increase the potential for erosion. Extending the BMGR land withdrawal would continue to limit public access and public vehicle use would continue to be limited to designated open roads, thus limiting the potential for increased sediment in stormwater runoff. Direct impacts from sedimentation of surface water would be negligible. No Clean Water Act Section 303(d)-listed impaired waters occur in or near the BMGR. Section 404 permitting is not required for the washes on the BMGR because they are all ephemeral. There would be no impact on impaired or jurisdictional waters.

The potential for contamination of surface water from military activities would continue and would be unchanged from current conditions. The Air Force and Marine Corps would continue their ongoing programs to prevent, contain, and clean up spills of hazardous substances associated with ground-based activities and from aircraft crashes that could contaminate surface waters. As further discussed in Section 3.16.1, the Air Force ORA and Marine Corps REVA report that no transport of munitions constituents through surface water to off-range areas has been identified; based on this history, no direct or indirect effects on off-range surface water are anticipated from extending the land withdrawal.

4.9.1.2 Groundwater

The potential for contamination of groundwater from military activities would be unchanged from current conditions. The existing programs to prevent contamination of surface water would continue to protect groundwater so that any direct effects from continued military use would be negligible.

Groundwater use on the BMGR is expected to remain minimal as few military facilities on the range require water. The Gila Bend AFAF within BMGR East and the Cannon Air Defense Complex within BMGR West include developed and staffed facilities that require water, and on-range wells are used to support construction activities and other military needs. No significant increase in water use on the BMGR has been identified, so groundwater use is expected to remain a minor direct effect of ongoing operations.

4.9.1.3 Water Rights

The use of surface water for wildlife management would not be affected by the extension of the BMGR. Acquisition of additional surface water rights for military use is not proposed. The Arizona Department of Water Resources would continue to control issuance of surface water rights. There would be no direct or indirect impact on water rights.

4.9.2 Alternatives 2, 2A, 2B, and 2C

4.9.2.1 Surface Water and Groundwater

The proposed Gila Bend Addition land withdrawal would have virtually no direct effect on surface water or groundwater. The Air Force proposes to use the Gila Bend Addition for safety and operational security, which does not require water use. Surface-disturbing activities would be limited to minimal use of the existing roads. Low-volume road use combined with the minimal surface waters and scarce precipitation limit the potential for increased sedimentation within surface waters. No range training or munitions activities that could result in surface or groundwater contamination are proposed for the Gila Bend Addition. There would be no impact on water quantity or groundwater. Negligible indirect adverse impacts to surface water quality due to increased sedimentation is possible.

4.9.2.2 Water Rights

The Air Force would not seek to acquire any water rights associated with withdrawal of lands for the Gila Bend Addition. The single existing surface water right on the Gila Bend Addition lands would not be affected. There would be no direct or indirect impact on water rights.

4.9.3 No Action Alternative

Under the No Action Alternative, water use required for military activities on the BMGR would be reduced and eventually cease. Although range cleanup activities may continue for some time after the withdrawal ends, additional water use is not expected to be required for these activities. Military water rights may be conveyed to BLM or become inactive. The use of surface water for wildlife management would not be affected. In the long term, the reduced use of water at BMGR would result in a localized minor beneficial impact.

While ground disturbing military training activities that could result in erosion affecting surface waters would no longer occur, the extent of ground disturbance associated with decontamination and decommissioning of military facilities could be major adverse effect, increasing the potential for surface water sedimentation in stormwater runoff. However, military storage and use of hazardous materials would cease; munitions use as part of military training on the range would end, eliminating the potential for future MC contamination. Consequently, no new surface water or groundwater contamination from military activities would occur. The nature and intensity of the impact cannot be determined at this time.

Future activities under BLM management are unknown but could include uses such as agriculture, grazing, and mining that would generate future demand for water use or result in potential new sources of surface water and groundwater contamination, affecting water quality. Such actions would be subject to NEPA analysis prior to implementation. Sedimentation of surface water due to ground-disturbing activities, whether from range clean-up, BLM-permitted land use, or CBP activities would result in an adverse impact, but the magnitude of the effect cannot be estimated.

4.10 Air Quality

Impacts to air quality are described for the alternatives and a summary of the general conformity applicability analysis is provided.

4.10.1 Alternatives 1, 1A, 1B, and 1C

Activity levels and estimates of criteria pollutant and GHG emissions have been used to characterize current (2019) emissions as representative of future emissions under Alternative 1 and its variants. If the land withdrawal is extended, current levels of flight and ground operations would continue. Air quality impacts would remain the same as they are now for the duration of the withdrawal. No net increases in criteria pollutant, HAP, or GHG emissions would occur in any nonattainment or maintenance area under Alternatives 1, 1A, 1B, and 1C. Therefore, the estimated net emissions increases associated with the proposed action are less than the applicable conformity threshold values established at 40 CFR 93.153(b). The requirements of the General Conformity Rule do not apply. Alternatives 1, 1A, 1B, and 1C would be assumed to conform with the applicable SIPs. No additional air quality impacts are anticipated.

The environmental effects of GHG emissions are by their nature cumulative and affect the environment on a global level (Department of the Navy 2009). No individual source of GHG emissions is large enough to result in a measurable effect on global GHG concentrations or climate change. As a result, the potential impacts of GHG emissions on climate change for all alternatives is discussed in the context of cumulative impacts in Section 5.3.9, and the potential impacts of climate change on the BMGR and its environmental impacts are described in Section 4.11.

4.10.2 Alternatives 2, 2A, 2B, and 2C

The withdrawal of the Gila Bend Addition under this set of alternatives would not increase aircraft or ground operations or future emissions. Impacts would be the same as those described for Alternative 1 and its variants. Alternative 2 and its variants would conform with the applicable SIPs.

4.10.3 No Action Alternative

Removing the BMGR from military use would reduce the number of military aircraft operations in the airspace overlying the BMGR and, following decommissioning and decontamination activities, would eliminate military ground operations. Therefore, some reduction in emissions would be expected. Necessary training would have to take place at different ranges, which could result in greater travel distance to reach an alternate range. Emissions occurring at the BMGR would be displaced rather than eliminated. It is difficult to ascertain the indirect air quality impacts because the location(s) where training and testing would be reassigned is unknown.

Activities on the former range allowed by the BLM in the future could affect air quality. The context and intensity of these activities and their impacts are unknown at this time.

4.11 Climate Change

DoD has conducted a department-wide assessment of the effects of climate change on the way it executes its mission as described in Section 3.11 (DoD 2014). Some climate change effects may have less direct impact on the BMGR due to geographic location (for example, effects affecting the Arctic), but even geographically distant impacts could indirectly affect the BMGR as a result of shifts in DoD operations and funding. A summary of the DoD department-wide climate change impact assessment pertinent to the BMGR is shown in Table 4.11-1.

Table 4.11-1. Potential Effects of Climate Change on DoD Lines of Effort

Lines of Effort	Potential Effects of Climate Change
Plans and Operations	Increased demand for defense support to civil authorities.
Plans and Operations	Altered, limited, or constrained environment for military operations.
Training and Testing	Increased number of “black flag” (suspended outdoor training) or fire hazard days.
Training and Testing	Decreased training/testing land carrying capacity to support current testing and training rotation types or levels. Some training/testing lands may lose their carrying capacity altogether.
Training and Testing	Increased dust generation during training activities, which may interfere with sensitive equipment, resulting in greater repairs, or may require more extensive dust control measures to meet environmental compliance requirements.
Training and Testing	Stressed threatened and endangered species and related ecosystems, on and adjacent to DoD installations, resulting in increased endangered species and land management requirements.
Training and Testing	Increased operational health surveillance and health and safety risks to DoD personnel.
Training and Testing	Increased maintenance and repair requirements for training and testing lands and associated infrastructure and equipment (e.g., training roads, targets)

Lines of Effort	Potential Effects of Climate Change
Built and Natural Infrastructure	Increased inundation, erosion, and flooding damage.
Built and Natural Infrastructure	Changing building heating and cooling demand, impacting installation energy intensity and operating costs.
Built and Natural Infrastructure	Disruption to and competition for reliable energy and fresh water supplies.
Built and Natural Infrastructure	Increased ecosystem, wetland, sensitive species, and non-native invasive species management challenges.
Built and Natural Infrastructure	Increased maintenance requirements for runways or roads to remain operable during extreme hot days.
Built and Natural Infrastructure	Changed disease vector distribution, increasing the complexity and cost of ongoing disease management efforts.
Acquisition and Supply Chain	Changed operational parameters for current and planned weapons and equipment, resulting in increased associated maintenance requirements or requirements for new equipment.
Acquisition and Supply Chain	Reduced availability of or access to the materials, resources, and industrial infrastructure needed to manufacture the DoD's weapon systems and supplies.
Acquisition and Supply Chain	Interrupted shipment, delivery or storage/stockpile of materials or manufactured equipment and supplies.
Acquisition and Supply Chain	Alterations in storage and stockpile activities.
Acquisition and Supply Chain	Reduced or changed availability and access to food and water sources to support personnel.

Source: DoD 2014.

4.11.1 Alternatives: 1, 1A, 1B, and 1C

Per DoD's assessment, climate change has in the past and will continue to affect BMGR under Alternative 1 and its variants. DoD and other federal, state, and local agencies are proactively developing and implementing management strategies to address the potential impacts of climate change on the range and in perimeter areas.

The effects of continued military operations and withdrawal of the BMGR on biological resources and invasive species, wildfire, water availability, or public health and safety as described in other sections is anticipated have little change in the future. Climate change, however, could exacerbate conditions, adversely affecting both the individual resources and military training. For example, climate change stressors on special status species could impact military operations if populations dwindle, as was the case with Sonoran pronghorn in 2002 when the estimated U.S. population plummeted to 21 Sonoran pronghorn as a result of prolonged drought and changing climate conditions. Because of the diminished population, monitoring for pronghorn became necessary and training missions were cancelled if pronghorn were present in target areas. This adversely affected military training as well as required the expenditure of time and funds. In addition, increases in wildfire risks could threaten range infrastructure

such as communications equipment and smoke could disrupt operations. Extreme temperatures and vector-borne disease resulting from climate change could affect the health of personnel, resulting in missed training opportunities. Overall, climate change is anticipated to have minor, long-term adverse impacts on the continued military operations at the BMGR.

4.11.2 Alternatives 2, 2A, 2B, and 2C

While climate change would continue to increase stress on wildlife and vegetation and make soils more vulnerable to erosion within the Gila Bend Addition, such effects would not be the result of withdrawing the land. Because the Air Force proposes no development or use of the land, climate change would have no effect on the proposed action to withdraw it.

4.11.3 Alternative 3: No Action Alternative

As emissions contributing to climate change are a global issue rather than a localized issue, the effects of climate change on operations would be essentially unchanged.

Future use of the BMGR would be at the BLM's discretion so it is speculative if actions would occur that would be affected by or contribute to climate change. Regardless of which agency has jurisdictional authority and administrative responsibility for the range, management strategies would be required to adapt to changing climate conditions and resulting environmental impacts.

4.12 Biological Resources

4.12.1 Alternatives 1, 1A, 1B, and 1C

Existing military features and operational activities would persist with Alternative 1 and its variants. Likewise, the military stewardship actions to protect biological and natural resources also would continue, including compliance with Sikes Act responsibilities through the INRMP and assessing future proposed actions (unrelated to the land withdrawal proposal) for effects on ESA-listed species and completion of ESA Section 7 consultations when applicable.

4.12.1.1 Vegetation

As documented in Tables 3.2-2 and 3.2-4, the existing military surface footprint for all ongoing training, targeting, and support areas in aggregate currently affects approximately 149,000 acres, or less than 9 percent, of the BMGR. Of the 149,000 acres, military surface disturbance results in negligible direct adverse impacts in about 101,000 acres. Another about 15,000 acres incur minor to high levels of direct adverse impacts. The ground support areas and some EOD clearance areas where physical ground disturbance is concentrated in a relatively small area exhibit high levels of impact, while the greater proportion of the total use area receives dispersed and lighter use and exhibited relatively minor levels of vegetative impact. About 33,000 acres, in aggregate, exhibit moderate to complete levels of surface disturbance as a result of EOD clearance work, ordnance impacts in core target areas, intensive ground training or support operations, and built training and support infrastructure. Moderate to complete direct adverse impacts affect less that 2.0 percent of the total BMGR surface. The direct physical impacts of military use on native vegetation include damage to or destruction of plants, which has involved the clearing of all vegetation in some operating areas. Indirect effects to vegetation result, in part, from

damage to soils and stormwater drainage including disruption of the soil surface, compaction of the plant rooting zone, alteration of surface drainages, and reductions in water infiltration and percolation capacities in the soil. Another indirect impact to native vegetation stems from the increased potential for invasive plant species to proliferate in areas with disturbed soils because many invasive species germinate and grow more quickly, thus displacing native species. In areas where military activities or public use does not occur, vegetation density and diversity remain in a native desert condition.

With renewal of the BMGR, ground-disturbing activities would continue within specific, previously disturbed areas. Military surface use would be expected to fluctuate over time, and the amount of change would be documented in future 5-year updates of the Public Report completed in association with reviews of the INRMP. Vegetation effects would be long term.

No impacts to wetlands would occur because there are no wetlands as defined by the U.S. Army Corps of Engineers on the BMGR.

4.12.1.2 Wildlife

Ongoing military activities may directly affect wildlife through disturbance resulting in changes in behavior or physical damage and indirectly through degradation of habitat (Larkin et al. 1996). The main source of disturbance to wildlife on the BMGR is from ground activities (e.g., target and road maintenance, ordnance delivery on targets, and ground support training) and noise (e.g., aircraft overflights and ordnance detonations). Direct impacts to wildlife, including mortality, injury, or disturbance occur from human activities required for military training and range maintenance; such effects would be long term to coincide with the duration of military operations. Vehicle use, training activities, and use of ordnance in target areas and subsequent EOD cleanup can result in injury to wildlife. Mortality to birds (bird strike) can occur but would be mostly limited to auxiliary field takeoffs and landings and a negligible direct adverse effect.

Grading and other ground-disturbing activities to maintain roads and target areas result in removal of habitat as well as potential destruction of burrows of small mammals and reptiles or mortality of these animals. Larger wildlife would flee the area when these activities occur. Existing fencing along the perimeter and remnant fencing within the BMGR restrict wildlife movement; fencing has a negligible adverse effect because fencing is limited except near highways where the fencing would also deter wildlife injuries and mortality from vehicle strikes.

Noise from aircraft overflights and exploding ordnance would continue disturb wildlife, although the effects vary widely between species. Some of these noises, especially startling noises, may invoke an alarmed response in wildlife (Krausman et al. 1993 as referenced in Larkin et al. 1996), and temporarily disrupting their behavior, including causing them to flee or disperse from an area.

4.12.1.3 Special Status Species

BMGR management of ESA-listed species and species with Conservation Agreements are discussed in this section.

Sonoran Pronghorn

Activities in support of military operations, including aerial maneuvers, use of ordnance, ground-disturbing activities such as grading, EOD cleanup, and other off-road use of vehicles, could result in disturbance to Sonoran pronghorn.

Munitions releases on tactical ranges can injure or kill Sonoran pronghorn if the animals are present (USFWS 2010a). Before training mission are executed, monitoring for pronghorn occurs and includes coordinating visual observations and telemetry surveillance to locate pronghorn. If one or more pronghorn are present in the target area, protocols, such as delaying, relocating training activities, and temporarily closing targets reduces potential impacts to the animals.

Noise can alter the behavior of the animal, including disruption of foraging or dispersal. However, a study has shown that the changes in pronghorn behavior are not likely to be detrimental to the animals (Krausman et al. 2004). In addition, while pronghorn might avoid areas with higher noise levels, the animals will continue to use areas that were previously disturbed by military activities (Krausman et al. 2005; Landon et al. 2003; Price 2015).

Sonoran pronghorn rely upon nomadic roaming across the landscape. Range fencing restricts this movement and subsequently access to forage and water. Over time, the Air Force has removed unnecessary, historic fencing and has modified fencing to be more compatible for pronghorn movement (USFWS 2010a). In addition, active removal of invasive species helps to maintain the pronghorn habitat.

Military activities may disturb, startle, and injure, or kill Sonoran pronghorn; however, conservation measures developed with USFWS and the Recovery Team continue to reduce the potential for affecting this species. The overall effects on ongoing operations would be minor and would not likely adversely affect the species.

Acuña Cactus

Currently, acuña cactus on the BMGR has only been identified on BMGR East. The plants are not known to occur where military activities are taking place, and direct impacts on this species from ground disturbing activities are not anticipated. There is a small chance that a military-ignited fire could impact occupied acuña cactus habitat; however, this potential indirect impact is considered negligible due to the distance between military activities and occupied habitat and the low probability of a fire spreading long distances without being suppressed. As the understanding of the distribution of suitable habitat expands and new locations of the cactus within BMGR East are discovered, conservation measures would be developed and applied in consultation with USFWS to address any adverse effects to this cactus due to DoD activities (Luke AFB and MCAS Yuma 2018a). The Air Force recently completed consultation with USFWS to address potential impacts of ongoing military operations to the acuña cactus. In a letter dated 15 September 2020, USFWS concurred with the Air Force's determination that ongoing operations may affect, but are not likely to adversely affect the cactus.

Peirson's Milk-vetch

Associated with dune habitat that occurs within the far southwest section of BMGR West, a comprehensive, multi-year vegetation survey and mapping effort found no Peirson's milk-vetch on the

range (see Section 3.12). However, the USFWS believes that this species is likely to be found in the Yuma Dunes. Target training does not typically occur in this area of the BMGR. No impact to negligible adverse direct impact may occur.

Flat-tailed Horned Lizard

Some military facilities and training operations within BMGR West occur within flat-tailed horned lizard habitat. Surveys were conducted from 2011 through 2014 to evaluate military operation effects, and particularly for impacts associated with jet noise and increased vehicle traffic on flat-tailed horned lizards in habitat within BMGR West. The study found that both reproductive success and movement patterns were not significantly affected by the jet noise or traffic (Luke AFB and MCAS Yuma 2018a). Management for conservation under the interagency Rangewide Management Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003) would continue as part of military operations. Direct effects from continued military operations would be adverse but would be minor in intensity.

Sonoran Desert Tortoise

Some military operations and facilities, including air-to-ground targets, occur on mountain slopes and bajadas where Sonoran desert tortoise may occur (Air Force 1999). Direct adverse effects on tortoise include the potential to be harmed or killed by ordnance use, grading of roads or target areas, and vehicle use. Grading and EOD activities may also destroy tortoise burrows and cause habitat loss or damage. Facilities and temporary equipment can potentially impact tortoises by providing perch sites for predators such as ravens (Air Force 1999).

The Sonoran desert tortoise occurs on BMGR East, and habitat modeling of the area is used to identify locations where training activities and tortoise populations overlap. When a potential overlap occurs, planning can be undertaken to minimize impacts from these encounters (Luke AFB and MCAS Yuma 2018a). Numerous conservation measures, including limiting off-road vehicle use, fire management plans in tortoise habitat areas, managing trespass livestock grazing, and tortoise awareness training for those using BMGR lands for recreation, have been implemented to manage tortoises and their habitat. With the continuance of these conservation measures, direct adverse effects on Sonoran desert tortoise would be minor.

Special Status Species Consultation Status for Alternative 1, 1A, 1B, and 1C

The proposed extension of the BMGR land withdrawal would authorize the Air Force and Marine Corps to continue to use the range for military training and test purposes but would neither modify those activities nor propose new operations. Ongoing military activities affect vegetation, wildlife habitat and, wildlife, including special status species, and those effects would continue if the BMGR should be extended. The potential effects of all ongoing training and test activities at the BMGR on ESA-listed special status species have been assessed through the ESA Section 7 consultation process and the USFWS has issued Biological Opinions that address those activities; current Biological Opinions and summaries of prescribed conservation measures are provided in Appendix G. Section 7 consultations on ongoing operations at the BMGR are complete and coordination with the USFWS for the proposed land withdrawal extension was initiated by letter on 28 January 2020 (refer to Section 6.1.2). That coordination documented that the proposed extension of the land withdrawal would not directly cause any new or additional impacts to ESA-listed species. Any future changes in military use within at the

BMGR that may affect ESA-listed species would be addressed through subsequent ESA Section 7 consultation with USFWS.

4.12.2 Alternatives 2, 2A, 2B, and 2C

The withdrawal of the Gila Bend Addition would reduce the potential for land-disturbing activities to occur in the newly withdrawn area. Vegetation and wildlife on the Gila Bend Addition lands would be managed in accordance with the BMGR INRMP. Noise levels would not change. Limiting activities in the area reduces the potential for direct biological impacts over current conditions. Because the military need for the land is for safety and a security buffer rather than for a surface use, Alternative 2 and its variants may be beneficial to vegetation and wildlife in the long term by eliminating public use, retiring the potential for future grazing, and eliminating the potential for mining.

- No special status plant species (i.e., Peirson's milk-vetch and acuña cactus) or the flat-tailed horned lizard are known to occur on the Gila Bend Addition lands and so no impact would occur. Due to the nomadic nature of the pronghorn, they may cross through these lands despite poor quality of the habitat; recent telemetry data indicate pronghorn have been recorded on the Gila Bend AFAF and within 5 miles of the Gila Bend Addition. Monitoring and telemetry surveillance for the Sonoran pronghorn per the INRMP would continue to track these animals, including onto the Gila Bend Addition lands. The cessation of grazing and reduction in human activity could result in a negligible beneficial effect on the experimental, non-essential Sonoran pronghorn population introduced to areas east of State Route 85 if animals wander onto this land. The topography of the Gila Bend Addition does not support Sonoran desert tortoise typical habitat (e.g., rocky, boulder slopes and bajadas); therefore, it is unlikely that tortoises would occur within this area and no direct or indirect impact is anticipated.
- Migratory birds protected under the Migratory Bird Treaty Act, DoD Partners in Flight mission-sensitive priority bird species, and other special status avian species would be managed as recommended in the INRMP. Many of these birds occur on the Gila Bend Addition and would continue to do so, especially with reduced human disturbance; there would be a negligible beneficial impact on migratory birds.

4.12.2.1 Special Status Species Consultation Status for Alternative 2, 2A, 2B, and 2C

Consultation for special status species related to the proposed extension of the BMGR land withdrawal and inclusion of the Gila Bend Addition lands would be the same as stated for Alternatives 1, 1A, 1B, and 1C. The proposed land withdrawal extension and expansion would not result in any change to on-the-ground activities as defined in previous Biological Opinions; terms and conditions that were established in prior Biological Opinions would remain in effect. In a letter submitted to the USFWS dated 27 January 2020, the Air Force determined that the extension of the existing BMGR and proposed Gila Bend Addition would have no new effects that have not been considered in previous Biological Opinions. Sonoran pronghorn that may occur within the Gila Bend Addition lands are considered a reintroduced population designated as experimental/nonessential, allowing flexibility in management and limited consultation requirements with USFWS.

4.12.3 No Action Alternative

Under the No Action Alternative, AZGFD would continue managing wildlife resources, including water catchments, hunting programs, and surveying for species within the BMGR. Military-supported conservation measures that support wildlife and special-status species would be phased out, which could adversely affect funding and other actions to preserve and protect species. This would result in a long-term adverse effect that would be moderate in intensity unless funding and conservation activities provided by DoD are replaced by another agency or entity.

Impacts associated with proposed decontamination of areas on the BMGR would adversely affect biological resources. For instance, subsurface removal of ordnance could affect vegetation composition, which could in turn impact wildlife resources (e.g., forage, cover, burrows). The level of decontamination required is presently unknown, and it is expected that portions of the range could not be safely decontaminated or made safe for future use. The decontamination and closure of BMGR would undergo a separate NEPA evaluation and Section 7 consultation with USFWS, as needed.

Because clearing ordnance would cover areas that are not typically disturbed, this component of the No Action Alternative would likely have greater adverse impacts on vegetation, habitat condition, wildlife, and special status species than the ongoing military activities. Depending on the amount of disturbance required for decontamination, the context and intensity of these impacts is unknown at this time.

Future use of the BMGR would be subject to a BLM planning process and environmental assessment in compliance with NEPA. While future uses cannot be determined at this time, opening the range to multiple-use management, which could include mining, grazing, more intensive recreation, rights-of-way for utilities, and other uses under the public land laws could have a greater impact on biological resources than the ongoing military surface uses. This could include disturbance of land presently in a natural, native desert condition and a more extensive human presence that may disturb wildlife.

4.13 Cultural Resources

4.13.1 Alternatives 1, 1A, 1B, and 1C

Under Alternatives 1, 1A, 1B, and 1C, the existing treatment of cultural resources would remain unchanged. DoD would continue to comply with legislation codified in the numerous federal laws, regulations, Executive Memoranda and Orders specific to the protection of cultural resources, as well as Air Force-, Marine Corps-, and Navy-specific cultural resources management guidelines (Appendix J). Historic properties, unevaluated cultural resources, TCPs, and Sacred Sites would continue to be managed and protected under the stewardship of the 56 RMO at Luke AFB and the Range Management Department at MCAS Yuma under the provisions outlined in the BMGR East and BMGR West ICRMPs (56 RMO 2020; MCAS Yuma 2019).

Established government-to-government consultation with affiliated Tribal Nations would not change. DoD would continue to regularly consult with affiliated Tribal governments regarding undertakings that have the potential to affect cultural resources and would continue to maintain and strengthen established Tribal relationships. Tribal access to areas of cultural importance on the BMGR would remain

unchanged, and Tribal concerns regarding sensitive natural and cultural resources would continue to be considered in project planning during INRMP and ICRMP activities.

Efforts to identify and evaluate cultural resources would also remain unchanged under Alternatives 1, 1A, 1B, and 1C. Survey priorities identified in the ICRMPs (56 RMO 2020; MCAS Yuma 2019) would continue to be implemented, and the treatment and management of newly identified resources would follow established guidelines.

Under Alternatives 1, 1A, 1B, and 1C, ongoing and potential impacts to cultural resources as a result of military use, road use, and recreational use of the BMGR would continue. Ground and air military activities are largely confined to designated areas, limiting the extent of land disturbance and effect to a relatively small percentage of the overall BMGR. Within these areas, land disturbance ranges from complete (construction of roadways and established high-intensity weapons impact areas) to negligible (spot-impacts on BMGR East) and low (off-road vehicle use and dispersed ground troop exercises). Direct impacts to cultural resources have likely occurred as a result of these activities, particularly in areas where military surface use predates many of the current regulatory protections. While military use activities would continue to have the potential to adversely affect cultural resources, most operations areas have now been surveyed, and areas of concern are priorities in the ICRMP planning process to mitigate current and previous impacts and minimize future effects. No new operations are proposed with these alternatives, and no change in effects to cultural resources are anticipated. Overall, the direct and indirect impacts associated with Alternative 1 and its variants would be minor in intensity and would reflect a continuation of the impacts occurring currently.

Recreational use of the BMGR contributes to adverse impact to cultural resources from inadvertent damage cause by parking and camping within archaeological sites, as well as vandalism, looting, or unauthorized artifact collection. Based on a survey of roads in Area B and Bender Springs, approximately 50 percent of cultural sites have been adversely affected by recreational activities (Tactikos 2011, Tagg and Blake 2012, Vanderpot 2018). In recognition of the damage caused to cultural resources by recreational use of BMGR East, the ICRMP reports that 56 RMO is taking appropriate steps to identify and evaluate cultural resources that may be affected by public recreational use; to identify potential adverse effects to historic properties; and to avoid, minimize, or mitigate such effects. Mitigation of adverse effects has included the closure of road segments, fencing to keep vehicle traffic from driving over and to archaeological sites, signage at the main gates and along heavily travelled routes, and Arizona Site Stewards to monitor archaeological sites for disturbance (56 RMO 2020). Under Alternatives 1, 1A, 1B, and 1C, the ongoing moderate potential to directly impact cultural resources would remain unchanged.

4.13.2 Alternatives 2, 2A, 2B, and 2C

No military ground operations are proposed for the Gila Bend Addition, so no damage to cultural resources from military operations would occur from expanding the range boundary to incorporate the Gila Bend Addition.

Impacts to cultural resources could occur as a result of ongoing grazing permit allowances on the Gila Bend Addition land. Given that the area has not been actively grazed since 2008 and the allotment with an active permit has not been grazed since 1989, it is unlikely that grazing will resume on the Gila Bend

Addition. There is a negligible to low potential that damage may occur to intact cultural resources as a result of cattle trampling or rancher access, if grazing resumes before the permit expires. This potential direct impact would reflect a continuation of previous impacts from past grazing activities on the Gila Bend Addition and would occur regardless of the status of the withdrawal.

The expansion of the range boundary to incorporate the Gila Bend Addition would have a minor to moderate direct beneficial impact on the preservation of cultural resources by preventing unauthorized access and the preclusion of access for recreational use and mining activities that could impact cultural resources.

Any historic properties, unevaluated cultural resources, TCPs, or Sacred Sites located on the Gila Bend Addition would be managed and protected under the stewardship of the 56 RMO at Luke AFB under the provisions outlined in the BMGR East ICRMP (56 RMO 2020). Similarly, areas of potential interest and concern to affiliated Tribal Nations located on the Gila Bend Addition would be identified through government-to-government consultation. Tribal access to these areas would be coordinated with 56 RMO, and Tribal concerns regarding sensitive natural and cultural resources located in the Gila Bend Addition would be considered in project planning during INRMP and ICRMP activities.

4.13.3 No Action Alternative

During the interim period between the expiration of the current land withdrawal and the acceptance of the lands by the Secretary of the Interior, military testing and training would cease, and management of cultural resources would continue to follow the protocols of the BMGR East and BMGR West ICRMPs (56 RMO 2020; MCAS Yuma 2019).

The full extent of range decontamination that would be required is unknown. However, the history of target development and EOD clearance may be used to guide this effort as the more intensive decontamination activities likely would occur in areas that have been subject to ongoing military use. These areas have been inventoried for cultural resources; significant resources have been identified and might be adversely affected by decontamination activities. Walking transect surveys to identify areas of potential contamination, off-road vehicle use to haul away debris, subsurface disturbance required to extract partially or intentionally buried munitions debris, or detonations in place if required to render a munition safe to remove would have the potential to adversely affect cultural resources. Because the extent of decontamination required is unknown both in terms of geographic area and clean-up methods, the potential to adversely impact cultural resources would range from minor to major but cannot be determined at this time.

Following acceptance of the land by the Secretary of the Interior, BLM would manage and protect these resources under the requirements outlined in numerous federal laws, regulations, Executive Memoranda and Orders specific to the protection of cultural resources, as well as BLM-specific cultural resources management guidelines (Appendix I).

If the No Action Alternative is selected, BLM would also take responsibility for conducting government-to-government consultation with BMGR-affiliated Tribal Nations. Government-to-government consultation would follow established BLM protocols. Tribal access to areas of cultural importance on BMGR, and Tribal concerns regarding sensitive natural and cultural resources would be

considered in BLM project planning. Provisions for the management of cultural resources, maintenance of government-to-government consultation, and issues of concern to Tribal Nations would be contained in a governing RMP.

4.14 Noise

Alternatives 1, 2 and their variants would continue to keep the BMGR available for the types of military uses that occur presently. Because military operations would not change with the extension of the land withdrawal, updated detailed sound contours for BMGR operations were not developed. However, current operations were compared to those modeled for the 1999 land withdrawal, the F-35B and F-35A basing EISs in 2010 and 2012, and the 2020 AFRC EIS for a potential transition from AFRC A-10 aircraft to 24 F-35As at Davis-Monthan AFB. The findings of these studies all indicate that noise exceedances of the 65 dBA DNL threshold beyond the boundary of the BMGR would continue to be limited to areas proximate to the Gila Bend AFAF and certain portions of the CPNWR underlying R-2301W and R-2301E. Use of the CPNWR and CPW to support military aviation training is authorized in accordance with the Arizona Desert Wilderness Act of 1990 and MLWA of 1999. The recent development of the auxiliary landing field, KNOX, in BMGR West for F-35B training resulted in the termination of Field Carrier Landing Practice training at AUX-2 and the elimination of noise exceedances of the 65 dBA DNL threshold that had extended beyond the BMGR West boundary. The 65 dBA noise contours associated with Field Carrier Landing Practice training are now contained entirely within BMGR West.

4.14.1 Alternatives 1, 1A, 1B, and 1C

Future noise exposure resulting from the continued use of the BMGR are anticipated to be consistent with the existing noise footprint. Noise exposure of 65 dBA DNL or greater beyond the boundary of BMGR is limited to areas proximate to the Gila Bend AFAF and portions of the CPNWR below R-2301W and R 2301E, resulting in an ongoing moderate adverse direct impact. While no future changes in military land use or infrastructure at the BMGR are currently planned, potential emergent training needs would be evaluated for noise effects. The changes would need to be substantial to result in significant changes to the existing noise footprint because a doubling of the current activities would yield 3 dBA increase in the noise footprint.

Sorties on the MTRs that terminate at the BMGR would continue to cause a minor indirect noise effect that extends beyond the BMGR. Past noise analysis on these MTRs found that noise contours for the underlying land are less than 65 dBA Ldnmr. Therefore, changed use of these MTRs would also need to be substantial before the noise would increase exceed 65 dBA Ldnmr.

4.14.2 Alternatives 2, 2A, 2B, and 2C

No military operations are planned for the proposed Gila Bend Addition that would generate noise in excess of the current baseline conditions for BMGR East. No direct noise impacts are anticipated as a result of withdrawing the Gila Bend Addition land area. The withdrawal of the land would prevent encroachment of incompatible uses within the existing noise footprint of the BMGR.

4.14.3 No Action

While training missions that use MTRs to enter BMGR East to deliver munitions on targets within the range would end, MTRs used for other flight training could continue. Use of the designated low-level flight corridors over the CPNWR that support the Marine Corps WTI course would be expected to end because the integration of land and air operations are a critical component of that training. Consequently, the noise effects at the refuge would likely diminish but not end. This would result in a minor to moderate beneficial impact to surrounding areas that are currently experience noise.

The Gila Bend Addition would not be authorized. The elimination of operations on the BMGR land surface would eliminate the noise emissions that contribute to the 65 dBA DNL noise contour that extends beyond the BMGR boundary at Gila Bend AFAF. Noise resulting from the use of the restricted airspace over the BMGR could continue but would likely be less than current conditions, again a minor beneficial impact.

4.15 Visual Resources

This analysis qualitatively evaluates the extent each alternative would introduce military modifications that affect visual resources. Military modifications may contrast with the natural landscape by introducing colors, lines, textures, and forms that differ from the surrounding visual resources.

4.15.1 Alternatives 1, 1A, 1B, and 1C

No new visual impacts would occur as a result of Alternative 1 or its variants. Existing military modifications to the BMGR's visual landscape would continue, as needed, to fulfill the range's military training and testing mission. Recreational visitors who travel into the interior of the BMGR would continue to experience the most apparent visual effects of military modifications of the natural landscape. However, these visitors selected to recreate on a military range so the views would be consistent with expectations. Motorists would continue to observe the range and facilities that are visible from Interstate 8 and State Routes 85 and 195; however, views would be of short duration and the visual intrusions on the natural landscape would be a negligible effect. Some range modifications would continue to be visible to residents of adjacent communities to BMGR, such as Gila Bend and Ajo; because residential views may be seen daily, residents may perceive these a long-term visual impacts as unwanted. Knowing that military use of the BMGR predates most of the nearby land uses, the effects would likely be perceived as minor.

Continuing the land withdrawal also precludes other types of visual modifications such as mine-related features, vegetation damage from foraging livestock, and certain types of recreation-related impacts such as extensive campgrounds and off-highway vehicle trails. Because of the restrictions associated with the BMGR and its location on large intact tracts of native Sonoran Desert, the land withdrawal would provide a conservation effect of the visual landscape for future generations, which is a long-term, moderate beneficial effect.

4.15.2 Alternatives 2, 2A, 2B, and 2C

BLM currently manages the visual resources located on the Gila Bend Addition in accordance with its Visual Resources Management system with a classification that allows modifications to be evident if subordinate to the existing landscape character. This is consistent with the land's proximity to the built environment at the Gila Bend AFAF. If the proposed Gila Bend Addition land withdrawal is authorized, the Air Force would manage the visual resources on these lands in accordance with the Sikes Act and the associated BMGR INRMP, which does not preclude development of military operations in order to protect visual resources. However, the Air Force does not propose to develop the Gila Bend Addition or otherwise change its visual landscape, so there would be no direct impact to the visual character. The withdrawal of this land would preclude the introduction of other land uses that would adversely affect its visual character. Maintaining the existing condition of the land would result in a long-term minor to moderate beneficial impact.

4.15.3 No Action Alternative

Under the No Action Alternative, visual resource modifications, such as spent munitions casings, may be removed as part of the decommissioning process; however, it is unlikely the former range would be fully rehabilitated to a natural landscape because of the safety risks from attempting to remove potential unexploded ordnance. Therefore, although visual scars from the former range may remain, no additional impacts to visual resources are anticipated under the No Action Alternative unless the decontamination and decommissioning processes result in substantial ground disturbance such as the creation of roads. Overall, however, a minor net beneficial impact would occur.

Under the No Action Alternative, visual resources would no longer be affected by the development of new infrastructure and facilities to support the military training and testing that occurs at BMGR. However, depending on BLM's land use management of the former BMGR, other development that would not otherwise occur as an active military range, such as grazing or mining, could adversely impact the visual resources of the former military range. Such actions would be subject to NEPA analysis prior to implementation. The visual impact associated with the No Action Alternative would depend on the future allowable used of the land. The nature and intensity of the impact cannot be determined at this time.

4.16 Hazardous Materials and Waste

4.16.1 Alternatives 1, 1A, 1B, and 1C

Hazardous materials use and hazardous waste generation associated with military activities would continue without any substantial changes in types or quantities. The Environmental Element of the 56th Civil Engineering Squadron, Luke AFB would continue to manage hazardous substances on BMGR East, and the MCAS Yuma Environmental Department would continue to manage hazardous substances on BMGR West.

4.16.1.1 Hazardous Materials Storage

Hazardous materials required for ongoing military activities would continue to be stored and managed in accordance with Air Force and Marine Corps requirements. The continued withdrawal of the BMGR would have no impact on hazardous materials storage.

4.16.1.2 Environmental Restoration Program

RCRA investigation and any required response actions would be implemented at the one AOC at a munitions burial site on the North Tactical Range at BMGR East identified for investigation by ADEQ. All other Installation Restoration Program or Munitions Response Program sites within the BMGR have been closed with no further action required. Any required maintenance of closed sites would continue to meet regulatory requirements. No impact would occur with the continued withdrawal of the BMGR.

4.16.1.3 Storage Tanks

Use of storage tanks to support military activities would continue; storage tanks are primarily associated with fuel storage at Gila Bend AFAF, at the Cannon Air Defense Complex, and with generators on the ranges. Existing tanks may be removed or replaced, or new tanks may be installed based on future military operational needs. Tanks would continue to be managed in accordance with applicable regulations. No impact would occur with the continued withdrawal of the BMGR.

4.16.1.4 Resource Conservation and Recovery Act Permitted Facilities

The only current RCRA-permitted facility is the Munitions Treatment Range within BMGR West. This RCRA-permitted facility would continue to operate as long as the military has a need for it. No impact would occur with the continued withdrawal of the BMGR.

4.16.1.5 Munitions Treatment Facilities

The RCRA-permitted Munitions Treatment Range on BMGR West would continue to operate to destroy unserviceable, outdated, or obsolete munitions. Development of additional munitions treatment facilities is not anticipated. No impact would occur with the continued withdrawal of the BMGR.

4.16.1.6 Munitions Constituents

Munitions use would continue as part of military training on the range. Regular EOD clearance activities would continue as described in Section 3.16.

The Air Force and Marine Corps would continue periodic range assessments (ORA and REVA) to track the potential for contamination from MC. The BMGR has been used for military training since World War II, and the most recent range assessments did not identify releases of MC off the BMGR. Future releases of MC off the BMGR would continue to be unlikely. The ongoing negligible effects associated with MC use would be unchanged with the continued withdrawal of the BMGR.

4.16.1.7 Per- and Polyfluorinated Alkyl Compounds

AFFF containing PFAS use has not been documented on BMGR West, although historical trace amounts may be possible. Fire suppression with AFFF containing PFAS at Gila Bend AFAF on BMGR East has been discontinued. The Air Force would continue any required investigation of potential PFAS release sites at Gila Bend AFAF. Future releases of PFAS would not be expected. No new impact would occur with the continued withdrawal of the BMGR, and minor impacts from historical use would continue to be evaluated and addressed based on findings and regulatory requirements.

4.16.2 Alternatives 2, 2A, 2B, and 2C

Hazardous materials are not currently used or stored on the Gila Bend Addition area, and no hazardous waste sites have been identified. The Air Force does not propose to conduct any activities or install any structures or infrastructure in the expansion area that would require use or storage of hazardous materials or generation or storage of hazardous wastes. No munitions training would occur on the expansion area and no storage tanks would be installed. Therefore, the withdrawal of the Gila Bend Addition would have no effect on hazardous materials or wastes.

4.16.3 No Action Alternative

The MLWA requires that, prior to relinquishing their jurisdiction, the Secretaries of the Air Force and Navy would provide the Secretary of the Interior a report characterizing the environmental condition of the land, air, and water resources affected by their activities on and over the BMGR lands. The Air Force and Marine Corps shall take all actions necessary to address any release or substantial threat of a release, regardless of its source, occurring on or emanating from the BMGR lands during the period of withdrawal. The Air Force and Marine Corps are responsible for, and shall conduct, the necessary remediation whether known at the time of relinquishment or subsequently discovered after relinquishment if attributable to military activities.

If the Secretary of the Interior accepts the BMGR lands before all necessary response actions have been completed, the Secretary of the Interior shall consult with the Secretaries of the Air Force and Navy before undertaking or authorizing any activities on the lands that may affect existing releases; interfere with the installation, maintenance, or operation of any response action; or expose any person to a safety or health risk.

The Air Force and Marine Corps would no longer use or store hazardous materials and wastes on the BMGR but would continue to manage hazardous materials through the range deactivation process. This would include being responsible for the munitions burial site at BMGR East, underground and aboveground storage tanks, clean-up of potential PFAS releases, and closure of the RCRA-permitted Munitions Treatment Range on BMGR West. The removal of hazardous materials and wastes would eliminate future possible leaks or mishaps, resulting in a minor beneficial direct and indirect impact.

4.17 Public Health and Safety

4.17.1 Alternatives 1, 1A, 1B, and 1C

With Alternatives 1, 1A, 1B, and 1C, the Marine Corps would continue to adhere to the safety guidance and procedures outlined in Station Order 3710.6J (Marine Corps 2013), and the Air Force would continue to follow Air Force Manual 13-212 (Air Force 2018) and 2020 Luke AFB Guidance Memorandum to LUKEAFBI 13-212, *Range Planning and Operations* (Air Force 2020b). Military testing and training activities that currently occur at the BMGR would not change. Therefore, it is anticipated that the same level of flight operations, training missions, laser use, and other military activities that may pose a risk to public health and safety would continue in the same general location, frequency, and capacity for the foreseeable future.

Public use of the BMGR (with valid permit) would continue unchanged. No new impact would occur. Safety concerns associated with the adjacent international border and those smuggling contraband would continue; these potential risks are best handled by CBP or other law enforcement professionals that actively patrol within the range. Other non-military hazards, such as abandoned mines and wells, as well as road hazards would continue to pose a potential threat to public visitors even though the Air Force and Marine Corps try to mitigate hazards with appropriate signs and range maintenance activities.

Existing safety protocol and designated public access areas on the range surface and its airspace would continue so that any potential risks associated with military and non-military hazards to public safety on the BMGR remain minor and limited to the duration of the visit unless unauthorized use areas are entered. No change to existing public health and safety risks are anticipated under Alternatives 1, 1A, 1B, or 1C.

4.17.2 Alternatives 2, 2A, 2B, and 2C

The Gila Bend Addition would become subject to the safety guidance and procedures outlined in Luke AFB Air Force Manual 13-212 (Air Force 2018) and 2020 Luke AFB Guidance Memorandum to LUKEAFBI 13-212, *Range Planning and Operations* (Air Force 2020b). The Gila Bend Addition would enhance the safety of flight operations at Gila Bend AFAF, create a safety buffer along the existing range perimeter, and provide the Air Force with control of the land underlying the R-2305 restricted airspace. The Gila Bend Addition would improve safety of the Gila Bend AFAF by preventing the development of incompatible activities or land uses adjacent to the Gila Bend AFAF runway. Operations in a runway environment pose risks that may include fast moving aircraft striking a bird or wildlife, aircraft being damaged by a foreign objects or debris on the runway, a poorly executed landing, or a forced emergency landing from malfunctioning equipment. Individuals who are not trained for this special operating environment would be precluded to better protect their safety as well as to maintain security of flight operations. Therefore, Alternatives 2, 2A, 2B, and 2C would have a long-term direct moderate beneficial effect on public health and safety of military personnel and the general public, particularly the residents adjacent to the Gila Bend AFAF.

4.17.3 No Action Alternative

Military hazards to public health and safety would be reduced under the No Action Alternative because military training and testing operations that require a surface use would cease, which would result in a direct major beneficial effect on public health and safety. Non-military hazards to public health and safety, such as border-related safety concerns may not change, although it is unclear if a change in land use would influence international border crossing activity.

Under the No Action Alternative, the DoD would determine the practicability and economic feasibility of decontamination of lands and the public health and safety risks this would present during the decontamination process. During the interim period between the expiration of the existing land withdrawal and acceptance of the lands by the Secretary of the Interior, it is impossible to determine if the range could safely accommodate public access because the uncertainty of the methods and extent of actions needed for DoD to decontaminate the land. Portions of the BMGR may not be fully and safely decontaminated; these areas would remain the responsibility of the Air Force or Marine Corps to manage in perpetuity, and public access or other uses would continue to be prohibited. Upon acceptance of the lands within the former BMGR, BLM would identify public health and safety-related procedures through a planning process, in which decisions would be made for allowable future use.

4.18 Socioeconomics

Use of the BMGR as a military reservation directly and indirectly affects socioeconomic conditions in perimeter communities and in other communities proximate to other military installations that use the range for training purposes.

This analysis of potential future socioeconomic impacts of the BMGR on external communities is primarily a function of the duration of the withdrawal period associated with the action alternatives. The analysis is limited by the availability of long-term forecasting data for withdrawal alternatives that exceed 25 years. The projection data provided in this analysis were developed prior to the COVID-19 pandemic; some assumptions used in the forecasts may no longer be valid, but the data remain the best available at the time this LEIS was prepared.

4.18.1 Alternative 1

4.18.1.1 Future Trends Influencing Socioeconomic Conditions

Population Projections

The Arizona Office of Economic Opportunity provides official long-term population forecasts (through 2045) that can be applied to the 25-year withdrawal period (2024 to 2049) associated with Alternative 1 (Arizona Commerce Authority 2020). Growth in surrounding communities is anticipated to continue in the same manner that it has since 2010. These are presented in Table 4.18-1. The total population of Yuma County, including incorporated areas, is projected to increase by 38 percent by 2045, adding approximately 86,000 more people to the southwest, west, and northwest perimeter of the range. Maricopa Association of Governments (2019) projects the population of the Gila Bend Municipal Planning Area (in the northeast BMGR perimeter) to increase from 2,500 in 2018 to 3,900 in 2050.

Table 4.18-1. Population Projections for Counties and Local Communities in the BMGR Perimeter, 2018-2055

Area	2018	2025	Percent Change	2035	Percent Change	2045	Percent Change	2055	Percent Change
Arizona	7,076,200	7,791,800	10.1	8,777,600	12.7	9,682,300	10.3	10,504,500	8.5
Maricopa County	4,294,460	4,780,632	11.3	5,423,356	13.4	5,966,889	10.0	6,414,083	7.5
Town of Gila Bend	2,000	2,900	45.0	3,200	10.3	3,300	12.1	3,700	12.1
Unincorporated Maricopa County	295,600	334,700	13.2	449,500	34.3	558,500	24.2	669,300	19.8
Pima County	1,034,201	1,091,610	5.6	1,164,088	6.6	1,222,916	5.05	1,277,075	4.4
Unincorporated Pima County	362,047	376,231	3.9	394,000	4.7	409,284	3.9	425,137	3.9
Yuma County	225,212	247,724	10.0	280,096	13.1	311,199	11.1	340,187	9.3
City of San Luis	36,250	46,913	29.4	61,063	30.2	73,552	20.4	84,079	14.3
City of Somerton	17,403	20,232	16.3	24,449	20.8	28,357	16.0	32,541	14.8
City of Yuma	103,469	110,988	7.3	123,492	11.3	136,286	10.4	149,036	9.4
Town of Wellton	3,197	3,698	15.7	4,371	18.2	4,928	12.7	5,347	8.5
Unincorporated Yuma County	64,893	65,893	1.5	66,721	1.3	68,075	2.0	69,183	1.6

Source: Arizona Commerce Authority 2020.

Long-term population projection data are not available for the Ajo-Why Planning Area in Pima County (Holden, personal communication 2020), nor for the Tribal communities in the BMGR perimeter.

Economic Projections

The University of Arizona's Economic and Business Research Center's 30-year (2019-2049) outlook for Arizona provides general economic projections applicable to the duration of a 25-year land withdrawal (Hammond 2019). According to the 30-year outlook, Arizona's job growth is projected to increase an average of 1.4 percent annually and is expected to outpace population growth through 2049. This macro trend, driven by an aging population, would lead to a tighter labor market and an increase in wages. Under this scenario, per capita personal income gap between Arizona and the nation is forecasted to improve over time. In 2018, Arizona's personal income per capita was 18.7 percent below the national average, and the gap is forecasted to decrease to 13.3 percent by 2049. If the country experiences an economic recession, Arizona is likely to experience a "moderate downturn" as well. Likewise, if the U.S. economy grows significantly faster than baseline projections, Arizona's economy would also be expected to perform better than currently forecast. It is reasonable to assume that the local and regional economies of southwest Arizona would generally follow state trends. Agricultural-based economies would continue to transition to more diversified urban-based economies with rapidly growing local populations.

4.18.2 Alternatives 1A, 1B, and 1C

Communities in the BMGR perimeter area are projected to continue to experience population growth and associated urbanization, particularly in Yuma County. Over time, these trends would likely lead to an expanded and more diversified economy and may potentially decrease reliance on the BMGR's contribution to socioeconomic conditions of the region as a whole. Similar socioeconomic impacts are anticipated to apply to large urban communities like Tucson and Phoenix that host military installations that currently rely on the BMGR for training purposes. Future development to accommodate growth would be guided by general plans for the respective communities or county.

The population and economic data presented for Alternative 1 would also apply to the first 25 years of Alternatives 1A, 1B, and 1C. No reliable population or socioeconomic data are available to apply to the full duration of a 50-year land withdrawal (Alternative 1A) or to an indefinite land withdrawal (Alternative 1B), or the permanent transfer of jurisdiction (Alternative 1C). A change or continuation of the agency with administrative jurisdiction would differ very little from existing management of the range and would not directly the perimeter communities.

Even if projected trends suggest a more diversified economy may decrease reliance on the BMGR's contribution to the region as a whole, the growing population also indicates that retaining existing jobs is important. As described in Section 3.18.1, a 2017 study concluded that more than 34,000 persons report to the military installations in Arizona that are regular BMGR users, which equates to approximately $2.4 billion in annual military payroll. Spending by Arizona military operations not tied to payroll is approximately $11.5 billion and military installations indirectly generated more than 76,000 jobs in 2017. While this economic impact is not all tied to the BMGR, many of the jobs at Arizona's military installations and the indirect jobs created to support these jobs exist because

installations such as Luke AFB, MCAS Yuma, and Davis-Monthan AFB have the BMGR for training. Therefore, extending the land withdrawal through Alternatives 1, 1A, 1B, and 1C would be a direct, beneficial, and long-term socioeconomic impact.

4.18.3 Alternative 2

Given the relatively small size (2,366 acres) of the Gila Bend Addition and the likelihood that it will remain undeveloped and relatively unchanged from its current status if included in a new land withdrawal, the impacts of Alternative 2 on socioeconomic conditions are anticipated to be identical to Alternative 1.

4.18.4 Alternatives 2A, 2B, and 2C

Impacts associated with Alternatives 2A, 2B, and 2C would be identical to Alternatives 1A, 1B, and 1C.

4.18.5 No Action Alternative

The No Action Alternative would result in a transition of the BMGR from military to non-military ground-based uses. Potential changes to military use of the airspace and perimeter areas could also result, although the degree of potential change cannot be projected. Eliminating military use of the BMGR land surface would likely result in major socioeconomic impacts to some perimeter communities and to other communities that host military installations that use the BMGR for training purposes. Impacts would vary, depending on location.

Communities that host military installations with substantial ties to the BMGR operations (including Gila Bend AFAF) may lose direct and indirect military-related employment and experience-related socioeconomic impacts, resulting in both direct and indirect adverse impacts that could range from minor to major depending on the extent of job losses. Other communities may experience increases in military-related employment from the transfer of personnel to receiving installations, which would be a minor beneficial effect to the installations gaining jobs.

Yuma County and western Maricopa County would likely see the greatest adverse socioeconomic change, though the magnitude of those changes cannot be predicted. Yuma County is home to MCAS Yuma and western Maricopa County hosts Luke AFB. These installations employ military and civilian personnel with jobs directly and indirectly tied to the presence and operation of the BMGR as a military training range. These geographic areas may see a reduction in military-related employment, economic activity, and population, as well as changes in housing, education and public services. Active duty personnel at MCAS Yuma, Davis-Monthan AFB, and Luke AFB may be relocated to installations outside of their current communities. Civilian personnel may or may not need to relocate depending on their position and the availability of alternative employment opportunities. Appendix J provides data from a 2017 study on the existing economic impact of Arizona's 10 military installations. These installations collectively contribute over 76,000 direct and indirect jobs and nearly $11.5 billion in annual economic impacts (The Maguire Company 2017).

The impact of the No Action Alternative on socioeconomic conditions could potentially extend beyond Arizona's borders to military installations in California that periodically use the BMGR for training purposes (refer to Table 1.2-1) and to other geographic areas where displaced training operations are moved.

4.19 Environmental Justice

This section addresses potential concerns about environmental justice by discussing the disproportionate environmental effects of the alternatives on low-income and minority populations. The Air Force's *Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process (EIAP)* (Air Force 1997) provides the framework of the analysis. Following this guidance, analysis of potential environmental justice impacts is performed after the following criteria are met:

- The proposed action results in potential impacts.
- The impacts are adverse, meaning that they would have a negative effect on human health or the environment that is significant, unacceptable, or above generally accepted norms.

The Air Force Guide describes adverse human health effects to include bodily impairment, infirmity, illness, or death; while adverse environmental effects may include ecological, cultural, human health, economic, or social impacts when interrelated to impacts on the natural or physical environment.

Potential adverse impacts from noise were identified in the vicinity of Gila Bend AFAF for all action alternatives in Section 4.14, *Noise*. This is not a direct effect of extending the land withdrawal, but rather an indirect effect of the land withdrawal allowing continued use of the Gila Bend AFAF for aircraft takeoff and landing. A potential adverse impact from noise was determined to occur for receptors in geographic areas experiencing 65 dB or greater levels of noise created by this aircraft use. This environmental justice analysis focuses on whether low-income or minority populations living in the area of the identified potential noise impacts are disproportionately affected when compared to the community of comparison, which is Maricopa County.

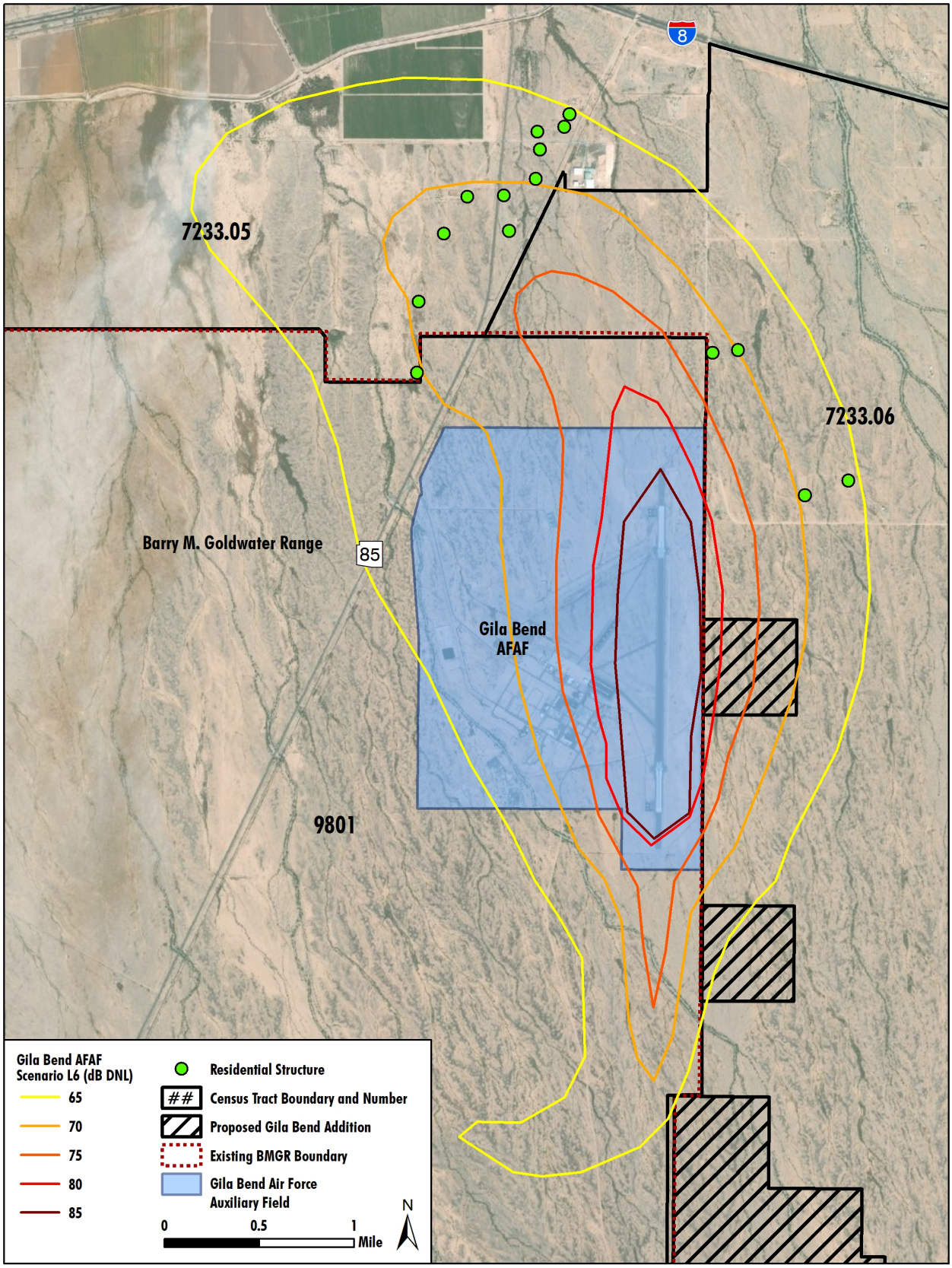
Figure 4.19-1 shows the noise contours projected for Gila Bend AFAF operations and the three census tracts underlying the impact footprint. A census tract is defined to have disproportionately high low-income and/or minority population if the census tract percentage is higher than the community of comparison or is at least 50 percent. The population of Census Tract 9801 is zero, so low-income and minority percentages are not applicable (Maricopa Association of Governments 2020). Table 4.19-1 shows the low-income and minority percentages for Census Tracts 7233.05 and 7233.06. Based on the census data, approximately 78 percent of the population in Census Tract 7233.05 and 56 percent of the population in Census Tract 7233.06 are a minority. As reported in the *F-35A Training Basing Environmental Impact Statement* (Air Force 2012), 15 residences are within an area where noise exposure is between 65 and 74 dBA DNL. Since the 2012 EIS, 56 RMO staff have reported that some of these residences are no longer occupied.

Table 4.19-1. Low-Income and Minority Percentages of Census Tracts Underneath Gila Bend AFAF Noise Contours, 2014-2018

Affected Area	Low-income (%)	Disproportionate? (Yes or No)	Minority (%)	Disproportionate? (Yes or No)
Maricopa County	14.7	Not applicable	44.3	Not applicable
Affected Census Tract 9801	Not applicable	Not applicable	Not applicable	Not applicable
Affected Census Tract 7233.05	36.6	Yes	78.7	Yes
Affected Census Tract 7233.06	14.7	No	56	Yes

Source: Maricopa Association of Governments 2020; Census Reporter 2018.

Figure 4.19-1. Gila Bend AFAF Noise Contours and Census Tracts



4.19.1 Alternatives 1, 1A, 1B, and 1C

While extending the land withdrawal itself would not cause a disproportionate adverse effect on environmental justice populations, it would indirectly allow for the continued military operations at the Gila Bend AFAF, which results in a noise level in the range of 65 to 74 dBA DNL for up to 15 residences in Census Tracts 7233.05 and 7233.06. These off-range noise levels fall well below 80 dBA DNL that DoD policy guidance cites as the threshold for identifying populations at the most risk for potential hearing loss due to military aircraft noise (Carter 2009). In addition, sounds levels inside a residence are typically about 20 dBA DNL lower than exterior sound levels due to the sound insulating nature of a structure. Because Census Tract 7233.05 has a disproportionate percentage of low-income populations and Census Tracts 7233.05 and 7233.06 have a disproportionate percentage of minority populations when compared to Maricopa County, there would be an indirect adverse environmental justice impact. While this is a moderate effect on the residences affected, the overall environmental justice impact is minor because less than 1 percent of the residences in the community are affected.

Methods to mitigate the effects could include retrofitting the impacted houses with better insulating materials to reduce noise within the homes. However, it should be noted that the findings are based on a projection and not a study of actual conditions with the transition from F-16s to F-35A use of Gila Bend AFAF.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, considers health or safety risks that are attributable to products or substances that a child is likely to come in contact with or ingest by food, water, contaminated soils, breathing unhealthful air, or through exposure to unsafe products. As the only identified off-range risk was a potential increased exposure to noise for less than 1 percent of the residents in the Town of Gila Bend, the risk was considered discountable if applicable at all.

4.19.2 Alternatives 2, 2A, 2B, and 2C

Withdrawing the Gila Bend Addition would have no effect on noise levels generated from the Gila Bend AFAF. The adverse noise effects on the disproportionate minority population would be the same as described for Alternative 1 and its variants.

4.19.3 No Action Alternative

If the land withdrawal were not extended, the operations at Gila Bend AFAF would cease and the noise at 65 dBA DNL or above that affects 15 residences would be eliminated. It would be speculative to project noise effects if the Gila Bend AFAF were decommissioned as a result of the military not being able to use this facility, or if the facility might be repurposed for a non-military use. However, on the basis of the discontinued aircraft use of the Gila Bend AFAF, no noise-related environmental justice impacts would occur with the No Action Alternative. The No Action Alternative would have a minor beneficial impact on the minority community.

5. Cumulative Effects

5.1. Introduction

Cumulative effects are those additive or interactive effects on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR Section 1508.7). Interactive cumulative effects may be countervailing—where the net effect is less than the sum of the individual effects—or synergistic—where the net effect is greater than the sum of the individual effects. The CEQ advises focusing on meaningful cumulative effects, rather than on all conceivable impact relationships (CEQ 1997b). Additionally, the agency recommends a cumulative effects analysis on specific resources, ecosystems, and human communities that may be affected by the proposed action or alternatives with consideration for short- and long-term durations, and geographical extension across political or administrative boundaries. The analysis should focus on the aggregate effects of past, present, and reasonably foreseeable future actions that are truly meaningful, and the scope of analysis should reflect the magnitude and geographic scale of the impacts that would be caused by the proposed action (CEQ 2005). Cumulative impacts are most likely to occur when a relationship or synergism exists between a proposed action and other actions within a specified geographic boundary or during a similar time period. Actions overlapping with, or in proximity to, the Proposed Action would be expected to have more potential for a relationship than those actions more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts versus actions that occur years apart.

The cumulative effects assessment considers potential impacts at two scales—a landscape-wide scale commensurate with the geographic scope of the decision to either extend the BMGR land withdrawal or allow it to expire and be converted to other land uses, and a localized scale appropriate to the decision to expand or not expand the range to incorporate the Gila Bend Addition.

The past, present, and reasonably foreseeable future actions addressed in this LEIS were identified through public sources and contacts with Federal and non-Federal agencies. A key source for screening past actions relevant to the land withdrawal extension for the BMGR was the cumulative effects assessment of the 2006 Final EIS for the first range-wide BMGR INRMP, which was implemented in 2007 (Air Force et al. 2006). The 2006 EIS assessment provided a comprehensive evaluation of how past actions contributed to shaping the contemporary environment of the BMGR and its surrounding region. For all resources, the contributions of actions before 2006 are generally captured in this LEIS through the description of the affected environment for that resource. Following from the 2006 cumulative effects assessment, the past actions considered in this LEIS generally occurred or were initiated after the 2007 INRMP was implemented. The exceptions are a few actions that occurred or began before 2007 but were included either because of the ongoing implications of the action or the action initiated a series of subsequent actions with ongoing effects.

Present actions are recent or ongoing events. Some past actions, such as resource management plans, were implemented a number of years ago but continue to guide ongoing land use and management. Reasonably foreseeable future actions are projections made to predict future impacts and are not

planning decisions nor set limits on future agency actions. Past, present, and reasonably foreseeable future actions addressed in this LEIS are identified and described in Table 5.1-1. Figure 5.1-1 shows the general locations of many of the actions that are listed in Tables 5.1-1. Actions that are not depicted on the map affect large or otherwise nonspecific locations.

5.2. Effects of the Proposed Action and Other Recent and Ongoing Activities on Individual Resources

5.2.1. Introduction

The analysis presented in this section considers the cumulative effects of:

- Extending the BMGR land withdrawal
- Incorporating the Gila Bend Addition into BMGR East through a land withdrawal that matches the duration and jurisdictional administration terms of the existing BMGR
- Considering the past, present, and reasonably foreseeable future actions identified and described in Table 5.1-1.

5.2.2. Military Range and Airspace Operations

The current airspace and range conditions of the BMGR region are an outcome of past actions dating from the World War II establishment of the range and the authorization for the BMGR provided by the MLWA of 1999. Extending the BMGR withdrawal would preserve both the restricted land area and authority necessary to continue to conduct training and test activities. The Gila Bend Addition would enable the R-2305 airspace to be more fully utilized and would enhance the safety and security of the Gila Bend airfield, which may help to avoid operational disruptions. The Gila Bend Addition would provide a cumulative benefit to military operations together with extension of the BMGR land withdrawal.

The pending renegotiation of the 1994 MOU of the CPNWR and CPW, which currently governs military use of the CPNWR and CPW, may change military aviation training conditions over the CPNWR and CPW to a limited extent. The resulting conditions would not be subject to refuge or wilderness compatibility determinations that were established by the MLWA of 1999 and the Arizona Desert Wilderness Act of 1990. However, any proposal that exceeds the scope of past environmental analyses would be subject to evaluation under NEPA, with an opportunity for public input on the proposal, prior to its implementation.

Potential future actions in the region, such as development of commercial solar energy facilities, transmission lines, or urban areas, have the potential to affect flights on MTRs, the alignments of the MTRs, or low-level helicopter flights to or from the BMGR. Development may present hazardous obstructions to low flying aircraft. Residential development would be sensitive to the noise of low-level overflights and could influence military operations if development forces the realignment of MTRs.

Table 5.1-1. Past, Present, and Reasonably Foreseeable Future Actions within the Region of Influence of the Proposed Extension of the BMGR Land Withdrawal

Action	Action Description	Contribution to Cumulative Effects	Resources Affected
1. Sonoran pronghorn recovery actions (2002 to present, ongoing, and future).	a. U.S. Sonoran pronghorn population, which averaged 140 animals over the previous 10 years, fell sharply in 2002 to 21 or fewer animals during extreme drought. Complete loss was likely without action (not depicted on Figure 5.1-1 – throughout range in BMGR, CPNWR, OPCNM, BLM Ajo area). b. 2002 to present and ongoing: emergency recovery actions included developing irrigated forage enhancement plots with drinking water, stand-alone drinking waters, and baled alfalfa feeding stations that are activated during critical droughts to provide supplemental forage and water until rain brings habitat relief. c. 2003 to present and ongoing: A 1-square-mile captive breeding pen was established in CPNWR in 2003 to help recover the remnant U.S. population in CPNWR, BMGR, OPCNW, and Ajo area BLM land. d. 2011 to present and ongoing: A second breeding pen was established in Kofa NWR in 2011 to establish a second pronghorn population, classified in accordance with the ESA as nonessential and experimental, within an unoccupied portion of its historic range that includes Kofa NWR, portions of Yuma Proving Ground, and BLM, State Trust, and private lands to the east (USFWS 2018). e. 2015 to present and ongoing: A third pronghorn population, also classified as nonessential and experimental, was established in 2015 with a release of pronghorn in Area B of BMGR East. This location, east of State Route 85, includes unoccupied historic habitat in BMGR East, SDNM south of Interstate 8, the proposed Gila Bend Addition and BLM public lands near Ajo east of State Route 85, and the Tohono O'odam Nation north of State Route 86 and west of Indian Route 15 (USFWS 2016b). f. 2020 to 2022: A release of captive-bred pronghorn in Vekol Valley south of Interstate 8 in SDNM is planned for late 2020 or 2021. The animals would be held in a temporary 20-acre enclosure for recovery from being transported and acclimation to the new location. Five temporary waters would be installed in the vicinity of the holding pen to support the animals during a transition period after they have been released. A second transfer of captive-bred pronghorn may be released in Vekol Valley the following year. The released animals would be classified as a nonessential experimental population (BLM 2020b).	Recovery actions since 2002 have reversed the decline of the U.S. Sonoran pronghorn population, thus preserving the presence of the largest native herbivore within the ecosystem collectively encompassed by the BMGR, CPNWR, OPCNM, and BLM Ajo area. Although this area remains essential to the recovery of this species, establishing two nonessential experimental populations of Sonoran pronghorn has added capacity and resiliency to its recovery prospects. This success indicates that survival and recovery of the species may no longer be solely reliant on habitat within the BMGR, CPNWR, OPCNM, and BLM Ajo area. Preserving the pronghorn within its last U.S. habitat remnant conserves important elements of wildlife diversity and ecological function in that area. Reintroducing the species to two former habitat areas restores elements of ecological diversity to those areas. Preserving and restoring this animal within its existing and former habitats also enhances wilderness, cultural, and recreational values in those areas. When taken together with Action 2, extending the BMGR land withdrawal and Action 1 would provide synergistic conservation and restoration benefits for habitat and ecological functions within the existing and portions of the historic range of Sonoran pronghorn. Management of El Pinacate Y Gran Desierto in Mexico and may have a synergistic effect on the U.S. Sonoran pronghorn population as a result of exchanges of animals to bolster genetic diversity. The recovery actions and Action 2 would partially offset any countervailing effects of continuing military operations on Sonoran pronghorn.	Biological, cultural, and recreational resources. Sonoran pronghorn recovery actions.
2. BMGR INRMP and resource management plans and a foundation document for CPNWR, BLM, OPCNM, and El Pinacate Y Gran Desierto, and BMGR Public Report (2006 to present, ongoing, and future; not depicted on Figure 5.1-1).	Resource management plans, plan updates, or policy foundation documents for CPNWR (2006), BLM public lands (2010 and 2012), SDNM (2012), OPCNM (2016), and BMGR (2007, 2012, and 2018) in the U.S. and El Pinacate Y Gran Desierto Altar Biosphere Reserve (2013) in Mexico were developed during the current BMGR withdrawal. The individual plans provide long-term guidance for using, conserving, and managing resources within each of these major land use designations. The BMGR Public Report describes ongoing military use, changes in military use, environmental conditions, and public access opportunities at the BMGR. A Public Report is prepared coincident with each INRMP update to provide information that will facilitate updating of the INRMP and help reviewers understand and comment on the proposed INRMP updates. The 5-year cycle for INRMP updates and Public Reports would continue as long as the BMGR is authorized. The next iteration in the 5-year cycle for the BMGR INRMP update and Public Report is planned for 2023 or 2024.	Although they serve diverse primary land uses, the CPNWR, BLM public lands, SDNM, OPCNM, and BMGR together have conserved a contiguous expanse of primarily natural Sonoran Desert that encompasses more than 5,000 square miles. The plan for each of these areas supports the designated purpose of the area, but all of the plans share an emphasis on resource protection and the use of ecosystem management principles to achieve long-term conservation goals. When considered together with extending the BMGR land withdrawal, these plans collectively provide synergistic conservation and restoration benefits for individual resources and ecosystem functions across the shared contiguous area.	Natural, cultural, and public access, recreation, health, and safety resources.
3. ICRMP updates for BMGR West and BMGR East (2019 and 2020, ongoing and future; not depicted on Figure 5.1-1).	A BMGR-wide ICRMP was completed in 2009. ICRMPs, which provide guidance for the protection and management of cultural resources in accordance with the NHPA and other applicable law, are reviewed annually and revised on a 5-year cycle. The ICRMP for BMGR West was updated and approved in 2019 and for BMGR East in 2020 (MCAS Yuma 2019, 56 RMO 2020). The ICRMPs were prepared in consideration of Tribal concerns and interests and provide protocols for Tribal consultations and access to the BMGR.	The ICRMPs provide synergistic benefits for protecting and managing cultural resources and Tribal interests in the CPNWR, BLM public lands, SDNM, OPCNM, and BMGR region when taken together with the resource management plans in Action 2 for all of these areas.	Cultural resources.
4. SDNM livestock grazing decision (2020 ongoing and future).	BLM issued a final decision on 29 September 2020 to allocate six livestock grazing allotments (totaling 252,460 acres) within the SDNM north of Interstate 8 as available for livestock grazing. This decision amends the SDNM Resource Management Plan that had made these allotments unavailable for livestock grazing. The plan amendment does not affect SDNM south of Interstate 8, which remains unavailable for livestock grazing (BLM 2020b).	The BLM found that making the six allotments available for livestock grazing would not cause a significant environmental impact. The decision does not affect SDNM south of Interstate 8 and contiguous to BMGR East, which will remain unavailable to livestock grazing. This livestock grazing decision will have no cumulative effect on the BMGR.	None.

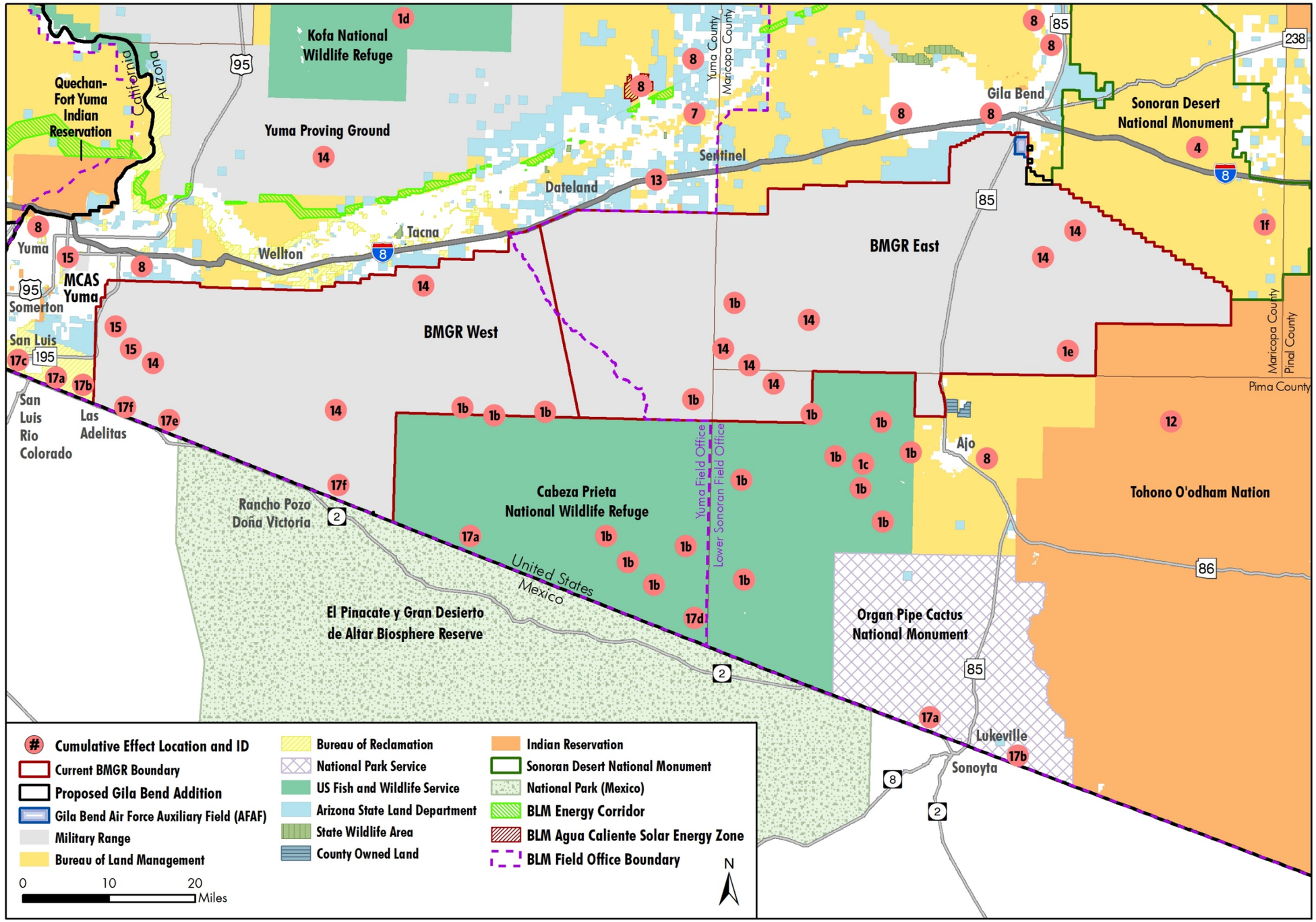
Action	Action Description	Contribution to Cumulative Effects	Resources Affected
5. Big Game, Migratory Bird, Upland Game, and Predatory and Fur-bearing Mammal Hunt Plan at CPNWR (2020).	USFWS approved the Hunt Plan to continue current authorization for bighorn sheep hunting at the CPNWR and to open most of the refuge for other big game, migratory birds, upland game, and predatory and fur-bearing mammal species. Arizona game management units 46A and 46B encompass the CPNWR (USFWS 2020d) (not depicted on Figure 5.1-1 – includes most of CPNWR).	The plan expands hunting opportunities in the BMGR region but would not likely have a discernable cumulative effect on the stability or health of wildlife populations or other biological resources at the BMGR. The USFWS 29 July 2020 Biological Opinion found that the proposed hunting plan would not be likely to jeopardize the continued existence of the Sonoran pronghorn (USFWS 2020e).	Recreation and biological resources.
6. BLM: SDNM Target Shooting (2018 and ongoing).	BLM decided in a resource management plan amendment that 435,700 acres of land in the SDNM, including the area of SDNM south of Interstate 8, would remain available for recreational target shooting to the extent that it is consistent with requirements for protecting public safety and is subject to monitoring and mitigation (BLM 2018a) (not depicted on Figure 5.1-1 – includes most of SDNM).	Recreational target shooting is permitted at the BMGR including in the Bender Springs area adjacent to SDNM. The BLM decision provides for consistency between recreation management policies at BMGR and SDNM and synergistic benefits, when taken together with Action 2, for recreational shooting and public safety.	Recreation and public health and safety.
7. BLM Quail Point acquisition (2017 and ongoing).	BLM acquired 360 acres of private land within the boundaries of the Sears Point ACEC to protect cultural resources, wildlife habitat, and recreation opportunities. The parcel is highly scenic. The ACEC is located approximately 6 miles south of Hyder, Arizona (BLM 2017b).	Acquiring the Quail Point parcel enhanced protection of cultural resources at the Sears Point ACEC; thus, providing a synergistic benefit for preserving the prehistoric record of the greater region that includes the BMGR when considered together with Actions 2 and 3.	Cultural resources.
8. Energy Projects: Solar power plants (2011 to 2016), BLM Agua Caliente Solar Energy Zone (2013), Transmission Lines (2015 and 2021), BLM Energy Corridor No. 115-238 (2019).	Eight utility-scale solar power plants were constructed near the BMGR between 2011 and 2016. One plant is east of Yuma, two are near Agua Caliente, four are near Gila Bend, and one is near Ajo. The Arizona Public Service Hassayampa-to-North Gila Substation, 500-kilovolt transmission line from the Buckeye to Yuma was completed along the Union Pacific Railroad in 2015. BLM designated the 2,560-acre Agua Caliente Solar Energy Zone in 2013 to identify public land well suited for utility-scale production of solar energy and eligible for competitive solar right-of-way leases and streamlined permitting. A 290-megawatt solar power plant was completed in 2014 on private land next to the BLM solar energy zone, but no applications for projects in the zone were pending as of November 2018. BLM Energy Corridor No. 115-238, which follows the Buckeye-to-Yuma alignment, was designated in 2019 to support potential placement of future transmission lines; oil, gas and hydrogen pipelines; and distribution infrastructure. Phase I construction of the 13-mile North Gila-Orchard, 230-kilovolt transmission line from the existing North Gila Substation to the Orchard Substation in Yuma began in 2020 and with completion expected in 2021. Phase II of the project would extend from the Orchard Substation to the Yucca Power Plant. Phase II construction dates have yet to be determined (Arizona Public Service Company 2020).	The BMGR vicinity has some of the highest solar insolation levels in the U.S. and the recent construction of power plants around the range supports the economies of the region, Arizona, and southern California. The Ajo plant supports the local community and reduces a potential need to upgrade the capacity of the existing Gila Bend to Ajo transmission line through BMGR East. These energy projects collectively support economic activity and land use in the BMGR region but would have no positive or adverse cumulative effects when taken together with the proposed BMGR land withdrawal extension or Gila Bend Addition.	Perimeter land use and socioeconomic resources.
9. Arizona Military Regional Compatibility Project, Joint Land Use Study, Gila Bend AFAF and BMGR (2005 and ongoing) (not depicted on Figure 5.1-1).	The Joint Land Use Study was conducted under the sponsorship of the Arizona Department of Commerce as a proactive statewide endeavor to convene the relevant jurisdictions, base personnel, landowners, and other interested parties to address land use compatibility and conflict issues in the vicinity of military installations. The purpose of the study was to support the sustainability of military installations and their missions by facilitating implementation of compatible land use around Gila Bend AFAF and the perimeter of the BMGR in accordance with Arizona land use compatibility legislation.	The Joint Land Use Study developed land use planning principles, procedures, and implementation strategies for municipalities and county governments in Yuma and Maricopa counties that continue to provide synergistic benefits, when taken together with Actions 10 and 11, for maintaining and promoting compatible land use adjacent to and near the BMGR.	Perimeter land use and socioeconomic resources.
10. General plans for five municipalities adjacent to the BMGR (2010-2020) (not depicted on Figure 5.1-1).	Land use general plans, which guide and regulate land use, have been completed for five incorporated municipalities that have planning boundaries contiguous to the BMGR. The most recent updates occurred in Somerton (2010–draft update is in progress), Yuma (2012), Wellton (2013), Gila Bend (2017), and San Luis (2020).	These communities have traditionally been supportive of the BMGR and the economic and recreation benefits that it supports. The general plans provide land use guidance that is compatible with BMGR operations and have a synergistic benefit when taken together with Actions 9 and 11.	Perimeter land use and socioeconomic resources.
11. County comprehensive land use plans for Maricopa, Pima, and Yuma Counties (2012-2018).	Comprehensive land use plans have been completed for Yuma County (2020), Pima County (2015), and Maricopa County (2016). These plans provide policy and regulatory guidance and planning/approval procedures for land use in unincorporated rural and urban areas, including areas abutting the BMGR (Maricopa County 2016; Pima County 2015; Yuma County 2012). The Yuma County plan directly addresses the significance of the BMGR to the County and processes for maintaining compatible land use within its operational perimeter. The Maricopa and Pima county plans do not directly identify the BMGR, but most of the perimeter of the range in these counties is contiguous to federal or Tribal land, which is not subject to most county land use controls.	The Yuma County plan provides a synergistic benefit for maintaining compatible land use in the BMGR perimeter when taken together with Actions 9 and 10.	Perimeter land use and socioeconomic resources.

Action	Action Description	Contribution to Cumulative Effects	Resources Affected
12. Bureau of Indian Affairs: Western Region Integrated Noxious Weed Management Plan for Weed Control Projects on Indian Lands (2014 and ongoing).	The plan authorized integrated weed management practices and the use of all weed management tools on Western Region Reservations, including the Tohono O'odham Nation and other reservations in the BMGR perimeter (Bureau of Indian Affairs 2014).	Effective control of noxious weeds is best achieved through management strategies that are applied across affected regions regardless of internal land use jurisdictions. This action provides a synergistic benefit for effective weed management when considered together with the ongoing invasive species and wildfire management plans for BMGR West and BMGR East.	Biological resources.
13. ADOT transportation improvements on Interstate 8 (2020-2024 and 2021-2025).	The ADOT 2020-2024 5-Year Plan Includes 23 miles of pavement rehabilitation on Interstate 8; water and wastewater repairs at the Sentinel Rest Area; and 33 miles of bridge deck rehabilitation. The ADOT 2021-2025 Tentative 5-Year Plan includes 17.12 miles of pavement rehabilitation on Interstate 8 (ADOT 2019; ADOT 2020).	Interstate 8 is a critical component in the regional transportation system that supports regional economic activity and facilitates surface access to the BMGR, especially BMGR West, for military training; range development, maintenance, and management; law enforcement; and public access. Maintaining Interstate 8 in a serviceable condition would have additive benefits for the continuing operation, use, maintenance, and management of the range.	Transportation, military land and airspace use, public access and safety, and biological, cultural, and socioeconomic resources.
14. U.S. Army: Extended Range Cannon Artillery Project (2018 and potential future action).	Army testing of extended range artillery at the BMGR began in 2018. Inert artillery projectiles were fired from two positions in BMGR West up to 73 kilometers to existing targets within BMGR East. Three tests involving the firing of a total of 11 projectiles into North and South tactical ranges combined were performed in 2018. The duration of a typical test was approximately 7 days: 3 days for mobilization, 2 days for test firings, and 2 days for demobilization (YPG 2017).	The artillery test program is consistent with the authorized purposes of the BMGR. The Army is considering possible requirements for future extended range artillery tests at the BMGR, which would continue to be scheduled so that the priorities of aviation and other training activities would not be disrupted. The 3 May 2017 Biological Opinion of the USFWS found that although the extended range artillery test program may have some adverse effects on Sonoran pronghorn, the action would not be likely to jeopardize the continued existence of that species (USFWS 2017). Significant adverse effects on biological and cultural resources were also not anticipated (YPG 2017). Surface hazard areas for test fires to date would encompass much of BMGR West and BMGR East west of State Route 85. Access by the public and non-participating government personnel to areas encompassed in the hazard areas have to be suspended during the duration of the tests.	Military land and airspace use, noise, public access and safety, transportation, biological resources, and cultural resources.
15. MCAS Yuma Air Installation Compatible Use Zones Update (2019).	The AICUZ update defines current flight operations, runway clear zones and accident potential zones, and high-noise zones surrounding MCAS Yuma and KNOZ and AUX-2 within BMGR West, and recommends land uses that are compatible within these zones (Naval Facilities Engineering Command, Southwest and Marine Corps Installations Command 2019). The clear zones, accident potential zones, and high-noise zones at KNOZ and AUX-2 do not exceed the boundary of BMGR West.	The AICUZ confirms that no adjustments in land use compatibility are necessary in the vicinity of BMGR West as a consequence of operations at KNOZ or AUX-2. No need to change operations at KNOZ or AUX-2 is indicated as a result of the AICUZ findings. No other resources are affected by the findings.	Military land and airspace use.
16. Renegotiation of the 1994 MOU between the Air Force, Marine Corps, and USFWS (2021 – not depicted on Figure 5.1-1).	The Air Force, Marine Corps, and USFWS are in the process of renegotiating the terms of the 1994 MOU (Appendix B) that governs military use of the CPNWR/CPW and overlying R-2301E and R-2301W airspace as provided by the MLWA of 1999. The operational issue that prompted the renegotiation process was a proposal by the Air Force to lower the floor for regular military overflights of a portion of the CPNWR in R-2301E from the current 1,500 feet AGL to 500 feet AGL as approved in the 2011 Record of Decision for the Barry M. Goldwater Range East Range Enhancements Final EIS (56 RMO 2010). Other elements of the MOU may also be evaluated during the renegotiation. The renegotiation is expected to be completed during 2021 but could take longer.	The May 2010 Biological Opinion for the proposed lowering of the floor over the CPNWR for regular military flight operations found that the action would not be likely to jeopardize the continued existence of the Sonoran pronghorn. The affected area of the CPNWR is away from the most frequently visited areas of the CPNWR/CPW, but the lowered floor may annoy some wilderness visitors. The proposal to lower the floor, however, is consistent with the Arizona Desert Wilderness Act of 1990 and Section 3032 of the MLWA of 1999. No adverse cumulative effects are anticipated.	Military airspace use, biological resources, and recreation.
17. Illegal Immigration and CBP border protection activities (2001 to present and ongoing).	Illegal immigrant and smuggler traffic and the border protection and law enforcement responses that have ensued have resulted in some of the most widespread and adverse environmental impacts at the BMGR during the current withdrawal period. The most severe damage has been as a result of cross-country driving by smugglers and CBP off road driving involved in law enforcement interdictions or search and rescues. Most of the vehicle impacts occurred as the last BMGR withdrawal closed. The current period began before vehicle barriers constructed along the border in 2007 and 2008 helped to curb vehicle traffic from Mexico. In this respect, the border vehicle barrier has had a positive effect by reducing damage from cross-country driving by smugglers and the need for law enforcement interdictions.	No comprehensive assessment of the extent to which cross-country vehicle and foot traffic by smugglers and immigrants illegally entering the U.S. has impacted the BMGR is available. The CPNWR/CPW has also suffered these impacts and has studied the impacts of smuggling traffic and CBP interdiction activities. In 2011 the USFWS completed an assessment of about 94 percent of the refuge to determine the extent of off-road vehicle tracks that had been created primarily by smuggling traffic and CBP interdiction activities (USFWS 2011). Using high resolution aerial photography and randomized ground verification	Natural and cultural resources, public recreation and safety, security of BMGR facilities, disruption of training or test activities.

Action	Action Description	Contribution to Cumulative Effects	Resources Affected
	Immigrants often enter the U.S. on foot and their heavy traffic has extensively impacted soils and vegetation in some areas and they have left behind substantial quantities of trash. CBP reports annual apprehensions of illegal aliens by Border Sector (CPB 2020a). No data is available on the total numbers of aliens that have entered the U.S. illegally, but apprehension data provides indications of trends in illegal entries. Apprehension data from the Yuma Sector, which extends for 126 miles from the Yuma-Pima County line in the CPNWR to the Imperial Sand Dunes in California and includes BMGR West, indicate that there have been three distinct periods of immigration activity in the sector during the current withdrawal period. From FY 2000 through FY 2007, there were an average of almost 85,000 annual apprehensions with a high of over 138,000 in FY 2005 and a low of just under 38,000 in FY 2007. From FY 2008 through FY 2015, apprehensions declined sharply to an average of under 7,000 annually with a high of 8,363 in FY 2008 and a low of 5,833 in FY 2011. The decline is thought to have occurred as a result of the vehicle barriers, increased law enforcement activity, and the Great Recession of 2007 to 2009, which depressed the economic incentives for immigrants to come to the U.S. Apprehension data for FY 2016 through FY 2019, shows an average of over 30,000 annually. More than half of that increase came in FY 2019 with more than 68,000 apprehensions as compared to just over 14,000 in FY 2016. Notable CBP border protection activities during the withdrawal period include: a. A barrier to deter border crossings with vehicles was constructed in the Roosevelt Reservation along the border in BMGR West and elsewhere in the region was completed at about the start of the current BMGR withdrawal period. The barriers markedly reduced vehicle traffic and the impacts of that traffic. b. Construction of up to 20 Remote Video Surveillance System towers impacting a total of 64.5 acres, including 2 towers on the international border within OPCNM and 5 towers on or near the international border on BLM and Reclamation land within 5 miles of the western boundary of BMGR West (CBP 2012). c. Removal and replacement of 27.5 miles of existing pedestrian fence with bollard fence and fiber optic cables along the international border near San Luis, Arizona (CBP 2019b). d. Conversion of 3 acres of undeveloped land within CPNWR along El Camino del Diablo to modify and expand the Wellton Station Forward Operating Base: Camp Grip to a total of 5.51 acres (CBP 2020b). e. Construction of approximately 400 feet of a new border barrier (i.e., wall) along with road construction and communications cable installation in the Roosevelt Reservation within BMGR West to close an existing gap near Border Monument 198 to reduce illegal entry into the U.S. (CBP 2020b). f. Department of Homeland Security and U.S. Army Corps of Engineers is currently constructing a 31-mile secondary barrier/wall in BMGR West approximately 150 feet north of the existing vehicle barrier along the U.S.-Mexico international border. The action was authorized by the President under Title 10 U.S.C. Section 2808 (construction authority in the event of a declaration of war or national emergency). Installing up to 31 gates in the secondary barrier to allow for egress of CBP agents is being considered. Only 11 of the gates are located by existing roads so additional unimproved roads or jeep trails may be created along the secondary barrier and elsewhere in BMGR West. Projected environmental impacts include: • Construction of the secondary barrier will adversely impact approximately 866 acres of flat-tailed horned lizard habitat. • Creation of additional roads will further adversely impact flat-tailed horned lizard habitat (acres of impact not known at this time because the location and extent of new CBP roads are not known). • Most of the area north of the secondary barrier has not been surveyed for cultural resources so impacts are also unknown.	surveys, the USFWS found nearly 8,000 miles of vehicle trails concentrated in the flat broad alluvial valleys of the CPNWR. Trail densities were found to be as high as 49.9 miles of trail per square mile in the most heavily impacted areas; although the mean densities over six large sectors of the refuge varied from 0.9 miles to 9.1 miles per square mile. Among observed impact concerns from off-road vehicle use were soil compaction, soil erosion, damage to soil crusts, altered surface and soil hydrology, disruption of Sonoran pronghorn and other wildlife migrations/movements, wildlife mortality, damage to vegetation, spread of invasive plant species, and damage to cultural resources. Cross-country vehicle traffic that wasn't either arrested by CBP or didn't break down in the CPNWR, entered the BMGR. Prior to the construction of border vehicle barriers, BMGR West endured similar patterns of cross-country vehicle traffic emanating from its approximately 37 miles of contiguous exposure to the international boundary. In 2014, the U.S. Geological Survey released a final report to quantify disturbances to soils, vegetation, and cultural resources caused by migrant and smuggling traffic, border security, and general recreational vehicle use in BMGR West (Villarreal 2014). The study identified highly disturbed areas vulnerable to soil compaction and detected approximately 6,077 miles of unauthorized off-road tracks. The newly constructed border barrier along the international boundary from west of BMGR West to east of OPCNM likely will impact wildlife movements between the United States and Mexico. Current or potential cross-border movements by larger species, such as mule deer, may be curtailed by the barrier in locations where movement was not previously impaired. Within the BMGR, Sonoran pronghorn will not be affected by the 31-mile barrier segment constructed adjacent to the southern boundary of BMGR West because this species does not occur this far west in either the United States or Mexico. Sonoran pronghorn do occur in eastern CPNWR, OPCNM, and in adjacent areas of Mexico, but free movement and interbreeding between the U.S. and Mexican populations has been greatly impeded or curtailed for decades by Mexico Highway 2 as well as livestock and border fencing (USFWS 2002a; USFWS 2016b). As a result, the new barrier would not cause further segregation between the U.S. and Mexican Sonoran pronghorn populations but would likely curtail actions to reestablish pathways for free movement.	
18. Davis-Monthan Air Force Base Personnel Recovery Training Program (2020 and future). (2010-2020) (not depicted on Figure 5.1-1).	The Air Force is implementing an improved comprehensive personnel recovery training program centered out of Davis-Monthan AFB that will utilize 14 existing training locations in BMGR East, Gila Bend AFAF, and 160 other sites in Arizona, California, Nevada, and New Mexico (Air Force 2020d). Personnel recovery forces pararescuemen; combat rescue officers; survival, evasion, resistance, and escape specialists; and other uniquely trained personnel. The training at BMGR East will be an extension of the ongoing CSAR training at the Rescue Range, AUX-6, and HLZs in South and East tactical range (Figure 3.2-2) as described in Table 3.2-1 and Section 3.2.1.3.	An Environmental Assessment found that no significant environmental impacts would result from the proposed improved training program, including that portion of the program performed at BMGR East (Air Force 2020d). The improved training activities at BMGR East are/will be similar to and consistent with ongoing CSAR and SpecOps training. No new or expanded environmental impacts are expected.	Military airspace use and biological resources.

* Numbers also signify action locations shown on Figure 5.1-1.

Figure 5.1-1. Location of Past, Present, and Reasonably Foreseeable Actions within the Region of Influence of the Proposed Extension of the BMGR



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However, energy development on public lands would be anticipated to occur in designated zones and communities would plan to minimize conflict with designated land uses and military operations. Based on these factors, extending the BMGR land withdrawal and expanding BMGR East to include the Gila Bend Addition would have no cumulative effect on the range or use of the overlying restricted airspace as compared to current conditions.

With the long enduring past and present use of using BMGR, CPNWR, and CPW for military activities and agency agreements addressing future operations, no cumulative on military operations would occur.

5.2.3. Civil Air Transportation

Extending the BMGR land withdrawal would have no effect on the National Airspace System when compared to existing conditions. Consequently, the action would not contribute to the aggregation of impacts on civil air transportation. No cumulative effects would be anticipated.

5.2.4. Non-Military and Perimeter Land Use

The primary and predominant use of BMGR land is support of military training and test purposes. With few exceptions including CBP infrastructure, State Routes 85 and 195, a railroad, wildlife waters, and a transmission line in the State Route 85 corridor, no infrastructure has been or likely would be authorized to support non-military land use in the BMGR. Limited public access consistent with the military purposes is allowed and managed through a permit system. Extending the BMGR land withdrawal would not change these conditions. No cumulative impacts on non-military land use within the BMGR would be anticipated.

Land management agency management plans, community General Plans, and county Comprehensive Plans have the most influential effect on perimeter land use. Land use and development outside of the BMGR is subject to state and local regulation, including zoning, but are not subject to mandatory regulatory controls provided by the MLWA of 1999. Noise studies project off-range noise exposures at Gila Bend AFAF that exceed 65 dB DNL, the threshold at which some land use controls are recommended to limit or restrict certain land uses. The State of Arizona requires political subdivisions in the vicinity of a military airport to adopt land use plans and enforce zoning regulations that ensure that development will be compatible with high-noise levels and accident potential zones generated by military airport operations. The Air Installation Compatible Use Zone Study prepared for the Gila Bend AFAF predates the use of the F-35A in training; an updated study may prompt local land use plans and zoning to be amended to ensure continuing compatibility. Authorization of the Gila Bend Addition would eliminate the potential for encroachment of some incompatible land use, but this acquisition would not encompass all off-range 65 dB DNL exposure areas.

The Town of Gila Bend also has established an energy zone to encourage commercial-scale solar energy projects; during construction, these types of projects also result in noise. However, noise attenuates with distance and potential future projects in the energy zone would be far enough away from the Gila Bend AFAF to not have an additive noise effect near the airfield so land use policies associated with the energy zone would be unaffected.

5.2.5. Utilities

Reasonably foreseeable growth in the western U.S., combined with demand for green energy to combat climate change, will likely result in continued development of utility-scale renewable energy and transmission projects in BMGR perimeter areas, which has highly advantageous solar insolation levels. BLM designated the Agua Caliente Solar Zone to support future solar projects, and local jurisdictions are supporting utility projects through streamlined permit processes. Effective corridors and infrastructure for transmitting energy have been well developed outside of the range and Gila Bend Addition, and ample land space is located in the range perimeter that is suitable for utility use. A 69-kilovolt transmission line that supplies Ajo is located in the State Route 85 corridor. The capacity of this line could be upgraded if needed to support the community, but the recent solar plant development at Ajo would likely offset this need. Although utility projects on or around the range would generally remain incompatible with the BMGR, extending the land withdrawal, with or without the Gila Bend Addition, would not be likely to contribute to adverse cumulative effects on utilities as development could continue to occur in areas more distant from the BMGR.

5.2.6. Ground Transportation, Traffic, and Traffic Circulation

Extending the BMGR land withdrawal and expanding BMGR East to include the Gila Bend Addition would continue to preclude the development of any public or private transportation systems for non-government purposes within the range except for potential improvements to the existing State Route 85; State Route 195; the out-of-service Tucson, Cornelia, and Gila Bend Railroad; and routes that align with the range boundary such as County 14th Street in Yuma. No future improvement plans for these facilities have been identified at this time. State Route 195, which passes inside the western boundary of BMGR West, has no exits and no other transportation developments would be allowable within the range boundary. While ongoing military operations preclude development of new public use routes through the range, no need for such a route has been identified; Interstate 8 already efficiently connects perimeter communities north of the BMGR and Highway 2 provides an east-west corridor south of the range in Mexico. Military ground operations in the BMGR and within the proposed Gila Bend Addition would likely continue to be served by existing routes. The highway system and various arterial and local roads provide military surface access to the BMGR from military bases in the region. No notable increase in military use of off-range surface transportation routes, as compared to existing conditions, would be anticipated if the BMGR land withdrawal is extended or if BMGR East is expanded to encompass the Gila Bend Addition. Population growth in the Yuma area is expected to prompt an increase in regional traffic, but the demand would remain west of the range.

The ADOT 2020-2024 5-Year Plan includes plans for pavement rehabilitation, water and wastewater repairs at the Sentinel Rest Area, and multiple bridge deck rehabilitation projects on Interstate 8. The ADOT 2021-2025 Tentative 5-Year Plan also includes pavement rehabilitation on Interstate 8, as well as constructing and widening US Highway 95 around Fortuna Wash. Extending the BMGR land withdrawal and authorizing of the Gila Bend Addition would not affect completion of any of these projects or impact regional transportation. Therefore, the proposed actions, when considered together with past, present,

and reasonably foreseeable future actions would have no cumulative effects on traffic or the regional transportation system.

5.2.7. Public Access and Recreation Resources

In accordance with the Sikes Act, the BMGR is managed to provide the public with access to the range for natural resource-based recreation to the extent that such access is consistent with the military requirements. The BMGR is contiguous to the expansive tract of federal land that includes CPNWR, OPCNM, BLM public lands, and SDNM and is located near Kofa NWR and other substantial areas of BLM public lands north of Interstate 8 that provide public outdoor recreation opportunities in Sonoran Desert environments that are similar to those at the range. The BLM acquisition of Quail Point (Action 7), which affords opportunities for recreation, and the opening of most of the SDNM to recreational target shooting (Action 6) have increased public use opportunities in the perimeter. There is a synergistic effect that results from the proximity of these different areas and the variety of opportunities they afford.

Security improvements at the international border may affect the experience of recreational users within the BMGR, CPNWR, and OPCNM. Construction of the new CBP border barrier along the U.S.-Mexico boundary has introduced visual obstructions within BMGR West, CPNWR, and OPCNM. These are popular recreational use areas and the visual obstruction may influence the recreational experience for some.

Conversely, the new CPB border barrier and other activities (Action 17) are intended to reduce illegal border crossings, which can also negatively affect recreational settings and opportunities in BMGR, CPNWR, and OPCNM. In the past, illegal border traffic has created unauthorized roads and trails, disturbed wildlife, dumped trash, and presented threats to the safety of recreational users. Although construction of the enhanced CBP border wall and activities may impact the experience of recreational users at BMGR and nearby recreation areas, in the long-term it may reduce illegal border activities that likewise adversely affect the landscape and the recreational opportunity experience.

Opportunities to view wildlife may be diminished by projects that create noise or increase human presence, such as construction projects, recreational shooting, and military activities. The CPB border barrier limits some wildlife movement, further reducing wildlife observation opportunities. However, the ongoing conservation and protection programs associated with the many management plans in the region and the Sonoran pronghorn recovery plan may increase the likelihood of observing both common wildlife and rare species within the BMGR and continuous areas.

Extending the BMGR land withdrawal and approving the Gila Bend Addition would preclude future mining, agriculture, grazing, and other appropriative land uses within the withdrawn lands. These actions when considered together with the conservation and preservation missions associated with the wildlife refuges, national monuments, and other contiguous public lands in the region would have the synergistic effect of generally conserving an expansive and predominantly natural Sonoran Desert landscape and the recreational experience this provides. There would be negligible to no cumulative impact on public access and recreational resources.

5.2.8. Earth Resources

Sonoran Desert soils can be vulnerable to physical disruption with a subsequent loss in function and risk of accelerated erosion. The long-standing presence of the BMGR has provided a soil conservation benefit for much of the range by excluding or limiting activities, such as row-crop farming or intensive off-road vehicle recreation, that can cause extensive damage to natural soils. Designation of the CPNWR, OPCNM, and SDNM have conferred similar and contiguous soil conservation benefits. Still, soil disruption occurs at the BMGR due to authorized military training, test, and support operations; some resource management actions and public visitation; and CBP infrastructure developments, law enforcement, and search and rescue operations.

Military use of the BMGR is focused on designated target and ground training and support areas. The effects of military activities on soils have been limited primarily to these specified locations. The Air Force and Marine Corps have actively worked to minimize unnecessary disturbance of soils without sacrificing training or testing needs. Procedures have been implemented to designate and manage the BMGR road network and to inventory and track the physical footprint of military surface use as part of the 5-year INRMP Update and Public Report processes. Management of the designated road system has generally curbed the creation of unauthorized roads and has greatly reduced off-road driving, which is unauthorized for public visitors. Although changes in military training activities have resulted in modest increases in soil disturbance in certain locations, the overall magnitude of such disturbance throughout the entire BMGR have decreased 45 percent over the current withdrawal period (refer to Tables 3.2-1 through 3.2-4).

Conversely, unauthorized off-road driving and heavy foot traffic by international smugglers and illegal immigrants have led to extensive soil damage during the current withdrawal period in areas of the BMGR, CPNWR, OPCNM, SDNM, and on land along the border to the east and west of the BMGR region (Action 17). Although damage by this traffic is dispersed over a broad expanse of the region, it was severe and extensive enough to raise concerns for the ecological health of the desert as well as for impacts on cultural and recreational resources. The natural qualities of the OPCNM and CPNWR wildernesses are also imperiled. Border protection measures by CBP, including physical border barriers and law enforcement patrols, suppressed the use of vehicles by smugglers to a considerable degree by 2008, and continued to decline for about 8 years following the Great Recession. Immigrant traffic started to increase again by 2019. The new border barriers under construction may curtail immigrant traffic, but results cannot be projected.

Extending the BMGR land withdrawal, with or without the Gila Bend Addition, together with the other large blocks of land that are managed for conservation values would continue benefit earth resources because a significant expanse of Sonoran Desert would preclude or minimize other ground disturbing activities. Overall, there would be negligible to no cumulative impact on soils.

Mineral potential on the BMGR is not exceptional and opportunities to extract mineral resources of comparable or better value occur in the region outside of the BMGR. An example would be the New Cornelia Mine near Ajo, which is inactive but could be mined if it became economically feasible. Mining

and mineral leasing would continue to be precluded in the CPNWR, OPCNM, SDNM, the BMGR (if the land withdrawal is extended), and BLM Quail Point ACEC (Action 7), but other areas in the region would remain open to potential mining activity. A withdrawal of the Gila Bend Addition would result in a 2,366-acre increase in the area precluded from mining. Because withdrawn public lands are presently unavailable for mineral entry, the effect would largely be a continuation of the existing condition with a potential negligible restriction. No cumulative impact is anticipated.

5.2.9. Water Resources

Extending the land withdrawal would have a negligible cumulative effect on water resources. Military water use is minimal and extending the land withdrawal would not change the volume or type of water use. Existing water use in the perimeter area is primarily used for domestic and agricultural purposes is likely to increase slowly from existing conditions as population grows. Other actions in the region, including construction of power generation facilities, communities, and roads (Actions 8, 10, 11, and 13) could contribute to water use in the area in the future. Construction requires the short-term use of water; growing communities and agriculture would be long-term uses. Given no relative increase in water use at BMGR and no need for water at the Gila Bend Addition, there would be no cumulative impact on water resources.

5.2.10. Air Quality

Air quality in the BMGR region is generally well within federal and state regulatory standards, although there are a few exceptions in more urbanized areas near the BMGR, such as Yuma where developed areas are designated nonattainment (refer to Table 3.10-1). Of the projects listed in Table 5.1-1, only military operations, CBP border infrastructure and enforcement operations, perimeter community land use, transportation, and energy actions would contribute air emissions; none of the listed projects would be expected to result in major levels of emissions. As these are mostly ongoing projects that are expected to continue, their effects on air quality are already accounted for in the baseline condition.

The proposed action, extension of the land withdrawal, would result in continuation of current aircraft and ground operations at the BMGR. No net increases in emissions would occur; therefore, the estimated net emissions increases associated with the proposed action are less than the applicable conformity threshold values established at 40 CFR 93.153 (b). The requirements of the General Conformity Rule are not applicable. The contribution of air emissions due to military activities at the BMGR when combined with other current and potential emission increases from growth in community development and traffic would result in a negligible cumulative effect on air quality.

5.2.11. Climate Change

The environmental effects of GHG emissions are by their nature cumulative and global (Department of the Navy 2009). No individual source of GHG emissions is large enough to result in a measurable effect on global GHG concentrations or climate change. Project-related GHG emissions, as described in Section 4.10, would continue to contribute to the cumulative aggregation of emissions; contributions

from extending the BMGR land withdrawal would continue to reflect the current baseline for the foreseeable future.

The impacts of climate change on the BMGR are incrementally complicating many aspects of natural and cultural resources management at the BMGR CPNWR, OPCNM, SDNM, and other public lands, as well as in the surrounding communities and agricultural areas. For example, the spread of invasive species and the frequency and intensity of wildfire threatens property, wildlife habitat, and other resources throughout the region. Factors such as continuing drought, increasing temperatures, and drier soils are negatively impacting irrigation water supplies and changing agricultural practices. Similarly, cycles of drought and severe weather may affect soil stability, drainage, and erosion patterns that in turn may damage military and community infrastructure and require that funds allocated to resource management be redirected to repairs. Climate change has an adverse cumulative effect on military operations and natural and cultural resources.

5.2.12. Biological Resources

The BMGR, CPNWR, OPCNM, SDNM, and other BLM public lands collectively provide one of the largest and least disturbed natural tracts of native Sonoran Desert. The BMGR contributes about half of the acreage comprising this contiguous land area. Extending the BMGR land withdrawal and approving the Gila Bend Addition, would have the overall cumulative effect of continuing this significant contribution towards the protection and conservation of Sonoran Desert biological resources. Despite the conservation benefits, the continuing ground-disturbing activities from military operations, public access and recreation, cross-border smuggling and illegal immigration, border barriers, and other CBP enforcement actions contribute to the cumulative effects on biological resources. Beyond this block of land, actions in the region including community development, roadways and utility infrastructure, livestock grazing, and more intensive recreation that may include off-road driving contributes to a cumulative loss of wildlife habitat and other biological stressors.

Ground-disturbing activities from military operations would continue if the BMGR land withdrawal were extended, although as discussed in Section 3.2, these effects have diminished by about 45 percent in aggregate during the current withdrawal period. Although a future training or test mission could emerge that would expand ground disturbances, no such mission is currently foreseen.

Cross-border smuggling, illegal immigration, and CBP border protection and humanitarian responses have posed the most substantial threat to soil, biological, and other resources in the region (56 RMO 2010; Luke AFB and MCAS Yuma 2018b; USFWS 2001). Damage was extensive in many areas during the early 2000s and some biological communities as well as habitat for certain sensitive species such as flat-tailed horned lizards and Sonoran pronghorn populations was highly disturbed or impacted. Left unabated, the cross-border traffic flow threatened to overwhelm the abilities of some biological systems to sustain themselves. Construction of border vehicle barriers and the economic disincentives of the Great Recession substantially reduced the cross-border traffic problem but did not entirely resolve it. If the cross-border traffic issue should resume and is once again added to the effects of military activities, the cumulative impact may become unmanageable and some biological resources may be adversely

affected or become unsustainable. The enhanced border barriers currently being added to the border protection infrastructure may curtail much of that threat, but that outcome has not yet been ascertained.

During the last 25 years, the Air Force and Marine Corps have implemented countervailing measures that have included designation of an authorized road network and protocols for managing vehicle use, an improved public access permit system, public access outreach and education, and range patrols by law enforcement and security officers. These efforts have helped to ensure that visitor access to and use of the BMGR has not caused damage that, when added to the effects of military training and testing, would unacceptably compromise biological resources.

The issue of invasive plant species, addressed in Section 3.11.3.2, is a biological resource management problem in the context of cumulative effects. Disturbed soils provide avenues that can accelerate the spread of invasive species. Ground disturbed by military operations at the BMGR and the designated road system have been among the early locations colonized by invasive species (Luke AFB and MCAS Yuma 2018b). While controlling invasive plants in these locations is difficult, the affected sites are known and surveyed, and the population is generally stable. The more uncertain and threatening cumulative effects issue with the potential spread of invasive plants would be the resumption of wildcat vehicle trails and heavy footpaths as a result of future increases in smuggling, illegal immigration, and resultant CBP border protection and humanitarian responses.

From a regional cumulative effects perspective, the federally managed land in the region south of Interstate 8 is largely unfragmented and unfenced except for the State Route 85 right-of-way and the highway itself. Wildlife move unimpeded across these political boundaries and the health of biological communities in one location can support the conditions in others.

Regional cumulative effects conditions for biological resources outside of the contiguous BMGR, CPNWR, OPCNM, and SDNM block are more mixed (Figure 5.1-1). The Tohono O'odham Nation to the east provides an additional expanse of generally open, natural desert, and synergistically supportive of biological resources. However, the Nation supports livestock grazing and harbors feral burros, which are not permissible within the federal land area. El Pinacate Y Gran Desierto de Altar Biosphere Reserve in Mexico is also a generally open, intact expanse of Sonoran Desert that shares a geologic physiography and biological heritage with the U.S. side of the border. Wildlife movements across the border and habitat are curtailed by Mexican Highway 2, some Mexican agricultural and urban areas, and U.S. border barriers.

Reclamation land that is contiguous to BMGR West shares the Yuma Desert Flat-Tailed Horned Lizard Management Area with the military range. The flat-tailed horned lizard, while not protected by the ESA, is a species of concern whose population is vulnerable due to habitat loss and degradation, and direct mortality from on- and off-road vehicle use. The Marine Corps and Reclamation are party to a multi-agency Conservation Agreement that recognizes the Management Area and outlines voluntary agency actions to protect the species and its habitat. BMGR West encompasses about 88 percent of the approximately 131,000-acre Management Area and Reclamation supports the remaining 12 percent.

This cooperative relationship, which includes all of the flat-tailed horned lizard habitat in Arizona that is under conservation management, provides a synergistic biological benefit that has helped to keep this species from needing protection through ESA listing. The rest of the western boundary of BMGR West is essentially formed by State Route 195, which forms a barrier between the range and off-range land use to the west. The highway barrier protects the flat-tailed horned lizard Management Area from encroachment, but it also marks the practical western limit of the biological communities of the range. In fact, the cumulative effect of urban and agricultural land use in the Greater Yuma area west of the Gila Mountains has severed the biological communities of BMGR West from the lands extending west to the Colorado River and to the north to the confluence of the Gila and Colorado rivers.

The cumulative effects of land use on biological resources to the north of the BMGR between the Gila Mountains and SDNM is more mixed. Extensive agriculture with a network of irrigation canals characterize the eastern and western ends of this about 100-mile long area, but a more undeveloped and open central desert area persists. Still, Interstate Highway 8 and the Union Pacific Railroad forms a barrier to wildlife movements north to the Gila River, although water diversion for irrigation has left the Gila River predominantly dry except when it carries stormwater flows.

The combined long-term, habitat conservation benefits provided by the BMGR, CPNWR, OPCNM, and BLM public lands near Ajo has supported the continued existence and recovery of the U.S. population of the Sonoran pronghorn. Extending the BMGR land withdrawal would be a major contribution towards the continuing recovery of this endangered species. The near catastrophic impact of the drought of 2002 on this species and the continuing adverse effects on its habitat from climate change demonstrate that all active recovery actions implemented since 2002 have been and will continue to be necessary to recover the species.

The endangered acuña cactus population in BMGR East is not in a location directly affected by military operations or other ongoing activities. Another population of this cactus occurs in OPCNM, but immigration and smuggling and the resulting CBP law enforcement and humanitarian responses affect the population there. Extending the BMGR land withdrawal would provide an important conservation benefit to the continuing, aggregate survival and recovery potential of acuña cactus.

5.2.13. Cultural Resources

Ground-disturbing activities have had and will continue to have the potential for adverse impacts to cultural resources throughout the BMGR region, including the potential to unearth intact subsurface cultural deposits. Ground disturbance from military operations is contained to specific locations, but immigrant and smuggler traffic, and CBP infrastructure and law enforcement actions result in more widespread disturbance. While the construction of the CBP border wall is intended to deter disturbance from border crossing activity, the construction of the border wall itself has a high-to-moderate potential to impact cultural resources and could contribute to negative cumulative effects.

Except for projects that may be constructed as part of county and municipal land-use plans on private lands, the actions identified in Table 5.1-1 are subject to federal and/or state cultural resources regulations. Under those regulations, effects to cultural resources would be assessed and potential

impacts would be subject to mitigation. Similar to how planned actions on the BMGR are subject to the provisions of the ICRMPs and INRMP, public land administered by DOI agencies (including BLM, USFWS, and NPS) have RMPs that account for effects on cultural resources and provide measures for preserving and protecting such resources.

5.2.14. Noise

BMGR operations currently generate exceedances of the 65-dB noise contour, which is the typical threshold for the application of land use compatibility guidelines, only at Gila Bend AFAF. For the rest of the BMGR, noise emanating from the range does not exceed the 55-dB noise contour and in most locations does not exceed 45-dB or even 40-dB noise contours. Sudden onset noise from low altitude aircraft overflights, particularly along MTRs, and sonic booms that propagate off-range trigger occasional noise complaints from residents or other persons around the BMGR perimeter. However, these events do not trigger concerns relative to off-range land use compatibility guidelines.

Other noise sources from around the perimeter of the BMGR are relatively quiet; most of the BMGR perimeter is open, unoccupied desert with no repetitive sources of unnatural sound. Interstate Highway 8 and the Union Pacific Railroad generate transportation noise across the northern perimeter area. Urban noise generated in Yuma, Gila Bend, Ajo, Wellton, Somerton, and San Luis is characteristic of small-town noise. No known or apparent sources of noise would combine with the airfield noise to further affect land use compatibility in the vicinity of Gila Bend beyond temporary and intermittent noise from construction, including urban development and power infrastructure projects. Noise impacts associated with these projects would be expected to be limited to the immediate areas surrounding the individual projects and would not result in a cumulative noise impact that would affect land use compatibility long term. Because the contribution from other uses is short-term and minor, negligible cumulative noise effects are anticipated.

5.2.15. Visual Resources

Very few range features supporting military operations are visible to adjacent communities or motorists traveling on roadways near the BMGR. Any visible military modifications are primarily in background views of observers. Consequently, viewers living, visiting, or driving near the range boundary primarily experience a natural desert landscape.

Within the context of viewers along the BMGR perimeter or recreating within accessible areas in the range, construction of energy infrastructure (Action 8) and CBP border-related improvements (Action 17) have, and will foreseeably, continue to contribute to a deterioration of the natural landscape and scenic quality of the lands within BMGR and its vicinity. Construction of a new CBP border wall has introduced a visual obstruction and a dominant visual focus point in areas adjacent to BMGR along the international border. Past, present, and reasonably foreseeable construction of energy infrastructure, such as transmission lines, have and will continue to alter the landscape in the vicinity of BMGR. Additional energy infrastructure may increase in the future in the BMGR region due to the BLM's designation of the Palo Verde San Diego Corridor as an energy corridor. However, despite these

contributing visual elements, the general visual character of the BMGR and surrounding areas is open desert and rural, agricultural-based development. Table 5.1-1 identifies RMPs that implement management measures to preserve valuable visual resources on adjacent public lands. Cumulative impacts on the visual character of the BMGR and surrounding area would be minimal.

5.2.16. Hazardous Materials and Waste

Extending the BMGR land withdrawal would not substantially change the types or quantities of hazardous materials storage and use, or hazardous waste generation and storage on the BMGR. The Air Force and Marine Corps would continue to manage hazardous material and waste, and to investigate and remediate hazardous waste sites as necessary.

Routine storage and use of hazardous materials, as well as generation and storage of hazardous waste such as fuel and lubricants for construction vehicles, paving materials, paints for construction projects or operation and maintenance of infrastructure, and pesticides and herbicides used for agricultural and roadside maintenance would occur in the region of influence. The entity engaged in these types of activities or projects would manage and dispose of its hazardous material and waste in accordance with applicable regulations, which would limit the potential for cumulative impacts. This would include other agencies such as CBP and AZGFD conducting operations within the BMGR. No source of MC beyond authorized military activities on BMGR tactical ranges is known to occur.

While some hazardous materials can take a long period of time to dissipate if spilled or otherwise enter the soil or water, the levels of use on BMGR and in the surrounding areas do not aggregate to a point that a notable cumulative impact occurs. Thus, cumulative impacts associated with hazardous materials or waste would be negligible.

5.2.17. Public Health and Safety

Within the BMGR public health and safety risks associated with military operations are identified and managed by controlling access and limiting recreation activities within the range. Other non-environmental risks include vehicular accidents and potential encounters with illegal border crossing activities (particularly persons smuggling contraband) or encountering CBP apprehension activities by being in the wrong place at the wrong time. Construction of the new CBP border barrier along the U.S.-Mexico border and other border security enhancements (Action 17) are intended to reduce illegal border-related activities and traffic, thus reducing the potential cumulative public health and safety risks on the range.

The risk of military personnel and the public encountering unexploded ordnance on the BMGR would continue to exist regardless of the action taken by Congress. Safety protocols and designated public access areas would continue to minimize hazards to public safety on the BMGR. Aircraft and weapons systems under development that may be used in the future would be assessed for risks to public health and safety before their use on the range is authorized. Because actions in the area would not have similar contributions, the ongoing and reasonably foreseeable impacts from the BMGR would result in a negligible cumulative impact.

5.2.18. Socioeconomics

Much of the region in which the BMGR is located is undeveloped. Land uses such as agriculture, livestock grazing, recreation, residential and commercial developments, and wildlife and wilderness protection all have associated socioeconomic impacts. These impacts include direct and indirect employment, earnings, attraction of tourism, and economic growth. When the socioeconomic contributions of the BMGR are combined with the surrounding communities, the benefit is synergistic. Extending the BMGR land withdrawal would ensure this contribution to the economy of communities near the range perimeter as well as the economies of the communities that host installations that regularly use the range. While the cumulative socioeconomic effects would likely be negligible in the context of other actions identified in Table 5.1-1, the effects of each land use and industry contribute to the state, regional, and local economy. Diversity supports a more stable economy and results in a beneficial cumulative impact.

5.2.19. Environmental Justice

The only identified environmental justice impact associated with extending the BMGR land withdrawal and approving the Gila Bend Addition is that doing so would continue to support existing operations at the Gila Bend AFAF. Noise from those operations may affect persons living in Census Tracts 7233.05, which has both a minority and low-income population, and 7233.06, which currently has a minority population percentage that exceeds 50 percent. As a result, a potentially disproportionate noise impact may be occurring, as described in Section 4.19. The only foreseeable future actions near the affected area within this Census Tract that may have an additive noise effect are anticipated to be construction associated with community growth and development in and around Gila Bend, agricultural practices, or construction associated with potential renewable energy or transmission line projects. Construction noise is short-term but could have a negligible temporary cumulative effect on this population depending on the proximity of the construction.

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6 Public Outreach, Consultation, and Coordination

This chapter describes the public outreach, consultation, and coordination that contributed to developing this LEIS and to processing the BLM land withdrawal applications. This LEIS was prepared in accordance with the environmental impact assessment process established in the NEPA of 1969 (P.L. 91-190) and the CEQ Regulations for Implementing NEPA (40 CFR Parts 1500-1508 [the 1978 version of this rule was used because a NOI and scoping had been previously issued on this LEIS issued prior to the September 14, 2020 implementation of the CEQ's updated NEPA regulations]). The laws and administrative regulations for the NEPA process and the BLM land withdrawal process are distinct, with different requirements for timelines, public involvement, and final deliverables. Figure 1.1-2 provides a high-level diagram of the NEPA and BLM processes. Key steps of each process are described in the following sections. Details about the NEPA scoping process and BLM land withdrawal process are provided in the *Scoping Summary Report* that has been posted to the BMGR project website[1] and available by request.

6.1 Agency Coordination

Coordination regarding the BMGR land withdrawal extension and the new withdrawal of the Gila Bend Addition has been ongoing for several years. Initial coordination with BLM began in 2016. Early coordination was used to facilitate the development of a management plan for the withdrawal process, identify key team members and stakeholders, identify cooperating agencies, identify issues and concerns, and map out the process for completing the various processes that must occur, such as the BLM segregation of the Gila Bend Addition lands, land withdrawal applications, Tribal consultation, NEPA LEIS process, etc. In addition to this early coordination, data collection and technical reports were prepared to obtain an understanding of the current status of actions and resources. Coordination with USFWS and AZGFD commenced at this point.

6.1.1 Cooperating Agencies in the LEIS Process

Lead federal agencies for the project proposal are required to invite other federal agencies with administrative jurisdiction in the BMGR to participate as cooperating agencies in the NEPA analysis and document preparation (40 CFR 1501.6). BLM, USFWS, and AZGFD were invited to serve as cooperating agencies for their jurisdictional, regulatory, or special expertise that would contribute to preparation of the LEIS. All three agencies accepted and have participated in interagency meetings and other opportunities for active engagement and issue resolution throughout the NEPA process.

6.1.2 USFWS Section 7 Consultation

The Air Force submitted a letter on 28 January 2020 to USFWS indicating the rationale for ESA compliance for the extension and expansion of the BMGR Public Land withdrawals. The letter noted that as an administrative function, the land withdrawals would not alter the existing land use within the Gila Bend Addition, or result in changes to on-going, on-the-ground military training activities by the Air

[1] https://barry-m-goldwater-leis.com/public-documents/

Force or Marine Corps as previously addressed through the Section 7 consultation process with USFWS. The biological opinions issued by USFWS would remain in effect in that the criteria for reinitiation of consultation established in 50 CFR 402.16 have not been met.

The activities and actions at the BMGR:

- Have not exceeded allocated incidental take
- Are occurring in a manner considered in the biological opinion
- Have not changed in a manner that would cause effects not previously considered
- Occur in locations where no new species has been listed or where new critical habitat has been designated)

Therefore, it was determined that there were no new effects that have not been considered in previous biological opinions.

Any future change in military activities on the BMGR would require project-specific compliance with NEPA and the ESA through an assessment of effects to ESA-listed species and re-initiation of consultation, as appropriate. A listing of issued biological opinions for Air Force and Marine Corps activities on the BMGR was provided to USFWS. The Gila Bend Addition lands had not previously been considered through the consultation process; therefore, a thorough evaluation of those lands for potential affects to ESA listed species was conducted and addressed (AFCEC and RMO 2019a; AFCEC and RMO 2019b; AFCEC and RMO 2019c; AFCEC and RMO 2019d; AFCEC and RMO 2019e; AFCEC and RMO 2019f). The Air Force notified USFWS of its conclusion that the extension of the BMGR land withdrawal and proposed Gila Bend Addition would have no effect on listed species.

6.2 Public Involvement: NEPA LEIS

6.2.1 Project Mailing List

The Air Force and Marine Corps developed and continues to maintain a project mailing list for this LEIS to distribute paper and electronic materials to government agencies, elected officials, tribes, non-governmental organizations and interested individuals. All individuals and organizations that submitted comments for the NEPA scoping process or the BLM land withdrawal process were added to the project mailing list. Organizations and individuals have also been able to request their addition to the mailing list without comment submittal.

6.2.2 DoD Federal Register Notices of Intent

Pursuant to 40 CFR Part 1506.8(b)(1), preparation of an LEIS does not require a scoping process. However, the Air Force and Marine Corps elected to provide for a public scoping period and announced this in the NOI to prepare an LEIS that was published in the *Federal Register* on 18 March 2020 (85 Federal Register 15438). This notice served as the official starting date of the NEPA process and for the LEIS scoping period. Scoping provides opportunities for public and agency involvement, identifies issues of interest or concern to frame the LEIS, builds public confidence in an objective environmental analysis, and ultimately provides an informed decision-making process.

The NOI briefly discussed NEPA requirements; the proposed action and alternatives; project purpose and need; resource areas that Air Force and Marine Corps would evaluate in the LEIS; scoping meeting dates, times, and locations; and the close of the comment period. The NOI also provided a point of contact for submitting comments or obtaining more information. Because the five scoping meetings were cancelled due to the COVID-19 National Emergency, an amended NOI was published on 30 March 2020 (85 Federal Register 17544) to announce cancellation of the in-person scoping meetings and extension of the scoping comment period to 3 June 2020.

6.2.3 Agency Notification Letter

Scoping notification letters were mailed to government agencies and representatives with potential interest in the project or with jurisdiction over potentially affected geographic areas the week of 30 March 2020. In accordance with NEPA, the agency notification letter provided a formal invitation to submit comments on the proposed project.

6.2.4 BMGR Project Website

The BMGR project website[2] was created to share information with the public during the development of the LEIS and the BLM land withdrawal process. The website went live on 20 March 2020, and included background information about the project, public notification announcements, project documents and maps, and information about project-related public meetings. It also included an electronic form to submit comments through the scoping period and through the duration of the project. Digital copies of public outreach materials and events described in Section 6.2 were also posted to the website.

6.2.5 Newspaper Advertisements and Media Releases

The Air Force and Marine Corps announced the NEPA public scoping period in the media through a paid display advertisement and through media releases. The newspaper advertisement was published in 10 newspapers in communities in the BMGR region and included two Spanish-language newspapers; publication dates were timed to shortly follow publication of the DoD's 18 March 2020 NOI. The Public Affairs offices at Luke AFB and MCAS Yuma distributed the media release on 20 and 22 April 2020 to various media outlets announcing cancellation of the scoping meetings due to the COVID-19 National Emergency and directing readers to the BMGR project website.

6.2.6 Project Newsletters

A scoping newsletter was mailed to nearly 200 identified interested parties on 17 April 2020. Electronic copies of the newsletter were also sent by email on 28 April 2020 to members of the public who requested to be advised of, or participate in, Intergovernmental Executive Committee meetings for the BMGR. The scoping newsletter provided project information on the continuing military need for the BMGR, announced the preparation of an LEIS, described alternatives being considered, and solicited public input in the scoping process.

[2] https://barry-m-goldwater-leis.com/

6.2.7 Project Brochure

Before the COVID-19 outbreak caused meeting cancellations, a color brochure was developed for distribution at the public meetings. The brochure provides an overview of the proposed action and alternatives, the NEPA/LEIS process, pertinent dates and times for public comments, and background information about the project. Following cancellation of the public scoping meetings, the brochure was made available to Luke AFB and MCAS Yuma Public Affairs offices and to BLM offices in Phoenix, Tucson, and Yuma for public distribution. The brochure was also posted to the BMGR project website.

6.3 Public Involvement Methods: BLM Land Withdrawal Process

In accordance with 43 U.S.C. 1714(b)(1) and 43 CFR 2300, BLM is processing the DoD's two land withdrawal applications for the proposed extension of the BMGR land withdrawal and addition of the Gila Bend Addition to BMGR East. This BLM administrative process is separate from the NEPA process. BLM's public involvement process for the DoD land withdrawal applications are conducted in accordance with the Federal Land Policy and Management Act of 1976 (43 CFR Subpart 2310). BLM is also required to formally notify the public about the proposed land withdrawal applications and to solicit public comment as part of its application review process. The comments received on the BLM land withdrawal applications for the BMGR and the Gila Bend Addition were also considered in the development of this LEIS. While the BLM public involvement process relied on the project mailing list and project website developed for this LEIS, the agency developed its own *Federal Register* notice, paid display advertisements, and media releases.

6.3.1 DOI Federal Register Notification

BLM's Notice of Application for Withdrawal Extension and Addition was published in the *Federal Register* on 20 April 2020 and included notification of two virtual public meetings.

6.3.2 BLM Media Announcements and Coordination

Subsequent to publishing its *Federal Register* Notice, BLM published a paid newspaper display advertisement in local and regional newspapers. The advertisement was published to notify the public of the two BMGR land withdrawal applications and the two virtual public meetings. The agency also distributed a media release. The display advertisement and media release were intended to promote public awareness of the proposed land withdrawal applications and BLM-hosted virtual public meetings.

6.3.3 BLM Virtual Public Meetings

BLM hosted two (online) virtual public meetings to provide information and solicit public comments on the two BMGR land withdrawal applications. The 1-hour virtual meetings were held on the Zoom Video Webinar platform on 26 and 28 May 2020. The BLM-moderated meetings included a 20-minute presentation followed by a 40-minute question and answer session that provided the public with an opportunity to make live comments and ask questions by phone and in writing by computer. The webinar panelists included project team members from BLM, Air Force, and Marine Corps. Closed caption transcription was provided by a human transcriber during each virtual meeting. The edited

transcription and video recording of each meeting was posted to the BLM-AZ YouTube channel[3] on 15 June 2020. A link to the video recordings was also posted to the BMGR project website on 15 June 2020.

6.4 Tribal Coordination

The Air Force and Marine Corps initiated NHPA Section 106 Tribal consultation in accordance 36 CFR 800, Protection of Historic Properties, on 16 January 2020. This consultation informed Tribal Nations that the LEIS was being prepared, invited their participation in the NEPA process, initiated consultation, and requested input on how DoD could best communicate with each tribe. On 20 April 2020, interested Tribal Nations were mailed a copy of the project brochure. In response to the communication, the project team received responses from the Hia-Ced Hemakajam and Ak Chin Indian Community of the Maricopa Indian Reservation. Tribal scoping meetings were proposed to Tribal Nations to supplement the government-to-government Tribal consultation process required under Section 106 of the NHPA and related Executive Orders and agency policies.

The Air Force and Marine Corps notified the SHPO in written communication dated 13 January 2021, of their further determination that the provisions of the 1958 Engle Act, which defers decision-making on the land withdrawal to Congress, rather than the NHPA Section 106 process (36 CFR 800), was the correct regulatory framework for the LEIS. The communication also noted that the proposed withdrawal would have no potential to cause effects to historic properties as per 36 CFR 800.3(a). The SHPO responded in agreement with this notification on 22 January 2021.

The Air Force and Marine Corps then submitted a letter to Tribal Nations participating in government-to-government Tribal consultation on 6 May 2021 to indicate that while the Section 106 process has been determined to not be relevant to the LEIS, Tribal Nations will continue to be engaged to consult on projects, findings, mitigation measures, and Tribal access to ancestral lands occurring within the BMGR. This continued engagement will follow the protocols and procedures outlined in the INRMP and ICRMPs.

A copy of each of these tribal consultation letters and correspondence with the SHPO is included in Appendix I.

The Tribal Historic Preservation Officer of the Tohono O'odham Nation suggested an appropriate venue for an LEIS meeting would be a Four Southern Tribes Working Group meeting, which would include representatives from the Gila River Indian Community of the Gila River Indian Reservation, Salt River Pima-Maricopa Indian Community of the Salt River Reservation, Ak Chin Indian Community of the Maricopa Indian Reservation, and Tohono O'odham Nation. Before further coordination occurred, the COVID-19 National Emergency was declared, and most Tribal administrative offices were closed.

A virtual consultation meeting was held between Dr. Ned Norris, Chairman of the Tohono O'odham Nation, and Brigadier General Gregory Kreuder, Commander of the 56 FW, Luke AFB, on 10 August 2020. Staff from the 56 RMO participated. Chairman Norris inquired specifically about the administrative

[3] https://www.youtube.com/channel/UC8etzzUU_oyb6Jcj8kLRMcg

jurisdiction transfer alternative and stated that he would coordinate with the Nation's Legislative Council and appropriate committees for inputs to the consultation process.

A virtual meeting between 56 RMO and the Four Southern Tribes Working Group was held via Zoom on 19 March 2021. Information specific to the LEIS was presented by Charles Buchanan, Director, 56 RMO; other attendees included Kevin O'Berry, Luke AFB Installation Tribal Liaison Officer; and THPOs and cultural resources staff from the Gila River Indian Community of the Gila River Indian Reservation, Salt River Pima-Maricopa Indian Community of the Salt River Reservation, Ak Chin Indian Community of the Maricopa Indian Reservation, and Tohono O'odham Nation. The LEIS presentation directed all future communications regarding the land withdrawal to the Installation Tribal Liaison Officer, notified Tribal attendees of the conclusion of Section 106 consultation on the LEIS and the intent to continue to interface and consult under the conditions of the 56 RMO INRMP and ICRMP, and updated Tribal attendees on the status of the Gila Bend Addition and LEIS alternatives.

6.5 Public Participation and Public Comments

Preparation of a LEIS need not have a scoping process, per 40 CFR Part 1506.8(b)(1), but the Air Force and Marine Corps elected to provide for a public scoping period and announced this in the March 18, 2020, *Federal Register* NOI. While the planned public scoping meetings were cancelled because of the March 13, 2020 Presidential Proclamation declaring a national crisis due to COVID-19, a virtual version was provided by placing the scoping materials on the project website. Using an amended NOI and other notices, the public was encouraged to review project materials and was provided 77 days to offer comments, through June 3, 2020. The LEIS also considered comments received on the related land withdrawal applications for the BMGR and the Gila Bend Addition.

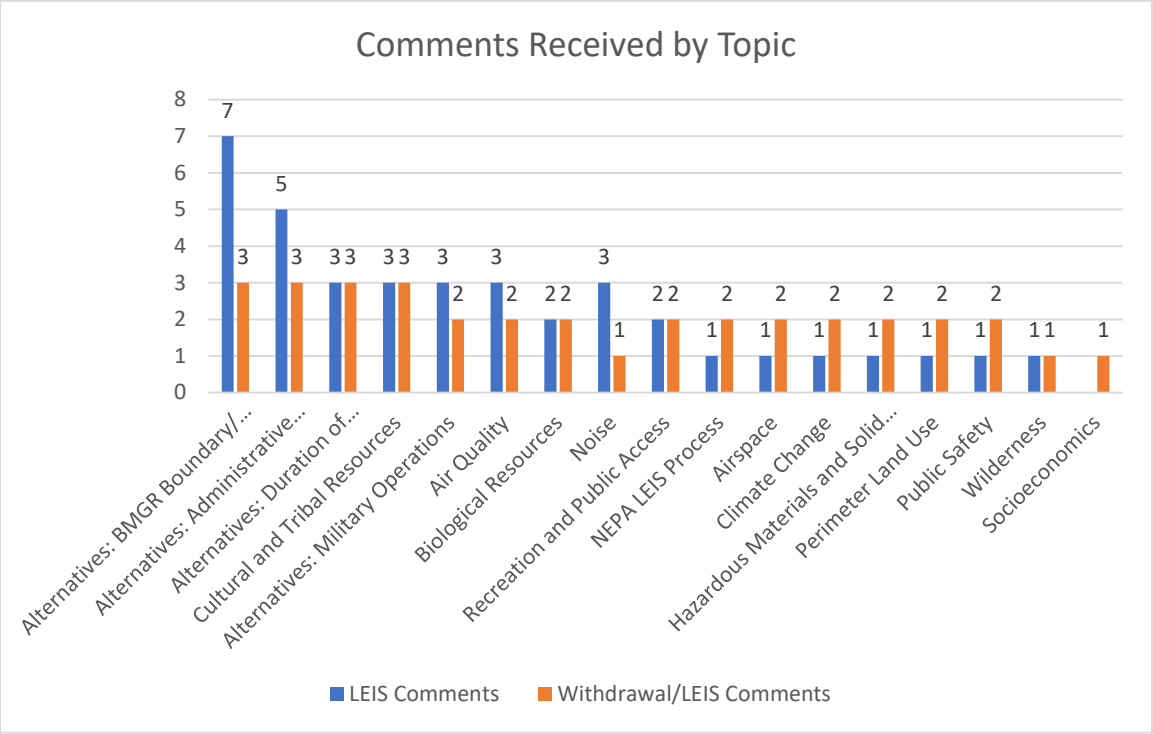
The Air Force and Marine Corps received LEIS scoping comments from five government agencies, five individuals, and one organization representing elected officials surrounding Luke AFB. BLM received comments from five individuals, one business, and copies of two agency letters that were also sent to the Air Force and Marine Corps on the LEIS. Collectively, 17 submissions of project-related written comments were received.

A tally of substantive comments by topic area is shown on Figure 6.5-1. Substantive comments are specific, such as those that challenge the analysis, identify factual inaccuracies, identify impacts not analyzed, or suggest reasonable alternatives not considered. Note that commenters often address multiple topics and resource areas, and some commenters offer similar comments on a topic. Non-substantive comments are non-specific and may express a conclusion, an opinion, agree or disagree with the proposals; vote for or against the proposal itself, or some aspect of it; or state a personal preference or opinion. Non-substantive comments included input unrelated to the BMGR, personal opinions about specific alternatives, and comments that did not contain meaningful input for the analysis.

Copies of the formal written scoping comments for the LEIS and the BLM land withdrawal process are included in the Scoping Summary Report. All substantive comments were considered in development of this LEIS. The comments largely focused on the project alternatives.

The Air Force and Marine Corps considered comments from agencies, tribes and the general public to refine the alternatives that were described in their preliminary proposal and to develop a proposed action. The revised alternatives formed the basis of the environmental impact assessment evaluated in the Draft LEIS as required by NEPA. The comments were also used to define and evaluate the effects of the various alternatives on the environment. The BMGR project website contains a link to the Scoping Summary Report that provides more details about the scoping process and results.

Figure 6.5-1. Public Comments Received on the Proposed BMGR Land Withdrawal by Topic



During the scoping process, approximately 10 issues were identified that are beyond the scope of the LEIS. The issues were not directly related to decisions being made regarding the proposed extension of the land withdrawal or the proposed Gila Bend Addition, or were not relevant to the purpose and need for action.

6.6 Notification, Distribution and Review of the Draft LEIS

As required under NEPA, the Draft LEIS was made available for public review and comment. In addition, two virtual public hearings were held that provided information regarding the action and an opportunity to provide comments. This section provides more information on these subjects.

6.6.1 Federal Register Notice of Availability

In accordance with the CEQ regulations implementing NEPA, the Draft LEIS was submitted to the U.S. EPA who published a Notice of Availability in the *Federal Register* on 15 January 2021 to announce the document's availability and the public comment period.

6.6.2 BMGR Project Website

An electronic copy of the entire Draft LEIS was posted to the project website public documents page. Information on how to comment on the Draft LEIS, the deadline to submit comments, and an electronic form to submit comments on the Draft LEIS throughout the public comment period was also available on the project website. Digital copies of public outreach materials described in sections 6.6.4 and 6.6.5 were posted to the website. Public hearing dates, times, formats, and how to register to participate were advertised on the website.

6.6.3 Newspaper Advertisements

Newspaper advertisements announcing the availability of the Draft LEIS and the public hearing dates were published in 10 community newspapers in the BMGR region and included two Spanish-language newspapers. The newspaper publication dates were timed to shortly follow publication of the EPA's 15 January 2021 Notice of Availability. The advertisement was published on two different dates in each newspaper.

6.6.4 Project Newsletters

A project newsletter was mailed to approximately 400 interested parties on 13 January 2021. Electronic copies of the newsletter were also sent by email on 14 January 2021 to approximately 200 interested parties. Some recipients received both the printed and electronic version of the newsletter if they previously provided a mailing and email address. The newsletter provided project information on the continuing military need for the BMGR, indicated the availability of the Draft LEIS for review and comment, summarized the alternatives considered and the impacts disclosed in the Draft LEIS, solicited public input in the Draft LEIS, as well as informed the public about the virtual public hearings.

6.6.5 Community Flyer

Following initial contact by phone to request posting a flyer, a transmittal letter and community flyer were also mailed on 13 January 2021 to two post offices, two gas stations, the Gila Bend Family Resource Center, and a grocery store to further publicize the public comment period in the communities of Gila Bend and Ajo. The transmittal letter requested assistance with posting the flyer, which provided information about where to access the Draft LEIS, the comment period, and virtual public hearing dates and times.

6.6.6 Draft LEIS Distribution

The public review period of the LEIS commenced with the Notice of Availability on 15 January 2021 and continued for 45 days until 1 March 2021. The Draft LEIS was accessible on the project website. The document was sent to five community libraries for public review, as well as the Gila Bend Family Resource Center. Due to public health concerns related to the spread of COVID-19, the Burton Barr Central Library did not open to the public during the public comment period, but notification materials provided alternate options for review including points of contact for requesting a copy of the document.

- Yuma County Main Library
  2951 S. 21st Drive, Yuma

- Salazar-Ajo Library
  15 West Plaza #179, Ajo
- Joel D. Valdez Main Library
  101 North Stone Avenue, Tucson
- Gila Bend Library
  202 North Euclid Avenue, Gila Bend
- Burton Barr Central Library
  1221 North Central Avenue, Phoenix
- Gila Bend Family Resource Center
  303 E Pima St, Gila Bend

6.6.7 Public Hearings

The Air Force and Marine Corps hosted two (online) virtual public hearings on the Draft LEIS to provide a summary of the Draft LEIS findings and allow participants an opportunity to make formal public comments on the Draft LEIS. The virtual public hearings were announced to the public in the community flyer, the newsletter, in newspaper advertisements, and on the project website.

The two, 90-minute virtual public hearings were held on the Zoom for Government Webinar platform from 3:00 p.m. to 4:30 p.m. Mountain Standard Time (Arizona Time) on Tuesday, 2 February 2021 and from 6:00 p.m. to 7:30 p.m. on Wednesday, 3 February 2021. However, as advertised in the public hearing notification materials, both meetings concluded early for lack of public comments after a 10-minute warning that the meeting would conclude early if no comments were received.

The public hearings included a 25-minute pre-recorded presentation followed by a formal comment period where attendees were provided an opportunity to provide oral comments. A link to the video recordings were posted to the BMGR project website on 4 February 2021.

Prior to the commencement of the virtual hearings, the project team provided guidance on the features on the Zoom platform. The project team explained how to use the “raise hand” feature to indicate when a participant would like to make a comment, how to unmute and mute if making a comment, and how to use the chat box to request technical assistance. Military judge Lt. Col. Christopher James presided over both public hearings. Lt. Col. James began each public hearing by introducing himself and explaining his role as the moderator of the public hearings. His introductory remarks:

- Explained the purpose of the public hearing
- Described how to make oral comments
- Advised participants the hearing was being recorded and a court reporter was present to record any oral comments made
- Directed participants to visit the project website to review the PowerPoint public hearing presentation, videos developed for the scoping period, and recordings of the public hearings (added after the hearings)
- Introduced key Air Force and Marine Corps team members involved with the project

- Identified the public hearing agenda

After the military judge's remarks, pre-recorded welcome messages from Brigadier General Gregory Kreuder, Commander of the 56th Fighter Wing at Luke AFB, and Colonel Charles Dudik, Commanding Officer at MCAS Yuma were played. The commanders briefly explained the importance of the BMGR to military training and the continuing need for the range. The presentation commenced with a two-minute background video that provided additional information about the history and purpose of the BMGR, followed by a 25-minute pre-recorded presentation outlining the proposed land withdrawal extension and Gila Bend Addition, the purpose and need for the actions, the alternatives evaluated in the Draft LEIS, the environmental consequences for each of the alternatives analyzed in the Draft LEIS, and how to submit comments on the Draft LEIS. Appendix K includes the transcript of both public hearings and the pre-recorded presentation script. The presentation slides were posted to the Documents page of the BMGR project website.

A 5-minute recess followed the presentation to allow participants time to formulate their comments, including comments on any information addressed in the presentation. When the hearing resumed, the formal comment period began where attendees were provided an opportunity to provide oral comments via a toll-free telephone line or raising a hand in the Zoom platform signaling a request to speak. No formal comments were provided at either public hearing. The video meeting recordings were posted to the Documents page of the BMGR project website on 4 February 2021.

Table 6.6-1 provides an overview of the participants for each virtual public hearing.

Table 6.6-1. Virtual Public Hearing Participation

Participants	2 February 2021	3 February 2021
Air Force	13	10
Marine Corps	7	6
Navy	2	0
BLM	2	1
Consultant Team Members	4	3
Agency Representatives	0	1
Participants from Consultant Firms (Non-Team Members)	2	1
General Public	3	0

6.6.8 Comments on the Draft LEIS and Responses to Comments

Comments on the Draft LEIS and responses to those comments may be found in Appendix M.