

BARRY M. GOLDWATER RANGE
INTEGRATED CULTURAL RESOURCES
MANAGEMENT PLAN

Part III: Cultural Resources Management on
The Barry M. Goldwater Range West



Prepared for
MCAS Yuma
Range Management Department
Yuma, Arizona

2019

Cover photograph taken from *A Historic Mining Context for the Western Barry M. Goldwater Range and an Archaeological Inventory of the Historic Fortuna Mine and Campsite, Yuma County, Arizona* (Schaefer et al. 2007).

Photograph Caption - The Fortuna Mill, after 1900, view north, with the blacksmith shop, hoists and gallows frame above and the tailings pile and pond below after removal of cyanide plant. Note the large stacks of ironwood for fuel (Arizona Historical Society, Yuma).

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LIST OF ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AGFD	Arizona Game and Fish Department
AIRFA	American Indian Religious Freedom Act
ALF	Auxiliary Landing Field
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
ASM	Arizona State Museum
AUX-II	Auxiliary Airfield II
BMGR	Barry M. Goldwater Range
BMGR East	Barry M. Goldwater Range East
BMGR West	Barry M. Goldwater Range West
CA	Cooperative Agreement
CBP	United States Customs and Border Protection
CD-ROM	compact disk read-only memory
CFR	Code of Federal Regulations
CLEO	Conservation Law Enforcement Officer
CO	Commanding Officer
COLS	Common Output Levels of Service
CommStrat	MCAS Yuma Communication Strategy and Operations
CRM	Cultural Resources Manager
CSOC	Convoy Security Operations Courses
DHS	United States Department of Homeland Security
DoD	Department of Defense
DoN	Department of the Navy
DVD-ROM	digital versatile disc read-only memory
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPPPBE	Environmental Project Planning, Programming, Budgeting and Execution
FARP	Forward Arming and Refueling Point
FASP	Field Ammunition Supply Point
FOIA	Freedom of Information Act
FR	<i>Federal Register</i>
FY	Fiscal Year
GBAFAF	Gila Bend Air Force Auxiliary Field
GIS	geographic information system
GPS	Global Positioning System
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan

MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCO	Marine Corps Order
MLWA	Military Lands Withdrawal Act of 1999
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSC	Multiple Surveillance Capability
NAGPRA	Native American Graves Protection and Repatriation Act
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OPNAV	Office of the Chief of Naval Operations
PA	Programmatic Agreement
PDF	Portable Document Format
PL	Public Law
RMD	Range Management Department
SDE	Spatial Data Engine
SDSFIE	Spatial Data Standards for Facilities, Infrastructure, and Environment
SECNAV	Secretary of the Navy
SHPO	State Historic Preservation Officer
SOP	Standard Operating Procedure
TACTS	Tactical Aircrew Combat Training Systems
TCP	Traditional Cultural Property
U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
USN	United States Navy
UXO	unexploded ordnance

BARRY M. GOLDWATER RANGE WEST INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN

2019 – 2023

SIGNATURE PAGE

This Integrated Cultural Resources Management Plan documents the procedures and processes through which Barry M. Goldwater Range West fulfills its commitment to compliance with applicable laws, regulations, and policies in the spirit of faithful stewardship of cultural resources.

APPROVING OFFICIALS:



24 July 2019

David A. Suggs
Commanding Officer
Marine Corps Air Station Yuma, Yuma, Arizona

DATE

PLAN UPDATES

This Integrated Cultural Resources Management Plan covers a five-year period. The plan will be reviewed annually and updated on an as-needed basis to account for new information and address any problems encountered while using the document.

Annual Reviews		
Date	Review Findings	Reviewer Initials

Updates and revisions are a necessary part of maintaining a proactive management plan. The section below should be used to document changes to the plan that will improve cultural resources management. Each entry in this section should reference the plan section and page number that is being updated to facilitate quick cross-referencing.

Plan Changes			
Date	Section/Page	Comment/Change	Reviewer

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EXECUTIVE SUMMARY

The Integrated Cultural Resources Management Plan (ICRMP) for the Barry M. Goldwater Range (BMGR) is designed to support the military mission through proactive cultural resources management and to fulfill legal obligations for the protection of historic properties needed to sustain the withdrawal of public lands for military operations. The ICRMP is divided into three separate documents. Part I provides the basic components and general overview of cultural resources management on BMGR (Luke Air Force Base 2009a). Part II develops a tailored cultural resources management plan for Barry M. Goldwater Range East (BMGR East) (Luke Air Force Base 2009b), which is managed by the United States Air Force (USAF). Part III (this document) provides specific guidance for cultural resources management on Barry M. Goldwater Range West (BMGR West), which is managed by the United States Marine Corps (USMC). This organizational structure reflects the congressionally mandated management authority of the Secretary of the Air Force and Secretary of the Navy over the eastern and western portions of the range, respectively, their specific regulatory requirements, and the differences in military activities and cultural and natural resources between the BMGR East and the BMGR West.

This document is a multi-year planning and decision document signed by the Commanding Officer of Marine Corps Air Station (MCAS) Yuma, designed specifically for the management and regulatory compliance of cultural resources on the BMGR West. It is an internal document that integrates cultural resources program requirements with ongoing mission activities and other planning documents and metrics. It documents cultural resources associated with the BMGR West, identifies potential conflicts between the USMC military mission and cultural resources management, and describes compliance actions necessary to maintain mission-essential properties. The material in this ICRMP is organized to provide sufficient detail to guide day-to-day managers in an easy-to-use format, including the use of Standard Operating Procedures that address the installation's objectives, staffing, policies, and compliance actions to ensure legal and regulatory requirements for managing cultural resources are fulfilled.

This document was prepared pursuant to Department of Defense Instruction 4715.16, *Cultural Resources Management*; Secretary of the Navy Instruction 4000.35A, *Department of the Navy Cultural Resources Program*; and Marine Corps Order 5090.2 (Volume 8), *United States Marine Corps Environmental Compliance and Protection Program: Cultural Resources Management*. As required by *U.S. Marine Corps Guidance for Completion of an Integrated Cultural Resources Management Plan Update* (USMC 2009), this ICRMP will require annual reviews and updates on an as-needed basis to take into account new information and address any problems encountered with using the document.

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1. INTRODUCTION

The Integrated Cultural Resources Management Plan (ICRMP) for the Barry M. Goldwater Range (BMGR) is designed to support the military mission through proactive cultural resources management and to fulfill legal obligations for the protection of historic properties needed to sustain the withdrawal of public lands for military operations. The ICRMP is divided into three separate documents. Part I provides the basic components and general overview of cultural resources management on the BMGR (Luke Air Force Base 2009a). Part II develops a tailored cultural resources management plan for Barry M. Goldwater Range East (BMGR East) (Luke Air Force Base 2009b), which is managed by the United States Air Force (USAF). Part III (this document) provides specific guidance for cultural resources management on Barry M. Goldwater Range West (BMGR West), which is managed by the United States Marine Corps (USMC). This organizational structure reflects the congressionally mandated management authority of the Secretary of the Air Force and Secretary of the Navy (SECNAV) over the eastern and western portions of the range, respectively, their specific regulatory requirements, and the differences in military activities and cultural and natural resources between the BMGR East and the BMGR West.

This document (Part III) is a multi-year planning and decision document signed by the Commanding Officer (CO) of Marine Corps Air Station (MCAS) Yuma, designed specifically for the management and regulatory compliance of cultural resources on the BMGR West. It is an internal document that integrates cultural resources program requirements with ongoing mission activities and other planning documents and metrics. It documents cultural resources associated with the BMGR West, identifies potential conflicts between the USMC military mission and cultural resources management, and identifies compliance actions necessary to maintain mission-essential properties.

Part III is designed to be used in conjunction with Part I of the ICRMP (Luke Air Force Base 2009a), and refers the reader back to pertinent sections of Part I instead of repeating general information. For example, Part I outlines military aviation training and support activities on the BMGR and describes the working relationships and responsibilities among the USAF, USMC, and federal and state agency partners in the region (Sections 1 and 2, respectively). In Section 3 of Part I, the laws, regulations, and other guidance that govern cultural resources management on the BMGR are summarized. Sections 4 and 5 of Part I provide an overview of natural and cultural resources on the BMGR. The process of evaluating the historic significance of cultural resources, and thus their eligibility for inclusion on the National Register of Historic Places (NRHP), is detailed in Section 6. In Section 7 of Part I, the efforts of USAF and USMC to identify and consult with tribes that attach cultural importance to places on the BMGR are summarized. Part I concludes with a brief discussion of the relationship of military training and cultural resources management goals, and some anticipated challenges (Section 8).

Part III of the ICRMP was prepared pursuant to Department of Defense (DoD) Instruction 4715.16, *Cultural Resources Management*; SECNAV Instruction 4000.35A, *Department of the Navy Cultural Resources Program*; and Marine Corps Order 5090.2 (Volume 8), *United States Marine Corps Environmental Compliance and Protection Program: Cultural Resources Management*. This document is intended to support the BMGR Integrated Natural Resources

Management Plan (INRMP) (Luke Air Force Base and MCAS Yuma 2018a) required by Congress in the Military Lands Withdrawal Act of 1999 (MLWA).

Because this document follows *U.S. Marine Corps Guidance for Completion of an Integrated Cultural Resources Management Plan Update* (USMC 2009), the general format and content may differ from Parts I and II of the ICRMP.

1.1. MISSION AND GOALS FOR THE CULTURAL RESOURCES MANAGEMENT PROGRAM

1.1.1. Military Mission

The BMGR (Figures 1 and 2) is the nation's second largest tactical aviation training range and is essential for developing and maintaining the combat readiness of the USMC, USAF, United States Navy (USN), and Army tactical air forces. Since the beginning of World War II, the BMGR has contributed to the nation's defense by effectively accommodating the training requirements of changing air combat capabilities and missions. The USAF and USMC are the two principal agencies that operate and use the range for combat aircrew training.

Under the MLWA, Congress reauthorized the withdrawal of approximately 1,650,000 acres of public land for military use. The MLWA split the range into two segments (BMGR East and BMGR West), and assigned jurisdiction to the Secretary of the Air Force and SECNAV. The BMGR West encompasses approximately 700,000 acres. Range activities within the BMGR West are managed by the Range Management Department (RMD) at MCAS Yuma, and cultural resources stewardship is managed through the MCAS Yuma Cultural Resources Management Program. This program supports the USMC mission by achieving regulatory compliance and ensuring USMC stewardship responsibilities are met.

1.1.2. Goals of the Cultural Resources Management Program

As described in Part I of the ICRMP (Luke Air Force Base 2009a), there are three overarching cultural resources management goals: (1) support military operations through proactive management of cultural resources; (2) fulfill legal obligations for the protection of historic properties; and (3) address Native American concerns, including disposition of cultural items. These goals are designed to comply with the DoD and USMC policies that are discussed in Section 1.4 (*Laws, Regulations, and Standards*).

1.2. ORGANIZATION OF THE DOCUMENT

An important goal for this BMGR West ICRMP is to provide relevant information in a manner that facilitates the planning and decision-making necessary to achieve compliance. To that end, the material is organized to provide sufficient detail to guide day-to-day managers in an easy-to-use format, including the use of Standard Operating Procedures (SOPs) located in Appendix A.

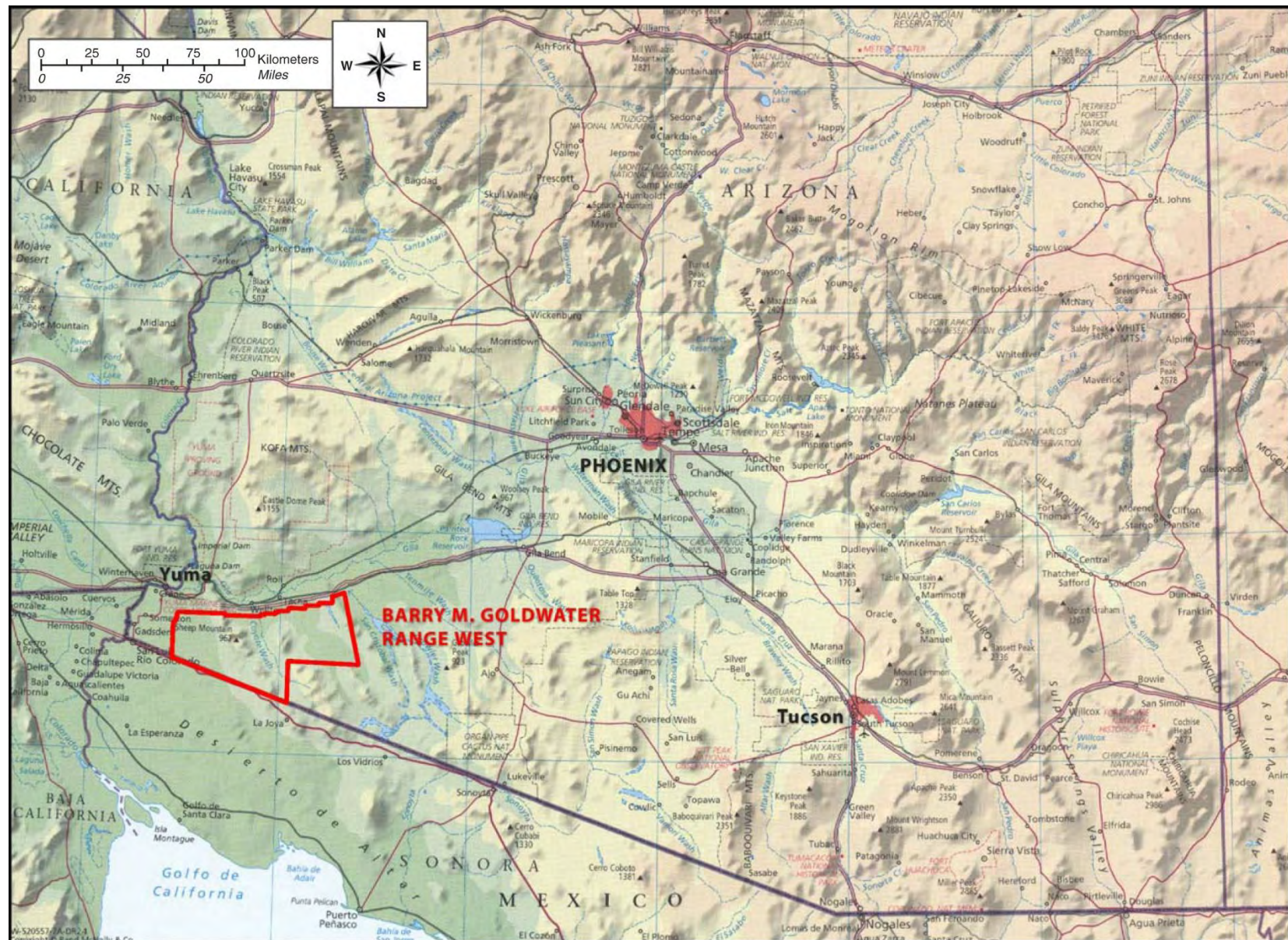


Figure 1. Barry M. Goldwater Range West Regional Location Map

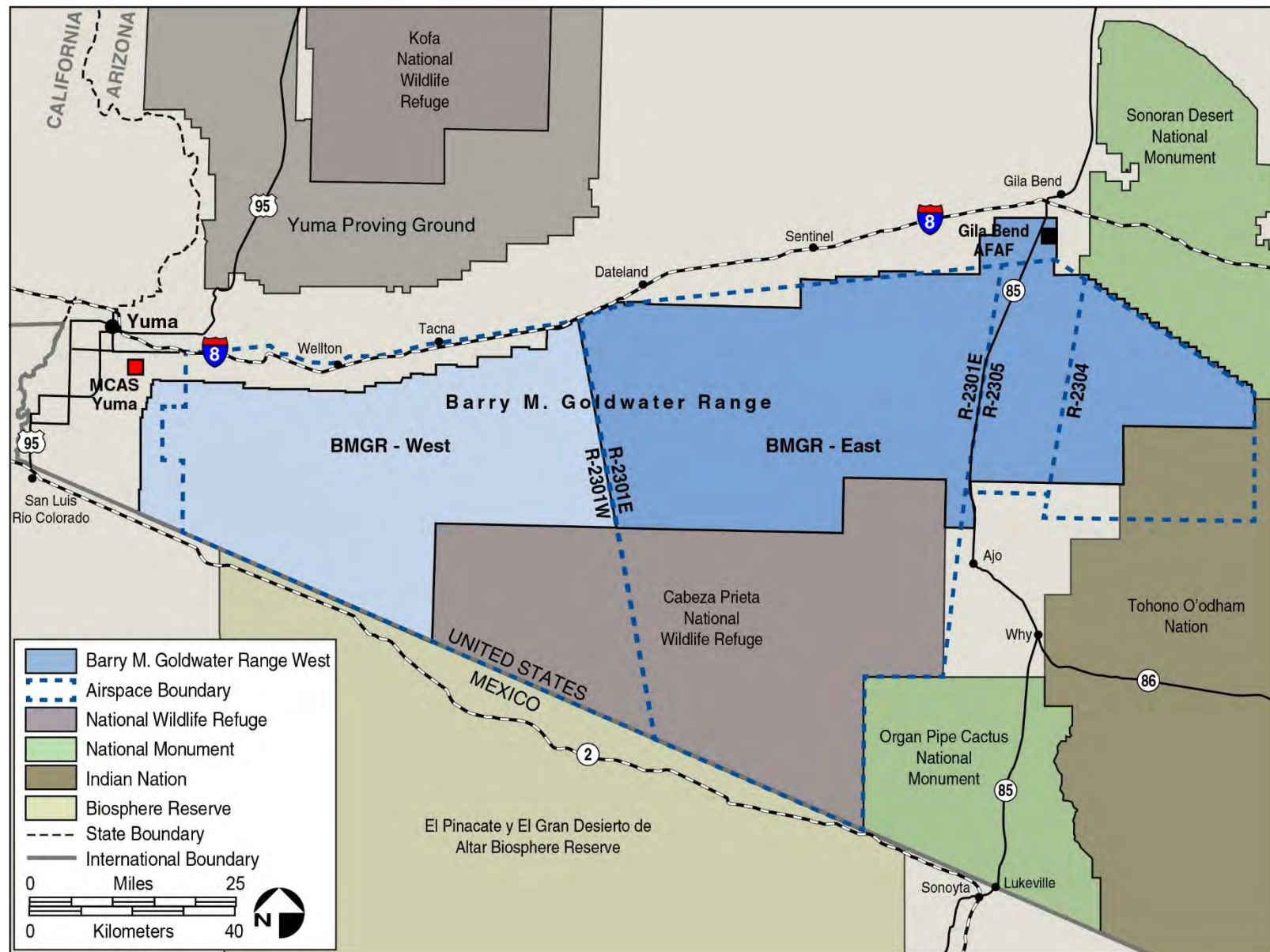


Figure 2. Barry M. Goldwater Range Land Tenure

Major topics of the ICRMP include:

- a summary of relevant laws, regulations, policies, and procedures, with emphasis on those that apply specifically to the BMGR West (Section 1.4);
- a review of key roles and responsibilities for cultural resources management at the BMGR West (Section 1.5);
- an overview of the current mission of the BMGR West (Section 2.1);
- a discussion of the types of projects that may affect cultural resources on the range (Section 2.1);
- a summary of previous cultural resources investigations and a list of previously recorded cultural resource sites, including a brief description of the properties and their NRHP-eligibility determinations (Section 2.2 and Appendix E);
- identification of unique cultural resource issues on the range (Section 2.2.5);
- an analysis of the sufficiency of existing cultural resources information and review of data gaps for compliance requirements and Section 110 survey progress (Section 2.2.7);
- procedures to ensure that actions of the installation and its tenants protect and enhance the cultural resources located on the range (Section 2.3);
- procedures for compliance with the National Historic Preservation Act (NHPA) (Section 2.3.2; SOPs #1 and 2);
- a discussion on integrating the NHPA Section 106 planning process with the National Environmental Policy Act (NEPA) process (Section 2.3.2);
- procedures for compliance with the Archaeological Resources Protection Act (ARPA) and Native American Graves Protection and Repatriation Act (NAGPRA) (Section 2.3.2; SOPs #3 and 4);
- procedures for inadvertent discoveries as well as ensuring the proper processing, maintenance, preservation, curation, and repatriation of archaeological collections (Section 2.3.2; SOPs #4, 5, and 6);
- coordination/consultation processes between the installation, Indian tribes, and the public (Section 2.3.2; SOP #7);
- a summary of cultural resources data management status, processes, and access requirements regarding electronic databases, hardcopy records, and geographic information system (GIS) data (Sections 2.3.3 and 2.3.4);
- provisions for public outreach (Section 2.3.5);
- protection and preservation strategies for threatened cultural resources (Section 2.3.6); and
- priorities for near-term and long-term actions related to cultural resources compliance, including funding priorities and protocols for specific program requirements (Section 2.3.7).

1.3. PREPARATION OF THE INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN

This document is based on reviews of USMC policy information, previous cultural resources investigations and plans, and interviews with personnel at the BMGR West. The following provides additional information about consultation efforts, followed by a summary of relevant agency agreement documents that were reviewed and incorporated, when applicable, into the BMGR West ICRMP policies and guidelines. Copies of the agreement documents can be found in Appendix B.

1.3.1. Integrated Cultural Resources Management Plan Consultations

Primary consultation with external interested parties and the public was undertaken during the preparation of the Environmental Impact Statement (EIS) for the BMGR INRMP (United States Department of Air Force et al. 2006). Consulting parties for the preparation of Part I of the ICRMP (Luke Air Force Base 2009a) included the State Historic Preservation Officer (SHPO) and tribes that claim cultural affiliation with places on the BMGR.

In addition to the SHPO and the tribes, the U.S. Department of the Interior Bureau of Land Management and U.S. Fish and Wildlife Service (USFWS), on behalf of the Secretary of the Interior, and the Arizona Game and Fish Department (AGFD), on behalf of the state of Arizona, were afforded an opportunity to participate in consultations. Through the Intergovernmental Executive Committee, the agencies also invited the public, interested individuals, organizations, and entities to participate in the development of a Programmatic Agreement (PA) (36 CFR 800.14(b)(2)(ii)). The Advisory Council on Historic Preservation (ACHP) declined to participate in consultation.

The following tribes¹ have expressed a desire to be kept apprised of the development of the ICRMP for the BMGR West:

- Ak-Chin Indian Community;
- Cocopah Tribe;
- Colorado River Indian Tribes;
- Gila River Indian Community;
- Hia-Ced Hemajkam Organization;
- Quechan Tribe;
- Salt River Pima-Maricopa Indian Community;
- Tohono O'odham Nation;
- Yavapai-Apache Nation; and
- Yavapai-Prescott Indian Tribe.

Additionally, MCAS Yuma will send letters to the following tribes to determine if they are interested in consulting on future projects that occur on BMGR West: Chemehuevi Tribe, Fort

¹ The listed tribes are federally recognized, except for the Hia-Ced Hemajkam Organization.

McDowell Yavapai Nation, Fort Mojave Indian Tribe, Hopi Tribe, Pueblo of Zuni, and San Carlos Apache Tribe.

1.3.2. Agency Agreement Documents

Barry M. Goldwater Range Integrated Natural Resources Management Plan

Programmatic Agreement. A PA was developed among the 56th Range Management Office, Luke Air Force Base, MCAS Yuma, and the Arizona SHPO regarding potential impacts on historic properties from implementing the 2007 BMGR INRMP. The BMGR INRMP was jointly developed by Luke Air Force Base and MCAS Yuma in accordance with the MLWA of 1999. The INRMP was implemented via an EIS that studied the potential impacts it might have on various resources, including cultural resources. Because the effects on historic properties from 6 of the 17 conservation elements could not be assessed prior to the implementation of the INRMP, the PA was developed to stipulate the steps to be taken for compliance with Section 106 concerning those 6 elements on the BMGR. The following groups were invited to be consulting parties: the Ak-Chin Indian Community, the Cocopah Tribe, the Colorado River Indian Tribes, the Gila River Indian Community, the Hia C-ed O’odham Alliance, the Hopi Tribe, the Fort McDowell Yavapai Nation, the Fort Mohave Indian Tribe, the Fort Yuma-Quechan Tribe, the Pascua Yaqui Indian Tribe, the Salt River Pima-Maricopa Indian Community, the San Carlos Apache Tribe, the Tohono O’odham Nation, the Yavapai-Prescott Indian Tribe, the Yavapai-Apache Nation, and the Pueblo of Zuni. The PA was signed in 2005 and is currently in effect (Appendix B: B-1).

Memorandum of Understanding on Section 106 Compliance Consultation Process for

Negative Findings. A Memorandum of Understanding (MOU) between MCAS Yuma and the Arizona SHPO implements procedures to help streamline the Section 106 compliance consultation process for undertakings characterized by negative finds. The MOU was signed in 2010 and is currently in effect (Appendix B: B-2).

Memorandum of Agreement on Curation Services. A Memorandum of Agreement (MOA) between Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center (MCAGCC), and MCAS Yuma concerns curatorial services of archaeological artifacts, specimens, and associated records (per 36 CFR 79.4(b)). Six boxes of artifacts and associated records from BMGR West are currently housed at the MCAGCC Curation Facility, and all new BMGR West collections will be housed at MCAGCC for long-term storage and curation, per the MOA. The original MOA was signed in 2011; it was renewed in 2017 and is currently in effect (Appendix B: B-3).

1.4. LAWS, REGULATIONS, AND STANDARDS

Federal laws, regulations, and Executive Orders establish a legal backdrop for managing cultural resources under federal oversight. Chief among these are the NHPA, ARPA, NAGPRA, NEPA, and Executive Order 13175 (*Consultation and Coordination with Indian Tribal Governments*). Additional direction is provided by DoD instructions, Department of the Navy (DoN) instructions, USMC orders, and MCAS Yuma standards.

Table 1 provides website addresses to access regulatory requirements, citations, and summaries of relevant legal authorities and policies for cultural resources on the range. It presents information in the following order: federal laws and implementing regulations, Executive Orders, DoD instructions and policies, DoN instructions, and USMC orders and guidelines.

Full text versions of many federal laws, regulations, and court decisions are accessible online from the Cornell University Law Library at <http://www.law.cornell.edu>. Most laws, regulations, and standards relating to cultural resources are accessible through the National Park Service at <http://www.nps.gov/history/laws.htm>. The website <http://www.dtic.mil/whs/directives> provides DoD instructions. Defense Environmental Network and Information Exchange at <https://www.denix.osd.mil> provides DoD cultural resources policy and guidance, and the DoN Issuances website at <https://www.secnav.navy.mil/doni/default.aspx> provides Office of the Chief of Naval Operations (OPNAV) and SECNAV instructions.

Section 3 (*The Legal Setting*) of Part I of the ICRMP (Luke Air Force Base 2009a) summarizes the most relevant regulations and policies that apply to the BMGR. The following provides brief descriptions of DoN and USMC policies and procedures, as well as MCAS Yuma survey standards that apply specifically to the BMGR West.

- **SECNAV Instruction 4000.35A, DoN Cultural Resources Program, April 9, 2001**

SECNAV Instruction 4000.35A establishes policy and assigns responsibilities for a cultural resources program under the direction and oversight of the Assistant Secretary of the Navy (Energy, Installations, and Environment). This instruction assigns responsibilities to the Commandant of the USMC which are applicable to USMC activities on the BMGR West, and the Commandant will issue implementing instructions. The *Navy Historic and Archaeological Resources Protection Planning Guidelines* also address preparation of Historic and Archaeological Resource Protection Plans, which are comparable to ICRMPs.

- **SECNAV Instruction 11010.14B, DoN Policy for Consultation with Federally Recognized Indian Tribes**

This policy clarifies DoN procedures and responsibilities for consultation with representatives of federally recognized Indian tribes, including Alaska Native governments, on issues with the potential to impact protected tribal resources, tribal rights, or Indian lands.

- **SECNAV Instruction 5090.8B, Policy for Environmental Protection, Natural Resources, and Cultural Resources Programs**

This DoN instruction re-issued policy and assigned responsibilities within the DoN for managing environmental protection, natural resources, and cultural resources programs.

- **OPNAV Instruction 11170.2B, Navy Responsibilities Regarding Undocumented Human Remains**

This policy provides guidance regarding the discovery, handling, and disposition of undocumented human remains located above-ground, below-ground, or in association with structures such as aircraft or ships during DoN action or on DoN land.

Table 1. Legal Authorities and Policies

Name	Regulation	Hyperlinks
Public Law		
Military Lands Withdrawal Act of 1999	PL 106-65 §3031	https://www.gpo.gov/fdsys/pkg/PLAW-106publ65/pdf/PLAW-106publ65.pdf
Archaeological Resources Protection Act of 1979	16 USC §§ 470aa–mm	https://www.law.cornell.edu/uscode/text/16/chapter-1B
Sikes Act	16 USC § 670	https://www.law.cornell.edu/uscode/text/16/chapter-5C/subchapter-I
Native American Graves Protection and Repatriation Act of 1990	25 USC §§ 3001–3013	https://www.law.cornell.edu/uscode/text/25/chapter-32
American Indian Religious Freedom Act of 1978	42 USC §§ 1996 and 1996a	https://www.law.cornell.edu/uscode/text/42/1996
National Environmental Policy Act of 1969	42 USC §§ 4321–4370m	https://www.law.cornell.edu/uscode/text/42/chapter-55
National Historic Preservation Act of 1966	54 USC §§ 100101, 300101–307108	https://www.law.cornell.edu/uscode/text/54/subtitle-III/division-A
Historic Sites Act of 1935	54 USC §§ 102303–102304, 309101, 320101–320106	https://www.law.cornell.edu/uscode/text/54/subtitle-III/division-C/chapter-3201
Antiquities Act of 1906	54 USC §§ 320301–320303	https://www.law.cornell.edu/uscode/text/54/subtitle-III/division-C/chapter-3203
Federal Regulation		
Protection of Archaeological Resources: Uniform Regulations	32 CFR Part 229	https://www.law.cornell.edu/cfr/text/32/part-229
National Register of Historic Places Regulations	36 CFR Part 60	https://www.law.cornell.edu/cfr/text/36/part-60
Procedures for State, Tribal, and Local Government Historic Preservation Programs	36 CFR Part 61	https://www.law.cornell.edu/cfr/text/36/part-61
Determination of Eligibility for Inclusion in the National Register of Historic Places	36 CFR Part 63	https://www.law.cornell.edu/cfr/text/36/part-63
The Secretary of the Interior’s Standards for the Treatment of Historic Properties	36 CFR Part 68	https://www.law.cornell.edu/cfr/text/36/part-68
Curation of Federally-Owned and Administered Archaeological Collections	36 CFR Part 79	https://www.law.cornell.edu/cfr/text/36/part-79
Protection of Historic Properties	36 CFR Part 800	https://www.law.cornell.edu/cfr/text/36/part-800
Federal Property Management Regulations	41 CFR Part 101	https://www.law.cornell.edu/cfr/text/41/chapter-101
Preservation of American Antiquities	43 CFR Part 3	https://www.law.cornell.edu/cfr/text/43/part-3
Protection of Archaeological Resources	43 CFR Part 7	https://www.law.cornell.edu/cfr/text/43/part-7

Table 1. Legal Authorities and Policies

Name	Regulation	Hyperlinks
Native American Graves Protection and Repatriation Regulations	43 CFR Part 10	https://www.law.cornell.edu/cfr/text/43/part-10
Executive Orders and Presidential Memorandum		
Protection and Enhancement of the Cultural Environment (1971)	Executive Order 11593	https://www.archives.gov/federal-register/codification/executive-order/11593.html
Locating Federal Facilities on Historic Properties in Our Nation's Central Cities (1996)	Executive Order 13006	http://www.achp.gov/EO13006.html
Indian Sacred Sites (1996)	Executive Order 13007	http://www.achp.gov/EO13007.html
Consultation and Coordination with Indian Tribal Governments (2000)	Executive Order 13175	https://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/Req-EO13175tribgovt.pdf
Preserve America (2003)	Executive Order 13287	http://www.preserveamerica.gov/EOtext.html
Government-to-Government Relations with Native American Tribal Governments (1994)	Presidential Memorandum	https://www.justice.gov/archive/otj/Presidential_Statements/presdoc1.htm
Department of Defense Policy and Instructions		
Department of Defense American Indian and Alaska Native Policy	DoD Policy	http://www.spk.usace.army.mil/Portals/12/documents/tribal_program/American-Indian-and-Alaska-Native-Policy-Booklet-Version-2-for-Web-Posting.pdf
Department of Defense Interactions with Federally Recognized Tribes, September 14, 2006	DoD Instruction 4710.02	http://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/471002p.pdf
Cultural Resources Management, September 18, 2008 (<i>updated November 21, 2017</i>)	DoD Instruction 4715.16	http://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/471516p.pdf?ver=2017-11-21-114100-670
Department of the Navy Instructions		
Department of the Navy Cultural Resources Program	SECNAV Instruction 4000.35A	http://www.secnav.navy.mil/eie/ASN%20EIE%20Policy/SECNAV%20INSTRUCTION%204000.35A.pdf
Department of the Navy Policy for Consultation with Federally Recognized Indian Tribes, Alaska Native Tribal Entities, and Native Hawaiian Organizations	SECNAV Instruction 11010.14B	https://www.secnav.navy.mil/doni/Directives/11000%20Facilities%20and%20Land%20Management%20Ashore/11-00%20Facilities%20and%20Activities%20Ashore%20Support/11010.14B.pdf
Policy for Environmental Protection, Natural Resources, and Cultural Resources Program	SECNAV Instruction 5090.8B	https://www.secnav.navy.mil/doni/Directives/05000%20General%20Management%20Security%20and%20Safety%20Services/05-00%20General%20Admin%20and%20Management%20Support/5090.8B.pdf
Navy Responsibilities Regarding Undocumented Human Remains	OPNAV Instruction 11170.2B	https://www.secnav.navy.mil/doni/Directives/11000%20Facilities%20and%20Land%20Management%20Ashore/11-100%20Structures%20and%20Facilities%20Support/11170.2B.pdf

Table 1. Legal Authorities and Policies

Name	Regulation	Hyperlinks
Marine Corps Orders and Guidance		
Environmental Compliance and Protection Program, Volume 8	MCO 5090.2	https://www.marines.mil/News/Publications/MCPPEL/Electronic-Library-Display/Article/1552941/mco-50902/
Manual for the Marine Corps Historical Program	MCO 5750.1H	http://www.marines.mil/Portals/59/Publications/MCO%205750.1H.pdf
U.S. Marine Corps Guidance for Completion of an Integrated Cultural Resources Management Plan Update, 2009	U.S. Marine Corps Guidance	http://www.miramar-ems.marines.mil/Portals/60/Docs/MEMS/Cult_Res/USMC_ICRMP_Guidance_(Feb09).pdf

CFR = Code of Federal Regulations; DoD = Department of Defense; MCO = Marine Corps Order; OPNAV = Office of the Chief of Naval Operations; PL = Public Law; SECNAV = Secretary of the Navy; U.S. = United States; USC = United States Code

- **Marine Corps Order 5090.2 (Volume 8), United States Marine Corps Environmental Compliance and Protection Program: Cultural Resources Management**

Volume 8 establishes USMC policy and responsibilities for compliance with statutory requirements to protect historic properties and archaeological resources, and discusses compliance with applicable federal statutory and regulatory requirements, Presidential Memoranda, Executive Orders, and DoD regulations and policies for the integrated management of cultural resources on USMC lands or that may be affected by USMC actions.

- **Marine Corps Order 5750.1H, Manual for the Marine Corps Historical Program**

This document sets forth policies, procedures, and standards governing the administration of the USMC historical program and delineates the responsibilities of the History Division, the National Museum of the Marine Corps, field commands, and the Archives and Special Collections Branch of the Library of the Marine Corps in planning, conducting, and executing this program. It is published for instructing and guiding commanders, staff members, and individuals.

- **USMC Guidance for Completion of an Integrated Cultural Resources Management Plan Update, February 2009**

This USMC guidance document focuses on developing ICRMP Updates for USMC installations and addresses how to manage significant changes to ICRMP content. It includes a summary of the required elements of an ICRMP per DoD Instruction 4715.16, and provides guidance on preparing the required information.

- **MCAS Yuma Archaeological Survey and Report Standards, October 2016**

This document sets forth archaeological survey and reporting standards for work conducted for MCAS Yuma (see Appendix C). This document supplements the standards from the Arizona State Museum (ASM) and the California Office of Historic Preservation for archaeological surveys performed in Arizona and California, respectively.

1.5. ROLES AND RESPONSIBILITIES

The following section describes the roles and responsibilities for key military and non-military personnel, agencies, and groups.

1.5.1. Military Responsibilities

Marine Corps Air Station Yuma Commanding Officer. The CO's responsibilities include:

- establishing a cultural resources management program;
- establishing a government-to-government relationship with federally recognized Indian tribes;
- establishing a process that requires installation staff, tenants, and other interested parties to coordinate with the Cultural Resources Manager (CRM) early in the project

planning process to determine if significant cultural resources may be affected by an installation undertaking;

- establishing funding priorities and programming funds;
- serving as the “agency official” (36 CFR 800), with responsibility for the installation’s compliance with the NHPA;
- serving as the “federal agency official” (43 CFR 10), with responsibility for installation compliance with NAGPRA;
- serving as the “federal agency official” (36 CFR 79), with management authority over archaeological collections and associated records;
- serving as the “federal land manager” (32 CFR 229), with responsibility for installation compliance with ARPA; and
- signing all NHPA PAs, MOAs, and NAGPRA Cooperative Agreements (CAs) and Plans of Action after command comments have been addressed, and overseeing the preparation of NRHP nominations for historic properties.

Marine Corps Air Station Yuma Director, Range Management Department. The RMD at MCAS Yuma controls operations at the BMGR West. The RMD Director oversees all range management functional units, including the Conservation Division. The RMD Director’s responsibilities include:

- scheduling the use of BMGR West lands for training field exercises and tests;
- advising the CO of proposed actions that may result in potential adverse effects to historic properties; and
- serving on the CO’s behalf as the government’s representative during government-to-government consultation with Native American tribes in accordance with DoD Instruction 4710.02.

Marine Corps Air Station Yuma Conservation Program Manager. The Conservation Program Manager’s responsibilities include:

- supervising the CRM;
- ensuring cultural resources are considered during planning and implementation of all discretionary federal actions under the purview of MCAS Yuma;
- coordinating cultural resources management activities with organizational elements, installation tenants, and other parties as identified by the CO;
- developing funding priorities for cultural resources program and compliance activities on the CO’s behalf;
- participating in consultation as described in this document or by other laws and regulations;
- serving on the CO’s behalf as the federal agency official with management authority over archaeological collections and associated records; and
- reviewing and approving requests for access to cultural resources data and signing non-disclosure agreements.

Marine Corps Air Station Yuma Cultural Resources Manager. The CRM’s responsibilities include:

- reviewing all projects to determine the type and level of impacts to cultural resources;

- determining the applicable laws and regulations and the applicable SOPs or other regulatory or consultation requirements;
- participating in consultation as described in this document or by other laws and regulations, and conducting and reviewing technical studies, as necessary;
- serving as the point-of-contact with the Arizona SHPO and the ACHP, and for Native American consultation;
- assisting the CO with developing funding priorities for cultural resources program and compliance activities;
- developing budget requirements for compliance with this ICRMP and any PAs or MOAs;
- coordinating and approving excavation permits on the installation;
- coordinating record keeping and artifact curation, including:
 - developing and maintaining records, reports, and documentation sufficient for consultation and assessment of NRHP eligibility (including maps, plans, notes, data forms, site records, photographs, memoranda, draft and final reports); and
 - curating artifacts in accordance with *Curation of Federally-Owned and Administered Archaeological Collections* (36 CFR 79).
- updating the ICRMP as needed, based on periodic reviews;
- providing cultural resources expertise for short- and long-range planning, advising other range planners, and conducting preliminary site surveys;
- ensuring that all proposed operations-related functions that may affect cultural resources on the range are identified early in the planning process, and coordinating with appropriate regulatory agencies regarding such work;
- conducting Section 106 reviews of all operations-related undertakings and negotiating agreement documents to complete the review process;
- developing and implementing agreement documents and preparing reports per the terms of the corresponding agreement document; and
- conducting range tours for and meetings with tribal representatives and others in connection with range planning and operations and with specific projects.

Marine Corps Air Station Yuma Communication Strategy and Operations. To heighten public and military awareness of the cultural resources identified on the BMGR West, the MCAS Yuma Communication Strategy and Operations (CommStrat) may assist the CRM in initiating an educational program related to historic preservation and the cultural resources situated on the range. CommStrat can help in locating historical information regarding station resources or activities and may assist in developing interpretive programs. CommStrat can also assist in promoting the ICRMP to the public and installation personnel.

Department of the Navy, Commandant's Legal, Western Area Counsel's Office. The Counsel's Office coordinates and reviews agreement documents (e.g., PAs, MOAs, NAGPRA CAs) to ensure that such documents are correct and complete, as these documents become legally binding. The Counsel serves as legal counsel in administrative cases, hearings, and enforcement actions, and may interpret various cultural resources laws and regulations.

Installation Tenants and Other Military Users. MCAS Yuma tenants are required to consult with the station and applicable local and regional agencies to obtain site approval for their projects and operations. Site approval instructions are routed through the RMD.

1.5.2. Nonmilitary Participants

Arizona State Historic Preservation Officer. The SHPO coordinates state participation and implementation of the NHPA and is a key participant in the Section 106 process of the NHPA. The SHPO consults with and assists the USMC with identifying historic properties, assessing project effects, and considering alternatives to avoid or reduce such effects. The SHPO takes into account the interests of the people of Arizona and the preservation of their cultural heritage. The SHPO also assists the USMC in identifying potential consulting partners. All undertakings at the BMGR West that fall under Section 106 must be coordinated with the SHPO or have a signed PA or MOA that allows for procedures agreed upon by all parties to be used instead of the standard Section 106 compliance process (see Section 1.3.2 for current agreements).

Advisory Council on Historic Preservation. The ACHP may be invited to participate in the Section 106 process or may participate as a result of comments received from any consulting party. If such a request is made, the ACHP has 15 days to acknowledge the request and to state their interest in participating. If the ACHP does request to participate, they have up to 45 days to provide comments. Copies of the agreement document are provided to the ACHP for review, if so requested.

Native American Groups. MCAS Yuma will provide timely opportunities for communication with Native American tribes concerning decisions that may affect them. MCAS Yuma will make every effort to ensure that consultation with the tribes is initiated as early as possible (e.g., during the initiation of the NHPA Section 106 process), and is carried out in good faith, and that honesty and integrity are maintained at all stages of the consultation process. Consultation should occur as part of a meaningful and comprehensive process that promotes effective communication between the tribes and MCAS Yuma. Consultations will respect the sovereign status of each Native American tribal government, and MCAS Yuma will work directly with federally recognized tribes on a government-to-government basis. A list of primary points-of-contact is provided in Appendix D.

Arizona Game and Fish Department. The AGFD manages the state's resident wildlife, which is held in trust for the citizens of the state of Arizona; this wildlife management responsibility also applies to the BMGR West. The AGFD was a joint member of the team preparing the BMGR INRMP five-year review (Luke Air Force Base and MCAS Yuma 2018a) and is part of the 2001 CA for implementing an ecosystem-based INRMP for the BMGR. The primary wildlife management responsibilities of AGFD on the BMGR West (Luke Air Force Base and MCAS Yuma 2018b) are:

- develop and maintain habitat assessment/evaluation, protection, management, and enhancement projects;
- conduct wildlife population surveys;
- manage wildlife predators and endangered species/special status species;
- issue hunting permits, enforce hunting regulations, and establish game limits for hunting, trapping, and non-game species collection; and
- assist and advise DoD in the management of off-highway vehicle use in terms of habitat protection and user opportunities.

United States Fish and Wildlife Service. The mission of the USFWS is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing

benefit of the American people. Among other things, the agency advises and assists the USMC with their efforts to protect and recover all threatened and endangered species as mandated by the Endangered Species Act of 1973, as amended (16 USC §§ 1531 et seq.). The USFWS was a joint member of the team preparing the BMGR INRMP five-year review (Luke Air Force Base and MCAS Yuma 2018a) and is part of the 2001 CA for implementing an ecosystem-based INRMP for the BMGR.

The USFWS leads the Sonoran Pronghorn Recovery Team and the implementation of the USFWS Sonoran Pronghorn Recovery Plan of 1998, as amended in 2016. The plan includes numerous proposed management actions, some of which have potential to disturb cultural resources; examples include habitat enhancements, placement and maintenance of artificial water sources, and selective thinning of vegetation.

United States Customs and Border Protection. The priority mission of the U.S. Customs and Border Protection (CBP), a component of the U.S. Department of Homeland Security (DHS), is managing, securing, and controlling the nation's borders. The CBP is responsible for preventing illegal entry into the United States and for apprehending undocumented aliens who have entered the United States illegally. The southern boundary of the westernmost portion of the BMGR West includes approximately 37 miles of the international border between the United States and Mexico. Activities involving the smuggling of people, drugs, or other contraband occur on the BMGR West. Two CBP jurisdictional sectors, the Tucson and Yuma sectors, are responsible for the entire Arizona-Mexico border, with the latter covering the BMGR West through the Wellton and Yuma stations.

Although the DHS has the authority to waive environmental laws under certain circumstances, activities such as road maintenance, dragging of roads, and placement of Multiple Surveillance Capability (MSC) vehicles have not been included in any waiver. MCAS Yuma has had a series of discussions and formal meetings between the MCAS Yuma CO and the CBP Yuma Sector Chief and between the MCAS Yuma Conservation staff and CBP Yuma Sector Public Lands Liaison. MCAS Yuma has also entered into an MOU regarding CBP's action on the range to prevent or minimize the impact to cultural and natural resources.

Due to several instances of CBP agents inadvertently damaging historic properties between 2015 and 2019 (including as recently as March 2019), MCAS Yuma Conservation staff stepped up their efforts to encourage CBP to collaborate with MCAS Yuma in the protection of natural and cultural resources during the conduct of their mission. MCAS Yuma RMD personnel dedicated many hours in 2017 delineating multiple locations so as to provide CBP with suitable locations for the deployment of MSC trucks where such activities would not cause negative impact to cultural and natural resources. In October of 2018, MCAS Yuma representatives held a meeting with CBP officials, including the CBP Yuma Sector Agent-in-Charge, to request that CBP personnel discontinue the practice of randomly placing MSC trucks in culturally sensitive areas within BMGR West. In February of 2019, MCAS Yuma Conservation staff met with the Quechan Cultural Committee and CBP Yuma Sector staff to discuss the importance of CBP staying within approved locations and on approved roads. During March of 2019, an MCAS Yuma RMD Conservation Law Enforcement Officer (CLEO) spent several hours training various shifts of agents on the importance of protecting natural and cultural resources on the BMGR West by staying within approved locations and on approved roads.

Although MCAS Yuma will continue to try to work proactively with the CBP in minimizing impacts to natural and cultural resources, RMD will request funds from CBP for costs of any evaluations, excavations, and tests incurred by MCAS Yuma during the assessment of damages caused by CBP activities to any cultural resource site.

Public Participation. Public interest in historic preservation matters on the BMGR West and participation during the Section 106 process is encouraged by the installation. The USMC and the SHPO seek and consider the views of the public when taking steps to identify and evaluate historic properties and when developing alternatives. Public participation in the Section 106 process is coordinated with and satisfied by such programs conducted by the USMC under the authority of NEPA and other regulatory requirements. Providing public notice includes providing historic preservation information to the public adequate to elicit feedback on such issues that can then be considered resolved in decision-making. Members of the public are given a reasonable opportunity to provide input and may have an active role in the overall process.

The Barry M. Goldwater Range Executive Council. Since 1997, representatives of Luke Air Force Base, MCAS Yuma, the AGFD, the USFWS, the Bureau of Land Management, and the National Park Service have met frequently to discuss BMGR regional issues. This group, called the BMGR Executive Council, is not a decision-making body, but the sharing of information that takes place at these meetings facilitates regional solutions to common problems that are difficult or impossible to address one agency or jurisdiction at a time. This is particularly useful because the missions and responsibilities of the non-military agencies transect land management boundaries. MCAS Yuma sends one representative to this council.

The Intergovernmental Executive Committee. In recognition of the level of public interest in the management of natural and cultural resources at the BMGR, the MLWA of 1999 called for the creation of an Intergovernmental Executive Committee comprised of:

...selected representatives from interested federal agencies, as well as at least one elected officer (or other authorized representative) from State government and at least one elected officer (or other authorized representative) from each local and tribal government, as may be designated at the discretion of the Secretary of the Navy, the Secretary of the Air Force, and the Secretary of the Interior [PL 106-65 §3031(b)(6)].

The sole purpose of the Intergovernmental Executive Committee is to exchange views, information, and advice pertaining to the management of natural and cultural resources on the BMGR. The Intergovernmental Executive Committee, consisting of representatives of federal and state agencies, local governments, and federally recognized tribes, meets three times a year, rotating the location between Tucson, the Phoenix metropolitan area, and Yuma, and its meetings are open to the interested public. MCAS Yuma sends one representative to this committee to address local concerns.

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2. CULTURAL RESOURCES MANAGEMENT STRATEGY

2.1. MILITARY AND NON-MILITARY ACTIVITIES ON BARRY M. GOLDWATER RANGE WEST THAT MAY HAVE THE POTENTIAL TO AFFECT CULTURAL RESOURCES

2.1.1. Military Training Facilities and Uses

The primary mission of the BMGR West is to support readiness training by the USMC and USN aircrews, including use as (1) an armament and high-hazard testing area; (2) training for aerial gunnery, rocketry, electronic warfare, and tactical maneuvering and air support; and (3) other defense-related purposes. For the USMC and other users, the BMGR West is an essential component of their ability to produce the combat-ready crews needed to defend the nation and its interests. Table 2, which was adapted from the 2018 INRMP Public Report (Luke Air Force Base and MCAS Yuma 2018b), provides a summary of the current military training facilities and military uses at the BMGR West (see Sections 1 and 2 of Part I of the ICRMP [Luke Air Force Base 2009a] for additional details).

In addition to developed targets and ground support areas, 636 miles of roads are present on the BMGR West, of which 209 miles are administrative (non-public) use and 427 miles are for administrative and public use (Luke Air Force Base and MCAS Yuma 2018b). This road network provides surface access to, between, or within the various functional areas of the range. All vehicles are restricted to designated roads except as required by explosive ordnance disposal, maintenance, emergency response, and environmental staff and contractors conducting required mission support activities.

Table 2. Current Military Training Facilities and Uses at Barry M. Goldwater Range West

Range Feature or Facility	Description
Surface Area and Airspace	
BMGR West Surface Area	The BMGR West surface area consists of approximately 40 percent of the total BMGR acreage; boundary and land withdrawal areas were established by the MLWA of 1999.
Restricted Airspace	R-2301W lateral boundaries, altitude floor (ground surface), and altitude ceiling (80,000 feet above mean sea level) are unchanged since 1960.
Airspace Subranges	Four airspace subranges (TACTS-Hi, TACTS-Low, Cactus West, and AUX-II) are allocated to one or more subranges or are aggregated into larger units as needed to support training.
Aviation Training Ranges and Facilities	
AUX-II	AUX-II provides an assault landing zone airstrip for training aircrews of C-130 aircraft to operate in and out of a primitive landing zone in a forward area; AUX-II also continues to be used as a staging area or FARP for helicopter operations.
F-35B ALF	Construction of the F-35B ALF, otherwise known as KNOZ, was completed in 2015; the ALF includes three simulated landing helicopter assault decks, flight control towers, aircraft maintenance shelter, refueling apron, and a fire and rescue shelter.
Cactus West Target Complex	The Cactus West Target Complex includes a bull's-eye target, located inside a 1,500-foot radius bladed circle, and two berm and panel targets for strafing practice; ordnance deliveries are restricted to inert and practice munitions.

Table 2. Current Military Training Facilities and Uses at Barry M. Goldwater Range West

Range Feature or Facility	Description
Urban Target Complex	The Urban Target Complex provides a simulated urban setting with streets, 240 buildings, multiple targets, and vehicles for training aircrews in precision air-to-ground attack in densely developed and populated areas; the complex is located inside a fenced area.
Instrumentation	A portion of the TACTS Range is instrumented to support air-to-air and air-to-ground combat training; the electronic architecture is composed of 27 fixed-positions and 17 mobile-positions that can track, record, and replay the simultaneous actions of 36 aircraft and scoring weapon use; no munitions are fired or otherwise released on this electronically scored range.
Air-Ground Training Facilities	
Ground Support Area	Thirty-three undeveloped ground support areas allow units to participate in off-road training exercises; most ground troop developments are coordinated with aviation training exercises to enhance the realism of air-ground training evolutions for both elements.
Parachute Drop Zones	Twenty-one parachute tactical drop zones are currently designated. The AUX-II drop zone is located within a previously disturbed, inactive bull's-eye bombing target; the drop zone immediately to the east of AUX-II is the only drop zone approved for parachute cargo drops, which require retrieval by an off-road combat forklift. Ten drop zones are located within ground support areas to minimize off-road driving for retrievals.
Ground Combat Training Ranges	
Rifle and Pistol Ranges	The Rifle and Pistol Ranges are used to train and qualify personnel in the use of small arms.
Small Arms Live-Fire Maneuver Range (Range 2)	The Small Arms Live-Fire Maneuver Range is located in an unused sand and gravel borrow pit and serves as a close combat maneuvering range for training small teams or individuals in the tactical use of infantry small arms.
Multi-Purpose Machine Gun Range (Panel Stager)	The Multi-Purpose Machine Gun Range is located at the inactive air-to-ground bombing target at the Panel Stager Range 2; ground-to-ground machine gun fire of .50 caliber and smaller is directed from guns mounted on vehicles traveling on existing access roads at target sets located in the retired bombing impact area.
CSOC 1 and 2, Murrayville (East and West)	Four CSOCs are designed to train troops assigned to protect vehicle convoys in combat theaters; static and pop-up targets that simulate threats are located in ambush scenarios along the access road and run-in line; these are located along the existing access roads in the vicinities of the Cactus West Target Complex, Urban Target Complex, and along the run-in line to the Urban Target Complex.
Combat Village	The Combat Village simulates a small building complex adjacent to a railroad; this facility is used as an electronically scored target and for training small units in infantry tactics involving reconnaissance, assaults, or defense; only blank small arms munitions and a special effects small arms marking system are authorized.
Hazard Areas	Five hazard areas, four to the west and one to the east of the Gila and Tinajas Altas mountains, support use of small arms and/or aircraft lasers in training operations; surface entry to hazard areas is closed to nonparticipating personnel when hazardous activities are scheduled.
Support Areas	
Cannon Air Defense Complex	The Cannon Air Defense Complex provides administrative, maintenance, and training areas for a Marine Air Control Squadron; the complex is a permanent built-up facility of about 192 acres.

Table 2. Current Military Training Facilities and Uses at Barry M. Goldwater Range West

Range Feature or Facility	Description
AUX-II FASP	The FASP provides temporary secure storage for munitions used by ground units during exercises, primarily during semi-annual weapons and tactics instructor courses; the FASP is located about 1,500 feet northwest of AUX-II.
Munitions Treatment Range	The Munitions Treatment Range is used to train personnel in using demolitions explosives and unexploded ordnance.
Live Ordnance and Drop Tank Jettison Area	The Cactus West Target bull's-eye is used as a Live Ordnance and Drop Tank Jettison Area for aircraft experiencing difficulties that warrant a precautionary jettisoning of external stores prior to recovery at MCAS Yuma. Panel Stager Range 2 is currently used as the impact area for the Multi-Purpose Machine Gun Range.

Source: adapted from Table 2-2 in the 2018 INRMP Public Report (Luke Air Force Base and MCAS Yuma 2018b)

ALF = Auxiliary Landing Field; AUX-II = Auxiliary Airfield II; BMGR = Barry M. Goldwater Range; CSOC = Convoy Security Operations Courses; FARP = forward arming and refueling point; FASP = Field Ammunition Supply Point; MCAS = Marine Corps Air Station; MLWA = Military Lands Withdrawal Act of 1999; TACTS = Tactical Aircrew Combat Training Systems

2.1.2. Barry M. Goldwater Range West Management Units and Public Access

The original INRMP identified seven management units within the BMGR, three of which are within the BMGR West (Luke Air Force Base and MCAS Yuma 2007). Because of differences in their historical and proposed uses, as well as differences in the natural resources they contain, the Record of Decision for the INRMP EIS includes different management strategies for some units.

- **Management Unit 1** (approximately 230,000 acres) lies mostly within the restricted area in the westernmost portion of the BMGR West and is off limits to most public visitation. Although a number of military operations occur within this unit, the surface effects of these activities are limited to a small portion of the area. Existing roads provide limited access to most of the unit.
- **Management Unit 2** (approximately 265,000 acres) incorporates a topographically diverse landscape including the Gila Mountains, Copper Mountains, Wellton Hills, and Baker Peaks, as well as the Lechuguilla Desert Valley. Tactical Aircrew Combat Training System Range facilities and the USMC ground support areas are located within this unit. With the exception of the laser hazard area, public access is compatible with current military operations throughout most of this unit. This unit, which includes areas with some of the highest road densities within BMGR, has long been a popular public outdoor recreation area.
- **Management Unit 3** (approximately 195,000 acres) occupies the easternmost area of the BMGR West and is generally bounded on the east by the Mohawk Mountains, although the northeastern corner of the area lies on the eastern side of these mountains. This unit contains some of the largest roadless areas on the BMGR West. Military surface use within Unit 3 is limited to five widely dispersed ground support areas and scattered Tactical Aircrew Combat Training System Range instrument sites. The area is generally open to public visitation on a seasonal basis, but the rates of visitation are less than those experienced in Management Unit 2. The unit is within the current range

of the endangered Sonoran pronghorn, which extends eastward into the BMGR East and southward into the Cabeza Prieta National Wildlife Refuge.

There are no developed recreation sites or facilities on the BMGR West. All recreational access is by permit only, and public access may be restricted occasionally to support military activities that present safety hazards and/or have security requirements. Visitors must abide by range-specific rules, including rules related to rock hounding and hunting (Luke Air Force Base and MCAS Yuma 2018b). Disturbance or removal of cultural artifacts is strictly prohibited.

Those members of the public who wish to access the range must visit www.luke.isportsman.net to obtain a range pass, watch a safety video, and sign a hold-harmless agreement with the DoD prior to accessing range lands. BMGR West Rules, available on the website, emphasize the fact that cultural resources are protected under federal law from collection, damage, or disturbance of their settings.

Public access to, and use of, portions of the range may be restricted or curtailed if and when such measures are required in order to protect vulnerable resources, such as sensitive cultural resources.

2.1.3. Other Activities under the Barry M. Goldwater Range Integrated Natural Resources Management Plan

The original BMGR INRMP (Luke Air Force Base and MCAS Yuma 2007) identified specific goals for the range that support the military mission, the protection and conservation of cultural resources, and public access, some of which fall under the purview of, or may trigger stewardship actions under, the Cultural Resources Management Program:

- Manage cultural resources in accordance with the BMGR ICRMP.
- Provide for public access to BMGR resources for sustainable multipurpose use, consistent with the military purposes of the range (including security and safety requirements) and ecosystem sustainability.
- Apply ecosystem management principles through a goal- and objective-driven approach that recognizes social and economic values; is adaptable to complex, changing requirements; and is realized through effective partnerships among private, local, state, tribal, and federal interests.
- Meet or exceed the statutory requirements of the MLWA of 1999, the Sikes Act, and other applicable resource management requirements.
- Require that public access (via a range pass) and use of the BMGR be compatible with mission activities and other considerations such as security, safety, and resource conservation and protection goals.
- Incorporate cultural resource protection strategies that reflect DoD's mandate to preserve cultural resources, including consideration of those resources in its decision-making process.
- Comply with *Protection of Historic Properties* (36 CFR 800) and DoD policy, which require agencies to initiate consultation with the SHPO, tribes, and others, pursuant to Section 106 of the NHPA, early in the planning process, when the widest range of prudent and feasible alternatives is available and issues identified through consultation may be resolved most easily.

- Be consistent with the ICRMP for the BMGR.
- Prohibit commercial tour operations on the BMGR unless a range policy is developed to permit and regulate or restrict this use.
- In accordance with Section 3031(b)(3)(E)(vi)(I) of the MLWA, develop an MOA with agencies and tribal governments responsible for lands adjacent to the BMGR to establish courses of action to be taken by SECNAV to prevent, suppress, and manage brush and range fires occurring outside the boundaries of the range resulting from military activities.

Additional activities discussed in the 2018 INRMP Public Report (Luke Air Force Base and MCAS Yuma 2018b) that could affect cultural resources and may trigger stewardship actions include wildlife enhancement projects (e.g., water and food plots), invasive species control, illegal border traffic, wildland fire management, public recreation, and installation of signs, gates, and fences to support road infrastructure and public access.

2.2. CULTURAL RESOURCES OVERVIEW

2.2.1. Cultural Historical Overview

Section 5 of Part I of the ICRMP (Luke Air Force Base 2009a) provides a comprehensive cultural historical overview of the BMGR, from the Paleoindian period to present day. It summarizes each time period, identifies current research issues, and provides the background necessary for evaluating potential historic significance of cultural resources on the BMGR West.

2.2.2. Previous Cultural Resources Investigations

Cultural resource inventories are one of the most valuable tools in an installation's planning program. Such inventories facilitate forward planning by indicating areas of the range and training areas that are sensitive for archaeological sites and historical buildings and areas in which undertakings may occur without concern for adversely impacting significant cultural resources. Such inventories also help with identifying the risk, expense, and investment of time that must be incurred by a project to avoid or mitigate impacts to significant sites.

While smaller military installations may have completed 100 percent cultural resource inventory on lands within their jurisdiction, the majority of larger installations have yet to complete archaeological and historical resource inventories. One of the goals of the cultural resources program for the BMGR West is to accomplish 100 percent survey coverage, in order to obtain a complete picture of the resources requiring management. Because the range's boundaries cover such a vast land area (approximately 700,000 acres), a complete survey has yet to be completed. Long-term planning is in place to continue systematic surveys of the entire range (see also SOP #1 for more information).

While a full inventory of the BMGR West has yet to be accomplished, current knowledge of the cultural resources on the range has provided a cursory understanding of areas of low, medium, and high archaeological and historical sensitivity. The following discussion of previous studies addresses overview studies and archaeological investigations, historic building and structure evaluations, and other studies for the range.

Overview Studies and Archaeological Investigations

As of May 2019, about 142,448 acres (20 percent of the range) have been surveyed for archaeological resources. Appendix E-1 lists 92 cultural resources investigations based on the current MCAS Yuma Cultural Resources database and identifies each study by MCAS Yuma report number, title, author, and contractor. This list includes several large overview studies and context studies that have been prepared for either the BMGR as a whole or specifically for the BMGR West (e.g., Ahlstrom 2000; Hartmann and Thurtle 2000; Schaefer et al. 2007; Woodall et al. 1993). The majority of prior studies relate to investigations associated with specific undertakings with the potential to affect cultural resources (e.g., Apple 1996; Middleton 1981; Schaefer and Andrews 2010; Underwood 2003). Of particular note, however, is the number of recent surveys covering large expanses of land ranging from 6,000 to over 26,000 acres on the BMGR West (e.g., Hart and Hart 2011; Hlatky et al. 2016; Keur et al. 2015; Laine and Seymour 2016; Neuzil 2012). Even though only 20 percent of the range is currently surveyed, long-term planning is in place for systematically surveying the entire range, as noted above.

Historic Building and Structure Evaluations

All buildings and structures on the BMGR West that were built prior to 1969 have been evaluated for significance based on the four NRHP criteria for evaluation. All seven were either determined not eligible for listing on the NRHP or, through consultation with the Arizona SHPO, were determined to be nonstructural elements of a type that are not generally considered for listing on the NRHP. All buildings and structures on the BMGR West that were built during the Cold War (i.e., prior to 1990) have been evaluated for significance based on *Criteria Consideration (g)* of the NRHP (a property achieving significance within the past 50 years if it is of exceptional importance). Of the 17 that fall into this category, 8 were determined not eligible for listing on the NRHP under *Criteria Consideration (g)*, and, through consultation with SHPO, 9 were determined to be nonstructural elements of a type that are not generally considered for listing on the NRHP. The eight properties that were determined to be not eligible for listing on the NRHP under *Criteria Consideration (g)* will be reassessed for significance once they reach the 50-year threshold.

Cultural Affiliation Study

A BMGR West Cultural Affiliation Study (Fortier and Schaefer 2010) was conducted in accordance with Section 110 of the NHPA and in support of NAGPRA, the American Indian Religious Freedom Act, Executive Order 13007 (*Indian Sacred Sites*), and Executive Order 13175 (*Consultation and Coordination with Indian Tribal Governments*). The study presents overviews of the history, culture, and indigenous peoples of southwestern Arizona, including information about the Yuman speaking peoples of the Colorado and Gila River regions as well as the Piman speaking peoples known as Tohono O'odham and Hia C-ed O'odham. The study also presents information about Native American culturally significant resources which have been used for food, ritual activities, and construction materials by the affiliated tribes of the BMGR West region. This may help MCAS Yuma better assess potential impacts to natural and cultural resources of concern to the affiliated Native American tribes of the BMGR West region.

2.2.3. Recorded Cultural Resources

For the most part, sites identified at the BMGR West are split fairly evenly between prehistoric and historical resources. The prehistoric resources found on the range include an array of

pre-contact cultural remains, including lithic and ceramic artifact scatters, temporary habitation sites, rock features and rock art, prehistoric trails, and other sites. These prehistoric resources document the continuous use of the range from its earliest known inhabitants of the Paleoindian Period (approximately 7,500 to 10,000 years ago) through the time of Euro-American exploration and settlement. Previously documented historical resources located within the BMGR West are World War II-era military bombing targets, historic trash scatters and roadways, evidence of mining activities, campsites, and historic artifact scatters.

Appendix E-2 lists previously recorded cultural resource sites within the BMGR West based on the current MCAS Yuma Cultural Resources database. The list provides the MCAS Yuma site number and corresponding ASM site number, NRHP eligibility determination, references for the original site recordation and any updates, and a brief description of the recorded resource. According to the current database, there are 414 recorded sites located within the BMGR West as of May 2019. Of these sites, 1 is listed on the NRHP, 113 have been determined eligible for listing, 203 have been determined not eligible for listing, and 97 have not been evaluated (see Appendix E-2). The NRHP-listed site is El Camino del Diablo (BMGRW-0002/SON C:1:15), which consists of an overland route and associated artifact scatters, trails, and roads that leads from Sonoyta, in Mexico, into the U.S. through the Cabeza Prieta National Wildlife Refuge, entering the BMGR West about 3 miles north of the U.S./Mexico border and heading west to the Tinajas Altas Mountains. Although the route is known to run north from there on both the east and the west sides of the Gila Mountains, only the east/west trending southern portion is listed on the NRHP.

2.2.4. Traditional Cultural Properties

Traditional Cultural Properties (TCPs) are defined in Parker and King (1990) as places of special heritage value to contemporary communities because of their association with the cultural beliefs or practices that provide a foundation for those communities and provide a basis in maintaining cultural identity. It should be noted that not all TCPs are related to Native American sacred sites; the term is applied to any traditionally used site, regardless of cultural affiliation. It should also be stated that a great deal of knowledge regarding specific TCPs is likely unavailable to researchers, as the Native American community often maintains such information as confidential.

Much of the effort to identify TCPs on the range lies in consultation with affiliated tribes. The Native American community may assign cultural significance to land and other kinds of natural resources on a broad scale, or may focus on discreet locations. TCPs may also cover a range of resource types, from geographic features to traditional resource gathering areas.

An inventory of TCPs was undertaken by Dames and Moore (Tisdale 2001) and conducted in consultation with Native American tribes in the region. The general types of sites that are considered TCPs within the BMGR's boundaries include *tinajas*, caches of religious goods, possible burials, pictographs, and rock features (alignments, cleared circles, and intaglios). Sometimes referred to as natural water tanks, *tinajas* are naturally occurring depressions or catchments that can catch and hold surface water. There are also intermittent streams, mountain springs, and sand catchments located within the BMGR West. Because water is necessary for survival and is the primary limiting factor in an area as arid as the western Papagueria, natural water sources would have likely been assigned high cultural importance.

No TCPs or sacred sites on the BMGR West have been officially identified or designated by Native American representatives to date. As discussed in Section 2.3.4 (*Access to Cultural Resources Data*), MCAS Yuma does not ask for, nor does it maintain, locational information for any TCPs or sacred sites that the tribes wish to keep confidential.

2.2.5. Other Unique or Sensitive Cultural Resources

Buried Cultural Resources

The potential for buried cultural resources depends on the geology, the geomorphology, and the soil types (to mention a few of the most dominant factors) found throughout the BMGR West. As more research is conducted in and around the range, more accurate appraisals can be made regarding the potential for buried cultural deposits. Several areas have already been identified as having known buried cultural deposits. These areas should be considered of high importance when making decisions about projects or actions that could affect them.

Desert Pavement

Areas on the range with desert pavement are also considered to have archaeological potential. Desert pavement signifies areas that have maintained their surface and subsurface integrity and are typically indicative of undisturbed, older soil deposits. Desert pavement is formed when finer grained soils are swept away by winds, through winnowing of fine-grained sediments during rain, or by larger stones moving progressively upwards as finer-grained soils are redeposited beneath the surface.

Tinajas

Tinajas, which translates as “small jars” in Spanish, are natural water-collecting bedrock depressions that were utilized by the prehistoric and historical inhabitants of the BMGR West as one of the few reliable water sources in the region. *Tinajas* are also imbued with a certain spiritual or religious significance and may qualify as TCPs, as noted above.

Trails

Over 50 pedestrian trails, whose periods of use range from the preceramic to the historical, have been recorded as sites or features within sites on the BMGR West. In addition to pedestrian trails, archaeologists have also noted myriad animal trails within their survey areas. Further complicating the identification of anthropogenic trails are those created by humans that have been utilized by animals in historical or modern times. With only 20 percent of the range surveyed, it can be estimated that there are another 250 pedestrian trails that have yet to be recorded on the BMGR West.

Trails on the BMGR West that were used by its prehistoric inhabitants are generally considered spiritually significant features to the Native American tribes who consider some portions of the range as part of their aboriginal territories. Trails with temporally associated features or artifacts are typically considered significant for their contributions to the scientific knowledge about aboriginal travel and trade in this region. Due to the importance of aboriginal trails to both the Native American tribes and the scientific community, MCAS Yuma has specific instructions for recording trails that help to capture as much information as possible (see Appendix C).

2.2.6. Heritage Assets

The DoN defines heritage assets as unique items of historical or natural significance that are categorized as “collections” and “non-collections.” Collections include artifacts, archival information (including audiovisual, electronic, text, and other similar documentation), artwork, and historical artifacts. Non-collections are defined as archaeological sites, buildings and structures, cemeteries, and memorials and monuments.

Importantly, the broad category of heritage assets includes properties subject to treatment as cultural resources, as well as other objects, such as artwork, flags, uniforms, and similar items that do not qualify for protection under historic preservation law. These latter objects are not subject to management under this ICRMP; however, they are subject to reporting to the DoN and the USMC Historical Center.

2.2.7. Data Gaps

Although substantial cultural resources work has been completed to date, forming a considerable base of knowledge for the BMGR West, there remains data gaps and the potential for discovery of additional historic properties. Given the large size of the BMGR West (approximately 700,000 acres), a complete inventory of range property has not been completed. Since the MLWA of 1999 transferred control of the BMGR West to MCAS Yuma, there have been approximately 40 cultural resources surveys on the range. Each of these surveys was conducted in support of one of three general project categories: military use (12 surveys); other agencies (e.g., the CBP, Arizona Department of Transportation) (13 surveys); and natural and cultural resources studies (15 surveys). Surveys for the military and other agencies are funded by the project proponent and are specific to the locations of the proposed projects. As of May 2019, about 142,448 acres (20 percent of the range) have been surveyed for archaeological resources.

The majority of the cultural resources studies, totaling over 100,000 acres, have been conducted within the Area of Potential Effects (APE) of the 2005 INRMP PA and focused on designated roadway corridors and areas of known high traffic use by the CBP and for public recreation. Because the corridors of all of the designated roadways on the BMGR West have now been surveyed, future cultural resources funding will be used mainly for inventorying resources within high traffic areas (see also Section 2.3.7, under *Integrated Natural Resources Management Plan Programmatic Agreement Site Monitoring and Management Plan*).

Of the 414 sites recorded to date located within the BMGR West, 97 have not been evaluated for listing on the NRHP. Therefore, a primary data gap centers on evaluating recorded resources that have either not been evaluated or warrant reevaluation for NRHP eligibility (see also Section 2.3.7, under *National Register of Historic Places Evaluation of Undetermined Sites*). While sites should be evaluated under all NRHP criteria, a robust research design can be used to set the stage for evaluating a site under NRHP *Criterion D* (have yielded or may be likely to yield, information important in history or prehistory). A well-developed research design should be set within a historical context appropriate for the range and should include a series of research questions relevant to the region. For prehistoric sites, these questions may center on core themes, such as chronology, subsistence, settlement, and trade. For historic period sites, core themes may include contact and interaction between Native Americans and non-indigenous groups, transportation, mining, and military land use. Section 6 of Part I of the ICRMP (Luke Air Force

Base 2009a) provides more information on relevant research questions and the NRHP evaluation process, including guidance for evaluations of TCPs.

2.3. MANAGEMENT ACTIONS

MCAS Yuma is responsible for compliance with several laws, regulations, policies, and directives related to the management of cultural resources (Section 1.4, *Laws, Regulations, and Standards*). This section addresses management actions on the BMGR West that support the installation's compliance with these requirements, while fulfilling its mission and supporting the missions of its tenants. Additionally, regularly scheduled training for MCAS Yuma personnel involved with cultural resource issues are available on an annual basis, as needed, including overviews of regulatory requirements (e.g., NHPA, ARPA, NAGPRA).

2.3.1. Integrated Cultural Resources Management Plan Updates

As required by *U.S. Marine Corps Guidance for Completion of an Integrated Cultural Resources Management Plan Update* (USMC 2009), this ICRMP will be reviewed annually and updated on an as-needed basis to take into account new information and address any problems encountered with using the document. During the annual review, the CRM will complete a self-assessment to determine the success of the cultural resources program over the previous year and to note specific accomplishments or challenges encountered. Annual reviews may also include participation by external stakeholders to note changes in points-of-contact, discuss initiatives completed over the previous year, and outline upcoming projects.

ICRMP updates will integrate the latest available cultural resources information, including any new cultural resource studies on the BMGR West and any sites that have been newly identified, evaluated, or mitigated. Existing or new federal laws or regulations will be updated or added to relevant sections of the ICRMP, and any regulatory actions or violations that have occurred since the last update will be noted. SOPs will be improved and updated as needed based on the result of their use. Updates to the ICRMP will also consider any changes in the military mission, substantial increases or decreases of range acreage, identification of new consulting partners, and achievement of major program milestones. All updates to this ICRMP will be made in compliance with DoD Instruction 4715.16.

Future ICRMP updates will be summarized in this section.

2.3.2. Standard Operating Procedures for Cultural Resources Compliance Actions

MCAS Yuma has developed a series of SOPs that address the installation's objectives, staffing, policies, and compliance actions to ensure legal and regulatory requirements for managing cultural resources are fulfilled.

National Historic Preservation Act Compliance (SOPs #1 and 2)

Requirements for Section 110 of the NHPA compliance are provided in SOP #1. Section 110 guides federal agencies in ensuring that historic preservation is integrated with agency programming and charges these agencies with the responsibility to identify, preserve, and maintain historic properties within their jurisdictions. Each federal agency is responsible for establishing a preservation program to identify, evaluate, protect, and preserve historic properties and prepare nominations for the NRHP. Out-year funding should be programmed to take into

consideration the costs of completing a Section 110 inventory of the entire BMGR West. In particular, the program should set goals for the number of acres to be surveyed per year contingent upon funding to work towards completion of a comprehensive record of archaeological sites located on the range. The program should also set goals for evaluating sites on a regular basis, as funding allows.

Procedures for Section 106 of the NHPA compliance are provided in SOP #2. Section 106 directs federal agencies to take into account the effect of their undertakings on historic properties. Compliance procedures are outlined in the ACHP's regulations, *Protection of Historic Properties* (36 CFR 800). These include guidance on how to identify, evaluate, determine effects, and resolve adverse effects of all undertakings on historic properties. The NHPA recommends that federal agencies begin the Section 106 process early in the undertaking's planning so that a broad range of alternatives may be considered during the planning process for the undertaking. Consultation with the SHPO and communication with Native Americans should begin in this critical early phase and continue through the phases that follow. In addition to the SHPO and Native American representatives, the USMC will also plan to enter into discussion with other parties that have a demonstrated interest in the project at hand, including interested members of the public.

The Section 106 process is often conducted concurrently with the processes associated with NEPA. NEPA mandates that federal agencies consider all environmental consequences relevant to proposed actions and reasonable alternatives and include the public in the decision-making process. A cultural resources survey with NHPA Section 106 review often supports the cultural resources component of an Environmental Assessment (EA) or an EIS, which are two types of documents that may be used to detail the analyses of impacts performed during the NEPA process. Although the NEPA process can be used to satisfy Section 106 compliance review, MCAS Yuma typically adheres to the regulations separately yet runs the processes concurrently. Several factors contribute to this preference including funding, contracting, and timing of the processes. The most significant factor, however, is the release of cultural resource locations. Often an essential part of Section 106 review, these locations cannot be disclosed in public documents, including EAs and EISs. Thus, a summary of the thorough Section 106 review is written for inclusion in the public NEPA documents.

Archaeological Resources Protection Act Compliance (SOP #3)

ARPA strengthened protection of archaeological resources on federal and tribal lands by changing the criminal classification for unauthorized excavation, collection, or damage from misdemeanors (defined by the Antiquities Act of 1906) to felonies. Trafficking in archaeological resources from public and tribal lands is also prohibited by ARPA. ARPA requires notification of affected Native American tribes if archaeological investigations would result in harm to or destruction of any location considered by tribes to have religious or cultural importance. Policies and procedures for ARPA permits, ARPA violation documentation, and other actions are provided in SOP #3.

Native American Graves Protection and Repatriation Act Compliance and Inadvertent Discoveries (SOPs # 4 and 5)

NAGPRA protects human remains, funerary objects, sacred objects, and items of cultural patrimony of indigenous peoples on federal lands. NAGPRA also applies to collections management related to the treatment of Native American human remains, associated or

unassociated funerary objects, sacred objects, and objects of cultural patrimony. This includes collections that were previously recovered and held in federal or federally funded archaeological repositories. Requirements for federal collections include the preparation of an inventory of NAGPRA-related artifacts, human remains, and funerary objects. NAGPRA also contains provisions for repatriation of such objects to lineal descendants or culturally related Indian tribes. Policies and procedures for NAGPRA inventories, consultations, and inadvertent discoveries of NAGPRA-related materials are provided in SOP #4.

SOP #5 provides procedures for inadvertent discoveries of non-NAGPRA-related cultural materials. These inadvertent discoveries, also referred to as post-review discoveries, are managed in accordance with the Secretary of the Interior's regulations, *Protection of Historic Properties* (36 CFR 800.13).

Treatment and Curation of Archaeological Collections (SOP #6)

The regulations titled *Curation of Federally-Owned and Administered Archaeological Collections* (36 CFR 79) establish definitions, standards, procedures, and guidelines to be followed by federal agencies to preserve collections of prehistoric and historical material remains and associated records recovered under the authority of the Antiquities Act (54 USC §§ 320301 et seq.), the Reservoir Salvage Act (54 USC §§ 312501 et seq.), the NHPA (54 USC §§ 300101 et seq.), or ARPA (16 USC §§ 470aa–mm).

While most collections associated with the BMGR West are currently housed at the ASM in Tucson, Arizona, some collections are at the BMGR Repository at Gila Bend Air Force Auxiliary Field and the MCAGCC Curation Facility. New collections will be housed at the MCAGCC Curation Facility for long-term storage and curation per an MOA for curatorial services of archaeological artifacts, specimens, and associated records (see Section 1.3.2 and Appendix B). Copies of technical reports, site records, and other associated materials are also housed at MCAS Yuma and managed by the MCAS Yuma CRM. Additional policies and procedures for the treatment and curation of archaeological collections are provided in SOP #6.

Tribal Consultation Program (SOP #7)

Consultation is the formal, mutual process by which an installation commander and/or CRM communicates and coordinates with tribal governments. It is intended to foster positive relationships with sovereign Native American nations and to ensure active participation by tribes in planning and implementing activities that may affect resources of interest to those groups. Consultation provides an essential means of obtaining the advice, ideas, and opinions of Native American parties regarding the management of federal resources, as well as ensuring the concerns of all involved parties are addressed. SOP #7 provides policies and procedures for tribal consultations regarding activities carried out on or issues concerning the BMGR West.

2.3.3. Cultural Resources Data Management

The MCAS Yuma CRM manages cultural resources databases and records, which are housed at MCAS Yuma and include:

- hard copies of all reports;
- digital copies of all reports;
- historical maps and documents;

- hard and digital copies of internal and external correspondence;
- hard and digital copies of relevant literature concerning cultural resources;
- hard and digital copies of all site forms; and
- digital (Adobe Portable Document Format [PDF] and GIS) information for all sites and survey areas.

The BMGR West cultural resources GIS data are managed in two feature classes (*Cultural_Resources* and *Cultural_Resources_Restricted*) within the structure of the MCAS Yuma Spatial Data Engine (SDE). Within the *Cultural_Resources* feature class is the *CulturalSurveyArea* polygon feature, which contains the attributes for each of the cultural resources surveys that have been performed on the range. The *Cultural_Resources_Restricted* feature class contains one polygon feature and one point feature, *ArchaeologicalSiteArea* and *ArchaeologicalSitePoint*, respectively. As can be inferred from their titles, the data in the *Cultural_Resources* feature class can be accessed by personnel who have SDE permissions, while access to the *Cultural_Resources_Restricted* feature class is limited to those personnel who have a need to know and who have been approved by the CRM.

Contractors submitting cultural resources GIS data to MCAS Yuma will be provided with a database template and attribute population instructions to ensure they are submitting data that are compliant with the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) and are in accordance with MCAS Yuma's Specifications for Geospatial Data, which are provided in Appendix F-1.

2.3.4. Access to Cultural Resources Data

The general public can access government information through Freedom of Information Act (FOIA) requests. However, there are exceptions, including the dissemination of archaeological site location, character, or ownership information (see NHPA Section 304 and ARPA Section 9).

MCAS Yuma follows best management practices for maintaining the confidentiality of archaeological site locations, which means that only professional archaeologists and qualified personnel with a valid need are allowed to access such data. Site location information will be available to project planners on a need-to-know basis, and such information cannot be included in subsequent analyses, reports, or studies that might be made available to the general public. Contractors and other agencies who have a need to use MCAS Yuma cultural resources GIS data must request access permission from the MCAS Yuma GIS Manager. A sample of a Geospatial Data Request letter is included in Appendix F-2. These outside data users will be required to sign a Geospatial Data Use and Nondisclosure Agreement, a copy of which is provided in Appendix F-3. Requests for site location data from professional archaeologists who are not under contract to the DoD and requests from the general public will be referred to the ASM (i.e., use of the ASM's GIS-based AZSITE system).

Additionally, reports and site records that contain resource locations are kept in locked cabinets in a room with restricted access. Electronic data with resource location information is stored in a secured database where access is granted by the CRM on a need-to-know basis. Because exemption from a FOIA request cannot be guaranteed, MCAS Yuma does not ask for or maintain locational information for any TCPs or sacred sites that the tribes wish to keep confidential.

2.3.5. Public Outreach

Public outreach is an important part of cultural resources management to keep the public informed and engaged about cultural resources present on the range. Public outreach activities include participation in Arizona Archaeology Month as well as presentations of archaeological data at symposia (such as the annual meeting of the Society of American Archaeology), DoD-sponsored events, meetings of archaeological and historical societies, and Site Steward conferences. The results of archaeological and historical research are also published in professional journals. These efforts should follow MCAS Yuma's best management practices for maintaining required confidentiality as noted above.

Other public outreach efforts include providing public access to cultural resources on the range, which is consistent with Executive Order 13287 (*Preserve America*). The site most often visited by the public is the historic Fortuna Mine and La Fortuna ghost town. In 2007, RMD Conservation staff developed and installed a 2-mile interpretative trail through the site that allows the public to learn about the early Arizona territory mining process and gain insight into the daily lives of the people who lived and worked in this demanding environment. Also, group tours can be scheduled with an MCAS Yuma CLEO that focus on the anecdotal written history of the area through the eyes of people who lived there.

In addition to Fortuna Mine visitors, the BMGR West draws off-road driving enthusiasts as well as gem and mineral collectors. MCAS Yuma CLEOs give tours and lectures at club meetings where they educate members on the ephemeral nature of cultural resources and how to avoid inadvertently disturbing features such as rock cairns and intaglios. The CLEOs also instruct the public on proper climbing, collecting, and driving etiquette in sensitive areas such as near rock art.

Although guided tours are not offered for El Camino del Diablo, the public can access and traverse four segments of the famed Devil's Highway on the BMGR West. MCAS Yuma cooperated with other federal agencies, Friends of the Sonoran Desert, and other Sonoran Desert alliances to produce *A Visitor's Guide to El Camino del Diablo*, a booklet with a road log of junctions, miles, and Global Positioning System (GPS) coordinates at various intervals along the trail. In addition to telling the history of the trail, the guide highlights scenic viewpoints, natural features and processes, historical sites, and other points of interest. As with any other public forays onto the range, anyone traveling on El Camino del Diablo must obtain the appropriate visitor's pass prior to entering the range.

A recent public outreach project on the BMGR West, funded by a 2016 National Public Lands Day DoD Legacy Award, was the placement of a kiosk at the intersection of El Camino del Diablo and Foothills Boulevard. One side of the kiosk tells the story of El Camino del Diablo by highlighting dates and events that relay its importance as a travel route. The other side displays a map and photographs of some of the modes of travel that have been used on the route. The project also entailed intersection repairs and fencing to improve the intersection.

2.3.6. Sustainability Initiatives and Protection of Cultural Resources

One of the primary focuses of environmental stewardship within the DoD is the concept of sustainability; this concept applies to design, construction, operations, and resource conservation. Sustainable practices are an investment in the future. Through conservation, improved

maintainability, recycling, reduction and reuse of waste, and other actions and innovations, the USMC can meet current needs without compromising the ability of future generations to meet their own. Chapter 4 of the National Park Service publication, *Guiding Principles of Sustainable Design* notes that:

Sustainability has often been an integral part of the composition of both tangible and intangible cultural resources. Ecological sustainability and preservation of cultural resources are complementary. In large part, the historic events and cultural values that are commemorated were shaped by mankind's response to the environment. When a cultural resource achieves sufficient importance to be deemed historically significant, it becomes a nonrenewable resource worthy of consideration for sustainable conservation.

Management, preservation, and maintenance of cultural resources should be directed to that end [National Park Service 1993].

Sustainability, therefore, is a key component of cultural resources management, and is reflected in the policies and procedures to manage NRHP-eligible buildings, structures, and archaeological sites at the BMGR West. All buildings and structures on the range that were built before 1969, as well as those built during the Cold War (i.e., prior to 1990), were either determined to be not eligible for listing on the NRHP, or, through consultation with the Arizona SHPO, were determined to be nonstructural elements of a type that are not generally considered for listing on the NRHP. Moving forward, properties determined to be not eligible for listing on the NRHP under *Criteria Consideration (g)* that were less than 50 years old at the time of their evaluation will be reassessed for significance once they reach the 50-year threshold. Similarly, properties built after 1990 will be evaluated once they reach the 50-year threshold.

As described in Section 2.2.3 (*Recorded Cultural Resources*), there are 414 recorded archaeological sites located within the BMGR West as of May 2019. One of these sites is listed on the NRHP, 113 have been determined eligible for listing, 203 have been determined not eligible for listing, and 97 have not been evaluated. Roughly one-half of the currently documented sites on the BMGR West (all sites with eligible or undetermined eligibilities) are within the APE for the 2005 INRMP PA and will be managed in accordance with the proposed management plan after it is completed (see Section 2.3.7, under *Integrated Natural Resources Management Plan Programmatic Agreement Site Monitoring and Management Plan*). Presently, the INRMP PA is the document by which preservation decisions are guided.

Based on the MCAS Yuma CRM records, one archaeological site on the range has been fenced to protect it from accidental intrusions by the military, the CBP, and public. The intaglio was originally recorded by Statistical Research Inc. in 1989 (Altschul and Jones 1989), who recommended that the site be fenced. The Bureau of Land Management Yuma Resource Area erected a three-strand barbed wire fence around the entire intaglio in 1990.

MCAS Yuma also takes steps to educate people who work on the range in cultural resources protection. This type of education program serves to provide non-archaeologists with an awareness of the importance of the sensitive cultural resources located on the range, thereby leading to a favorable attitude towards protection and preservation. All military personnel, government employees, and contractors who perform any work on the BMGR West are required to attend a Range Safety Briefing prior to entering the range. The briefing includes a section on cultural resources sensitivity and awareness, as well as instructions on what to do if any are encountered. Contractors working on the BMGR West may receive a more in-depth briefing on

the cultural resources that may be encountered during their activities. Training may cover a range of subjects including an explanation of SOPs, an introduction to cultural resource regulations and management, and the identification of cultural resources themselves.

Everyone who enters the range will be held accountable for their actions concerning cultural resources.

2.3.7. Future Year Cultural Resources Compliance Undertakings

The following are future year cultural resources compliance priorities. Funding priorities, also known as Common Output Levels of Service (COLS), are assigned to projects based on the catalog number, or type of activity, under which a particular project falls. Projects assigned a COLS of 3 are the highest priority, followed by COLS 2, with COLS 1 projects having the lowest priority. For instance, the catalog number for ICRMP funding, CN-3066, is automatically set to a COLS 3, as ICRMPs are required under Marine Corps Order 5090.2 (Volume 8). Conversely, a project nominating properties to the NRHP, CN-3060, is automatically set to a COLS 1, because property nominations, for example, have a lower priority than NAGPRA issues. The proposed future year cultural resources compliance undertakings are described below. Table 3 summarizes these undertakings, provides their COLS assignments, and lists their short-term and long-term needed actions.

Tinajas Altas Management Plan. The Tinajas Altas Project began in 1996 with the goal of comprehensively recording the archaeological site and associated features and artifacts, which were under the management of Luke Air Force Base at that time. The management recommendations at the conclusion of the project in 2000 included a proposed Tinajas Altas Archaeological District. Between 2003 and 2006, MCAS Yuma contracted with SWCA Environmental Consultants and made several modifications to the contract to produce a management plan and an NRHP nomination package. This resulted in the delivery of a draft management plan and draft NRHP nomination form for the Tinajas Altas site, both of which were never finalized and are now outdated. Actions are needed to update the management plan and nomination package and finalize both, through SHPO and tribal consultation.

National Register of Historic Places Evaluation of Undetermined Sites. Prior to 2013, MCAS Yuma neglected to make NRHP-eligibility determinations for sites that were recorded but were not within the APE of a proposed project. Since 2013, MCAS Yuma has been systematically going through previous survey project records, working backward from the most recent, to make and consult on NRHP-eligibility determinations for sites that have been given recommendations by the contractors who recorded them. As of May 2019, there are 97 recorded archaeological sites on the BMGR West with undetermined NRHP eligibilities. Actions are needed to continue to reduce the backlog of unevaluated sites, in consultation with the SHPO and interested tribal governments and organizations.

Integrated Natural Resources Management Plan Programmatic Agreement Site Monitoring and Management Plan. MCAS Yuma executed a PA in 2005 to guide the Section 106 compliance for the implementation of the 2007 BMGR INRMP (see Appendix B-1). The PA undertaking included six conservation elements from the INRMP: (1) motorized access and unroaded area management; (2) camping and visitor stay limits; (3) recreation services and use supervision; (4) rockhounding; (5) woodcutting, gathering, and firewood use, and collection of native plants; and (6) recreational shooting. All roadway corridors and some of the more

popular public access areas have been surveyed. Further actions are needed to continue PA and Section 106 compliance, including additional surveys of the APE, especially high-traffic areas, and development of a monitoring and management plan for areas and elements covered by the PA.

Update Collections Curation. In 2017, MCAS Yuma signed a new MOA with MCAGCC for curatorial services, replacing the previous agreement executed in 2011 (see Appendix B-3). Eight boxes of BMGR West artifacts and one box of associated records are housed at MCAGCC. Nine boxes of artifacts related to testing at Tinajas Altas are housed at the Gila Bend Air Force Auxiliary Facility based on work conducted by Luke Air Force Base. Other BMGR West materials collected prior to 2011, including 18 cubic feet of artifacts and associated records, are curated at the ASM, the state's official curation facility. A 2015 inspection of the BMGR West collections at the ASM revealed that most of the BMGR West collections are in the "field state," where there are no artifact identification, material type, weights, and other pertinent information recorded for each artifact. Actions are needed to ensure all BMGR West collections are properly cataloged and curated.

Continue to Update Geographic Information System. The MCAS Yuma GIS database is managed through the USMC's SDSFIE-compliant SDE. Over the years, various contractors have written plans for adding the station's cultural resources spatial data to the SDE; however, none of the plans were ever completed. Starting in 2013, MCAS Yuma initiated a new strategy of creating polygon features for each of the surveyed areas and site boundaries known within the BMGR West. Data that were not already in GIS format or GIS data that MCAS Yuma did not have were either digitally created from original paper records or requested from the original source. All of the MCAS Yuma cultural resources data have been input and are stored and managed within the Station's GIS database, but some of the data still need to be verified and refined.

Table 3. Future Year Cultural Resources Compliance Undertakings

Action (COLS)	Current Status	Short-Term Plan	Long-Term Plan
Tinajas Altas Management Plan (COLS 1)	The draft management plan and draft NRHP nomination form were never finalized and are now outdated.	<ul style="list-style-type: none"> • Develop a statement of work to update the plan and nomination package • Request funding • Begin contracting effort 	<ul style="list-style-type: none"> • Complete the management plan through consultation with the SHPO and tribes • Complete nomination package through consultation with the SHPO and tribes
NRHP Evaluation of Undetermined Sites (COLS 3)	As of May 2019, there are 97 recorded sites with undetermined NRHP eligibilities.	<ul style="list-style-type: none"> • Develop funding request, or • Develop field-going strategy 	<ul style="list-style-type: none"> • Execute short-term plan • Make determinations • Consult with the SHPO and tribes
INRMP PA Site Monitoring and Management Plan (COLS 1)	Funding is requested annually to continue surveys within the APE. MCAS Yuma has begun talks with the Arizona Site Stewards Volunteer Program for site monitoring assistance.	<ul style="list-style-type: none"> • Continue to survey APE and evaluate newly recorded sites • Develop a statement of work to develop a monitoring and management plan • Request funding • Begin contracting effort 	<ul style="list-style-type: none"> • Complete the monitoring and management plan through consultation with the SHPO and tribes

Table 3. Future Year Cultural Resources Compliance Undertakings

Action (COLS)	Current Status	Short-Term Plan	Long-Term Plan
Update Collections Curation (COLS 3)	Artifacts and associated records are housed at the ASM, GBFAF, and MCAGCC. Some boxes at the ASM are not properly curated.	<ul style="list-style-type: none"> • Develop strategy to upgrade collections at the ASM, or • Move collections from the ASM to MCAGCC and curate collections per MOA guidelines 	<ul style="list-style-type: none"> • Ensure all BMGR West collections are properly catalogued and curated
Continue to Update Geographic Information System (COLS 3)	All of the MCAS Yuma cultural resources data are stored and managed within the Station's GIS database, but some of the data need to be verified and refined.	<ul style="list-style-type: none"> • Continue to update the GIS database with necessary corrections and additions 	<ul style="list-style-type: none"> • Have all MCAS Yuma cultural resources spatial data up-to-date in the GIS database • Have all sites and survey polygons linked to their site record and survey report

APE = Area of Potential Effects; ASM = Arizona State Museum; BMGR = Barry M. Goldwater Range; COLS = Common Output Levels of Service; GBFAF = Gila Bend Air Force Auxiliary Facility; GIS = geographic information system; INRMP = Integrated Natural Resources Management Plan; MCAGCC = Marine Corps Air Ground Combat Center; MCAS = Marine Corps Air Station; MOA = Memorandum of Agreement; NRHP = National Register of Historic Places; PA = Programmatic Agreement; SHPO = State Historic Preservation Officer

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APPENDIX A

Standard Operating Procedures

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A-1
Standard Operating Procedure #1
National Historic Preservation Act Section 110 Compliance

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STANDARD OPERATING PROCEDURE #1

NATIONAL HISTORIC PRESERVATION ACT SECTION 110

COMPLIANCE

DRIVER

The National Historic Preservation Act (NHPA) became public law on October 15, 1966 (PL 89-665) and was codified in title 16 of the United States Code (16 USC § 470). Various amendments followed through the years, including the 1980 amendment that added Section 110 (PL 96-515). On December 19, 2014, Public Law 113-287 moved the NHPA's provisions from title 16 of the United States Code to title 54 (54 USC §§ 300101 et seq.), with minimal and non-substantive changes to the text of the act and a re-ordering of some of its provisions. The Advisory Council on Historic Preservation (ACHP), however, notes that the law that moved the NHPA to title 54 specifies that a reference to an old title 16 provision (e.g., 16 USC § 470h-2 rather than 54 USC §§ 306101 through 306114, for Section 110 of the NHPA) is legally deemed to refer to the corresponding provision in the new title 54.

The ACHP intends to continue referring to Section 110 of the NHPA as “Section 110” since that refers to the section in the public law (PL 96-515) that added this section to the NHPA, as opposed to its legal citation of the United States Code (54 USC §§ 306101-306114). The Section 110 Guidelines, first published in the *Federal Register* on February 17, 1988 (53 FR 4727-46), are titled *The Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act*.

OVERVIEW

Section 110 of the NHPA requires that federal agencies that manage cultural resources assess the significance of those resources and assume responsibility for the preservation of historic properties. Such properties may include archaeological sites, buildings, structures, districts, landscapes, objects, and traditional cultural properties. They are historic properties if they meet the criteria for inclusion on the National Register of Historic Places (NRHP). Marine Corps Air Station (MCAS) Yuma shall evaluate all known cultural resources on the Barry M. Goldwater Range West (BMGR West) to determine which meet the criteria for nomination to the NRHP. Included is the directive to inventory and manage all properties that appear to qualify for inclusion on the NRHP. The criteria are specified in title 36 of the Code of Federal Regulations (36 CFR 60). Agencies are further cautioned not to allow historic properties to deteriorate significantly. Additionally, each Department of Defense installation shall identify and evaluate all cultural resources under its control, including resources from 1945 to 1989, even if they have not yet reached the 50-year threshold.

The intent of Section 110 of the NHPA is to ensure that historic preservation is fully integrated into ongoing programs at federal agencies. The Secretary of the Interior's guidelines direct agencies to establish a preservation program for the identification, evaluation, nomination to the NRHP, and protection of historic properties.

The BMGR West consists of approximately 700,000 acres, of which 142,448 acres (20 percent of the range) have been surveyed for cultural resources as of May 2019. For the fiscal years (FYs) 2013 to 2016, MCAS Yuma received funding to contract for an average of about 15,000 acres per year for Section 110 compliance surveys, with received funding falling short of the

requested budgets most years. If Congress continues to fund the United States Marine Corps (USMC) at or above current levels, the entirety of the BMGR West could feasibly be surveyed within 37 years.

Within the 142,448 acres that have been surveyed, 414 cultural resource sites have been recorded. Of those 414 sites, the NRHP eligibility of 97 has not been determined. Those 97 sites are treated as eligible and avoided until such time as they can be evaluated. A majority of the sites with no eligibility determination on the BMGR West were evaluated by consultants who gave recommendations in their survey reports. The Cultural Resources Managers (CRMs) at the various times that the reports were received, however, did not offer the recommendations to the Commanding Officer (CO) for determinations, and thus, NRHP-eligibility consultations were not done. MCAS Yuma is accomplishing the determinations as time allows, working backward from the most recent reports and averaging about one or two reports each year. Additional survey and evaluation studies are needed to develop a comprehensive record of archaeological sites located on the range.

All buildings and structures on the BMGR West that were built prior to 1969 have been evaluated for significance based on the four criteria for evaluation (see *Criteria for Evaluation* below). All seven were either determined not eligible for listing on the NRHP, or, through consultation with the Arizona State Historic Preservation Officer (SHPO), were determined to be nonstructural elements of a type that are not generally considered for the NRHP. All buildings and structures on the BMGR West that were built during the Cold War (i.e., prior to 1990) have been evaluated for significance based on *Criteria Consideration (g)* of the NRHP (see *Criteria for Evaluation* below). Of the 17 that fall into this category, 8 were determined not eligible for listing on the NRHP under *Criteria Consideration (g)*, and, through consultation with SHPO, nine were determined to be nonstructural elements of a type that are not generally considered for the NRHP. The eight properties determined to be not eligible for listing on the NRHP under *Criteria Consideration (g)*, will be reassessed for significance once they reach the 50-year threshold.

PROCEDURES

This Standard Operating Procedure (SOP) and associated Integrated Cultural Resources Management Plan (ICRMP) establish the MCAS Yuma preservation program and details the procedures to be followed for Section 110 compliance on the BMGR West.

Using ENCORE, or the USMC's current tool for Environmental Project Planning, Programming, Budgeting and Execution (EPPPB), the CRM will submit funding requests for Section 110 projects for future FYs during the annual FY planning cycle. The annual requests will be for funds to survey at least 20,000 acres per year.

Using ENCORE or the USMC's current EPPPB tool, the Conservation Program Manager will provide local review and prioritization of the requests and will forward to headquarters for final approval.

Upon receipt of funds, the CRM will work with Naval Facilities Engineering Command (NAVFAC) Southwest to procure the consultant services necessary to perform the survey. The CRM is responsible for writing a Statement of Work that details the number of acres to be surveyed; federal and state regulations to be met; the project objectives; a description of the

deliverables, including geographic information system (GIS) data; and qualifications for those performing the work.

Based on the survey results as reported by the consultant, the evaluations in the report, and observations during any site visits, the CRM will provide recommendations to the CO on the NRHP-eligibility determinations for sites recorded or updated during the survey.

A letter requesting consultation from the CO, signed under their direction by the Director of Range Management, will be sent along with a copy of the survey report to the tribes with whom MCAS Yuma typically consults for Section 110 projects on the BMGR West. The letters will be addressed to the executive leader of each tribe with a copy being sent to their appointed consultation representative. The CRM will follow up via email with each tribe that has not responded within 30 days of receipt of the consultation package.

The CRM will then compile the tribal consultation results into a matrix that is mailed to SHPO along with copies of letters and emails to and from the tribes and a copy of the report. Since there is no project linked to the Section 110 surveys, the accompanying letter from the CO will only request SHPO concurrence with the NRHP-eligibility determinations.

If agreement cannot be reached on the eligibility of any sites, those sites will be managed and maintained as eligible until such time as a Section 106 project necessitates further evaluation or the Keeper of the National Register of Historic Places is asked to intervene.

SURVEY

Survey includes conducting a records search/literature review, performing systematic pedestrian coverage of a property, documenting and/or updating documentation for all discovered sites, and preparing a report that provides additional knowledge regarding the survey area. Surveys performed in compliance with Section 110 on the BMGR West generally do not involve excavation. MCAS Yuma, however, may institute a policy, through consultation with SHPO, that allows for shovel test pits or trowel scrapes to assist in the NRHP evaluations of sites. Section 110 surveys on the BMGR West are usually non-collection; however, unusual or unique artifacts may be considered for collection on an individual basis.

In lieu of the typically required survey work plan, MCAS Yuma has developed standards that delineate the methods to be used in performing surveys on the BMGR West (see Appendix C of the ICRMP associated with this SOP). These standards are meant to supplement the *Arizona State Museum (ASM) Archaeological Site Recording Manual* and SHPO's *Standards for Inventory Documents Submitted for SHPO Review in Compliance with Historic Preservation Laws*, both of which are incorporated here by reference. The survey interval, as required by SHPO, is a maximum of 20 meters apart. All sites identified during a survey must meet the requirements of SHPO and the *ASM Archaeological Site Recording Manual*. A report summarizing the survey results will include NRHP-eligibility recommendations, based on the *Criteria for Evaluation* listed below, for all recorded resources.

Survey reports, in a format based on the requirements of the ASM, SHPO, and MCAS Yuma standards, will describe the overall project, the historic context for any sites identified, methodologies, research questions, study results, recommendations, and any additional requirements for documentation. All discovered sites are treated as eligible for listing on the NRHP until a determination of eligibility is completed and has SHPO concurrence. Since there

are no proposed projects or immediate plans for Section 110 survey projects, recommendations will typically include avoidance.

CRITERIA FOR EVALUATION

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A.** That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B.** That are associated with the lives of significant persons in our past; or
- C.** That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D.** That have yielded or may be likely to yield, information important in history or prehistory.

Ordinarily, properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they meet *Criteria Consideration (g)* (a property achieving significance within the past 50 years if it is of exceptional importance).

A-2
Standard Operating Procedure #2
National Historic Preservation Act Section 106 Compliance

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STANDARD OPERATING PROCEDURE #2

NATIONAL HISTORIC PRESERVATION ACT SECTION 106 COMPLIANCE

DRIVER

The National Historic Preservation Act (NHPA) became law on October 15, 1966 (PL 89-665) and was codified in title 16 of the United States Code (16 USC § 470). Various amendments followed through the years. On December 19, 2014, Public Law 113-287 moved the NHPA's provisions from title 16 of the United States Code to title 54 (54 USC §§ 300101 et seq.), with minimal and non-substantive changes to the text of the act and a re-ordering of some of its provisions. The Advisory Council on Historic Preservation (ACHP), however, notes that the law that moved the NHPA to title 54 specifies that a reference to an old title 16 provision (e.g., 16 USC § 470f rather than 54 USC § 306108, for Section 106 of the NHPA) is legally deemed to refer to the corresponding provision in the new title 54.

The ACHP intends to continue referring to Section 106 of the NHPA as "Section 106" since that refers to the section in the original public law that enacted the NHPA, as opposed to its legal citation of the United States Code. It is also a reference that has been in constant use for almost 50 years. Likewise, the regulations implementing Section 106 of the NHPA (36 CFR 800), are not affected by this recodification, so referencing of those regulations can continue as before.

OVERVIEW

The NHPA establishes the federal government's policy to provide leadership in preserving historic properties and to administer federally owned or controlled historic properties in the spirit of stewardship. The ACHP regulations, *Protection of Historic Properties* (36 CFR 800), sets forth the procedural requirements of the NHPA Section 106 to identify, evaluate, determine effects, and resolve adverse effects of all undertakings on historic properties. An undertaking, as defined in the regulations, means:

a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license or approval [36 CFR 800.16(y)].

A historic property, as defined in the regulations, means:

any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria [36 CFR 800.16(1)(1)].

The regulations require that federal agencies initiate the Section 106 process early in the planning of an undertaking (36 CFR 800.1(c)). Consultation with the Arizona State Historic Preservation Officer (SHPO) and communication with Native Americans should also begin in this critical early phase and continue throughout the process. In addition to SHPO and Native American representatives, the Marine Corps Air Station (MCAS) Yuma will also plan to enter

into discussion with other parties that have a proven interest in the project at hand, including interested members of the public. Neither the NHPA nor the ACHP's regulations require that all historic properties be preserved; they do, however, require that all federal agencies consider the effects of their proposed undertakings on historic properties.

PROCEDURES

Proposed undertakings that have the potential to cause effects on historic properties on the Barry M. Goldwater Range West (BMGR West) are submitted for Section 106 review to the Range Management Department through various means, from different project proponents. Project proponents can be MCAS Yuma staff, departments, or tenants (e.g., Range Training Officer, Installation and Logistics); other United States Marine Corps (USMC) agencies (e.g., Marine Corps Installations Command); other federal agencies (e.g., U.S. Customs and Border Protection, U.S. Geological Survey); state, county, or city entities (e.g., Arizona Department of Transportation); or public utilities (e.g., Arizona Public Service), to name a few. Without consideration of how, or by whom, they are submitted, all proposed undertakings are subjected to Section 106 review and procedures in accordance with the regulations (36 CFR 800).

MCAS Yuma, as allowed under the regulations (36 CFR 800.14), has developed alternative procedures for compliance with the Section 106 process as it pertains to two specific project categories: a Memorandum of Understanding (MOU) for negative findings and a Programmatic Agreement (PA) for undertakings associated with the 2007 BMGR Integrated Natural Resources Management Plan (INRMP). Both documents can be found in Appendix B of the Integrated Cultural Resources Management Plan (ICRMP) associated with this Standard Operating Procedure (SOP).

The basic tenet of the MOU (*Memorandum of Understanding between Marine Corps Air Station, Yuma, Arizona and Arizona State Historic Preservation Officer for Section 106 Compliance Consultation Process for Negative Findings*) is the streamlining of SHPO consultation for Section 106 project surveys when no cultural properties are identified within the project Area of Potential Effects (APE). The MCAS Yuma Cultural Resources Manager (CRM) will ensure that tribal consultations, pursuant to the regulations (36 CFR 800.3 and 800.4), have been conducted for projects meeting this criterion. The CRM will internally document the results of the surveys and tribal consultations for each such project, and at the end of the federal fiscal year, provide an annual report to SHPO that summarizes those actions completed without SHPO consultation.

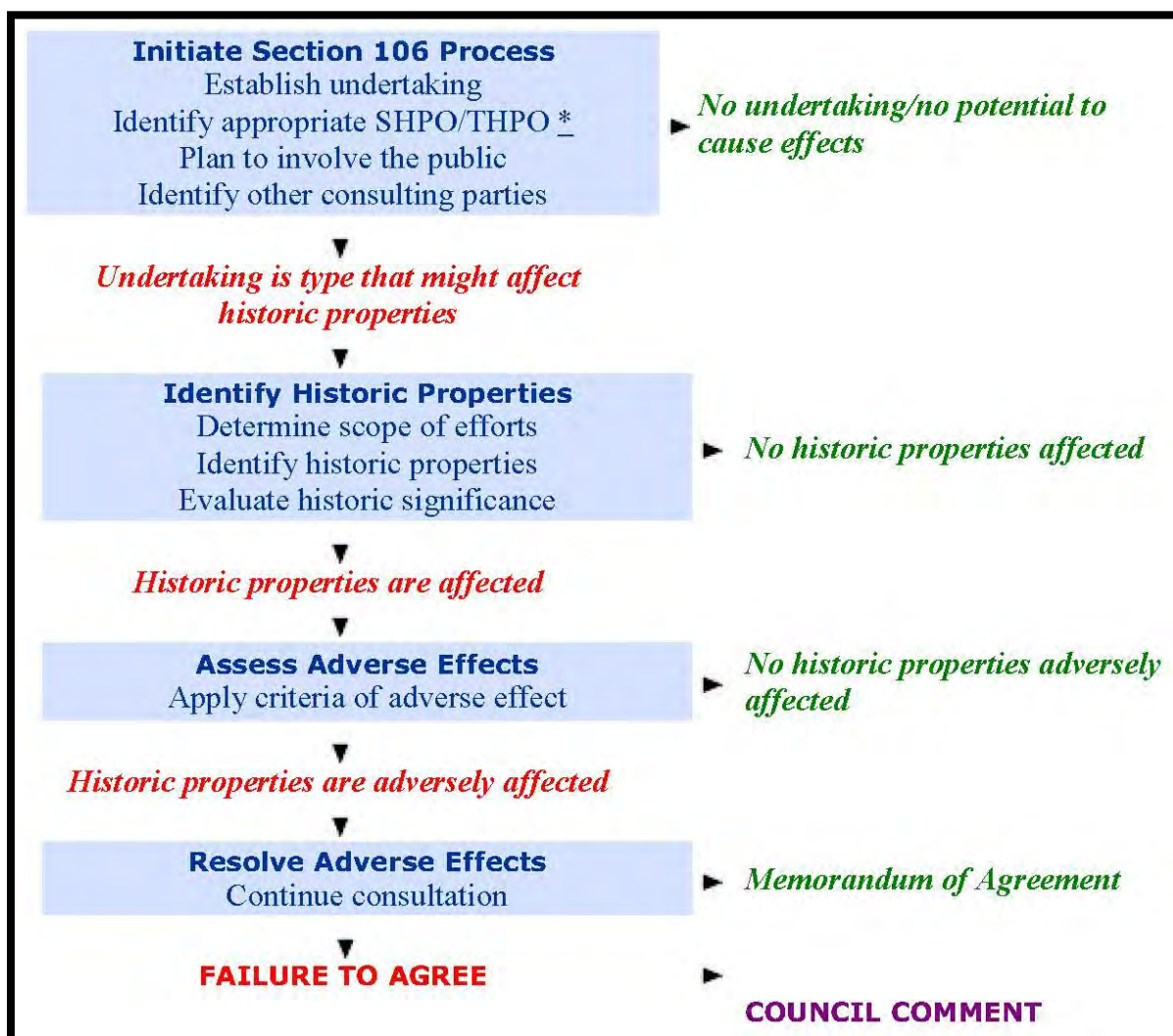
The PA (*Programmatic Agreement among 56th Range Management Office, Luke Air Force Base, Marine Corps Air Station Yuma, and Arizona State Historic Preservation Officer regarding Potential Impacts on Historic Properties of Implementing an Integrated Natural Resources Management Plan for the Barry M. Goldwater Range, Southwestern Arizona*) was executed in 2005 in response to the Military Lands Withdrawal Act of 1999 (PL 106-65) requirement that the U.S. Air Force and USMC prepare an INRMP to govern their management of natural and cultural resources on the BMGR. An Environmental Impact Statement (EIS) was prepared to analyze a range of management strategies and identified preferred alternatives for 17 conservation elements. Of the 17 conservation elements that were analyzed in the EIS, 6 were identified as the undertaking to be implemented in accordance with the PA (Stipulation 2).

The APE of the undertaking covered by the PA is a discontinuous area that includes those parts of the range that are open to public access. On the BMGR West, this includes all of Management

Units 2 and 3, plus the southeastern-most extension of Unit 1, which encompasses the area previously designated the Tinajas Altas Mountains Area of Critical Environmental Concern when it was under the management of the Bureau of Land Management.

As stated above, all proposed undertakings are subjected to Section 106 review. For those undertakings that do not fall under the purview of either of these alternative procedures, below is a simple flowchart of the Section 106 process, per the regulations (36 CFR 800), which will be followed by MCAS Yuma.

Failure to take the effects of an undertaking on historic properties into account in accordance with NHPA Section 106 and its implementing regulations (36 CFR 800) can result in formal notification from the ACHP to the Secretary of the Navy of foreclosure of the ACHP's opportunity to comment on the undertaking pursuant to the NHPA. A notice of foreclosure could potentially be used by litigants against the USMC in a manner that can halt or delay critical mission activities.



NATIONAL ENVIRONMENTAL POLICY ACT AND SECTION 106

The Section 106 process is often conducted concurrently with the processes associated with the National Environmental Policy Act (NEPA). NEPA mandates that federal agencies consider all environmental consequences relevant to proposed actions and reasonable alternatives and include the public in the decision-making process. A cultural resources survey with NHPA Section 106 review often supports the cultural resources component of an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), which are two types of documents that may be used to detail the analyses of impacts performed during the NEPA process. Although the NEPA process can be used to satisfy Section 106 compliance review, MCAS Yuma typically adheres to the regulations separately yet runs the processes concurrently. Several factors contribute to this preference including funding, contracting, and timing of the processes. The most significant factor, however, is the release of cultural resource locations. Often an essential part of Section 106 review, these locations cannot be disclosed in public documents, including EAs and EISs. Thus, a summary of the thorough Section 106 review is written for inclusion in the public NEPA documents.

A-3
Standard Operating Procedure #3
Archaeological Resources Protection Act Compliance

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STANDARD OPERATING PROCEDURE #3 ARCHAEOLOGICAL RESOURCES PROTECTION ACT COMPLIANCE

DRIVER

The Archaeological Resources Protection Act (ARPA) became public law on October 31, 1979, (PL 96-95) and was codified in title 16 of the United States Code (16 USC §§ 470aa-mm). Various amendments followed through the years. The implementing regulations for ARPA, *Protection of Archaeological Resources*, are found within title 32 of the Code of Federal Regulations (32 CFR 229).

OVERVIEW

An archaeological resource, as defined under ARPA, is any material remains of human life or activities which are at least 100 years of age, and which are of archaeological interest (32 CFR 229.3(a)). Per ARPA, it is a federal offense to excavate, remove, damage, alter, or otherwise deface archaeological resources on federal lands without authorization. The sale, purchase, exchange, transport, and/or receipt of archaeological resources obtained in violation of this law also are federal offenses. Unless found in direct physical relationship with other archaeological resources as defined by ARPA, items excluded from ARPA include paleontological remains, coins, bullets, and unworked minerals and rocks (32 CFR 229.3(a)(4)). Paleontological remains are protected under the Antiquities Act of 1906.

PROCEDURES

Archaeological resources from federal installations, as defined under ARPA (32 CFR 229.3), belong to the installations, except where Native American Graves Protection and Repatriation Act (NAGPRA) requires repatriation to lineal descendants or the closest culturally affiliated federally recognized tribe (see Standard Operating Procedure [SOP] #4 [*NAGPRA Compliance*]). Resources collected from lands used by the United States Marine Corps (USMC), but for which the fee title is held by another agency, are the property of the agency designated as the land manager in the land-use instrument (e.g., public land order, special use permit). The Marine Corps Air Station (MCAS) Yuma Commanding Officer (CO) ensures that land-use instruments allowing for military use are reviewed to determine proper roles and responsibilities.

MCAS Yuma staff or contractors carrying out official duties associated with managing archaeological resources are not required to obtain a permit under ARPA or the Antiquities Act for investigating archaeological resources on a federally owned or controlled installation, including situations where cultural items, as defined by NAGPRA, may be excavated. However, in situations where NAGPRA cultural items or historic properties may be encountered during intentional excavation of archaeological resources, the requirements of NAGPRA (43 CFR 10) and the National Historic Preservation Act (NHPA; 36 CFR 800) must be met before excavating.

To comply with ARPA, the CO is considered the federal land manager as defined in the regulations (32 CFR 229.3(c)). As the federal land manager, the CO may determine that certain archaeological resources in specified areas under CO jurisdiction and under specific circumstances are not or are no longer of archaeological interest and are not considered archaeological resources for the purposes of ARPA (32 CFR 229.3(a)(5)). All such

determinations are then justified and documented by memorandum and formally staffed for review.

The CO ensures that military police, installation legal staff, installation public affairs officials, and range management staff are familiar with the requirements and applicable civil and criminal penalties under ARPA.

PUBLIC EDUCATION

ARPA directs federal cultural resource managers to establish public education programs to foster the public's awareness of the significance and sensitivity of resources located on lands within their jurisdiction. MCAS Yuma outreach includes providing briefings to all field-going civilian personnel, contractors, and military units utilizing the ranges. MCAS Yuma produces and distributes a visitor's guide and map for the Barry M. Goldwater Range West (BMGR West) that helps to educate the visiting public on protected archaeological resources. Also in accordance with ARPA Section 9, the CO may withhold information concerning the nature and location of archaeological resources from the public under the Freedom of Information Act (5 USC § 552).

ARCHAEOLOGICAL RESOURCES PROTECTION ACT PERMIT

ARPA permits are required when the following three criteria are met: 1) the project is located on the BMGR West, 2) digging or collection of artifacts will occur, and 3) the participants are not directly contracted to or by MCAS Yuma. ARPA permits are issued for archaeological investigations that may result in the excavation or removal of Native American inhumations and other cultural items as defined in NAGPRA, or in the excavation of archaeological resources that are of religious or cultural importance to federally recognized tribes.

An ARPA permit can be obtained by submitting an ARPA permit application to the MCAS Yuma Cultural Resources Manager (CRM), pursuant to Section 4(a) of ARPA. To qualify for an ARPA permit, the Principal Investigator for the project must meet the Secretary of the Interior's Standards for Archaeology and Historic Preservation (48 FR 44738-9).

MCAS Yuma may issue an ARPA permit after the CRM consults with culturally affiliated Indian tribes in accordance with NAGPRA (43 CFR 10.5) and ARPA (32 CFR 229.7). The CRM will inform the tribes that are most likely to be culturally affiliated with the area of the planned activity and provide the names of other present-day Indian tribes that historically occupied the area and any other tribes that may be associated with the items expected to be found. The notice of the project will include a request for a face-to-face meeting with tribal members and proposed treatment and disposition of Native American human remains and other NAGPRA-related items. Written notification will be followed by telephone contact if there is no response. Indian tribes have the right to ensure that excavations are carried out following these rules and that the disposition of NAGPRA-related items is carried out per the custody stipulations of NAGPRA.

The CRM will monitor the field investigations conducted under an ARPA permit to ensure compliance with the ARPA and NAGPRA regulations (32 CFR 229 and 43 CFR 10) and the terms and conditions of the permits.

The CO ensures that the ARPA permits:

- comply with the requirements of the regulations (32 CFR 229 and 43 CFR 10);
- require any interests that federally recognized tribes may have in the permitted activity are addressed in a manner consistent with the requirements of NHPA and NAGPRA, prior to issuance of the permit;
- require that permitted activities are conducted according to applicable professional standards of the Secretary of the Interior; and
- require that the excavated archaeological artifact collection and associated records are permanently housed in a curation facility that meets the requirements of *Curation of Federally-Owned and Administered Archaeological Collections* (36 CFR 79), except as otherwise required under NAGPRA.

ARCHAEOLOGICAL RESOURCES PROTECTION ACT VIOLATION DOCUMENTATION

Investigation of looting, vandalism, or other destruction of an archaeological resource on the BMGR West will require a systematic examination of the crime scene by both an MCAS Yuma Conservation Law Enforcement Officer (CLEO) or Naval Criminal Investigative Service investigator and a professional archaeologist. The law enforcement officer will be responsible for investigating violations of federal law and, therefore, will direct the archaeological crime scene investigation process. The archaeologist will provide forensic expertise on archaeological resources for the crime scene investigation, and law enforcement personnel may request assistance in other activities, such as taking the crime scene photographs, preparing crime scene sketches, collecting crime scene evidence, preparing reports, and testifying in court. The archaeologist will always work under the direction of the investigating officer. The primary function of the archaeologist during an ARPA investigation will be the production of the Archaeological Damage Assessment Report. At the outset of any ARPA violation investigation, the investigating officer and the archaeologist must coordinate all investigation activities through the Judge Advocate General's office. Penalties imposed for ARPA violations vary, but could reach as high as \$250,000 in fines and five years' imprisonment.

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**Standard Operating Procedure #4
Native American Graves Protection and Repatriation Act Compliance**

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STANDARD OPERATING PROCEDURE #4 NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT COMPLIANCE

DRIVER

The Native American Graves Protection and Repatriation Act (NAGPRA) became public law on November 16, 1990 (PL 101-601) and was codified in title 25 of the United States Code (25 USC §§ 3001-3013). NAGPRA protects human remains, funerary objects, sacred objects, and objects of cultural patrimony of indigenous peoples on federal or tribal lands. Implementing regulations for NAGPRA, *Native American Graves Protection and Repatriation Regulations*, are found within title 43 of the Code of Federal Regulations (43 CFR 10).

OVERVIEW

NAGPRA stipulates priorities for assigning ownership or control of human remains, funerary objects, sacred objects, and objects of cultural patrimony of indigenous peoples excavated or discovered on federal or tribal lands. The act also provides for repatriation of Native American human remains and cultural objects previously collected from federal lands and in the possession or control of a federal agency or federally funded repository. In addition to defining procedures for dealing with previously collected Native American human remains and cultural objects, these regulations outline procedures for negotiating plans of action or comprehensive agreements for treatment of human remains and cultural items encountered in intentional excavations or inadvertent discoveries on federal or tribal lands.

In 1990, NAGPRA was signed into law, establishing a “systematic process for determining the rights of lineal descendants and Indian tribes and Native Hawaiian organizations to certain Native American human remains, funerary or sacred objects, or objects of cultural patrimony with which they are affiliated” (60 FR 232). The law applies to such collections in federal possession or control, in the possession or control of any institution or state or local government receiving federal funds, or any archaeological finds excavated intentionally or discovered inadvertently on federal lands. Briefly, NAGPRA requires the following:

- That an Archaeological Resources Protection Act (ARPA) permit be obtained to excavate or remove NAGPRA-related items from federal or tribal lands (see Standard Operating Procedure [SOP] #3 [*ARPA Compliance*]);
- That the objects be excavated only after Native American consultation has been conducted, or, in the case of tribal lands, with the permission of the tribe;
- That the disposition of the human remains or other NAGPRA-related items be consistent with Section 10.6 of the regulations (43 CFR 10.6); and
- That proof of Native American consultation be provided to the agency that issued the ARPA permit.

NAGPRA also requires that “all Federal authorizations to carry out land use activities on Federal lands or tribal lands...must include a requirement for the holder of the authorization to notify the appropriate Federal or tribal official immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony” (60 FR 232).

PROCEDURES

The ownership or control over Native American human remains and other NAGPRA-related items is given priority to tribes based upon the lineal descent of the deceased individual, the Indian tribe on whose lands the discovery was made, and the tribe with the closest cultural affiliation with the NAGPRA-related items. When the tribal affiliation of the discovery cannot be determined, custody is based upon the tribe that prehistorically occupied the lands where the discovery was made. If, by a preponderance of evidence, it is determined that a different tribe has a stronger affiliation with the human remains or objects, the tribe with the strongest affiliation is awarded custody of the items.

INVENTORY OF NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT -RELATED ITEMS

Museums or federal agencies that house Native American human remains, funerary or sacred objects, or objects of cultural patrimony are required to inventory these items and provide a summary description of the collections to lineal descendants or affiliated Indian tribes. The inventory serves to inform Native Americans of the existence of these items should they wish to request repatriation of them. The inventory provides an estimate of the number of objects in federal possession, a description of the kinds of objects the collection includes, reference to the means by which the collection was made and the dates and locations it was made, and information pertaining to the cultural affiliation of the collections.

In 2000, the United States Army Corps of Engineers St. Louis District published the results of an inventory of collections under the control of military installations in selected western states, including Arizona. The inventory of the Marine Corps Air Station (MCAS) Yuma collections included those that in 1996 and 1997 were curated at the Arizona State Museum, the Bureau of Land Management Phoenix District, and KEA Environmental. The report concluded that MCAS Yuma collections contain no human skeletal remains, and thus, no associated funerary objects. MCAS Yuma consults with tribal members regarding collections in its possession and will repatriate collections under certain circumstances after consultation is complete.

INADVERTENT DISCOVERIES

In the event of the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony on the Barry M. Goldwater Range West (BMGR West), the MCAS Yuma Cultural Resources Manager (CRM) will ensure that all appropriate measures are implemented to protect the remains and any other protected cultural items; all appropriate tribes and agencies will be promptly notified of the find; and all applicable federal, tribal, and state procedures will be followed, as outlined below.

In the event of inadvertent discovery of cultural materials, cease activities immediately, secure the discovery site from further disturbance, and contact the CRM.

1. The CRM will visit the location of the discovery within 24 hours of the notification of the find to determine if NAGPRA applies. The services of appropriate technical experts (e.g., specialist in human osteology, forensic anthropologists) may be retained to participate in the field visit.
2. If the objects are determined to be not covered under NAGPRA, the procedures in SOP #5 (*Inadvertent Discovery of Cultural Materials*) will be implemented.

3. If human remains are known or suspected to be present, the CRM will also promptly coordinate with the MCAS Yuma Conservation Law Enforcement Officer or appropriate MCAS Yuma Law Enforcement staff regarding notification to the local medical examiner, and the procedures in this SOP will be implemented. The CRM will also notify the MCAS Yuma Commanding Officer (CO) through the appropriate chain of command, installation legal counsel, and the Public Affairs Officer.
4. The CRM will notify the Arizona State Historic Preservation Officer (SHPO) of the discovery. The notification should be by telephone, to be followed immediately by written notification.
5. Federally recognized tribes will be notified by telephone along with a written confirmation within three days of the discovery. This notification must include pertinent information as to kinds of human remains, funerary objects, sacred objects, or objects of cultural patrimony, their condition, and the circumstances of discovery.
6. The CRM will follow NAGPRA procedures (43 CFR 10) and consult with interested parties (i.e., SHPO, tribes, property owner) to discuss disposition of remains and mitigation measures. The CRM, in consultation with SHPO and Native Americans, as appropriate, will determine the procedures for disposition and control of any Native American cultural items excavated or removed as a result of an inadvertent discovery.
7. Activities in the area of discovery will resume 30 days after certification of notification is received, or sooner, if a signed binding agreement is reached. Before the original action can resume, the CRM must have implemented the NAGPRA process properly and confirmed with legal counsel that MCAS Yuma is in a legal position to proceed with the project in the area of discovery.

INTENTIONAL EXCAVATION

The CO must take reasonable steps to determine whether a planned activity may result in the excavation of human remains, funerary objects, sacred objects, or objects of cultural patrimony from the BMGR West. In accordance with the regulations (43 CFR 10.3(b)), the intentional excavation of human remains, funerary objects, sacred objects, or objects of cultural patrimony from federal or tribal lands after November 16, 1990 is permitted only if:

1. The objects are excavated or removed following the requirements of ARPA and its implementing regulations (see SOP #3 [*ARPA Compliance*]),
2. The objects are excavated after consultation with or, in the case of tribal lands, consent of, the appropriate Native American tribe pursuant to Part 10.5,
3. The disposition of the objects is consistent with their custody as described in Part 10.6, and
4. Proof of the consultation or consent is shown to the federal agency official (i.e., CO) or other agency official (CRM) responsible for the issuance of the required permit.

The CO will notify in writing any Native American tribes that are likely to be culturally affiliated with any human remains, funerary objects, sacred objects, or objects of cultural patrimony that may be excavated. The CO will also notify any present-day Native American tribes which aboriginally occupied the area of the planned activity and any other Native American tribes that the CO reasonably believes are likely to have a cultural relationship to the human remains or objects that are expected to be found.

NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT CONSULTATIONS

Consultation is conducted to identify traditional religious leaders and lineal descendants for NAGPRA-related issues, and serves to establish procedures to determine custody and the treatment and disposition of NAGPRA-related items excavated intentionally or discovered inadvertently on the BMGR West. MCAS Yuma may ask for the following:

- contact information for the tribal official(s) that will act to represent a particular tribe during the consultation process,
- names of appropriate consulting partners and the methods by which to consult, and
- kinds of cultural items that are perceived to be associated with NAGPRA issues.

After consultation is complete, MCAS Yuma will prepare a written plan of action, which is then provided to lineal descendants and Indian tribes. Native American representatives sign the plan of action as appropriate. The plan of action may include a description of the following:

- the kinds of cultural items that are of concern,
- the specific information used to determine the custody of NAGPRA-related items,
- the planned treatment and handling of such items,
- the planned archaeological recording and analysis of such items,
- steps to be followed to contact tribal officials when excavation or discoveries occur,
- the traditional treatment that will occur when such items are encountered,
- the nature of any reports to be prepared, and
- the disposition of NAGPRA-related items.

Whenever possible, MCAS Yuma will enter into comprehensive agreements with tribes that are affiliated with NAGPRA-related items and those who have claims to them. Such agreements will typically address MCAS Yuma activities on the BMGR West that may trigger NAGPRA.

TRANSFER OF CUSTODY

Once the custody rights of a particular tribe have been determined, MCAS Yuma will transfer custody of the Native American human remains and/or other NAGPRA-related objects with respect to traditional customs and practices of the affiliated tribes. A general notice of the proposed disposition will be published in a newspaper with circulation that covers the area in which the human remains and cultural objects were discovered, and in which interested Native American parties currently reside. The notice will describe the nature and affiliation of discoveries, solicit further claims to custody, and will be published twice (with the second publication occurring at least one week after the first). Transfer of the objects will occur at least 30 days after publication of the second notice. If additional claimants do not appear within this time period, a copy of the notice will be sent to the Departmental Consulting Archaeologist at the National Park Service for further research.

Unclaimed Native American human remains and cultural objects are cared for and managed, or returned in accordance with the regulations developed by the NAGPRA Review Committee.

SCIENTIFIC STUDY

Many Native Americans consider the scientific study of human remains, including photographic documentation, to be disrespectful and culturally insensitive. NAGPRA limits scientific research

to procedures that are necessary for determining cultural affiliation and lineal descendancy. The regulations only allow for more extensive study in those circumstances where human remains and certain cultural items are indispensable to the completion of a specific scientific study, the outcome of which is of major benefit to the United States (43 CFR 10.10(c)).

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A-5
Standard Operating Procedure #5
Inadvertent Discovery of Cultural Materials

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STANDARD OPERATING PROCEDURE #5

INADVERTENT DISCOVERY OF CULTURAL MATERIALS

DRIVER

Archaeological investigation methods are designed to discover material evidence of past cultural activities. It is possible, however, that buried archaeological deposits may remain undetected during the survey process, only to be exposed later by construction or other ground-disturbing activities. These inadvertent discoveries, also referred to as post-review discoveries, are managed in accordance with the Secretary of the Interior's regulations *Protection of Historic Properties* (36 CFR 800.13).

OVERVIEW

The Marine Corps Air Station (MCAS) Yuma Cultural Resources Manager (CRM) will ensure that, in the event of an inadvertent discovery of archaeological deposits, measures are taken promptly to protect the find from further disturbance, assess the significance of the discovery, and implement appropriate mitigation measures (if needed). See Standard Operating Procedure [SOP] #4 for policies and procedures related to Native American Graves Protection and Repatriation Act (NAGPRA) compliance and the inadvertent discovery of Native American human remains and associated funerary objects, sacred objects, or objects of cultural patrimony.

PROCEDURES

For ground-disturbing activities, project managers and construction personnel will be briefed on cultural resources potentially existing on the range. They will be instructed to notify the CRM immediately upon the discovery of any previously unknown cultural materials, and the following procedures will be adhered to.

1. In the event of inadvertent discovery of cultural materials, cease activities immediately within at least a 100-foot radius, secure the discovery site from further disturbance, and contact the CRM, Range Management Department, or the Conservation Program Manager, as appropriate.
2. The CRM will notify the Arizona State Historic Preservation Officer (SHPO) of the discovery. The notification should be by telephone, to be followed immediately by written notification.
3. If human remains are known or suspected to be present, the CRM will also promptly coordinate with the MCAS Yuma Conservation Law Enforcement Officer or appropriate MCAS Yuma Law Enforcement staff regarding notification to the local medical examiner. The CRM will also notify the MCAS Yuma Commanding Officer through the appropriate chain of command, installation legal counsel, and the Public Affairs Officer. No photographs of the human remains should be taken during this process.
4. The CRM will visit the location of the discovery within 24 hours of the notification of the find. The services of appropriate technical experts (e.g., specialist in human osteology, forensic anthropologists) may be retained to participate in the field visit.
5. A determination of NAGPRA, Archaeological Resources Protection Act (ARPA), and National Historic Preservation Act (NHPA) compliance will be made by the

- CRM upon identification of the discovered material as archaeological or historical in origin. If the CRM determines that the site contains human remains, funerary objects, sacred objects, or objects of cultural patrimony, the procedures in SOP #4 (*NAGPRA Compliance*) will be implemented. If the objects are determined to be not covered under NAGPRA, the procedures outlined in this SOP will be followed.
6. If archaeological materials are present and disturbance has been limited, the CRM will recommend that the activity be relocated to avoid the site until compliance with the Section 106 process and evaluation for National Register of Historic Places (NRHP) eligibility may be completed. If the activity cannot be relocated, the CRM shall consult with SHPO. Unless the activity is of the nature of an actual emergency (natural disaster or declaration of war), site activity must stop until consultation with SHPO and/or the Advisory Council on Historic Preservation (ACHP) is completed. Failure to cease activities that intentionally destroy archaeological deposits prior to evaluation and determination of NRHP eligibility in accordance with the regulations (36 CFR 800) may result in fines and penalties under ARPA.
 7. The CRM will contact SHPO to obtain concurrence on the NRHP-eligibility determination of the site. If SHPO and the CRM agree that the discovered archaeological deposit is not eligible for listing on the NRHP, the correspondence will be documented. The CRM may then advise the project manager to proceed with project activities, although the CRM will monitor the remainder of excavation activities in the vicinity to ensure that NRHP-eligible deposits are protected.
 8. If, in the opinion of either SHPO or the CRM, the recovered materials are of insufficient quantity or otherwise non-diagnostic to make a valid assessment of NRHP eligibility, an emergency mitigation plan may be developed by the CRM, in consultation with SHPO. Further ground-disturbing activities in the immediate site vicinity shall be halted pending the accomplishment of the emergency mitigation plan. The CRM may request that SHPO be present on site to consult directly on the assessment of the site's NRHP eligibility. SHPO may choose to send a representative to observe the emergency mitigation plan without prior request by MCAS Yuma; however, access to the site by non-military personnel must be approved by and coordinated with the cultural resources office.
 9. If the site is determined eligible, or if MCAS Yuma and SHPO cannot reach an agreement on determination of eligibility, the following alternative actions are available:
 - a. Reconsider relocating the project to avoid adverse effect (this is always the preferable course of action).
 - b. Develop a Memorandum of Agreement (MOA) with SHPO that specifies the scope and extent of data recovery required to mitigate the project impact.
 10. Where data recovery (mitigation) is limited in scope and such action is amenable to SHPO, MCAS Yuma may elect to proceed without development of an MOA. All aspects of data recovery will be fully documented and reported to SHPO in a written report at the termination of data recovery efforts.

A-6
Standard Operating Procedure #6
Treatment and Curation of Archaeological Collections

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STANDARD OPERATING PROCEDURE #6 TREATMENT AND CURATION OF ARCHAEOLOGICAL COLLECTIONS

DRIVER

The regulations titled *Curation of Federally-Owned and Administered Archaeological Collections* (36 CFR 79) establish definitions, standards, procedures, and guidelines to be followed by federal agencies to preserve collections of prehistoric and historical material remains and associated records recovered under the authority of the Antiquities Act (54 USC §§ 320301 et seq.), the Reservoir Salvage Act (54 USC §§ 312501 et seq.), the National Historic Preservation Act (54 USC §§ 300101 et seq.), or the Archaeological Resources Protection Act (16 USC §§ 470aa–mm). The regulations define responsibility for federal collections; procedures and guidelines to manage and preserve collections; terms and conditions for federal agencies to include in contracts, memoranda, agreements or other written instruments with repositories for curatorial services; standards to determine when a repository has the capability to provide long-term curatorial services; and guidelines for collections access, loan, and use (36 CFR 79).

OVERVIEW

Perhaps the most compelling reason for establishing and maintaining a proper curation facility for archaeological artifacts, aside from the fact that each federal agency is required to do so by law, is that the collected prehistoric and historical material information will be the only lasting evidence of the historical past of the Barry M. Goldwater Range West (BMGR West). Without proper conservation and storage, archaeological artifacts deteriorate, become misplaced, or are otherwise subject to the many vicissitudes of time.

Archaeological collections include material remains that are excavated or removed during a survey, excavation, or other study of a prehistoric or historical site, and associated documents that are prepared or assembled in connection with the survey, excavation, or other study. Associated documents comprise original records (or copies thereof) that are prepared or assembled to document efforts to locate, evaluate, record, study, preserve, or recover prehistoric or historical resources.

Collections from federal lands should be deposited in a repository that meets the standards outlined in Part 79.9 of the regulations to ensure that they will be safeguarded and permanently curated in accordance with federal guidelines (36 CFR 79.9).

A curation facility is specifically designed to serve as a physical repository where collections and records are sorted, repackaged, assessed for conservation needs, and then placed in an appropriate, environmentally controlled, secure storage area. Proper curation also includes a review and update of all paper records. Artifact data are entered into a database that serves as an important management and research tool. The overall goal of the federal curation program as set forth in Part 79.10 is to ensure the preservation and accessibility of cultural resource collections and documents for use by members of the public interested in the archaeology and history of the region (36 CFR 79.10).

A 1999 report by the United States Army Corps of Engineers (USACE), St. Louis District, Mandatory Center of Expertise for the Curation and Management of Archaeological Collections,

provides guidelines for Department of Defense (DoD) agencies regarding artifact collection and curation of collections, and follows the requirements of Part 79 (36 CFR 79). The curation guidelines prepared by the USACE include adjustments to Part 79 to address the unique collections management challenges facing DoD agencies. The authors emphasized that artifact collection destroys a site's primary context. Only by carefully documenting, recording, and handling artifacts can this context be preserved for study. These guidelines also stress the importance of maintaining collections and their accompanying documentation for reexamination. These guidelines establish several principles:

- Curation begins before archaeological materials are collected or a document is created.
- It must be considered that all actions (including inaction) may have a permanent effect on archaeological materials.
- Each action that affects artifacts, records, and other materials should be documented.
- Collections should be curated in a repository that meets the standards of Part 79 (36 CFR 79).

PROCEDURES

Most collections associated with the BMGR West are currently housed at the Arizona State Museum in Tucson, Arizona. Nine boxes of artifacts, as well as associated records, from the Tinajas Altas site and vicinity, collected during studies when Luke Air Force Base had management responsibility for the BMGR West, are at the BMGR Repository at Gila Bend Air Force Auxiliary Field (GBAFAP). Six boxes of artifacts and associated records are housed at the Marine Corps Air Ground Combat Center (MCAGCC) Curation Facility for long-term storage and curation per a recent 2017 Memorandum of Agreement (MOA) for curatorial services of archaeological artifacts, specimens, and associated records (see Appendix B of the ICRMP associated with this SOP). Copies of technical reports, site records, and other associated materials are also housed at Marine Corps Air Station (MCAS) Yuma and managed by the MCAS Yuma Cultural Resources Manager (CRM).

The following procedures will be followed for all new collections:

- Before permanent curation, all artifacts recovered on the BMGR West will be analyzed using commonly accepted methods for artifact analysis in the region. Artifact analyses will be consistent with current archaeological research objectives for the region.
- Cleaning, curation, and storage of artifacts and associated documents will meet professional standards and follow the guidelines of the curation facility at MCAGCC, according to the MOA.
- Artifacts and associated documents will be stored in clean, spacious, temperature-controlled facilities while on the installation and kept in archival-quality bags, folders, or boxes.
- All field, laboratory, and other project records to be curated will be reproduced on archival-quality paper.

REPORTING AND INSPECTION REQUIREMENTS

Inspections of federally curated archaeological collections are conducted periodically by the CRM or a qualified United States Marine Corps (USMC) representative selected by the CRM, in

accordance with the Federal Property and Administrative Services Act (40 USC § 484), and its implementing regulation (41 CFR 101). Consistent with Part 79.11(a), the CRM or a qualified USMC representative selected by the CRM will (36 CFR 79. 11(a)):

- Maintain a list of any U.S. government-owned property received;
- Periodically inspect the physical environment in which all archaeological materials are temporarily stored to monitor the physical security and environmental control measures;
- Periodically inspect the collections housed in temporary storage to assess the condition of the material remains and associated records, and to monitor those remains and records for possible deterioration and damage;
- Annually inventory the collections by accession, lot, or catalog record, verifying the location of the material remains and associated records;
- Periodically inventory any other U.S. government-owned property in the possession of the CRM;
- Send the CRM an annual status report from their curation facility where BMGR West collections are housed; and
- Periodically inspect any other U.S. government-owned archaeological materials that are housed outside of USMC jurisdiction.

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A-7
Standard Operating Procedure #7
Native American Consultation

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STANDARD OPERATING PROCEDURE #7

NATIVE AMERICAN CONSULTATION

DRIVER

Native American consultation, also referred to as American Indian or Indian Tribal consultation, is mandated by federal laws, Executive Orders, and Department of Defense (DoD) and Department of Navy policies, including the National Historic Preservation Act (NHPA; 54 United States Code [USC] §§ 300101 et seq.), American Indian Religious Freedom Act (AIRFA; 42 USC § 1996), Native American Graves Protection and Repatriation Act (NAGPRA; 25 USC §§ 3001-3013), Archaeological Resources Protection Act (ARPA; 16 USC §§ 470aa-mm), Executive Order 13175 (*Consultation and Coordination with Indian Tribal Governments*), DoD Instruction 4710.02 (*DoD Interactions with Federally Recognized Tribes*), and Secretary of Navy Instruction 11010.14B (*Department of the Navy Policy for Consultation with Federally Recognized Indian Tribes*).

OVERVIEW

Consultation, broadly defined, is the action or process of formally discussing. More specifically, consultation, as defined in the NHPA Section 106 regulations, is the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process (36 CFR 800.16(f)). As it pertains to this Standard Operating Procedure (SOP), consultation is the formal, mutual process by which the Commanding Officer (CO) and Cultural Resources Manager (CRM) communicate and coordinate with tribal governments. It is intended to foster positive relationships with sovereign Native American nations and to ensure active participation by tribes in planning and implementing activities that may affect resources of interest to those groups. Consultation provides an essential means of obtaining the advice, ideas, and opinions of Native American parties regarding the management of federal resources, as well as ensuring the concerns of all involved parties are addressed.

PROCEDURES

Marine Corps Air Station (MCAS) Yuma consults with Native American tribes and organizations for specific undertakings (see SOP #2 [*NHPA Section 106 Compliance*]), when creating or updating procedural documents that affect tribal resources (e.g., Integrated Cultural Resources Management Plan [ICRMP], Integrated Natural Resources Management Plan), when excavation of Native American remains is anticipated or unintentionally occurs (see SOP #4 [*NAGPRA Compliance*]), upon discovery of cultural materials during project implementation (see SOP #5 [*Inadvertent Discovery of Cultural Materials*]), when an undertaking will affect Traditional Cultural Properties or areas of tribal significance under DoD Instruction 4710.02, and when requested by a specific tribe.

MCAS Yuma will make every effort to ensure that consultation with the tribes is carried out in good faith and that honesty and integrity are maintained at all stages of the consultation process. Consultation should occur as part of a meaningful and comprehensive process that promotes effective communication between the tribes and MCAS Yuma.

Consultations will respect the sovereign status of each Native American tribal government, and MCAS Yuma will work directly with federally recognized tribes on a government-to-government basis. MCAS Yuma consults with those groups that have tribal or trust lands in proximity to the Barry M. Goldwater Range West (BMGR West), those Native American tribes that occupied the area of the BMGR West at some point in history, and those tribes or groups with an expressed interest in consultation proceedings regarding the BMGR West. When an undertaking may affect a property of historic value to a non-federally recognized tribe on non-Native American lands, the consulting parties will, if warranted, afford such a tribe the opportunity to participate as an interested party.

Native American consultation can be either formal or informal, but will always be initiated on a formal government-to-government basis. For MCAS Yuma, that typically will entail a letter from the CO, signed on his behalf by the Director of Range Management, to the executive leader of each tribal government. Written correspondence will be sent via certified mail or similar device that offers receipt of delivery to the addressee. Subsequent, informal consultation is conducted at the staff level and consists of communication and exchange of information through emails, phone calls, and meetings, which are necessary to ensure relationships are maintained. The CO and CRM will share appropriate technical information and data with the tribes in accordance with the established Geospatial Data policy (see Appendix F of the ICRMP associated with this SOP).

MCAS Yuma will provide timely opportunities for communication with Native American tribes concerning decisions that may affect them. DoD Instruction 4710.02 states that installations should involve tribal governments early in the planning process for proposed actions that may have the potential to affect protected tribal rights, land, or resources, and shall endeavor to complete consultations prior to implementing the proposed action. Similarly, tribal consultation should be conducted during the initiation of the NHPA Section 106 process. Early involvement means that a tribal government is given an opportunity to comment on a proposed action in time for the tribal government to provide meaningful comments that may affect the decision.

Because consultation is required by various statutes, regulations, and policies, it is important to maintain records that document MCAS Yuma's good faith efforts to consult with Native American tribes. Copies of letters and emails, documentation of phone calls, and notes of meetings will be compiled (with sensitive information omitted) and placed in the project folder associated with the specific consultation effort. For informal consultation specific to a tribe and not pertaining to any one certain project, the documentation will be maintained in separate electronic or paper files for each tribe.

INSTALLATION LIAISONS

DoD Instruction 4710.02 states that:

When contacting tribes, the consultation shall be initiated by the installation commander. Follow-on consultation shall be at a level agreed to by the installation commander and tribal government leadership. Base commanders at installations that have on-going consultation and coordination with tribes shall assign a staff member to serve as a tribal liaison [DoD Instruction 4710.02 Parts 6.8-6.9].

For the BMGR West, the designated liaison is the MCAS Yuma CRM.

CULTURALLY AFFILIATED TRIBES

MCAS Yuma consults with nine Native American tribes and one Native American Organization who have expressed an interest in the BMGR West: the Ak-Chin Indian Community, the Cocopah Indian Tribe, the Colorado River Indian Tribes, the Gila River Indian Community, the Quechan Indian Tribe, the Salt River Pima Maricopa Indian Community, the Tohono O’odham Nation, the Yavapai-Apache Nation, the Yavapai-Prescott Indian Tribe, and the Hia C-ed Hemajkam. Additionally, MCAS Yuma will send letters to the following tribes to determine if they are interested in consulting on future projects: Chemehuevi Tribe, Fort McDowell Yavapai Nation, Fort Mojave Indian Tribe, Hopi Tribe, Pueblo of Zuni, and San Carlos Apache Tribe.

PUBLIC DISCLOSURE AND CONFIDENTIALITY

Representatives of Indian tribes may be reluctant, unwilling, or even unable to provide information on sacred site locations or specific aspects of religious ceremonies or cultural traditions. It is MCAS Yuma’s policy to not request more information than is needed to discuss and resolve consultation issues and to not keep that information on file except when absolutely necessary. Even though subsection (b)(3) of the Freedom of Information Act (FOIA) exempts the locations of resources of tribal concern from release because they are “specifically exempted from disclosure by statute”, that only applies if the other statute’s disclosure prohibition is absolute (5 USC § 552(b)(3)). The U.S. Department of Justice has found that the *Archaeological Resources Protection Act of 1979* (16 USC §§ 470aa-mm) applies concerning information pertaining to the nature and location of certain archaeological resources. It is important to note, however, that FOIA applies only to records in the control or possession of a federal agency and does not apply to nongovernmental or private organizations (e.g., contractors, associations, or other organizations) simply because they may receive federal funds or support.

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APPENDIX B

Agreement Documents

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B-1

**Barry M. Goldwater Range Integrated Natural Resources Management Plan
Programmatic Agreement**

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PROGRAMMATIC AGREEMENT

Among

56th RANGE MANAGEMENT OFFICE, LUKE AIR FORCE BASE
MARINE CORPS AIR STATION YUMA
AND
ARIZONA STATE HISTORIC PRESERVATION OFFICER

Regarding

POTENTIAL IMPACTS ON HISTORIC PROPERTIES
OF IMPLEMENTING
AN INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
FOR THE BARRY M. GOLDWATER RANGE,
SOUTHWESTERN ARIZONA

WHEREAS, the Military Lands Withdrawal Act of 1999 (MLWA; Public Law 106-65) reauthorized the withdrawal of over 1,650,000 acres of public land in southwestern Arizona for military use and assigned jurisdiction over the Barry M. Goldwater Range (BMGR) East and BMGR West to the Secretaries of the Air Force and Navy, respectively; and

WHEREAS, the MLWA requires the United States Air Force (USAF) and Marine Corps (USMC) to prepare an Integrated Natural Resources Management Plan (INRMP) that will govern their management of natural and cultural resources on the BMGR, and the US Air Force (USAF) and US Marine Corps (USMC) have published a Draft Environmental Impact Statement (DEIS) that analyzes a range of management strategies and identifies a preferred alternative for managing the natural resources of the BMGR; and

WHEREAS, the 56th Range Management Office (56 RMO) at Luke Air Force Base administers the land and airspace of the BMGR East, and the Range Management Department (RMD) at Marine Corps Air Station Yuma manages the BMGR West; and

WHEREAS, other laws and regulations also govern the management of natural resources by Department of Defense installations, including the Sikes Act, as amended (16 U.S.C. 670a et seq.), which sets forth requirements for management of natural resources on military installations, including: conservation and rehabilitation of natural resources; sustainable multipurpose resource use, which shall include hunting, fishing, trapping, and non-consumptive uses; and public access subject to safety requirements and military security [16 U.S.C. 670a (a)(3)]; and

WHEREAS, under the previous withdrawal legislation, the Bureau of Land Management (BLM) had surface management authority over areas within BMGR not actively used for military training and allowed public access for recreational purposes to some areas in accordance with Department of Interior policies and procedures; and

WHEREAS, the USAF and USMC propose to permit the continued use of some portions of BMGR for public recreation consistent with the provisions of MLWA, the Sikes Act, and the INRMP; and

WHEREAS, the preferred alternative described in the DEIS sets forth actions that will be implemented when the Record of Decision (ROD) is signed, including six elements that have been identified as having the potential to impact cultural resources, including properties that may be eligible for inclusion on the National Register of Historic Places (NRHP); and

WHEREAS, although less than five percent of the APE has been surveyed, these limited survey data indicate that properties eligible for inclusion on the National Register of Historic Places are likely to be present in unsurveyed portions of the APE but their number, nature, and significance are unknown; and

WHEREAS, the USAF and USMC have consulted with the Arizona State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (the Council), and have identified the Department of Interior, US Fish and Wildlife Service (USFWS) and/or BLM, and the Arizona Game and Fish Department as consulting parties; and

WHEREAS, SHPO is authorized to enter into this agreement in order to fulfill its role of advising and assisting federal agencies in carrying out their Section 106 responsibilities under the following federal statutes: Sections 101 and 106 of the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470f, and pursuant to 36 CFR Part 800, regulations implementing Section 106, at 800.2(c)(1)(i) and 800.6(b),

WHEREAS, SHPO also is authorized to advise and assist federal and state agencies in carrying out their historic preservation responsibilities and cooperate with these agencies under A.R.S. 41-511.04(D)(4),

WHEREAS, the Ak-Chin Indian Community, the Cocopah Tribe, the Colorado River Indian Tribes, the Gila River Indian Community, the Hia C-ed O'odham Alliance, the Hopi Tribe, the Fort McDowell Yavapai Nation, the Fort Mohave Indian Tribe, the Fort Yuma-Quechan Tribe, the Pascua Yaqui Indian Tribe, the Salt River Pima-Maricopa Indian Community, the San Carlos Apache Tribe, the Tohono O'odham Nation, the Yavapai-Prescott Indian Tribe, the Yavapai-Apache Nation, and the Pueblo of Zuni attach cultural importance to places on the BMGR and have been invited to participate in the development, execution, and implementation of this agreement; and

WHEREAS, pursuant to the Council's regulation at 36 CFR Part 800, *Protection of Historic Properties*, a programmatic agreement may be used when effects on historic properties are similar and repetitive, when effects on historic properties cannot be fully determined prior to approval of an undertaking, where routine management activities are undertaken at federal installations, or when other circumstances warrant a departure from the normal Section 106 process (36 CFR 800.14(b)(1)(i, ii, iv, and v);

NOW THEREFORE, the signatories have agreed that the execution and implementation of this agreement is evidence that the USAF and USMC have made a good faith effort to take into account the effects of the undertaking on historic properties and have afforded the Council an opportunity to comment on the undertaking and its effects in accordance with 36 CFR Part 800.

STIPULATIONS

1. This PA shall be implemented under the oversight of a person or persons who meet or exceed the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739) in the appropriate discipline(s).

2. Undertaking

The **undertaking** includes those actions identified as the Preferred Alternative under 6 of the 17 conservation elements (elements 3-7 and 9) shown in Table 3-3 of the DEIS (see Attachments A and B):

- Motorized access and unroaded area management
- Camping and visitor stay limits
- Recreation services and use supervision
- Rockhounding
- Woodcutting, gathering, and firewood use, and collection of native plants
- Recreational shooting

Some of the actions included in the Preferred Alternative and analyzed in the EIS (for example, use of the road system) may be implemented without further analysis under the National Environmental Policy Act and the Council on Environmental Quality regulation 40 CFR Parts 1500-1508, and some of those actions have the potential to impact historic properties that may exist in the area. Once the Record of Decision (ROD) and the INRMP are signed, the actions identified above as the undertaking may be implemented in accordance with the terms of this agreement; other actions included in the Preferred Alternative (for example, development of additional wildlife waters) will require additional analysis and review.

3. Area of Potential Effect

The **area of potential effect (APE)** is the area within which any historic properties that may exist may be affected by the undertaking. In this instance, it is a discontinuous area that includes those parts of BMGR East and West that will be open to public access, where the actions identified as the undertaking (Stipulation 2) may occur (see Attachment C).

- A. Within BMGR East, the APE consists of almost all of Management Unit 6 (Area B plus what is known as the Ajo Air Station area).
- B. Within BMGR West, the APE is all of Management Units 2 and 3, plus the southeasternmost extension of Unit 1, which encompasses the existing Tinajas Altas Mountains Area of Critical Environmental Concern.

4. Identification and evaluation of resources within the APE:

A. Extent of previous survey effort

- 1) BMGR East: Little systematic survey has been completed in the areas open to public access (Management Unit 6); 56 RMO has concentrated its efforts on areas impacted

by military training. Roughly 16 % of BMGR East has been surveyed; however, only 2,346 of the roughly 138,000 acres within the APE (just less than 2%), including 93 acres in the Ajo Air Station parcel west of SR 85, have been systematically surveyed (see Attachment D).

- 2) BMGR West: MCAS Yuma is in the process of compiling and reconciling the various archaeological resources databases that exist for BMGR West. Under contract to MCAS Yuma, Northland Research, Inc., has been tasked to complete an up-to-date and thorough archaeological resources database for the BMGR West. Because the archaeological resources database for the BMGR West is not complete, figures presented for the number of acres surveyed, sites recorded, and sites evaluated should be considered tentative at this time. Once this analysis is completed, a table of survey and site information will be included as an attachment to this agreement. For the most part, MCAS Yuma has concentrated its survey efforts on areas potentially impacted by actions proposed by the USMC in order to fulfill its military mission. In Management Unit 1, nearly 7,000 acres have been surveyed in the western part of the unit which is closed to public access. In the Tinajas Altas area of Management Unit 1, 5,523 acres have been systematically surveyed; most of this work was sponsored by the 56 RMO before the passage of MLWA in 1999. In all, approximately 5.4% of Management Unit 1 has been surveyed (Attachment E). Surveys of 16,377 acres (6.2% of the unit) were completed in Management Unit 2, nearly all of these in support of military actions. Management Unit 3 has received the least survey with only 1824 acres (0.9% of the unit).

B. Previously recorded sites

- 1) BMGR East: Thirty-six archaeological sites have been recorded in the APE (see Attachment D). In addition to these, volunteer site stewards have reported as many as 32 rock shelters in the vicinity of existing roads in Area B; however, their exact locations are unknown and only brief descriptive remarks about these sites are available.
- 2) BMGR West: As indicated in Stipulation A.2 above, MCAS Yuma is in the process of compiling and reconciling the various archaeological resources databases that exist for BMGR West, and figures presented for the number of acres surveyed, sites recorded, and sites evaluated should be considered tentative at this time. Available information indicates that 151 archaeological sites have been recorded in the APE, including 40 in Management Unit 1, 86 in Management Unit 2, and 25 in Management Unit 3.

C. Previously evaluated sites

- 1) Eligible
 - a) BMGR East: Eleven of the previously recorded archaeological sites were determined eligible for inclusion on the National Register of Historic Places by BLM when they were first identified. To date, the USAF has not reconsidered these determinations. Determinations of eligibility for the remaining sites have not been made.
 - b) BMGR West: As indicated in Stipulation A.2, additional information regarding eligibility determinations will be added or attached to this agreement when it becomes available. Preliminary figures are 47 sites recommended eligible and 60

sites recommended not eligible. No eligibility recommendations are available for 44 sites.

2) Not eligible

- a) BMGR East: None of the evaluated sites in Area B has been found to be ineligible for inclusion on the NRHP. The Ajo Air Station was recorded as a potentially eligible Cold War property; however, the SHPO concurred with the Air Force's determination that it was not eligible for inclusion on the NRHP.
- b) BMGR West: As indicated in Stipulation C.1(b), this information will be added or attached to this agreement when it becomes available.

D. Phased identification and evaluation strategy

- 1) In coordination with consulting parties, USAF and USMC will make determinations of eligibility for previously recorded sites and offer these determinations to SHPO for concurrence.
- 2) With consulting parties, USAF and USMC will prioritize areas for survey based on available data. Priority survey areas will include known camping and recreational use sites, areas adjacent to most heavily traveled roads, and natural water sources such as washes, springs, or Tinajas (see Attachments D and E). Other priority areas may be identified based on recreation monitoring or other management activities, including observations made by range security patrols and volunteer Site Stewards.
- 3) As surveys of priority areas are completed, USAF and USMC will evaluate the eligibility of recorded resources for inclusion on the NRHP and will offer determinations of eligibility to SHPO and consulting parties.
- 4) USAF and USMC will compile and distribute an annual report to the parties to this agreement and shall meet with consulting parties as needed to evaluate the progress of the inventory and evaluation strategy, and if necessary, develop alternatives.

5. Assessing and Resolving Effects

- A. With consulting parties, assess effects on previously identified historic properties.
- B. As surveys of priority areas are completed, and determinations of eligibility made, USAF and USMC will assess the effects of the undertaking on historic properties, and in consultation with the parties to this agreement, will develop measures to avoid, minimize, or mitigate any adverse effects. Those measures may include, but are not limited to: avoidance of impacts through management actions such as road closures, signing, monitoring by Site Stewards, or increased security patrols; preservation in place through fencing or other measures; comprehensive recording and documentation; and oral-historical or archaeological investigation.
- C. USAF and USMC will monitor the success of management actions taken and the results of this monitoring effort will be included in the annual report to consulting parties.

6. Monitoring and Reporting

A. Monitoring

- 1) The ICRMP for BMGR, which is incorporated in the INRMP by reference, will include strategies for monitoring sites in areas open to public use, as well as military training areas that are closed to the public. Volunteer Site Stewards will monitor selected sites in public-use areas; some sites will be monitored by USAF and USMC personnel.

- 2) Previously unidentified sites that are discovered during implementation of the undertaking will be treated in accordance with the discovery procedures described in the ICRMP.

B. Reporting

- 1) USAF and USMC will compile and distribute an annual report to the parties to this agreement no later than 15 January of each year that this agreement remains in effect. That report will: summarize the results of inventory completed in the reporting year; identify areas programmed for inventory in the upcoming year; describe the results of monitoring activities, including discoveries made during this process; identify any problems encountered in implementing the agreement; and propose solutions for consideration by the parties.

7. Dispute Resolution

- A. Should any signatory to this agreement or any concurring party object at any time to the manner in which the terms of this agreement are implemented, or to any documentation prepared in accordance with its terms, USAF and USMC will immediately notify the other signatories of the objection and request their comments on the objection within 14 days following receipt of the such notification. USAF and USMC will consult with the objecting party for no more than 30 days to resolve the objection, honor the request of any other signatory to participate in the consultation, and take any comments provided by other signatories into account in efforts to resolve the objection. If at the end of the 30-day consultation period, USAF and USMC determine that the objection cannot be resolved through such consultation the USAF and USMC will either:
 - 1) Render a decision regarding the objection within 14 days after it has determined that the objection could not otherwise be resolved and in writing notify the objecting party and the other signatories of its decision within this time frame. In reaching a final decision, USAF and USMC will take all comments received into account. USAF and USMC shall have the authority to make the final decision resolving the objection; or
 - 2) Forward all documentation relevant to the objection to the Council per 36 CFR Part 800.2(b)(2). Any comments provided by the Council within 30 days after its receipt of all relevant documentation and all other comments will be taken into account by USAF and USMC in reaching a final decision regarding the objection. USAF and USMC will notify all signatories and consulting parties in writing of the final decision within 14 days after it is rendered. USAF and USMC shall have the authority to make the final decision resolving the objection.
- B. At any time during implementation of the terms of this agreement, should an objection be raised by a member of the public, USAF and USMC shall immediately notify the other signatories in writing and take the objection into account. USAF and USMC shall consult with the objecting party and, if the objecting party so requests, with any or all of the other signatories for no more than 30 days. Within 14 days following closure of this consultation period, USAF and USMC will render a decision regarding the objection and notify all parties of this decision in writing. In reaching a final decision, USAF and USMC will take into account comments from the signatories. USAF and USMC shall have the authority to make the final decision resolving the objection.
- C. The agencies' responsibility to carry out all other actions under this PA that are not the subject of the objection will remain unchanged. USAF and USMC may implement that

portion of the Undertaking subject to objection under this stipulation after complying with either subsection (A)(1) or (A)(2) of this stipulation.

- D. Any dispute pertaining to the National Register eligibility of cultural resources covered by this PA will be addressed by USAF and USMC in accordance with 36 CFR Part 800.4 (c)(2).

8. Amendment or Termination

- A. The BMGR INRMP shall be reviewed, and possibly updated, annually and may be revised at least every 5 years. Substantive changes in the undertaking as defined in this agreement may require amendment or modification of the agreement. USAF and USMC will include the signatories to this agreement in consultation regarding the need for INRMP updates and revisions, and the parties will consult to amend this agreement as needed.
- B. If any signatory believes that the terms of this agreement are not being honored or cannot be carried out, or that an amendment to its terms should be made, that signatory will immediately consult with the other signatories to consider and develop amendments to the agreement.
- C. If this agreement is not amended as provided for in this stipulation, the USAF, USMC, or SHPO may terminate it. The party terminating this agreement will provide all other signatories with a written explanation of the reasons for termination.
- D. If the Council determines that the terms of this agreement are not being carried out, or if this agreement is terminated, the USAF and USMC shall comply with 36 CFR 800, Subpart B.

9. ANTI-DEFICIENCY ACT

All requirements set forth in this Agreement requiring expenditure of USAF and USMC funds are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. section 1341). No obligation undertaken by USAF or USMC under the terms of this agreement shall require or be interpreted to require a commitment to expend funds not appropriated for a particular purpose.

10. OTHER

- A. Equal Opportunity/Non-Discrimination: The Parties agree to comply with Chapter 9, Title 41, Arizona Revised Statutes (Civil Rights), Arizona Executive Order 99-4 and any other federal or state laws relating to equal opportunity and non-discrimination, including the Americans with Disabilities Act.
- B. Records: Pursuant to A.R.S. et seq. 35-214, 35-215 and 41-2548, all books, accounts, reports, files and other records relating to this Agreement shall be subject, at all reasonable times, to inspection and audit by the State for five years after the termination of this Agreement.
- C. Conflict of Interest: This Agreement is subject to cancellation by the State under A.R.S. et seq. 38-511 if any person significantly involved in the Agreement on behalf of the State is an employee or consultant of the contractor at any time while the Agreement or any extension of the Agreement is in effect.

- D. Non-Availability of Funds: This Agreement shall be subject to available funding, and nothing in this Agreement shall bind the State to expenditures in excess of funds authorized and appropriated for the purposes outlined in this agreement.
- E. Arbitration: To the extent required by A.R.S. §§ 12-1518(B) and 12-133, the parties agree to resolve any dispute arising out of this Agreement by arbitration.

11. EFFECTIVE DATE


This agreement shall take effect on the date that it has been fully executed by the USAF, USMC, and SHPO and shall expire on 5 October 2024, at the end of the current range withdrawal, unless it has been amended by the signatories to extend its term.

Execution of this agreement and subsequent implementation of its terms evidence that USAF and USMC have afforded the Council a reasonable opportunity to comment on the undertaking and its effects on historic properties, that USAF and USMC have taken into account the effects of the undertaking on historic properties, and that USAF and USMC have satisfied their responsibilities under Section 106 of the NHPA and 36 CFR Part 800.


ATTACHMENTS

- A. Table of Alternative Management Strategies from DEIS
 B. Preferred Alternative
 C. Comparison of Preferred Alternative and Existing Management
 D. Area of potential effect, areas surveyed, and sites recorded on BMGR East
 E. Area of potential effect, areas surveyed, and sites recorded on BMGR West
 F. Prioritized survey areas (to be developed after ROD is signed)

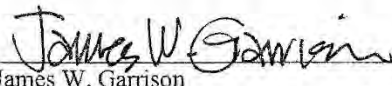
SIGNATORIES


 ROBIN RAND, Brig Gen (S), USAF
 Commander, 56th Fighter Wing


 Date


 B. D. Hancock
 Colonel, U.S. Marine Corps
 Commanding Officer, MCAS Yuma


 Date


 James W. Garrison
 Arizona State Historic Preservation Officer


 Date

CONCURRING PARTIES:

Arizona Game and Fish Department

Date

Ak-Chin Indian Community

Date

Cocopah Tribe

Date

Colorado River Indian Tribes

Date

Fort McDowell Yavapai Nation

Date

Fort Mohave Indian Tribe

Date

Fort Yuma-Quechan Tribe

Date

Gila River Indian Community

Date

Hia C-ed O'odham Alliance

Date

Hopi Tribe

Date

Salt River Pima-Maricopa Indian Community

Date

San Carlos Apache Tribe

Date

Tohono O'odham Nation

Date

Yavapai-Prescott Indian Tribe

Date

Yavapai-Apache Nation

Date

Pueblo of Zuni

Date

B-2

**Memorandum of Understanding on Section 106 Compliance Consultation
Process for Negative Findings**

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UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION YUMA
YUMA AZ 85369-9100
ARIZONA STATE HISTORIC PRESERVATION OFFICE
PHOENIX AZ 85007

5758
MCAS

23 AUG 2010

MEMORANDUM OF UNDERSTANDING
BETWEEN
MARINE CORPS AIR STATION, YUMA, ARIZONA
AND
ARIZONA STATE HISTORIC PRESERVATION OFFICE

Subj: SECTION 106 COMPLIANCE CONSULTATION PROCESS FOR NEGATIVE
FINDINGS

1. Purpose. This Memorandum of Understanding (MOU) is by and between Marine Corps Air Station, Yuma, Arizona; hereafter referred to as MCASY, and the State Historic Preservation Office, Phoenix, Arizona; hereafter referred to as SHPO. The purpose of this agreement is to help streamline the Section 106 compliance consultation process (National Historic Preservation Act of 1966 and implementing regulations at 36 CFR Part 800) between MCASY and SHPO for undertakings characterized by negative findings. This MOU will result in streamlining MCAS Yuma's Section 106 consultations with SHPO by decreasing the number of consultations required under 36 CFR Part 800, thus assisting in the better management of heavy work loads by both parties.

2. Background. MCASY has determined that their programs and projects may have an effect upon properties included in or eligible for inclusion in the National Register of Historic Places (NRHP) and therefore requires Class III (100% inventory) cultural resources surveys prior to implementation of said programs and projects. Many of these Class III cultural resources surveys result in negative findings in which no cultural (archaeological, historical, or traditional) properties are identified within a project's Area of Potential Effect (APE). ("Traditional" properties include tribal Traditional Cultural Properties or TCPs, sacred sites, traditional use areas, or other properties of cultural and religious significance.)

3. Responsibilities. In support of this agreement, it is understood that:

a. MCAS Yuma Cultural Resources Program Office shall:

(1) Conduct Class III cultural resources surveys for all projects, as appropriate; these surveys will meet the *Secretary of the Interior's Standards and Guidelines for Historic Preservation*, especially including *Guidelines and Standards for Identification, Evaluation, and Archeological Documentation*.

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SUBJ: SECTION 106 COMPLIANCE CONSULTATION PROCESS FOR NEGATIVE FINDINGS

(2) Ensure that all Class III surveys are carried out by or under the direct supervision of a person meeting the Secretary of the Interior's *Professional Qualifications* (48 FR 44738-44739).

(3) Ensure that the APEs for these Class III surveys include indirect and cumulative impact areas associated with a project, as well as direct impact areas.

(4) Ensure that tribal consultations, pursuant to 36 CFR 800.3 and .4, with relevant Indian Tribes have been conducted for these projects in order to ascertain if tribal TCPs, sacred sites, traditional use areas, or other properties of cultural and religious significance are present within a project APE.

(5) Ensure that the following reporting guidelines are met:

(a) When no cultural properties are identified within a project APE as a result of a Class III cultural resources survey, document the results internally, as appropriate to MCASY's reporting and documentation standards and policies.

(b) At the end of the federal fiscal year, provide an Annual Report to SHPO that summarizes those actions completed without consultation. The Annual Report will list the individual projects and negative finding documents completed during the fiscal year, along with a map of the installation/facility showing project locations. This report will be provided to SHPO by November 1st of each year.

(c) At its discretion, MCASY may decide to consult with SHPO on surveys resulting in negative findings. Such consultation shall pertain to that undertaking only and will not negate this MOU for all other projects.

(6) For any unanticipated discoveries encountered during a project for which negative finding documentation was generated following this MOU, ensure that work ceases in the area of the discovery and that MCASY's internal procedures for handling discoveries are followed. MCASY will then consult with SHPO on the discovery situation as per 36 CFR Part 800, Subpart B.

(7) Ensure self-monitoring of the process embodied in this MOU. If any problems are encountered in implementing this agreement, notify SHPO and seek advice on rectifying the situation(s).

b. Arizona State Historic Preservation Office shall:

(1) Monitor activities carried out pursuant to this MOU. SHPO will review MCASY's Annual Report and provide MCASY with any review comments within 30 days of receipt. If no comments are received from SHPO within this time period, MCASY may assume that SHPO does not have any issues with the work summarized in the Annual Report.

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SUBJ: SECTION 106 COMPLIANCE CONSULTATION PROCESS FOR NEGATIVE FINDINGS

(2) Review and comment on those negative surveys for which MCASY voluntarily seeks SHPO consultation as per 3a(5)(c) of this MOU.

4. Dispute Resolution. Should either party object at any time to any actions proposed, or the manner in which the terms of this MOU are implemented, they shall notify the other party in writing with a proposed solution. While discussions ensue between MCASY and SHPO to resolve the objection, MCASY shall continue to comply with this MOU unless otherwise agreed to by both parties. If the objection cannot be resolved as a result of these discussions, it is the responsibility of MCASY to consult with SHPO pursuant to the Section 106 compliance steps found at 36 CFR Part 800, Subpart B. To the extent required by A.R.S. §§ 12-1518(B) and 12-133, the parties agree to resolve any dispute arising out of this agreement by arbitration.

5. Other Provisions

a. State Standard Clauses for Federal Agreement Documents Equal Opportunity/Non-Discrimination: The Parties agree to comply with Chapter 9, Title 41, Arizona Revised Statutes (Civil Rights), Arizona Executive Order 99-4 and any other federal or state laws relating to equal opportunity and non-discrimination, including the Americans with Disabilities Act.

b. Records: Pursuant to A.R.S. et seq. 35-214, 35-215 and 41-2548, all books, accounts, reports, files and other records relating to this agreement shall be subject, at all reasonable times, to inspection and audit by the State for five years after the termination of this agreement.

c. Conflict of Interest: This agreement is subject to cancellation by the State under A.R.S. et seq. 38-511 if a person significantly involved in the agreement on behalf of the State is an employee or consultant of the contractor at any time while the agreement or any extension of the agreement is in effect.

d. Non-Availability of Funds: This agreement shall be subject to available funding, and nothing in this agreement shall bind the State to expenditures in excess of funds authorized and appropriated for the purposes outlined in this agreement.

6. Terms of Agreement

a. Personnel responsible for execution this Agreement are the MCASY Archaeologist/Cultural Resource Program Manager and the Arizona SHPO Archaeological Compliance Specialist.

b. All support identified within this agreement is provided on a non-reimbursable basis. Any additional support not identified in this agreement will be reviewed on a case-by-case basis to determine

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SUBJ: SECTION 106 COMPLIANCE CONSULTATION PROCESS FOR NEGATIVE FINDINGS

whether it will be provided on a non-reimbursable or reimbursable basis.

c. Nothing in this agreement is intended to conflict with current law or regulation. If a term of this agreement is inconsistent with such authority, then that term shall be invalid, but the remaining terms and conditions of this agreement shall remain in full force and effect.

7. Points of Contact

MCAS Yuma Archaeologist/Cultural
Resource Program Manager
(928) 269-2288

SHPO Archaeological Compliance
Specialist
(602) 542-7138

MCAS Yuma Support Agreements Manager
(928) 269-2047/3637

8. Modification/Termination. The terms of this agreement will normally be modified by mutual agreement by both agencies. Notification of the intention of either agency to terminate or modify the agreement will be by written notice at least 30 days in advance of the proposed date. Any modification(s) will be recorded in writing and made a part of this basic agreement. If the agreement is terminated, MCASY will consult with SHPO under 36 CFR 800.3 and 800.4 on all negative surveys from that time on or until a new MOU is established.

9. Effective. This agreement becomes effective upon the last date of the signatories below. This MOU will remain in effect for ten years with biennial reviews, or until modified, terminated, or superseded by official documentation.

James W. Garrison 8/30/10
James W. Garrison Date
State Historic Preservation
Officer
Phoenix, Arizona

M. A. Werth 8/23/2010
M. A. Werth Date
Colonel, US Marine Corps
Commanding Officer
Marine Corps Air Station
Yuma, Arizona

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Memorandum of Agreement on Curation Services

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Appendix I

M62974-20161130-0308

UNITED STATES MARINE CORPS
MARINE AIR GROUND TASK FORCE TRAINING COMMAND
MARINE CORPS AIR GROUND COMBAT CENTER
BOX 788100
TWENTYNINE PALMS, CALIFORNIA 92278-8100

4000

P&I

21 Aug 17

MEMORANDUM OF AGREEMENT
BETWEEN
MARINE AIR GROUND TASK FORCE TRAINING COMMAND
MARINE CORPS AIR GROUND COMBAT CENTER
TWENTYNINE PALMS, CALIFORNIA
AND
MARINE CORPS AIR STATION, YUMA, ARIZONA

Subj: MEMORANDUM OF AGREEMENT CONCERNING CURATORIAL SERVICES FOR MARINE
CORPS AIR STATION YUMA

Encl: (1) 2017 MCAS Yuma Collections Inventory Report
(2) MAGTFTC, MCAGCC Archaeology and Paleontology Curation Center
Instructions for Submission of Collections

1. This is a Memorandum of Agreement (MOA) between Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, (hereinafter referred to as MAGTFTC, MCAGCC), and Marine Corps Air Station (MCAS) Yuma, Arizona (hereinafter referred to as MCAS Yuma) concerning curatorial services of archaeological artifacts, specimens and associated records referred as "Collections" per 36 CFR § 79.4(b). When referred to collectively, MAGTFTC, MCAGCC and MCAS Yuma are referred to as the "Parties".

2. Background. MCAS Yuma has the responsibility under 36 CFR § 79 to ensure that the Collections are suitably managed and preserved for the public good. To this end, MCAS Yuma seeks to obtain curatorial services from MAGTFTC, MCAGCC. In accordance with 36 CFR § 79.8, MAGTFTC, MCAGCC agrees to manage, preserve, obtain, store, catalog, and maintain the Collections listed in enclosure (1) and any other future Collections added to the MCAS Yuma Collections Inventory Report. MAGTFTC, MCAGCC recognizes the benefits that will accrue to the Collections as well as the public and scientific interests by storing and maintaining the Collections for study and other educational purposes.

3. Purpose. The purpose of this MOA is to establish curatorial responsibilities to manage, preserve, obtain, store, catalog, and maintain certain collections of archaeological artifacts, specimens, and associated records.

4. Scope. This agreement shall not alter existing authority or command relationships aboard MAGTFTC, MCAGCC or MCAS Yuma.

5. Responsibilities

a. MAGTFTC, MCAGCC will:

(1) Provide for the professional care and management of the Collections, and bear all costs for such care.

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CORPS AIR STATION YUMA

(2) Perform all work necessary to protect the Collections in accordance with 36 CFR § 79 for the curation of federally-owned and administered archaeological Collections.

(3) Assign qualified professionals having responsibility for the work under this MOA such as the Curator, the Collections Manager, and the Conservator each of whose expertise is appropriate to the nature and content of the Collections.

(4) Provide and maintain a repository facility having requisite equipment, space, and adequate safeguards for the physical security and controlled environment for the Collections and any associated records in MAGTFTC, MCAGCC's possession.

(5) Maintain complete and accurate records of the Collections, including information on the study, use, loan, and location of said Collections which have been removed.

(6) Not in any way adversely alter or deface any of the Collections except as may be absolutely necessary in the course of stabilization, conservation, scientific study, analysis, and research. Any activity that will involve the intentional destruction of any of the Collections must be approved in advance and in writing by MCAS Yuma.

(7) In accordance with 36 CFR § 79.11, annually inspect the Collections and perform only those conservation treatments that are absolutely necessary to ensure the physical stability and integrity of the Collections. A report of the results of the inventories, inspections, and treatments shall be provided to MCAS Yuma.

(8) Within five business days of discovery, report all instances of and circumstances surrounding loss, deterioration, damage, and/or destruction of the Collections to MCAS Yuma to include those actions taken to correct any deficiencies in the curation center or operating procedures that may have contributed to the loss, deterioration, damage, and/or destruction. Actions to repair or restore any part of the Collections must be approved in advance and in writing by MCAS Yuma.

(9) Approve or deny requests for access to the Collections (or any part thereof) for scientific, educational, or religious uses in accordance with 36 CFR § 79.10 requirements for the curation of federally-owned and administered archaeological collections. MCAS Yuma may specify reasonable conditions for handling, packaging, and transporting the Collections to prevent breakage, deterioration, and contamination. MAGTFTC, MCAGCC will refer requests for consumptive uses of the Collections (or any part thereof) to MCAS Yuma for approval or denial.

(10) Provide copies of any publications resulting from study of the Collections to MCAS Yuma. All exhibits, reproduction, and studies shall credit MCAS Yuma and read as follows: "Courtesy of Marine Corps Air Station Yuma."

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CORPS AIR STATION YUMA

(11) Not mortgage, pledge, assign, repatriate, transfer, exchange, give, sublet, discard, nor part with any possession of the Collections in any manner to any third party either directly or indirectly without the prior written permission of MCAS Yuma. Any such requests shall be redirected to MCAS Yuma.

(12) Not take any action whereby any of the Collections shall or may be encumbered, seized, taken in execution, sold, attached, lost, stolen, destroyed or damaged.

(13) Return any deposited items to MCAS Yuma upon request, at MCAS Yuma's expense.

b. MCAS Yuma will:

(1) Deliver or cause to be delivered, at MCAS Yuma's expense, the Collections to MAGTFTC, MCAGCC.

(2) Submit Collections in accordance with enclosure (2), MAGTFTC, MCAGCC Instructions for Submission of Collections. Any deviation by MCAS Yuma from the MAGTFTC, MCAGCC Instructions for Submission of Collections must be negotiated in advance with MAGTFTC, MCAGCC, on a case-by-case basis.

(3) Assign as MCAS Yuma's representative, having full authority with regard to this MOA, a person who meets the pertinent professional qualifications.

(4) Jointly with MAGTFTC, MCAGCC's designated representative, MCAS Yuma's representative will inspect and inventory the Collections and the repository facility, as needed and at least annually.

(5) When appropriate, provide instructions for restricting access to information relating to the nature, location and character of the prehistoric or historic resource from which the material remains are excavated or removed.

(6) Approve or deny requests for consumptively using the Collections (or any part thereof).

(7) Prior to moving, exchanging, or disposing of any collection that is from Indian lands, ensure the Federal Agency Official obtains written consent of the Indian landowner and the Indian tribe having jurisdiction over the lands. Additionally, if any collection falls under the category of human remains and associate funerary objects, then these items must be handled according to 43 CFR § 10.11.

(8) Adhere to terms and conditions developed pursuant to §-.7 of uniform regulation 43 CFR part 7, 36 CFR part 296, 18 CFR part 1312, and 32 CFR part 229 when the collection is from a site on public lands that the Federal Agency Official has determined is of religious or cultural importance to any Indian tribe having aboriginal or historic ties to such lands.

6. Possession. Title to the Collections being cared for and maintained under this MOA lies with the Federal Government.

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Subj: MEMORANDUM OF AGREEMENT CONCERNING CURATORIAL SERVICES FOR MARINE
CORPS AIR STATION YUMA

7. Personnel. Each party is responsible for all costs of its personnel, including pay and benefits, support, and travel. Each party is responsible for supervision and management of its personnel.

8. General Provisions

a. Points of Contact (POC). The following POCs will be used by the Parties to communicate in the implementation of this MOA. The MCAS Yuma POC for the administration of this MOA is the Support Agreement Manager (SAM). Any modifications to the contents and conditions of the MOA must be facilitated through the both the MAGTFTC, MCAGCC and MCAS Yuma SAMs. Each party may change its point of contact upon reasonable notice to the other party.

(1) MAGTFTC, MCAGCC Natural Resources and Environmental Affairs
(NREA)

Primary POC: Collections Manager, (760) 830-1196

Alternate POC: Conservation Branch Head, (760) 830-5200

(2) MAGTFTC, MCAGCC Performance & Innovation

Primary POC: Director, (760) 830-5140

Alternate POC: Administrative Officer, (760) 830-1186

(3) MCAS Yuma

Primary POC: Archeologist, (928) 269-2288

Alternate POC: Conservation Manager, (928) 269-3401

Administrative POC: Support Agreement Manager,
(928) 269-2047 or (928) 269-3637

b. Correspondence. All correspondence to be sent and notices to be given pursuant to this MOA will be addressed to:

(1) MAGTFTC, MCAGCC

AC/S G-4, NREA Division
Box 788110
MAGTFTC, MAGACC,
Twentynine Palms CA 92278-8110

Director, Performance & Innovation
Attn: Support Agreements Manager
Box 788350
Twentynine Palms, CA 92278-8350

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M62974-20161130-0308

Subj: MEMORANDUM OF AGREEMENT CONCERNING CURATORIAL SERVICES FOR MARINE
CORPS AIR STATION YUMA

(2) MCAS Yuma
Commanding Officer
Attn: Range Management Department
Box 99134
Yuma, AZ 85369-9134

9. Review of Agreement. This MOA will be reviewed annually on or around the anniversary of its effective date for financial impacts and triennially in its entirety.

10. Modification, Change, or Amendment. Any modifications, changes, or amendments to this agreement must be in writing. Subsequent to approval, all Parties must sign the modification, change, or amendment. Written requests for modifications will be forwarded by one Party to the other not less than 30 business days prior to the desired effective date of such modification.

11. Disputes. Any disputes relating to this MOA will, subject to any applicable law, Executive Order, Directive, or Instruction, be resolved by consultation between the Parties or in accordance with Department of Defense Instruction 4000.19.

12. Termination of Agreement. This MOA may be terminated by either Party by giving at least 90 business days written notice to the other Party. The MOA may also be terminated at any time upon the mutual written consent of the Parties.

Upon termination, at the expense of MCAS Yuma, MAGTFTC, MCAGCC shall return such Collections to the destination directed by MCAS Yuma and in such a manner to preclude breakage, loss, deterioration, and contamination during handling, packaging, and shipping, and in accordance with other reasonable conditions specified in writing by MCAS Yuma. If MAGTFTC, MCAGCC terminates or is in default of this MOA, MAGTFTC, MCAGCC shall fund the packaging and transportation costs.

13. Transferability. This Agreement is not transferable.

14. Entire Agreement. It is expressly understood and agreed that this MOA embodies the entire agreement between the Parties regarding the MOA's subject matter.

15. Effective Date. This MOA takes effect beginning on the day after the last Party signs.

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M62974-20161130-0308

Subj: MEMORANDUM OF AGREEMENT CONCERNING CURATORIAL SERVICES FOR MARINE
CORPS AIR STATION YUMA

16. Expiration Date. This MOA expires nine (9) years on the anniversary of its effective date.

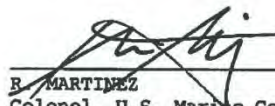
17. Cancellation of Previous MOA. This MOA cancels and supersedes the previously signed agreement which had an effective date of 30 November 2011, between the same Parties.

SUGGS.DAVID.AL
LEN.1125602939

Digitally signed by
SUGGS.DAVID.ALLEN.1125602939
DN: c=US, o=U.S. Government,
ou=DoD, ou=PKI, ou=USMC,
cn=SUGGS.DAVID.ALLEN.1125602939
Date: 2017.08.21 17:14:02 -07'00'

D. A. SUGGS
Colonel, U.S. Marine Corps
Commanding Officer, MCAS Yuma,
Yuma, AZ

Date: _____


R. MARTINEZ
Colonel, U.S. Marine Corps
Chief of Staff, MAGTFMC, MCAGCC
Twentynine Palms, CA

Date: 20170726

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Appendix I

M62974-20161130-0308

MARINE AIR GROUND TASK FORCE TRAINING COMMAND
 MARINE CORPS AIR GROUND COMBAT CENTER
 BOX 788100
 TWENTYNINE PALMS, CALIFORNIA 92278-8100

2017 MCAS Yuma Collections Inventory Report

Current Collection:

# Artifact Boxes	Accession #	CRR or Source	Year Accessioned
1	2012.003	"Yuma Pot"*	2012
2	2015.004	Yuma	2015
1	2015.005	Yuma	2015
3	2015.006	Yuma	2015
1	2015.007	Yuma	2015
1	2015.008	Yuma	2015

*The "Yuma Pot" is on display in the APCC Exhibit Room.

Total # Artifact Boxes: 9 (11.25 cu.ft.)

Associated records: 0.5 linear feet.

No additional collections from MCAS Yuma have been accessioned to the MCAGCC APCC in FY17.

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Appendix I

**MAGTFTC, MCAGCC Archaeology and Paleontology Curation Center
Instructions for Submission of Collections**

Please ensure that all submitted archaeological collections and supporting documentation conform to the following instructions.

Cleaning

- Artifacts should be cleaned with water or dry brushed.
- Wash only those materials that will not deteriorate or where cleaning with water will not destroy archaeological evidence.
- Artifacts, specimens or samples that should not be washed or otherwise cleaned or processed should be separated from other materials and marked: *Special Treatment Required*

Sorting and Cataloging

- Each item submitted in a collection should be assigned a unique sequential catalog number.
- Collections should be sorted according to the following hierarchy: 1) site number, 2) artifact type, 3) catalog number.
- Collections must be accompanied by a catalog (Excel spread sheet; hard copy stored in Box #1).
- Include a full, written explanation of the cataloging/analytical method employed with each collection in addition to coding forms and/or analytical abbreviations (i.e. keys). Specifically include notes on deaccessioned, lost, mis-numbered (including unused numbers) or mis-recorded items.

Packaging

- All items must be packed in acid-free materials.
- Storage boxes must be archival, must meet or exceed a bursting test of 200 lbs p/sq inch, and must measure 10"x12"x15" (such as Gaylord #TC1215, available at gaylord.com).
- All artifacts should be placed in plastic, self-sealing (ziplock) bags (at least 4 mil/thick).
- Fragile items (bone, shell, wood, etc.) should be placed in plastic vials, then into plastic bags.
- Double-bagging is required for heavier objects.

Tags and Labels

- Each bag should contain an internal printed acid free paper tag no larger than 1 ¾" x 2 ¾", which includes the following eight fields in order (note: please use MAGTFTC, MCAGCC "Request for Accession Number" form to request an accession number before submission of

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collection). Do not use adhesive labels. See the *Artifact Catalog Format* section below for further discussion of these fields.

Site:

Catalog:

Accession: (please request an Accession number before submission of collection)

Unit/Location:

Level:

Total No:

Material: (when appropriate, please include specific material type, e.g. Material_2)

Item: (when appropriate, please include more specific Description information)

SAMPLE LABELS

<p>Site: CA-SBR-8974 Catalog: 199 Accession: 2003.007 Unit/Location: Unit 2 Level: 0-10 cm Total No: 5 Material: stone, rhyolite Item: debitage</p>	<p>Site: CA-SBR- 9765 Catalog: 22 Accession: 2004.005 Unit/Location: N25/E30 Level: Surface Total No: 1 Material: metal Item: historic refuse, can fragments</p>
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- Individual artifacts such as tools, diagnostics, or other unique items should be surface labeled with waterproof, permanent white or black ink and sealed with a layer of clear, permanent sealant. Fragile items such as beads should be labeled with an acid free tag. Surface labels should contain, at a minimum, the Site number and the Catalog number.

Soil Samples

- All bulk soil samples are required to be processed *before* submission to the curation center.

Radiocarbon Samples

- Fragile samples should be packaged in aluminum foil or archival plastic vials and placed in plastic bags.

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Photographs and Slides

- Photographs, negatives, and slides should be separated as to type and stored in archival polypropylene storage pages.
- Negatives must be accompanied by proof sheets.
- All slides and photographs must be appropriately labeled and numbered.
- All slides and photographs must be accompanied by a photographic record.
- Digital photographs (JPEG) -- see below for electronic submission requirements.

Final Technical Synthesis Report Submission

With respect to the stipulations specified in the Scope of Work please submit:

- One (1) final technical report on archival paper - unbound
- Requisite number of bound copies (not required to be on archival paper)
- Original field notes, drawings, maps, and photos
- Copy of the report, including graphics, on CD-ROM as a PDF file (e.g. Adobe Acrobat)
- Separate files also on the CD should include:
 - ✓ Individual PDF files for all completed site forms
 - ✓ All final report graphics (includes digital photos)- JPEG
 - ✓ Photographic record- Excel
 - ✓ Artifact catalog-Excel (using, at a minimum, the fields on the following page:)
 - ✓ All associated GIS files

Artifact Catalog Format (see MCAGCC Collection Template)

The MAGTFTC, MCAGCC Collection Template contains the format required for collection information to be uploaded to the MAGTFTC, MCAGCC Cultural Resources database. While catalogs included with the submitted report need not be restricted to this format, it is requested that they also be submitted according to these guidelines, in order that all collections data can be integrated into our database. See the below descriptions for details on how information should appear on the template.

Accession: The accession number for the collection, provided by the MCAGCC Collections Manager

Prefix: State and county designation (e. g., CA-SBR-)

Site: Site number as whole number

Suffix: Site component information, if other than prehistoric (H or /H)

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Catalog: Unique whole number for each item or group of like items.

Material: Material type of artifact(s). Please select from the attached *Material List*, if possible. If no appropriate item appears on the list, please contact the MCAGCC Collections manager to have an item added to the list.

Material_2: Specific material type, especially regarding stone (e. g., felsite, granite, rhyolite, basalt, cryptocrystalline).

Item: Type or description of object (e. g., core, bone, sherd, biface). Please select from the attached *Item List*, if possible. If no appropriate item appears on the list, please contact the MAGTFTC, MCAGCC Collections manager to have an item added to the list.

Description: Any further item description deemed necessary

Total No: The number of like artifacts contained in a single cataloged bag.

Unit / Location: The numbered Unit, Feature, etc., recorded in the project report.

Level: Level below surface at which the artifact was located, in either centimeters or other applicable code (e. g., level A, B, C, D).

Weight: Weight of artifact(s) measured in grams (g).

Condition: Information about the condition of the artifact, if necessary

Comments: Any additional information should be recorded here (e. g., Does it have any unique / noteworthy characteristics? Is it a large, unboxed item? Does it require special attention?).

For questions regarding the above guidelines, please contact:

Charlene Keck, Collections Manager
Natural Resources and Environmental Affairs
Marine Air Ground Task Force Training Command
Marine Corps Air Ground Combat Center
Twentynine Palms, CA 92278-8110
Phone: 760-830-1196 FAX: 760-830-5718
Email: charlene.keck@usmc.mil

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Item List	Material List
assayed cobble	stone
battered stone	ceramic
bead	bone
biface	fiber
charcoal	metal
cobble tool	glass
core	wood
core tool	shell
debitage	soil
drill	charcoal
faunal bone	other
fire affected rock	
flake tool	
flotation sample	
formed flake tool	
groundstone	
hammerstone	
historic military	
historic mining	
historic refuse	
misc stone	
modern trash	
modified sherd	
modified stone	

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other	
other	
sample	
projectile	
point	
seed	
Item List	Material List
shell	
sherd	
tool blank	
utilized	
flake	
wood	

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APPENDIX C

Marine Corps Air Station Yuma Archaeological Survey and Report Standards

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Marine Corps Air Station Yuma Archaeological Survey and Report Standards

To Supplement Arizona State Museum "Archaeological Site Recording Manual",
"Standards for Inventory Documents Submitted for SHPO Review in Compliance with
Historic Preservation Laws", and "Arizona Reporting Standards for Cultural Resources"
for all Archaeological Survey's Performed in Arizona for Marine Corps Air Station
(MCAS) Yuma

and

To Supplement California OHP "Instructions for Recording Historical Resources" and
"Archaeological Resource Management Reports (ARMR): Recommended Contents and
Format" for all Archaeological Surveys Performed in California for MCAS Yuma

**October
2016**

Point of Contact for Questions:
Karla James, M.A.,
Archaeologist
karla.james@usmc.mil
928-269-2288

1. Prior to Fieldwork

If not provided at onset of task, contractor will request current versions of the relevant digital datasets held by MCAS Yuma. These are continually being updated and it will save rewrites later if you work from the most recent authoritative data.

Contractor will thoroughly review all reports for previous surveys in the vicinity of the survey area so that they have an understanding of the prehistoric and historical archaeology of the area and survey methods executed during previous surveys in the area.

Contractor will supply the necessary documentation to schedule range access at least two weeks prior to beginning field work. All field-crew members will be required to attend the range safety and security brief and obtain Range IDs before beginning field work.

Check Bureau of Land Management (BLM)/General Land Office (GLO) maps and other historical maps for any historic period roads, mines, homesteads, etc. Contractor is also expected to check BLM grazing allotment information if there are relevant historical-period sites found during the survey.

2. In The Field

GPS Data Collection

GPS data will be collected in North American Datum (NAD) 83, in the UTM zone for the location at which the data will be collected. The settings on the GPS unit will be verified each day before data collection begins. During each day of data collection, an accuracy assessment will be performed on the data collected that day. At a minimum, the accuracy assessment will consist of either 1) collecting a data point for each of at least three survey monuments (GLO markers, etc.), near the location where data will be collected that day, or 2) downloading the data to a computer with post-processing software (Pathfinder, Trimble Positions, etc.), performing differential correction, and printing out an accuracy report for that day's data collection. If the accuracy assessment shows that the day's data do not meet the accuracy standards in the SOW, the data must be re-collected.

Survey

The entire survey area will be surveyed except for slopes greater than 40 percent, unless stated otherwise in the contract. Contractor will do site updates and new site records for all previously recorded sites in the survey area, to include updated GIS data such as site datum and site boundary.

Survey Polygon for GIS

The survey polygon provided in the deliverables by the contractor should not be the survey polygon provided by MCAS Yuma. The survey polygon provided by MCAS Yuma is only a general reference and will not be identical to the area surveyed. Please see the GIS template for directions as to how the survey polygon for the *CulturalSurveyArea* feature class should be created.

Arizona

Distance between transects will be maintained at 20 meters or less, depending on the ground visibility.

- 80-100 percent ground visibility transects will be no more than 20 meters apart
- Below 80 percent ground visibility transects will be no more than 15 meters apart

California

Distance between transects will be maintained at 15 meters or less, depending on the ground visibility.

Recording Sites and Isolated Occurrences

Establishing a Site Datum

Contractor shall place a permanent datum stake in an inconspicuous location as near to the site center as possible, and within the site boundary, for every site. The UTM coordinates collected for the datum are to be reported as the *cntr UTM* on the first page of the ASM site card in Arizona or as the *P2.d. UTM* on the first page of the Primary Record in California.

Trails

MCAS Yuma ranges are home to wild animals that have roamed the ranges for decades. These animals have created many trails of their own and have also used human-made trails. In order to avoid having to manage animal trails as cultural resources, use the following guidelines when determining whether a trail is animal- or human-made:

- Animal trails are often narrow and one can see that it would be difficult, if not impossible, for a human to walk with their feet so close together.
- Human trails are generally straighter than animal trails, though this is not always so.
- Animal trails often follow the contour of a hill/mountain whereas human trails are more likely to go up and over or around these features.
- Human trails will usually have artifacts or features somewhere along them, though not always.
- If a trail has plants such as ocotillo or creosote bush growing in them and there are no visible routes bypassing the plants, this is a good indication of age and possible human origin/use.

Prehistoric trails that are 100 or more meters long will be recorded as linear sites; whereas, those less than 100 meters with no associated artifacts will be recorded as isolated occurrences (IOs). All artifacts and features near trails will be recorded with a set of coordinates for each (Easting and Northing in NAD83, UTM Zone 11 or 12), the only exception being a situation where there are numerous artifacts within a five-meter diameter. Those locations will, however, be detailed in the field notes.

Prehistoric trails will be recorded with one person capturing GPS data while walking the trail and keeping the GPS receiver as close to the centerline of the trail as possible. In addition, there will be one person on either side of the trail at a distance of no more than five meters, closely examining the ground for artifacts and features. Often in areas along trails where several sherds are found, there will be an intersecting or branching trail. Examine the ground spanning out from the trail in all directions where ceramics are found along a trail. Look closely in the vicinity of any trails as they go into or come out of a wash because these locations are often marked with ceramics.

In areas where ceramic sherds appear to be in a linear or curvilinear pattern, a closer examination of the area for evidence of trails will be performed.

Before field work is completed, pull trail GPS data into GIS with DOQ or other aerial imagery and examine the trajectory of both ends of all trails to see if more of each trail is visible so that they can be followed and recorded to at least the survey boundary.

Before field work is completed, pull the ceramic GPS data into GIS with DOQ or other aerial imagery and see if any trails are visible in areas where ceramics occur in a linear trajectory.

Roads

Unfortunately, MCAS Yuma's ranges have fallen victim to significant cross-country travel throughout its history, and there are numerous roads, trails, and two-tracks across the ranges. If any such features have few or no associated artifacts by which to date them, or if they do not appear on any historical GLOs or other maps, they will not be recorded. Historical roads more than 100 meters long will be recorded as

linear sites whereas those less than 100 meters with no associated artifacts will be recorded as IOs.

Rock Features

All rock features will be described in terms of cobbles (less than 10 inches in diameter) and boulders (greater than 10 inches in diameter).

When recording rock rings or alignments, note presence or absence of caliche on exposed and buried surfaces.

Note if the rocks are laying on the surface or to what degree they are embedded.

If rock rings are on desert pavement, note whether the area within the ring is cleared of desert pavement or is the same as the surrounding area.

Rock feature (e.g. cairn, ring, alignment) descriptions will include approximate number of cobbles and/or boulders, number of courses, height and base diameter measurements, and any other attributes that might indicate whether the feature is historical or prehistoric.

Historical period military defensive positions will include description of shape (e.g. half circle, u-shaped), and number of courses.

Cleared Areas (aka "Sleeping Circles")

There are myriad cleared areas on MCAS Yuma ranges that have natural causes such as plant scars and burro wallows. There are also many cleared areas created by munitions detonations. Any cleared areas recorded as prehistoric cultural features must meet the following criteria:

1. Be circular in shape.
2. Have a well-defined rim.
3. Rim must be more than one stone thick.
4. Does not have unpatinated gravel interior if it is not present in the surrounding matrix.
5. Is associated with artifacts or other features indicating human activity.

See McAuliffe and McDonald (2004) and McDonald et al. (2006) for more information.

Ceramics

If field crew is not experienced and knowledgeable in typing Patayan ceramics, just record all the pertinent attributes of the sherds: temper, thickness, fracture, finish, surface color, oxidation, form, decoration, etc. Take a close-up photo of a fresh break on a representative sample of sherds.

Flaked Stone

If possible, discern what type of core the flakes originated from (e.g., bifacial flake core, single platform core). Note if flakes are "cortical," "partly cortical," or "non-cortical" and give counts or estimates of each type. If other flaked stone technological information can be discerned, include that information as well. Describe material type, e.g. good quality chert, poor quality jasper.

In the simplest terms possible, describe the color of the artifacts, e.g. brown, tan, red, and not purplish/reddish/fuchsia.

Scaled sketches will be made of all projectile points.

Historical Period Artifacts

For measurements of cans use the whole number equivalents (4 $\frac{3}{4}$ inches expressed as 412, 5 $\frac{1}{2}$ inches

expressed as 508). For sites and IOs containing historical can dumps or other trash deposits, a general statement about the concentration and an estimated number of artifacts will suffice:

Can concentration consists of approximately 20 crushed #10 cans, 50 whole or partial milk cans with "punch here" embossed on the lid, and 100 sanitary cans.

When recording sites with numerous shell casings, record the various head stamps and overall count estimate. This is a military reservation and has been so for many years. Detailed information about shell casings is a waste of time and is of no scientific value. We do not need itemized lists of these artifacts and a general statement will suffice:

Approximately 100 30.06 shell casings with head stamps "LC 44", "UT 42", and "TC 43".

Unidentifiable pieces of metal that are scattered across the ranges do not need to be recorded as IOs.

Recording Methods

Ensure that photographs are taken facing a direction where the sun does not produce a glare in the frame. As much as is possible, try to not have any feet, portions of other surveyors, footprints, photographer shadows, backpacks, vehicles, etc., in the photographs. If necessary, crop the photographs before putting them in the report. Do not ever photograph any training troops or facilities unless it is specifically called for in the contract.

At least one overview photograph of the site and one photograph of each feature will be taken at every site. Include scales and north arrows for reference. Distinguishable natural background such as mountains and slow-growing plants such as saguaros and ocotillos are also useful to help relocate sites in the future.

At least one photograph of each diagnostic lithic artifact will be taken. A selective sample of ceramic sherds at each site or IO will be photographed. Include scale for reference.

At least one photograph will be taken of each feature recorded as an isolated occurrence.

Detailed site maps will be made for each site. Include easily identifiable natural features such as saguaro, ocotillo, trees, and drainages (use different symbols for various vegetation types). Any nearby (within 20 meters) roads, trails (animal or human), and two-tracks will be depicted on the maps. Also include any areas of disturbance. Also to be included on all site record site maps: north arrow pointing to the top or side of page (not a corner), and give direction and distance to any roads within 100 meters.

Arizona

If the density and diversity of artifacts and features does not meet ASM Revised Site Definition Criteria, record the item or items as an IO. In other words:

- Any number or combination of flakes and/or cores from a single source will be recorded as an IO if there are no other artifacts or features within 15 meters.
- Any number of sherds in a single pot drop will be recorded as an IO if there are no other artifacts or features within 15 meters.
- Any single feature will be recorded as an IO if there are no associated artifacts within 15 meters or temporally associated feature within 100 meters.
- Less than 20 artifacts of any kind within a 15-meter diameter area will be recorded as an IO.
- Less than 30 artifacts of a single class (e.g., lithics, ceramics, cans), within a 15-meter diameter area will be recorded as an IO.

California

In order to obtain some consistency in the site recording methods on our two ranges in separate states, MCAS Yuma will institute the following changes to site definitions:

- Any number or combination of flakes and/or cores from a single source will be recorded as an IO if there are no other artifacts or features within 15 meters.
- Any number of sherds in a single pot drop will be recorded as an IO if there are no other artifacts or features within 15 meters.
- Any single feature will be recorded as an IO if there are no associated artifacts within 15 meters or temporally associated feature within 100 meters.
- Less than 20 artifacts of any kind within a 15-meter diameter area will be recorded as an IO.
- Less than 30 artifacts of a single class (e.g., lithics, ceramics, cans), within a 15-meter diameter area will be recorded as an IO.

3. Report

The report title will follow this format:

Archaeological Survey of XXXX Acres for the Proposed XXXX on the Barry M. Goldwater Range West, Yuma County, Arizona

Archaeological Survey of XXXX Acres for the Proposed XXXX on the Chocolate Mountain Aerial Gunnery Range, XXXX County, California

If the title is included in a page header in the report, an abbreviated version is acceptable. The complete title, however, will be included on DPR 523A Section P11, Report Citation (California) or ASM Site Card Side A Report Ref. (Arizona).

If the report is formatted with chapters where the page numeration begins at 1 for each chapter (e.g., 5.1, 5-1) and not numbered sequentially throughout, insert numbered tabs at each chapter of the report.

In the Methods section of the report, state the datum and projection in which the data were collected, and also state the datum and projection of the deliverables.

There should be consistent formatting of the various parts of the report: all tables should be similar, all table captions should be the same style; all figure captions should be the same style.

In addition to the *Arizona Reporting Standards and Standards for Documents Submitted to SHPO* and/or *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*, the following items will be included in all reports:

- The date of the final report shall be on the front cover (e.g., January 1, 2016)
- This distribution statement shall be on the front cover: Distribution authorized to U.S. Government agencies and their contractors; and federally recognized Indian Tribes for purposes of cultural resource research/investigation. Other requests for this document shall be referred to Range Management Department, MCAS Yuma, Arizona.
- At least one overview photo of each site
- At least one photo of each type of feature on each site
- All photos should be half-page size if possible
- An Isolated Occurrences table with the columns for IO Number, Description, Northing, and Easting will

be included in an appendix. Append a footnote to the Easting column header to specify the datum used for the entire table. If the IOs are in both Zone 11 and 12, add a column for Zone, otherwise use a footnote to state the UTM zone. IOs will be numbered consecutively, beginning with 1 (IO 001, IO 002, IO 003). Do not keep IO field numbers in the report (IO KJ-10-1, IO LP-10-1)

IO Type		To Include In Description
<i>Ceramics</i>		
Pot Drop	Do not call out that it is ceramic. Do not call a small number of sherds a pot drop. Only use this term if it is a complete or nearly complete vessel.	Type- if it cannot be typed, specify the Ware if known. Estimated number of rim and body sherds. Vessel type if discernable. Diameter of the IO.
Sherd(s)	Do not call out that it is ceramic.	Type- if it cannot be typed, specify the Ware if known. Estimated number of rim and body sherds. Vessel type if discernable. Diameter of the IO if more than one sherd.
Historical		Ware (e.g., stoneware, earthenware, porcelain) and maker's mark. Type of vessel if discernable. Diameter of the IO if more than one sherd.
<i>Lithics</i>		
Debitage	Do not call out that it is lithic.	Number of "cortical", "partially cortical", and "non-cortical" flakes. Type and color of material (e.g., brown chert, tan quartzite). Whether all are from the same parent rock. Diameter of the IO if more than one flake.
Hammerstone(s)	Do not call out that it is lithic.	Type and color of material. Diameter of the IO if more than one.
Tested Cobble(s)	Do not call out that it is lithic.	Type and color of material. Number of fragments. Diameter of the IO if more than one.
Tool(s)	Do not call out that it is lithic.	Type of tool (e.g., expedient, scraper). Type and color of material and whether it was utilized. Diameter of the IO if more than one.
Projectile Point(s)	Do not call out that it is lithic.	Type and color of material, type or period (e.g., desert side-notched, archaic) of point. Diameter of the IO if more than one.
Core(s)	Do not call out that it is lithic.	Type and color of material and whether it is uni-directional or bifacial, etc. Diameter of the IO if more than one.
Mano(s)	Do not call out that it is lithic.	Material type, whole or fragment. Diameter of the IO if more than one.
Metate(s)	Do not call out that it is lithic.	Material type, whole or fragment, concave or flat. Diameter of the IO if more than one.
<i>Other Prehistoric Artifacts</i>		
Shell(s)		Shell species, whole or fragment, whether it was worked and number of each. Diameter of the IO if more than one.
<i>Historical Artifacts</i>		
Can(s)	Do not call out that it is metal.	Number and type of cans (e.g., 10 sanitary, 2 meat tins). Opening (e.g., church-key, knife, punched). Diameter of the IO if more than one.
Jar(s)	Do not call out that it is glass.	Number and type of jars. Maker's mark. Diameter of the IO if more than one.

Bottle(s)	Do not call out that it is glass.	Number and type of bottles. Maker's mark. Blown or machine made. Diameter of the IO if more than one.
Glass	Do not use for whole or nearly whole vessels.	Maker's mark. Whether it was a window, jar, or bottle if discernable. Diameter of the IO.
Nail(s)		Number or wire or cut nails.
Cartridges		Number of each caliber. Year and manufacture of military ammunition.
<i>Rock Features</i>		
Rock Ring(s)	Do not use this for hearths.	Prehistoric, historical, or unknown age. Number of cobbles and/or boulders and whether they are embedded. Presence of caliche. Number of layers and height if more than a single layer. Diameter of the IO.
Rock Alignment(s)	Do not use this for rock rings.	Prehistoric, historical, or unknown age. Number of cobbles and/or boulders and whether they are embedded. Presence of caliche. Number of layers and height if more than a single layer. Length of IO.
Rock Pile(s)	Do not use for single layer clusters.	Prehistoric, historical, or unknown age. Number of cobbles and/or boulders and whether they are embedded. Presence of caliche. Approximate height. Diameter of the IO.
Rock Cluster(s)	Do not use for piles.	Prehistoric, historical, or unknown age. Number of cobbles and/or boulders and whether they are embedded. Presence of caliche. Diameter of the IO.
Rock Cairn(s)		Prehistoric, historical, or unknown age. Number of cobbles and/or boulders and whether they are embedded. Presence of caliche. Number of tiers or height. Diameter of the IO.
Hearth(s)		Prehistoric, historical, or unknown age. Number of cobbles and/or boulders and whether they are embedded. Presence of caliche. Number of tiers or height. Presence of charcoal. Diameter of the IO.

Preferred Format for IO Tables

IO No.	Period	Description	Zone	Easting ¹	Northing
001	Prehistoric	Rock ring, 10 boulders, slightly embedded, caliche on bottom surface of some rocks, 1.5 m in diameter	11	768772	3593653
002	Historical	20 1944 50-caliber shell casings, St. Louis, 4 sanitary cans, 5 x 2 m area	11	768990	3594200
003	Unknown	Rock cairn, 3 tiers high, 50 cm base diameter, approx. 20 boulders and cobbles, on surface	12	277888	3596222

¹ North American Datum 1983

- Map(s) showing all previous surveys and previously recorded sites in the search area of current survey
- A "Previous Surveys within One Mile" (or One-half Mile) table with the columns for BMGRW or CMAGR Survey Number (or ASM Survey Number if outside BMGRW boundary; or **Other Survey Number if outside CMAGR boundary**), Report Title, and Reference (e.g. Jones and Jones 2010) will be included in the Previous Research section. Those surveys falling within the current survey area will be marked in bold or italics, and explained in a footnote (e.g., **Bold** indicates surveys within current survey area).
- A "Previously Recorded Sites within One Mile" (or One-half mile) table with the columns for ASM

Number in AZ or Trinomial and Primary Number in CA, Site Description, NRHP-eligibility Determinations, and Reference will be included in the Previous Research section. Those sites falling within the current survey area will be marked in bold or italics, and explained in a footnote (e.g., Note: Sites in *italics* are in the current survey area).

- Map(s) showing recorded IO locations with historical IOs having a different symbol than prehistoric IOs, at a scale where they can be neatly labeled and visible. This can be combined with the site locations map if there are few enough resources to still produce a good quality map. IO labels on the map do NOT need "IO" before the IO number, as these are redundant.
- Plan-view maps for all sites should be scaled to fit vertically or horizontally on 8 ½ by 11 paper unless the site is so large that it would be impractical. Each plan-view site map, whether in the report or as part of the site record, needs to have a legend that shows what the signs on a map symbolize and represent. If contour lines are depicted on the plan-view site map, the legend must state the contour intervals (e.g., 10-foot contours, contour interval 1 meter), or the actual elevation should be printed on the lines.
- Associated artifacts table and features table for each applicable site, with columns for Type, Count, Description (to include measurements when appropriate), and Date(s) that will fit vertically on 8 ½ by 11 paper. Columns can be combined, when feasible (e.g., dates can be in the description column). These tables will also be depicted on the site cards.

Be sure that all maps that state 1:24,000, actually print at that scale.

Eligibility recommendations will discuss significance criteria and aspects of integrity to sufficiently convey these aspects to the reader.

Be sure formatting of dates is correct and consistent throughout the report (10,000 BC and AD 1000). Do not use CE, BCE, or BP, the only exception being radio carbon dates, which can be reported using BP.

4A. Site Cards (Arizona)

Thoroughly read the ASM Site Recording Manual and use the codes and abbreviations in there. Some of the blanks that are often filled out incorrectly include:

Proj. Name: This is the abbreviated name that you sent to ASM to acquire site numbers (e.g., *MCAS Yuma FY13 Surveys*).

Site Name: Unless the site was previously given a name, no sites will be named on MCAS Yuma.

Series: All maps used should be 1:24,000 (i.e., 7.5')

Site Size: (in Ft or M) Historical period sites consisting of roads or buildings (i.e., constructed features/sites), will be reported in feet. Prehistoric and historical period military sites will be measured in meters.

Length: The length of the site is the distance between the two most distant points on the site perimeter.

Width: The width is the greatest distance between opposite boundaries, perpendicular to length.

Cntr UTM Z E N : All UTM coordinates for the site card shall be derived from the differentially corrected GPS data. Zone will be the zone in which the site is actually located, (i.e., 11 or 12). The easting and the northing will be in NAD 83 and in the zone in which the site is actually located. This will

be a point as close to the center of the site as possible. For large sites, four perimeter UTM's will also be recorded. For linear sites, two end point UTM's will also be recorded. For linear sites, there should be *ctr. UTM* and the end points should be renamed from *peri. UTM* to the closest cardinal direction (e.g. *North* and *South*). The UTM's for the location of the datum will be written in the Site Description/Remarks section. Please be sure that the data are projected in NAD 83 and the correct UTM zone when acquiring the UTM coordinates – do not attempt to acquire coordinates when the data are projected in Arizona State Plane West.

BL: For all sites on MCAS Yuma, this will be *GI*. It need only be written on the first line.

TWN RNG: If the site falls in one township and range, it need only be written on the first line.

SC: Fill this in only if it has been surveyed, do not project it. Preferably, only one section will be on each line. For long sites, however, there may need to be two or more sections on each line, separated by commas. The Subdivisions will have corresponding separating commas.

SUBDIVISION: See paragraph two on page 22 of the ASM manual.

ASM Proj No.: This is issued by ASM when you receive the site numbers. Be sure to fill it in on all site cards.

Side B is not to be included in the Site Record.

Side C Artifacts: Read and follow the instructions on page 27 and 28 of the ASM manual, with the following exception. SHPO will no longer accept artifact counts using the plus symbol (e.g., 200+), and they must be a range instead (e.g., 200-250). Exact counts for small numbers and *P* for present for artifacts such as nails or crown caps are also acceptable.

Sides C and D Features: Read and follow the instructions on pages 29-31 of the ASM manual. If there are no features listed on Side D, delete that page from the Site Record.

Put photos, rim profiles, and other supplementary information into site cards as much as possible.

4B. Site Cards (California)

Thoroughly read the OHP *Instructions for Recording Historical Resources* and use the codes and abbreviations as instructed. Put photos, rim profiles, and other supplementary information into site cards as much as possible. The blanks that MCAS Yuma has specific instructions for are:

DPR 523A Primary Record

***Resource Name or #: (Assigned by recorder)** - Sites and IOs recorded on land managed by MCAS Yuma will not be named. The field recording number will be indicated here.

***P7. Owner and Address:** - All sites recorded within the CMAGR will have the following owner address:

Marine Corps Air Station Yuma
Range Management Bldg. 151
Yuma, AZ 85369

***P11. Report Citation:** - For newly recorded sites, this will be the author(s) name(s), year that

report is finalized, and the full report title.

DPR 523C Archaeological Site Record

***A8, Nearest Water** - Do not list the Coachella Canal. This is for the nearest natural fresh water source or probable former source. "Unknown" is an acceptable response.

DPR 523J Location Map

After the map has been inserted into the document, do a test print and measure the map to ensure that it prints at 1:24,000.

5. Data Compendium (One of the final deliverables)

A CD or DVD with the following folders (separate DVDs can be created if necessary):

Folder 1: Photographs

All photos in a single electronic folder saved as JPEGs with all photos listed on a single Microsoft Excel photo log to be included in the same folder. On the photo log, photos must be organized and filed by project area and site number/IO number as much as possible, not by field date, field director, or other organization method that will make no sense to MCAS Yuma cultural resources personnel or future researchers.

Folder 2: Field Notes

Scanned copies of all field notes saved as PDFs in a single electronic folder. Again, as much as possible, field notes should also be organized into folders by project area and site number/IO number.

Folder 3: Site Cards

Arizona: Complete ASM site cards in both Microsoft Word and PDF formats. The files should be named for the ASM site number. Include a copy of ASM's populated Site Number Request form as received from them with the project name, project number, and site numbers.

California: Complete OHP site cards in both Microsoft Word and PDF formats. The files should be named for the Primary Number.

Folder 4: Report

Complete report in both Microsoft Word and PDF formats.

A separate CD or DVD will contain GIS data:

All GIS data are to be in the template provided by MCAS Yuma and according to the GIS Specifications in the SOW. The data disk will be labeled with the date of the data set.

References

McAuliffe, Joseph R., and Eric V. McDonald

2006 Holocene Environmental Change and Vegetation Contraction in the Sonoran Desert. *Quaternary Research* 65:204-215.

McDonald, Eric, Erik Hamerlynck, Joseph McAuliffe, Todd Caldwell

2004 Analysis of Desert Shrubs Along First-order Channels on Desert Piedmonts: Possible Indicators of Ecosystem Condition and Historic Variation. Strategic Environmental Research and Development Program SEED Project #CS1153. Final Technical Report

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APPENDIX D

Tribal Consultations Points-of-Contact List

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Title	First Name	Last Name	Job Title	Company	Address	City	State	Postal Code
Mr.	Robert	Miguel	Chairman	Ak-Chin Indian Community	42507 W. Peters and Nall Road	Maricopa	Arizona	85138
Ms.	Carmen	Narcia	Cultural Specialist	Ak-Chin Indian Community	42507 W. Peters and Nall Road	Maricopa	Arizona	85138
Ms.	Sherry	Cordova	Chairwoman	Cocopah Indian Tribe	14515 S Veterans Dr.	Somerton	Arizona	85350
Mr.	Justin	Brundin	Cultural Resources Manager	Cocopah Indian Tribe	14515 S Veterans Dr.	Somerton	Arizona	85350
Mr.	Dennis	Patch	Chairman	Colorado River Indian Tribes	26600 Mohave Road	Parker	Arizona	85344
Mr.	Bryan	Etsitty	Tribal Historic Preservation Officer	Colorado River Indian Tribes	26600 Mohave Road	Parker	Arizona	85344
Mr.	Stephen	Lewis	Governor	Gila River Indian Community	P.O. Box 97	Sacaton	Arizona	85147
Mr.	Barnaby V.	Lewis	Tribal Historic Preservation Officer	Gila River Indian Community	P.O. Box 2140	Sacaton	Arizona	85147
Ms.	Christina C.	Andrews	Chairwoman	Hia-Ced Hemajkam	P.O. Box 447	Ajo	Arizona	85321
Mr.	Jordan	Joaquin	President	Quechan Indian Tribe	P.O. Box 1899	Yuma	Arizona	85366
Mr.	Manfred	Scott	Chairman	Quechan Cultural Committee	P.O. Box 1899	Yuma	Arizona	85366
Mr.	Martin	Harvier	President	Salt River Pima-Maricopa Indian Community	10005 East Osborn Road	Scottsdale	Arizona	85256
Ms.	Angela	Garcia-Lewis	Cultural Preservation Compliance Supervisor	Salt River Pima-Maricopa Indian Community	10005 East Osborn Road	Scottsdale	Arizona	85256
Mr.	Edward	Manuel	Chairman	Tohono O'Odham Nation	P.O. Box 837	Sells	Arizona	85634
Mr.	Peter	Steere	Tribal Historic Preservation Officer	Tohono O'Odham Nation	P.O. Box 837	Sells	Arizona	85634
Ms.	Jane	Russell-Winiecki	Chairwoman	Yavapai-Apache Nation	2400 W. Datsi Road	Camp Verde	Arizona	86322

Title	First Name	Last Name	Job Title	Company	Address	City	State	Postal Code
Ms.	Gertrude	Smith	Cultural Department Director	Yavapai-Apache Nation	2400 W. Datsi Road	Camp Verde	Arizona	86322
Mr.	Robert	Ogo	Acting President	Yavapai-Prescott Indian Tribe	530 East Merritt Street	Prescott	Arizona	86301
Ms.	Linda	Ogo	Culture Research Department Director	Yavapai-Prescott Indian Tribe	530 East Merritt Street	Prescott	Arizona	86301

APPENDIX E

Barry M. Goldwater Range West Cultural Resources Data

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E-1
Previous Cultural Resources Investigations

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MCAS Yuma Report Number	Title	Author	Contractor
BMGRW-1980-001	Archaeological Site Descriptions: The Buried Trench Project, Luke Air Force Range, Arizona	Doelle	HDR Sciences
BMGRW-1981-001	A Cultural Resource Investigation of a Proposed 69 kV Transmission Line	Middleton	Bureau of Reclamation
BMGRW-1982-002	An Archaeological Survey of the Yuma Tacts Range Project Area, Luke Air Force Range, Arizona	Doelle	Institute for American Research Arizona Division
BMGRW-1982-003	An Archaeological Survey of the Cares-Dry Project Area, Luke Air Force Range, Arizona	Mayro	Institute for American Research Arizona Division
BMGRW-1982-004	An Archaeological Survey of the Expanded Cares-Dry Project Area, Luke Air Force Range, Arizona	Bowen	Institute for American Research Arizona Division
BMGRW-1983-001	An Archaeological Survey of the ISST Project Area, Luke Air Force Range, Arizona	Mayro	Institute for American Research Arizona Division
BMGRW-1984-001	An Archaeological Survey of the Expanded ISST Project Area, Luke Air Force Range, Arizona	Mayro	Institute for American Research Arizona Division
BMGRW-1984-002	Letter Report re: Archaeological Evaluation of the Proposed Border Patrol Road Located on Luke Air Force Range, Arizona	Mayro	Institute for American Research Arizona Division
BMGRW-1985-001	Assessment of Cultural Resources for the Yuma Range Air Installation Compatible Use Zone Study	Effland	Archaeological Consulting Services, Inc.
BMGRW-1986-001	Archaeological Survey for Peacekeeper Follow-on Basing Concealment Testing, Dateland Test Site, Luke Air Force Range, Arizona	Christensen	Tetra Tech, Inc.
BMGRW-1986-002	A Cultural Resources Survey of a Proposed Expansion of the ISST Missile Site, Luke Air Force Range, Yuma County, Arizona	Polk	Sagebrush Archaeological Consultants
BMGRW-1987-001	Surface Reclamation Along Camino Del Diablo, Tinajas Altas Natural Area	Barger	Bureau of Land Management
BMGRW-1988-001	Cultural Resources Technical Report for the Goldwater Range Environmental Assessment, Phase I	Bruder, Fenicle, and Bassett	Dames & Moore
BMGRW-1988-002	Tinajas Altas Pothole Improvement	Blanchard	Bureau of Land Management
BMGRW-1989-001	Preliminary Technical Report, A Cultural Resources Sample Survey of Operation Zones, Barry M. Goldwater Range, Marine Corps Air Station, Yuma, Arizona	Altschul and Jones	Statistical Research, Inc.
BMGRW-1989-002	TASET H Site Fence	Blanchard	Bureau of Land Management
BMGRW-1990-001	Tortoise Inventory	Pike	Bureau of Land Management

MCAS Yuma Report Number	Title	Author	Contractor
BMGRW-1990-002	AUX 2 LHA Pad Security Fence	Blanchard	Bureau of Land Management
BMGRW-1990-003	Squad Level Ground Training Area	Blanchard	Bureau of Land Management
BMGRW-1991-001	Pistol Range Survey	Johnson	Bureau of Land Management
BMGRW-1991-003	P-111 Radar Hill AN/TPS-63	Blanchard	Bureau of Land Management
BMGRW-1991-004	Moving Sands Tracked Vehicle Target Area	Blanchard	Bureau of Land Management
BMGRW-1991-005	USGS Trenches for Imaging Radar	Blanchard	Bureau of Land Management
BMGRW-1991-006	Dripping Springs Wildlife Water	Blanchard	Bureau of Land Management
BMGRW-1992-001	An Archaeological Survey of the Yuma Lateral Expansion Project, La Paz and Yuma Counties, Arizona	McQuestion, Haynes-Peterson, and Stein	SWCA
BMGRW-1992-002	Historic Yuma Project	Pfaff, Queen, and Clark	Bureau of Reclamation
BMGRW-1993-001	Two Sides of the River: Cultural Resources Technical Studies Undertaken as Part of Environmental Documentation for Military Use of the Marine Corps Air Station, Yuma Training Range Complex in Arizona and California	Woodall, Peterson, Apple, and Bruder	Dames & Moore
BMGRW-1993-002	MCAS Explosive Ordnance Disposal Facility	Johnson	Bureau of Land Management
BMGRW-1996-001	Phase I Cultural Resources Survey for the Tactical Aircrew Combat Training System Range Upgrade, Marine Corps Air Station, Yuma	Apple	KEA Environmental, Inc.
BMGRW-1996-002	The Western Edge: Cultural Resources Assessment for the Yuma Aviation Training Range Complex on the Goldwater Range, Southwestern Arizona	Bruder, Shepard, and Olszewski	Dames & Moore
BMGRW-1996-003	Goldwater Range Remote Interrogator Sites (TACTS Range)	Johnson	Bureau of Land Management
BMGRW-1996-004	Coyote Peak Water Catchment	Johnson	Bureau of Land Management

MCAS Yuma Report Number	Title	Author	Contractor
BMGRW-1997-001	A Supplemental Cultural Resources Survey of Three Parcels, Totaling 61.6 Acres, for the Proposed Yuma Area Service Highway Between San Luis and Interstate-8 at Araby Road, Yuma County, Arizona	Lite	Archaeological Research Services, Inc.
BMGRW-1997-002	Final Report Archaeological Testing of Five Sites for the Tactical Aircrew Combat Training System (TACTS) Range Upgrade, Marine Corps Air Station (MCAS) Yuma, Arizona	York, Apple, and Cleland	KEA Environmental, Inc.
BMGRW-1997-003	County 14th Extension ROW Amendment	Johnson	Bureau of Land Management
BMGRW-1997-004	Betty Lee Cistern Mine Gates	Johnson	Bureau of Land Management
BMGRW-1998-001	Archaeological Inventory and Survey Report for the Marine Corps Air Station (MCAS) Yuma, Cannon Air Defense Complex, and Martinez Lake Recreation Area, Yuma County, Arizona	Carrico and Case	Brian F. Mooney Associates
BMGRW-1999-001	The ISST Bunkers and the MX Buried Trench National Register Eligibility Assessment of Two Properties M. Goldwater Range, Yuma County, Arizona	Gross and Van Wormer	Affinis
BMGRW-1999-002	MCAS Antelope Forage Project	Johnson	Bureau of Land Management
BMGRW-2000-001	The Only Water for 100 Miles Volumes I and II	Hartmann and Thurtle, editors	SWCA
BMGRW-2000-002	Class III Cultural Resources Survey for the P-111 Cannon Complex Storm Water Retention Pond Enlargement Project	Telles	Bureau of Reclamation
BMGRW-2000-003	Class III Cultural Resources Survey for the Range Gate Entrance Dirt Removal Project	Telles	Bureau of Reclamation
BMGRW-2000-004	Living in the Western Papageria: An Archaeological Overview of the Barry M. Goldwater Range in Southwestern Arizona	Ahlstrom	Arcadid Geraghty & Miller/SWCA
BMGRW-2001-001	An Intensive Archaeological and Biological Survey of Six Proposed Emergency Towers on the Barry M. Goldwater Range (East and West)	Rankin, Barry, and Wirt	56 RMO/ESM
BMGRW-2002-001	Archaeological Survey for Two Crash Sites on the Barry M. Goldwater Range, Marine Corps Air Station, Yuma	Bowden-Renna and Apple	EDAW, Inc.
BMGRW-2002-002	A Cultural Resources Survey of 84.6 Acres for the Proposed Yuma Area Service Highway, East of San Luis, Yuma County, Arizona	Morrison	Logan Simpson Design, Inc.

MCAS Yuma Report Number	Title	Author	Contractor
BMGRW-2003-001	A Supplemental Cultural Resources Survey of 16.1 Acres for the Proposed Yuma Area Service Highway Between US 95 North of San Luis and Interstate 8 at Araby Road, Southwest Yuma County, Arizona	Lonardo	Logan Simpson Design, Inc.
BMGRW-2003-002	Flat Tailed Horn Lizard Trapping Project	Queen	Bureau of Land Management
BMGRW-2003-003	Archaeological Survey of the Mohawk Valley Forage Enhancement Project, Marine Corps Air Station, Yuma	Underwood	EDAW, Inc.
BMGRW-2004-001	Aux II Bivouac Area	Lawson	MCAS Yuma
BMGRW-2004-002	A Cultural Resources Survey of 3.0 miles (118.7 Acres) of an Alternate Alignment for the Proposed Yuma Area Service Highway and of a United States Marine Corps Yuma Air Station Rifle Range Parking Lot (4.7 Acres) Between County 15th and County 19th	Lonardo	Logan Simpson Design, Inc.
BMGRW-2004-003	Cultural Resources Along Selected Roads and Tracks in the Vicinity of the Western Terminus of the Camino Del Diablo, Barry M. Goldwater Range, Arizona	Schaefer, Andrews, and Moslak	ASM Affiliates
BMGRW-2004-004	Results of Archaeological Testing at AZ X:6:14(ASM), a Limited Activity Site Located Within the Original Corridor of the Proposed Yuma Area Service Highway Between US 95 and Interstate 8, Yuma County, Arizona	Walsh	Logan Simpson Design, Inc.
BMGRW-2004-005	A Cultural Resources Survey of 2.40 Miles (110.55 Acres) of an Alternate Alignment for the Proposed Yuma Area Service Highway Between US 95 North of San Luis and Interstate 8 at Araby Road, Southwest Yuma County, Arizona	Walsh	Logan Simpson Design, Inc.
BMGRW-2004-006	Archaeological Survey of 35 Acres at AUX II for Dust Abatement Study	Lawson	MCAS Yuma
BMGRW-2005-001	Cultural Resources Survey for the Installation of Permanent Vehicle Barriers and Patrol Roads, Office of Border Patrol Yuma Sector, Arizona	Hart, Dosh, Lindemuth, and Welch	Gulf South Research Corporation/Northland Research, Inc.
BMGRW-2005-002	Flat Tail Horned Lizard Culvert Study	Lawson	MCAS Yuma
BMGRW-2005-003	Border Radar	Lawson	MCAS Yuma
BMGRW-2006-001	Archaeological Survey for the Pronghorn Drinkers Project, Marine Corps Air Station Yuma, Arizona	Bowden-Renna, Shalom, and Apple	EDAW, Inc.

MCAS Yuma Report Number	Title	Author	Contractor
BMGRW-2006-002	Cultural Resources Survey: 15 Proposed, 6 Alternate, and 12 Existing Rescue Beacons, Yuma, Pima, and Maricopa Counties, Arizona	Dechambre and Hart	Northland Research, Inc.
BMGRW-2006-003	An Archaeological Survey and Historical Assessment of the Tinajas Altas Site (AZ X:12:2[ASM]), Barry M. Goldwater Range, U.S. Marine Corps Air Station Yuma, Yuma County, Arizona	Foster, editor	SWCA
BMGRW-2006-004	Cultural Resources Survey of 1,500 Acres around the Copper Mountains at the Barry M. Goldwater Range, Marine Corps Air Station, Yuma, Arizona	Hart	Northland Research, Inc.
BMGRW-2006-005	A Class III Cultural Resources Survey of 24 Linear Miles of Right-of-Way along Cipriano Pass Road and Avenue 4E and 2.1 Acres along the U.S./Mexico Border within the Barry M. Goldwater Range, Marine Corps Air Station, Yuma, Yuma County, Arizona	Stahman	Northland Research, Inc.
BMGRW-2006-006	Supplemental Cultural Resources Survey for the Installation of Permanent Vehicle Barriers and Patrol Roads, Office of Border Patrol Yuma Sector, Arizona	Zyniecki, Lindemuth, and Hart	Gulf South Research Corporation/Northland Research, Inc.
BMGRW-2007-001	A Historic Mining Context for the Western Barry M. Goldwater Range and an Archaeological Inventory of the Historic Fortuna Mine and Campsite, Yuma County, Arizona	Schaefer, Manley, Andrews, and Moslak	ASM Affiliates
BMGRW-2007-002	A Class III Cultural Resources Survey of Approximately 5.75 Miles of Right of Way along County 14th Street between Avenue 7 East and Avenue 13 East, Yuma, Yuma County, Arizona	Harris Environmental Group, Inc.	Harris Environmental Group, Inc.
BMGRW-2007-003	A Line Through the Sand: A Class I Overview and Class III Cultural Resource Inventory of the Proposed San Luis Rio Colorado Project Transmission Line Corridor, Yuma County, Arizona	Graves, Natoli, and Huber	Statistical Research, Inc.
BMGRW-2008-001	Cultural Resources Survey Along 173 Miles of Roadway Near Wellton Hills, Barry M. Goldwater Range West, Marine Corps Air Station, Yuma County, Arizona	Dosh	Northland Research, Inc.
BMGRW-2008-002	Cultural Resources Survey Along 92 Miles of Roadway in Mohawk Valley, Barry M. Goldwater Range West, Marine Corps Air Station, Yuma County, Arizona	Dosh	Northland Research, Inc.
BMGRW-2008-003	A Cultural Resource Survey for the Proposed Murrayville Range Complex, Barry M. Goldwater Range-West, Arizona	Schaefer and Richards	ASM Affiliates

MCAS Yuma Report Number	Title	Author	Contractor
BMGRW-2008-004	A Cultural Resources Survey of Approximately 12 Miles and Damage Assessment of Four Cultural Resources Sites Along the Camino del Diablo Within the Barry M. Goldwater Bombing Range in Yuma County, Arizona	Stubing and Davis	Carter Burgess
BMGRW-2009-001	Archaeological Survey for the Lonesome Dove Landing Zone	Drennan and Foster	SAIC
BMGRW-2009-002	Sonoran Pronghorn Forage Enhancement Plot, Devils Hills, Barry M. Goldwater Range West	Lawson	MCAS Yuma
BMGRW-2009-003	A Cultural Resources Survey of County 14th Street between Avenue 3E and Avenue 6 1/2E, in Yuma County, Arizona	Turner	Jacobs Engineering Group
BMGRW-2009-004	A Cultural Resources Survey of 22 Acres for a Proposed Aggregate Materials Storage Area Located Adjacent to the SR 195 Right-of-way near County 19th Street in Yuma, Yuma County, Arizona	Walsh	Logan Simpson Design, Inc.
BMGRW-2010-001	Archaeological Survey of 16 Ground Support Areas on the Barry M. Goldwater Range West in Support of the MV-22 Osprey Project, Yuma County, Arizona	Barr and Griset	SWCA
BMGRW-2010-002	Archaeological Survey of Barry M. Goldwater Range West Training Areas in Support of MV-22 Training EIS, Yuma County, Arizona	Schaefer and Andrews	ASM Affiliates
BMGRW-2010-003	Cultural Resources Survey Proposed Auxiliary Landing Field, Marine Corps Air Station Yuma, Yuma, Arizona	TEC, Inc.	TEC, Inc.
BMGRW-2011-001	Cultural Resources Survey of 10,000 Acres of Roads on the Barry M. Goldwater Range West for the Marine Corps Air Station, Yuma, Yuma County, Arizona	Hart and Hart	EnviroSystems Management, Inc.
BMGRW-2012-001	A Cultural Resource Survey of 22,865 Acres on the Barry M. Goldwater Range-West, Marine Corps Air Station, Yuma	Neuzil	EcoPlan Associates, Inc.
BMGRW-2013-001	Cultural Resources Survey for a Renewable Energy Project for Marine Corps Air Station Yuma	Jones	Cardno TEC
BMGRW-2013-002	Archaeological Survey Report of Negative Findings for the Laser Spot Video Recording System on the Barry M. Goldwater Range West	James	MCAS Yuma
BMGRW-2014-001	Archaeological Survey Report of Negative Findings for the Range One Expansion on the Barry M. Goldwater Range West	James	MCAS Yuma
BMGRW-2015-001	Archaeological Survey of 21,941 Acres on the Barry M. Goldwater Range West, Marine Corps Air Station, Yuma, Arizona	Keur, Homburg, Hall, and Wegener	Statistical Research, Inc.

MCAS Yuma Report Number	Title	Author	Contractor
BMGRW-2015-002	Archaeological Survey Report of Negative Findings for a Proposed Earthquake Early Warning Sensor on the Barry M. Goldwater Range West	James	MCAS Yuma
BMGRW-2016-001	An Archaeological Survey of 6,289 Acres on the Barry M. Goldwater Range West, Yuma County Arizona	Laine and Seymour, editors	Far Western/AMEC
BMGRW-2016-002	Archaeological Survey of 26,172 Acres on the Barry M. Goldwater Range West, Marine Corps Air Station Yuma, Arizona	Hlatky, Windingstad, Knighton-Wisor, Keur, and Wegener	Statistical Research, Inc.
BMGRW-2016-003	Letter Report for National Public Lands Day Restoration and Improvements Along the Historic El Camino Del Diablo within the Barry M. Goldwater Range West	James	MCAS Yuma
BMGRW-2018-001	Archaeological Survey of 7,143 Acres on the Barry M. Goldwater Range West, Yuma County, Arizona	Knighton-Wisor, Windingstad, and Wegener	SRI
BMGRW-2019-001	Class III Inventory of 80.55 acres for the Barry M. Goldwater Range Border Barrier System Geotechnical Investigations, Yuma County, Arizona	Winslow and Andrews	ASM Affiliates
BMGRW-2019-002	Letter Report on CBP Damage to Lithic Site on the BMGRW	James	MCAS Yuma
BMGRW-2019-003	Archaeological Survey Report of Negative Findings for the Reopening of a Road on the Barry M. Goldwater Range West	James	MCAS Yuma

Source: MCAS Yuma Cultural Resources Management database, dated May 2019

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E-2
Recorded Cultural Resource Sites

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MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0001	AZ X:12:1(ASM)	Undetermined	Ezell 1949	Johnson 1992	Prehistoric artifact scatter, bedrock milling, pictographs
BMGRW-0002	SON C:1:15(ASM)	Listed	Unknown 1961	-	Camino del Diablo
BMGRW-0003	AZ X:12:2(ASM)	Eligible	Carr and Ayres 1971, Hedges 1976	Foster 2006, Hart and Hart 2011	Tinajas Altas- bedrock milling, artifacts, rock art, trails, rock ring, and historical graffiti, foundations
BMGRW-0004	AZ X:8:9(ASM)	Undetermined	Van Devender 1973	-	Rock shelter, ceramic vessel containing a seed cache
BMGRW-0005	-	-	-	-	Not Assigned
BMGRW-0006	AZ Y:6:7(ASM)	Eligible	Doelle 1982	-	Ground stone, flaked stone
BMGRW-0007	AZ Y:6:10(ASM)	Eligible	Doelle 1982	-	Pits, hearths, rock clusters, cleared areas, rock alignment, flaked stone, ground stone, ceramics
BMGRW-0008	AZ Y:6:12(ASM)	Undetermined	Doelle 1982	-	Ash features, ceramics, ground stone, flaked stone, bone
BMGRW-0009	AZ Y:6:13(ASM)	Undetermined	Doelle 1982	-	Cleared circle, ash feature, ground stone, flaked stone, ceramics
BMGRW-0010	AZ Y:6:14(ASM)	Undetermined	Doelle 1982	-	Ground stone, ceramics, bone, charcoal
BMGRW-0011	AZ Y:6:15(ASM)	Not Eligible	Doelle 1982	Bruder et al. 1996	Cleared circles, rock clusters, ceramics, ground stone, possible trail
BMGRW-0012	AZ Y:6:16(ASM)	Undetermined	Doelle 1982	-	Pits, ground stone, flaked stone, ceramics, bone
BMGRW-0013	AZ Y:6:18(ASM)	Undetermined	Doelle 1982	-	Rock rings, pit, ash feature, lithics, ceramics
BMGRW-0014	AZ Y:6:19(ASM)	Undetermined	Doelle 1982	-	Historical campsite
BMGRW-0015	AZ Y:6:9(ASM)	Undetermined	Doelle 1982	-	Rock rings, ground stone, chipped stone, ceramics, shell
BMGRW-0016	AZ Y:6:17(ASM)	Undetermined	Doelle 1982	-	Rock rings, rock cluster, ground stone, flaked stone, ceramics
BMGRW-0017	AZ X:12:3(ASM)	Not Eligible	Doelle 1982	Barr and Griset 2010	Lithic, ground stone, ceramic
BMGRW-0018	AZ X:12:4(ASM)	Not Eligible	Doelle 1982	Hlatky et al. 2016	Prehistoric artifact scatters
BMGRW-0019	AZ X:8:14(ASM)	Undetermined	Bowen 1982	-	Lithic quarry, lithic scatter, trail

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0020	AZ Y:5:5(ASM)	Not Eligible	Doelle 1982	Bruder et al. 1996, Barr and Grisct 2010	Prehistoric cleared circles, rock piles, surface artifacts
BMGRW-0021	AZ Y:6:22(ASM)	Not Eligible	Christensen 1986	Hart and Hart 2011	Trail
BMGRW-0022	AZ Y:6:27(ASM)	Undetermined	Christensen 1986	-	Historical campsite
BMGRW-0023	AZ X:12:48(ASM)	Eligible	Broyles and Roberson 1987	Hlatky et al. 2016	Tinajas, trail segment, bedrock milling, pictographs
BMGRW-0024	AZ X:12:49(ASM)	Eligible	Broyles and Roberson 1987	Hlatky et al. 2016	Bedrock milling, rock shelters, and tinajas
BMGRW-0025	AZ X:7:46(ASM)	Undetermined	Broyles 1987	-	Series of tinajas, bedrock milling, ceramics, petroglyphs, historical graffiti, trails
BMGRW-0026	AZ X:8:91(ASM)	Undetermined	Broyles and Roberson 1987	-	Ephemeral tinaja with bedrock milling
BMGRW-0027	AZ X:12:5(ASM)	Not Eligible	Bruder et al. 1988	-	Prehistoric ceramic and lithic scatter
BMGRW-0028	AZ X:12:6(ASM)	Undetermined	Bruder et al. 1988	-	Rock ring, artifact scatter
BMGRW-0029	AZ X:8:15(ASM)	Not Eligible	Bruder et al. 1988	Dosh 2008 - Wellton	Wood foundations, rock alignments, possible latrine, historical trash dump
BMGRW-0030	AZ X:8:16(ASM)	Not Eligible	Bruder et al. 1988	-	Rock cairns, cleared circle, historical trash dump
BMGRW-0031	AZ X:8:17(ASM)	Not Eligible	Bruder et al. 1988	Barr and Grisct 2010	Historical structural remains
BMGRW-0032	AZ X:8:18(ASM)	Undetermined	Bruder et al. 1988	Dosh 2008 - Wellton, Barr and Grisct 2010	Cleared circles
BMGRW-0033	AZ X:8:92(ASM)	Undetermined	Broyles 1988	Johnson 1996	Prehistoric trail, hearth, clearing, artifact scatter
BMGRW-0034	AZ Y:5:6(ASM)	Not Eligible	Bruder et al. 1988	-	Historical tent platform, trash deposits, three pits, associated artifacts
BMGRW-0035	AZ Y:5:7(ASM)	Not Eligible	Bruder et al. 1988	-	Historical trash dump
BMGRW-0036	AZ X:12:50(ASM)	Eligible	Broyles 1988	Hart and Hart 2011	Trail segments, shell fragments, ceramics, flakes, cores, rock ring

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0037	AZ 050-2087	Undetermined	Altschul and Jones 1989	-	Lithic scatter
BMGRW-0038	AZ X:12:10(ASM)	Undetermined	Altschul and Jones 1989	-	Single pot break and ground stone scatter
BMGRW-0039	AZ X:12:11(ASM)	Undetermined	Altschul and Jones 1989	-	Chipping stations
BMGRW-0040	AZ X:12:12(ASM)	Undetermined	Altschul and Jones 1989	-	Rock ring
BMGRW-0041	AZ X:12:13(ASM)	Undetermined	Altschul and Jones 1989	-	Rock rings, lithic scatter
BMGRW-0042	AZ X:12:14(ASM)	Undetermined	Altschul and Jones 1989	-	Rock circle
BMGRW-0043	AZ X:12:15(ASM)	Undetermined	Altschul and Jones 1989	-	Rockshelter with cache of palo verde branches
BMGRW-0044	AZ X:12:16(ASM)	Undetermined	Altschul and Jones 1989	Hartmann and Thurtle, ed. 2000	Rockshelters, lithics, ceramics, trail segment, historical rockshelter, kiln, retaining wall, trash scatter
BMGRW-0045	AZ X:12:17(ASM)	Undetermined	Altschul and Jones 1989	-	Small rockshelter with cached ocotillo branches
BMGRW-0046	AZ X:12:18(ASM)	Eligible	Altschul and Jones 1989	Hart and Hart 2011	Partially buried lithic and ceramic
BMGRW-0047	AZ X:12:19(ASM)	Not Eligible	Altschul and Jones 1989	Hart and Hart 2011	Rock cairns (one with intact tobacco tin containing papers)
BMGRW-0048	AZ X:12:7(ASM)	Not Eligible	Altschul and Jones 1989	Bruder et al. 1996	Ceramic scatter
BMGRW-0049	AZ X:12:8(ASM)	Undetermined	Altschul and Jones 1989	-	FAR, one associated flake, sherds
BMGRW-0050	AZ X:12:9(ASM)	Undetermined	Altschul and Jones 1989	-	Pit
BMGRW-0051	AZ X:8:19(ASM)	Undetermined	Altschul and Jones 1989	-	Cleared circle, lithic scatters
BMGRW-0052	AZ X:8:20(ASM)	Undetermined	Altschul and Jones 1989	-	Trail segment, lithic scatters
BMGRW-0053	AZ X:8:21(ASM)	Undetermined	Altschul and Jones 1989	-	Rockshelter with associated artifacts

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0054	AZ X:8:22(ASM)	Undetermined	Altschul and Jones 1989	-	Rockshelter with associated artifacts
BMGRW-0055	AZ X:8:23(ASM)	Undetermined	Altschul and Jones 1989	-	Small cave with cairn and rock wall
BMGRW-0056	AZ X:8:24(ASM)	Undetermined	Altschul and Jones 1989	-	Rock-lined cleared circle, ceramics
BMGRW-0057	AZ X:8:25(ASM)	Undetermined	Altschul and Jones 1989	Bruder et al. 1996	Rock alignment (possibly modern)
BMGRW-0058	AZ X:8:26(ASM)	Undetermined	Altschul and Jones 1989	-	Cairn with intact mining claim
BMGRW-0059	AZ X:8:27(ASM)	Undetermined	Altschul and Jones 1989	-	Rock-lined circle
BMGRW-0060	AZ X:8:28(ASM)	Undetermined	Altschul and Jones 1989	-	Rock-lined circle, possible shrine, two bedrock tanks
BMGRW-0061	AZ X:8:29(ASM)	Undetermined	Altschul and Jones 1989	-	Lithic scatters
BMGRW-0062	AZ Y:5:11(ASM)	Not Eligible	Altschul and Jones 1989	Bruder et al. 1996	Rock alignment
BMGRW-0063	AZ Y:5:12(ASM)	Not Eligible	Altschul and Jones 1989	Bruder et al. 1996	Historical mine (Owl Mine)
BMGRW-0064	AZ Y:5:13(ASM)	Not Eligible	Altschul and Jones 1989	Bruder et al. 1996	Cleared circles
BMGRW-0065	AZ Y:5:16(ASM)	Undetermined	Altschul and Jones 1989	Bruder et al. 1996	Cairn
BMGRW-0066	AZ Y:5:17(ASM)	Not Eligible	Altschul and Jones 1989	Barr and Griset 2010	Rock-lined cleared area, rock circle, trail segment, pot break, two depressions
BMGRW-0067	AZ Y:5:20(ASM)	Undetermined	Altschul and Jones 1989	-	Prehistoric artifact scatter, historical can scatter
BMGRW-0068	AZ Y:5:21(ASM)	Undetermined	Altschul and Jones 1989	-	Cleared circle
BMGRW-0069	AZ Y:5:22(ASM)	Undetermined	Altschul and Jones 1989	-	Rock cairn (mining claim marker)
BMGRW-0070	AZ Y:5:23(ASM)	Undetermined	Altschul and Jones 1989	-	Rock-lined circles, pot break, one flake

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0071	AZ Y:5:24(ASM)	Undetermined	Altschul and Jones 1989	-	Cleared circle with associated rock berm
BMGRW-0072	AZ Y:5:25(ASM)	Undetermined	Altschul and Jones 1989	-	Rock-lined ring, ground stone
BMGRW-0073	AZ Y:5:8(ASM)	Not Eligible	Altschul and Jones 1989	Bruder et al. 1996	Lithic scatter, trail, rockshelters
BMGRW-0074	AZ X:12:51(ASM)	Undetermined	Broyles and Roberson 1987	-	Trail
BMGRW-0075	AZ X:6:14(ASM)	Eligible	McQuestion et al. 1992	Walsh 2004	Lithic procurement and reduction
BMGRW-0076	AZ 050-2587	Undetermined	Johnson 1993	Barr and Grisct 2010	Alignment of 14 rock cairns
BMGRW-0077	AZ 050-2588	Not Eligible	Johnson 1993	Barr and Grisct 2010	Rock piles
BMGRW-0078	AZ Y:9:2(ASM)	Eligible	Woodall et al. 1993	-	Historical and prehistoric artifact scatter
BMGRW-0079	AZ X:6:72(ASM)	Not Eligible	Bruder et al. 1996	Hart and Hart 2011	WWII airfield, historical trash (AUX-2)
BMGRW-0080	AZ Y:5:10(ASM)	Eligible	Bruder et al. 1996	Hart and Hart 2011	Intaglio with associated trails
BMGRW-0081	AZ Y:5:14(ASM)	Not Eligible	Bruder et al. 1996	Hart and Hart 2011	Prehistoric artifact scatter
BMGRW-0082	AZ Y:5:15(ASM)	Not Eligible	Bruder et al. 1996	Hart and Hart 2011, Barr and Grisct 2010	Prehistoric ceramic, ground stone, shell artifacts
BMGRW-0083	AZ Y:5:18(ASM)	Not Eligible	Bruder et al. 1996	Barr and Grisct 2010	Cleared circles
BMGRW-0084	AZ Y:5:19(ASM)	Not Eligible	Bruder et al. 1996	Barr and Grisct 2010	Rock alignments (possibly modern)
BMGRW-0085	AZ Y:5:9(ASM)	Not Eligible	Bruder et al. 1996	Hart and Hart 2011	Linear arrangement of rock piles
BMGRW-0086	AZ X:6:80(ASM)	Not Eligible	Lite 1997	-	Lithic and ceramic scatter

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BMGRW-0087	AZ X:6:81(ASM)	Undetermined	Lite 1997	Jones 2013, Hart and Hart 2011	WWII-era gunnery range, roads and ammunition dumps
BMGRW-0088	AZ Y:5:26(ASM)	Not Eligible	Bruder et al. 1996	Dosh 2008 - Mohawk	Rock alignments (possibly modern)
BMGRW-0089	AZ Y:5:27(ASM)	Not Eligible	Apple 1996	York et al. 1997	Prehistoric trail segment, lithic scatter
BMGRW-0090	AZ Y:5:28(ASM)	Not Eligible	Apple 1996	York et al. 1997	Cleared circles, lithic scatter
BMGRW-0091	AZ Y:5:29(ASM)	Undetermined	Apple 1996	-	Lithic scatters
BMGRW-0092	AZ Y:5:30(ASM)	Undetermined	Apple 1996	-	Prehistoric ceramic scatter, metate fragment
BMGRW-0093	AZ Y:5:31(ASM)	Not Eligible	Apple 1996	York et al. 1997	Prehistoric artifact scatters
BMGRW-0094	AZ Y:5:32(ASM)	Not Eligible	Apple 1996	York et al. 1997	Prehistoric temporary camp, historical road and trash scatter
BMGRW-0095	AZ Y:5:33(ASM)	Not Eligible	Apple 1996	York et al. 1997	Lithic scatter, ground stone and features
BMGRW-0096	AZ Y:5:34(ASM)	Undetermined	Apple 1996	-	Lithic scatter
BMGRW-0097	AZ Y:5:35(ASM)	Not Eligible	Apple 1996	Hart and Hart 2011	Lithic scatters
BMGRW-0098	AZ Y:9:4(ASM)	Undetermined	Apple 1996	-	Prehistoric temporary camp
BMGRW-0099	AZ 050-1662	Undetermined	Johnson 1998	-	Pictographs
BMGRW-0100	AZ X:12:52(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock circle
BMGRW-0101	AZ X:12:53(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Bedrock milling, rock cairn, trails, and prehistoric artifacts
BMGRW-0102	AZ X:12:54(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock circle, trail
BMGRW-0103	AZ X:12:55(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Prehistoric artifact scatter within a tafoni, associated rock wall
BMGRW-0104	AZ X:12:56(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Historical mine adit, associated features

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0105	AZ X:12:57(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock features, ceramics, artifact scatter
BMGRW-0106	AZ X:12:58(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	Hart and Hart 2011	Trail segment, ceramics and historical artifacts
BMGRW-0107	AZ X:12:59(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock cluster
BMGRW-0108	AZ X:12:60(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock circles
BMGRW-0109	AZ X:12:61(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	Hart and Hart 2011	Trail segments, rock circles, rock clusters, ceramic scatters
BMGRW-0110	AZ X:12:62(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock features, trail segment, bedrock milling, prehistoric and historical artifact scatters
BMGRW-0111	AZ X:12:63(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Bedrock milling, rock cairn, ceramic scatter and one lithic artifact
BMGRW-0112	AZ X:12:64(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock rings
BMGRW-0113	AZ X:12:65(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock cluster, rock circle, and prehistoric and historical artifact scatter
BMGRW-0114	AZ X:12:66(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock circles
BMGRW-0115	AZ X:12:67(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	Hart and Hart 2011	Trail segment, historical and prehistoric artifacts
BMGRW-0116	AZ X:12:68(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Mining features, historical artifacts
BMGRW-0117	AZ X:12:69(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Prehistoric ceramic scatter, historical feature and artifacts
BMGRW-0118	AZ X:12:70(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock alignment, cairn, fire ring, historical and prehistoric artifacts
BMGRW-0119	AZ X:12:71(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Ceramic scatter, rock feature
BMGRW-0120	AZ X:12:72(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock features, trail segment, artifact scatters
BMGRW-0121	AZ X:12:73(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Trail segments, boulder pile, historical and prehistoric artifact scatters

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BMGRW-0122	AZ X:12:74(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock circle, rock cluster, artifacts
BMGRW-0123	AZ X:12:75(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Ceramic and shell scatter
BMGRW-0124	AZ X:12:76(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock ring
BMGRW-0125	AZ X:12:77(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Rock feature, lithic artifact
BMGRW-0126	AZ X:12:78(ASM)	Undetermined	Hartmann and Thurtle, ed. 2000	-	Prehistoric artifact scatter
BMGRW-0127	AZ X:7:119(ASM)	Undetermined	Schaefer et al. 2004	-	Lithic scatter, road, historical trash scatter
BMGRW-0128	AZ X:7:120(ASM)	Eligible	Schaefer et al. 2004	Hart and Hart 2011	Water pipeline segment, roads, trail segments, ceramic scatter
BMGRW-0129	AZ X:7:121(ASM)	Undetermined	Schaefer et al. 2004	-	Prehistoric trail segment, artifacts
BMGRW-0130	AZ X:7:122(ASM)	Not Eligible	Schaefer et al. 2004	-	Mining features, historical artifacts
BMGRW-0131	AZ X:7:123(ASM)	Not Eligible	Schaefer et al. 2004	Hart and Hart 2011	Lithic scatter, quarry
BMGRW-0132	AZ X:7:124(ASM)	Not Eligible	Schaefer et al. 2004	-	Lithic scatter
BMGRW-0133	AZ X:7:125(ASM)	Not Eligible	Schaefer et al. 2004	-	Lithic scatter, quartzite and chert quarry
BMGRW-0134	AZ X:7:126(ASM)	Eligible	Schaefer et al. 2004	Laine and Seymour, ed. 2016	Trail, historical and prehistoric artifacts
BMGRW-0135	AZ X:7:127(ASM)	Not Eligible	Schaefer et al. 2004	-	Trail, historical and prehistoric artifacts
BMGRW-0136	AZ X:7:128(ASM)	Not Eligible	Schaefer et al. 2004	-	Historical trail, cairn, quartz shatter
BMGRW-0137	AZ X:7:129(ASM)	Not Eligible	Schaefer et al. 2004	-	Trail segment, historical artifacts
BMGRW-0138	AZ X:7:130(ASM)	Not Eligible	Schaefer et al. 2004	-	Prospecting pits, milled wood
BMGRW-0139	AZ X:7:131(ASM)	Not Eligible	Schaefer et al. 2004	-	Prospect pit, rock cluster
BMGRW-0140	AZ X:7:132(ASM)	Not Eligible	Schaefer et al. 2004	-	Prospect pit, cairns, trail segment
BMGRW-0141	AZ X:7:133(ASM)	Not Eligible	Schaefer et al. 2004	-	Quartz prospects
BMGRW-0142	AZ X:7:134(ASM)	Not Eligible	Schaefer et al. 2004	-	Lithic scatter
BMGRW-0143	AZ X:7:135(ASM)	Not Eligible	Schaefer et al. 2004	-	Lithic scatter, historical bottle and glass fragments
BMGRW-0144	5360-3	Undetermined	Schaefer et al. 2004	Hart and Hart 2011	Historical trash scatter

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BMGRW-0145	5360-15	Undetermined	Schaefer et al. 2004	-	Lithic scatter
BMGRW-0146	AZ X:10:18(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 199
BMGRW-0147	AZ X:10:19(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 200
BMGRW-0148	AZ X:10:20(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 201
BMGRW-0149	AZ X:11:1(ASM)	Not Eligible	Hart et al. 2005	-	Historical adobe foundation, artifact scatter
BMGRW-0150	AZ X:11:2(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 196
BMGRW-0151	AZ X:11:3(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 197
BMGRW-0152	AZ X:11:4(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 198
BMGRW-0153	AZ X:12:80(ASM)	Not Eligible	Hart et al. 2005	-	Historical scatter of cans and glass
BMGRW-0154	AZ X:12:81(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 193
BMGRW-0155	AZ X:12:82(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 194
BMGRW-0156	AZ X:12:83(ASM)	Eligible	Hart et al. 2005	-	International Boundary Monument 195
BMGRW-0157	AZ 050-3127	Undetermined	Unknown 2006	Hart and Hart 2011	Geoglyph (possibly recent), trail segment, rock alignment, metate fragment
BMGRW-0158	AZ X:12:85(ASM)	Eligible	Hart 2006	-	Historical mine, associated features
BMGRW-0159	AZ X:12:86(ASM)	Eligible	Hart 2006	-	Historical mining camp, associated features
BMGRW-0160	AZ X:12:87(ASM)	Not Eligible	Hart 2006	-	Historical mining camp, associated features
BMGRW-0161	AZ X:12:88(ASM)	Not Eligible	Hart 2006	-	Historical mine, mining camp, associated features
BMGRW-0162	AZ X:12:89(ASM)	Not Eligible	Hart 2006	-	Historical camp, associated features
BMGRW-0163	AZ X:12:90(ASM)	Not Eligible	Hart 2006	-	Historical mine, mining camp, associated features
BMGRW-0164	AZ X:8:109(ASM)	Not Eligible	Hart 2006	-	Historical trash scatter
BMGRW-0165	AZ Y:5:38(ASM)	Eligible	Hart 2006	-	Historical camp, associated features (Betty Lee Tank)
BMGRW-0166	AZ Y:5:39(ASM)	Eligible	Hart 2006	-	Historical mine, mining camp, associated features (Betty Lee Mine)
BMGRW-0167	AZ Y:5:40(ASM)	Not Eligible	Hart 2006	-	Historical artifact scatter
BMGRW-0168	AZ Y:5:41(ASM)	Not Eligible	Hart 2006	-	Prehistoric camp
BMGRW-0169	AZ Y:5:42(ASM)	Not Eligible	Hart 2006	-	Prehistoric camp
BMGRW-0170	AZ Y:9:8(ASM)	Not Eligible	Hart 2006	-	Historical mine, mining camp, associated features

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BMGRW-0171	AZ Y:9:9(ASM)	Not Eligible	Hart 2006	-	Historical mine, mining camp, associated features
BMGRW-0172	AZ X:7:162(ASM)	Eligible	Schaefer et al. 2007	-	Fortuna Mine
BMGRW-0173	AZ X:7:163(ASM)	Eligible	Schaefer et al. 2007	-	Fortuna Mine Southwest
BMGRW-0174	AZ X:7:164(ASM)	Eligible	Schaefer et al. 2007	-	Road near Fortuna Mine
BMGRW-0175	AZ X:12:91(ASM)	Eligible	Dosh 2008a	-	Prehistoric artifact scatter
BMGRW-0176	AZ X:12:92(ASM)	Eligible	Dosh 2008a	-	Prehistoric ceramic scatter
BMGRW-0177	AZ X:7:188(ASM)	Not Eligible	Dosh 2008a	-	Historical camp, trash scatter
BMGRW-0178	AZ X:7:189(ASM)	Not Eligible	Dosh 2008a	-	Historical camp, trash scatter
BMGRW-0179	AZ X:7:190(ASM)	Not Eligible	Dosh 2008a	-	Historical trash scatter
BMGRW-0180	AZ X:7:191(ASM)	Undetermined	Dosh 2008a	-	Prehistoric rock ring
BMGRW-0181	AZ X:7:192(ASM)	Eligible	Dosh 2008a	Laine and Seymour, ed. 2016	Prehistoric trail, rock ring, artifacts
BMGRW-0182	AZ X:8:108(ASM)	Eligible	Dosh 2008a	-	Historical mine, trash scatter (Poorman Mine)
BMGRW-0183	AZ X:8:131(ASM)	Not Eligible	Dosh 2008a	-	Mine and camp
BMGRW-0184	AZ X:8:132(ASM)	Not Eligible	Dosh 2008a	-	Historical campsite
BMGRW-0185	AZ X:8:133(ASM)	Not Eligible	Dosh 2008a	-	Historical rock alignment
BMGRW-0186	AZ X:8:134(ASM)	Not Eligible	Dosh 2008a	-	Prehistoric sleeping circles
BMGRW-0187	AZ X:8:135(ASM)	Not Eligible	Dosh 2008a	-	Prehistoric sleeping circles
BMGRW-0188	AZ X:8:136(ASM)	Not Eligible	Dosh 2008a	-	Prehistoric sleeping circles
BMGRW-0189	AZ X:8:137(ASM)	Not Eligible	Dosh 2008a	-	Prehistoric sleeping circles
BMGRW-0190	AZ X:8:138(ASM)	Not Eligible	Dosh 2008a	-	Historical trash scatter
BMGRW-0191	AZ X:8:139(ASM)	Not Eligible	Dosh 2008a	-	Historical concrete structure, trash scatter
BMGRW-0192	AZ X:8:140(ASM)	Eligible	Dosh 2008a	-	Prehistoric trail shrines
BMGRW-0193	AZ X:8:141(ASM)	Eligible	Dosh 2008a	-	Historical mine, trash scatter
BMGRW-0194	AZ X:8:142(ASM)	Not Eligible	Dosh 2008a	-	Historical mine, trash scatter
BMGRW-0195	AZ X:8:143(ASM)	Not Eligible	Dosh 2008a	-	Historical mine, trash scatter
BMGRW-0196	AZ X:8:144(ASM)	Eligible	Dosh 2008a	-	Historical mine, trash scatter
BMGRW-0197	AZ X:8:145(ASM)	Not Eligible	Dosh 2008a	-	Historical mine, trash scatter
BMGRW-0198	AZ X:8:146(ASM)	Not Eligible	Dosh 2008a	-	Historical mining prospect, trash scatter
BMGRW-0199	AZ X:8:147(ASM)	Eligible	Dosh 2008a	-	Historical mine, trash scatter
BMGRW-0200	AZ X:8:148(ASM)	Not Eligible	Dosh 2008a	-	Historical trash scatter

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BMGRW-0201	AZ X:8:149(ASM)	Not Eligible	Dosh 2008a	-	Historical trash scatter
BMGRW-0202	AZ X:8:150(ASM)	Not Eligible	Dosh 2008b	-	Historical trash scatter
BMGRW-0203	AZ Y:5:50(ASM)	Not Eligible	Dosh 2008b	-	Historical trash dump
BMGRW-0204	AZ Y:5:51(ASM)	Not Eligible	Dosh 2008b	-	Historical trash dump
BMGRW-0205	AZ Y:6:87(ASM)	Not Eligible	Dosh 2008b	-	Historical trash scatter and roadway
BMGRW-0206	AZ Y:6:88(ASM)	Not Eligible	Dosh 2008b	-	Mining camp, masonry structure, fire rings, foot trail, can dumps, artifacts
BMGRW-0207	AZ Y:9:10(ASM)	Eligible	Dosh 2008b	-	Ceramics
BMGRW-0208	AZ X:8:151(ASM)	Not Eligible	Foster and Drennan 2009	-	Prehistoric lithic scatter
BMGRW-0209	AZ X:12:118(ASM)	Eligible	Barr and Griset 2010	-	Prehistoric ceramics, ground stone, flaked stone tools
BMGRW-0210	AZ X:12:93(ASM)	Not Eligible	Schaefer and Andrews 2010	-	Historical debris
BMGRW-0211	AZ X:12:94(ASM)	Not Eligible	Schaefer and Andrews 2010	-	Historical debris
BMGRW-0212	-	-	-	-	Not Assigned
BMGRW-0213	-	-	-	-	Not Assigned
BMGRW-0214	AZ X:8:156(ASM)	Not Eligible	Barr and Griset 2010	-	Rock alignments, sleeping circle
BMGRW-0215	AZ Y:5:53(ASM)	Not Eligible	Schaefer and Andrews 2010	-	Prehistoric ceramic scatter
BMGRW-0216	AZ Y:5:54(ASM)	Not Eligible	Schaefer and Andrews 2010	-	Prehistoric ceramic scatter
BMGRW-0217	AZ Y:5:55(ASM)	Not Eligible	Schaefer and Andrews 2010	-	Historical can and bottle dump
BMGRW-0218	AZ Y:9:11(ASM)	Undetermined	Schaefer and Andrews 2010	-	Sparse artifact scatter
BMGRW-0219	AZ Y:5:57(ASM)	Not Eligible	Barr and Griset 2010	-	Circle of rocks and a single sherd
BMGRW-0220	AZ Y:5:58(ASM)	Not Eligible	Barr and Griset 2010	-	Sleeping circles
BMGRW-0221	AZ Y:5:59(ASM)	Eligible	Barr and Griset 2010	-	Ceramic scatter
BMGRW-0222	AZ X:11:21(ASM)	Eligible	Hart and Hart 2011	Laine and Seymour, ed. 2016	Prehistoric artifact scatter (lithics, ceramics, and shell)
BMGRW-0223	AZ X:11:22(ASM)	Eligible	Hart and Hart 2011	-	Thermal features, artifact scatter

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BMGRW-0224	AZ X:12:119(ASM)	Eligible	Hart and Hart 2011	-	Prehistoric trail segments, artifact scatter
BMGRW-0225	AZ X:12:120(ASM)	Eligible	Hart and Hart 2011	Laine and Seymour, ed. 2016	Trail segments, rock features, possible roasting feature, prehistoric and historical artifacts
BMGRW-0226	AZ X:12:121(ASM)	Eligible	Hart and Hart 2011	-	Ceramic scatter
BMGRW-0227	AZ X:12:122(ASM)	Not Eligible	Hart and Hart 2011	-	Rock rings, sherd
BMGRW-0228	AZ X:7:215(ASM)	Not Eligible	Hart and Hart 2011	-	Can scatter
BMGRW-0229	AZ X:7:216(ASM)	Eligible	Hart and Hart 2011	-	Prehistoric artifact scatter - mostly ceramics
BMGRW-0230	AZ X:7:217(ASM)	Not Eligible	Hart and Hart 2011	-	Lithic procurement and reduction
BMGRW-0231	AZ X:7:218(ASM)	Not Eligible	Hart and Hart 2011	-	Lithic reduction
BMGRW-0232	AZ Y:10:17(ASM)	Not Eligible	Hart and Hart 2011	-	Mine shaft, prospects, can dump, rock pile, three-walled rock structure
BMGRW-0233	AZ Y:5:60(ASM)	Eligible	Hart and Hart 2011	-	Prehistoric trails, sherds, historical mining features, collapsed cabin
BMGRW-0234	AZ Y:5:61(ASM)	Not Eligible	Hart and Hart 2011	-	Dry well with remains of habitation structure and artifact scatter
BMGRW-0235	AZ Y:5:62(ASM)	Not Eligible	Hart and Hart 2011	-	Tent platform, historical artifacts
BMGRW-0236	AZ Y:5:63(ASM)	Not Eligible	Hart and Hart 2011	-	Collapsed corral, artifact scatter
BMGRW-0237	AZ Y:6:89(ASM)	Undetermined	Hart and Hart 2011	-	Prehistoric trail segment, cleared circles
BMGRW-0238	AZ Y:6:90(ASM)	Not Eligible	Hart and Hart 2011	-	Cleared circles
BMGRW-0239	AZ Y:6:91(ASM)	Eligible	Hart and Hart 2011	-	Mine, mining camp
BMGRW-0240	AZ Y:6:92(ASM)	Not Eligible	Hart and Hart 2011	-	Cleared circles
BMGRW-0241	AZ Y:6:93(ASM)	Not Eligible	Hart and Hart 2011	-	Multi-component artifact scatter of cans, milled lumber, and flaked stone
BMGRW-0242	AZ X:11:23(ASM)	Not Eligible	Neuzil 2012	-	Rock wall features
BMGRW-0243	AZ X:11:24(ASM)	Eligible	Neuzil 2012	-	Ceramic scatter with associated rock shelter
BMGRW-0244	AZ X:11:25(ASM)	Not Eligible	Neuzil 2012	-	Flaked stone scatter
BMGRW-0245	AZ X:11:26(ASM)	Not Eligible	Neuzil 2012	-	Flaked stone scatter, rock cluster
BMGRW-0246	AZ X:11:27(ASM)	Eligible	Neuzil 2012	-	Flaked stone quarry, rock cluster
BMGRW-0247	AZ X:8:158(ASM)	Eligible	Neuzil 2012	-	Prehistoric artifact scatter
BMGRW-0248	AZ X:8:159(ASM)	Undetermined	Neuzil 2012	-	Multiple rock enclosures
BMGRW-0249	AZ Y:6:4(ASM)	Undetermined	Doelle 1982	-	Trail, ceramics

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0250	AZ Y:13:7(ASM)	Not Eligible	Zyniecki et al. 2006	-	Historical scatter of cans and glass
BMGRW-0251	AZ X:6:124(ASM)	Undetermined	Jones 2013	-	Prehistoric ceramic and lithic scatter
BMGRW-0252	AZ X:6:125(ASM)	Not Eligible	Jones 2013	-	Historical trash scatter
BMGRW-0253	AZ X:6:126(ASM)	Not Eligible	Jones 2013	-	Historical trash dump
BMGRW-0254	AZ X:6:127(ASM)	Not Eligible	Jones 2013	-	Historical trash dump
BMGRW-0255	AZ X:6:128(ASM)	Not Eligible	Jones 2013	-	Historical trash scatter
BMGRW-0256	AZ X:6:129(ASM)	Not Eligible	Jones 2013	-	Historical trash dump
BMGRW-0257	AZ X:12:123(ASM)	Not Eligible	Keur et al. 2015	-	Historical artifact scatter
BMGRW-0258	AZ X:11:28(ASM)	Not Eligible	Keur et al. 2015	-	Historical trash scatter
BMGRW-0259	AZ X:11:29(ASM)	Not Eligible	Keur et al. 2015	-	Prehistoric artifact scatter
BMGRW-0260	AZ X:6:131(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical trash scatter
BMGRW-0261	AZ X:6:132(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric expedient lithic quarry
BMGRW-0262	AZ X:6:133(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical trash scatter
BMGRW-0263	AZ X:6:134(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric lithic scatter
BMGRW-0264	AZ X:7:228(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical rock feature
BMGRW-0265	AZ X:7:229(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical rock features
BMGRW-0266	AZ X:7:230(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0267	AZ X:7:231(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical rock features
BMGRW-0268	AZ X:7:232(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical rock feature
BMGRW-0269	AZ X:7:233(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0270	AZ X:7:234(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical habitation
BMGRW-0271	AZ X:7:235(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0272	AZ X:7:236(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0273	AZ X:7:238(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric trail
BMGRW-0274	AZ X:7:239(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0275	AZ X:7:240(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0276	AZ X:7:241(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric trail and historical habitation
BMGRW-0277	AZ X:7:242(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0278	AZ X:7:243(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0279	AZ X:7:244(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0280	AZ X:7:245(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical trail
BMGRW-0281	AZ X:7:246(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0282	AZ X:7:247(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0283	AZ X:7:248(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0284	AZ X:7:249(ASM)	Eligible	Laine and Seymour, ed. 2016	-	Historical habitation
BMGRW-0285	AZ X:7:250(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0286	AZ X:7:251(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0287	AZ X:7:252(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration
BMGRW-0288	AZ X:7:253(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0289	AZ X:7:254(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric artifact scatter
BMGRW-0290	AZ X:7:255(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0291	AZ X:7:256(ASM)	Eligible	Laine and Seymour, ed. 2016	-	Historical habitation
BMGRW-0292	AZ X:7:257(ASM)	Eligible	Laine and Seymour, ed. 2016	-	Historical mining exploration and habitation
BMGRW-0293	AZ X:7:258(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric trail
BMGRW-0294	AZ X:7:259(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0295	AZ X:7:260(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0296	AZ X:7:269(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric lithic scatter
BMGRW-0297	AZ X:7:270(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical trail
BMGRW-0298	AZ X:7:271(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric lithic scatter
BMGRW-0299	AZ X:7:272(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric lithic scatter
BMGRW-0300	AZ X:7:273(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric sherd scatter and historical trash scatter
BMGRW-0301	AZ X:7:274(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical trash scatter
BMGRW-0302	AZ X:8:161(ASM)	Eligible	Laine and Seymour, ed. 2016	-	Prehistoric habitation and historical trash scatter
BMGRW-0303	AZ X:8:162(ASM)	Eligible	Laine and Seymour, ed. 2016	-	Prehistoric trail, artifact scatter
BMGRW-0304	AZ X:11:30(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical rock features
BMGRW-0305	AZ X:11:31(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Unknown-age rock features

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0306	AZ X:11:32(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Historical habitation
BMGRW-0307	AZ X:11:33(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric sherd scatter and historical habitation
BMGRW-0308	AZ X:12:125(ASM)	Eligible	Laine and Seymour, ed. 2016	-	Prehistoric habitation
BMGRW-0309	AZ X:12:126(ASM)	Undetermined	Laine and Seymour, ed. 2016	-	Prehistoric trail
BMGRW-0310	AZ X:12:128(ASM)	Eligible	Laine and Seymour, ed. 2016	-	Prehistoric trail
BMGRW-0311	AZ Y:5:64(ASM)	Not Eligible	Laine and Seymour, ed. 2016	-	Prehistoric lithic scatter
BMGRW-0312	AZ Y:5:65(ASM)	Undetermined	Laine and Seymour, ed. 2016	-	Prehistoric trail
BMGRW-0313	AZ Y:5:66(ASM)	Undetermined	Laine and Seymour, ed. 2016	-	Unknown-age trail
BMGRW-0314	AZ Y:5:67(ASM)	Undetermined	Laine and Seymour, ed. 2016	-	Prehistoric trail
BMGRW-0315	AZ X:7:276(ASM)	Not Eligible	Hlatky et al. 2016	-	Historical mining
BMGRW-0316	AZ X:7:277(ASM)	Not Eligible	Hlatky et al. 2016	-	Historical rock ring, trash scatter
BMGRW-0317	AZ X:7:278(ASM)	Not Eligible	Hlatky et al. 2016	-	Historical trail
BMGRW-0318	AZ X:7:279(ASM)	Not Eligible	Hlatky et al. 2016	-	FAR concentrations
BMGRW-0319	AZ X:7:280(ASM)	Not Eligible	Hlatky et al. 2016	-	Rock concentration, lithic scatter
BMGRW-0320	AZ X:7:281(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0321	AZ X:7:282(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0322	AZ X:7:283(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0323	AZ X:7:284(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0324	AZ X:7:285(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0325	AZ X:7:286(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0326	AZ X:7:287(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0327	AZ X:7:288(ASM)	Not Eligible	Hlatky et al. 2016	-	FAR concentrations, lithics
BMGRW-0328	AZ X:7:289(ASM)	Not Eligible	Hlatky et al. 2016	-	FAR concentrations, lithics
BMGRW-0329	AZ X:7:290(ASM)	Not Eligible	Hlatky et al. 2016	-	Lithic scatter
BMGRW-0330	AZ X:7:292(ASM)	Eligible	Hlatky et al. 2016	-	Trail, ceramics

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0331	AZ X:7:293(ASM)	Eligible	Hlatky et al. 2016	-	Trails, ceramics
BMGRW-0332	AZ X:7:294(ASM)	Eligible	Hlatky et al. 2016	-	Trail, cleared circle
BMGRW-0333	AZ X:7:295(ASM)	Eligible	Hlatky et al. 2016	-	Trail
BMGRW-0334	AZ X:7:296(ASM)	Eligible	Hlatky et al. 2016	-	Trail, ceramics
BMGRW-0335	AZ X:11:34(ASM)	Eligible	Hlatky et al. 2016	-	Trails, rock pile, ceramics, flake
BMGRW-0336	AZ X:11:35(ASM)	Eligible	Hlatky et al. 2016	-	Trail
BMGRW-0337	AZ X:11:36(ASM)	Eligible	Hlatky et al. 2016	-	Trail, cleared circle
BMGRW-0338	AZ X:11:37(ASM)	Eligible	Hlatky et al. 2016	-	Trail
BMGRW-0339	AZ X:11:38(ASM)	Eligible	Hlatky et al. 2016	-	Trail
BMGRW-0340	AZ X:11:39(ASM)	Eligible	Hlatky et al. 2016	-	Trail
BMGRW-0341	AZ X:11:40(ASM)	Eligible	Hlatky et al. 2016	-	Whole olla, trail, ceramics, shell
BMGRW-0342	AZ X:11:41(ASM)	Eligible	Hlatky et al. 2016	-	Trail, rock alignment, ceramics
BMGRW-0343	AZ X:11:42(ASM)	Not Eligible	Hlatky et al. 2016	-	Rock ring, rock pile
BMGRW-0344	AZ X:11:43(ASM)	Eligible	Hlatky et al. 2016	-	Trail, cairn, ceramics, lithics
BMGRW-0345	AZ X:11:44(ASM)	Eligible	Hlatky et al. 2016	-	Trail, ceramics, lithics
BMGRW-0346	AZ X:11:45(ASM)	Eligible	Hlatky et al. 2016	-	Ceramics
BMGRW-0347	-	-	-	-	Not Assigned
BMGRW-0348	-	-	-	-	Not Assigned
BMGRW-0349	-	-	-	-	Not Assigned
BMGRW-0350	AZ X:12:129(ASM)	Eligible	Hlatky et al. 2016	-	Petroglyphs, ceramics, animal bone
BMGRW-0351	AZ X:12:130(ASM)	Eligible	Hlatky et al. 2016	-	Cairns, ceramics
BMGRW-0352	AZ X:12:131(ASM)	Eligible	Hlatky et al. 2016	-	Trail, cairn, ceramics, mano
BMGRW-0353	AZ X:12:132(ASM)	Eligible	Hlatky et al. 2016	-	Trail, ceramics, lithics
BMGRW-0354	AZ X:12:133(ASM)	Eligible	Hlatky et al. 2016	-	Trail, lithics
BMGRW-0355	AZ X:12:134(ASM)	Not Eligible	Hlatky et al. 2016	-	Ceramics, lithics
BMGRW-0356	AZ X:12:135(ASM)	Eligible	Hlatky et al. 2016	-	Trail, ceramics, lithics
BMGRW-0357	AZ X:12:136(ASM)	Not Eligible	Hlatky et al. 2016	-	Ceramics, lithics, burned bone
BMGRW-0358	AZ X:12:137(ASM)	Eligible	Hlatky et al. 2016	-	Ovate grinding features
BMGRW-0359	AZ X:12:138(ASM)	Eligible	Hlatky et al. 2016	-	Bedrock milling stations, ovate grinding features, ceramics
BMGRW-0360	Not Assigned	Undetermined	Not Assigned	-	Extensive trail, features, ceramics, lithics
BMGRW-0361	AZ X:7:302(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Rock ring, ceramics

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0362	AZ X:7:303(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0363	AZ X:7:304(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Survey marker, cairns
BMGRW-0364	AZ X:7:305(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Historical rock rings, tent bases, trail, artifact scatter
BMGRW-0365	AZ X:7:306(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0366	AZ X:7:307(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0367	AZ X:7:308(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, cairn, rock alignment, hammerstone
BMGRW-0368	AZ X:7:309(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical rock cluster, artifact scatter
BMGRW-0369	AZ X:7:310(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0370	AZ X:7:311(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0371	AZ X:7:312(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Multicomponent: prehistoric petroglyph, ceramics, lithics; historical inscription, artifact scatter; unknown rock alignment
BMGRW-0372	AZ X:7:313(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0373	AZ X:7:314(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0374	AZ X:7:315(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0375	AZ X:7:316(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Multicomponent: prehistoric ceramics, lithics; historical mining features, artifact scatter
BMGRW-0376	AZ X:7:317(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, cairn, rock cluster, lithics
BMGRW-0377	AZ X:7:318(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, cairns, rock ring, rock cluster, ceramics, flaked and ground stone

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0378	AZ X:7:319(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, ceramics, lithics
BMGRW-0379	AZ X:7:320(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail
BMGRW-0380	AZ X:7:321(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Rock ring, rock piles, clearings
BMGRW-0381	AZ X:7:322(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical tent pads, pits, rock piles, artifacts
BMGRW-0382	AZ X:7:323(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical cairns, artifacts
BMGRW-0383	AZ X:7:324(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Rock ring, rock alignments, ceramics, shell, flaked and ground stone
BMGRW-0384	AZ X:7:325(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical rock rings, rock alignments, clearings, rock-lined trails, rock cluster, rock pile, cans
BMGRW-0385	AZ X:7:326(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, lithics
BMGRW-0386	AZ X:7:327(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Multicomponent: prehistoric ceramics, flaked and ground stone; historical trash scatter; unknown rock alignment, rock pile
BMGRW-0387	AZ X:7:328(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Multicomponent: prehistoric ceramics, shell, flaked and ground stone; historical trail, cairns, pits, platform cistern, rock piles
BMGRW-0388	AZ X:7:329(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0389	AZ X:7:330(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical road
BMGRW-0390	AZ X:7:331(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, lithics
BMGRW-0391	AZ X:7:332(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Historical rock clusters, tent pads, rock piles, hearth, trash scatter
BMGRW-0392	AZ X:7:333(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Mining cairns

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0393	AZ X:7:334(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical mining
BMGRW-0394	AZ X:7:335(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, rock piles
BMGRW-0395	AZ X:7:336(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, rock pile
BMGRW-0396	AZ X:7:337(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, clearings, ceramics
BMGRW-0397	AZ X:7:338(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Rock pile, ceramics
BMGRW-0398	AZ X:7:339(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, rock ring, ceramics, shell
BMGRW-0399	AZ X:8:163(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, rock ring
BMGRW-0400	AZ X:8:164(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail
BMGRW-0401	AZ X:8:165(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical dump
BMGRW-0402	AZ X:8:166(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Historical campsite
BMGRW-0403	AZ X:8:167(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical campsite
BMGRW-0404	AZ X:8:168(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Cairns
BMGRW-0405	AZ X:8:169(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, rock pile, cairns, ceramics, lithics
BMGRW-0406	AZ X:8:170(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Historical mining
BMGRW-0407	AZ X:8:171(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Rock pile, bottle
BMGRW-0408	AZ X:8:172(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Historical mining
BMGRW-0409	AZ X:8:173(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, cairn

MCAS Yuma Site Number	ASM Site Number	NRHP Eligibility Determinations	Reference	Updated By	Description
BMGRW-0410	AZ X:8:174(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Rock piles, rock cluster
BMGRW-0411	AZ X:8:175(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Rock piles, lithics
BMGRW-0412	AZ X:8:176(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, rock alignment
BMGRW-0413	AZ X:8:177(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical dump
BMGRW-0414	AZ Y:5:70(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Intaglio, rock alignment
BMGRW-0415	AZ Y:5:71(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical dump
BMGRW-0416	AZ Y:5:72(ASM)	Not Eligible	Knighton-Wisor et al. 2019	-	Historical mining
BMGRW-0417	AZ Y:5:73(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Old Soak Mine
BMGRW-0418	AZ Y:5:74(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, ceramics
BMGRW-0419	AZ Y:5:75(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Trail, rock cluster, ceramics
BMGRW-0420	AZ Y:5:76(ASM)	Eligible	Knighton-Wisor et al. 2019	-	Rock shelter, ceramics, lithics

Source: MCAS Yuma Cultural Resources Management database, dated May 2019

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APPENDIX F

Geospatial Data Documents

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F-1
MCAS Yuma Specifications for Geospatial Data

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SPECIFICATIONS FOR GEOSPATIAL DATA: The Contractor shall develop GIS feature classes to Government provided specification. Specifications for all required geospatial data deliverables may be found in the following sections.

1.0 Database Files: The Marine Corps standard computing software is Microsoft Office 2010. Databases shall be provided in file geodatabase format, unless specified otherwise, as approved by the Government. All text, spreadsheet, and database files, to include aerial photography, shall be delivered on a Compact Disk read-only memory (CD-ROM) or Digital Versatile Disc read-only memory (DVD-ROM). Drafts for review may be delivered via the Government AMRDEC SAFE (Safe Access File Exchange) system.

<https://safe.amrdec.army.mil/safe>

2.0 Maps, Drawings, Sketches and Aerial Photography (Digital Geospatial Data):

2.1 Geospatial Data Software Format: Geographic data (vector and raster) must be provided in a form that does not require translation, preprocessing, or post processing before being loaded to the Installation's centrally hosted geodatabase. The Contractor shall validate any deviation from this specification in writing with the Government (Department GIS Manager via the Project Manager).

2.1.1 GIS (Feature Classes): All feature classes shall be provided in file geodatabase format using ArcGIS 10.1 software. The geodatabase must be importable to a multi-user geodatabase using ArcSDE 10.1. The delivered feature classes shall be provided with x, y domain precision of 1000 (unless otherwise identified by the Installation). Feature classes shall be in the same projection and use the same coordinate system, datum, and units as stated below in the paragraph titled Geospatial Data Projection.

(NOTE: ArcGIS and ArcSDE are geographic information system software produced by the Environmental Systems Research Institute (ESRI) of Redlands, California. This software is used by the Marine Corps GEOFidelis Program)

2.2 Geospatial Data Structure:

2.2.1 GIS (Feature Classes): When developing/delivering geospatial data, the Contractor shall develop the initial structure consistent with the most current version of the GEOFidelis Data Model. The GEOFidelis Data Model shall be followed for geospatial database table structure, nomenclature, and attributes. The Contractor shall consult with the Government concerning modifications or additions to the GEOFidelis Data Model. The Government may approve modifications to the GEOFidelis Data Model if it is determined that the GEOFidelis Data Model does not adequately address subject datasets. If further modifications to structure are required as a result of this Scope, the Contractor will consult with the Government (IGI&S Manager) for direction and final approval. It should be noted that the Contractor may request the Government provide the Contractor with the correct feature class schema. The Government will provide this in the form of an empty geodatabase.

2.2.1.1 Required Feature Classes: The Contractor shall develop all required GEOFidelis SDSFIE 3.0 GIS feature classes to depict all changes to existing survey areas, site boundaries, and isolated occurrences, as well as any others deemed necessary by the MCAS Yuma Project Manager.

2.2.1.2 Required Feature Class Attribution: The contractor shall be responsible for ensuring submitted feature classes are populated with all required MCAS Yuma feature class attribution. Specifications for attribute population may be obtained from the MCAS Yuma Range Department GIS Manager.

2.3 Geospatial Data Projection: Geographic data (regardless of format) shall be provided in **International Feet** and **projected** into the **Arizona West State Plane, FIPS Zone 0203** projection system. The maps and data shall use the GRS 1980 spheroid and the North American Datum 1983. This projection requirement applies to all GIS data layer deliverables as well as all CAD drawings such as as-designed and as-built project plans. Each data set shall have a projection file if appropriate based on format. Map or drawing **scales** will be determined by the Project Manager, if applicable. Mapping **accuracy** for the agreed scales will conform to the American Society for Photogrammetry and Remote Sensing (ASPRS) "Accuracy Standards for Large-Scale Maps", "Interim Accuracy Standards for Large-Scale Maps", and "Geospatial Positioning Accuracy Standards". Copies of these standards can be obtained on the Internet at <http://www.asprs.org>, and/or at <http://www.fgdc.gov>, or by contacting:

American Society for Photogrammetry and Remote Sensing
5410 Grosvenor Lane, Suite 210
Bethesda, MD 20814-2160

2.4 Geospatial Data Collection: Mapping grade Global Positioning System (GPS) data collection shall be performed to develop all site data. Mapping grade GPS data collection shall at a minimum use the Geoid2003 CONUS epoch (or a more current epoch if available at the time of this project). All site boundaries must be within ± 5 meters horizontal and all site datum points must be within ± 1 meter. Every effort shall be made to capture feature locations without using offsets unless obstructions are present. Any offsets used shall be annotated in the "user flag" field. The horizontal accuracy will be compiled, tested, and reported in accordance with Part 3 of the Federal Geographic Data Committee's Geospatial Positioning Accuracy Standards: the National Standard for Spatial Data Accuracy (NSSDA). Spatial accuracy will be reported at the 95% confidence level. The spatial accuracy standard is available at:

<http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/chapter3>

(NOTE: Raw GPS data collection information is not to be included in the table structure of the delivery, unless it is specifically part of the GEOFidelis Data Model, established Installation feature format, or specifically requested by the Government.)

2.5 Media for Geospatial Data Deliverables: Geographic data shall be delivered on a separate CD-ROM or DVD-ROM. This media shall **contain only the value-added data sets** as designated in the Task sections of the statement of work. Do not include the Contractor's working files or original installation data sets that may have been used by the Contractor to develop the deliverables. "READ ME" files may be included on the geographic data media if such files provide explanation of the delivered data sets. However, these "READ ME" files should not be delivered in lieu of standard metadata.

2.6 Geographic Data Documentation (Metadata): For each digital file delivered containing geographic information (regardless of format), **the Contractor shall provide documentation** consistent with the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM). Both 'Mandatory' and 'Mandatory as Applicable' fields shall be completed for each geographic data set. The documentation shall include, but not be limited to, the following:

- The name, description, abstract, and purpose of the data set/data layer.
- The source of the data and any related data quality information such as accuracy and time period of content.
- Descriptions of the receiver and other equipment used during collection and processing, base stations used for differential corrections, software and version used for performing differential corrections, estimated horizontal and vertical accuracies obtained, and conversion routines used to translate the data into final geographic data delivery format.
- Type of data layer (point, line, polygon, etc.).
- Field names of all attribute data and a description of each field name.
- Definition of all codes used in the data fields.
- Ranges of numeric fields and the meaning of these numeric ranges.
- The creation date of the map layer and the name of the person who created it.
- A point of contact shall be provided to answer technical questions.

Metadata generation tools included in the ArcGIS suite of software (or equivalent technology) shall be used in the production of the required metadata in XML format. Regardless of the tools used for metadata creation, the Contractor must ensure that the metadata is delivered in XML format and can be easily imported to the Installation's enterprise geodatabase. Copies of the FGDC metadata standard can be obtained on the Internet at <http://www.fgdc.gov> or by contacting:

FGDC Secretariat
c/o U.S. Geological Survey
590 National Center
Reston, Virginia 22092
(703) 648-5514

Additionally, the metadata will meet all requirements per the MCAS Yuma Metadata Authoring Guide, currently 3.0 dated January 2013. This document will undergo revision to reflect changes from ArcGIS 9.3.1 to 10.1.

2.7 Geographic Data Review: The digital geographic maps, related data, and text documents shall be included for review in the draft and final contract submittals. The data will be analyzed for discrepancies in subject content, correct format in accordance with these specifications, and compatibility with the existing GIS system. The Contractor shall incorporate review comments to data and text prior to approval of the final submittal. For each review of digital geospatial data deliverables, the Contractor shall provide a technical consultant to be available by telephone, email, web conference, or when practical, on-site at MCAS Yuma with the GIS Manager and functional area subject matter experts to visually review the data deliverables on a Windows 7 compatible system unless otherwise approved by the Government.

Ownership: All digital files, final hard copy products, source data acquired for this project, and related materials, including that furnished by the Government, shall become the property of the Installation and will not be issued, distributed, or published by the Contractor.

Contact Information: For project inquiries, please contact the Project Manager. For specific geospatial questions, upon approval of the Project Manager, you may contact:

Jonathan Gholson, YRMD GIS Manager
151 O'Neill St, Yuma, AZ, 85369
(928) 269-8400
jonathan.gholson.civ@usmc.mil

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Sample Geospatial Data Request Letter

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OMEGA ENTERPRISES CORPORATION
 SCIENCE AND TECHNOLOGY DIVISON
 10123 PACIFIC COAST ROAD
 SAN DIEGO CA 92120-1234

27 Aug 2009

From: Steve Travail, New Business Development, Omega Enterprises Corporation
 To: Karla James, Cultural Resources Manager, Marine Corps Air Station Yuma

Subj: MARINE CORPS AIR STATION YUMA GEOSPATIAL DATA REQUEST IN
 SUPPORT OF AIRFIELD OBSTRUCTION MAPPING AND MANAGEMENT

Ref: (a) NAVAIR Contract N1234-00-A-1234

Encl: (1) Statement of Work (Contract N1234-00-A-1234)

1. The Naval Air Systems Command has selected Omega Enterprises Corporation as a Phase II finalist under the innovative research solicitation for Innovative Airfield Obstruction Mapping and Management Technology (DoD SBIR NO1234-56). Phase II requires the demonstration of the technology, which is scheduled to occur at Marine Corps Air Station Yuma no later than September 30, 2009. The RAPTOR QUICKMAP system is comprised of a vehicle mounted stationary terrestrial 3D laser scanner, video capture, and an on-board data processing system. A 360 degree area of detection is monitored by the sensor, and referenced to a calibrated on-board GPS system. The display software requires a GEO Tiff map of the airfield with an ideal horizontal resolution of 12" pixel resolution or better. A sample area will be selected by the installation for the demonstration area in which the RAPTOR QUICKMAP will be used to capture potential airfield obstructions. To assist with this technology demonstration, prior to the installation site visit, Omega Enterprises Corporation requests that the installation provide copies of the following geospatial data layers so that the contractor can develop a schedule and action plan based on the demonstration area and provide raster imagery backgrounds to the display software.

2. The contractor requests copies of the following data layers or their equivalents if available to be provided on a CD-R or DVD or transferred via corporate FTP site located at
ftp://OmegaCorp/Projects/FY09/contracts/N1234_00_A_1234

airfield_surface_area
 air_accident_zone_area
 XXX.tif (geotiff imagery of the airfield area at .3 m resolution)

3. See ENCL 1 for the detailed Statement of Work (SOW).

4. Data will be transferred from the provided storage media format and stored on contractor maintained storage and retrieval systems utilizing approved protective measures in accordance with For Official Use Only data storage. Access to this information will be restricted to contractor personnel directly involved in project. The original storage media will be placed in a secure, locked cabinet or office after working hours. Upon completion of the project, a copy of the data will be provided back to the installation POC for review. Following final review, copies of the data will be provided to the MCAS Yuma IGI&S and Airfield Operations offices as appropriate. The original storage media will be destroyed or returned to the installation POC. Final disposition of digital data will be in accordance with the SOW and the signed MCAS Yuma geospatial nondisclosure agreement (NDA).

5. Mr. Collin Arbeit, GIS Analyst, Omega Enterprises Corporation ph (614) 555-1234, fax (614) 555-4321, ArbeitCJ@OmegaCorp.com, will be the contractor point of contact for this request.

6. All additional questions or concerns should be addressed to Mr. Steve Travail, New Business Development, (614)-555-1235, TravailSJ@OmegaCorp.com.

Respectfully,

Steve Q. Travail (ESQ)
New Business Development

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Geospatial Data Use and Nondisclosure Agreement

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Geospatial Data Use and Nondisclosure Agreement

Agency Name: *(shall be known as 'The Outside Agency')*

Address:

Project Title:

Contract Number:

The United States Marine Corps (USMC) has consulted with 'The Outside Agency' to develop and/or utilize geospatial information for use as part of the USMC Installation Geospatial Information and Services Program (IGI&S). 'The Outside Agency' understands and agrees that it is the duty and obligation of 'The Outside Agency' and its employees to comply with the provisions of the NHPA and this agreement respecting such information, and that any violation of this agreement may result in adverse action against both 'The Outside Agency' and its employees.

1. The development of any geospatial information, pursuant to the HQMC IGI&S Program is official, sensitive, and deliberative in nature. 'Geospatial' information includes all electronic and hard copy forms of data. 'The Outside Agency' and its employees further understand that the development of such information is not limited to final documents or products, but also includes all draft and feeder documents, briefings and notes, as well as any other related oral or written communication.
2. By signing below, 'The Outside Agency' and its employees agree that they will not use, or allow to be used, any data provided by the USMC for marketing or other uses not specifically stated in the Regulations. Data can only be used for other purposes with explicit written consent from the appropriate USMC approval authority and contracting officer. As it relates to the USMC IGI&S program, the appropriate USMC approval authority for any USMC Installation geospatial data is the USMC Installation's primary IGIS contact.
3. Any geospatial data or any other written communication, whether draft or final, is the official property and record of the Department of Defense (DoD) and shall be retained, disseminated, released, and destroyed in accordance with requirements of law and applicable DoD or Military Department directives, regulations, instructions, policies or guidance. This document must be returned to the office listed in the contact information below. Please direct any questions related to IGI&S to the person listed in the contact information below.
4. 'The Outside Agency' and its employees utilizing the data contained in the attached electronic document files depicting Marine Corps Air Station (MCAS) Yuma are responsible for verifying the accuracy of any and all spatial information contained in the attached files, to include the individual spatial components that comprise the overall map content. Due to multiple sources of data provided by various architectural-engineering firms, construction contractors, non-governmental agencies and other users, MCAS Yuma, offers no express or implied warranty for the accuracy of the spatial data provided. Use of this spatial data information by any entity other than MCAS Yuma Installation & Logistics Department is the sole responsibility and liability of the individual user. The end user of this spatial information accepts all responsibility for the accuracy and liabilities incurred in the use of the enclosed data.

Signature _____ Print Name _____

Title _____ Date _____

Contact Information:

Thomas Plicka
IGI&S Manager
MCIWest
MCAS YUMA
Box 99140 Bldg 888
Yuma, AZ. 85369-9140
Phone: (928) 269-2490
Fax: (928) 269-2713
E-Mail: thomas.plicka@usmc.mil

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APPENDIX G

Glossary

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GLOSSARY

Advisory Council on Historic Preservation: The Advisory Council on Historic Preservation (ACHP) is the independent federal agency charged by the National Historic Preservation Act (NHPA), as amended, to advise the President, Congress, and federal agencies on matters related to historic preservation. The ACHP also administers Section 106 of the NHPA through its regulation, *Protection of Historic Properties* (36 CFR 800).

Archaeological resources: Any material remains of past human life or activities that are capable of providing scientific or humanistic understandings of past human behavior and cultural adaptation through the application of scientific or scholarly techniques such as controlled observation, contextual measurement, controlled collection, analysis, interpretation, and explanation (see the Archaeological Resources Protection Act [ARPA] and 32 CFR 229.3).

Archaeological Resources Protection Act of 1979: ARPA (16 USC §§ 470 aa-mm) strengthened protection of archaeological resources on federal and tribal lands by increasing the penalties first included in the Antiquities Act of 1906 for unauthorized excavation, collection, or damage of those resources from misdemeanors to felonies, including fines and imprisonment for first offenses. Trafficking in archaeological resources from public and tribal lands is also prohibited by ARPA. ARPA requires notification of affected Native American tribes if archaeological investigations would result in harm to or destruction of any location considered by tribes to have religious or cultural importance.

Area of Potential Effects: The Area of Potential Effects (APE) is the area within which any existing historic properties may be affected by a federal undertaking. The APE includes the footprint of the proposed project and areas around the footprint that might be affected by visual, auditory, erosional, and other direct and indirect results of the undertaking. The APE may consist of a single area or two or more geographically discontinuous areas.

Building: One of the five National Register of Historic Places (NRHP) property types. A structure created to shelter any form of human activity—includes houses, barns, churches, and other buildings, including administration buildings, dormitories, garages, and hangars.

Conservation: Planned management, use, and protection of natural and cultural resources to provide sustainable use and continued benefit for present and future generations and to prevent exploitation, destruction, waste, and/or neglect.

Consultation: A reasonable and good-faith effort to involve affected parties in the findings, determinations, and decisions made during the Section 106 process and other processes required under other statutes and regulations. Consultations with Indian tribes must be on a government-to-government level to respect tribal sovereignty and to recognize the unique legal relationship between the federal government and Indian tribes set forth in the Constitution, treaties, statutes, and court decisions.

Cultural landscape: A geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, sites, and/or natural features.

Cultural resource: Cultural resources represent the nation's collective heritage; broad public sentiment for protecting these heritage resources has been codified over the years in numerous

federal, state, and local laws. This term includes: buildings, structures, sites, districts, and objects that may be eligible for or that are included on the NRHP (historic properties); cultural items as defined in the Native American Graves Protection and Repatriation Act (25 USC § 3001); American Indian, Eskimo, Aleut, or Native Hawaiian sacred sites for which access is protected under the American Indian Religious Freedom Act (42 USC § 1996); archaeological resources as defined by ARPA (16 USC § 470bb); archaeological artifact collections and associated records defined under Part 79 (36 CFR 79); and any definite location of past human activity, occupation, or use, identifiable through field inventory (survey), historical documentation, or oral evidence.

Culture: The traditions, beliefs, practices, lifeways, arts, crafts, and social institutions of any community, be it an Indian tribe, a local ethnic group, or the people of the nation as a whole. Human use of and adaptation to the environment as seen through the behavior, activities, and methods employed to transmit customs, knowledge, and ideas to succeeding generations.

Curation: The process of managing and preserving an archaeological collection of artifacts and records according to professional museum and archival practices (36 CFR 79).

Desert pavement: Large, flat, conspicuous areas largely devoid of vegetation and covered by a layer of tightly packed small stones, which are frequently very dark-colored due to the development of desert varnish. Desert pavement is formed through a process of physical weathering and the accumulation of a porous mineral layer in the soil that separates and levels the desert-pavement surface from the underlying, uneven rocky material.

District: One of the five NRHP property types. Districts are concentrations of significant sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Effect: Any change in the characteristics that contribute to the uses determined appropriate for a cultural resource, or to the qualities that qualify a cultural property for listing on the NRHP. Determination of effect is guided by criteria in Part 800.9 (36 CFR 800.9).

Evaluation: Assessing the historic significance and historic integrity of a site, building, structure, district, or object by applying the criteria of eligibility for inclusion on the NRHP.

Historic context: An organizing structure for interpreting history that groups together information about historic properties sharing a common theme, geographical location, and time period. The development of historic contexts is a foundation for decisions about the planning, identification, evaluation, registration, and treatment of historic properties based upon comparative significance.

Historic integrity: The ability of a property to convey its historic significance. To be eligible for listing on the NRHP, a property must be historically significant. It also must possess historical integrity, which is a measure of authenticity and not necessarily condition. Elements of integrity to be considered include location, design, setting, materials, workmanship, feeling, and association. Not all seven aspects of integrity need to be retained, but a property must have sufficient physical remnants from its period of historical importance to illustrate significant aspects of its past. The integrity of archaeological sites typically is evaluated by the degree to which they can provide important contextual information. The integrity of traditional cultural places is interpreted with reference to the views of closely affiliated traditional groups, if traditional people will write or talk about such places so information can be filed with a public agency. If a place retains integrity in the perspective of affiliated traditional groups, it probably

has sufficient integrity to justify further evaluation. NRHP Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*, provides guidance for identifying and assessing traditional cultural places.

Historic preservation: The NHPA (54 USC § 300315) states that historic preservation “includes identification, evaluation, recordation, documentation, curation, acquisition, protection, management, rehabilitation, restoration, stabilization, maintenance, research, interpretation, conservation, and education and training” regarding cultural resources.

Historic property: Any district, site, building, structure, or object listed in or eligible for inclusion on the NRHP because of its historic significance. The regulation at Part 60.4 explains criteria for determining eligibility for listing on the NRHP (36 CFR 60.4).

Historic significance: The importance of a property to the history, architecture, archaeology, engineering, or culture of a community, a state, or the nation. It is achieved by meeting one or more of the following criteria: association with events, activities, or patterns (*Criterion a*); association with important persons (*Criterion b*); distinctive physical characteristics of design, construction, or form (*Criterion c*); and/or potential to yield important information (*Criterion d*).

Identification: The first step in the NHPA Section 106 process includes preliminary work (such as archival research or literature review), actual efforts to identify properties through field survey, and the evaluation of identified properties to determine if they qualify as historic properties. The standard is a “reasonable and good faith effort” for identification and evaluation.

Indian tribe: A federally recognized Indian tribe is one that the U.S. government formally recognizes as a sovereign entity requiring government-to-government relations. The federal government holds lands in trust for many, but not all, Indian tribes. Some tribes are not federally recognized and are not afforded special rights under federal law, with the following exception. According to NRHP guidelines, traditional cultural places include places of cultural significance to both federally recognized tribes and other groups. Non-federally recognized tribes may be consulted as interested parties.

Inert: Nonreactive, nonexplosive (in regard to inert ordnance).

Intaglio: A figure or design incised on the surface of the earth, or desert pavement, or composed of rock alignments.

Integrated Cultural Resources Management Plan: An Integrated Cultural Resources Management Plan (ICRMP) is a document that defines the procedures and outlines plans for managing cultural resources on DoD installations (see DoD Instruction 4715.16).

Integrated Natural Resources Management Plan: An Integrated Natural Resources Management Plan (INRMP) is an integrated plan based, to the maximum extent practicable, on ecosystem management that shows the interrelationships of individual components of natural resources management to mission requirements and other land-use activities affecting an installation’s natural resources.

Inventory: A process of descriptive listing and documentation of cultural resources within a defined geographic area based on a review of existing data, fieldwork, and other means.

National Register of Historic Places: The NRHP is the official federal list of sites, districts, buildings, structures, and objects worthy of preservation consideration because of significance in American history, architecture, archaeology, engineering, or culture. The NRHP is administered

by the Department of the Interior, National Park Service. Criteria for eligibility, and the procedures for nomination, making changes to listed properties, and removing properties from the NRHP are detailed in *National Register of Historic Places* (36 CFR 60). Significance may be local, state, or national in scope.

Native Americans: American Indians, Eskimos, Aleuts, and Native Hawaiians (DoD Instruction 4715.16).

Object: One of the five NRHP property types. Objects typically are small in scale, sometimes movable, and often artistic in nature, and include sculpture, monuments, airplanes, boundary markers, and fountains.

Papaguería: A unique geographic area in southwestern Arizona and northwestern Sonora, Mexico; subdivided into the eastern and western Papaguería based on cultural and environmental factors. This term is used extensively in archaeological literature to identify a geographic region, an environment, and a cultural area.

Restricted airspace: Airspace with defined vertical and lateral dimensions that has been established by the Federal Aviation Administration (via the rule-making process) to denote areas where military activities can occur.

Road: A motor vehicle travelway.

Site: One of the five NRHP property types. The physical location of a significant activity or event; often refers to archaeological sites or traditional cultural places, although the term also may be used to describe military properties such as testing ranges, treaty signing locations, and aircraft wrecks. All sites are the location of past human activities or events.

State Historic Preservation Officer: The State Historic Preservation Officer (SHPO) is the official appointed by the governor of each state or territory to carry out the functions defined in the NHPA and to administer the state's historic preservation program. SHPOs provide advice and assistance to federal agencies regarding their historic preservation responsibilities.

Stewardship: The management of resources entrusted to one's care in a way that preserves and enhances the resources and their benefits for present and future generations.

Structure: One of the five NRHP property types. A work constructed for purposes other than human shelter, including bridges, tunnels, dams, roadways, and military facilities such as missiles and their silos, launch pads, weaponry, runways, and water towers.

Tinaja: A cavity or natural depression eroded into bedrock by stream or wind action and filled with direct rainfall or runoff. Small, rock pocket *tinajas* (formed by aeolian erosion) are found in rock outcrops away from streambeds. Stream channel *tinajas* (formed by alluvial action) are bedrock pools that range in size from small potholes to large plunge pools. These are one of the most reliable water sources in the Sonoran Desert. They can hold several hundreds of gallons and in some cases are perennial. *Tinajas* can be buried in sand but still retain subsurface water.

Traditional cultural property (or place): A property that is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community. The traditional cultural significance of a historic property is derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Examples of properties possessing such significance include: a location associated

with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world; a rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents; a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice; and a place where Native Americans still go to collect traditional tools or raw materials to make traditional items such as basketry or pottery.

Tribe: A federally recognized tribe or other federally recognized Native American group or organization (DoD Instruction 4710.02).

Undertaking: Any project, activity, action, or program wholly or partly funded under the direct or indirect jurisdiction of a federal agency. Includes projects and activities that are executed by or on behalf of a federal agency; federally funded; require a federal permit, license, or approval; or are subject to state or local regulation administered through delegation or approval authority by a federal agency. Also, any action meeting this definition that may have an effect on NRHP-eligible resources and thereby triggers procedural responsibilities (54 USC §§ 300101-307108).

Unexploded ordnance: Unexploded ordnance (UXO) are military munitions that have been primed, fused, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material, and remain unexploded either by malfunction, design, or any other cause.

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BARRY M. GOLDWATER RANGE

Integrated Cultural Resources Management Plan

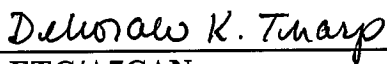
Part I: Background and Rangewide Management Issues

Part II: Cultural Resource Management on the BMGR East

**Prepared by
56th Range Management Office
Luke Air Force Base
Air Education and Training Command**

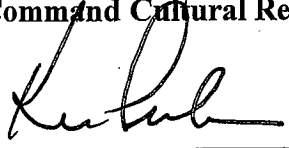
2009

Approving Officials:



**HQ AETC/A7CAN
Command Cultural Resources Manager**

27 Apr 09
Date



**KURT F. NEUBAUER
Brigadier General, USAF
Commander, 56th Fighter Wing**

17 Apr 09
Date

Part I

Background and Rangewide Management Issues

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ACKNOWLEDGEMENTS

Compiling a science-based, mission-oriented plan for the management of cultural resources on a 1.7 million acre range is an almost overwhelming task, especially when combined with the management of numerous contracts, programming and executing an extensive but methodical research program, and consulting with numerous agencies, tribes, and interested parties.

Beginning in 1996, a large number of projects were injected into a rapidly growing program in support of the Legislative Environmental Impact Statement which accompanied the request for the renewal of military use of the Barry M. Goldwater Range (BMGR). The Military Lands Withdrawal Act of 1999 renewed the Department of Defense's use of these withdrawn lands and inserted several new requirements, among them preparing a plan for managing the sensitive natural and cultural resources of the range. As planning for natural resource management proceeded, and during the process of preparing an Environmental Impact Statement for the Integrated Natural Resource Management Plan, the organization of the cultural resource management plan evolved and new emphasis was placed upon it.

A team of Air Force cultural resource professionals met at Luke AFB in February of 2002 to revise and restructure the existing draft Integrated Cultural Resources Management Plan for BMGR. The team included Adrienne Rankin, 56th Range Management Office (56 RMO) Staff Archaeologist and Carol Heathington, 56 RMO Historic Preservation Officer and Cultural Resource Manager; Jack Siegel and Deborah Tharp represented Air Education and Training Command. Additional expertise was provided by James Wilde, Senior Archeologist, Air Force Center for Environmental Excellence (AFCEE), and Newell Wright, formerly Cultural Resources Manager at Eglin AFB. Keith Myhrer, Nellis AFB Cultural Resources Manager, shared the template for the Nellis plan. Adrienne Rankin, Carol Heathington, and Deborah Tharp met again in April of 2002, and with key assistance from Julia Cantrell, AFCEE Cultural Resources Manager, edited and expanded the product of the first team meeting. Jan Lawson joined the staff of the Range Management Department, Marine Corps Air Station Yuma, in 2003 and has reviewed and contributed to this draft.

Much of Part I is based on the work of professional archaeological contractors, including Dames & Moore (now URS), SWCA Environmental Consultants, and Statistical Research, Inc., that have systematically surveyed large areas on BMGR under contract to the Air Force. The resulting reports represent a substantial contribution to our understanding of regional archaeology.

Without the dedicated efforts of all of these professionals, this plan would not have become a reality.

Acronyms and Abbreviations

ACC	–	Air Combat Command
ACHP	–	Advisory Council on Historic Preservation
ACMI	–	Air Combat Maneuvering Instrumentation
AETC	–	Air Education and Training Command
AFAF	–	Air Force Auxiliary Field
AFCEE	–	Air Force Center for Environmental Excellence
AFI	–	Air Force Instruction
AFRES	–	Air Force Reserve
AGL	–	Above Ground Level
AIRFA	–	American Indian Religious Freedom Act
ANG	–	Air National Guard
APE	–	Area of Potential Effect
ARNG	–	Army National Guard
ARPA	–	Archeological Resources Protection Act
BLM	–	Bureau of Land Management
BMGR	–	Barry M. Goldwater Range
BO	–	Biological Opinion
CAF	–	Combat Air Forces
CES	–	Civil Engineering Squadron
CEV	–	Environmental Flight (of Civil Engineering)
CFR	–	Code of Federal Regulations
CPNWR	–	Cabeza Prieta National Wildlife Refuge
CRM	–	Cultural Resources Manager
CSAR	–	Combat Search and Rescue
DHS	–	Department of Homeland Security
DOD	–	Department of Defense
DOI	–	Department of Interior
EA	–	Environmental Assessment
EIAP	–	Environmental Impact Analysis Process
EIS	–	Environmental Impact Statement
EO	–	Executive Order
EOD	–	Explosive Ordnance Disposal
EPA	–	Environmental Protection Agency
ERP	–	Environmental Restoration Program
ESM	–	Environmental Science Management
ETAC	–	East Tactical Range
FAA	–	Federal Aviation Administration
FOIA	–	Freedom of Information Act
FPO	–	Federal Preservation Officer
FR	–	Federal Register
FY	–	Fiscal Year
GIS	–	Geographical Information Systems
GPS	–	Geo-stationary Positioning System

HABS	–	Historic American Building Survey
HAER	–	Historic Architectural Engineering Record
HE	–	High Explosive
ICRMP	–	Integrated Cultural Resources Management Plan
INRMP	–	Integrated Natural Resources Management Plan
IO	–	Isolated Occurrence
MAJCOM	–	Major Command
MAP	–	Management Action Plan
MCAS	–	Marine Corps Air Station
MCO	–	Marine Corps Order
MLWA	–	Military Lands Withdrawal Act
MOA	–	Military Operating Area
MOA	–	Memorandum of Agreement
MOU	–	Memorandum of Understanding
MSP	–	Mission Support Plan
MTR	–	Military Training Route
NAGPRA	–	Native American Graves Protection and Repatriation Act
NEPA	–	National Environmental Policy Act
NHPA	–	National Historic Preservation Act
NRHP	–	National Register of Historic Places
NTAC	–	North Tactical Range
OPCNM	–	Organ Pipe Cactus National Monument
PA	–	Programmatic Agreement
RMD	–	Range Management Department
RMO	–	Range Management Office
ROCC	–	Range Operations Control Center
SDNM	–	Sonoran Desert National Monument
SF	–	Security Forces
SHPO	–	State Historic Preservation Officer
STAC	–	South Tactical Range
TAC	–	Tactical
TCP	–	Traditional Cultural Place/Property
THPO	–	Tribal Historic Preservation Office/r
USBP	–	United States Border Patrol
U.S.	–	United States
U.S.C.	–	United States Code
USFWS	–	United States Fish and Wildlife Service
USGS	–	United States Geological Survey
USMC	–	United States Marine Corps
USN	–	United States Navy
UXO	–	Unexploded Ordnance

INTRODUCTION

The Barry M. Goldwater Range (BMGR) encompasses almost two million acres of largely undisturbed desert, including a well-preserved record of human habitation and use. More significant for interpreting this record than any of its individual parts is that this landscape still includes evidence of the broad range of activities that took place here through time. Use of these lands for military training, and thus exclusion of other uses that produce significant and extensive ground disturbance, has inadvertently preserved intact a more complete “set” of sites than is generally available. Because of the size of the area and the number and significance of the resources present, management and long-term care of those resources is both a rare opportunity and a tremendous responsibility.

The principle goal of this Integrated Cultural Resource Management Plan (ICRMP) is to support the military mission on the BMGR by sustaining the withdrawal of public lands for that purpose through proactive cultural resource management. The management of cultural resources must directly support the military mission, for example, by ensuring that specific military activities on the range are conducted in compliance with Section 106 of the National Historic Preservation Act (NHPA; 16 U.S.C. 470 *et seq.*). Other activities that provide protection for cultural resources on the BMGR indirectly support the military mission by preventing or minimizing conflicts between military operations and resource protection goals.

This plan relies on and reflects several important principles:

- Cultural resources are nonrenewable resources.
- Cultural resource stewardship is a key component of strategic planning and land-use management.
- Investigation or documentation of cultural resources is only partial mitigation for their loss and archaeological excavation in itself constitutes an adverse effect.
- Consideration of cultural resources should begin at the earliest stage of project planning and design.
- Consultation with tribes must recognize the government-to-government relationship between federal agencies and federally recognized Indian tribes and be conducted in a culturally sensitive manner, in accordance with the Department of Defense (DOD) American Indian and Alaska Native Policy.

This document is an integral part of the Integrated Natural Resources Management Plan (INRMP) required by Congress in the Military Lands Withdrawal Act of 1999 (MLWA; Public Law [P.L.] 106-65). The basic components of cultural resource management on the BMGR are presented in Part I. Specific management plans for the BMGR East and the BMGR West comprise Parts II and III of the ICRMP. These subdivisions reflect the Congressionally mandated management authority of the Secretaries of the Air Force and Navy over the eastern and western portions of the BMGR, respectively, their specific regulatory requirements, and the differences in military activities and cultural and natural resources of the BMGR East and BMGR West.

Part I includes eight sections. Section 1 is a description and history of the BMGR. Section 2 establishes a regional framework for the ICRMP and INRMP for the BMGR, and in that context, the integration of this ICRMP and the INRMP are discussed. Section 3 outlines the legal drivers for cultural resource management on DoD lands in general, and the BMGR in particular. In Section 4, the environment is described and its importance in identifying, evaluating, and managing cultural resources is presented. Section 5 is an overview of cultural resources on the BMGR. Section 6 provides a detailed discussion of the National Register of Historic Places and the process of evaluating historic significance. Native American issues, including the history of consultation, traditional cultural places, and concerns expressed by representatives of tribes that claim affinity with places on the BMGR are summarized in Section 7. Section 8 describes several challenges facing the cultural resource program and summarizes the overall goals and objectives of this plan.

Section 1

THE BARRY M. GOLDWATER RANGE

The Barry M. Goldwater Range (BMGR; Figure I-1) is the nation's second largest tactical aviation training range and is essential for developing and maintaining the combat readiness of the tactical air forces of the United States Air Force, Marine Corps, Navy, and Army. Since the beginning of World War II, the BMGR has contributed to the nation's defense by effectively accommodating the training requirements of changing air combat capabilities and missions. The two principal agencies that operate and use the range for combat aircrew training are the Air Force and the Marine Corps. The range is also used by the Navy, Air Force Reserve (AFRES), Air National Guard (ANG), Army National Guard (ARNG), and aircrews of allied nations.

Under the Military Lands Withdrawal Act of 1999 (MLWA), Congress reauthorized the withdrawal of over 1,650,000 acres of public land for military use. In addition to these withdrawn lands, inholdings of formerly private and State Trust Lands totaling almost 84,000 acres purchased between 1986 and 1998 are held in fee simple by the Air Force. MLWA assigned jurisdiction over the BMGR East and BMGR West to the Secretaries of the Air Force and Navy, respectively. BMGR East includes approximately 1,050,000 acres; BMGR West encompasses approximately 691,760 acres. The 56th Range Management Office (56 RMO) at Luke Air Force Base (AFB) administers the land and airspace of the BMGR East. The Range Management Department (RMD), Marine Corps Air Station (MCAS) Yuma, controls the BMGR West. A five-mile-wide air and ground buffer zone along the Mohawk and Sierra Pinta mountains separates the two segments (Figure I-1).

1.1 HISTORY OF THE BMGR

World War II stimulated the development of what today is the BMGR, and altered the historic patterns of land use in the region. The range was initially established in the fall of 1941 to support the Army Air Forces flying training programs at Luke Field (Luke AFB after 1950) and Williams Field (Williams AFB after 1947). The first parcel of land selected for the range had three key characteristics critical to its intended mission. First, the new range was in close flying proximity to Luke and Williams fields (straight line flying distances of about 52 and 69 miles, respectively). Second, except for some scattered ranches and mines, the land was uninhabited and undeveloped. Third, at 1,684 square miles (1,077,500 acres), the initial range tract was large enough to be subdivided into several separate training areas that could safely support several simultaneous but independent training missions, which added significantly to the productivity of the overall training program.

Although the initial range was expansive, land continued to be added to provide training capacity to produce qualified aircrews for the Nation's war effort. The complex expanded to a total of 4,339 square miles (2,776,968 acres) during the World War II era. In November 1942 and March 1943 lands were added to the western part of the range to support flight training programs

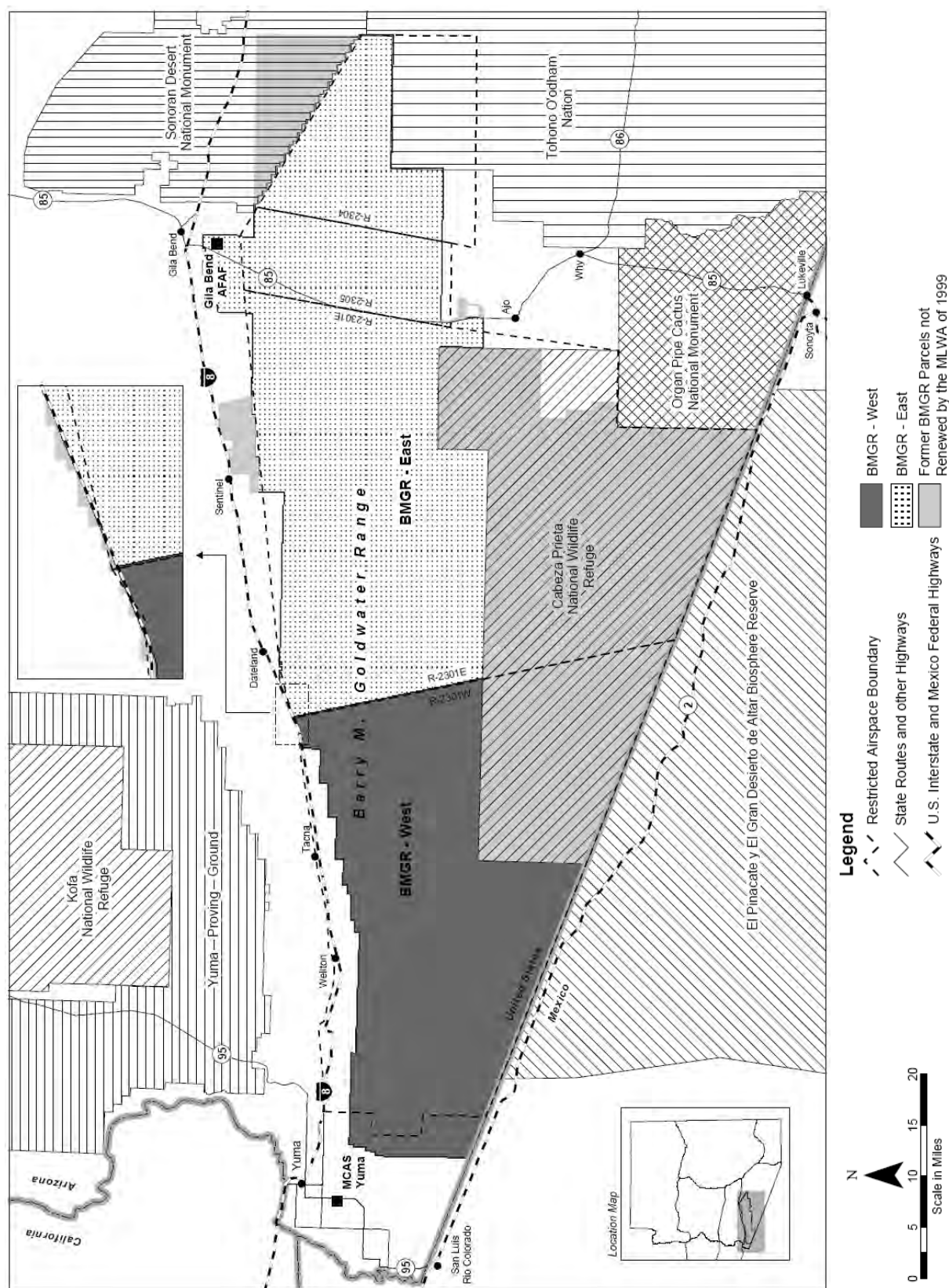


Figure I-1. The Barry M. Goldwater Range as renewed by the Military Lands Withdrawal Act of 1999.

at Yuma Army Air Base, which opened for operations on 29 June 1942 as a training command separate from those at Luke and Williams fields. By the end of 1942, the eastern and western range components were known as the "Gila Bend Gunnery Range" and "Yuma Aerial Gunnery and Bombing Range," respectively, and this east-west split of range resources continues today. The BMGR has had a number of official and unofficial names, including: *Ajo-Gila Bend Aerial Gunnery Range*; *Williams Bombing and Gunnery Range*; *Luke-Williams Bombing and Gunnery Range*; and, from 1963 to 1986, *Luke Air Force Range*. It was officially renamed the Barry M. Goldwater Air Force Range with the passage of the MLWA of 1986. Barry M. Goldwater Range East and Barry M. Goldwater Range West became the designated names of the segments managed by the Air Force and Marine Corps, respectively, in 1999.

1.2 THE MILITARY MISSION ON THE BMGR

The predominant use of the BMGR throughout its history has been to provide land and airspace for air combat training. The MLWA of 1999 continues the historic military purposes of the range, reserving the BMGR for use by the Secretaries of the Air Force and Navy for use as: (1) an armament and high-hazard testing area; (2) training for aerial gunnery, rocketry, electronic warfare, and tactical maneuvering and air support; and (3) other defense-related purposes.

For the Air Force, Marine Corps, and other users, the BMGR is an essential component of their ability to produce the combat-ready aircrews needed to defend the nation and its interests. The BMGR has been one of the nation's most productive military reservations for training tactical aircrews since World War II and has the capacity and military air-base support that provide the flexibility needed to sustain a major share of the country's aircrew training requirements now and for the foreseeable future. The value of the BMGR for supporting high-quality aircrew training stems from a combination of the following attributes:

- Restricted land and airspace allows military activities that may be hazardous to either non-participating air traffic or ground surface users to occur safely and without interruption.
- The extensive land and airspace size has allowed the range to be partitioned into up to 13 subranges to support multiple independent training activities simultaneously or used to support large-scale range-wide exercises.
- Ten nearby supporting air bases provide the technical, academic, materiel, command and control, maintenance, personnel, and community support needed to keep aircraft and aircrews flying.
- Electronic training instrumentation on the range can be used to observe, measure, record, and replay the simultaneous actions of multiple aircraft participating in training activities and can simulate aircraft weapons use as well as enemy missile threats.
- Nearby supporting military airspace provides airborne staging areas for BMGR training activities and relieves BMGR airspace of the need to support lower priority training operations.
- Year-round flying weather allows most training activities to be efficiently performed as planned without weather delays.
- Varied natural terrain adds realism to target simulations and the flight training experience.
- Gila Bend Air Force Auxiliary Field (AFAF) provides emergency divert support for aircraft on range as well as added training capability, and also serves as a hub for on-range support operations.

Although the lands and airspace of the BMGR have been used periodically for testing and other defense-related purposes, these activities have been secondary to the training of combat-ready aircrews since its inception. The primacy of the aircrew training mission at the BMGR is expected to continue into the foreseeable future.

The current primary mission of BMGR East is to support the training of Air Force, AFRES, ANG, and ARNG student aircrews transitioning to frontline combat aircraft; it also supports readiness training by aircrews from operational units. The current primary mission of BMGR West is to support readiness training by Marine Corps and Navy aircrews from operational units.

A critical seasonal user is the "Operation Snowbird" training program hosted by Davis-Monthan AFB, which involves 14 to 17 AFRES, ANG, and other units and up to 200 aircraft per year. Operation Snowbird allows units stationed in locations with seasonally severe weather to deploy for one or more weeks for fair-weather training on the BMGR; although many of these units are from areas with severe winter weather, Operation Snowbird is busy year-round. No other range has both the needed air base and range capabilities and range time capacity to accommodate the Snowbird program; without it, these units would experience decreased combat readiness.

In addition to these regular users, the range also is used to support training by "casual users" from outside the local flying area. These important casual-user training deployments originate from active duty, reserve, and guard flying units from other areas of the country and from U.S. and allied units from overseas. MCAS Yuma is the most active deployment site for Marine aviation units from both the east and west coasts, hosting between 50 and 70 unit deployments involving up to 700 aircraft per year. The air station hosts Navy fliers as well.

The BMGR East and BMGR West currently support a wide variety of tactical aviation training activities as well as selected ground training and training support operations, and both are partitioned into a number of smaller subranges or operations areas in order to safely support multiple, simultaneous training or other operations. The BMGR also supports critical pre-deployment exercises for units headed for overseas assignments.

The use and operation of BMGR East is controlled by Air Force Instruction (AFI) 13-212, *Range Planning and Operations*, 16 November 2007, and AFI 13-212, Luke AFB Supplement 1. In accordance with this AFI, the BMGR East land area is currently subdivided into nine aviation subranges and numerous supporting facilities (see Figure I-2).

The use and operation of BMGR West is controlled by MCAS Yuma Station Order 3710.6H. The BMGR West land area is currently partitioned into four aviation subranges, 35 existing and four approved but undeveloped ground support areas, and other facilities (Figure I-3).

1.2.1 BMGR East

The BMGR East is divided into a number of manned and tactical ranges capable of supporting multiple, simultaneous training events. Gila Bend Air Force Auxiliary Field (AFAF), located in the northernmost extension of the range, provides key support for range operations. These and other facilities are described below.

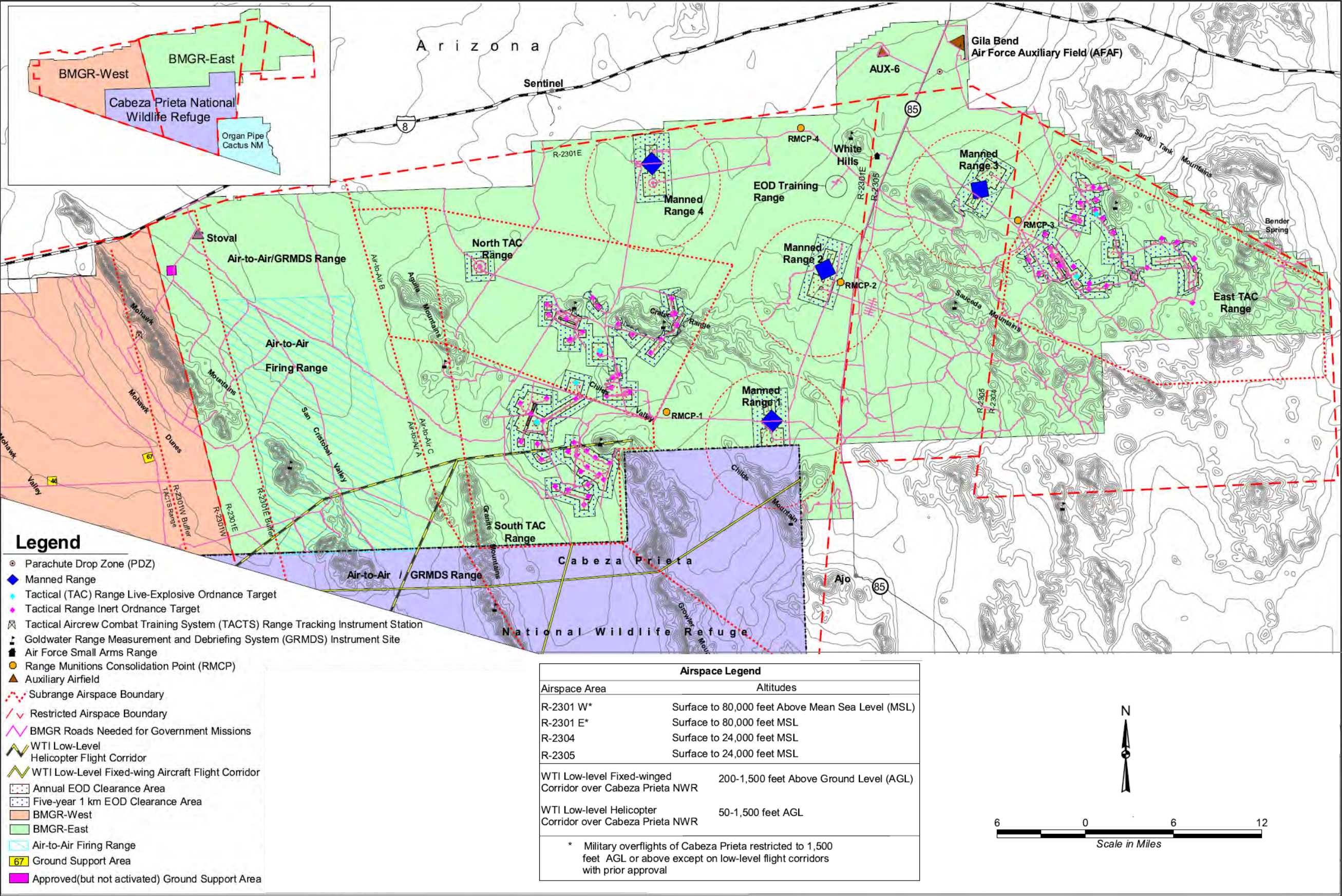


Figure I-2. Current military airspace and land use, Barry M. Goldwater Range East.

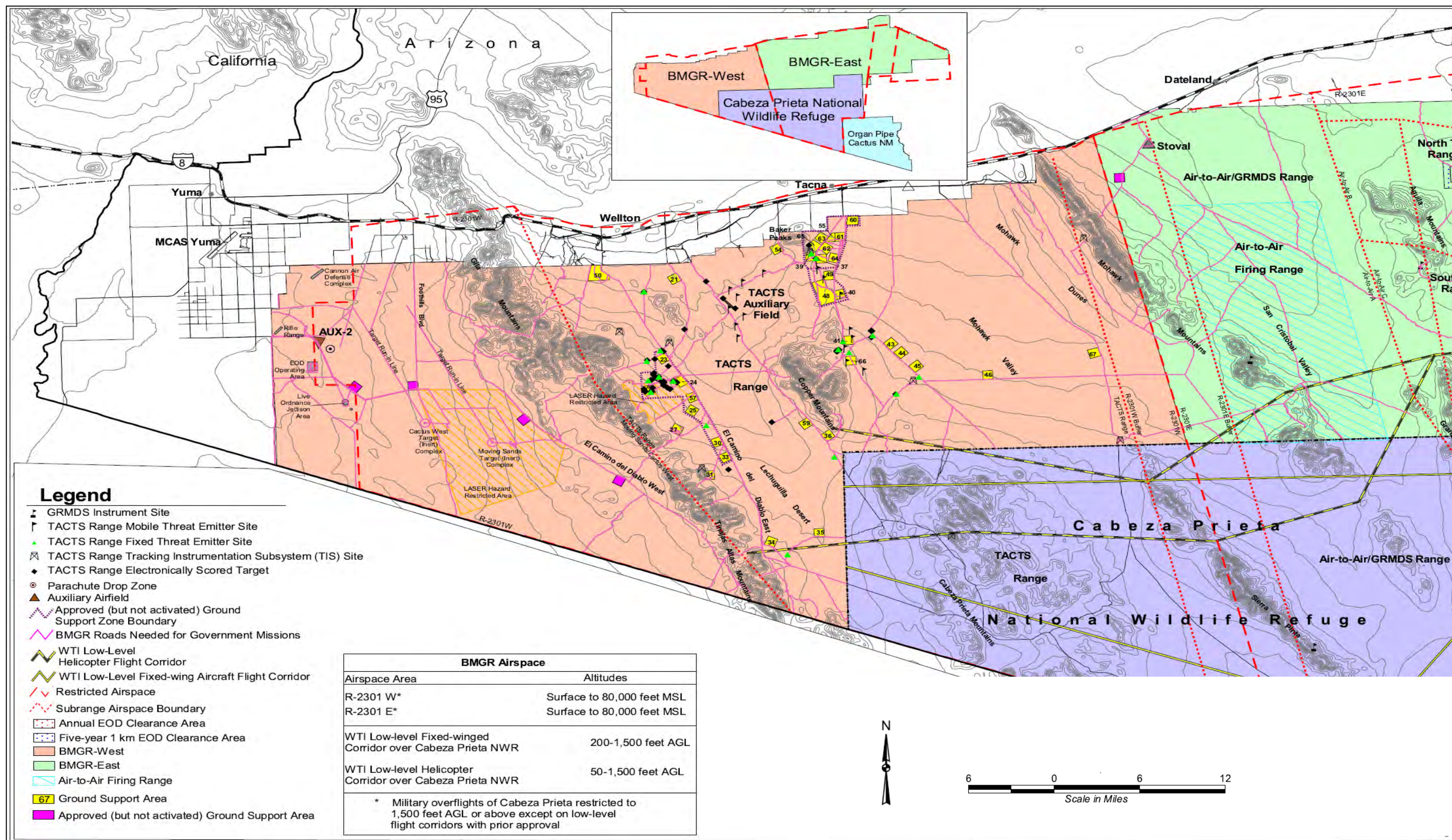


Figure 1-3. Current military airspace and land use, Barry M. Goldwater Range West.

1.2.1.1 Tactical Ranges

Three tactical ranges on BMGR East support numerous target complexes used in training aircrews to use gunnery, bombs, rockets, and missiles to attack enemy positions, equipment, and material. These targets simulate tactical features such as airfields, railroad yards, missile emplacements, truck convoys, and battlefield tank formations. Tactical ranges also include manned and unmanned threat simulators that may be included in training scenarios to better reflect real-world conditions.

The East Tactical Range (ETAC) encompasses about 113,520 acres and supports more than 30 identified target complexes. Targets and their directly associated ordnance impact and laser hazard areas affect approximately 8,700 acres. The remainder of the land area lies within, between, or near the surface danger zones in which errant ordnance or laser energy may strike without harm to people or property. All of ETAC must be regarded as potentially contaminated with unexploded ordnance (UXO). The vast majority of such contamination, however, is found in close proximity to targets.

The North and South Tactical Ranges (NTAC and STAC) serve the same aircrew training purposes as ETAC and feature similar target arrays. A total of 17,747 acres of NTAC and STAC, combined, is included in annual explosive ordnance disposal (EOD) clearances; 26,600 acres are included in five-year EOD clearances. The sizes and shapes of these ranges, the types of ordnance authorized for use, and the approved methods of delivery and target placement are collectively configured to contain all ordnance impact and blast effects. As with ETAC, all areas of NTAC and STAC must be regarded as potentially hazardous during live-fire training missions, and UXO could be encountered in surface or subsurface locations throughout these ranges.

In response to conditions faced by military pilots today, the 56 RMO has modernized targets throughout the tactical ranges. Improvements include a maneuver area for search and rescue operations with helicopter landing zones, drop zones, simulated enemy positions, and a small plywood structure; a simulated urban/industrial area where pilots use precision-guided munitions to target specific locations; and a simulated cave entrance at an existing rail yard target. Remotely operated, unmanned threat simulators have been added on all tactical ranges. The Laser Evaluation System – Mobile (LES-M) emits a radio tone when it senses being targeted by a targeting laser, providing an audible feedback to the aircrews.

Explosive Ordnance Disposal (EOD) programs control surface build-up of expended munitions within weapons ranges on BMGR East serve both safety and environmental management purposes. EOD surface clearances are performed within all Air Force weapons ranges in accordance with AFI 13-212. That AFI has been revised twice since the most recent range withdrawal; with each revision, the area affected by clearance procedures has been substantially reduced. When work on this ICRMP began, the AFI required EOD clearance out to a nautical mile around each target every five years. In 2002, the AFI was revised to require clearance to a distance of 1,000 feet annually and 1000 meters (or to the distance at which the density of munitions on the surface is reduced to fewer than five complete ordnance items per acre, whichever is closer to the target) every five years. The

2007 revision further reduced the extent of the area affected by range clearance requirements. The frequency of clearances has been reduced from 1- and 5-year intervals to 2- and 10-year intervals. EOD personnel will clear a radius of 300 to 500 feet (depending on the density of munitions identified) around all targets every 2 years and a radius of 1000 feet every 10 years (AFI 13-212, paragraphs 7.4.4.3 and 7.4.4.4). In addition, roads, the immediate vicinity of targets, and other areas will be cleared annually so that range maintenance activities may be conducted safely.

These changes have resulted in an important cultural resource protection benefit because they have substantially reduced the total area of tactical ranges and manned ranges that is subject to EOD surface-clearance activities and associated ground disturbance (see Part II, Section 2 for additional details).

General public access to the tactical ranges is not permitted because it is incompatible with the current training mission and prevailing levels of UXO surface contamination.

1.2.1.2 Manned Ranges

There are four manned ranges on BMGR East. Each has bull's-eye targets for training in simulated nuclear weapons delivery as well as conventional bombing and rocketry, an applied tactics target (a single target vehicle) for conventional bombing or rocketry training, and strafe targets for air-to-ground gunnery training. Controllers in observation towers at each manned range control the movement of aircraft and ground personnel and the delivery of munitions within the range. Only inert munitions are used on the manned ranges. Recent improvements at the manned ranges include replacing scoring systems at the strafing and bombing targets. The Improved Range Strafe Scoring System (IRSSS) is a more accurate acoustic system that can generate a pattern showing misses and hits and can be configured for scoring high-angle strafe, which is set up at the left-most target on each manned range. The Weapons Impact Scoring System (WISS) is a camera-based system for scoring bomb deliveries. It is operated by a single individual at a console rather than the two people formerly required to use the M-2 scope system. Cameras can be remotely adjusted to score different targets or to reduce the size of the bulls-eye.

Annual EOD clearances affect roughly 7,615 acres on Manned Ranges 1, 2, 3, and 4; approximately 19,070 acres are included in five-year EOD clearances. All surface entry to manned ranges by military and civilian personnel is controlled because of the safety hazards presented by the ongoing munitions delivery training missions performed in these ranges and by the relatively high concentrations of UXO present on the ground surface. General public access to manned ranges is not permitted because it is incompatible with the current training mission and prevailing levels of UXO surface contamination.

1.2.1.3 Air-to-Air Firing Range

The Air-to-Air range includes most of the R-2301E airspace west of NTAC and STAC (see Figure I-2; roughly 101,040 acres). The designated lands serve as a fallout area for munitions

expended in the overlying Air-to-Air Firing Range. Current munitions use is limited to 20 millimeter (mm) cannon rounds fired in air-to-air gunnery.

Past training activities in the Air-to-Air Firing Range included regular use of live air-to-air missiles. As a result, some types of air-to-air ordnance are likely present as UXO on the land beneath this range and adjacent R-2301E airspace. Surface entry to the Air-to-Air Firing Range fallout area by both military and civilian personnel is controlled because of the safety hazards presented by the ongoing weapons training missions performed in this range and by the expected concentrations of UXO present on the ground surface. General public access is not permitted, except under special circumstances, because it is incompatible with the current training mission and prevailing levels of UXO surface contamination.

1.2.1.4 Gila Bend Air Force Auxiliary Field

The 56 RMO operates and maintains Gila Bend Air Force Auxiliary Field (AFAF), which is located on and is a critical part of the BMGR East complex. The 8,500-foot by 150-foot paved runway at Gila Bend AFAF is used for emergency or precautionary recoveries of military aircraft that experience malfunctions, hung ordnance, or damage during operations on the BMGR. Its location on the BMGR has been invaluable in saving many aircraft over the past several years. A six-pad heliport is used routinely to support ARNG training operations, and the airfield is used daily by F-16 and A-10 aircrews from Luke and Davis-Monthan AFBs and the Arizona ANG for practicing traffic pattern and emergency simulated flameout (engine power loss) procedures which cannot be accommodated at their home installations. No aircraft are permanently based at Gila Bend AFAF.

A control tower provides air traffic control whenever Gila Bend AFAF is open. The auxiliary field also is equipped with a fire department, tie-down ramp, munitions storage area, and aircraft hangar. Aircraft with malfunctions or damage are repaired at Gila Bend AFAF by maintenance crews that travel from their home base to the auxiliary field for each event. Gila Bend AFAF also houses support facilities for control, maintenance, and security of the BMGR East, as well as air traffic control, fire department, and flightline transient alert services for the airfield.

In 2006, the 56 FW established expeditionary training programs for aircrews, maintainers, and operations planners at Gila Bend AFAF, in a setting that simulates conditions at a remote, deployed location. Other pre-deployment conducted at Gila Bend AFAF prepared ground personnel for deployment in forward areas, including development of individual and team war-fighting skills that would be needed at an expeditionary forward air base or during convoy operations. Although these 56 FW programs have been suspended, units from other installations and services continue to use Gila Bend AFAF for this purpose.

Gila Bend AFAF is operated by approximately 140 civilian contractor personnel at a cost of about \$10 million a year. Contractors also provide maintenance and operations support for the BMGR East outside of Gila Bend AFAF—maintaining targets, serving as range control officers on the manned ranges, and performing other activities. Air Force civilian personnel serve as quality assurance evaluators, overseeing this function.

The Range Operations Coordination Center (ROCC, call sign Snake-eye) was moved from Gila Bend AFAF to Luke AFB in December 2003. The ROCC is responsible for authorizing and coordinating all military and non-military aircraft entering and departing R-2301E, R-2304, and R-2305 (see Figure I-2 for restricted areas), as well as surface users entering or departing the BMGR East.

1.2.1.5 Other Military Use Areas

Other developed facilities within the BMGR East include Stoval Auxiliary Airfield, Auxiliary Airfield 6 (AUX-6), a small arms range, four range munitions consolidation points (RMCPs), and an EOD training range. Stoval is an unmanned outlying auxiliary airfield that was constructed to support training during World War II. The airfield consists of three approximately 3,700-foot runways laid out as an equilateral triangle, with a parking apron appended to the runway on the east side. Although this airfield is not maintained and its macadam surface has deteriorated, Stoval Airfield continues to support periodic training activities requiring remote, primitive airfield conditions. One such activity is the semiannual Weapons Tactics Instructors (WTI) Course conducted by the Marine Corps which includes Marine air and ground units. Stoval Airfield is incorporated in the WTI Course as a deployment site for ground units performing air defense, communications, and command and control functions and as a location for conducting helicopter and C-130 aircraft operations from a forward airfield.

AUX-6 is used on an irregular schedule throughout the year as a staging area, drop zone, or forward arming and refueling point for helicopter operations and as a field training/bivouac site for ARNG or Air Force Security Police units. In 2006, the runways at AUX-6 were cleared of vegetation and repaired and stabilized, and this facility now can be used as an assault landing strip by C-130 aircraft. Like Stoval, AUX-6 is used by WTI exercises as an assault landing field. AUX-6 is not used for munitions training by ground or air forces. The primary parachute training DZ is located just east of AUX-6, about 3.5 miles west southwest of Gila Bend AFAF.

The approximately three-acre small arms range is located west of State Route 85 and east of the White Hills. This facility is used for small arms training by range security personnel and law enforcement agents stationed in the vicinity.

Range Munition Consolidation Points (RMCPs) 1, 2, 3, and 4 serve as range EOD and maintenance support areas for BMGR East. Expended munitions, munitions scrap, and metal target debris that is safe for handling is cleared from the three tactical and four manned ranges and transported to the RMCPs for demilitarization and decontamination processing before being released for off-range recycling or disposal. Each RMCP is about 5.8 acres in size and is fenced and locked to control entry.

The EOD training range is located north of Manned Range 2 just south of the Manned Range 4 access road (Figure I-2). This facility occupies a portion of a munitions treatment range which was deactivated in 1996. The training range is used for training EOD technicians to

safely detonate UXO. Detonation of high-explosive charges of up to 2,000 pounds net explosive weight is authorized in this area.

1.2.2 BMGR West

The current primary mission of BMGR West is to support readiness training by Marine Corps and Navy aircrews from operational units. Current regular users include AV-8B, F-5, F/A 18, and VMFAT-101 aircrews from Marine Air Group (MAG) 13, Marine Aviation Weapons and Tactics Squadron (MAWTS) 1, and other Marine aviation units. MCAS Yuma is also host to training deployments from Marine Corps and Navy aviation units from throughout the fleet.

The area of BMGR West that lies east of the Gila and Tinajas Altas mountains (roughly 431,642 acres) supports a mix of Marine Corps and Navy training activities. Marine air defense, air control, communications, and command units select among 35 existing ground support areas as sites from which they may perform their missions. Marine Corps ground units also use the ground support areas for training at other times.

The area of BMGR West that lies west of the Gila and Tinajas Altas mountains (about 158,688 acres) currently supports six types of training facilities and three training support areas (Figure I-3). The training facilities include the Urban Training Area (formerly called Moving Sands), the Cactus West target complex, AUX-2, a parachute DZ, four approved ground-support areas, a rifle range, and the Cannon Air Defense Complex. Cactus West also supports an EOD operating area and a live-ordnance jettison area.

1.2.2.1 TACTS Range

The TACTS Range simulates both air-to-ground weapons delivery missions and surface-to-air missile threats. Eleven target complexes simulate airfield installations, power stations, fuel storage facilities, buildings, railway facilities, anti-aircraft missile and gun positions, and military vehicles. Aircrews training in air-to-ground weapons delivery maneuver their aircraft to attack these targets but neither carry nor release actual munitions. Instead, electronic pulses (rather than inert ordnance drops) simulate the release of munitions. There are no munitions impact areas. The main airfield complex also accommodates the use of airborne targeting lasers to designate the target intended for attack. Because the lasers used are not eye safe and could cause eye injury or blindness if an observer looks directly into the laser light, the area approved for laser use is posted as a laser hazard area.

Seventeen mobile and 18 fixed electronic threat emitter sites are located adjacent to existing roads within BMGR West, to the east of the Gila and Tinajas Altas Mountains (see Figure I-3). Controllers operate the threat emitters to challenge aircrews training within the TACTS Range with realistic air defense threats. The radar energy transmitted by the threat emitters is sufficient to be a radiation burn hazard to people close to the transmitter and in the path of the transmitted energy. Personnel on the ground at active mobile threat emitter sites keep people clear of hazardous areas associated with the emitter equipment. The fixed threat emitter transmitters are sufficiently elevated to ensure that emitted energy can strike the

ground only after it is attenuated to a safe level. Fixed emitters are posted and fenced to keep people and large mammals a safe distance from the site.

TACTS Range electronic instrument sites, target simulation, and laser hazard areas, are off limits except to specifically authorized personnel. Access to ground unit deployment areas (for other than missile firings) is restricted to protect the safety of both participating and nonparticipating personnel and to prevent disruption of the training exercise. With these exceptions, general public access to this area of BMGR West is currently permitted at most times because it is compatible with the regularly scheduled ongoing training missions.

Urban Training Area and Cactus West Target Complex

The Urban Training Area and Cactus West target complex provide a variety of scored air-to-ground targets for bombing, rocketry, and strafing. Ordnance deliveries on both complexes are restricted to the use of inert training practice munitions of up to 1,000 pounds. Both complexes include circular target areas 3000 feet in diameter that are used for training in conventional bombing and rocketry as well as separate targets for training in low-angle strafing. The Cactus West conventional target is a bull's-eye target designed to provide aircrews with training in the basic mechanics of delivering air-to-ground ordnance in a structured and tightly controlled target setting. What was then called the Moving Sands target complex was reconfigured in the late 1990s to represent a developed urban site with simulated streets and buildings set within the original impact area. This target complex also contains a remotely controlled movable target that runs in a racetrack pattern and can be operated at various speeds up to 50 miles per hour. The Urban Training Area is approved for air-to-ground laser use for designating targets. A posted laser hazard area extends around this target to warn surface users not to enter this area because of the risk of eye damage. Both target complexes are equipped with lighting for night operations.

Auxiliary Airfield 2, Cannon Air Defense Complex, and Other Military Use Areas

AUX-2 is a small, outlying airfield, a remnant of the World War II training era. Its original east-west oriented runway has been redeveloped with aluminum runway matting and a landing control tower to resemble the deck and control island of a Navy Landing Helicopter Assault (LHA) ship. This LHA deck is used to train and refresh helicopter and AV-8B aircrews in the basic flight mechanics and visual references used for landing, taking off, and taxiing their aircraft aboard an LHA ship. A northeast-southwest oriented runway serves as a 4,000-foot-long landing strip, known as a tactical landing zone (TLZ). The TLZ is used to train C-130 transport aircrews in landings and takeoffs from narrow, unimproved, and even improvised forward airfields. The third leg of the triangle serves as a range access road. Construction of a new hard-surfaced runway at AUX-2 to support AV-8B training in narrow-width roadway operations has been approved but not completed. The TLZ also serves as a DZ for tow banners used by the Marine Corps as aerial gunnery targets within the Chocolate Mountain Aerial Gunnery Range in southeastern California.

A parachute DZ used for training C-130 aircrews to perform cargo parachute drops is presently located a short distance southeast of AUX-2.

The rifle and pistol range is located just inside the BMGR entrance gate at Yuma County 19th Street. This entrance also provides access to AUX-2 and the Moving Sands and Cactus West target complexes. The rifle range has 30 firing lanes and is used by MCAS Yuma personnel to meet proficiency requirements for the use of small arms.

The Cannon Air Defense Complex, located in the northwest corner of the BMGR, provides administrative, support, and training areas for a Marine Air Control Squadron (see Figure 1.3). The complex is a permanent facility of about 0.3 square miles in size with a developed cantonment area.

The EOD operating area is just southwest of AUX-2. This area is used for EOD training and for disposing of munitions with expired shelf-lives. Both open burn and open detonation techniques are employed.

An area located about 5 miles west northwest of the Cactus West conventional target is used as a jettison area, where aircraft may safely release live but unarmed ordnance or drop tanks. Aircrews carrying live, unarmed ordnance are directed to this site when an in-flight malfunction requires the jettisoning of the munitions or other fuel tanks prior to a recovery of the aircraft at MCAS Yuma. EOD personnel recover jettisoned ordnance and fuel tanks after each release event.

Entry to the portion of BMGR West that is west of the Gila and Tinajas Altas mountains and also west of the extension of Foothills Boulevard and the western alignment of El Camino del Diablo (see Figure 1.3) is restricted at all times to authorized personnel. Public recreation is not permitted within this area.

General public access to the portion of BMGR West that is west of the Gila and Tinajas Altas mountains and east of the extension of Foothills Boulevard and the western alignment of El Camino del Diablo is generally not restricted (see Figure 1.3). Requirements for temporary restrictions on entry to this area to support special training activities are implemented on a case-by-case basis.

1.3 SUMMARY OF MILITARY LAND USE

In addition to developed targets and ground support areas, the current inventory identifies 2,085 miles of roads on the BMGR, of which 1,305 miles are used regularly to support the combined operations of the Air Force, Marine Corps, and nonmilitary agencies. Less than three percent of the 2,085 miles of roads are paved. This road network provides surface access to, between, or within the various functional areas of the range. All vehicles are restricted to designated roads except as required by EOD, maintenance, emergency response, and environmental staff and contractors conducting required mission support activities.

Approximately 273,000 acres, or about 16 percent of the BMGR, are or have been used to directly or indirectly support military operations (Table I-1). Included within these direct use acres are the following:

- locations used as munitions and target debris fall out for air-to-air gunnery
- ground-based targets or simulations (such as bull's-eye targets or simulated airfields)
- air-to-ground munitions impact areas
- EOD clearance areas
- auxiliary airfields
- maintenance and clean-up areas
- ground support training areas
- developed training facilities
- retired target or test areas

The remaining cumulative military surface use area from past and present activities is 172,000 acres or about 10 percent of the BMGR.

The level of surface disturbance within these areas ranges from low to complete. Areas of high to complete surface disturbance, however, are limited to about 0.2 percent of the BMGR surface.

Table I-1

MILITARY SURFACE USES AND ASSOCIATED DISTURBANCE

Military Surface Uses (Acres)	Associated Surface Disturbance	Total Acres
Primary air-to-air gunnery range (101,040) Inactive alternative air-to-air gunnery range (86,914)	Negligible disturbance to ground surface across affected area	101,040
Manned range annual EOD clearance area (7,615) Manned range five-year clearance areas (27,238) Tactical range five-year EOD clearance area (92,548)	Low to moderate levels of disturbance to ground surface across affected area	127,401
HE hill dispersed munitions blast area (2,976) Tactical range inert target munitions impact area (17,154) Tactical range annual EOD clearance area (25,494) AUX-6 (182) Stoval Auxiliary Airfield (182) AUX-2 (215) Closed auxiliary airfields (910) Ground troop deployment support areas (10,922) Retired target areas (823)	Low to high levels of disturbance to ground surface across affected area	38,728
Gila Bend AFAF (2,007) Manned range 50-use day EOD clearance area (308) Range maintenance, cleanup, and EOD support areas (435)	Moderate to high levels of disturbance to ground surface across affected area	2,750
Manned range cleared layout and targets (939) Tactical range cleared-target simulations (430) HE hill target core munitions blast areas (51) Moving Sands/Cactus West cleared target centers (400) Developed training sites (180) Retired test areas (841)	High to complete levels of disturbance to ground surface across affected area	2,841
Total Military Surface Use		272,760

Section 2

THE REGIONAL MANAGEMENT SETTING AND THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE BARRY M. GOLDWATER RANGE

This section summarizes the regional management setting and the history of interagency cooperation that characterizes it. The bulk of the section describes the process of developing the Integrated Natural Resources Management Plan (INRMP) required by MLWA and its relationship to this ICRMP.

2.1 REGIONAL PARTNERS

The Environmental Impact Statement (EIS) for the INRMP described in some detail the management roles of several state and federal agencies on BMGR, including BLM, USFWS, USBP, and AGFD (U.S. Air Force and others 2005). These agencies have a long and productive history of cooperating to achieve their respective missions on BMGR.

In 1982 the Air Force, Navy/Marine Corps, USFWS, BLM, and AGFD signed a Natural Resources Management Cooperative Agreement. That agreement led to the production of the Luke Air Force Range Natural Resources Management Plan in 1986, which was in turn adopted by the BLM as the basis for preparing the Goldwater Amendment to the Lower Gila South Resource Management Plan which took effect in 1990. Over the course of these planning efforts, the agencies recognized that effective resource management on the BMGR depends on addressing natural and cultural resource management issues from a broad-scope, integrated perspective that promotes resource protection and conservation opportunities created by military use requirements, and emphasizes interagency communication and cooperation.

Non-military agencies with ongoing missions on the BMGR include the Arizona Game and Fish Department (AGFD), U.S. Fish and Wildlife Service (USFWS), and the Border Patrol (a unit of U.S. Customs and Border Protection (CPB), Department of Homeland Security (DHS)).

2.1.1 Arizona Game and Fish Department

The AGFD manages the state's resident wildlife, which is held in trust for the citizens of the State of Arizona; this wildlife management responsibility also applies to the BMGR. The AGFD's mission is

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

The primary wildlife management responsibilities of AGFD on the BMGR are to

- Issue hunting permits, enforce hunting regulations, and establish game limits for hunting, trapping, and non-game species collection

- Develop and maintain habitat assessment/evaluation, protection, management, and enhancement projects
- Conduct wildlife population surveys
- Manage wildlife predators and endangered species/special status species
- Manage OHV use in terms of habitat protection and user opportunities

Under a previous withdrawal, AGFD and the Bureau of Land Management (BLM) jointly prepared the 1997 Lechuguilla-Mohawk Habitat Management Plan (HMP). AGFD joined with the BLM and Luke AFB to prepare the 1999 Draft Barry M. Goldwater East HMP. The objectives of these plans include maintenance and enhancement of habitat for Sonoran pronghorn (*Antilocapra americana sonoriensis*), desert tortoise (*Gopherus agassizii*), flat-tailed horned lizard (*Phrynosoma mcallii*), mule deer (*Odocoileus hemionus*), desert bighorn sheep (*Ovis canadensis*), upland game, nongame species, and other sensitive wildlife habitat on the BMGR. To implement these objectives, AGFD actively manages wildlife waters on the BMGR, including constructing and maintaining man-made and reconstructed natural water catchments.

2.2 U.S. Fish and Wildlife Service

The mission of the USFWS is *working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people*. Among other things, the agency advises and assists the Air Force and Marine Corps with their efforts to protect and recover all threatened and endangered species as mandated by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The USFWS leads the Sonoran Pronghorn Recovery Team and the implementation of the USFWS Sonoran Pronghorn Recovery Plan of 1998, as amended in 2002. The plan includes a list of 51 proposed management actions, some of which have potential to disturb cultural resources; examples include habitat enhancements, placement and maintenance of artificial water sources, and selective thinning of vegetation. Much of the animal's current range lies within the BMGR, including most of the area west of State Route 85 and east of the Copper Mountains.

2.3 Border Patrol and Other Department of Homeland Security Agencies

The Border Patrol is responsible for preventing illegal entry into the United States and for apprehending undocumented aliens (UDAs) who have entered the United States illegally. The southern boundary of the westernmost portion of the BMGR includes approximately 37 miles of the international border between the United States and Mexico. In recent years, Border Patrol apprehensions of UDAs in the BMGR vicinity have represented about 3 percent of all apprehensions along the Southwestern border (U.S. Air Force and others 2005). Activities involving the smuggling of drugs or other contraband also occur on the BMGR. Two Border Patrol jurisdictional sectors, the Tucson and Yuma sectors, are responsible for the entire Arizona-Mexico border, including the BMGR.

The Border Patrol conducts daily reconnaissance by air or ground surveillance. Traditional Border Patrol operations/activities on BMGR include patrolling roads and off-road areas,

dragging unimproved roads to facilitate the observation of foot traffic, conducting aerial reconnaissance, and inspecting vehicles at checkpoints. For the most part, the Border Patrol conducts ground surveillance by observing tracks on drag roads. Drag roads are prepared by dragging several bolted-together tires across a dirt road or well-used trail in order to assist agents in detecting evidence of illegal crossings by people or vehicles. The Tucson and Yuma sectors maintain helicopters and fixed-wing aircraft that can provide assistance to any station within the two sectors. Other Border Patrol activities include road blocks and road patrols.

Due to the extreme temperatures that occur in southwestern Arizona from May through October, the Border Patrol conducts rescue missions to save UDAs who are severely dehydrated or suffering from other heat-related distress. In recent years, border towns in California and Texas have been closely monitored; as a result, crossings in more remote areas, particularly through the CPNWR and Organ Pipe Cactus National Monument, and BMGR West, have increased. Because of the remoteness of these areas and the harsh environmental conditions, the Border Patrol's role in rescue missions in the area in general and on BMGR in particular has increased in response.

The Border Patrol also offers assistance on the range and surrounding lands to AGFD, BLM, and USFWS. Border Patrol helicopters are occasionally used to locate lost recreationists, record illegal off-road vehicle use, and assist in wildlife management activities. The Border Patrol also maintains distress beacons that may be activated by persons in need of rescue.

Other units and agencies within DHS play a role on the BMGR, both on the ground and in the air, and these efforts are expected to increase over the first five years covered by this plan, as the government steps up its efforts to control the borders. As specific proposals are made, their potential to affect cultural resources is assessed, and alternatives considered as needed.

In October 2006, President George W. Bush signed into law H.R. 6061, the Secure Fence Act, authorizing the construction of 700 miles (1,125 kilometers) of physical fences and barriers to prevent vehicles and pedestrians illegally crossing the US-Mexico border. Motion-detecting ground sensors, remote-controlled cameras, helicopters, radar, and unmanned aerial vehicles will further secure the border in what some call a "virtual fence." The Act also calls for an additional 14,000 Border Patrol agents to be added to the current force of 11,300 and increases the number of off-highway vehicles (such as ATVs, motorcycles, and SUVs) for agents in the field. By order of the President, National Guard units also have been sent to the border to assist the Border Patrol. This and other related legislation are part of the Secure Borders Initiative launched in 2005 to develop and implement a strategy to secure America's borders and to stem illegal entry into the country.

Border Patrol operations and ongoing tactical infrastructure (TI) projects within the BMGR and adjacent lands include approximately 34 miles of post-on-rail permanent vehicle barriers (PVB) and an associated patrol and drag road on the CPNWR. As of March 2007, 2 miles from the eastern boundary of the OPCNM had been completed. More than 75 miles of PVB are being constructed on the Tohono O'odham Nation (TON). These PVBs include both bollard-style and post-on-rail construction. The USBP maintains a temporary checkpoint on State Route 85 at

milepost 17.8. Negotiations are in progress between the USBP and the Air Force regarding a proposal to make this temporary checkpoint permanent.

SBI-net, the newly established technology arm of CBP, is currently testing a technology-based solution in the Sasabe area (named Project 28 or P28) of the Tucson Sector. Once completed, it is expected to be implemented on the Tohono O'odham Nation, OPCNM, and CPNWR. The solution includes a combination of technology, personnel and infrastructure. PVBs and access roads support field personnel and rapid response vehicles. Strategically placed towers are outfitted with ground-based radar, cameras and radio repeater equipment. Vehicle and communication centers operate on satellite technology. No timelines or equipment locations have been identified outside of P28 at this time.

Initial construction of a bollard-style vehicle barrier on the BMGR West began in January 2007, working from west to east along the 37-mile-long border between Mexico and the BMGR West. A shorter segment of a fence to prevent pedestrian crossings has also been constructed. An all-terrain road has been laid along the border fences, and numerous access roads, patrol roads, and drag roads now cross BMGR West.

Environmental analyses for the actions on the BMGR West proposed by the Border Patrol and the DHS began in 2005 but were halted in early 2007 when Department of Homeland Security Secretary Michael Chertoff exercised the authority granted him under the Real ID Act (2005) to waive environmental and historical preservation laws.

2.1.4 Bureau of Land Management

Under MLWA, BLM no longer exercises overall management authority for the BMGR; however, that agency retains a role in BMGR management. The BMGR is withdrawn and reserved for the following military uses: (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; and (D) other defense-related purposes consistent with the purposes specified in this paragraph. MLWA section (a)(5) directs the Secretaries of the Air Force and Navy to consult with the Secretary of the Interior before using the lands withdrawn and reserved by this section for any other purposes. This function has been delegated to the BLM at the local level: Phoenix (BMGR East) and Colorado River (BMGR West) Districts.

2.2 THE BARRY M. GOLDWATER RANGE EXECUTIVE COUNCIL

Since 1997 representatives of these agencies have met frequently to discuss BMGR regional issues. This group, called the Barry M. Goldwater Range Executive Council (BEC), is not a decision-making body, but the sharing of information that takes place at these meetings facilitates regional solutions to common problems that are difficult or impossible to address one agency or jurisdiction at a time. This is particularly useful because the missions and responsibilities of the nonmilitary agencies cross-cut land management boundaries.

2.3 THE INTERGOVERNMENTAL EXECUTIVE COMMITTEE

In recognition of the level of public interest in the management of the natural and cultural resources of the BMGR, the MLWA of 1999 called for the creation of an Intergovernmental Executive Committee (IEC) comprised of “selected representatives from interested federal agencies, as well as at least one elected officer (or other authorized representative) from State government and at least one elected officer (or other authorized representative) from each local and tribal government, as may be designated at the discretion of the Secretary of the Navy, the Secretary of the Air Force, and the Secretary of the Interior” (P.L. 106-65 §3031(b)(6)). Its sole purpose is to exchange views, information, and advice pertaining to the management of natural and cultural resources on BMGR. The IEC meets three times a year, rotating the location between Tucson, the Phoenix metropolitan area, and Yuma, and its meetings are open to the interested public.

Cities, towns, and counties in the region, and tribes that attach cultural importance to the BMGR were invited to become members of the IEC. To date, 14 state and federal agency offices, 5 local governments, and 5 federally recognized tribes have accepted membership.

2.4 THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

The MLWA of 1999 specified that the INRMP for the BMGR should include provisions for the proper management and protection of cultural as well as natural resources and for sustainable use of those resources by the public to the extent consistent with the military purposes of the range [see P.L. 106-65 §3031(b)(3)(E)(i)]. The MLWA directed that the INRMP be prepared and implemented in accordance with the Sikes Act (16 U.S.C. 670 *et seq.*). The scope of the Sikes Act, however, is limited to the conservation and management of natural resources on DoD lands and does not include guidance for the management and protection of cultural resources. To satisfy these requirements, this ICRMP is incorporated by reference in the INRMP.

MLWA and the Sikes Act establish parameters that limit the types of nonmilitary land uses that may be accommodated on the BMGR. Most of these parameters exclude rather than permit potential nonmilitary land uses. Appropriative land uses are excluded from the range by two provisions of the MLWA of 1999. First, this act specifically withdraws these lands from all forms of entry under the general land laws and mining and mineral leasing laws for at least the duration of the 25-year withdrawal. Second, grazing and agricultural outleasing also are effectively excluded from the range by another provision of the MLWA of 1999 which states that the INRMP for the range shall support only the continuation of these activities where they currently exist. Neither livestock grazing nor agricultural leasing has been sanctioned on the BMGR since 1941, when these activities were determined to be incompatible with the military purposes of the range. Thus, the INRMP does not support mining or grazing on BMGR.

Under MLWA, public use of the range must be consistent with the military mission and the protection, conservation, and rehabilitation of natural and cultural resources. Safety hazards or security concerns are present on a near continuous basis on about 62 per cent of the BMGR, and public access to these areas is prohibited. Safety hazards or security concerns are present within the other 38 percent of the BMGR only at selected times or in selected confined locations, and

public visitation can be accommodated on a regular basis as long as certain necessary restrictions are observed.

The DOD approach to integrated resource management planning, which is central to the INRMP, is founded on several broad concepts including sustainability, biodiversity, and ecosystem management. MLWA calls for sustainable use by the public of the natural and cultural resources on these withdrawn lands. Unfortunately, the concept of sustainable use of cultural resources on BMGR is impractical at best. This fundamental disconnect between natural and cultural resource management practices must be acknowledged and addressed in both this ICRMP and the INRMP.

The concept of sustainable consumptive use of natural resources is based on the premise that these resources are generally renewable and can be managed to provide an annual or periodic yield of goods, services, and direct and indirect benefits over the long term. In contrast, cultural resources are not renewable, are in finite supply, often are easily damaged or destroyed by even casual or limited use, and in most if not all instances, cannot be recovered or restored once damaged. Because of these characteristics, the broad body of federal laws, regulations, and other forms of guidance addressing management of cultural resources on military installations and other federal lands has stressed the need to protect, curate, and interpret rather than use these resources (see Section 3 for summary of legal requirements). The concept of sustainable consumptive use is incompatible with cultural resource management requirements.

Nonconsumptive use of cultural resources also is problematic because of the vulnerability of these resources to physical damage, loss of historic information potential, or damage to or desecration of their cultural or religious values. Use of culture resources on most federal lands, which is generally limited to nonconsumptive viewing and interpretation of these resources in place, is supported because of the benefits of increased public awareness of their importance and fragility. Park-like development and interpretation of most cultural resources on BMGR is probably not appropriate, because such developments are expensive to establish and maintain, and may be more likely to diminish rather than promote the preservation of sites in remote, largely unregulated settings.

Most of the cultural resources on BMGR are surficial archaeological sites that are sensitive or vulnerable to such a degree that they cannot be sustained without special protections from typical public use. Under this ICRMP and the INRMP, then, access to these locations may be prohibited or restricted in order to protect them.

These constraints place DoD natural and cultural resource management requirements and public access strategies in direct conflict; this conflict was a source of considerable debate in meetings of the interagency INRMP Core Planning Team. The Air Force and Marine Corps strategies for resolving this conflict are outlined in the INRMP and in a programmatic agreement that demonstrates the agencies' compliance with Section 106 of the National Historic Preservation Act (NHPA) for the actions described in the INRMP that may be implemented without further analysis under the provisions of National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*). Those strategies are further defined in ICRMP Parts II and III, respectively.

The Environmental Impact Statement (EIS) for the INRMP analyzed the impacts of five alternative strategies, including the proposed action and a no-action alternative, for managing natural and cultural resources and public access within the BMGR. The five strategies were developed in accordance with NEPA and guided by BMGR resource management goals developed during the EIS process. These goals reflect applicable statutory and regulatory guidance; the needs of the military mission of the range; public and tribal viewpoints gathered through scoping, workshops, and other efforts; input regarding the management missions and needs of the USFWS, AGFD, and USBP; and the specific qualities of BMGR natural and cultural resources.

The EIS identified five overarching policy goals that support and are consistent with the military mission, protection and conservation of natural and cultural resources, and public access to the BMGR. In no implied order of importance, they are:

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

Alternatives that were consistent with these overall requirements were developed during the public scoping and workshop phases of the EIS planning process for the proposed INRMP. These four strategies, identified as A through D, were designed to represent the full spectrum of management requirements and issues identified during these early planning phases. The strategies outline resource management guidance for each of 17 separate areas of natural resource management. Management of cultural resources is not an element of this matrix, as their management will be governed by this ICRMP.

Management Strategy A represented the no-action alternative, which would have continued the ongoing management practices of the Goldwater Amendment and established HMPs rather than to develop new management practices in the INRMP. Strategies B, C, and D were developed to reflect the spectrum of public opinion received during scoping regarding motorized access, resource protection and conservation, and acceptable approaches to wildlife and ecosystem management.

Strategy B included the greatest degree of motorized access to the BMGR, including expanding the road network available for public use, to the extent compatible with the military mission and the maintenance of a functioning natural ecosystem. This alternative provided for the application of resource protection and conservation measures, but its focus was on resource-specific

monitoring, targeted wildlife management actions (such as continued development and maintenance of wildlife waters), and basic compliance with regulatory requirements.

Strategy C placed more limitations on public access and use, principally as a result of either road closures or restrictions on public access to selected roads, and included a greater focus on proactive conservation elements. Strategy D represented the opposite end of the spectrum from Strategy B; it imposed the most limits on motorized access and public use activities and conservation of unroaded blocks of land of 3,000 acres or more, and emphasizes adaptive management methods incorporating feedback from ecosystem monitoring.

The analysis of the impact of implementing any of these management strategies, as presented in the EIS, summarized effects on cultural resources likely to result from road use and road closures, permitting public access, and wildlife management activities. Some of the existing roads pass through archaeological sites, and their continued use may damage those sites. More extensive impacts are likely to result from vehicle-based camping along roads. The causes of inadvertent damage and intentional vandalism of archaeological sites are complex, but ease of vehicular access was identified as a major factor (U.S. Air Force and others 2005: 5-265). Secondary effects are difficult to quantify, but a reduction in the road network is likely to have beneficial effects by decreasing the rate of damage to archaeological sites that occurs as an indirect impact of motorized vehicle access.

The effect of established camping and visitor stay limits was difficult to assess because the extent of such camping activities on the BMGR is not well documented. Many cultural resources are fragile surface manifestations that could be seriously damaged or destroyed by driving over them even once or twice. Occasional limited camping typically does not result in the level of ground disturbance that could adversely affect archaeological and historical sites, but extended stays, camping by large parties, or repeated use of popular camp sites results in relatively greater disturbance. All of the alternatives supported non-vehicle based camping in all areas open to the public and vehicle-based camping within 50 feet of most existing roads.

All alternatives included many measures to improve general vegetation, wildlife, and wildlife habitat. Most are likely to have little or no impact on cultural resources, but some activities, such as habitat restoration or invasive species eradication, might involve ground disturbance and therefore could potentially affect archaeological and historical sites. In addition, as many as six wildlife water development projects might be undertaken, and 43 existing wildlife water developments would be maintained and repaired as needed. Many of the existing water developments are at or near natural water sources. Because water sources are rare on the BMGR, the density of archaeological sites is likely to be relatively high at such locations. In addition, tribal representatives have identified such water sources as places of traditional cultural importance. New construction or maintenance activities at such sites may adversely affect cultural resources.

The Record of Decision described the management framework to be implemented in the INRMP, which is a composite of elements from Strategies A, B, C, and D. A separate INRMP that reflects that decision and supporting information developed in the EIS is in effect (U.S. Air Force and others 2007).

The following were identified during the INRMP EIS process as required actions regardless of the management strategies selected and implemented through the INRMP:

- Comply with federal statutory requirements (such as the ESA, Clean Air Act, NHPA, Archeological Resources Protection Act (ARPA), etc.), DoD policy and guidance, NEPA, MLWA of 1999, and the Sikes Act, as well as state and local statutory requirements (such as the Arizona Native Plant Law, air and water quality standards, hunting regulations, and requiring all campsites to be more than one-quarter-mile from any water source).
- Enforce federal, state, and local environmental protection laws and the resource protection provisions of the INRMP.
- Adhere to the policy and range-wide resource management goals established for the INRMP.
- Be consistent with the provisions of memoranda of understanding (MOUs), letters of agreement, conservation agreements, biological opinions, or other types of agreements or decisions developed for management or regulatory compliance purposes.
- Incorporate the principles of ecosystem management.
- Require that public access and use of BMGR be compatible with mission activities and other considerations such as security, safety, and resource conservation and protection goals.
- Incorporate cultural resource protection strategies that reflect the DoD's mandate to preserve cultural resources and to include consideration of those resources in its decision-making process.
- Comply with direction provided in 36 CFR Part 800, *Protection of Historic Properties*, and DoD policy, which requires agencies to initiate consultation with the State Historic Preservation Officer (SHPO), tribes, and others pursuant to Section 106 of the NHPA early in the planning process, when the widest range of prudent and feasible alternatives is available and issues identified through consultation may be resolved most easily.
- Be consistent with the ICRMP for the BMGR.
- Prohibit commercial tour operations on the BMGR unless a range policy is developed to permit and regulate or restrict this use.
- In accordance with Section 3031(b)(3)(E)(vi)(I) of the MLWA of 1999, develop a memorandum of agreement (MOA) with agencies and tribal governments responsible for lands adjacent to the BMGR to establish courses of action to be taken by the Secretaries of the Navy and Air Force to prevent, suppress, and manage brush and range fires occurring outside the boundaries of the range resulting from military activities.

2.4.1 INRMP Management Units

The EIS and INRMP identify seven management units within the BMGR; three within BMGR West and four within BMGR East. Numbered one through seven from west to east, these units are shown on Figure I-4.

- Management Unit 1 - approximately 230,000 acres
- Management Unit 2 - approximately 265,000 acres
- Management Unit 3 - approximately 195,000 acres
- Management Unit 4 - approximately 280,000 acres
- Management Unit 5 - approximately 440,000 acres
- Management Unit 6 - approximately 138,000 acres
- Management Unit 7 - approximately 188,000 acres

Because of differences in their historic and proposed uses, as well as differences in the natural resources they contain, the ROD includes different management strategies for some units.

Most of Management Unit 1 lies within the restricted area in the westernmost portion of BMGR West and is off limits to most public visitation. Although a number of military operations occur within this unit, the surface effects of these activities are limited to a small aggregate proportion of the entire area. Existing roads provide limited access to most of the unit.

Management Unit 2 incorporates a topographically diverse landscape including the Gila Mountains, Copper Mountains, Wellton Hills, and Baker Peaks, as well as the Lechuguilla Desert Valley. TACTS Range facilities and Marine Corps ground support areas are located within this unit. With the exception of the laser hazard area, public access is compatible with current military operations throughout most of this unit. This unit, which includes areas with some of the highest road densities within the BMGR, has long been a popular public outdoor recreation area.

Management Unit 3 occupies the easternmost area of BMGR West and is generally bounded on the east by the Mohawk Mountains, although the northeastern corner of the area lies on the eastern side of these mountains. This unit contains some of the largest unroaded areas on the BMGR. Military surface use within Unit 3 is limited to five widely dispersed ground support areas and scattered TACTS Range instrument sites. The area is generally open to public visitation, but the rates of visitation are less than those experienced in Management Unit 2. With the exception of the upland slopes of the Mohawk Mountains, the entire unit is within the current distribution of the endangered Sonoran pronghorn, which extends eastward into the BMGR East and southward into the CPNWR. As a result, Unit 3 is closed to public entry from March 15 to July 15 each year as a part of the overall effort to recover the subspecies.

Management Unit 4 includes some of the most remote locations within the BMGR. It is the westernmost area managed by the Air Force and generally underlies the Air-to-Air Firing Range. General public access to this area is restricted. Like Management Unit 3, Unit 4 straddles the Mohawk Mountains. The southwest corner of this unit lies west of the mountains and is often mistakenly regarded as part of BMGR West. Except for its mountain upland locations, Unit 4 is within the current distribution of the Sonoran pronghorn. Unit 4 includes Stoval Field, which is used as an assault landing field, and also serves as the munitions fallout impact area for the Air-to-Air Firing Range. Surface disturbance associated with the latter is minimal.

Management Unit 5 includes NTAC, STAC, and Manned Ranges 1, 2, and 4. Although the target impact and EOD clearance areas associated with these ranges represent the most extensive military use areas of the BMGR, most of the surface of this unit is relatively undisturbed. This management unit is bounded on the west by the Aguila and Granite mountains and on the east by State Route 85. Public access to Unit 5 is restricted because of hazards associated with past and present uses of the weapons ranges and other training sites.

Management Unit 6 includes two separate subunits. The larger subunit lying east of State Route 85 between the Saucedo and Batamote Mountains is also known as Area B. Military surface use in this area is currently limited to the target lead-in-lines to Manned Ranges 1 and 2 and an

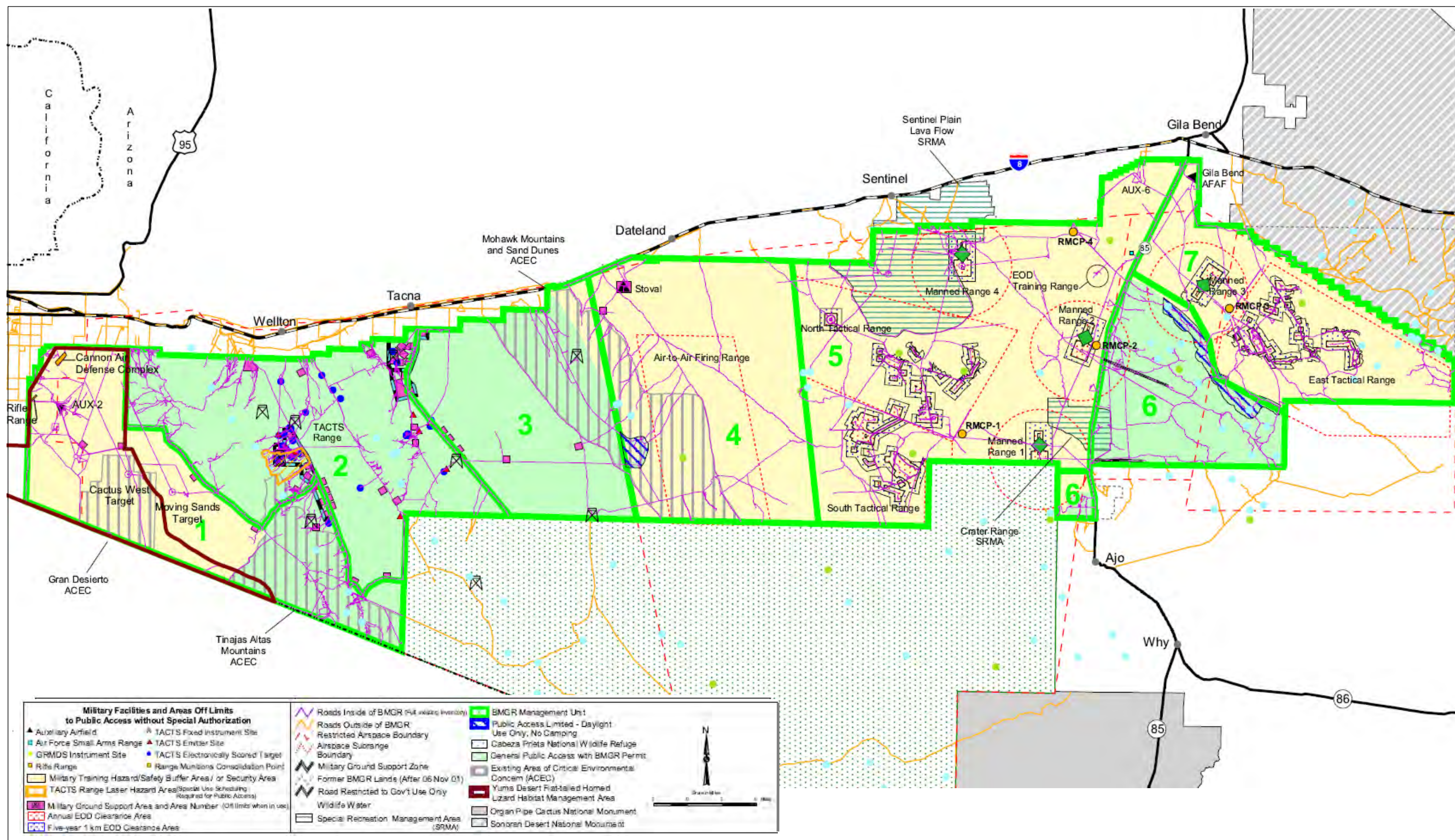


Figure I-4. BMGR management units and existing public access restrictions

instrument site on Hat Mountain. Public travel on the two target lead-in-lines is not permitted, but general public access is allowed in the rest of the subunit, and it is a popular back-country recreation site. No camping or nighttime travel is permitted along the road that roughly parallels and crosses the boundary between Units 6 and 7 because of hazards associated with air-to-ground munitions delivery training in Unit 7 (ETAC). The smaller of the two subunits lies between State Route 85 and Childs Mountain. The southeastern quarter of this subunit, which is known as the Ajo Air Force Station area, is open to public access. The northern half of the subunit provides a safety buffer for munitions delivery training missions at Manned Range 1 and is not open to the public.

Management Unit 7 comprises the easternmost areas of BMGR East including the Gila Bend AFAF; that facility, which is located in the northern portion of this unit, is the only industrial/urban area identified within the BMGR. Military surface use is generally confined to the northwestern valley areas of the unit and includes Manned Range 3 and ETAC (see Figure I-4). General public access is not compatible with military activities within nearly all of this unit because of ongoing munitions delivery training missions, high UXO concentrations, targeting laser use, and airfield security requirements. Public entry to Management Unit 7 is limited to the use of existing roads which parallel the unit boundary and cross in and out of the restricted area for short distances.

With the exception of a small campground on Gila Bend AFAF which is available for active duty and retired military personnel, there are no developed recreation sites or facilities on the BMGR. All recreational access to the BMGR is by permit only. Additional AGFD permits must be obtained for hunting. Areas on the BMGR currently open to regular AGFD hunting seasons include Management Units 2, 3, and 6 and the portion of Management Unit 1 that is open to public access. A portion of Unit 4 along the Mohawk Mountains is open to big horn sheep hunters under an Air Force Special Use Permit. All permit applicants must sign a hold-harmless agreement; applicants also must watch a range safety video in order to access Unit 6 and the small portion of Unit 1 that is open to the public. All permit holders are expected to comply with general rules of conduct for public lands. These rules address sanitation; terms of occupancy; vehicle use; natural and cultural resources; and health, safety, and comfort.

2.4.2 Cultural Resources and the INRMP

The INRMP incorporates the provisions of this ICRMP by reference, and public access to and use of portions of BMGR may be restricted or curtailed if and when such measures are required in order to protect vulnerable resources. The INRMP also specifically incorporates the cultural resource monitoring requirements identified in Parts II and III.

Because most cultural resource inventories completed by the Air Force and Marine Corps to date have focused on the military use areas, the vast area that has been and remains open to public use is largely unsurveyed. As a result, our knowledge of the resources that may have been and may continue to be affected by public use is extremely limited. Some cultural resources have been identified in these areas over the years, either by small, systematic surveys (for example, around developed wildlife waters) or through reports of discoveries by casual range users.

Cultural resources recorded to date on BMGR include artifact scatters, hearths, roasting pits, possible agricultural fields, petroglyphs, pictographs, bedrock milling sites, cairns, quarries, geoglyphs, trails, trail shrines, sites associated with historic Euro-American use such as mines and related features, wells, ranches, roads, and military training-related features such as World War II auxiliary airfields.

Native American tribes in the region have indicated that these places represent their history and heritage, and are thus important parts of their cultures. Consultation with tribes that attach cultural importance to places on BMGR has identified several general concerns or recommendations regarding natural and cultural resource management and the INRMP. Those comments were summarized as follows:

- Continue efforts to preserve and protect cultural resources and, in particular, continue to involve tribes in cultural resource issues
- Prohibit off-road vehicular travel because such activity damages resources
- Ensure DoD maintains adequate cultural and biological staffing to address the complexity of the BMGR and the associated management issues
- Control recreational access to protect natural and cultural resources
- Coordinate with and involve tribes in range management activities
- Restrict development of tinajas and other natural water sources on the range as wildlife waters.

2.4.2.1 Section 106 Review of INRMP Implementation

The Air Force and Marine Corps completed the review required by Section 106 of the NHPA and 36 CFR Part 800, *Protection of Historic Properties*, to support implementing the INRMP (see Part I, Section 3, for more information on the NHPA) by executing a programmatic agreement (PA) consistent with 36 CFR 800.14(b)(1)(ii), which provides for the use of a PA when effects on historic properties cannot be determined prior to approval.

The undertaking includes those actions described in the proposed action that would be implemented without further analysis when the INRMP was signed. Specifically, it includes 6 of the 17 conservation elements shown in Table 3-3 of the EIS (elements 3-7 and 9): motorized access and unroaded area management; camping and visitor stay limits; recreation services and use supervision; rockhounding; woodcutting, gathering, and firewood use, and collection of native plants; and recreational shooting.

Consulting parties included the SHPO and tribes that claim cultural affiliation with places on BMGR. The BLM and USFWS, on behalf of the Secretary of the Interior; and the AGFD, on behalf of the State of Arizona, also were afforded an opportunity to participate in consultation. Through the IEC, the agencies also invited the public—interested individuals, organizations, and entities—to participate in PA development (36 CFR 800.14(b)(2)(ii)). The Advisory Council on Historic Preservation (ACHP) declined to participate in consultation.

The area of potential effect (APE) is the area within which any historic properties that may exist may be affected by the undertaking. Impacts associated with the six elements listed above result from public use of BMGR, so the APE is limited to areas where public access will be permitted.

On BMGR East, the APE includes almost all of Management Unit 6 (Area B plus what is known as the Ajo Air Station area) and a very small portion of Management Unit 7, which are open to public access. On BMGR West, the APE is Management Units 2 and 3 (some areas off-limits when used for training), plus the southeastern-most extension of Unit 1, which encompasses the existing Tinajas Altas Mountains Area of Critical Environmental Concern.

Historically, the Air Force and Marine Corps have concentrated their inventory efforts on areas that may be affected by the military mission; as a result, most of the area where public access is permitted has not been systematically surveyed. On BMGR East, only 2,346 of the roughly 138,000 acres within Unit 6 have been systematically surveyed. On BMGR West, more than 5000 acres within Unit 1 were surveyed as a part of the Tinajas Altas project sponsored by the Air Force during the previous range withdrawal. With this exception, most surveys have been limited to military use areas. In all, roughly 39,000 acres on BMGR West have been systematically surveyed.

The executed PA, which has been filed with the ACHP, demonstrates compliance with Section 106 by listing historic properties known to exist in the APE and describing a phased strategy for identifying and evaluating other potentially eligible properties within the APE, and taking into account potential impacts to those properties.

All of the permitted actions listed above may affect historic properties. The INRMP will continue to support vehicle-based camping within 50 feet of the approved road system, and this activity is likely to adversely affect any historic properties that exist within this zone. Firewood collecting, rock hounding, and recreational shooting also may affect historic properties. Other permitted recreational activities (for example, hiking) are unlikely to have an appreciable effect on cultural resources. Activities that are not permitted (that is, not allowed under the INRMP and the rules governing recreational use by permit) but are facilitated by permitted access—such as vandalism or artifact collecting—may have a considerable adverse effect. Permit enforcement, environmental awareness education, and other efforts will be used to avoid or minimize these potential effects.

The Air Force and Marine Corps, with the consulting parties, will make determinations of eligibility for previously recorded sites, and also will prioritize areas for survey. Priority survey areas will include known camping and recreational use sites, areas adjacent to most heavily traveled roads, and natural water sources such as washes, springs, and tinajas. Other priority areas may be identified based on recreation monitoring or other management activities, including observations made by range security patrols and volunteer Site Stewards.

Measures to avoid, minimize, or mitigate adverse effects will be tailored to the nature of the resource and the likely impacts. Adverse effects to some resources may be avoided or minimized through management actions such as road closures, signing, monitoring by Site Stewards or increased range security patrols.

The Air Force and Marine Corps will prepare an annual report outlining actions taken to implement the PA and will distribute it to the consulting parties.

Section 3

THE LEGAL SETTING

The MLWA of 1999 specified that the INRMP for the BMGR would include provisions for the proper management and protection of cultural as well as natural resources and for sustainable use by the public of those resources to the extent consistent with the military purposes of the range [P.L. 106-65 §3031(b)(3)(E)(i)]. To satisfy these requirements, the ICRMP for BMGR is incorporated in the INRMP by reference.

Authority and guidance for cultural resources management on DoD lands is derived from a number of other federal laws, regulations, executive orders and memoranda, and military requirements (Table I-2).

3.1 FEDERAL LAWS, REGULATIONS, AND GUIDELINES

Although private efforts to study and preserve the cultural resources of the United States date to the late 1700s, laws to promote cultural resource preservation date only from the early 1900s (King and others 1977). The following sections summarize the laws relating to the management of cultural resources on the BMGR.

3.1.1 Military Lands Withdrawal Act of 1999 (P. L. 106-65)

The MLWA of 1999 renewed the withdrawal of the BMGR for military use for a period of 25 years, and assigned full land management responsibility to the Secretaries of the Air Force and Navy for their respective portions of the range. It also directs the Secretaries to develop an INRMP that will “include provisions for proper management and protection of the natural and cultural resources of such lands, and for sustainable use by the public of such resources to the extent consistent with the military purposes for which such lands are withdrawn and reserved by this section.” (P.L. 106-65 Sec. 3031(b)(3)(E)(i).

The MLWA also includes provisions that emphasize the importance of natural and cultural resource management in sustaining the withdrawal. The Secretary of the Interior, upon determining that the withdrawn lands are not being managed in accordance with the INRMP and that “the failure to do so is resulting in significant and verifiable degradation of the natural or cultural resources of such lands, is required to notify the Secretaries of the Air Force and Navy. Ultimately, if identified problems are not resolved, responsibility for the management of natural and cultural resources on the BMGR may be transferred to the Secretary of the Interior.

MLWA (Section 3031(b)(9)(B)) also defines sacred sites:

The term “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. Neither the Secretary of the Department of Defense, the Secretary of the Navy, the Secretary of the Air Force, nor the Secretary of the Interior shall be required under section 552 of title 5, United States Code, to make available to the public any information concerning the location, character, or use of any traditional Indian religious or sacred site located on lands withdrawn and reserved by this subsection.

Table I-2	
SUMMARY OF LEGAL REQUIREMENTS	
<i>Federal Laws</i>	
Military Lands Withdrawal Act of 1999, P.L. 106-65	
Antiquities Act of 1906, P.L. 59-209, 16 U.S.C. 431-433	
Historic Sites Act of 1935, as amended, P.L. 74-292, 16 U.S.C. 461-467	
National Historic Preservation Act of 1966, as amended, P.L. 89-665, 16 U.S.C. 470 et seq.	
National Environmental Policy Act of 1969, P.L. 91-190, 42 U.S.C. 4321 et seq.	
Archeological and Historic Preservation Act of 1974, P.L. 93-291, 16 U.S.C. 469-469c-1	
American Indian Religious Freedom Act of 1978, P.L. 95-341, 42 U.S.C. 1996	
Archaeological Resources Protection Act of 1979, as amended, P.L. 96-95, 16 U.S.C. 470aa et seq.	
Native American Graves Protection and Repatriation Act of 1990, P.L. 101-601, 25 U.S.C. 3001-3013	
<i>Federal Regulations</i>	
32 CFR Part 229, Protection of Archaeological Resources: Uniform Regulations	
36 CFR Part 60, National Register of Historic Places	
36 CFR Part 63, Determinations of Eligibility for Inclusion in the National Register of Historic Places	
36 CFR Part 65, National Historic Landmarks Program	
36 CFR Part 68, The Secretary of the Interior's Standards for the Treatment of Historic Properties	
36 CFR Part 78, Waiver of Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act	
36 CFR Part 79, Curation of Federally-Owned and Administered Archeological Collections	
36 CFR Part 800, Protection of Historic Properties	
43 CFR Part 3, Preservation of American Antiquities	
43 CFR Part 10, Native American Graves Protection and Repatriation Act Regulations	
<i>Executive Memorandum and Orders</i>	
Executive Memorandum, 29 April 1994, Government-to-Government Relations with Native American Tribal Governments	
Executive Order 13007, 24 May 1996, Indian Sacred Sites	
Executive Order 13175, 6 November 2000, Consultation and Coordination with Indian Tribal Governments	
<i>Military Requirements</i>	
DoD Directive 4710.1, Archeological and Historic Resources Management, 21 June 1984	
DoD Instruction 4710.02, DoD Interactions with Federally Recognized Tribes, 14 September 2006	
DoD Instruction 4715.3, Environmental Conservation Program, 3 May 1996	
DoD Instruction 4715.16, Cultural Resources Management, 18 September 2008	
DoD American Indian and Alaska Native Policy, 20 October 1998	
Air Force Instruction 32-7065, Cultural Resources Management Program, 1 June 2004	
Interim Guidance: Treatment of Cold War historic Properties for U.S. Air Force Installations, June 1993	
SECNAV Instruction 4000.35A, Department of the Navy Cultural Resources Program, 9 April 2001	
MCO P5090.2A, Marine Corps Environmental Compliance and Protection Manual	
<i>Other Guidance</i>	
Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, 48 FR 44716	
The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings	
Guidelines for Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act	
Guidelines for Restricting Information on the Location of National Register Properties	
Consultation with Native Americans Concerning Properties of Traditional Religious Cultural Importance, Advisory Council on Historic Preservation, 1993	
Guidelines for Evaluating and Documenting Traditional Cultural Properties, 1994	

3.1.2 Antiquities Act of 1906 (16 U.S.C. §§431-433)

The Antiquities Act codified at 43 Code of Federal Regulations (CFR) Part 3 is the first federal law to provide protection of ruins and objects of antiquity on federal lands. It authorizes the President to establish national monuments and objects of historic or scientific interest. The Act also established a system to permit examination and excavation by qualified researchers to increase knowledge and collect antiquities for permanent preservation in public museums. Penalties were established for unauthorized excavation and collection. Other laws have largely superseded the Antiquities Act; however, the authority to withdraw public lands from multiple use status to create National Monuments continues to be exercised. Also, the Antiquities Act remains the fundamental authorization for protection of paleontological resources.

3.1.3 Historic Sites Act of 1935 (16 U.S.C. §§461-467)

The Historic Sites Act (36 CFR Part 65) established a national policy to identify and preserve historic sites, buildings, objects, and antiquities of national significance. The law authorized the Secretary of the Interior to conduct surveys, collect and preserve data, and acquire historic and archaeological sites. The Historic American Building Survey (HABS) and Historic American Engineering Record (HAER) stem from this act, as well as the National Park Service program of designating National Historic Landmarks.

3.1.4 National Historic Preservation Act of 1966 (16 U.S.C. §470 et seq.)

The NHPA, as amended, is the cornerstone of the current federal cultural resource preservation program. The Act proclaims the historical and cultural foundations of the Nation should be preserved as a living part of our community life in order to give a sense of orientation to the American people. The NHPA expanded the policy enunciated by the Historic Sites Act to encompass resources of state and local significance as well as national, thus providing the basis for an expanded National Register of Historic Places (National Register) maintained by the Secretary of the Interior.

The NHPA also established the ACHP and the network of SHPOs. The ACHP advises the President and Congress on matters relating to historic preservation, encourages public interest and participation in historic preservation, and assists state and local governments in drafting legislation relating to historic preservation. The NHPA also directed the ACHP to promulgate regulations implementing Section 106. Under that regulation—36 CFR Part 800, *Protection of Historic Properties*—the SHPOs represent the people’s interests in consultation with federal agencies regarding historic properties.

The main purpose of the NHPA is to protect “historic properties,” defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register. To be determined eligible for the National Register, properties must be significant in American history, architecture, archaeology, engineering, or culture and generally must be at least 50 years old. They must also possess integrity of location, design, setting, materials, workmanship, feeling, or association, and meet at least one of the criteria set forth in the National Register regulations (36 CFR Part 60).

Sections 106 and 110 of the NHPA and the regulations at 36 CFR Part 800 have particular relevance for ICRMPs. Section 106 establishes a strategy for protecting historic properties by directing federal agencies to make reasonable and good faith efforts to identify properties eligible for listing on the National Register and take into account the effects of their undertakings on such properties and to provide the Council an opportunity to comment on these activities. Section 110(a)(2) directs agencies to identify, evaluate, and nominate to the National Register historic properties under their jurisdiction or control. This section also stipulates that these activities be conducted in consultation with federal, state, and local agencies, Native American tribes, and interested parties.

The NHPA was substantially amended in 1992 to recognize that properties of traditional religious or cultural importance to a Native American tribe may be eligible for inclusion in the National Register. Section 101(d)(6)(B) of the NHPA requires agency officials to consult with any Native American tribe or Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by an undertaking. The Council issued revised regulations in 2001 which significantly modified the Section 106 review process to emphasize the role of Native American consultation.

Other regulations implementing NHPA include the *Secretary of Interior's Standards for Historic Preservation Projects* (36 CFR Part 68), which address approaches to preservation, rehabilitation, restoration, and reconstruction. Additional direction is provided by *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines*, which address preservation planning; identification, evaluation, and registration of resources; historical, architectural and engineering, and archaeological documentation; and professional qualification standards.

3.1.5 National Environmental Policy Act of 1969 (42 U.S.C. §4321et seq.)

NEPA established the protection and enhancement of the environment as national policy. In addition to natural resources, NEPA specifically stipulates that federal agencies should work to preserve historic and cultural aspects of our national heritage. Implementing regulations issued by the Council on Environmental Quality are codified at 40 CFR Parts 1500-1508, and the Air Force has published counterpart regulations at 32 CFR Part 989. These regulations encourage combining NEPA compliance with other regulatory requirements such as those of the NHPA, American Indian Religious Freedom Act (AIRFA), and Native American Graves Protection and Repatriation Act (NAGPRA).

3.1.6 Archeological and Historic Preservation Act of 1974 (16 U.S.C. §§469-469c-1)

The Archeological and Historic Preservation Act (AHPA), promulgated as an amendment of the Reservoir Salvage Act of 1960, provides for the preservation of archaeological and historical information that otherwise might be lost as a result of federal construction projects and other federally licensed activities and programs. This Act stipulates that up to one percent of the funding appropriated by Congress for federal undertakings can be spent to recover, preserve, and protect

archaeological and historical data. A subsequent amendment authorized the one-percent limit to be administratively exceeded under certain circumstances.

3.1.7 American Indian Religious Freedom Act of 1978 (42 U.S.C. §1996)

The American Indian Religious Freedom Act (AIRFA) reiterates the First Amendment guarantee of religious freedom, with specific reference to the inherent right of Native Americans, Native Alaskans, and Native Hawaiians to believe, express, and exercise their traditional religions. Such rights include, but are not limited to, access to religious sites, use and possession of sacred objects, and freedom to worship through ceremonial and traditional rites. Federal agencies are directed to evaluate their policies and procedures to determine if changes are needed to ensure that such rights and freedoms are not disrupted by agency practices. The Act is not implemented by regulations.

3.1.8 Archeological Resources Protection Act of 1979 (16 U.S.C. §470aa et seq.)

The Archeological Resources Protection Act (ARPA) strengthened protection of archaeological resources on federal and tribal lands by increasing the penalties for unauthorized excavation, collection, or damage from misdemeanors defined by the Antiquities Act of 1906 to felonies with fines up to \$10,000 and one year of imprisonment for first offenses. Trafficking in archaeological resources from public and tribal lands is also prohibited by ARPA. ARPA requires notification of affected Native American tribes if archaeological investigations would result in harm to or destruction of any location considered by tribes to have religious or cultural importance. When archaeological investigations are performed under contract to the installation or facility where they are located, such contracts serve in lieu of a permit. The implementing regulations are at 32 CFR Part 229.

Regulations for *Curation of Federally Owned and Administered Archeological Collections*, 36 CFR Part 79, define standards, procedures, and guidelines to be followed by federal agencies to preserve collections of prehistoric and historic material remains and associated records. These regulations apply not only to collections recovered under the authority of ARPA, but also the Antiquities Act, AHPA, and NHPA.

3.1.9 Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. §3001 et seq.)

The Native American Graves Protection and Repatriation Act (NAGPRA) protects human remains, funerary objects, sacred objects, and items of cultural patrimony of indigenous peoples on federal lands. The Act stipulates priorities for assigning ownership or control of such cultural items excavated or discovered on federal or tribal lands.

The Act also provides for repatriation of human remains and cultural items previously collected from federal lands and in the possession or control of a federal agency or federally funded repository. Implementing regulations are codified at 43 CFR Part 10. In addition to defining procedures for dealing with previously collected human remains and cultural items, these regulations outline procedures for negotiating plans of action or comprehensive agreements for

treatment of human remains and cultural items encountered in intentional excavations or inadvertent discoveries on federal or tribal lands.

3.2 EXECUTIVE MEMORANDUM AND ORDERS

Three presidential directives are particularly relevant to managing cultural resources. An Executive Memorandum and an Executive Order (EO) address how executive agencies should consult with Native American tribal governments, which have a unique status as dependent sovereign nations. Another EO directs executive agencies to protect sites that are sacred to Native Americans.

3.2.1 Executive Memorandum, 29 April 1994, Government-to-Government Relations with Native American Tribal Governments

Executive Memorandum of 29 April 1994 addressed the nature of relations with Native American tribes. It requires federal agencies to establish and operate within a government-to-government relationship with federally recognized tribes.

3.2.2 Executive Order 13007 of May 24, 1996, on Indian Sacred Sites

EO 13007 addressed Native American sacred sites. It requires that to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, federal land managers must accommodate access to and ceremonial use of Native American sacred sites by native religious practitioners, and avoid adversely affecting the physical integrity of sacred sites. The order also charges agencies to maintain the confidentiality of sacred sites when appropriate.

3.2.3 Executive Order 13175 of November 6, 2000, on Consultation and Coordination with Indian Tribal Governments

This order established provisions for regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications. It further has provisions to strengthen government-to-government relationships, and reduce the imposition of unfunded mandates on Native American tribes. EO 13175 directs agencies to establish an accountable process to ensure meaningful and timely input by tribal officials in the development of any regulatory policies that have tribal implications.

3.3 MILITARY REQUIREMENTS

In addition to federal legislation and regulations, the DoD, Air Force, Navy, and Marine Corps have developed formal guidance to aid land managers in implementing cultural resource regulations. Relevant documents are summarized here.

3.3.1 DoD Directive 4710.1, *Archaeological and Historic Resources Management*, 21 June 1984

This directive provides policy, prescribes procedures, and assigns responsibilities for the management of archaeological and historic resources under DoD control. It is the policy of DoD to integrate historic preservation requirements with the planning and management of activities under DoD control. It also is DoD policy to minimize expenditures through judicious application of options available in complying with applicable laws, and to encourage practical and economical rehabilitation and adaptive use of significant historic buildings and structures.

3.3.2 DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*, 14 September 2006

This instruction implements DoD policy, assigns responsibilities, and provided procedures for DoD interactions with federally recognized tribes in accordance with DoD guidance, executive orders, and presidential memoranda. It is the policy of DoD to: 1) meet its responsibilities to tribes and comply with applicable statutes, regulations, and guidance; 2) build stable and enduring relationships with tribal governments; 3) fully integrate the principles and practices of meaningful consultation and communication with tribes; and, 4) take into consideration the significance that tribes ascribe to protected tribal resources.

3.3.3 DoD Instruction 4715.3, *Environmental Conservation Program*, 3 May 1996

DoD Instruction (DoDI) 4715.3 covers a wide range of topics pertinent to the integrated management of natural and cultural resources on properties under DoD control and describes means and assigns responsibilities for implementing policies, and prescribes appropriate procedures. It also directs DoD installations to take a proactive approach to consultation with Native American tribes, both in the Section 106 process and with respect to tribal cultural concerns in general. Among other things, it also directs installations to select a staff member to serve as a liaison to tribes and to educate appropriate staff about tribes with cultural ties to lands managed by DoD.

3.3.4 DoD Instruction 4715.16, *Cultural Resources Management*, 18 September 2008

This instruction establishes DoD policy and assigns responsibilities in accordance with other DoD instructions and directives for compliance with applicable Federal statutory and regulatory requirements, executive orders and memoranda for the integrated management of cultural resources on DoD-managed lands. It is DoD policy to:

- Manage and maintain cultural resources under DoD control in a sustainable manner through a comprehensive program that considers the preservation of historic, archaeological, architectural, and cultural values; is mission supporting; and results in sound and responsible stewardship.
- Be an international and national leader in the stewardship of cultural resources by promoting and interpreting the cultural resources it manages to inspire DoD personnel and to encourage and maintain U.S. public support for its military.

- Consult in good faith with internal and external stakeholders and promote partnerships to manage and maintain cultural resources by developing and fostering positive partnerships with Federal, tribal, State, and local government agencies; professional and advocacy organizations; and the general public.

It provides guidance in several areas, including the processes of cultural resource management, programming funds for cultural resource programs, and the contents of ICRMPs, and establishes cultural resource metrics for DoD components.

3.3.5 DoD American Indian and Alaska Native Policy, 20 October 1998

The DoD American Indian and Alaska Native Policy addresses trust responsibilities to tribes. This policy enunciates principles based on federal statutes, treaties, and other policies for DoD to use in working with federally recognized American Indian and Alaska Native Governments. The goal of the policy is to build stable and enduring relationships and to establish procedures for meaningful consultation and communication with tribes. The policy recognizes that tribes ascribe significance to certain natural resources and properties of traditional or customary religious or cultural importance, and that DoD will manage its lands to conserve, protect, and provide access to those resources to the extent practicable and consistent with military training, security, and readiness requirements.

The policy supports tribal self-governance and recognizes the obligations for establishing government-to-government relations between the federal government and tribes. It recognizes the importance of increasing understanding and addressing tribal concerns of the past, present, and future. The policy stipulates that tribal consultation needs to be conducted prior to reaching decisions on matters that have the potential to significantly affect protected tribal resources, tribal rights, or Indian lands.

3.3.6 Air Force Instruction 32-7065, Cultural Resources Management, 1 June 2004

AFI 32-7065 provides guidance for protecting and managing cultural resources and implements DoDI 4715.3. This AFI is comprehensive and covers the full range of cultural resource management issues pertinent to Air Force operations. It outlines the requirements for cultural resource management plans such as this document, and also addresses appropriate training of Air Force personnel with regard to cultural resource management, and describes the steps to follow in evaluating and nominating eligible properties to the National Register. The AFI defines compliance requirements for protecting cultural resources.

AFI 32-7065 also provides guidance for determining the eligibility of properties for National Register listing and for nominating those properties that qualify. Guidance for consulting with experts and preparing MOAs is included, along with advice about preparing statements of work and when necessary, issuing ARPA permits. The AFI includes general guidelines for data recovery, budgeting, database management, and cultural resource management training.

3.3.7 Interim Guidance: Treatment of Cold War Historic Properties for U.S. Air Force Installations, June 1993

The Cold War had a tremendous impact on cultural and political developments throughout the world. Because of concern that highly significant properties may be destroyed prior to reaching the normal 50-year age for evaluation, the Air Force requires its installations in the United States to consider Cold War-era properties for National Register eligibility and offers “Interim Guidance.” Only a carefully selected, relatively small number of these resources are expected to meet eligibility requirements for National Register listing for properties less than 50 years of age.

3.3.8 Secretary of the Navy (SECNAV) Instruction 4000.35A, Department of the Navy Cultural Resources Program, 9 April 2001

SECNAV Instruction 4000.35A establishes policy and assigns responsibilities for a cultural resources program under the direction and oversight of the Secretary of the Navy (Installations and Environment). This instruction assigns responsibilities to the Commandant of the Marine Corps, which are applicable to Marine Corps activities on the BMGR, and the Commandant will issue implementing instructions. The *Navy Historic and Archaeological Resources Protection Planning Guidelines* also address preparation of Historic and Archaeological Resource Protection (HARP) plans, which are comparable to ICRMPs.

3.3.9 Marine Corps Order P5090.2A, Environmental Compliance and Protection Manual

Chapter 8 of Marine Corps Order P5090.2A, *Environmental Compliance and Protection Manual*, addresses historic and archaeological resources protection. This manual defines regulatory requirements, states Marine Corps policy, and assigns responsibilities to staff of the Commandant of the Marine Corps and installation commanders.

Section 4

THE NATURAL ENVIRONMENT

The BMGR is located within the most arid portion of the Sonoran Desert. Despite this harsh environment, humans have utilized the natural and biotic resources of the area for at least 12,000 years. Any study of human behavior must take into account the environmental setting for human survival and adaptation to changing environmental conditions. Decisions regarding mobility and sedentism, settlement location, scheduling of subsistence activities, and travel were influenced by the distribution of various natural and biotic resources (Flannery 1968). This section provides general information about the natural resources of the BMGR based on an assessment and summary of published data presented by Ahlstrom (2000) and concludes with a summary of environmental changes during the last 12,000 years. Detailed studies of the various aspects of the natural and biotic environment can be found in Dean (1988), Sellers and Hill (1974), McGuire and Schiffer (1982), and McClellan and Vogler (1977).

4.1 THE PAPAGUERÍA

The Papaguería is a unique geographic area in southwestern Arizona and northwestern Sonora, Mexico, which extends from south of the Gila River on the north to the Gulf of California on the south, and from the Colorado River on the west to Three Points (west of Tucson) on the east (Figure I-4). This region is subdivided into the eastern and western Papaguería based on cultural and environmental factors: the boundary between two Piman-speaking O’odham groups, and the juncture of two biotic communities coupled with a marked change in annual rainfall. The boundary between these areas is located near and roughly parallels the eastern boundary of the BMGR East. This term is used extensively in archaeological and other literature, including this report, to identify a geographic region, an environment, and a cultural area, and it features prominently in the discussions of historic themes and culture history in Sections 5 and 6.

4.2 TOPOGRAPHY AND SURFICIAL GEOLOGY

The Basin and Range physiographic province (Fenneman 1931; McClellan and Vogler 1977) is characterized by a series of long and narrow, parallel northwest trending mountain ranges that are separated by alluvium-filled basins or valleys. Two subprovinces of the Basin and Range are present within the BMGR. The Salton Trough subprovince includes the area west and south of the Gila and Tinajas Altas Mountains and the Yuma Desert and west of the Disierto de Altar. The Salton Trough is a down-warped or down-faulted area that was once part of the Gulf of California, but has been filled in by the accretion of the Colorado River delta. This province is characterized by “desert alluvial slopes and delta plain” (Fenneman 1931: 377-379, Plate I). The Sonoran Desert subprovince includes the area east of the Gila and Tinajas Altas Mountains and north of the United States—Mexico border. This subprovince is characterized by widely separated short ranges in desert plains. These ranges are linear, and most trend northwest-southeast.

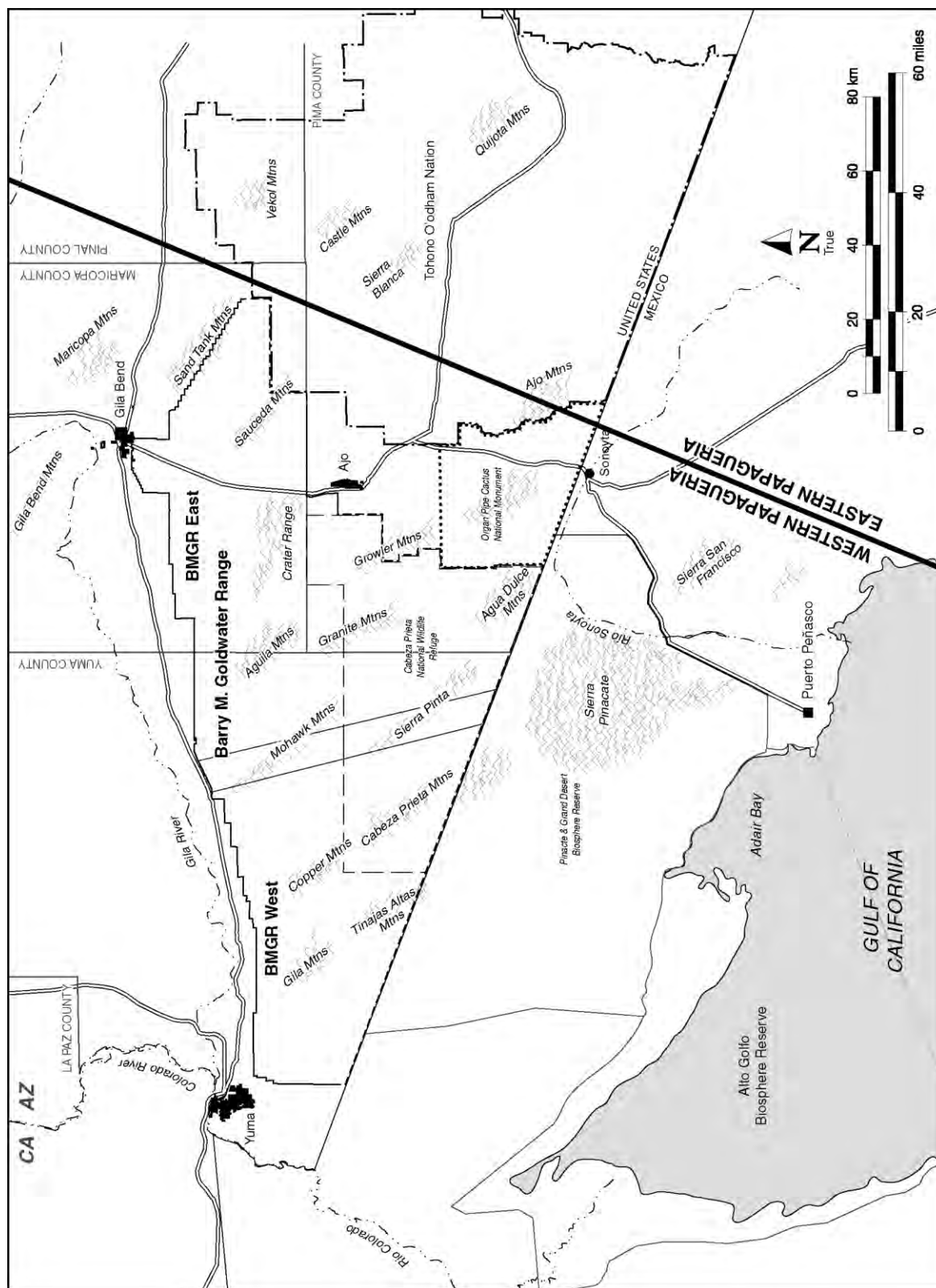


Figure I-4 The Eastern and Western Papagueria

Three major landforms are identified in the Basin and Range province: mountain ranges, piedmont slopes, and basins. Mountain ranges represent the first component, and two types are found on the BMGR. The sierra-type (sharp-crested) mountains were produced during the late Tertiary and early Quaternary Basin and Range disturbance. A series of earthquakes during that event simultaneously caused the mountains to thrust upward and the valleys to drop downward along north- to northwest-trending faults, producing a geologic structure commonly referred to as horst and graben. Bedded mesa-type mountains, composed of volcanic ash (NRPT 1986: 4-5), were formed by volcanism that also occurred during the Tertiary and Quaternary periods.

The piedmont slope, a large area of sloping land that is partly erosional, extends from the mountain fronts to the basins. The piedmont consists of an upper surface of eroded bedrock—the pediment—and a lower convex-shaped depositional surface—the alluvial fan. Lateral coalescence of the alluvial fan has resulted in the formation of extensive *bajadas* that slope gently toward the centers of the basins or valleys.

The basins were formed when sediments from the mountain and pediment slopes washed down and filled the troughs forming the valleys. Basin filling halted when structural uplift, accompanied by tilting of basins and faulting of basin-fill beds occurred during the Tertiary. The floors of the valleys slope gradually from 1,800 feet above sea level at the eastern end of the BMGR to just 200 feet at the western end. A secondary elevational gradient crosscuts this slope, as elevations of the valley floors decrease to the north, toward the Gila River valley (McClellan and Vogler 1977). Drainages, including Growler Wash and San Cristobal Wash, began to erode and cut the basin fill, forming watercourses through the central part of the basin and establishing a through-flowing drainage system.

In addition to these basin fill sediments, sand dunes occur in several valleys in the central and western portions of the BMGR. Most of the dunes on the BMGR are semistabilized (McClellan and Vogler 1977: 12). According to Bryan,

The Yuma Desert is almost completely mantled with sand from 1 to 10 feet deep. Along the eastern margin of the Lechuguilla Desert, Tule Desert, and Mohawk Valley are belts of sand dunes. The belt of dunes is particularly conspicuous at the south end of the Pinta Mountains. In this locality the dunes are invading the mouths of the mountain canyons and impeding stream erosion. A belt of wind-blown sand from a quarter of a mile to a mile wide surrounds the Pinacate plain. Growler Valley and the valley of the Ajo are almost free of wind-blown sand, but patches of drifted sand occur on the Sentinel Plain and around its margin (Bryan 1925: 107).

The rocks of the mountain ranges are much older than the late Tertiary to early Quaternary faulting that led to the formation of the basin-and-range topography. Proterozoic granitoid and metamorphic rocks (1,450 to 1,800 million years ago [mya]) are distributed throughout the BMGR (Reynolds 1988). Late Cretaceous to Early Tertiary granitic and granitoid rocks (45 to 85 mya) are common in the western two-thirds of the range. Tertiary volcanic rocks (middle Miocene to Oligocene, 15 to 38 mya) occur in the eastern two-thirds of the BMGR and are dominant in the eastern one-third. Finally, Holocene to Tertiary (Pliocene to middle Miocene)

basaltic rocks (0 to 16 mya) are found as lava flows in the north central and south central portions of the BMGR.

Specific rock types associated with human use include rhyolite and quartzite quarries in the Sand Tank Mountains and the Crater Range, and rhyolite quarries in the Saucedo Mountains (Bayman 1992: 15; Blanchard 1992; Seymour and Doak 1993: 55, 59). Chert quarries have been recorded in the Crater Range (Seymour and Doak 1993: 59, 72). Quartz quarries, associated with volcanic rocks, have been recorded in the Crater Range and the Wellton Hills (Bayman 1992: 15; Blanchard 1992; Bowen 1982: 8). A metasandstone quarry recorded in the Baker Peaks also includes crystalline and volcanic rocks (Altschul and Jones 1989: 27, 61). Obsidian quarries are documented in and around the Saucedo Mountains and on the southwest side of the Sand Tank Mountains (Shackley 1995). Cryptocrystalline cobbles in ancient flood deposits also were used.

4.3 CLIMATE AND HYDROLOGY

Climate, which is an expression of meteorological phenomena over a long period of time, can be described in terms of local weather conditions such as temperature and precipitation. Climate influences the natural characteristics and processes on the BMGR. Climate and hydrology are interrelated environmental parameters that play key roles in the prehistoric and historic human use of the BMGR.

4.3.1 Temperature

The large amount of solar radiation received by the BMGR accounts for its generally mild winters and hot summers. Ahlstrom (2000: 24-27) summarizes temperature and precipitation data for three weather stations located around BMGR from 1941 through 1970: Wellton, at an elevation of 260 feet; Gila Bend, at 735 feet; and Ajo, at 1,763 feet. These data show that mean daily maximum temperatures are highest at Gila Bend, intermediate at Wellton, and lowest at Ajo. During the summer months, mean daily maximum temperatures at Gila Bend range from 104.8 to 109.1 degrees Fahrenheit (F). Mean daily minimum temperatures in most months are highest at Ajo, intermediate at Gila Bend, and lowest at Wellton. During the winter months, mean daily minimum temperatures at Wellton range from 34.5 to 38.2 degrees F. The mean freeze-free period at the three stations ranges from around 260 days at Gila Bend and Wellton to 314 days at Ajo (Ahlstrom 2000: 27). The growing season is longer at Ajo, an upland location, than at the other two stations, which are located in the Gila River Valley.

4.3.3 Precipitation

The BMGR climatic regime is characterized by a bimodal precipitation pattern that is unique to western North America (Dean 1988; Sellers and Hill 1974). Data from the Ajo, Gila Bend, and Wellton stations indicate two precipitation maxima (July-September and December-March) separated by intervals of reduced rainfall (October-November and April-June). The summer precipitation pattern reflects thunderstorms during July, August and September, which are associated with warm, moist air moving northwestward over the state from the Gulf of Mexico. Winter precipitation results from storms that enter the state from the Pacific Ocean and is more variable from year to year.

Annual precipitation during the period from 1941 to 1970 ranged from 0.62 to 8.81 inches at Wellton, 2.02 to 13.58 inches at Gila Bend, and 3.46 to 15.27 inches at Ajo (Ahlstrom 2000). Mean summer precipitation around the BMGR ranges from 0.5 to 4 inches, and mean winter precipitation from 1 to 2 inches. Almost no rain falls during the spring drought months of May and June.

4.3.3 Hydrology

The location of reliable water sources is vital to human settlement. Six types of natural water sources are found on the BMGR: washes, tinajas, charcos, playas, springs, and pozos (Ahlstrom 2000: 30). The BMGR contains through-flowing drainage systems with major drainages running along the axes of the intermountain basins. Several washes, including San Cristobal Wash and its tributary Growler Wash, Quilotosa Wash, Bender Wash, Sand Tank Wash, and Saucedo Wash, flow northward to the Gila River. Washes on the west side of the Gila and Tinajas Altas Mountains flow toward the Colorado River. Washes on the BMGR are ephemeral; that is, they “flow only during or after rains and as an immediate result of the rain” (Bryan 1925: 120). Both the Gila River, located north of the range, and the Rio Sonoyta, located to the south, are intermittent, which means they “have a permanent flow over short stretches of their courses throughout the year” (Bryan 1925: 119).

Tinajas, also known as rock tanks or plunge pools, are the most reliable source of water on the BMGR. They are basins or depressions that are worn into bedrock that capture rainfall and runoff; some tinajas may hold water throughout the year. Tinajas are found primarily in the bottoms of drainages and typically form as plunge pools below falls (Bryan 1925: 129-130): the Tinajas Altas, a series of nine plunge pools, and Baker Tanks are examples. According to Bryan (1925:127), “Streams of the size common in southwestern Arizona are competent to erode pools 10 to 20 feet in diameter and 3 to 10 feet deep.” Some tanks are filled with sand, but contain water that can be obtained by digging. These sand tanks “are less likely to be foul than rock tanks, and as the sand slows evaporation, the water commonly lasts longer” (Bryan 1925: 257).

Broyles (1996: Table 1) defines perennial water holes as lasting “through drought to the next rainfall cycle, which ... should be within six months,” and intermittent water holes as lasting from one to six months. Perennial water holes are found in the Aguila Mountains, Baker Peaks, Gila Mountains, and Tinajas Altas Mountains.

Charcos are formed by the ponding of water in channels underlain by fine-grained alluvium and vary from shallow pans 18 inches wide by 6 feet long to depressions 5 to 6 feet deep, 15 to 30 feet wide, and more than 1,000 feet long (Bryan 1925: 121). The larger charcos are of great importance to travelers through the desert, because only these hold sufficient water to last for more than a few days after a rain and are found in the same location from year to year” (Bryan 1925: 123).

Playas, which are located in the basins or valley bottoms, are flat areas where water occasionally stands and evaporates. Many playas contain evaporate salt deposits referred to as *salinas*. Playas, or dry lakebeds, are similar to charcos in that they are underlain by alluvium and at times

hold surface water. Playas occur primarily in the central portion of the range north of the Crater Range, the San Cristobal Valley, west of the Mohawk Mountains on the east side of the Mohawk Dunes, east of the Aguila Mountains, and east of the Sierra Pinta Mountains (Huckell 1979: Figures 1 and 6; McClellan and Vogler 1977: Map 1). Laguna Prieta, a salt water lake, is located farther west, between the Tinajas Altas Mountains and the Colorado River (Davis and others 1990; Ezell 1955: Figure 106; Lumholtz 1912: 254; Minckley and Brown 1982: Figure 151).

Springs and seeps (the latter having flows of less than 5 gallons per minute) are not common in mountain ranges on BMGR. Bryan identified two kinds of springs in his study area: “(1) fracture springs, which depend on water derived from rainfall, and stored in the fractures characteristic of certain types of rocks; and (2) fissure springs, which depend on fissures that penetrate the deeper parts of the earth’s crust and allow deep-seated waters to rise to the surface” (1925: 161). Springs are found only in the far eastern portion of the BMGR; none has been located west of the Sand Tank Mountains. Two springs have been identified in Organ Pipe Cactus National Monument south of BMGR: Dripping Spring located in the Puerto Blanco Mountains (a fracture spring) and Quitobaquito Springs (a fissure spring).

Pozos are fresh- or brackish-water springs that are fed by precipitation that has percolated into the sand; they “are frequently associated with faults along the margin of the Gulf” (Davis and others 1990: 136; also Hayden 1976: 285). None has been identified on the BMGR; however, there has been no systematic survey of surface water sources to date.

4.4 PLANT AND WILDLIFE COMMUNITIES: THE BIOTIC ENVIRONMENT

The BMGR is located within the central portion of the Sonoran Desert, which is further divided into seven subdivisions (Shreve and Wiggins 1964: Map 1). Two of the latter, the Lower Colorado Valley and Arizona Upland subdivisions, occur within the BMGR. Shreve and Wiggins defined the boundary between these two subdivisions as extending north-south through the eastern end of the BMGR.

A second system of vegetation classification was developed by Brown and Lowe (1980) and applied to the Southwest (also see Brown 1982). The hierarchical structure of Brown and Lowe’s classification system “provides for sensitivity to scale,” and can be used to describe the environment at scales ranging from the regional to the local. Thus, the Sonoran Desertscrub biotic community, or biome, is divided into subdivisions, the subdivisions into series or plant communities, and the series into associations. Ahlstrom (2000: 42-43) grouped the 34 associations to create a finer scale mapping of the Lower Colorado River Valley and Arizona Upland subdivisions within the BMGR (Figure I-5).

The Lower Colorado River Valley subdivision is the driest of the Sonoran desert subdivisions, and plant growth is typically both open and simple, reflecting the intense competition existing between plants for the scarce water resource (Turner and Brown 1982: 190). This subdivision accounts for valley settings throughout the BMGR, as well as for portions of a number of mountain ranges. The Lower Colorado River Valley subdivision can be described with reference to a single plant series or community, Creosotebush-White Bursage. Alternatively, it can be divided into two dominant series, Creosotebush-White Bursage and Saltbush, and two lesser

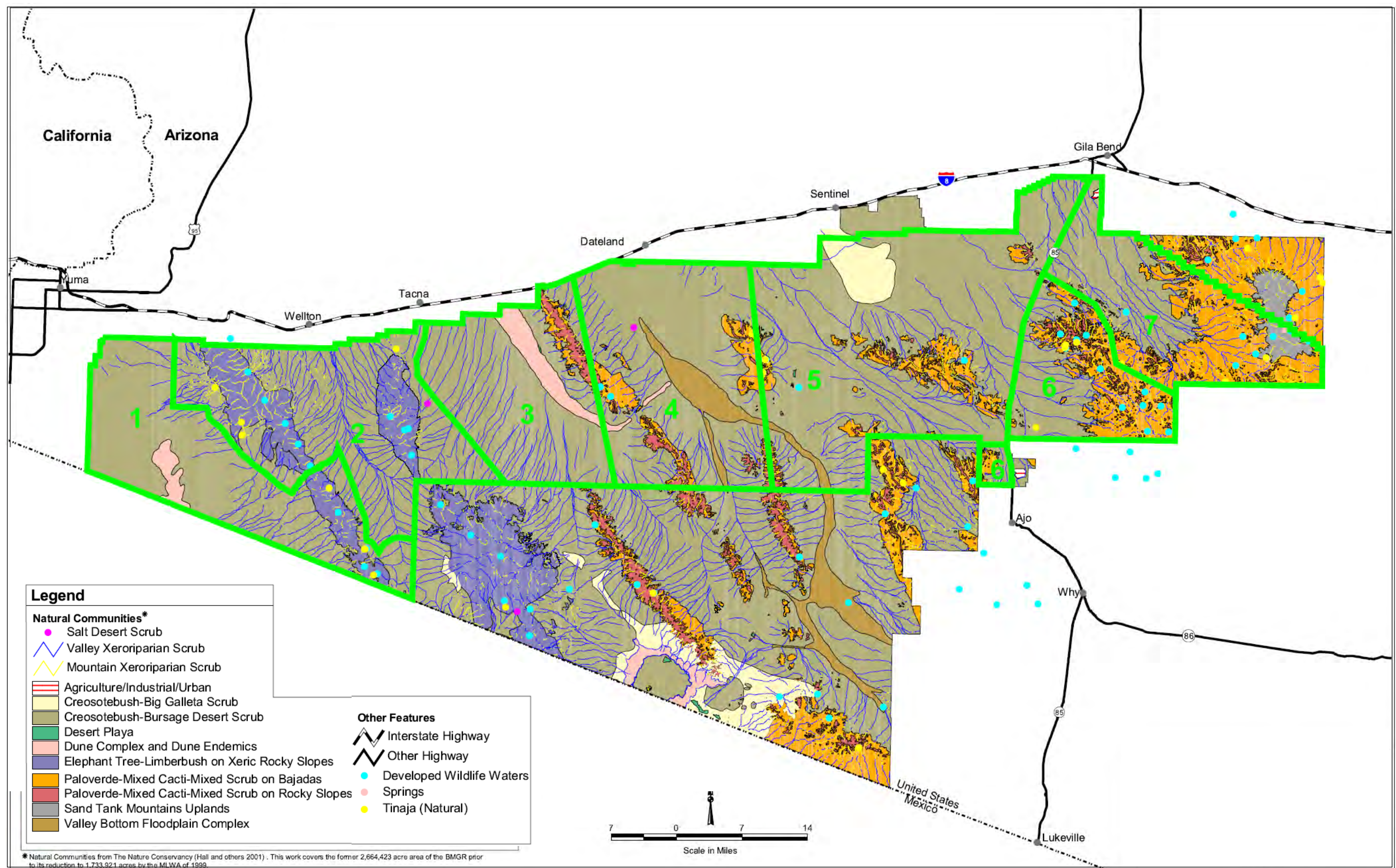


Figure I-6. Natural community conservation elements and BMGR management units

series, Creosotebush-Big Galleta and Mixed Scrub. Dominant plant species include white bursage (*Ambrosia dumosa*) and creosotebush (*Larrea tridentata*); others include mesquite (*Prosopis* sp.), big galleta grass (*Hilaria rigida*), triangle-leaf bursage (*A. deltoides*), ocotillo (*Fouquieria splendens*), blue paloverde (*Cercidium floridum*), foothill paloverde (*C. microphyllum*), and ironwood (*Olneya tesota*).

Fauna include coyote (*Canis latrans*), desert bighorn sheep (*Ovis canadensis nelsoni*), which occupies the region's mountain ranges, the endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*), which lives in the basins, and mule deer (*Odocoileus hemionus*). Small mammals include the desert cottontail, black-tailed jackrabbit (*Lepus californicus*), and numerous species of rodents (Hoffmeister 1986; Turner and Brown 1982: 200).

Most mammals of the Lower Colorado subdivision have adapted to high daytime temperatures by spending much of the day underground or aestivating [passing the summer in a dormant or torpid state]. Consequently, the sandy plains of this subdivision may host large populations of burrowing rodents, at least one of which, the Round-tailed Ground Squirrel (*Spermophilus tereticaudus*), is characteristic of the subdivision (Turner and Brown 1982: 200). Because of the sparseness and openness of its vegetation, the Lower Colorado River Valley subdivision supports a less diverse avifauna than the Arizona Upland subdivision. "Its avian inhabitants are largely lesser numbers of arid-adapted desert species" (Turner and Brown 1982: 200). There are, on the other hand, a variety of snakes and lizards, some adapted to sandy habitats.

Most of the region containing the Arizona Upland subdivision of Sonoran Desertscrub "is on slopes, broken ground, and multi-dissected sloping plains (Turner and Brown 1982). The Arizona Upland subdivision is found at the extreme eastern portion of the BMGR, as well as on mountain ranges throughout the range. The Paloverde-Cacti-Mixed Scrub series is the primary Arizona Upland series. Foothill paloverde and saguaro (*Carnegie gigantea*) dominate the series, with ironwood playing a secondary role (NRPT 1986: 7-9). Additional species listed as dominants in one or another of the plant associations making up this community include creosotebush, brittlebush (*Encelia farinosa*), limberbush (*Jatropha* sp.), white bursage, and ocotillo.

Plants of this subdivision important to Native Americans include the saguaro, organ pipe cactus (*C. thurberi*), mesquite and other leguminous trees, cholla and prickly pear cacti (*Opuntia* sp.), and desert agave (*Agave deserti*). Saguaro can be expected in many of the Arizona Upland communities in bajada and mountain settings within BMGR (Turner and others 1995: 146). Desert agave occurs in scattered locations and has been observed generally in mountain settings at elevations above 200 m on the BMGR (Turner and others 1995: 50-54). Tables I-3 and I-4 list plant species used by the region's Native American inhabitants.

Like the Lower Colorado River Valley subdivision, large mammals of the Arizona Upland subdivision include the coyote, mule deer, white-tailed deer (*O. virginianus*), desert bighorn sheep, and collared peccary or javelina (*Dicotyles tajacu*); small mammals include desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit, and numerous species of rodents (Ahlstrom 2000: 50). The subdivision supports numerous and varied birds, lizards, and snakes (Turner and Brown 1982: 203). Animal species of economic importance are listed in Table I-5.

Table I-3

Plant Species of Economic Importance in the Western Papaguería

Scientific Name	Common Name	Location	Edible Parts	Availability
<i>Acacia greggii</i>	cat-claw	bajada	seeds	July-September
<i>Agave deserti</i>	agave	mountain slopes	basal rosette, stem, leaves, flowers	November-May
<i>Allium</i>	wild onion	mountain slopes	leaves	winter
<i>Amaranthus</i>	pig-weed	valley floor	leaves, seeds	July-November
<i>Atriplex</i>	saltbush	bajada	seeds	spring, fall
<i>Boerhaavia</i>	spiderling	bajada	seeds, leaves	July-September
<i>Capsicum</i>	chillipiquin	mountain slopes	fruit	summer
<i>Carnegiea gigantea</i>	saguaro	bajada	fruits	July-November
<i>Celtis</i>	hackberry	valley floor	berries	July-November
<i>Cercidium</i>	paloverde	bajada	seeds	July-November
<i>Datil</i>	yucca	bajada	leaves, root	July-November
<i>Dichelostemma</i>	Papago blue-bells	mountain slopes	leaves	winter
<i>Eriogonum</i>	wild buckwheat	bajada	seeds	fall
<i>Ferocactus wislizenii</i>	fishhook barrel cactus	bajada	seeds	October-November
<i>Fouquieria</i>	ocotillo	bajada	flowers, seeds	April-June
<i>Franseria</i>	bursage	valley floor	leaves	July-November
<i>Larrea tridentata</i>	creosotebush	bajada	leaves	July-November
<i>Lycium</i>	wolfberry	bajada	berries	July-August
<i>Olneya tesota</i>	ironwood	bajada	seeds	July-August
<i>Opuntia</i>	cholla, prickly pear	bajada	buds	July-November
<i>Prosopis juliflora</i>	mesquite	valley floor	Pods, seeds	July-November
<i>Quercus</i>	oak	mountain slopes	seeds	summer
<i>Rumex</i>	wild sorrel, dock	valley floor	leaves	March-April
<i>Solanum</i>	wild potato	mountain slopes	root	summer
<i>Suaeda</i>	seepweed	bajada	seeds, leaves	fall

*Compiled from Brown and Lowe (1980: Appendix II), Coe (1979: 13-14), and Doelle (1980b: 84)

Table I-4

**Plants Mentioned in Oral Histories as Food and Beverage Sources
Used by Hia C-Ed O’odham in the Twentieth Century***

Scientific Name	Common Name	Edible Parts
<i>Acacia greggii</i>	cat-claw	pods
<i>Agave deserti</i>	agave, mescal	hearts
<i>Agave murpheyi</i>	agave, mescal	hearts
<i>Amaranthus fimbriatus</i>	desert spinach	leaves
<i>Amaranthus palmeri</i>	desert spinach	leaves
<i>Atriplex elegans</i>	wheelscale	greens
<i>Atriplex wrightii</i>	saltbush	greens
<i>Capsicum annuum</i>	chiltepine	fruits
<i>Carnegiea gigantea</i>	saguaro	fruits
<i>Cercidium floridum</i>	paloverde	fruits
<i>Cercidium microphyllum</i>	paloverde	seeds
<i>Chenopodium murale</i>	goose-foot	greens
<i>Cirsium neomexicanum</i>	thistle	stems (chewed)
<i>Citrullus lanatus</i>	watermelon	fruits
<i>Condalia globosa</i>	condalia	fruits
<i>Cucumis melo</i>	cantaloupe	melons
<i>Cucurbita argyrosperma</i>	squash	fruits
<i>Descurainia pinnata</i>	tansy mustard	seeds
<i>Dichelostemma pulchellum</i>	covenas	
<i>Echinocereus engelmannii</i>	hedgehog cactus	fruits
<i>Echinocereus fasciculatus</i>	hedgehog cactus	fruits
<i>Echinomastus erectocentrus</i>	acuna cactus	stems
<i>Ephedra aspera</i>	Mormon tea	stems
<i>Ephedra trifurca</i>	Mormon tea	stems
<i>Ferocactus cylindraceus</i>	barrel cactus	fruits
<i>Ferocactus emoryi</i>	barrel cactus	fruits
<i>Ferocactus wislizenii</i>	barrel cactus	fruits
<i>Ficus carica</i>	fig	fruits
<i>Hoffmanseggia glauca</i>	hog potatoes	
<i>Lophocereus schottii</i>	senita	fruits
<i>Lycium andersonii</i>	wolfberry	berries
<i>Lycium berlandieri</i>	wolfberry	berries
<i>Lycium exsertum</i>	wolfberry	berries
<i>Lycium fremontii</i>	wolfberry	berries

Table I-4, continued

**Plants Mentioned in Oral Histories as Food and Beverage Sources
Used by Hia C-Ed O’odham in the Twentieth Century***

Scientific Name	Common Name	Edible Parts
<i>Lycium parishii</i>	wolfberry	berries
<i>Mammillaria thornberi</i>	fishhook cactus	fruits
<i>Monolepis nuttalliana</i>	patota greens	
<i>Olneya tesota</i>	ironwood	seeds
<i>Opuntia acanthocarpa</i>	buckhorn cholla	buds
<i>Opuntia arbuscula</i>	pencil cholla	fruits
<i>Opuntia engelmannii</i>	prickly pear	fruits
<i>Opuntia fulgida</i>	jumping cholla	buds
<i>Opuntia leptocaulis</i>	cholla	fruits
<i>Opuntia violacea</i>	prickly pear	buds
<i>Orobranche cooperi</i>	broomrape	stalks
<i>Peniocereus greggii</i>	cereus	roots
<i>Phoenix dactylifera</i>	data palm	fruits
<i>Pholisma sonora</i>	sandfood	
<i>Plantago insularis</i>	psyllium	seeds
<i>Portulaca oleracea</i>	purslane greens	
<i>Prosopis pubescens</i>	screwbean	pods
<i>Prosopis glandulosa</i>	mesquite	pods
<i>Prosopis velutina</i>	velvet mesquite	
<i>Punica granatum</i>	pomegranite	seeds
<i>Salvia columbariae</i>	chia	seeds
<i>Sambucus mexicana</i>	elderberry	fruits
<i>Sarcostemma cynanchoides</i>	milkweed	sap
<i>Solanum eleagnifolium</i>	nightshade	fruits
<i>Stenocereus thurberi</i>	organ pipe	fruits
<i>Trianthema portulacastrum</i>	horse purslane	leaves
<i>Triticum aestivum</i>	wheat	seeds
<i>Vitis vinifera</i>	grapes	
<i>Zea mays</i>	corn	seed
<i>Zizyphus obtusifolia</i>	abrojo	fruits

*This list is based on Nabhan and others (1989: Table 3) and includes both introduced and domesticated plants.

Table I-5

Economically Important Animals of the Western Papaguería *

Species	Common Name
<i>Antilocapra americana sonorensis</i>	sonoran pronghorn
<i>Bassariscus astutus</i>	ring-tailed cat
<i>Canis latrans</i>	coyote
<i>Citellus harrisi saxicola</i>	Harris' antelope squirrel
<i>Citellus tereticaudus</i>	round-tailed ground squirrel
<i>Dicotyles tajacu</i>	javelina
<i>Dipodomys deserti deserti</i>	desert kangaroo rat
<i>Lepus californicus deserticola</i>	black-tailed jack rabbit
<i>Lophortyx</i>	quail
<i>Neotoma albigula</i>	white-throated wood rat
<i>Neotoma lepida</i>	desert wood rat
<i>Odocoileus hemionus crooki</i>	desert mule deer
<i>Ovis canadensis</i>	desert bighorn sheep
<i>Perognathus amplus rotundus</i>	Arizona pocket mouse
<i>Perognathus baileyi domensis</i>	Bailey's pocket mouse
<i>Peromyscus eremicus</i>	cactus mouse
<i>Sylvilagus auduboni</i>	desert cottontail
<i>Urocyon cinereoargenteus</i>	gray fox
<i>Vulpes macrotus</i>	kit fox

*Compiled from Brown and Lowe (1982: Appendix II), Coe (1979: 14-15), and Doelle (1980b: 103)

4.5 PALEOCLIMATE

Human occupation in the Papaguería began in the Late Wisconsin era, at the end of the Pleistocene epoch, and the changes in regional environmental conditions since then must be a part of any attempt to reconstruct the history of human occupation. Paleoenvironmental scientists have used evidence derived from alluvial stratigraphy, pollen trapped in sediments, and plant materials incorporated in packrat middens to reconstruct that environment and describe its changes. See McGuire (1982b), Moratto (1984), Stone (1987), Weide (1982), and Ahlstrom (2000) for summaries of that research. Van Devender and others (1987), Van Devender (1990), and Betancourt and others (1990) have produced syntheses of vegetation history in the arid interior of western North America based on data from packrat middens.

There is considerable evidence that conditions in the Late Pleistocene were cooler and wetter than in the Holocene (Weide 1982: 8). As a result, lakes formed in many desert basins, and some plant species occurred at lower elevations than they do today.

Antevs (1948, 1955) identified the Provo Pluvial at the end of the Pleistocene and divided the Holocene into the Anathermal, Altithermal, and Medithermal ages. As summarized by Ahlstrom, the Provo Pluvial (to ca. 7000 B.C.), corresponding to the last advance of the Wisconsin continental ice sheet, was a time when the playas of the Great Basin were filled with water; the Anathermal (7000-5000 B.C.) was a warm, moist interval, becoming warmer and drier through time. The Altithermal (5000-2400 B.C.) was a warm and dry period, drier than today; the Medithermal (since 2000 B.C.) has been a cool and moist interval (Ahlstrom 2000: 56).

The shift from Late Pleistocene to Holocene conditions began within 1,000 years before or after 9000 B.C. according to Weide (1982:10). Vegetation during the late Pleistocene-Holocene transition (12,000-6000 B.C.) consisted of a widespread piñon-juniper woodland (*Pinus monophylla*, *Juniperus osteosperma*). The pinyon-juniper woodland was replaced by subtropical desert species during the period of 10,000-6000 BC. The woodland retreated to higher elevations and the desert expanded. Relict populations of juniper are found in the Sand Tank Mountains. Many species of animals (mammoth, giant ground sloth, camel, and horse) became extinct, particularly between 11,000 B.C. and 6000 B.C. (Moratto 1984: 88). The shift to relatively modern vegetation occurred in the Mohave Desert by about 6000 B.C. (Van Devender and others 1987:34).

Only one approach—the study of plant macrofossils from packrat middens—has been applied successfully to the Western Papaguería. Using packrat-midden data, Van Devender (1990) documented changes in the vegetation of rocky habitats within the Sonoran desert from the late Wisconsin through the Holocene. In the Late Wisconsin (14,000-9000 B.C.), desertscrub covered most of the region, including the Colorado River Valley; pygmy conifer woodland would have occurred along the region's eastern edge, as well as in the BMGR East (Betancourt and others 1990). Although the majority of the BMGR was primarily desertscrub at this time, mountain ranges like the Tinajas Altas Mountains supported the pygmy conifer woodland species of single-leaf piñon and California juniper. Single-leaf piñon disappeared from the Tinajas Altas samples at the late Wisconsin-early Holocene boundary, whereas California juniper persisted through the early Holocene (9000-7000 B.C.).

Desertscrub species present in samples dating from the late Wisconsin or early Holocene, through the middle Holocene (7000-2000 B.C.) and into the late Holocene (2000 B.C.-present), include white bursage, creosotebush, desert agave, brittlebush, mormon tea, and catclaw acacia (Van Devender 1990). In the middle Holocene, catclaw and blue paloverde were growing on slopes; today they are restricted to washes. Foothill paloverde does not appear in the assemblages until the late Holocene. Van Devender noted that “in the middle Holocene nearly twice as many species were growing near the rock shelters [where the Tinajas Altas samples were collected] as occur there today” (1990: 148). Also according to Van Devender: “Desertscrub communities in the harshest environments may have changed minimally. Potential examples include the creosote bush-white bursage communities of the Gran Desierto and the halophyte communities surrounding the head of the Gulf of California” (1990: 153).

Based on packrat-midden analysis, the climate of the Late Wisconsin was cooler and wetter than that of today. “The middle and late Wisconsin records of single-leaf piñon associated with Joshua tree from 460-550 m elevation in the Tinajas Altas Mountains reflect 40 to 60 percent increases in annual precipitation, with over 100 percent increase for the cool season” (Van Devender 1990: 155).

The modern climatic regime was established by the beginning of the late Holocene. Data from middens in the Puerto Blanco Mountains, located in Organ Pipe Cactus Monument, suggest that a brief climatic fluctuation, with greater summer and winter rainfall than the Late Holocene norm, occurred around A.D. 1000. In the Tinajas Altas Mountains and elsewhere, “impoverished modern floras at the midden sites suggest that the present climate is as hot and dry today as at any time in the Holocene” (Van Devender 1990: 159).

Many researchers believe that environmental change has been an important causal factor in human occupation of the Southwestern U.S. Thus paleoenvironmental reconstruction should play an important role in interpreting the archaeological evidence of that occupation. On the BMGR, climate change may help explain the variation in subsistence practices, as observed in the archaeological record, across time and space. For example, evidence indicating a wetter climate around A.D. 1000 would help explain the inferred presence of Hohokam agriculturalists in what is considered an inhospitable environment today. Only through multiple lines of evidence can the record of past human occupation be understood.

Section 5

CULTURE HISTORICAL OVERVIEW

In this chapter, a culture historical overview of the region is presented; it includes a summary of each time period defined and identifies some current research issues. Additional detail will be developed in Parts II and III regarding specific resource inventories and their results.

Since the first Spanish explorers wrote about the area, southwestern Arizona and northern Sonora, Mexico have been known as the Papaguería (Haury 1975: 3). The term is derived from the O'odham word, *Papavi Kuadam* or “Fepary [Bean] Eaters,” which the Spanish condensed to Papago (Nabhan 1985: 113). As described in Section 4, the term has been used to describe a region, an environment, and a culture area (see Figure I-4). The BMGR lies within the Western Papaguería.

Culture histories of the Western Papaguería tend to emphasize history at the expense of culture. Most of these have simply reiterated longstanding assumptions about human habitation in and use of the region, which are largely based on a sequence of narrowly defined innovations in material culture—projectile point styles, the appearance and type of pottery. There are several explanations for this pattern. First, to a greater degree than in most other regions of the world, there is an apparent uniformity to the archaeology—mainly rock piles and artifact scatters—that is difficult to interpret in a broadly conceived diachronic framework. Like the better known Formative cultures to the east and west, the people of the Western Papaguería had a diverse and changing material culture, but that diversity and its accompanying shifts in ceramic, architectural, and burial style are difficult to study when prehistoric populations typically had few possessions, and for the most part did not live in permanent settlements.

Three related patterns have characterized the archaeology of the Western Papaguería. First, there is the laserlike focus on diagnostic artifacts, particularly ceramics. In all regions, archaeologists use temporally sensitive artifacts to help date sites, but in the Western Papaguería this orientation dominates all other research avenues. A single sherd becomes the object of intense scrutiny, and the absence of such artifacts renders entire collections uninterpretable. A strong “pots equal people” mentality is reflected in studies of the Western Papaguería, although most archaeologists decry this equation (see Ahlstrom and Chenault 2000: 248). Second, although archaeologists recognize that stone tools dominate collections from the Western Papaguería, lithic analysis has not featured prominently in posing or addressing research questions. This is in marked contrast to the archaeology of the adjoining Mojave and Colorado Deserts, as well as the Great Basin and other arid regions of the world. Third, attention has been placed on Formative cultures rather than on hunters and gatherers. This emphasis seems misplaced. Evidence for village life and agriculture—the hallmarks of the Formative way of life (Willey and Phillips 1958)—in the Western Papaguería is very limited, although these attributes were certainly well established in the Eastern Papaguería and in the Gila Bend area along the Gila River. Even during the florescence of the Hohokam and Patayan cultures, much of the population of the Western Papaguería remained organized in small, mobile groups that depended primarily on wild plants and animals for their sustenance (Altschul and others 2002).

The following overview is designed to provide the reader with an understanding of current research topics. Readers wanting more general background information on the prehistory, ethnography, and history of the Western Papaguería are referred to the more comprehensive regional overviews (Ahlstrom, editor 2000; McGuire and Schiffer 1982; Whittlesey and others 1994).

Current issues in American archaeology today include “who were the first Americans?” and “when did they arrive?” Archaeologists have long argued that the first Americans were hunters in pursuit of large game animals who crossed the Bering land bridge, thereby leaving their Asian homeland for the New World about 12,000 years ago. Recent finds have complicated this picture. The site of Monte Verde in Chile, for example, contains evidence of human occupation coeval with (if not earlier than) the earliest sites in northern North America (Dillehay 1997). Sites on the Pacific coast in British Columbia and off the shore of California have yielded similarly early dates, but show a fully maritime culture. Instead of the monolithic land-bridge hypothesis, most archaeologists today consider that multiple migrations into the New World (Anderson and Gillam 2000) of different populations and by different routes are likely to have occurred.

Julian Hayden (1976) developed a culture-history framework for southwestern Arizona and northwestern Mexico based in part on the work of Malcolm Rogers (1939, 1945, 1958, 1966). Hayden added an archaeological culture, the Malpais, to the beginning of Roger’s sequence and suggested that it predated 12,000 BP and could be as old as 35,000 BP. The Malpais artifact assemblage, identified primarily from the Sierra Pinacate region of northwest Mexico, contains choppers, scrapers, and worked shell. The flaked stone typically exhibits heavy patination called desert varnish. These tool assemblages also are found in association with “sleeping circles”, trails, rock shrines, and intaglios (Hayden 1982). Dating of the Malpais complex based on desert varnish present on the tools remains controversial.

5.1 PALEOINDIAN PERIOD

The term *Paleoindian* has been used traditionally to refer to the earliest evidence of human occupation of North America dating from about 10,000 B.C. to 7500 B.C. Climate in the western portion of the Papaguería during the Paleoindian period was much colder and wetter than today. Analyses of packrat middens indicate that the vegetation consisted of piñon, juniper, yucca, and grasses.

Traditionally, archaeologists have argued that the original inhabitants of the continent were accidental visitors. Hunters in pursuit of herds of large game crossed the Bering land bridge, thereby leaving their Asian homeland for the New World about 12,000 years ago. These hunters were immensely successful, following Pleistocene megafauna, including mammoths, bison, and horses, from Alaska to the tip of South America in only a few thousand years, and lending an unintended hand in the extinction of these animals. The spread of the early big-game hunters, termed Paleoindians, is relatively easy to follow, marked by a particular style of fluted projectile point, referred to as Clovis.

The few Paleoindian sites in the Papaguería have not entered into the debate surrounding the first Americans. Only a single site containing deposits of Paleoindian age—Ventana Cave, roughly 48 miles west of Ajo, Arizona, on the Tohono O’odham Nation—has been systematically excavated (Haury 1950). Sites in the Western Papaguería that have been attributed to this period consist entirely of surface artifacts.

Ezell (1954) reported a fluted Clovis-style projectile point from near the northwest boundary of Organ Pipe Cactus NM in the Cabeza Prieta NWR, and another fluted point was found along the Gila River near Painted Rocks (Whittlesey et al. 1994). A Clovis-style point was identified in the Fortuna Mine area on the BMGR West by BLM archaeologist Cheryl Blanchard, BLM. In 1998, AZ Y:8:100 (ASM) was recorded in the East Pass on the North Tactical Range of the BMGR East; evidence of multiple temporal components including the Clovis period, the early Archaic period, the middle Archaic period, and the Ceramic period was noted (Tucker, ed. 2000). The site consists of 12 features including rock clusters, rock rings and roasting features, and four Clovis-style fluted projectile points and point fragments, as well as artifacts dating to later periods (Tucker, ed. 2000: 405–424).

The surficial nature of early sites has led to research into the areas of chronometrics and classification. Surficial sites are notoriously difficult to date, and since most Paleoindian sites in the Western Papaguería are surface scatters of artifacts, archaeologists have long been intrigued by methods for dating desert pavement. Rogers used the association of cultural materials with “extinct” or Pleistocene landforms as a relative measure of time, whereas Hayden argued that the degree of varnish on the surface of lithic artifacts was an indicator of age. The thicker the varnish, the older the artifact—and some artifacts are so well varnished that they must be Paleoindian or older (dating to a period referred to as Malpais) in age. Recently, Schneider and Zreda (2000) have presented evidence that calls into question this time-honored method of dating. Other methods of dating desert varnish, including cation-ratio dating and radiocarbon dating of organic material trapped in the varnish, also have been investigated (for example, Dorn 1983). As yet, none of these methods has been successful (for example, Harry 1992, 1995).

Archaeologists have used more than one classification scheme to refer to Paleoindian sites. Archaeologists trained in Arizona generally refer to Paleoindian sites as Clovis, whereas those from California use the term San Dieguito or Lake Mohave. The Clovis complex is characterized by distinctive, large lanceolate points with a channel flake removed from the center to produce a flute. Dates for Clovis sites cluster between 9500 B.C. and 9000 B.C. San Dieguito is divided into three phases, based on the presence or absence of various lithic tool types. San Dieguito I is the only phase that has been identified in the southwestern desert of Arizona. San Dieguito II and III are confined to the area along the Colorado River and the deserts of southeastern California. San Dieguito I is characterized by large flakes and cobbles, cores, hammer stones, cleavers, cobble choppers, beveled flakes, and other specialized flakes (Bauer et al. 1996).

Theoretically, Clovis sites are the remains of big-game hunters; the San Dieguito/Lake Mohave adaptation, in contrast, centered on resources available at pluvial desert lakes and coastal marshes of the late Pleistocene and early Holocene. Neither concept is necessarily appropriate

for the Western Papaguería; most of the region did not support either herds of megafauna or pluvial lakes.

The adaptations represented by the two types are often construed as mutually exclusive subsistence strategies (see McGuire 1982a); an alternative view is that Paleoindian culture was composed of highly opportunistic societies. Essentially, they were hunters when there was something to hunt (rarely), and gatherers of whatever plants were available (more frequently). Their success in settling an entire hemisphere in less than two millennia suggests that they were constantly moving into new territories with new resources. Flexibility had to be at the center of this mobile culture's tool kit. Questions about whether we should call them Clovis or San Dieguito (for example, Henshaw and others 2000: 209) fade in importance to more central questions of how the people who first entered the Western Papaguería conceptualized the land and its resources, and adapted correspondingly.

5.2 ARCHAIC PERIOD

The term Archaic refers to a period of time from approximately 8500 B.C. to A.D. 1, as well as an economy of hunting and gathering that gradually adapted to local environments and resources. Analysis of pollen and macrofossils from packrat middens in the Papaguería (Van Devender 1977, 1987; Van Devender and Spaulding 1979) indicates that Sonoran desert vegetation was established by 8000 B.C. and that Archaic paleoenvironments were similar to the modern Sonoran desert. By this time, the large Pleistocene fauna that helped to fuel the Paleoindian hunting economy were extinct. The Archaic lifeway was characterized by hunting small game animals and gathering wild plants. Tools used by these hunters and gatherers reflect this economic base and the change in vegetation. Grinding tools such as manos and metates were used in plant processing. Less specialized projectile points probably were used as dart points and knives.

Artifact assemblages recorded in different regions have been identified as distinct complexes based on the presence of specific projectile point styles. These cultural traditions are clearly defined in the regions where they were first defined but are difficult to identify elsewhere. This situation is exemplified by the diverse Archaic remains from Ventana Cave, which could not be identified with a single Archaic tradition. Haury (1950) suggested that the area was a meeting ground or an area of cultural overlap. The Papaguería is located in an area considered transitional between two major Archaic traditions, the Amargosa and the Cochise culture. Recent work has yielded data that challenge this framework. The identification of a Southwestern Archaic tradition that incorporates the older Archaic traditions into a systematic framework is presented below.

Archaic period cultures of the Southwest only rarely have been the focus of intense study. Some archaeologists have spent their careers on the Clovis sites of Arizona and New Mexico, and many more have focused their attention on the pueblos and pit house villages of the Hohokam, Mogollon, and Anasazi, but relatively few have paid attention to the period in between. The lack of interest is probably related to a belief that little happened. Projectile point styles change, but not much else. Archaeologists have conceived of an 8,000-year (or longer) Archaic period during which cultures settled in and gradually adapted to local environments and resources.

Malcolm Rogers was the first to identify the Archaic period in the Western Papaguería. In 1939, he defined the Amargosa tradition to include the Archaic cultures of southern California and the lower Colorado River region (Rogers 1939). Two years later, Sayles and Antevs independently defined the Cochise culture to describe the Archaic period cultures of southeastern Arizona (Antevs 1941; Sayles 1941; see also Eddy and Cooley 1983). Much like the Clovis–San Dieguito debate discussed above, Papaguerian archaeologists have argued about whether the Amargosa or Cochise traditions should be applied to Archaic sites in the region. McGuire (1982a: 178) suggests that the differences between the Amargosa and Cochise cultures reflect the east-west environmental gradient in southern Arizona. In the east, where the Cochise culture was established, the environment was wetter, and people had greater access to grasses and large game animals. This is reflected in the material culture by the presence of metates and projectile points. By contrast, groups in the more arid western desert had to rely more on desert-adapted species such as mesquite. The Amargosa grinding technology, as illustrated in the gyratory crusher, reflects this latter adaptation (Hayden 1969).

Our understanding of the Archaic cultures of the Western Papaguería has been hampered at least as much by archaeological concepts as by the nature of the data. Archaeologists have tended to paint Archaic culture with a broad brush, using many of the same concepts across the arid western United States; yet, if there is any consensus within the archaeological community about the period, it is that groups became better adapted to their individual immediate environments. The evidence suggests that instead of being culturally homogeneous, the Southwest supported a greater variety of cultural adaptations than ever before. Thus, to understand the Archaic period in the Western Papaguería, and on BMGR, we should concentrate on evaluating local adaptations rather than developing global explanations.

To explain Archaic cultural development in the Western Papaguería, we need to understand how hunters and gatherers perceived their environment—what resources were targeted and how the resource mix changed over time. Next, we need hypotheses that tie economic decisions to organizational and logistical choices. Finally, we need to link these hypotheses to the archaeological record.

Vanderpot and Altschul (2004) contend that the hard seeds of wild grasses in the Childs Valley were an important Archaic period resource, and that reliance on wild-grass seeds fluctuated with climatic conditions and technological innovation.

Grasses would have been more available during moister regimes, and grass seeds would have been more useful in the diet after the introduction of slab or flat-surface grinding implements. During drier periods, people would have placed greater reliance on desert succulents, legumes, and riverine resources. We predict, therefore, that intense use of desert grasses coincided with moister regimes after the introduction of grinding implements (ca. 3000 B.C.). The size and range of the social unit exploiting these grasses depended on the amount and reliability of the resource. Small, mobile groups are expected if the grasslands were restricted in size, available for short periods, or unpredictable from season to season; larger groups, in contrast, probably coalesced in these grasslands during generation-long periods of abundant resources (Vanderpot and Altschul (2004: 12).

Once identified, patterns identified in the availability and exploitation of resources in localized environments may be combined with patterns in other resource areas to create a cohesive model of resource exploitation, population movement, and culture in the Western Papaguería during the Archaic period.

5.3 FORMATIVE PERIOD

The terms Formative and Ceramic have been used to describe the period from the beginning of the Common Era (A.D. 1) to A.D. 1450. The events and processes that transpired on the BMGR and in the western portion of the Papaguería in this time period are often interpreted relative to cultural sequences identified in areas to the north and east (Hohokam), west (Patayan), and to a lesser degree, the south (Trincheras). The Areneños, another culture located to the southwest in the Sierra Pinacate (Hayden 1967), has not figured as prominently in interpretations of regional prehistory.

The occupation of the Papaguería during this period has been the focus of archaeological study, and as with earlier periods, cultural sequences developed for the Formative period in regions to the east and west have been used to describe events and processes in the Papaguería. Because our knowledge of Hohokam culture is so much better than that of Patayan culture, most culture histories of the Papaguería look eastward (for example, Ahlstrom and others 2000).

An argument can be made, however, that Hohokam culture was largely irrelevant, or at most tangential, to cultural processes in the Western Papaguería over the last 1,000 years of prehistory. Haury (1950, 1976) recognized that Hohokam culture was largely riverine in focus. To account for nonriverine sites with Hohokam traits, Haury created two branches of Hohokam culture—riverine and desert. Masse (1980) attacked this distinction using data from Gu Achi and other pre-Classic sites in the Papaguería. Recognizing a general consistency in pre-A.D. 1000 material culture, Masse (1980) applied the Hohokam label to Formative culture of the pre-Classic period in the Papaguería, but argued that such an affiliation ended around A.D. 1000. Between A.D. 1000 and 1100, Masse contended that much of the Papaguería was abandoned, and subsequently resettled by a non-Hohokam culture.

There is no denying that Hohokam pottery and other items are found in the Western Papaguería; Hohokam pottery types are represented by large numbers of sherds at sites in the northern half of the region, and even at a few sites in the southern half. The question is what these sherds and other Hohokam material culture items signify. Do these remains mean that Hohokam people lived in or traveled through the Western Papaguería? Did a culture indigenous to the Western Papaguería obtain these items through trade and exchange? These same questions apply equally to the Patayan sherds and artifacts that are found in greater frequency to the west.

At stake in this argument is whether we view the Western Papaguería as a hinterland for Hohokam and Patayan cultures or the heartland of a group with an essentially Archaic period lifeway that interacted with, but was not dominated by, its Formative period neighbors to the east and west. Most archaeologists have taken the first view, in which inhabitants of permanent settlements along the Gila and Colorado Rivers of central and western Arizona made forays into the desert to obtain specific resources (for example, Ahlstrom and others 2000: 126–127; Altschul and Jones 1989; Bayman 1988; Doelle 1980). This construct reflects the idea that the Western

Papaguería was an inhospitable place to live. The problem with this notion, is that it is at odds with the archaeological data. In the 75 years since Malcolm Rogers began surveying the Western Papaguería, hundreds of archaeological sites have been recorded in the interior. Some of these are large sites reflecting intensive occupations, such as Verbena Village, Lago Seco, Kuakatch Village, and Lost City (see Ahlstrom 2000).

The ethnography of the Western Papaguería is instructive on this point. The Yumans were a semisedentary, riverine culture, inhabiting the banks of the Colorado and Gila Rivers and dependent for at least 50 percent of their diet on agricultural produce (Castetter and Bell 1951; Kelly 1977; Spier 1978). The Tohono O'odham to the east practiced a mixed agriculture-hunting-foraging economy with a two-settlement system, occupying a well village in winter and moving in summer to locations near their fields (Fontana 1983a; see also Castetter and Bell 1942; Jones 1969). In contrast, the Hia C-ed O'odham were a mobile people who formed few villages, depended heavily on hunting and gathering, and only occasionally practiced agriculture (Crosswhite 1981; Ezell 1955; Nabhan and others 1989).

One might assume that the Hia C-ed O'odham had the most precarious of these adaptations. It is instructive, however, to note that groups similar to the Hia C-ed O'odham occupied most of the Sonoran, Colorado, and Mojave Deserts. The Pai groups to the north, for example, practiced a seasonal round that focused on the plants and animals of the canyons and mesas, and only rarely visited the permanent waters of the Colorado River (Dobyns and Euler 1970; Euler 1958).

During the Archaic period, hunter-gatherers successfully adapted to the Western Papaguería. The advent of agriculturally based societies along the major rivers might have complicated the social landscape, but it is hard to understand how or why their presence would have vitiated a previously successful lifeway. Ahlstrom and his colleagues argue that the riverine Formative cultures would have made forays into the desert to obtain specific goods and their presence and activities would have “changed the dynamic of interaction for groups of hunter-gatherers (and part-time farmers) who inhabited the Western Papaguería” (Ahlstrom and others 2000: 126). In particular, Hohokam people were major consumers of marine shell, mostly from the Gulf of California, as well as obsidian from the Saucedo and Sand Tank Mountains. The implication is that these Formative groups would have out-competed or at least pushed back the indigenous Western Papaguerian groups.

Certainly the emergence of Formative cultures along the Gila and Colorado Rivers, as well as those along the Ríos de la Concepción and Sonoyta, would have altered the social equation for hunters and gatherers of the Western Papaguería. This situation, of course, has been repeated throughout the world for millennia, as Neolithic farming communities developed and interacted with neighboring pastoral and hunter-gatherer societies. Ahlstrom and others (2000: 125) note two types of interaction that have dominated the anthropological literature. The first involves some form of social umbrella that allows individuals to change from farmers to foragers and back again as conditions allow. The second is a more mechanical form of exchange of goods and services. Such exchanges are generally one-sided, with the foraging population being economically and politically dependent on the farmers.

Complicating the relationship between desert and river groups is the issue of language. All Piman groups speak languages of the Uto-Aztecan linguistic family. Traditionally, it was assumed that the Proto-Uto-Aztecan (PUA) speech community originated in the Great Basin and spread south to Mexico and Latin America (Fowler 1983; Lamb 1958). Fowler argues that PUA might have been associated with the Oshara phase of the Archaic period, and thus, dates the origin of the PUA language groups to around 5000 B.P. Fowler states that a breakup of the Northern PUA community around 3000 B.P. could be consistent with her thesis. According to this viewpoint, agriculture was introduced from the south by Mixe-Zoquean speakers. Some indigenous foraging-based PUA speech communities as well as other language communities, such as Yuman, Tanoan, Keresan, and Zuni, gradually adopted agriculture techniques, whereas others continued their hunter-gatherer lifeways. In this view, Upper Piman-speaking groups were all originally hunter-gatherers, with some such as the Tohono O'odham incorporating agriculture into their subsistence strategy, and others like the Hia-Ced O'odham retaining their foraging lifeway.

Bellwood (1997) and Hill (2001) have recently turned this argument on its head, suggesting instead that PUA originated in the south and moved north. Combining linguistic with archaeological evidence, Hill (2001: 929) concludes: —Under this model, the Uto-Aztecan presence in California, the Great Basin, and the Southwest is the result of a migration northward, driven by the demographic consequences of an early commitment to cultivation.” Citing evidence from the Santa Cruz Valley, Hill argues that agriculture was introduced into the southern Southwest by around 3700 B.P. and that the breakup of PUA did not occur until as late as 2900 B.P. Hill views PUA hunter-gatherer groups, such as the Hia-Ced O'odham and Takic speakers in the deserts of eastern California, as —evolving” from cultivators to foragers.

Although much of Hill's argument is compelling, we find the conclusion that PUA speaking hunter-gatherers of the Papaguería originated as Mexican cultivators is at odds with the archaeological record (see also Carpenter and others 2002). There is no evidence that Hohokam or Patayan communities established along the Gila and Colorado Rivers ever pushed out the indigenous groups of the Papaguería. Instead the groups adapted to each other. A much more parsimonious explanation for the language distribution is one of symbiotic adaptations in which farmers and foragers developed social networks to gain access to resources of economic and ideological value.

As with many dichotomies in anthropology, the extremes represent the ends of a continuum, the specifics of which depend on local conditions and history. In the Western Papaguería, for example, there is substantial ethnographic evidence of Hia C'ed and Tohono O'odham individuals working as seasonal laborers on farms along the Gila River, first on Akimel O'odham (Pima) farms and later on Anglo-American farms (Fontana 1983a, 1983b; Jones 1969). The relationships between the laborers and the two groups of farmers were, of course, radically different. The Hia C'ed and Tohono O'odham workers had social and cultural ties to the Akimel O'odham, allowing a relationship of relative equality to emerge, in which Hia C'ed and Tohono O'odham workers shared in the crop. In contrast, the relationship with Anglo-American farmers was one of employee to employer in a cash market.

To better understand the late prehistoric and protohistoric periods in the Western Papaguería, archaeologists must stop thinking of the indigenous population as necessarily either Hohokam or Patayan and should carefully examine evidence of the relationship between desert and riverine cultures. Instead of viewing prehistory solely with reference to the desires and objectives of the riverine farmers, we should also examine the benefits of this interaction for both the riverine farmers and the hunter-gatherers of the Western Papaguería. This analysis also should examine changes in the different components of that interaction over time. Were the relationships among Hohokam, Patayan, and indigenous Western Papaguerian peoples similar to those documented ethnographically among the Akimel O'odham, Hia C-ed O'odham, Tohono O'odham, and riverine Yuma? This question goes to the heart of continuity and change before and after European contact, which has dominated Southwest archaeology for more than a century.

5.4 SPANISH PERIOD

The rugged, arid, and isolated nature of the Western Papaguería acted as a constraint on historical-period European activities in the region. The Spanish presence in the Southwest began with the expedition of Francisco Vásquez de Coronado in the 1540s, but this *entrada* passed far to the east of the Papaguería. Coronado did send one of his lieutenants, Melchor Díaz, across the Western Papaguería to Yuma, where he forded the Colorado River into California (Sheridan 1995: 26), but the expedition did little more than provide limited information on the region, which was largely forgotten by the Spanish for the next 150 years. Later sixteenth- and early-seventeenth-century Spanish exploration remained well to the north, following more reliable water sources.

In the late seventeenth century, the Spanish missionary effort, already well established farther south, brought the Jesuit Francisco Eusebio Kino to the Papaguería. During the period 1693–1707, Kino made numerous trips across the region, both as an exploring cartographer and in search of suitable locations for permanent missions. Although he passed through the Papaguería many times en route to the Gila River, he spent little time in the region and made no attempt to establish settlements there. His efforts along the Santa Cruz River, on the eastern edge of the Papaguería, led to the establishment of Jesuit missions at Guevavi and Bac in 1730, and eventually to the establishment of a presidio at Tubac in 1753, but even the Santa Cruz Valley remained sparsely settled for the remainder of the Spanish colonial era, primarily because of persistent Apache raiding. In 1775, Juan Bautista de Anza, commander of the presidio at Tubac, led a group of Spanish settlers down the Gila River and across the California desert, thus opening an overland route to the Franciscan missions being established along the coast. But the road to California was soon closed because of the hostility of the Yumans living on the lower Colorado River, and after a few years the limited Spanish presence in the Papaguería implied by this route ended (Bischoff 2000; Hartmann 1989; Majewski and Ayres 1997; Weber 1992: 248–258).

In their discussion of the early historical period, Tucker and others (2000) focus largely on documented events relating to Native American interactions in the area. We also believe this theme is important, but we would stress that during the historical period the study of Native Americans cannot be undertaken without a consideration of the effects of European contact in the area. Much remains to be done in terms of historical-period Native American material culture, particularly during the transition from protohistory to history, but it is clear that Spanish

introductions, including cultivars, livestock, and technology, had a significant impact on indigenous lifeways in the Papaguería, despite the lack of Spanish settlements (Sheridan 1988).

5.5 MEXICAN PERIOD

With continued Apache raids on the thinly populated frontier, settlement was hampered. By 1821, Spain lost its grip on the region, and Mexico gained its independence. The current project area, because of its isolation, witnessed little change during this period. Mexican authority over the area did little to curb the Apache threat, and settlements declined in many places. Much of present-day Arizona passed into American hands in 1848. Following subsequent border disputes, the southwestern portion of Arizona was acquired by the United States under the Gadsden Purchase of 1854 (Homburg and others 1994: 38). Little is known regarding settlement of the Western Papaguería during this period.

5.6 EARLY AMERICAN PERIOD

American interest in the project area began with attempts to link California with other states to the east. With the discovery of gold in California in 1848, this became critical. The Camino del Diablo first used by Europeans in Kino's day and crossing the formidable southern portion of the Papaguería, became a common—and often lethal—route for the rush of forty-niners headed to California. Another, less hazardous east-west route followed the Gila River to its confluence with the Colorado (Hartmann 1989; Sheridan 1995). An important north-south route across the Papaguería passed through the Quijotoa Valley, to the east of the project area, connecting what is now Gila Bend with Pozo Blanco and points south. This route was also first used by Kino and other Spanish explorers and was later followed by miners and others in the nineteenth century (Homburg and others 1994).

Survey parties crossed the Gadsden Purchase during the 1850s in search of routes for a transcontinental railroad, although it would be decades before a railroad was constructed across the region. Surveys of the U.S.-Mexican border were also commissioned and constituted the first exploration of much of southwestern Arizona. Such surveys brought the region to the attention of others, particularly those seeking precious minerals. Stagecoach lines were established across the region, most notably the Butterfield Overland Stage in 1858. The stage line allowed for more concerted exploration of southwestern Arizona, including the project area. Mines were sought out in the area, and a few were opened during this frontier period. The American military followed the settlers and miners in order to afford them protection. Military presence in this portion of the west, however, remained slight. With the outbreak of the Civil War, American military resources were sent east, and in other portions of the region (for example, south and southeast of the Papaguería), Apache raiding again took its toll. Transportation corridors throughout the region slowly expanded during this period, and archaeological traces of the associated activities, including mining, can be expected throughout the BMGR.

5.7 POST-CIVIL WAR PERIOD

Following the end of the Civil War, ranching and mining activity increased in Arizona, and routes of travel improved across the region. In order to protect the new settlers, the military

began a concerted effort to subdue ~~hostile~~ Native American groups throughout the territory. To supply the military posts and the new settlements, cattle ranches sprouted up across the state, even in such arid places as southwestern Arizona. Mines also began to be exploited during this period. As miners and ranchers moved across the state, communication and transportation links were improved. Trails that had been used by Native Americans for centuries were expanded and improved to handle wagon transportation. Perhaps one of the most significant events for the project area during the historical period was the arrival of the railroad in the early 1880s. The railroad connected the region to the rest of the nation, providing access to all sorts of markets and goods. Cattle, ore, and other natural resources could now be carried to markets with ease, making the pursuit of these enterprises far more profitable. As a result, ranches expanded, and prospecting increased in the late nineteenth century. A profitable avenue of study for this period is to consider the overall effects of the region's involvement in the global economy.

5.8 EARLY TWENTIETH CENTURY

During the early twentieth century, the arrival of the automobile spurred further development of roads across the territory. Arizona was admitted to the union as a state in 1912. With American involvement in World War I, demand for copper and agricultural products (including cattle) led to further economic development of the region. Numerous mining claims were made in the project area during this period. Company towns, such as Ajo, grew up near the mines (Sheridan 1995: 253). What is now State Route 85 was established as the main road between Ajo and Gila Bend. Homesteads were filed across the region early in the century, but few were ever ~~proved-up~~ (Stein 1990). We expect there to be a fair number of archaeological sites and isolates relating to this period on the BMGR.

5.9 WORLD WAR II TO PRESENT

The military potential of aircraft was realized during World War I, by which time American pilots were using airplanes for everything from reconnaissance to air-to-air combat. The beginning of World War II marked the meteoric growth in American military aviation; between 1940 and 1944, Congress had appropriated over \$60 billion to the Army Air Forces. Establishing training areas for aircrews was a critical component of this buildup. The isolated nature of southwestern Arizona, along with its nearly ideal flying climate led to federal acquisition of the area in 1941. Initially, 1.1 million acres were acquired in order to create a training range for air-to-air and air-to-ground combat. The training was directed from Luke Field, which had been established in June 1941. The acreage was soon thereafter expanded to 2.1 million acres. Ranchers and other settlers in the area were told to vacate their property. Many refused, however, claiming their rights to lease the land under the Taylor Grazing Act of 1934, and some remained in the area until the mid-1950s (Homburg and others 1994: 40).

During World War II, the War Department divided the range into eastern and western components, designated the Gila Bend Gunnery Range and the Yuma Aerial Gunnery and Bombing Range. Since then, the range has been renamed several times, and in 1986, it was redesignated the Barry M. Goldwater Range. With the MLWA of 1999, Congress reauthorized the withdrawal of over 1,650,000 acres of public land for military use. In addition to these withdrawn lands, inholdings of formerly private and State Trust Lands totaling almost 84,000

acres purchased between 1986 and 1998 are held in fee simple by the Department of Defense. MLWA assigned jurisdiction over the BMGR East and BMGR West to the Secretaries of the Air Force and Navy, respectively.

The Barry M. Goldwater Range is the nation's second largest tactical aviation range and continues to be essential for developing and maintaining the combat readiness of the tactical air forces of the United States Air Force, Marine Corps, Navy, and Army for more than 50 years. Since the beginning of World War II, the Goldwater Range has contributed to the nation's defense by effectively accommodating the training requirements of changing air combat capabilities and missions.

In addition to aircrew training, the BMGR has occasionally been the site of military testing projects. The first large-scale, surfaced-based test project known to have occurred on the BMGR was initiated in April 1977 at a location about 12 miles south of Wellton, Arizona. This project was the first of a series of tests that was part of the larger Air Force study program to develop workable basing modes for the MX Peacekeeper missile. These projects evaluated two protective shelter designs, a hardened underground missile silo and a buried, hardened tunnel through which a missile would be shuttled and ultimately launched. The intent of both projects was to protect a missile launching system so that it could survive the effects of a nuclear "first strike." Subscaled prototypes of the proposed shelters were tested using blast and shock pressures generated by conventional high explosives in an increasingly powerful series of separate detonation tests calculated to simulate the effects of a nuclear weapon detonation. The validity of the tunnel-basing mode was further tested within the eastern range area beginning in 1978. All of the above-ground infrastructure and debris from these projects was later removed from the range, with the exception of two large bunkers, one which the Marine Corps now uses as a storage facility.

Buildings and structures, targets arrays, and other facilities on BMGR are associated with historic events from the buildup of military aviation during World War II through the evolution of jet aircraft, missile defense systems, and other advances in military technology, weapons, and training.

5.10 SUMMARY

The BMGR region has hosted a long and complex history of human activity in a harsh and unforgiving environment. Despite these harsh conditions, it is clear that people lived and thrived here for generations. Reconstruction of these events is but one focus of cultural resource studies in the region.

Section 6

EVALUATING HISTORIC SIGNIFICANCE: THE NATIONAL REGISTER OF HISTORIC PLACES

When the first cultural resource overview of the BMGR was prepared in 1977, only 46 archaeological and historical sites had been recorded. Within a decade the number had almost doubled, and it had reached about 400 by 1995, when the most recent overview was initiated (Ahlstrom 2000). The total number of sites recorded now exceeds 1500. The vast majority of cultural resources found on the BMGR consists of archaeological sites, and a discussion of strategies for evaluating the historic significance of these sites is the focus of this chapter.

6.1 THE NATIONAL REGISTER OF HISTORIC PLACES

Since the passage of the NHPA in 1966, publicly funded surveys and excavations have constituted an increasingly important component of professional archaeological research each year. Federal agencies spend millions of dollars annually to identify and evaluate *historic properties*, that is, places that are listed or eligible for listing on the National Register, and to avoid, minimize, or mitigate the impacts of their actions on those properties. By law, federal agencies must consider impacts to historic properties in decision-making.

Section 101 of the NHPA authorized the Secretary of the Interior to “expand and maintain a National Register of Historic Places composed of districts, sites, building, structures, and objects significant in American history, architecture, archeology, engineering, and culture” (16 U.S.C. § 470a(1)(A)). The criteria for National Register eligibility require that a property be historically important (by meeting at least one of four defined categories of significance) and have sufficient historical integrity to convey that importance. Properties of local and state significance also are eligible for inclusion on the National Register.

The National Register does not include intangible resources, although intangible characters and associations often are what make a property significant. The relationship between a property and its historical associations (whether that is a specific event, a cultural theme, or traditional beliefs and practices) must be documented. Physical boundaries must be specified for all properties.

Historic properties may include sites, buildings, structures, districts, or objects. A *site* is the location of a significant activity or event, and often refers to archeological sites or traditional cultural places, although the term also may be used to describe military properties such as testing ranges, treaty signing locations, and aircraft wrecks. *Buildings* include houses, barns, churches, and other buildings created to shelter any form of human activity, including administration buildings, dormitories, garages, and hangars. *Structures* are built for purposes other than human shelter and include bridges, tunnels, dams, roadways, and military facilities such as missiles and their silos, launch pads and weaponry, runways, and water towers. *Objects* typically are small in scale and often artistic in nature, and include sculpture, monuments, boundary markers, and fountains. *Districts* are concentrations of significant sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Evaluating the historic significance of the numerous archaeological sites, traditional cultural places, and facilities associated with World War II and the Cold War that are found on the BMGR is a daunting task. This chapter provides some basic guidance in addressing those challenges by discussing data that must be collected to support an eligibility assessment. Much of this section is taken verbatim from two National Register Bulletins: *How to Apply the National Register Criteria for Evaluation* and *How to Complete the National Register Registration Form*.

6.1.2 Historic Significance

Historic significance is the importance of a property to the history, architecture, archaeology, engineering, or culture of a community, a state, or the nation. It is achieved by meeting one or more of the following criteria:

- Association with events, activities, or patterns (Criterion A)
- Association with important persons (Criterion B)
- Distinctive physical characteristics of design, construction, or form (Criterion C)
- Potential to yield important information (Criterion D)

6.1.2 Historic Integrity

Historic integrity is the ability of a property to convey its significance. To be eligible for the National Register, a property must be historically significant. It also must possess historical integrity, which is a measure of authenticity and not necessarily condition. A building in a state of disrepair but with strong historical associations is likely to be eligible, in contrast to a property in good condition but highly modified since its period of significance. Elements of integrity to be considered include location, design, setting, materials, workmanship, feeling, and association. Not all seven aspects of integrity need to be retained, but a property must have sufficient physical remnants from its period of historical importance to illustrate significant aspects of its past.

The integrity of archaeological sites typically is evaluated by the degree to which they can provide important contextual information. The integrity of traditional cultural places is interpreted with reference to the views of closely affiliated traditional groups, if traditional people will write or talk about such places so information can be filed with a public agency. If a place retains integrity in the perspective of affiliated traditional groups, it probably has sufficient integrity to justify further evaluation. National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*, provides guidance for identifying and assessing traditional cultural places.

6.1.3 Historic Themes and Contexts

The significance of a property must be evaluated within its historic context. A *historic context* is an organizing structure for interpreting history that groups information about historic properties which share a common theme, common geographical location, and common time period. The development of historic contexts is a foundation for decisions about the planning, identification,

evaluation, registration, and treatment of historic properties, based upon comparative significance. A *theme* is a trend or pattern in history or prehistory relating to a particular aspect of cultural development.

Historic contexts are patterns or trends in history that form the framework for understanding specific events, properties, or sites. According to National Register guidance, to decide whether a property is significant within its historic context, determine the following:

1. The facet or trend of significant local, state, or national prehistory or history associated with the property
2. Whether the property has relevance to understanding and illustrating the historic context
3. How the property specifically illustrates that history compared with other properties of the same or similar period, characteristics, or associations

Examples of broad historic contexts include subsistence practices, settlement patterns, migration, exploration, colonization, trade, transportation, religion, industrialization, and responses to documented environmental changes. More specific contexts relevant to southern Arizona might include Pleistocene subsistence and settlement; Archaic hunting and gathering adaptations; trade of obsidian, marine shell, ceramic, and turquoise objects; irrigation; migration; sedentism; political organization; and food production. Some broad contexts appropriate to understanding cultural resources on BMGR are discussed below.

6.2 HISTORIC THEMES AND CONTEXTS FOR BMGR

This section explores themes or broad contexts relevant to interpreting and evaluating BMGR sites. The vast majority of cultural resources recorded on the BMGR reflect the occupation of the region by indigenous cultures, and the first three themes focus on that adaptation. These themes have been an important focus of research regarding the cultural history of the Western Papaguería (Ahlstrom 2000; see Figure 4.1). They are (1) culture history and cultural identity, (2) subsistence and settlement, and (3) trade and exchange. Although recent research directions, as summarized in Section 5, have espoused a different perspective on these issues, they remain important concepts in the interpretation of the history of human occupation of the Western Papaguería.

The themes developed for the period of Euro-American occupation are based on a combination of oral history and documentary research. Oral history research completed to date includes interviews with long-time residents conducted in the 1980s by Bill Broyles as part of his independent effort to document the history of the western Papaguería. Other interviews have been conducted over the last three years as part of the BMGR oral history project carried out by Statistical Research, Inc. under contract to 56 RMO. On the BMGR, as elsewhere, oral history can provide valuable information on historical-period activities, but human memories are fallible, and inherent biases must be weighed. Interviewees often skew their responses to fit their view of the world or the situation under discussion. Whenever possible, oral history data should be compared with documentary information and archaeological evidence.

Ranching was the dominant Euro-American activity during the historic era and is well represented in the archaeological record. Mining was important in some areas. Closely related to both ranching and mining is transportation, and many roads pass through or near the BMGR. These roads often began as trails used by Native Americans, were later adopted and sometimes improved by prospectors, further used by ranchers, and improved once again with the coming of automobiles. Military activity also is well represented at archaeological sites throughout the region. After acquisition of the area by the military in 1941, the ranchers were forced to leave. Most left by the early 1950s, but some held out until the mid-1960s. The region's isolation, lack of population, dry climate, and rugged topography provided the military with unprecedented training opportunities.

The following discussion is not intended to present fully developed historic contexts, but to provide a foundation for context development.

6.2.1 Culture History, Chronology, and Archaeological Cultural Affiliation

Although much has been written about the cultural chronology of the Western Papaguería, many issues relating to that chronology have yet to be resolved. Details of Preceramic adaptations, Patayan chronology, a Hohokam chronology for the Papaguería, and the meaning of the overlapping distributions of Patayan and Hohokam ceramics have yet to be thoroughly explored. Recently, researchers have suggested that although chronology building remains an important issue, its goal should not be modifying the Hohokam or Patayan chronology, but building chronology centered on the BMGR or Western Papaguería.

In his discussion of the Preceramic period in southern Arizona, McGuire noted that most researchers have assigned Archaic period sites to either the Cochise culture and or the Malpais/San Dieguito/Amargosa cultural tradition, based largely on their experience and whether they brought a California or an eastern Arizona perspective to their work (McGuire 1982a: 177). Ahlstrom (2000:75) described three preceramic chronologies that have been applied to sites in the Papaguería: a western chronology analogous to McGuire's California perspective, an eastern chronology analogous to McGuire's eastern Arizona perspective, and a revised eastern chronology which divides the Archaic into Early, Middle, and Late complexes (Huckell 1984).

As a foundation for future research, some basis questions should be answered: (1) is enough information available about area archaeological sites to support applying either the Cochise or San Dieguito/Amargosa chronologies to sites on the BMGR? (2) are sites representing both traditions present, and if so, are they found in particular geographic areas? (3) is it productive to maintain a framework of possibly distinct traditions as a research focus, or is the panregional approach to the Archaic Period (Early, Middle, and Late) suggested by Huckell (1982) a more effective framework for evaluating the Archaic age resources on the BMGR?

Two chronologies have been applied to Formative period sites on the Western Papaguería—Hohokam and Patayan—and researchers have relied on the presence of distinctive pottery types to assign sites to one or the other of these traditions. Regional variants of the Hohokam chronology developed for the Salt-Gila Basin, Tucson Basin, and Eastern Papaguería have been applied to the BMGR, and the recorded sites represent the entire Hohokam chronology from the

Pioneer through the Colonial, Sedentary, and Classic periods. Ahlstrom (2000: 247-248) notes that Hohokam pottery diagnostic of the Pioneer and Colonial periods is found only on the eastern portions of the BMGR. Pottery dating to the subsequent Sedentary and Classic periods is found on the eastern and central portions of the BMGR.

Waters (1982) defined the most thorough typology and chronological sequence for the Lower Colorado Buff Ware ceramic tradition, basing his analysis on the work of Malcolm Rogers. The Patayan chronology consists of three ceramic groups, labeled Patayan I, II, and III. Waters (1982: Figures 7.4-7.6) documented the occurrence of all three groups in the Gila Bend area.

According to Waters (1982: 275), “Lower Colorado Buffware was produced and used along the Colorado River from the southern tip of Nevada to the Gulf of California, along the drainage of the lower Gila River, and in the peripheral deserts of western Arizona and southern California.” Whether this ware was in fact produced in the deserts of western Arizona—that is, in the Western Papaguería—has been an open question until very recently. Hill and Bruder (2000) report the results of pilot petrographic analyses that indicate that at least some Lower Colorado buff wares were locally produced in the Western Papaguería.

Some studies of ceramic data from the Western Papaguería have shown a separation between the distribution of Lower Colorado Buff Ware on the west and Hohokam wares (including Hohokam Buff Ware and Tucson Basin Brown Ware) on the east (for example, Huckell 1979), supporting a ceramic division first proposed by Gifford (1946).

Researchers such as Huckell (1979) and Schroeder (1967) have viewed the boundary between ceramic wares as an ethnic/linguistic boundary (McGuire 1982a: 214). They have interpreted the ceramic distribution as indicating that Patayan people (identifiable linguistically as Yumans in the historical period) inhabited the western area, and the Hohokam or people with a Hohokam-like cultural pattern (in either case, generally identified as Piman speakers) inhabited the eastern area.

Ezell (1955:372) addressed this issue, arguing that the boundary between the ceramic wares was a material-culture boundary and not a cultural or ethnic boundary. He cited as evidence the case of the Hia C-ed O’odham (also called Sand Papago). Ezell (1955) thought that the material-culture boundary for the Hia C-ed O’odham began on the coast of the Gulf of California in the area between Punta La Cholla and the mouth of the Río Sonoyta. He extended the boundary up the Sonoyta to Quitobaquito, and northward through the OPCNM area to the Gila Bend area. Surveys conducted over the last decade suggest that the notion of a boundary between the Patayan and Hohokam ceramic traditions must accommodate a broad area of overlap in the northeastern BMGR.

Some researchers have suggested that Patayan pottery was the dominant ware used, and perhaps made, by the non-Hohokam inhabitants of the Western Papaguería, who acquired limited amounts of Hohokam pottery through trade and/or during visits to Hohokam communities located to the northeast and east. Many have favored the hypothesis that Hohokam groups living to the east brought their pottery with them during excursions into and across the BMGR. Still others have suggested that at least some of the pottery identified as Hohokam was locally made.

The Trincheras culture or tradition has been identified in the area immediately southeast of the Western Papaguería. The Trincheras culture is relevant to the prehistory of the Western Papaguería for two primary reasons. First, it was the source of the Trincheras Purple-on-red ceramics that occur with low frequency on Papaguerían sites (Whittlesey and others 1994: 215). Second, Trincheras settlements and culture might have influenced the settlement history of the Western Papaguería. For example, individuals or groups from the Trincheras settlements might have entered the region on hunting forays or trading expeditions. The Trincheras settlements might have served as refuges for the residents of the Western Papaguería during times of drought. Either of these relational models could account for the presence of Trincheras ceramics at Western Papaguerían sites.

6.2.2 Subsistence and Settlement

Information on the types and distributions of archaeological sites and features can help archaeologists understand how different cultural groups subsisted on and occupied a landscape. Although few archaeological sites have been excavated on the BMGR, surveys provide information about the variability of the archaeological record that can be used to infer aspects of the subsistence and settlement systems of the aboriginal occupants of the region.

The types of features recorded at archaeological sites include artifact scatters (pottery sherds, flaked stone, ground stone, shell, and other items), artifact scatters with features, bedrock grinding features or ground stone tools, fire-affected rock, hearths and cooking pits, rock alignments, trails, clearings in desert pavement, and evidence of houses or temporary shelters. Limited evidence of agriculture has been identified at several sites on BMGR East. Ahlstrom (2000: 253-257) recognized trends in the spatial distribution of such features on BMGR. In general, the frequency of artifact assemblages comprising pottery sherds, grinding features and artifacts, and hearths and cooking pits, decreases from east to west. This pattern suggests that activities associated with a relatively more sedentary lifeway—such as use of ceramic vessels, cooking, and grinding seeds—were more common in the less arid eastern areas. Conversely, the pattern suggests that smaller and relatively more mobile groups, reflected in fewer artifact types, were more common in the drier western portions of the BMGR.

The proportion of sites represented only by flaked stone increases to the west. Potential explanations for this finding include: (1) a simpler range of activities conducted at those sites, (2) use of basketry instead of pottery by more mobile populations on the west side of BMGR, or (3) a higher proportion of sites associated with the Archaic rather than later periods in this area.

The relationships among the mobile hunter-gatherers of the Western Papaguería and their riverine neighbors to the east and west should be a major focus of investigation under this theme. Likewise, substantial changes in lifeway were brought about by European contact and should be reflected in the distribution and nature of archaeological remains of the contact period.

6.2.3 Trade and Exchange

Marine shell and obsidian artifacts found on archaeological sites on the BMGR are indicators of prehistoric trade and exchange, as is the presence of artifacts made of obsidian from sources on

BMGR at sites elsewhere in the Southwest. Analysis of the distribution of shell and obsidian artifacts provides evidence of aboriginal networks for trade and exchange.

Marine shell artifacts are common at Hohokam sites in central Arizona. McGuire and Howard (1987) and McGuire and Schiffer (1982) argue that the evidence of shell working in the Western Papaguería supports the hypothesis that the occupants of this region were shell traders who brought items of shell jewelry and unworked shell to the Hohokam. According to Ahlstrom (2000:257-261) marine shell has been noted at archaeological sites across the entire BMGR, although sites with shell are most common in the central portion of the BMGR. He suggests this represents a broad trading corridor along which shell was transported from the Gulf of California north to the Gila Bend area along trails identified by Hayden (1972).

Four sources of obsidian have been recognized in the Western Papaguería, including the Saucedo Mountains, Sand Tank Mountains, Los Vidrios in northern Sonora, and an “Unknown A” source. Shackley’s research has shown that —Saucedo Mountain obsidian is the most common volcanic glass found in Classic Hohokam contexts in both the Phoenix Valley and Tucson Basin” (Shackley 1995:547). Procurement of obsidian from sources within the Western Papaguería may have been linked to the transport of shell through the region (Doyel 1996; Mitchell and Shackley 1995).

Ahlstrom’s analysis of obsidian and marine shell distribution in the BMGR database shows that both obsidian and shell have come from site clusters in the eastern and central parts of the BMGR. In the western areas of BMGR, shell artifacts are relatively common but obsidian artifacts are rare.

Ahlstrom (2000:261) concludes that before the Classic period, people in the Papaguería participated in the procurement and production of shell artifacts along with limited amounts of obsidian for exchange to the Hohokam of the Salt-Gila Basin. Doyel (1996) demonstrated that obsidian reached the Gatlin site in the Gila Bend area in raw form and was worked there, but apparently was not extensively used or worked throughout much of the BMGR. Following the transition to the Classic period, the shell trade in the Western Papaguería evolved into an exchange of mostly unworked shell with an increased emphasis on obsidian trade.

The distribution of marine shell and obsidian on sites within the BMGR provides insight into aboriginal systems of trade and exchange over substantial distances. The sites on the BMGR provide opportunities to learn more about aboriginal spheres of regional interaction and influence. The discussion offered by Ahlstrom and his colleagues focuses on the role of trade and exchange in Hohokam and Patayan cultures. Current research suggests that approaching these issues from the perspective of the inhabitants of the Western Papaguería, rather than neighboring riverine areas, should be the primary focus of BMGR research.

6.2.4 Ranching

Many homesteads were filed in the late nineteenth and early twentieth centuries on what is now the BMGR, although very few were ever patented. The extreme aridity of the land, difficult transportation routes, and rugged topography all contributed to a dearth of successful

homesteads. Few homesteaders tried to “prove up” their claims by planting or making improvements to the land (Ahlstrom and others 2000:134). A significant exception is the homestead patent issued in 1929 to Thomas Childs, Jr., for a 320-acre parcel centered around Batamote Well, about 9 miles north of Ajo. This homestead, just east of the intersection of the road to Manned Range 1 and State Route 85, became the headquarters of the Childs Ranch, one of two large, family-owned ranching operations in the area. The other important family-owned ranch in the region belonged to the Stout family whose land extended eastward from the Gila Bend area. The history of the Childs and Stout homesteads typify the process through which many ranching operations in the Western Papaguería became established, and shows how at the base of the ranching theme lies a homesteading theme, albeit a largely unrealized one (Vanderpot and Altschul 2001).

6.2.5 Mining

The history of mining on BMGR East centers on the Ajo Hills, which were known as a source of copper as early as the eighteenth century. The first efforts at mining made under U.S. jurisdiction came in 1854, immediately after the Gadsden Purchase (Wilson 1949:6). These earliest efforts failed, and the first relatively successful operations occurred at the end of the nineteenth century. In 1890, the Cornelia Copper Company purchased the mining claims of Thomas Childs, Sr., who had staked the claims in 1887. These claims formed the center of the first large-scale mining operation in the Ajo Hills.

The Cornelia Copper Company failed within a few years but was succeeded by a series of claim consolidations that became the New Cornelia Copper Company in 1909. The Tucson, Cornelia and Gila Bend Railroad, built by New Cornelia in 1915–1916, linked Ajo to the Southern Pacific Railroad at Gila Bend to make development of the Ajo mine and associated processing facilities feasible. By 1916, the New Cornelia operation employed as many as 1,200 men, and a planned community was built to house company employees. Under the direction of John C. Greenway, a mining engineer and general manager of the Calumet and Arizona Company’s operation at Bisbee, the New Cornelia acquired further claims in the Ajo area and developed an improved leaching process that allowed for large-scale processing of low-grade copper ores. In 1917, the New Cornelia plant produced 10,000 tons of copper, the start of a boom that lasted until the collapse of the stock market in 1929. The New Cornelia Mining Company merged with the Calumet and Arizona Company following the collapse, and in 1931 Phelps-Dodge Corporation, based in Bisbee, purchased the new company. Phelps-Dodge operated the mine, through alternating periods of boom and bust, until 1984, when the mine was closed permanently (Hyde 1998: 145–147; Rickard 1998, 1999).

The Fortuna Mine, 30 miles east of Yuma on BMGR West, began with the 1895 discovery of a small but rich outcrop of gold. A year later, Charles D. Lane bought the mine for \$150,000 and organized the La Fortuna Gold Mining and Milling Company (Dunning 1959: 146). A 20-stamp mill was operated at the mine until 1904. At the peak of operations, the mine supported a community of 80 to 100 miners who lived in frame, adobe, and tent houses. The Fortuna Mine produced 2.6 million dollars in gold during this period. Efforts to reopen the mine in the 1930s were unsuccessful.

Prospectors combed the Wellton Hills and Copper Mountains in the late 1800s, and the La Posa Mining District was organized. Some copper, gold, and silver was recovered from the district, but in general development was no more than prospects or shallow mines, and the production was limited and sporadic. Named mines in the district include the Betty Lee and Last Chance Mines in the Copper Hills and the Double Eagle, Wellton Hill, and Poorman mines in the Wellton Hills (Bruder and others 1996: 86). At the Betty Lee, extensive shafts and tunnels were excavated and a small mill was erected; up to 30 miners were employed, but the mine was never profitable (Broyles and Hartman 2000: 190). Other claims clustered in the Saucedo and Sand Tank mountains but results did not warrant organization of a mining district (Ahlstrom 2000: 133).

6.2.6 Transportation

Roads in isolated southwestern Arizona were critical to survival during the historical period. Trails used for millennia by Native Americans became the first roads of the historical period, but others were added as Spanish, Mexican, and Anglo-American travelers passed through and eventually settled the area. At the start of the twentieth century, few roads passed through the Western Papaguería, and these were largely limited to the routes connecting the scattered dependable water sources in the region (Bryan 1922). This situation changed with the appearance of automobiles and the development of state highways, and even more following acquisition of the area by the U.S. military.

Along with automobiles and better roads, the twentieth century saw a great increase in smuggling from Mexico. Because of their proximity to the international border and their isolated character, the roads of the western Papaguería have long been used by smugglers, the first major wave coming during Prohibition. Bootleg liquor frequently would be brought from Sonoyta into Arizona on the Darby Well Road. The smugglers followed regular routes, always maintaining vigilance against police, and delivering their goods at night. Later, the smuggling of marijuana and other drugs and contraband followed many of the same routes (Rojo 1987).

Early travel across the BMGR was extremely difficult because of the aridity of the region, its rugged nature, and the dearth of knowledge about the topography. Those familiar with the region generally knew the location and reliability of water sources, but without this information, travel could be deadly (Bryan 1922, 1925). It also served as an important link between northern Sonora and southern California, allowing travelers to avoid the area along the Gila River, which was subject to Apache raiding for extended periods of time, especially during the nineteenth century.

One of the earliest routes across the region was the Camino del Diablo, which ran from the towns of Altar and Caborca in Sonora to Yuma. The first European to use the route was Melchor Díaz, a member of the Coronado expedition, who in 1540 traveled from what is now Ures, Sonora, to the mouth of the Colorado River at what is now Yuma. In 1699, Father Kino followed portions of the Camino del Diablo from Sonoyta to the Gila River at what is now Wellton. Kino located and named several rock tanks along this route, including Heart Tank and Cabeza Prieta Tank; however, Kino missed the important water source at Tinajas Altas (Thurtle and others 2000:1.25). In 1774, Juan Bautista de Anza sought a route to California from Sonora, and followed the Camino, possibly stopping at Tinajas Altas. From there he went north through

Tinajas Altas Pass, and crossed the Yuma Desert; later, his route would be followed by numerous travelers. The Camino was used by many hopeful prospectors during the California gold rush, and it was during this period that the road received its name. An estimated 400 travelers died along the route during the 1840s (NRPT 1986:10–17).

A route through the Quijotoa Valley was also used early in the historical period, by Father Kino and others traveling from missions in northern Mexico to Native American settlements along the Gila River. This route passed between the Saucedo and Sand Tank Mountains, extending between settlements at what are now known as Pozo Blanco and Gila Bend. Other Spanish explorers, soldiers, and missionaries followed the same route, as did prospectors and ranchers from the early nineteenth century on.

A few trails or roads emerged following U.S. acquisition of the area in the 1850s. The Arizona Mining and Trading Company created a road connecting Gila Bend with mines in Ajo in 1854, providing access from the mines to the Gila River. From there, the ore was transported to the Colorado River along what is known as the Yager wagon road, developed by Louis J.F. Jaeger. Archaeologists surveying the area noted that USGS bench marks dated 1925 were placed along the road for an undetermined distance (Slaughter and others 2000: 206).

The Yuma wagon road also developed as mines began to emerge in the Ajo area beginning in the middle of the nineteenth century. The road followed the Camino del Diablo from Yuma, branching off in the region of Las Playas. From there, the road headed due east through the Agua Dulce Mountains, then northeast to Ajo. Many of the early miners in Ajo followed this route, including organizers of the Arizona Mining and Trading Company in 1854. At that time, Papago Well and Bates Well were not yet established, making the journey perilous (NRPT 1986:10–17). Other routes of travel were developed to supply mines and ranches.

For the most part, however, the focus of travel through the region remained to the north, along the Gila River. It was along this route that the Butterfield Overland Stage Line connected San Antonio, Texas with San Diego, California. With the start of the Civil War, however, the line was abandoned. Other stage companies used the old route after the end of the war until the arrival of the railroad in 1880. The railroad made the area accessible to more and more people, and more importantly, provided a link to outside markets. Ore and cattle could be shipped with greater ease and less expense (Homburg and others 1994:337-338). With the construction of the Southern Pacific Railroad across southern Arizona in the 1880s, additional feeder lines sprouted up almost immediately. In 1915, construction began on the Tucson, Cornelia and Gila Bend Railroad from Gila Bend to Ajo.

The arrival of the automobile also led to the creation of new roads, particularly after 1910, when mining and cattle ranching expanded and automobile ownership became more widespread. The Automobile Club of Southern California placed signs on many of these roads during this period, although travel was hazardous at best. Water sources were few, far between, and unreliable. The roads were generally little better than trails, and vehicles could easily become mired in sand. Mileages were often listed in half-miles on signs established by the Auto Club. Many of the routes of travel through this inhospitable region were described in the early 1920s by USGS geologist Kirk Bryan (Bryan 1922). The purpose of Bryan's survey was to inform travelers of

water sources along these trails, and provide information on the condition of the trails, as well as the country in general.

Sometime in the 1920s or early 1930s, a settler named Charlie Bell established a road from Ajo to his well in the Growler Mountains. At one time there was a road from Ajo to Sentinel, passing through the Crater Range. Several other roads were constructed or improved during this period, as automobiles became more common; many of these roads followed earlier foot or wagon trails (NRPT 1986:10-17).

In 1934, Highway 84 was completed across western Arizona, providing an automobile route along the Gila River. The arrival of the military in the 1940s changed much of the historical-period travel patterns in the project area. Travel routes sought to connect training sites, bases, airfields, and targets with outside travel routes (Highway 84) or larger bases (Luke AFB). Old roads that had been used by settlers were less frequently used, and many fell into disuse. Hunters, sightseers, and to a lesser extent the military, continue to use many of these routes of travel.

6.2.7 Military Use of the BMGR

The military use of the BMGR can be divided into five periods: (1) World War II era, 1941 to 1949, (2) Korean War and early Cold War era, 1950 to 1959, (3) middle Cold War and Vietnam War era, 1960 to 1974, (4) late Cold War and Persian Gulf War era, 1975 to 1991, and (5) post Cold War era, 1992 to present. The BMGR was used for a variety of military purposes during those six decades but training of aircrews was and remains paramount.

Air Force use of the BMGR East and Marine Corps use of BMGR West reflect the evolution of weapons systems and training programs through time; however, the footprint of military operations has remained essentially unchanged throughout most of its history. The most substantial changes on BMGR East related to an expanded program of annual and 5-year EOD clearance operations within the manned and tactical target areas. On BMGR West, two targets—Rakish Litter and Panel Stager—were developed, upgraded, and then replaced with the new Moving Sands and Cactus West target complexes. Also, Marine Corps ground troops were integrated into aircrew training operations such as the biannual Weapons Tactics Instructor course.

Because many of the same areas have been used for successive generations of targets and ranges, features associated with the early periods are rare and most are in poor condition. Remnants of earlier episodes of military training do survive, and some have been evaluated for possible inclusion on the National Register as cultural resources associated with the history of military aviation tactical training during the World War II era and throughout the Cold War (Rogge and others 1995; Thompson 2004).

6.3 ARCHAEOLOGY AND THE NATIONAL REGISTER

According to National Register guidance, archaeological sites are associated with human activity, through events, processes, settlement, migration, beliefs, lifeways, and other facets of

the development or maintenance of cultural systems. The significance of an archaeological site should be determined by how well the site represents and can illustrate these factors. Formal context development has not been emphasized in the Section 106 review process, and most sites are simply evaluated by reference to regional culture histories. The historic significance of archaeological sites is almost always evaluated under Criterion D (having the potential to contribute significant information).

6.3.1 Archaeological Site Significance

The historic significance of most archaeological sites is evaluated under Criterion D because of their scientific importance within the discipline of archaeology; however, they also may be considered significant for other values.

6.3.1.1 Criterion D: Information Potential

Both of the following requirements must be met for a property to be eligible under this criterion:

1. The property must have, or have had, information to contribute to our understanding of human history or prehistory.
2. The information must be considered important and significant to current or traditional research interests.

One may argue that all archaeological sites meet the first test, but establishing the importance of information yet to be acquired is more challenging. Evaluating the importance of information should be done within an appropriate context. To be considered important, the information must have a significant bearing on current or traditional research issues or *on a priority area identified in an agency management plan* (emphasis added; the latter is a little-used provision that allows agencies some flexibility in identifying and managing historic properties under their care). Contexts for archaeological site assessment should be developed from the body of information already collected from similar properties and environments.

Additional considerations include:

1. Information likely to be obtained from a particular property must confirm, refute, or supplement existing information in an important way.
2. The connection to a context may be established through particular research questions using data that may be contained in the property—these may be property-specific questions or broader questions about a geographic area.
3. A property must be shown to have the potential to yield important information through surface indications, animal burrows, erosion, remote sensing, or test excavations.
4. The property should be sufficiently intact to yield the expected information if the appropriate study methods are used; partly excavated or disturbed properties might retain sufficient information potential to be eligible.
5. Completely excavated sites can be considered eligible under Criterion D.

6.3.1.2 The Significance of Small Sites

A major challenge for archaeologists and land managers is the evaluation of small sites. Small sites, sites without surface features, flaked stone scatters, scatters of fire-affected rock, and other small, low-density, or so-called “ephemeral” manifestations are often found not to be eligible because recordation during survey has “exhausted all research potential.” By this device, these sites are frequently written off; that is, their treatment is essentially the same as that accorded isolated artifacts. Yet, increasingly, archaeologists also recognize that isolated features, work stations, and other evidence of limited human activity are an important part of a settlement system or a cultural landscape. Resource procurement sites, processing locales, caches, markers, individual petroglyphs, vision sites, pot drops, and other such places illustrate behaviors that are invisible at the larger, more complex sites with which they are associated. Small sites must be honestly assessed by considering their place in the universe of neighboring sites, their age or cultural affiliation, and whether they have the potential, either individually or as a class, to yield important information through further investigation (thus achieving significance under Criterion D).

In recent years, there has been considerable discussion of redundant data and even redundant site types. Researchers and agency officials have suggested that important data about prehistory are not likely to be produced by investigating yet another site of several common types, ranging from flaked stone scatters to pit house villages. Often this represents the logical culmination of a trend toward addressing a standard set of research questions about particular features, artifact classes, or site classes. To an extent, it is also a self-fulfilling prophecy, for another part of this trend has been to develop a set of techniques designed to produce data to answer only those particular questions as efficiently and inexpensively as possible. Through repetition, research methods have been fine-tuned to the point that no other useful data can or will be collected. Is it possible that all questions about this type of site have been answered and all important information collected? Is it likely that if other research questions were defined and appropriate research designs were developed and implemented, no important data are likely to be produced? If the answer to these questions is no, then these sites should not be considered an insignificant part of the archaeological record.

Compounding this problem is that in many of the areas where small, low-density sites are ubiquitous, including the BMGR, systematic research is a relatively recent phenomenon, and fully developed historic contexts are only now being written based on that research (see for example Doolittle and others 2006). In some areas of the BMGR and the Western Papaguería, a few areally extensive surveys have located only a handful of isolated artifacts and a few extremely low-density artifact scatters. While these resources may not meet site definition criteria applied in other settings, given that they are the only evidence of human use in some areas, they clearly do provide important information about regional prehistory and land use.

What are the characteristics of sites that are “likely” to yield important information? Is it possible to list the hallmark surface characteristics of an eligible site? Probably not. All sites must be considered within a larger context—an environmental zone or geographic area, a

postulated archaeological settlement/subsistence system, or a cultural landscape. This last concept is being used increasingly to describe not just a system of past human behavior, but a broader universe that incorporates its environmental and cultural setting, including its visual and other sensory characteristics.

If the goal of archaeology is studying past human behavior, then the foundation of the significance assessment must be a broader perspective on past use of multiple sites and settings, their interrelationships, and the possibility that an examination of these relationships may inform on both the ways people perceived and interacted with their world and the ways in which that world shaped prehistoric and modern Native American cultures.

Archaeological evidence indicates that the inhabitants of larger, more complex sites lived, worked, and interacted with others over a surprisingly large area. Small sites and features of the natural environment are important components of that area and are critical to understanding those larger sites. Unfortunately, small sites are being selectively destroyed with little or no study, on the premise that all important data have been recovered through limited observations made during survey. Seldom is an effort made to place these sites within a detailed context as a part of the significance evaluation.

The selective destruction of any one component of a settlement system or cultural landscape forever limits our ability to reconstruct and understand past human behavior, yet that is precisely the result produced by wrongly identifying whole classes of sites as insignificant. A true assessment of site significance should be based on a historic context that includes all kinds of archaeological sites and gives careful consideration to their import both individually and collectively.

An important outcome of consultation with federally recognized tribes is an increased awareness of the cultural significance ascribed by tribes to most or all archaeological sites. The perspective of culturally affiliated tribes must be recognized and considered in determining eligibility. Cultural significance may qualify such places for inclusion on the National Register under Criterion A, B, or C.

6.3.1.3 Traditional Cultural Significance and Criterion A

More than a decade after the NHPA was amended to incorporate tribal concerns, meaningful tribal participation in the evaluation and treatment of archaeological sites remains an elusive goal. One strategy for complying with the 2000 revision of 36 CFR 800 is emphasizing more meaningful consultation with federally recognized tribes in the process of determining the National Register significance of archaeological resources. The foundation of this change should be the development of historic contexts that reflect Native American perspectives on their history and heritage.

Historic contexts that place archaeological sites within a traditional cultural perspective can be developed using information provided by federally recognized tribes that attach cultural significance to those sites. For example, three basic steps might demonstrate that an archaeological site exemplifies or is associated with an identified ~~“broad pattern”~~ of a tribe’s

or group's history and is therefore eligible for inclusion on the National Register under Criterion A.

1. Establish culture history (using early written accounts, oral history, ethnographies, early military records, Native Claims Act hearing records, treaties, studies of place names, or other evidence, such as documented tribal histories) and develop historic contexts from a tribal perspective using traditional knowledge.
2. Identify the types of places that are associated with a tribe or group (specific places by name, classes of places by generic description).
3. Examine the characteristics of individual archaeological sites and assign them to identified types as warranted.

6.3.2 The Evaluation Process

6.3.2.1 What Do We Need to Know?

Several important issues must be considered to improve evaluations of eligibility. Too often, the information needed to evaluate the significance of archaeological sites is not collected during archaeological survey. Generally it is more difficult to demonstrate that a site lacks the potential to yield important information than to agree to consider it “potentially” eligible; yet over the long term, this strategy makes agency management of cultural resources more difficult. What kinds of information should be recorded during survey to fully support an eligibility determination? The answer to this question must be based on an archaeological context or contexts. To insure that data collection is adequate, the contexts within which eligibility will be assessed must be defined in a research design before the identification and evaluation process begins.

There are good management reasons to insist that survey reports provide well-supported significance assessments. Statements of work (SOWs) should require sufficient data collection and evaluation during surveys. To meet this goal, after preparing a work plan or research design and completing required consultation, the identification effort may include shovel testing or other methods to insure that sufficient data are collected.

Judgments made from surface observations must be explained and supported, especially as they pertain to the likelihood of associated buried archaeological deposits. For example, did the recorder base this finding on soil profiles observed in a nearby road cut or entrenched stream channel, “backdirt” from a rodent burrow, or the results of excavation of a similar-looking site in an adjoining region? The potential presence of subsurface deposits alone is not the determining factor in evaluating the significance of archaeological sites.

Test excavations often are viewed as an essential part of the eligibility assessment process, especially where environmental factors limit the utility of surface observations. Throughout most of Arizona, however, surface observations have been shown to be a relatively reliable predictor of the occurrence of subsurface archaeological deposits, and numerous sites have been determined eligible for inclusion in the National Register in the absence of subsurface remains. For this reason and others, the Arizona SHPO does not require testing as a part of

making determinations of eligibility. The SHPO has stated that many if not most sites can and should be evaluated on the basis of surface evidence only.

6.3.2.2 How to Describe an Archaeological Site or District

National Register guidance directs researchers to include the following information in site descriptions and reports:

1. Environmental setting of the property today and, if different, its environmental setting during the periods of occupation or use. Emphasize environmental features or factors related to the location, use, formation, or preservation of the site or district.
2. Period of time when the property is known or projected to have been occupied or used. Include comparisons with similar sites and districts that have assisted in identification.
3. Identity of the persons, ethnic groups, or archaeological cultures that, through their activities, created the archaeological property. Include comparisons with similar sites and districts that have assisted in identification.

4. Physical characteristics

For individual sites, describe:

- Site type, such as rockshelter, temporary camp, lithic workshop, rural homestead, or shoe factory
- Prehistorically or historically important standing structures, buildings, or ruins
- Kinds and approximate number of features, artifacts, and ecofacts, such as hearths, projectile points, and faunal remains
- Known or projected depth and extent of archaeological deposits
- Known or projected dates for the period when the site was occupied or used, with supporting evidence
- Vertical and horizontal distribution of features, artifacts, and ecofacts
- Natural and cultural processes, such as flooding and refuse disposal, that have influenced the formation of the site
- Noncontributing buildings, structures, and objects within the site

For districts, describe:

- Type of district, such as a village with outlying sites, a group of quarry sites, or a historic manufacturing complex
 - Cultural, historic, or other relationships among the sites that make the district a cohesive unit
 - Kinds and number of sites, structures, buildings, or objects that make up the district
 - Information on individual or representative sites and resources within the district; for small districts, describe individual sites, and for large districts, describe the most representative sites individually and others in summary or tabular form or collectively as groups
 - Noncontributing buildings, structures, and objects within the district
5. Likely appearance of the property during the periods of occupation or use; include comparisons with similar sites and districts that have assisted in description
 6. Current and past impacts on or immediately around the property, such as modern development, vandalism, road construction, agriculture, soil erosion, or flooding.

Describe the integrity of a district as a whole and, in written or tabular form, the integrity of individual sites.

7. Previous investigations of the property, including:
 - Archival or literature research
 - Extent and purpose of any excavation, testing, mapping, or surface collection
 - Dates of relevant research and fieldwork. Identity of researchers and their institutional or organizational affiliation
 - Important bibliographic references

6.3.2.3 How to Discuss the Significance of Archaeological Sites

Discussions of significance in reports refer to the research design and should include the following:

1. What is the cultural context in which the property is considered significant? How does the site relate to what is currently known of the region's prehistory or history and similar known sites?
2. What kinds of information can the known data categories yield? What additional kinds of information are expected to be present on the basis of knowledge of similar sites? What similarities permit comparison with other known sites?
3. What is the property's potential for research? What research questions may be addressed at the site? How do these questions relate to the current understanding of the region's archaeology? How does the property contribute or have the potential for contributing important information regarding human ecology, cultural history, or cultural process? What evidence, including scholarly investigations, supports the evaluation of significance?
4. How does the integrity of the property affect its significance and potential to yield important information?
5. If the site has been totally excavated, how has the information yielded contributed to the knowledge of American cultures or archaeological techniques to the extent that the site is significant for the investigation that occurred there?
6. Does the property possess resources, such as buildings or structures, which in their own right are architecturally or historically significant? If so, how are they significant?

6.3.2.4 How to Discuss the Significance of Archaeological Districts

A slightly different set of questions should be addressed in evaluating districts, including:

1. What is the cultural context in which the district has been evaluated, including its relationship to what is currently known about the area's prehistory and history and the characteristics giving the district cohesion for study?
2. How do the resources as a group contribute to the significance of the district?
3. How do the resources individually or in representative groupings contribute to the significance of the district?
4. What is the district's potential for research? What research questions may be addressed at the district? How do these questions relate to the current understanding of the region's archaeology? How does the property contribute or have the potential for contributing important information regarding human ecology, cultural history, or cultural process?

What evidence, including scholarly investigations, supports the evaluation of significance? Given the existence of material remains with research potential, what is the context that establishes the importance of the recoverable data, taking into account the current state of knowledge in specified topical areas?

5. How does the integrity of the district affect its significance and potential to yield important information?
6. Does the district possess resources, such as buildings or structures that in their own right are architecturally or historically significant? If so, how are they significant?

6.3.3 Multiple Property Documentation or Cultural Landscape?

Multiple-property documentation may ~~be~~ used to nominate and register thematically-related historic properties simultaneously or to establish the registration requirements for properties that may be nominated in the future” (NPS 1991: 2), in accordance with the National Register Bulletin *How to Complete the National Register Multiple Property Documentation Form*. This strategy supports the assessment of a broad range of site types within a regional or temporal framework. The multiple-property approach fully supports determinations of eligibility for individual sites as members of a class of sites; however, it is not conducive to the identification and evaluation of cultural landscapes. Landscapes are typically treated as districts, where the relationships among individual sites and sites types are as important as, or perhaps even more important than, the individual properties.

The landscape concept is increasingly used to describe what archaeologists have called settlement/subsistence systems or archaeological districts; it combines elements of both constructs, but also includes other aspects (viewshed, auditory elements, and other sensory characteristics). In the mid-1990s, the National Park Service (NPS) launched a Historic Landscape Initiative; among the results of this initiative are published guidelines for the treatment of cultural landscapes and an inventory of properties managed by NPS that should be managed as landscapes and listed as such on the National Register. Cultural landscapes can range from thousands of acres of open space to a small property surrounding and associated with a historic homestead. A cultural landscape is defined as — a geographic area, including both cultural and natural resources ... associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values” (*Preservation Brief 36*, Protecting Cultural Landscapes, p. 1).

NPS continues to provide leadership in the identification and treatment of cultural landscapes. In 2000, NPS held a workshop on archaeological landscapes at its Santa Fe regional office. As a result of its continuing efforts, NPS now recognizes *ethnographic landscapes* as —a landscape containing a variety of natural and cultural resources that associated people define as heritage resources” (*Preservation Brief 36*, Protecting Cultural Landscapes, p. 2). This concept appears well suited to accommodating the concerns of Native Americans in the evaluation of significance.

It is also well suited to the needs of archaeologists who view individual sites as a component of a settlement system, cultural landscape, or other overarching construct. Using a landscape approach accommodates small and large sites, single- and multifunction sites, and sites that have significance for reasons other than, or in addition to, their information potential. A historic

context based on the landscape concept would identify the archaeological site types (and features of the natural world) associated with it, and give careful consideration to their import both individually and collectively. An ethnographic or archaeological landscape with its component features, incorporating the traditional cultural values of Native American tribes that attach significance to that landscape, could be described using National Register guidance.

Such a landscape-level context would provide critical support for interpreting and evaluating cultural resources recorded on BMGR, tremendously simplifying the evaluation process.

6.4 IDENTIFYING AND EVALUATING TRADITIONAL CULTURAL PROPERTIES

Section 101(d)(6)(A) of the NHPA states that: “Properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization may be determined to be eligible for inclusion on the National Register” (16 U.S.C. 470a(d)(6)(A)). The following subparagraph (B) states: “In carrying out its responsibilities under section 106, a federal agency shall consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to properties described in subparagraph A” (16 U.S.C. 470a(d)(6)(B)). Together they establish two important concepts: some (but not all) places of religious and cultural importance will meet the standard for eligibility, and agencies will consult with all tribes that attach importance to those places in evaluating them. Both NPS and the ACHP have published guidance to assist federal agencies in this process.

In 1994, the National Park Service issued National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (Parker and King 1990). It defines TCPs, a particular type of historic property, as places of special heritage value to contemporary communities (often, but not necessarily, Native American) because of their association with the cultural practices or beliefs that are rooted in the histories of those communities and are important in maintaining their cultural identity. Bulletin 38 advises agencies that some kinds of historic properties may be identified only by members of and experts in the cultures that use or value those places, such as tribal elders, religious leaders, or other holders of traditional or ceremonial knowledge.

An early step in any effort to identify historic properties is to consult with groups and individuals who have special knowledge about and interests in the history and culture of the area to be studied. In the case of traditional cultural properties, this means those individuals and groups who may ascribe traditional cultural significance to locations within the study area, and those who may have knowledge of such individuals and groups (p. 6).

The bulk of Bulletin 38 describes the process of evaluating the significance of traditional cultural properties. “It is vital to evaluate properties thought to have traditional cultural significance from the standpoint of those who may ascribe such significance to them...” (p. 4) and specifically addresses the significance and potential eligibility of natural landscapes and features if they are associated with significant traditions or uses.

Because identifying and evaluating such properties requires tribal consultation, the ACHP issued a policy statement in 1993 titled *Consultation with Native Americans Concerning Properties of*

Traditional Religious Cultural Importance. The policy emphasizes the importance of using culturally informed and culturally appropriate methods for consulting with Native Americans (ACHP 1993:3-4).

Consultation with Native Americans must be conducted with sensitivity to cultural values, socioeconomic factors, and the administrative structure of the group. Specific steps are to be taken to address language differences and issues such as seasonal availability of necessary participants. The ACHP policy and NPS guidance also acknowledge that Native American groups may consider it inappropriate to divulge some traditional cultural information, particularly to non-tribal members. The concern for confidentiality was addressed in the NHPA and the Section 106 regulation. Sensitive information about the location, character, or ownership of a historic property can be restricted if disclosure would endanger properties or impede the use of a traditional religious site by practitioners. The ACHP policy reaffirms the federal government's commitment to maintaining confidentiality regarding sensitive cultural resource information and limiting collection of sensitive information only to that necessary for planning in a manner that respects Native American need for confidentiality. A National Register Bulletin, *Guidelines for Restricting Information on the Location of National Register Properties*, provides details on how to appropriately restrict sensitive information.

Developing historic contexts that reflect traditional cultural values and establish a framework for evaluating the historic significance of such places from that perspective would both enhance the consultation process and simplify the process of identifying and evaluating properties eligible for inclusion on the National Register.

Section 7

NATIVE AMERICAN CONCERNS

Since 1996, the Air Force and Marine Corps have worked with Native American tribes and groups in the BMGR region to establish procedures for meaningful consultation and identify Native American concerns for places on BMGR. This section summarizes the history and results of that effort. Issues identified through consultation about particular resources and areas of BMGR, as well as ongoing Air Force- and Marine Corps-specific consultation procedures will be discussed in Parts II and III.

7.1 CONSULTATION

During preparation of the Legislative Environmental Impact Statement (LEIS) that supported the range renewal under the MLWA of 1999, the Air Force, Marine Corps, and BLM coordinated with representatives of tribes that expressed an interest in federal management of the BMGR or claimed cultural affiliation with the area. Tribal representatives received project newsletters and meeting notices. Native American tribes and groups were invited to participate in all public meetings, and two of the eight scoping meetings were held on the Tohono O'odham Nation in the communities of Sells and Santa Rosa.

A literature search and preliminary archival survey were undertaken to provide ethnohistoric and historic background on the area encompassed today by the BMGR and to identify affiliated tribes and potential TCPs and sacred sites. More than 40 published and unpublished sources were consulted at the Arizona State Museum at the University of Arizona, and the Arizona Room at the Hayden Library at Arizona State University. Individuals with knowledge of the BMGR or expertise in TCP/sacred sites issues also were contacted. The results of these efforts were summarized by Tisdale (1997).

The next step in this process was the preparation of a comprehensive plan to guide efforts to identify TCPs and sacred sites through consultation with affiliated tribal representatives (Tisdale 1998). The plan identified the collection of oral histories provided by traditional cultural experts and practitioners as the critical component of this effort, but ethnographic research also was recommended.

In late 1996, a team of agency and contractor cultural resource professionals led by Bruce Masse (then 56 RMO archaeologist) initiated consultation with Native American groups specifically with regard to cultural resources. All federally recognized tribes in Arizona and the Hia C-ed O'odham Alliance, the Pueblo of Zuni, the Campo Band of Mission Indians, the Chemehuevi Tribe, and the Torres Martinez Desert Cahuilla Indians were initially contacted (Table I-6).

Telephone inquiries were made by Dames & Moore staff, under contract to the 56 RMO, between December 1996 and February 1997. Tribal governmental offices were contacted and asked to designate an official contact person; each of the contacted tribes did so. Each contact was asked to indicate the proper procedure for future contacts. Colonel David L. White (then

Table I-6

Tribal Consultation Summary
(after Tisdale 2000)

Group	ICRMP Participation	TCP/Sacred Sites Study Participation	Keep Informed of ICRMP and TCP/Sacred Studies	No Interest in BMGR
Ak-Chin Indian Community	X	X	X	
Campo Band of Diegueño Mission Indians			X	
Chemehuevi Indian Tribe			X	
Cocopah Tribe*	X		X	
Colorado River Indian Tribes*	X		X	
Fort McDowell Yavapai Nation*			X	
Fort Yuma-Quechan Tribe	X		X	
Gila River Pima-Maricopa Indian Community	X	X	X	
Havasupai Tribe			X	
Hia C-ed O'odham Alliance*	X	X	X	
Hopi Tribe*	X	X	X	
Hualapai Tribe			X	
Kaibab Band of Paiute Indians			X	
Navajo Nation				X
Pascua Yaqui Tribe				X
Salt River Pima-Maricopa Indian Community	X	X	X	
San Carlos Apache Tribe*			X	
San Juan Southern Paiute Tribe				X
Tohono O'odham Nation*	X	X	X	
Tonto Apache Tribe				X
Torres Martinez Desert Cahuilla Mission Indians			X	
White Mountain Apache Tribe*			X	
Yavapai-Apache Nation*	X		X	
Yavapai-Prescott Indian Tribe	X		X	
Zuni Tribe	X	X	X	

*indicates a written response

Director of the 56 RMO) sent formal consultation letters to tribal leaders and cultural resource representatives of the 26 groups on 30 July 1997 inviting them to participate in preparing an ICRMP for the range and a study of traditional cultural values. Follow-up telephone calls were made to discuss whether the respective tribe wished to be involved in the study and to ask if a protocol had been established for consultations such as this. Tribes that expressed an interest in the project were invited to attend a coordination meeting on 25 October 1997 at Baker Peaks on the BMGR. Eight tribal groups were represented at the coordination meeting, where the team solicited tribal input concerning consultation protocols, confidentiality, and level of participation in the multifaceted project. The 56 RMO also offered to support research studies to be completed by individual tribal groups that chose to participate in the TCP/sacred sites study.

By December of 2000, the 56 RMO/Dames & Moore research team had presented project information and answered questions at 35 individual tribal meetings around the state. Additionally, they participated in more than 500 telephone conversations with tribal members and held 16 meetings with individual tribal representatives. Of the 26 contacted groups, 4 have indicated no interest in consulting about the cultural resources of the BMGR. The rest said they wished to be kept informed about the ICRMP and the TCP/sacred sites study as well as the LEIS. Twelve groups indicated that they wished to participate in the TCP/sacred sites inventory.

7.2 IDENTIFICATION OF TRADITIONAL CULTURAL PLACES AND SACRED SITES

As described in the comprehensive plan prepared by Tisdale (1998), the goal of the proposed TCPs and sacred sites study was to identify and document known places on the BMGR. Much of this effort focused on consultation with affiliated tribes. As Stoffle (1994) points out, general consultation should include identifying cultural resources and should consider at least the following: (1) archaeology sites, (2) petroglyphs, (3) human burials, (4) traditional cultural properties, (5) plants, (6) animals, (7) minerals, and (8) water. He recommends also considering sacred sites, including: (1) creation story locations and boundaries, (2) sacred portals recounting star migrations, (3) universal center locations, (4) historical migration destiny locations, (5) places of prehistoric revelations, (6) traditional visions quest sites, (7) plant-animal relationship locations, (8) mourning and condolence sites, (9) historical past occupancy sites, (10) spirit sites, (11) recent historical event sites, (12) plant, animal and mineral gathering sites, and (13) sanctified ground.

Native Americans attach religious and cultural significance to both land and resources on a broad scale. For example, a mountain or a viewshed may be recognized as traditionally important or sacred. Because of the significance of these places, and their importance in maintaining living cultures, tribal cultural experts are concerned about any potential use that would be incompatible with their beliefs and values. Traditional cultural concerns also may focus on discrete locations, access to specific ceremonial places, or the freedom to collect, possess, and use certain resources, such as particular plant and animal species. The challenge for an effective ICRMP is to consider such traditional places and resources in a manner consistent with regulatory and military requirements.

National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (Parker and King 1990), defines TCPs as places of special heritage value to contemporary communities (often, but not necessarily, Native American) because of their association with the cultural practices or beliefs that are rooted in the histories of those communities and are important in maintaining their cultural identity (see Section I-4). Sacred sites are defined more narrowly by Executive Order 13007 as discrete locations on federal land identified as sacred by virtue of their religious significance or ceremonial use by Native American religious practitioners. MLWA, Section 3031(b)(9)(B), defines sacred sites as “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” and identified as such to the Secretary of the Navy or Air Force. Such regulatory definitions often are a poor fit with traditional cultural perspectives, and are problematic to most tribal representatives and traditional practitioners.

Ethnographers, including Griffith (1992), Nabhan (1987), Russell (1975), and Walker (1991), have identified some of the types of places valued by the native peoples of the Southwest, including the following:

- monumental geographical features that have sacred meaning, including mountains and mountain peaks, caves, and rock shelters
- water sources such as springs, wells, and bedrock catchment tanks (*tinajas*)
- gathering areas where sacred plants, stones, minerals, salt and other natural materials are available
- cultural features such as vision quest sites
- trails and roads
- rock cairns, shrines, and trail markers
- rock art (pictographs and petroglyphs), intaglios, and geoglyphs
- caches and storage locations for village fetishes and the belongings of important people such as medicine men
- burial areas and cemeteries
- places of origin described in a group’s oral histories

An example of a TCP listed on the National Register of Historic Places is *I’ittoi Mo’o*, located in Organ Pipe Cactus National Monument (OPCNM). *I’ittoi Mo’o* is a natural rock spire located at the northern end of the Ajo Mountains. The O’odham consider this spire to be sacred because it marks one of the locations where the O’odham deity, *I’ittoi*, emerged to live among the Desert People and to teach them how to build homes, hunt, grow food, and gather the saguaro fruit to make into wine. When he completed his teaching, *I’ittoi* returned to the top of the mountain, where people continue to go to seek his guidance.

Like *I’ittoi Mo’o*, other mountains and hills play a significant role in the creation stories of many of the lower Colorado River tribes. For example, Avikwamé or Spirit Mountain (Newberry Mountain north of Needles, California) is important to the Quechan, Cocopah, Mojave, and other Yuman speaking groups because the mountain plays a pivotal role in their creation stories.

In other instances, mountains or other promontories are important directional or territorial markers for travelers. For example, Native Americans who participated in consultation about

quarrying at Antelope Hill, which is located along the Gila River north of the BMGR, identified it as a place frequently stopped at while traveling along the Gila River.

During the course of an archaeological survey of the area surrounding Tinajas Altas, which was conducted by SWCA, Inc., under contract to the Air Force, Native Americans talked with project archaeologists and researchers about the significance of Tinajas Altas in their cultures; several traditional cultural experts indicated that members of their tribes continue to visit and make offerings at Tinajas Altas. Ocotillo “spirit sticks” and corn pollen identified during the survey also may indicate ritual use of the area.

Peaks and mountains in the BMGR region have been identified in other studies as places of traditional cultural value. In a report prepared for the Legacy Resource Management Program, Vine Deloria, Jr., identified *Ahvakuotut* above Parker Dam in La Paz County as the ancient home of the Mojave, and *Huquempavi*, three sharp peaks south of Topock, as the place where *Mastamho*, a powerful spirit, killed an enormous sea serpent (Deloria 1998).

Among the site and feature types recorded on BMGR that have been identified by traditional cultural experts as culturally significant places that should be evaluated for National Register eligibility as TCPs are:

- pictographs, petroglyphs, and geoglyphs
- rock piles, mounds, cairns, and other accumulations that may represent shrines and trail markers,
- trails, and
- water sources such as springs, tinajas, and streams.

7.3 SUMMARY OF NATIVE AMERICAN CONCERNS

Beginning in 1997, the 56 RMO offered sole-source contracts to those tribal groups that indicated an interest in completing studies of TCPs and sacred sites on BMGR. The Hopi Tribe, the Yavapai-Prescott Tribe, the Pueblo of Zuni, the Yavapai-Apache Nation, and the Hia C-ed O’odham Alliance have completed studies as of this writing. Some of these studies have provided more specific information about places and issues of cultural importance. The concerns expressed by cultural advisors representing those tribes are similar in many respects and focus on several key topics.

7.3.1 Natural and Cultural Resource Protection and Management

Not surprisingly, the first recommendation of all tribes consulted is that all archeological sites should be left in place, and all TCPs and sacred sites should be avoided by modern activities. Tribal representatives do recognize the need for ongoing military training, and in consultation, most have recommended that military training activities should continue to impact the same areas that have been used since the 1940s rather than expanding disturbance to new areas.

They strongly recommend that, in cases where previously undisturbed areas must be impacted in order to accomplish the needs of the mission, both archaeological and TCP surveys should be conducted. Tribal representatives also have acknowledged that, when avoidance is not possible,

they understand the value of making a record of a site through scientific study, rather than seeing that site destroyed without a record being made. In general, however, tribal consulting parties have indicated that scientific investigations of resources not immediately threatened by other destructive forces should be avoided.

Some tribal representatives stressed that rock art, geoglyphs, and rock shelter sites should be monitored and protected from vandalism; they also recommended that the Air Force and Marine Corps take steps to prevent sites from being damaged or destroyed by erosion.

Most of the tribal studies stressed that Native Americans do not differentiate between natural and cultural resources, but rather take a more holistic approach to resource management. Several tribes indicated that water sources should be monitored and protected; some specifically stated that no new water control structures should be built at these locations, and that existing wildlife water catchments (such as enhanced tinajas) should be dismantled. Other recommendations include conducting ethnobotanical studies, supporting tribal gathering of traditional plants, and prohibiting predator control activities on the BMGR.

Some recommended that public education through interpretation with tribes be incorporated into the cultural resources management program as one way to protect sensitive archaeological sites.

7.3.2 Cultural Affiliation

Based on archaeological evidence of trade and travel through the BMGR area through time, as well as ethnographic evidence, numerous tribes have claimed cultural affiliation with places on BMGR. Because of the overlapping (in both time and space) claims of cultural affiliation throughout Arizona and the Southwest, several tribal representatives identified ongoing cultural affiliation research (see discussion of historic contexts in Part I, Section 4) as an important area of study.

7.3.3 Treatment of Human Remains

All of the tribal representatives consulted in this process have recommended complete avoidance of human remains and burial sites. Several tribes have stated that if remains are inadvertently disturbed, or if complete avoidance of impacts is impossible due to project constraints, the burial should be excavated and reburied out of harm's way, as close as possible to the original burial site. Those tribes have also recommended that the Air Force and Marine Corps negotiate and execute an agreement (or agreements) under NAGPRA to specify how that act will be implemented on the BMGR. Some have suggested a cemetery be created where all remains can be reinterred on the BMGR.

7.3.4 Identification of Traditional Cultural Places and Confidentiality of Sensitive Information

All tribes stress that the methods for carrying out TCP assessments and evaluations are different from those for archaeological surveys and must rely on the knowledge of the traditional practitioners. On that basis, they recommend that tribal experts be used to identify such places.

This perspective is consistent with a recent memorandum from John Fowler, ACHP Executive Director, entitled *Fees in the Section 106 Process* (16 July 2001). Mr. Fowler advised that agencies may need to request specific information and documentation regarding the location, nature, and condition of individual sites, or may request that a survey be conducted by a tribe as a part of the identification phase of Section 106 review.

Tribal cultural experts also expressed concern about Air Force and Marine Corps management and protection of site locations, and access to archaeological data and any sensitive information provided by tribes during consultation.

7.3.5 Developing a Programmatic Agreement

Several tribes specifically recommended that the Air Force and Marine Corps develop an agreement (or agreements) to which tribes that claim affiliation with places on BMGR would be signatories, which describes how those tribes will be involved in the protection and management of cultural resources on BMGR. Some have suggested that tribal monitoring of sensitive resources and streamlining the Section 106 review process be addressed in that document.

7.3.6 Future Research

There is no question that Native American tribes can provide valuable insight and information, and collaborative efforts between tribal groups and the scientific community can lead to new knowledge about the past. Several of the tribes consulted have asked to be involved in future research efforts. The Yavapai-Prescott Indian Tribe would like to continue to work with the BMGR cultural resource staff to identify trade routes that cross the BMGR, identify and research the rock art left behind by ancient travelers, and prepare a National Register Nomination for the Gila Mountains, where the creator's cremated remains were placed and then stolen by Coyote.

The Hopi Tribe recommends additional ethnographic and other research into cultural affiliation for NAGPRA purposes and has identified other important research issues. One is tying the oral tradition of clan migrations to the archaeological record and using this information to resolve some of the debate about the origins and demise of the Hohokam culture. Farming is a fundamental aspect of Hopi culture, and the Hopi Tribe is interested in ancestral farming practices. The technology and diversity of farming by ancient peoples also is a topic of intense interest to archaeologists. The Hopi report emphasized the importance of shell in Hopi ceremonial contexts and identified shell trade, manufacture, and distribution, and particularly shell trade routes, as areas of special interest (Anyon 1999: 65).

Both tribal representatives and archaeologists have expressed an interest in studying the trail systems that cross the BMGR. Trade played an important role in both intercultural and commodity exchange between the north and south. The BMGR is strategically located for the trade routes required to transport such goods as shell, salt, and turquoise.

There is particular interest in current research centered on defining the Patayan archaeological culture. The Yavapai-Prescott Indian Tribe identified this issue as potentially influencing investigations currently being undertaken throughout the Southwest. The AhaMakav Cultural

Society, Ft. Mojave Tribe, has expressed interest in reconciling the archaeological construct called Patayan with ethnographic and historic evidence and has commented favorably on research and interpretations presented in draft reports of surveys being conducted on BMGR.

7.4 ACCESS TO SACRED SITES

The MLWA directs the Air Force and Marine Corps to provide access by Native Americans to TCPs and sacred sites, and several of the tribal studies indicated that tribes should be allowed access to places on and collections from the BMGR. Unrestricted access (after initial contact and arrangements have been made) may be possible in some portions of the BMGR. Access to any TCPs and sacred sites identified in military operating areas (for example, the tactical ranges on BMGR East), however, will be constrained by both ongoing training activities and the hazards present in these areas. Consultation should identify times and conditions when access would be permissible. Specific information about access to BMGR East and BMGR West will be presented in Parts II and III, respectively.

Section 8

CONCLUSION

The cultural resource programs at BMGR East and West support the military mission; sustain the range withdrawal; ensure compliance with cultural resource protection statutes; identify places and issues of cultural importance to Native Americans; sponsor professional cultural resource studies; consult with Native Americans, the SHPO, the ACHP and other preservation partners about the management and protection of cultural resources on the BMGR; and provide opportunities for public involvement and education. This mission can be achieved most effectively by fostering a shared understanding of our legal obligations under federal laws and regulations, inventorying and identifying significant cultural resources by applying scientific methods, coordinating these activities with appropriate governmental and other organizations, and participating in regional and statewide outreach programs.

This ICRMP will guide Air Force and Marine Corps cultural resource programs in achieving their missions. Part I provides a solid foundation for the remainder of this document, which includes specific plans tailored to the needs of the two services and the cultural resources on their respective training lands.

Three overarching cultural resource program goals have been identified.

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

In this section, which concludes Part I, important issues in cultural resource management are identified, potential impacts to resources on BMGR are reviewed, and the relationship of cultural resource and other environmental and resource management actions is described.

8.1 CHALLENGES

The BMGR encompasses almost two million acres of largely undisturbed desert, including a well-preserved record of human habitation and use. More significant for interpreting this record than any of its individual parts is that this landscape still includes evidence of the broad range of activities that took place there through time. Use of these lands for military training, and thus exclusion of other uses that produce significant and extensive ground disturbance, has inadvertently preserved intact a more complete “set” of sites than is generally available. Because of the size of the area and the number and significance of the resources that may be impacted by Air Force and Marine Corps actions (or inaction), management and long-term care of those resources is both a rare opportunity and a tremendous challenge. In some situations, the size of the BMGR also works to the advantage of the Air Force and Marine Corps; when sensitive cultural resources are located early in the planning process, it is often quite feasible to avoid impacts by relocating or redesigning an action.

Working relationships between the Air Force and Marine Corps and tribes that claim affinity with places on BMGR have consistently improved since consultation began; nonetheless, a number of challenges will be faced in the years to come. Among them are developing procedures for taking into account the traditional cultural importance tribes attach to different kinds of resources on BMGR and developing agreements regarding the treatment of human remains and other items covered by NAGPRA.

Public Law 106-65 section 3013(b)(3)(E)(ii)(II) directs the Air Force and Marine Corps to “allow access to and ceremonial use of sacred sites to the extent consistent with the military purposes for which such lands are withdrawn and reserved.” Relatively unrestricted access is possible in some portions of the BMGR; however, access to sacred sites identified in the three tactical ranges, the four manned ranges, and the air-to-air range on the east side of the BMGR, and several live-fire and other training areas on BMGR West, will be constrained by the fact that these areas are heavily used by the military during most of each year. The Air Force and Marine Corps will provide access to these areas on request, when it is safe to do so, in accordance with procedures outlined in Parts II and III respectively.

Large areas within BMGR are off-limits to archaeological research for most of the year. The three tactical ranges on BMGR East comprise over 300,000 acres, and each is available for investigation for only six to eight weeks annually, yet these areas, where military training may be most likely to adversely impact cultural resources, are among the Air Force’s highest priority for inventory, evaluation, and impact assessment. These constraints affect the pace of cultural resource field studies, Section 106 reviews, and planning efforts.

In other areas, impacts of illegal border-related activity, law enforcement efforts, and border infrastructure development have had and likely will continue to have a substantial impact on all kinds of cultural resources. Given the surficial nature of most of these resources, they are extremely vulnerable to off-road vehicle traffic, whether legal or illegal. The attraction of natural water sources for travelers on foot tends to concentrate impacts in those areas, where cultural resources are often concentrated. Although the Air Force and Marine Corps cannot control these impacts, they can and should coordinate with Border Patrol and other law enforcement entities to minimize impacts of border-related activities on cultural resources to the extent possible.

8.2 POTENTIAL IMPACTS TO CULTURAL RESOURCES ON THE BMGR

In addition to military activity and border-related activities, Air Force and Marine Corps activities driven by the INRMP and other environmental mandates also may affect cultural resources. Environmental compliance requirements such as removal of contaminated soils may have an adverse effect on cultural resources. Seemingly low impact natural resource management actions also may affect sensitive resources. One example is the modification or enhancement of natural water sources to improve the reliability of these water sources for endangered species or game animals. These water sources were equally important to prehistoric human inhabitants, are often surrounded by archaeological evidence, and are culturally important to many modern tribes.

Of primary importance to the natural resource management program are Air Force and Marine Corps efforts to protect and recover threatened and endangered species, including the endangered Sonoran pronghorn and its habitat, which includes most of the BMGR west of SR 85 and east of the Copper Mountains, and the flat-tailed horned lizard, which is found west of the Gila and Butler mountains on BMGR West.

The primary objective of the USFWS Sonoran Pronghorn Recovery Plan of 1998, as amended (U.S. Fish and Wildlife Service 2002) is down-listing of the endangered Sonoran pronghorn. The plan includes a list of 51 proposed management actions, some of which have potential to disturb cultural resources; examples include habitat enhancements, placement and maintenance of artificial water sources, and selective thinning of vegetation. Some of the proposed activities meet the threshold established in regulation for Section 106 review; resource inventories, consultation, and other efforts will be as needed in advance of such undertakings.

The presence, or potential presence, of pronghorn on BMGR also affects the ability of the Air Force and Marine Corps to conduct cultural resource investigations, including survey and excavation. For example, cultural resource contractors working on BMGR East are affected by pronghorn monitoring and avoidance procedures as are training, maintenance, and EOD activities. While necessary, these constraints may limit the amount and timing of work that can be accomplished, and project schedules and budgets must be designed to reflect this level of uncertainty.

Other natural resource management activities on BMGR include studies of small owls, diurnal raptors, neotropical migratory birds, bats, small nocturnal mammals, desert tortoise, amphibians, and Pierson's milk vetch. Most of these efforts involve small teams of researchers who typically access study areas by vehicle on existing roads and by foot in the more remote areas. Most research can be designed and conducted in ways that are unlikely to impact cultural resources to any appreciable extent; however, many will require Section 106 review. Because some plants and animals may be of sacred or ceremonial value to traditional cultures, and because areas where particular plants were traditionally gathered may be eligible for inclusion on the National Register, tribal consultation will be required in many instances before such work begins.

A long-standing concern among archaeologists and tribal cultural experts is the modification of natural water sources to create more reliable wildlife waters. Water has always been a critical resource for desert dwellers and travelers, and archaeological evidence is often concentrated around tinajas and other water sources. These resources may be damaged or destroyed by activities associated with the modification of these natural sources to create more reliable wildlife waters, and may be further affected by ongoing maintenance of those waters. Tribal cultural leaders also are concerned about these modifications, which damage these traditionally significant or sacred places.

Finally, public recreation may constitute the greatest threat to cultural resources in some areas, and this permitted activity should be carefully managed and its impacts on cultural resources monitored. In particular, permitted vehicle-based camping within 50 feet of almost all roads in areas open to the public may damage or destroy fragile resources. Permit enforcement, surveys to identify and evaluate resources and establish baseline conditions in areas open to public use,

and regular monitoring of those resources will be key components on Air Force and Marine Corps management of cultural resources on BMGR. Increased recreational use supervision will reduce the likelihood of vandalism and intentional removal of protected resources. Under the terms of the programmatic agreement for INRMP implementation (see Section 2), the Air Force and Marine Corps will prioritize survey of areas likely to be affected by public access. These efforts will be discussed in detail in Parts II and III.

8.3 POTENTIAL IMPACTS ON THE AIR FORCE AND MARINE CORPS MISSIONS ON THE BMGR

Important objectives of cultural resource management on BMGR are to prevent conflicts between the military mission and resource protection and to sustain that mission by ensuring that the Air Force and Marine Corps comply with resource preservation statutes, regulations, and guidance in a way that minimizes the likelihood of successful legal challenge to their management decisions. Nonetheless, such conflicts between the military mission and resource management needs may arise occasionally.

The cultural resource programs of BMGR East and BMGR West place a high priority on completing required inventories and consultations in a timely manner, so that project schedules are not impeded. Successful integration of resource management and mission also requires that mission planners and project proponents understand and accept the requirements of the review process and involve cultural resource staff in planning at the very earliest stages. Potential project or mission impacts or delays are most likely to result from: 1) failure to involve cultural resource staff early in the process; 2) lack of available funding to complete the identification and evaluation effort in a timely manner; or 3) identification of significant resources in the area of potential effect.

Clearly, the best methods for reducing mission conflicts and delays are to: 1) involve cultural resource staff early in project planning, initiate the consultation process as soon as viable alternatives have been identified, and complete the process in accordance with applicable regulation; 2) conduct planning-level inventories to identify “red-flag” resources that should be avoided if at all possible; and 3) develop a team relationship between resource managers and mission planners, project proponents, and operators. Agency-specific procedures for avoiding or minimizing both conflicts and possible delays will be presented in Parts II and III.

8.4 COMMITMENT

Proactive resource stewardship is required by law; it is also the best tool for insuring that cultural resource issues do not threaten sustained use of BMGR for essential military training through the life of the present range renewal and beyond. Cultural resource protection and stewardship efforts on the BMGR will be addressed in Parts II and III, including the following issues:

- Preservation in place
- Archaeological site monitoring
- ARPA permitting and law enforcement
- Controlling access to site location and other data

- Collections management and curation
- Education and outreach programs

Successful implementation of this plan requires funding and other support at all levels within the Air Force and Marine Corps. The goals and priorities established in this ICRMP, as approved, represent the agencies' commitment to sound resource management and stewardship for the 25-year life of the BMGR land withdrawal. This plan will be evaluated annually and updated at least every five years. Execution of the program activities identified in this plan will continually improve our understanding of the extent and nature of cultural resources on BMGR, and management and stewardship strategies will be constantly reassessed and revised as needed.

Glossary

Advisory Council on Historic Preservation (ACHP): The independent federal agency charged by the National Historic Preservation Act (NHPA; Section 201), as amended, to advise the president, Congress, and federal agencies on matters related to historic preservation. The ACHP also administers Section 106 of the NHPA through its regulation at 36 CFR Part 800, *Protection of Historic Properties*.

Aeolian: Accumulated through wind action; commonly refers to sandy material in dunes.

Aggradation: The building of a floodplain by sediment deposition; the filling of a depression or drainageway with sediment; the building of a fan by deposition of an alluvial mantle.

Air Force Instruction (AFI) 32-7065 Cultural Resource Management Program: This AFI establishes guidelines for managing and protecting cultural resources on property affected by Air Force operations in the United States, its territories and possessions, to support the military mission and to meet legal compliance requirements.

Alluvial: Pertaining to processes or materials associated with transportation or deposition by running water.

Alluvial fan: A semiconical or fan-shaped constructional, major landform that is built of more or less stratified alluvium, with or without debris flow deposits, that occurs on the upper margin of a piedmont slope and that has its apex at a point source of alluvium debouching from a mountain valley into an intermontane basin. Also, a generic term for like forms in various other landscapes.

Alluvium (as in alluvial deposits and alluvial fans): Deposits of organic and inorganic material made by streams on riverbeds, floodplains, and alluvial fans, particularly deposits of clay or silty clay laid down during a time of flood.

Archaeological resources/Archeological resources: Any material remains of past human life or activities that are capable of providing scientific or humanistic understandings of past human behavior and cultural adaptation through the application of scientific or scholarly techniques such as controlled observation, contextual measurement, controlled collection, analysis, interpretation, and explanation (see the Archeological Resources Protection Act and 32 CFR §229.3).

Archeological Resources Protection Act (ARPA) of 1979: This act (16 U.S. Code [U.S.C.] 470aa-mm) strengthened protection of archaeological resources on federal and tribal lands by increasing the penalties first included in the Antiquities Act of 1906 for unauthorized excavation, collection, or damage of those resources from misdemeanors to felonies, including fines and imprisonment for first offenses. Trafficking in archaeological resources from public and tribal lands is also prohibited by ARPA. ARPA requires notification of affected Native American tribes if archaeological investigations would result in harm to or destruction of any location considered by tribes to have religious or cultural importance.

Area of potential effect (APE): The area within which any existing historic properties may be affected by a federal undertaking. The APE includes the footprint of the proposed project and areas around the footprint that might be affected by visual, auditory, erosional, and other direct and indirect results of the undertaking. The APE may consist of a single area or two or more geographically discontinuous areas.

Bajada: When several alluvial fans laterally coalesce, the resulting feature is called a *bajada* (Spanish for “that which is below”). *Bajadas* may be hundreds to thousands of feet thick and may hold deposits of water deep beneath the surface.

Basin: A loose abbreviation for intermontane basin, bolson, or semibolson. Also, a depressed area with no surface outlet or only limited surface outlet.

Basin floor: A generic term for the nearly level, lower most major part of intermontane basins, the floor includes all of the alluvial, aeolian, and erosional landforms below the piedmont slope. Component landforms include playas, broad alluvial flats with ephemeral drainageways, and relict alluvial and lacustrine surfaces that rarely, if ever, are subject to flooding.

Bedrock: The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulder: A rock fragment larger than 2 feet (60 cm) in diameter.

Building: One of the five National Register of Historic Places property types. A structure created to shelter any form of human activity—includes houses, barns, churches, and other buildings created to shelter any form of human activity, including administration buildings, dormitories, garages, and hangars.

Channel: The bed of a single or braided watercourse that commonly is devoid of vegetation and is formed of modern alluvium. Channels may be enclosed by banks or splayed across and slightly mounded above a fan surface and may include bars and dumps of cobbles and stones. Channels, excepting floodplain playas, are landform elements.

Charco: Shallow, natural, water catchment in clay, adobe flats or braided-wash channels. Also referred to as a “mudhole” in other parts of the U.S. Southwest.

Cienega: Spanish term for marshy area.

Clay: As a soil separate, the mineral soil particles are less than 0.002 mm in diameter. As a soil textural class, soil material that is 40 percent or more clay, is less than 45 percent sand, and is less than 40 percent silt.

Coarse-textured soil: Sand or loamy sand.

Cobble: A rounded or partly rounded fragment of rock 3–10 inches (7.6–25 cm) in diameter.

“Cold War” historic resources: Buildings, structures, sites, objects, and districts built, used, or associated with critical events or persons during the “Cold War” period (1945–1989) that possess exceptional historic importance to the nation or that are outstanding examples of technological or scientific achievement (see DOD Instruction 4715.3).

Colluvium: Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Concretion: Cemented body with crude internal symmetry organized around a point, a line, or a plane that typically takes the form of concentric layers visible to the naked eye.

Conglomerate: A coarse-grained, clastic rock composed of rounded or subangular rock fragments more than 2 mm in diameter. It commonly has a matrix of sand and finer-textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation: Planned management, use, and protection of natural and cultural resources to provide sustainable use and continued benefit for present and future generations and to prevent the exploitation, destruction, waste, and/or neglect (DOD Instruction 4715.3).

Consultation: A reasonable and good faith effort to involve affected parties in the findings, determinations, and decisions made during the Section 106 process and other processes required under other statutes and regulations. Consultations with Indian tribes must be on a government-to-government level to respect tribal sovereignty and to recognize the unique legal relationship between the federal government and Indian tribes set forth in the Constitution, treaties, statutes, and court decisions.

Creosotebush community: Found on fine-grained soils of lower alluvial fan and valleys; creosotebush, bursage.

Cultural landscape: A geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, and/or natural features.

Cultural resource: Cultural resources represent the nation's collective heritage, and broad public sentiment for protecting these heritage resources has been codified over the years in numerous federal, state, and local laws (King 1998; King et al. 1977). This term includes: (1) buildings, structures, sites, districts, and objects that may be eligible for or that are included in the National Register of Historic Places (historic properties); cultural items as defined in 25 U.S.C. 3001; American Indian, Eskimo, Aleut, or Native Hawaiian sacred sites for which access is protected under 42 USC 1996; archeological resources as defined by 16 USC 470bb; archeological artifact collections and associated records defined under 36 CFR 79 (see DOD Instruction 4715.3); and any definite location of past human activity, occupation, or use, identifiable through field inventory (survey), historical documentation, or oral evidence.

Culture: The traditions, beliefs, practices, lifeways, arts, crafts, and social institutions of any community, be it an Indian tribe, a local ethnic group, or the people of the nation as a whole. Man's use of and adaptation to the environment as seen through his behavior, activities, and the methods employed to transmit customs, knowledge, and ideas to succeeding generations.

Curation: The process of managing and preserving an archaeological collection of artifacts and records according to professional museum and archival practices, as defined in 36 CFR 79. For details, see Legacy Resource Management Program Office, Legacy Project No. 98-1714,

Guidelines for the Field Collection of Archaeological Materials and Standard Operating Procedures for Curating Department of Defense Archaeological Collections, available through the DENIX and AFCEE Web sites.

Deflation: The removal of material from the land surface by wind erosion.

Desert pavement: Large, flat, conspicuous areas devoid of vegetation and covered by a layer of tightly packed small stones, which are frequently very dark-colored due to the development of desert varnish. Desert pavement is formed through a process of physical weathering and the accumulation of a porous mineral layer in the soil that separates and levels the desert-pavement surface from the underlying, uneven rocky material.

Desert varnish (also rock varnish): A glossy coating found on rock, stone, or boulder surfaces that provides the dark complexion of the rock surface despite the internal color of the rock. Desert varnish is very thin, at most a few hundredths of a millimeter thick (about the thickness of a sheet of paper). The thickest, darkest coatings of varnish found on older deposits may be the result of accumulation over many tens of thousands of years to more than 100,000 years.

Department of Defense (DoD) Instruction 4715.3, *Environmental Conservation Program* (3 May 1996): This instruction covers a wide range of topics pertinent to the integrated management of natural and cultural resources on properties under DOD control and describes means and assigns responsibilities for implementing policies, and prescribes appropriate procedures. It also directs DOD installations to take a proactive approach to consultation with Native American tribes, both in the Section 106 process and with respect to tribal cultural concerns in general. Among other things, it also directs installations to select a staff member to serve as a liaison to tribes and to educate appropriate staff about tribes with cultural ties to lands managed by DOD.

Determination of eligibility: A formal determination of eligibility is a decision by the Department of the Interior that a district, site, building, structure or object meets the National Register criteria for evaluation although the property is not formally listed in the National Register.

Dissection: The partial erosional destruction of a land surface or landform by gully, arroyo, canyon, or valley cutting that leaves flattish remnants, ridges, hills, or mountains separated by drainageways.

District: One of the five National Register of Historic Places property types. Districts are concentrations of significant sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Dune: A mound, ridge, or hill of loose windblown granular material (generally sand), either bare or covered with vegetation.

Effect: Any change in the characteristics that contribute to the uses determined appropriate for a cultural resource, or to the qualities that qualify a cultural property for the National Register of Historic Places (NRHP). Determination of effect is guided by criteria in 36 CFR Part 800.9.

Erosion: The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Ethnography: The branch of anthropology that describes and analyzes extant cultural systems.

Ethnohistory: Ethnographic information that can be obtained from historical documents; for example, diaries of early explorers and early newspaper accounts.

Ethnology: The branch of anthropology that deals with the comparative cultures of various people, including their distributions, characteristics, folkways, religions, and organizations.

Evaluation: Assessing the historic significance and historic integrity of a site, building, structure, district, or object by applying the criteria of eligibility for inclusion in the NRHP.

Fan: A generic term for constructional landforms that are built of more or less stratified alluvium and occur on the piedmont slope, downslope from their source of alluvium.

Fine-textured soil: Sandy clay, silty clay, or clay.

Floodplain: A nearly level alluvial plain that borders a stream and is subject to flooding unless artificially protected.

Floor: A generic term for the nearly level, lower part of an intermontane basin (a bolson or semibolson) or a major desert stream valley.

Foothill: A steeply sloping upland that has relief of as much as 1,000 feet (300 m) and fringes a mountain range or high-plateau escarpment.

Geomorphic surface: An episode in landscape development; a mappable part of the land surface that is defined in terms of morphology (relief, slope, aspect), origin (erosional, constructional), age (absolute, relative), and stability of component landforms.

Geomorphology: The science that treats the general configuration of the earth's surface; specifically, the study of the classification, description, nature, origin, and development of the landforms and their relationships to underlying structure and the history of geologic changes as recorded by these surface features.

Gravel: Rounded or angular fragments of rock as much as 3 inches (2 mm to 7.6 cm) in diameter. An individual piece is a pebble.

Groundwater: Water filling all the unblocked pores of the material below the water table.

Historic archaeology: Investigation of historical-period sites through archaeological techniques; study of the material culture of people living during recorded history in order to understand cultural history and human behavior.

Historic context: An organizing structure for interpreting history that groups information about historic properties that share a common theme, geographical location, and time period. The development of historic contexts is a foundation for decisions about the planning, identification,

evaluation, registration, and treatment of historic properties based upon comparative significance.

Historic integrity: The ability of a property to convey its historic significance. To be eligible for the National Register of Historic Places, a property must be historically significant. It also must possess historical integrity, which is a measure of authenticity and not necessarily condition. Elements of integrity to be considered include location, design, setting, materials, workmanship, feeling, and association. Not all seven aspects of integrity need to be retained, but a property must have sufficient physical remnants from its period of historical importance to illustrate significant aspects of its past. The integrity of archaeological sites typically is evaluated by the degree to which they can provide important contextual information. The integrity of traditional cultural places is interpreted with reference to the views of closely affiliated traditional groups, if traditional people will write or talk about such places so information can be filed with a public agency. If a place retains integrity in the perspective of affiliated traditional groups, it probably has sufficient integrity to justify further evaluation. National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*, provides guidance for identifying and assessing traditional cultural places.

Historic preservation: 16 U.S.C. 470w, Section 301(8), states that historic preservation ~~includes~~ identification, evaluation, recordation, documentation, curation, acquisition, protection, management, rehabilitation, restoration, stabilization, maintenance, research, interpretation, conservation, and education and training” regarding cultural resources.

Historic property: Any district, site, building, structure, or object listed in or eligible for inclusion in the National Register of Historic Places (NRHP) because of its historic significance. The regulation at 36 CFR 60.4 explains criteria for determining eligibility for listing in the NRHP.

Historic significance: The importance of a property to the history, architecture, archaeology, engineering, or culture of a community, a state, or the nation. It is achieved by meeting one or more of the following criteria: association with events, activities, or patterns (Criterion a); association with important persons (Criterion b); distinctive physical characteristics of design, construction, or form (Criterion c); potential to yield important information (Criterion d).

Historic theme: A trend or pattern in history or prehistory relating to a particular aspect of cultural development.

Holocene: The second epoch of the Quaternary period of geologic time, extending from the end of the Pleistocene (about 10,000–12,000 years ago) to the present.

Identification: The first step in the National Historic Preservation Act Section 106 process includes preliminary work (such as archival research or literature review), actual efforts to identify properties, and the evaluation of identified properties to determine if they qualify as historic properties. The standard is a ~~reasonable~~ and good faith effort” for identification and evaluation.

Igneous rock: Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Indian tribe: Under AFI 32-7065, the term Indian tribe includes federally recognized American Indian tribes, Alaska Native villages, and Native Hawaiian organizations. A federally recognized tribe is one the U.S. government formally recognizes as a sovereign entity that requires government-to-government relations. The federal government holds lands in trust for many, but not all, Indian tribes. Some tribes are not federally recognized and are not afforded special rights under federal law, with the following exception. According to National Register of Historic Places guidelines, traditional cultural places include places of cultural significance to both federally recognized tribes and other groups.

Inert: Nonreactive, nonexplosive (in regard to inert ordnance).

Intaglio: A figure or design incised beneath the surface of the earth or composed of rock alignments.

Integrated Cultural Resources Management Plan (ICRMP): A document that defines the procedures and outlines plans for managing cultural resources on DOD installations (see DODI 4715.3; AFI 32-7065).

Integrated Natural Resources Management Plan (INRMP): An integrated plan based, to the maximum extent practicable, on ecosystem management that shows the interrelationships of individual components of natural resources management to mission requirements and other land use activities affecting an installation's natural resources (see DODI 4715.3).

Intensive archaeological survey: A pedestrian survey that is designed to locate and record all archaeological resources within a specified area from surface and exposed profile indications. Crew member spacing is 15 m or less for surveys conducted in southwestern Arizona.

Intermontane basin: A generic term for wide structural depressions between mountain ranges that are partly filled with alluvium and are called "valleys" in the vernacular. Also a relatively small structural depression within a mountain range that is partly filled with alluvium and commonly drains externally through a narrower mountain valley.

Inventory: A process of descriptive listing and documentation of cultural resources within a defined geographic area based on a review of existing data, fieldwork, and other means.

Lago: Spanish word for lake.

Landform: A three dimensional part of the land surface, formed of soil, sediment, or rock that is distinctive because of its shape, its significance for land use or to landscape genesis, its repetition in various landscapes, and its fairly consistent position relative to surrounding landforms.

Medium-textured soil: Very fine sandy loam, loam, silt loam, or silt.

Mesa: A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Microphytic soil crust: Also cryptogamic or cryptobiotic soil crust. The fragile, crusty, top layer of many desert soils characterized by the growth of lichens, algae, blue-green algae (cyanobacteria), liverworts, or mosses, in combination or singularly.

Mountain: A highland mass that rises more than 1,000 feet (300 m) above its surrounding lowlands and has merely a crest or restricted summit area (relative to a plateau).

National Register criteria: The criteria applied to evaluate the historic significance of properties to determine their eligibility for inclusion on the National Register of Historic Places. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one of four criteria (listed individually below).

National Register criterion a: associated with events that have made a significant contribution to the broad patterns of our history.

National Register criterion b: associated with the lives of persons significant in our past.

National Register criterion c: embodying the distinctive characteristics of a type, period, or method of construction, representing the work of a master, possessing high artistic values, or representing a significant and distinguishable entity whose components may lack individual distinction.

National Register criterion d: having yielded, or may be likely to yield, information important in prehistory or history (information potential).

National Register of Historic Places (NRHP): The official federal list of sites, districts, buildings, structures, and objects worthy of preservation consideration because of significance in American history, architecture, archeology, engineering, or culture. The NRHP is administered by the Department of the Interior, National Park Service. Criteria for eligibility, and the procedures for nomination, making changes to listed properties, and for removing properties from the NRHP are detailed in 36 CFR 60, *National Register of Historic Places*. Significance may be local, state, or national in scope. NRHP eligibility criteria are published in 36 CFR 60.

Native Americans: American Indians, Eskimos, Aleuts, and Native Hawaiians (DODI 4715.3).

Object: One of the five National Register of Historic Places property types. Objects typically are small in scale and often artistic in nature, and include sculpture, monuments, boundary markers, and fountains.

Outcrop: That part of a geologic formation or structure that appears at the surface of the earth.

Paleosol: A soil that formed on a landscape of the past with distinctive morphological features that result from a soil-forming environment that no longer exists at the site. The former pedogenic process was either altered because of external environmental change or interrupted by burial.

Palo verde–mixed cacti community: Found on piedmont slope (*bajada*) upper alluvial fans, pediments, mountainous areas; palo verde, saguaro, triangle leaf bursage, creosote, various cacti, ocotillo (Turner and Brown 1982).

Papaguería: A unique geographic area in southwestern Arizona and northwestern Sonora, Mexico; subdivided into the eastern and western Papaguería based on cultural and environmental factors. This term is used extensively in archaeological literature to identify a geographic region, an environment, and a cultural area.

Pediment: Broad, gently sloping erosional surface developed at the foot of a receding hill or mountain slope. The pediment extends from the abrupt contact of the mountains with the valley floor. The pediment formation is a smooth, eroded bedrock surface formed over time and often covered with a thin, discontinuous, alluvial veneer. It may be thinly mantled with alluvium and colluvium, ultimately in transit from upland front to basin or valley lowland.

Physiographic province: Very large, general landscape units that display dominant geologic formations and patterns such as basins, plateaus, and mountain ranges.

Piedmont: A general slope rising to mountains.

Plain: A flat, undulating, or even rolling area, larger or smaller, which includes few prominent hills or valleys, is usually at low elevation in reference to surrounding areas, and may have considerable overall slope and local relief.

Playa: The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Pleistocene: The first epoch of the Quaternary period of geologic time, following the Pliocene epoch and preceding the Holocene (about 2 million–10,000 years ago). The last epoch of the Tertiary period of geologic time, following the Miocene epoch and preceding the Pleistocene epoch (about 7 million–2 million years ago).

Pluvial lake: A lake formed in a period of exceptionally heavy rainfall; a lake formed in the Pleistocene epoch during a time of glacial advance and now either extinct or existing as a remnant. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapo-transpiration.

Pozo: A dug or drilled well; a freshwater, spring-like upwelling occurring in estuaries or salt flats.

Prehistory: That period of time before written history. In North America, prehistoric usually refers to the period before European contact.

Protohistory: The study of historical-period groups who themselves did not maintain written records. The protohistoric period is usually defined as between A.D. 1450 and A.D. 1700.

Quaternary: The second period of the Cenozoic era of geologic time, extending from the end of the Tertiary period (about 2 million years ago) to the present and consists of two epochs, the Pleistocene (Ice Age) and the Holocene (recent).

Remnant: A remaining part of some larger landform or of a land surface that has been dissected or partially buried.

Represo: A small, shallow, dug pond, usually on a floodplain. It is 3–5 feet deep and generally has water only during rainy seasons.

Represos: Reservoirs or dams constructed on the alluvial fan or in the valley (Tohono O'odham).

Restricted airspace: Airspace with defined vertical and lateral dimensions that has been established by the Federal Aviation Administration (via the rule-making process) to denote areas where military activities can occur.

Ridge: A long, narrow elevation of the land surface, typically sharp crested with steep sides and forming an extended upland between valleys.

Riparian habitat or area: A zone of transition from the aquatic to terrestrial ecosystems, whose presence is dependent upon surface and/or subsurface water, which reveals the influence of that water through its existing or potential soil/vegetation complex. Riparian habitat may be associated with features such as lakes, reservoirs, estuaries, potholes, springs, bogs, wet meadows, muskegs, and ephemeral, intermittent, or perennial streams. Riparian areas are often characterized by dense vegetation and an abundance and diversity of wildlife.

Riverine: Located along or in the banks of a river.

Road: A motor vehicle travelway within the BMGR.

Runoff: The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff.

Sand: As a soil separate, individual rock or mineral fragments from 0.05 to 2.0 mm in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sand dune: An aeolian dune and landform element built of sand-sized mineral particles. Dunes commonly occur on the leeward side of a Pleistocene lake bed.

Sandstone: Sedimentary rock predominantly containing sand-sized particles.

Sheet erosion: The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Silt: As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 mm) to the lower limit of very fine sand (0.05 mm). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site: One of the five National Register of Historic Places property types. The physical location of a significant activity or event; often refers to archaeological sites or traditional cultural places, although the term also may be used to describe military properties such as testing ranges, treaty signing locations, and aircraft wrecks. All sites are the location of past human activities or events.

State Historic Preservation Officer (SHPO): The official appointed by the governor of each state and territory to carry out the functions defined in the NHPA and to administer the state's historic preservation program. SHPOs provide advice and assistance to federal agencies regarding their historic preservation responsibilities.

Stewardship: The management of resources entrusted to one's care in a way that preserves and enhances the resources and their benefits for present and future generations (DODI 4715.3).

Stratified: Arranged in strata or layers.

Stream terrace: One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream and representing the dissected remnants of an abandoned floodplain, streambed, or valley floor produced by a former stage of erosion or deposition.

Structure: One of the five National Register of Historic Places property types. A work constructed for purposes other than human shelter, including bridges, tunnels, dams, roadways, and military facilities such as missiles and their silos, launch pads, weaponry, runways, and water towers.

Surface drainage: Runoff or surface flow of water from an area.

Talus: Fragments of rock and other soil material accumulated by the forces of gravity at the foot of slope.

Terrace: An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour; an old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Tertiary: The first period of the Cenozoic era of geologic time, following the Mesozoic era and preceding the Quaternary (from approximately 65 million to 2 million years ago). Epoch or series subdivisions include, in order of increasing age, Pliocene, Miocene, Oligocene, Eocene, and Paleocene.

Tinaja: A cavity or natural depression eroded into bedrock by stream or wind action and fill with direct rainfall or runoff. Small, rock pocket *tinajas* (formed by aeolian erosion) are found in rock outcrops away from streambeds. Stream channel *tinajas* (formed by alluvial action) are bedrock pools that range in size from small pot holes to large plunge pools. These are one of the most reliable water sources in the Sonoran Desert. They can hold several hundreds of gallons and in some cases are perennial.

Topography: The relative position and elevation of the natural or man-made features of an area that describe the configuration of its surface.

Traditional cultural property (or place): A property that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community. The traditional cultural significance of a historic property is derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Examples of properties possessing such significance include: a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world; a rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents; a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice.

Tribe: A federally recognized tribe or other federally recognized Native American group or organization (DODI 4715.3).

Undertaking: Any project, activity, action, or program wholly or partly funded under the direct or indirect jurisdiction of a federal agency. Includes projects and activities that are executed by or on behalf of a federal agency; federally funded; require a federal permit, license, or approval; or are subject to state or local regulation administered through delegation or approval authority by a federal agency. Also, any action meeting this definition that may have an effect on NRHP resources and thereby triggers procedural responsibilities under 16 USC 470 et seq. (see DODI 4715.3).

Unexploded ordnance (UXO): Refers to military munitions that have been primed, fused, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material and remain unexploded either by malfunction, design, or any other cause.

Upland: Land at a higher elevation than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley: An elongate, relatively large, externally drained depression of the earth's surface that is primarily developed by stream erosion.

Valley fill: In glaciated regions, material deposited in stream valleys by glacial movement. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Varnish (desert varnish): A surface stain or crust of brown or black manganese or iron oxide, typically with a glistening luster, that characterizes many exposed rock surfaces in the desert. It coats not only ledges or rocks in place but also boulders and pebbles that are scattered over the surface of the ground.

Viewshed: The total area visible from a point (or series of points along a linear transportation facility) and conversely the area that views the facility.

Volcanic: Pertaining to the deep-seated, igneous processes by which magma and associated gases rise through the crust and are extruded onto the earth's surface and into the atmosphere. Also, the structures, rocks, and landforms produced by these processes.

Wash (dry wash): The broad, flat-floored channel of ephemeral stream, commonly with very steep or vertical banks cut in alluvium.

Weathering: All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

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