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Cultural Resources Management Award — Installation

BARRY M. GOLDWATER RANGE (BMGR) EAST

Luke Air Force Base, Arizona

Nominee: **Barry M. Goldwater Range East**

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INTRODUCTION

Since September 1941 the Barry M. Goldwater Range (BMGR), located in southwest Arizona, has served as the nation's second largest Air Force tactical aviation range, essential for developing and maintaining the combat readiness of the tactical air forces of the United States Air Force, Marine Corps, Navy, and Army. The mild climate and vast tracts of uninhabited lands were tailor-made for military training. Overhead are 57,000 cubic miles of special use airspace, an incredible volume that easily accommodated the revolutionary transitions from propeller-driven aircraft firing.50 caliber guns to supersonic jets employing with precision-guided munitions. The BMGR has contributed significantly to the nation's defense by effectively accommodating the training requirements of changing air combat capabilities and missions that include aerial gunnery, rocketry, electronic warfare, and air support; as a place to develop equipment and tactics; and as an armament and high-hazard testing area. The two principal agencies that operate and use the Goldwater Range for combat aircrew training are the US Air Force and Marine Corps.

The primary mission of BMGR East is to support initial and continuation training of Air Force, Air National Guard and Reserves, and Army National Guard aircrews operating frontline combat aircraft. Some 55,000 sorties are flown annually. Military use areas include four manned air-to-ground ranges, three tactical ranges, WW II era auxiliary airfields, and an air-to-air range.

The Military Lands Withdrawal Act of 1999 reauthorized military use of the range and assigned jurisdiction and land management authority to the Secretaries of the Air Force and Navy for their respective portions of the range. The 56th Range Management Office (56 RMO) administers the land and airspace of the approximately 1,050,000 acres of the BMGR East. This includes operations and maintenance of the 2,000 acre Gila Bend Air Force Auxiliary Field (GBAFAF), located within BMGR East. GBAFAF is used daily by aircraft performing routine approaches and simulated emergency patterns and also used for emergency recoveries of military aircraft that experience malfunctions, hung ordnance, or damage during operations. The Range Management Office is a multi-disciplinary staff of 35, supported by a workforce of about 200 contractors, an unusually small number of people considering the scope of range operations and complexity of land management issues.

BACKGROUND

The cultural resources program is managed by two dedicated archaeologists within the 56 RMO Environmental Sciences Management (ESM) flight who ensure the rich cultural histories of the Range are identified, documented, and managed. The BMGR East lies within the Sonoran Desert within an area known the Western Papagueria. This is the hottest, most arid portion of the desert yet it is the most biologically and culturally diverse. The landscape includes steep mountain ranges separated by wide valleys that contain different plant and animal communities. Understanding the distributions of these communities and their relationship to prehistoric lifeways is critical for cultural resource management. The range is also home to several endangered plant and animal species.

The great natural and biological diversity of the range has resulted in significant cultural diversity through time. This heritage is represented by "historic properties" that include prehistoric sites, artifacts, historic buildings, Traditional Cultural Places, museum objects, photographs and documents. Cultural resources, a more inclusive term, includes intangible items such as sacred sites and natural features, such as surface waters, plants, animals, and minerals.

PROGRAM SUMMARY

During the award period the BMGR East cultural resources program made significant gains to inventory and evaluate resources on military training lands, protected numerous sites in proximity to military targets, established a new on-site curation facility, and clearly established itself as a regional leader in public outreach and interagency collaboration.

OVERALL CULTURAL RESOURCES MANAGEMENT

Most of the cultural resources on the Barry M. Goldwater Range are prehistoric archaeological sites situated on the desert landscape, rather than historic buildings. A new monitoring and rapid condition assessment program was

designed and implemented for sites located in primary impact zones around targets on tactical ranges. These assessments were completed for 80 sites originally recorded years ago. This effort included finding the site datum, repeat photography, relocating artifacts, mapping of new disturbances, and identification of new natural resource conditions.

Leveraging interdisciplinary skills, 56 RMO staff teamed with geographic information system analysts to consolidate three independent cultural resource databases prepared by three different contractors over a 15-year period. This complex effort resulted in a single integrated geodatabase used daily for analyzing resources.

The BMGR Site Steward Program continued its great success. This volunteer site-monitoring program has won SHPO recognition, and a training workshop organized by 56 RMO drew 100+ citizens who later devoted over 1000 hours monitoring sites on 130,000 public-access acres on the range. Site Stewards' activities included repeat photography, recording and mapping of disturbances, updating monitoring notebooks, cataloging site photos and site forms, and assisting archaeologists in intensive site recording.

BMGR East archaeologist Dr. David Doyel examines artifacts at the Lago Seco site.

HISTORIC BUILDINGS AND STRUCTURES

Historic buildings and structures on the range include World War II era auxiliary airfields used in the early days of the range's history; the arrival of much-faster jet aircraft rendered these facilities obsolete. These airfields were determined eligible for the National Register of Historic Places, and research preserved records of how bombing and gunnery training was conducted at these locations. A large report was published on the military history of the range that serves as summary and guiding document for the management of these resources.

Several of these auxiliary airfields have witnessed resumed use for military training. Several are also associated with prehistoric archaeological sites. For example, Stoval airfield is now used by the US Marine Corps as a forward arming point for helicopters and as bivouac for ground personnel. To support this operation, archaeological surveys were completed and a plan developed for test excavations. This project served two purposes: deriving a better understanding of how ancient people lived in this desert setting, and providing an expanded footprint for air and ground training. Auxiliary Field 6 is also a multi-component site where a large-scale archaeological data recovery project occurred. Since then the airfield has seen renewed use for military training similar to Stoval Field, including use as an assault strip for C-130 aircraft, so it's being used for its original purposes after decades of abandonment. The limited maintenance this requires does not alter the characteristics of the sites.

Christopher Doolittle, contract archaeologist, discovered this whole vessel in an EOD impact zone on the East Tactical Range. The bowl dates to around A.D. 1400; this pottery continued to be made by native people in the area until the early 1900s.

Target modernization is an ongoing process that dates back to the early days. Related historic resources include WW II and Korean War era vehicle convoys, gun enplacements, railroad targets, and a ground support building. Archival research has documented the original plans and how these resources were used in training operations.

ARCHAEOLOGICAL RESOURCES

A huge sustained focus on archaeological survey has been a top priority of the overall program. The coordinated effort of over 30 contract archaeologists for four years resulted in completion of 12,000 acres of impact zones and recording of 150 sites. Eleven major technical reports, 1,200 pages of text, describe the findings

56 RMO Archaeologist, Adrianne Rankin, assesses conditions of cultural sites on the North Tactical Range within the 1.05 million acre Barry M. Goldwater Range East. These sites are periodically re-assessed to evaluate whether they are being adversely affected by military training operations, erosion, or other factors.

of the surveys. These efforts required coordination with consulting partners including SHPO and 15 Native American tribes. The reports added to a growing library that describes 1,269 sites and surveys on 186,000 acres. An in-house survey of 30 miles of remote unpaved roads allowed much-needed road maintenance to proceed. About 18 percent of the 1.05 million acre range has been surveyed, including virtually all areas within the mission impact footprint, an incredible feat considering the time frame and 2-person staff.

This small staff required maximum use of best practices, sophisticated tools, and analytical skills to manage the resources on the range. As consultations with partners continued, the staff developed a systematic program for the in-house annual evaluation of nearly 80 archaeological sites located in high-risk zones potentially affected by mission activities. A new integrated cultural resources geodatabase became an indispensible tool for record keeping and resource management. The system includes a unique archaeological site condition database to monitor new disturbances and threats to sites, including records about how sites are being disturbed. As a result, data from repeat visits clearly identified the type and severity of the disturbance, allowing for the development of a mitigation plan. Routine site condition assessments are conducted for sites outside the mission impact areas.

The program promoted innovative thinking. For example, the single greatest source of archaeological site disturbance on the range is from Explosive Ordnance Disposal personnel performing range clearance. This annual operation consists of driving large vehicles in target areas to locate and remove spent munitions; this work creates much larger disturbance than direct impacts from ordnance. To address this issue, the team developed an inexpensive, long-term solution to mark archaeological sites for vehicle avoidance. Bright orange plastic poles were tested to ensure compatibility with F-16, A-10, and helicopter targeting systems, then were installed to create buffer areas around sites. The RMO team installed 500+ bright orange plastic poles to delineate 137 sites on three tactical ranges. This resulted in increased protection from inadvertent damage and saved $100,000 per year in survey and flagging costs!

RMO personnel installing bright orange plastic poles in the primary impact zone. The poles provide a buffer without compromising site location information and are highly visible to EOD personnel for avoidance when traversing the range, providing protection from inadvertent vehicle damage.

NATIVE AMERICAN PROGRAM

The 56 RMO has a full-time intergovernmental Native American liaison who organized meetings between tribal leaders and the installation commander. The liaison implemented the DoD American Indian and Alaska Native Policy and executive order on government-to-government relations, and coordinated management and operations issues, such as over-flights, noise, sonic booms, and capacity-building opportunities.

Quarterly briefings by the neighboring Tohono O'odham Nation (TON) were incorporated into the curriculum of F-16 pilot training. Nation leaders shared their culture and *Himdag* (way of life) with pilots to enable them to understand how military training in airspace over tribal lands impacts the people. This program, called "Face to the Nation," promoted respectful consideration of other cultural perspectives and a positive relationship with the Nation. This program worked to mitigate disturbances caused in the performance of training pilots in the special use airspace overlying much of the Nation.

Mr. Tim Berry, RMO Explosive Ordnance Technician, consults with Mr. Ron Barbea, Compliance Inspector, Tohono O'odham Nation Environmental Protection Office, about a jettisoned fuel tank that landed in a remote, unpopulated area of the Nation.

The 56 RMO, other federal agencies, tribes, and the SHPO co-sponsored a 3-day Traditional Cultural Places (TCP) workshop attended by over a hundred tribal members and archaeologists. Tribal members made presentations on TCP's and how consultation between tribes and agencies could be improved. Participants gained a better understanding that promoted mutual respect and understanding between agencies and tribes.

The identification, management and protection of these special cultural places, many of which can be found on the Goldwater Range, was paramount to dialog between agencies and tribal leaders regarding sensitive sacred sites. RMO archaeologists consulted with 23 federally-recognized tribes and one Native American group, located in Arizona, New Mexico, and California that claim cultural affiliation with BMGR East lands. Consultations included providing draft reports to tribes for comments and meetings with the TON Cultural Resource Committee and Cultural Affairs Office. Being the largest and closest to the BMGR, the TON often served as the lead for other tribes. On-going discussions addressed issues of traditional use and identification of sacred sites; incorporation of Native American perspectives into reports; inventory of plant materials and animals used for food, medicine, construction, ceremonies, and craft production; and field trips and access to areas used by tribes prior to the establishment of the BMGR East.

RMO supported multi-day field trips with the Yavapai-Apache, some of which were video-taped by tribal members and later shown to elders. These field trips provided opportunities for tribal youth to learn traditional information from elders about migrations, traditional uses, and sacred sites on the range. Members of the TON and the Hia C-ed O'odham co-authored chapters in a volume on cultural resources associated with the BMGR. Tribes provided scientific knowledge and perspectives of the interdependence of the earth, sky, plants, animals, and people which was incorporated into the natural resource program.

CURATION

The Goldwater Range recently benefited from an incredible windfall — the National Geospatial-Intelligence Agency, a tenant unit at Gila Bend Air Force Auxiliary Field, needed more space for long-term curation of documents. This resulted in renovation of an old warehouse to meet stringent Secretary of Interior standards, with a portion dedicated for use by the Air Force, saving $230,000 in renovation costs. But this also saved the cost of curating items in a public or private institution. Over 15,000 artifacts from 347 sites and 346 isolates plus about 18 linear feet of records were being held temporarily by the primary cultural resources contractor. If these items were accessioned at Arizona State Museum, the up-front five-year costs would exceed $306,000, with reduced annual costs continuing indefinitely thereafter. The decision to take on in-house curation was an easy one, with a free facility valued over $230,000 and massive savings during the first five years!

A new database is in final development that combines numerous data sets from several contractors. This data set not only includes all characteristics of sites and isolates, it also links with the data regarding the 15,000+ artifacts in curation. This powerful tool, combined with the on-site curation facility, provides for ready hands-on access by Air Force archaeologists, Native Americans, and researchers.

CULTURAL RESOURCES AWARENESS AND EDUCATION

The 56 RMO cultural resources team wrote the book on Air Force archaeology! Archaeologist Adrianne Rankin co-edited the 780 page book "Fragile Patterns: The Archaeology of the Western Papagueria." Both she and archaeologist Dr. David Doyel authored chapters in this book, which reports on a decade of archaeological research funded primarily by the Air Force. The book was selected as one of the top 12 southwest books of 2008, and resulting newspaper articles about BMGR archaeology appeared across the country.

Although the BMGR is located a full hour's drive from Luke AFB, the 56 RMO recognized that one key to protecting cultural resources is promoting education and outreach to military personnel and the general public. The installation commander, vice commander, and other senior officers received on-site briefings and tours that provided awareness of the cultural resources and the challenges and complexity to de-conflict resource management and the military mission. Staff archaeologists prepared articles for the base paper, the Thunderbolt, to educate airmen about cultural history and resource management. Briefings and range tours were given to the visiting dignitaries including Congressional staffers, the West Valley Leadership Council (Luke AFB supporters), and many other groups.

Annual munitions clearances performed by EOD troops were historically the most ground-disturbing military activity on the range. To counter this, briefings to EOD teams were conducted three times annually that included an overview of range culture history, identification and avoidance of cultural resources, and the protocol for reporting found cultural resources. This resulted in EOD personnel taking an interest and appreciation for resources on the range, and the identification of several new sites.

The remains of a Cold War target located atop a flat hill include artillery and searchlights. The target, eligible for the National Register of Historic Places, was used to train Korean War era pilots to detect, identify, and destroy simulated enemy positions on the ground.

RMO archaeologists were leaders in their profession, and frequently presented briefs and posters at national, state, and local forums including the Society for American Archaeology and the Sustaining Military Readiness conference. Both archaeologists presented lectures and field trips to local archaeological societies each year.

Mentoring of a graduate student led to a PhD dissertation on the utility of using advanced remote sensing and mathematical modeling to identify and record trails to build linkages between major archaeological sites on the range. These resources are difficult to detect on the ground and have been identified by Native Americans as sacred sites. This unfunded research project saved the Air Force $300,000 versus contractor costs, and the results were presented in a poster at the 2009 Sustaining Military Readiness conference.

COMMUNITY RELATIONS

Public outreach was a major component of the cultural resources program, and some two dozen annual events provided ample opportunity for presentations to hundreds of people. For the state-wide Arizona Archaeology month, Ms. Rankin co-founded "Seasons of Traditions," a month-long program at neighboring Organ Pipe Cactus National Monument (OPCNM) that showcases regional archaeology and Native American traditional arts and crafts. She contributed presentations and demonstrations at that event for the past 20 years. Ms. Rankin also was a by-name request consultant to OPCNM for the development of new museum exhibits at its visitor's center. RMO was a founding member of the Sonoran Shindig, an annual festival in Ajo. A recent event featured RMO archaeologists displaying five new posters highlighting BMGR East archaeology, including Ranching, Ethnobotany, Subsistence Practices, Ritual Landscapes, and the Site Stewards Program.

Explosive Ordnance Disposal personnel found this geoglyph on the North Tactical Range as a result of the cultural resource training they receive. Visits to this site by tribes indicate that it is an important Sacred Site on the BMGR East

The statewide Arizona Archaeological Society (AAS) meeting was held in nearby Gila Bend in 2009, attended by 100+ people. Dr. Doyel presented the keynote address and he and Ms. Rankin provided guided tours for many of the attendees. For over twenty years Dr. Doyel has volunteered and supported the Town of Gila Bend in its preservation efforts at the Gatlin Site National Historic Landmark. For ten years

Dr. Doyel served as professional advisor to the Agua Fria Chapter of the AAS and supervised their field projects.

RMO archaeologists have memberships in a number of professional organizations and cultural resource conservation organizations, including the Society for American Archaeology, Registry of Professional Archaeologists, Arizona Archaeological and Historical Society, Arizona Archaeological Council, Arizona Archaeological Society, and the American Rock Art Recording Association.

ENVIRONMENTAL ENHANCEMENT

Since most 56 RMO personnel have desk jobs, a new Stewardship Day event was established by the director and Environmental Sciences group to increase organizational commitment to the range resources. Over 20 volunteers teamed up to address erosion problems at the archaeological component of the National Register eligible Auxiliary Field 8 site. The team used straw bales and wattles to dam arroyos and slow the overland flow of rainwater, which was deeply incising the site. This event was a huge success — the site was stabilized, and the enthusiastic participation led to Stewardship Day becoming an annual event! When the volunteer Site Stewards reported that rock art sites in a rugged mountain area were strewn with litter left by undocumented aliens, this presented another Stewardship Day opportunity. The 56 RMO team mobilized in force, collecting hundreds of pounds of trash from an otherwise pristine landscape.

Auxiliary Field 8 Erosion Control RMO personnel implemented a conservation effort at a large prehistoric site adjacent to the airfields on the Goldwater Range.

MISSION ENHANCEMENT

Since the cultural resources program is embedded within the Range Management Office, direct support for the military training mission is a continual effort. This teamwork is an ideal situation that allows early consideration for cultural resources exactly as intended by the National Historic Preservation Act. Operational proposals were jointly developed with aircrews, allowing for immediate vetting and resolution of environmental or other issues.

When a multi-million dollar windfall was made available for range enhancements and other purposes, $500,000 was used to conduct cultural resources surveys in support of new initiatives. This included survey of 17 linear miles of access road and a 1000-acre block for a proposed Sensor Training Area, a no-drop target to train aircrews on use of precision-guided weapons. This proposed new target set was the keystone in a set of ten separate proposals that were assessed in an Environmental Impact Statement, itself a massive $550,000 undertaking. Due to the complexity of the analysis and its permutations, the bulk of the cultural resources section was rewritten by in-house personnel. This multi-year EIS effort has proceeded on time and on budget. The benefits to military readiness and range operations will be far-reaching and long-lasting.

Modernization of targets is an ongoing process to ensure that scenarios on the range replicate the real-world situations that pilots see in combat. In recent years entirely new targets were designed and constructed to replicate rural farms and small villages typical of southwest Asia. The cultural resource managers and other environmental staff assisted with siting these targets and with contract arrangements. Since the proposed sites were carefully selected to avoid potential conflicts, Section 106 reviews were completed expeditiously. Without this extensive involvement the funds would have been lost and several new target sets not constructed, resulting in diminished combat training opportunities for aircrews from all four services and foreign allies.

BMGR East is the poster child for interagency collaboration! Direct mission support is not limited to the military training mission. The U.S. Border Patrol and other elements of the Department of Homeland Security performed their interdiction missions within the BMGR and the region, and at a surprising level of intensity. The cultural resources staff was summoned to enable the use of mobile ground radar units at locations on the range. These locations were selected based on operational needs as

they had lines of sight capable of detecting distant foot traffic. Cultural resources surveys were performed in-house and an immediate "go ahead" given in the field, allowing the placement of units to meet time-critical law enforcement needs. The deterrent effect on illegal immigrant traffic was immediate.

In 2005 catastrophic wildfires burned some 130,000 acres of the Goldwater Range, requiring emergency intervention from the National Interagency Fire Center. Although this was considered a rare event due to heavy winter rains, prudent land managers plan ahead to better respond to future disasters. The 56 RMO teamed with experts from the US Forest Service to write the first-ever fire management plan for BMGR East. The plan included potential effects of fire fighting techniques on cultural resources. In fact, the plan highlighted locations of combustible cultural resources, providing the on-scene commander a better sight picture to direct response efforts.

CULTURAL RESOURCES COMPLIANCE

Full compliance with cultural resources laws was just a starting point for the Goldwater Range — the true measures of merit were how these compliance actions supported or enhanced the military training mission and protected resources, all the while in a cooperative manner with numerous consulting partners. Development of an all- new Integrated Cultural Resources Management Plan (ICRMP) was a multi-year effort that exemplified this collaborative spirit. The massive ICRMP was prepared in cooperation with Marine Corps Air Station Yuma, which operates BMGR West, and Volume 1 is that portion of the plan that addresses the common issues of both BMGR East and West — the physical setting, resource laws, culture history, and other landscape-scale elements. Volume 2 specifically addresses Goldwater Range East, and its encyclopedic heft and depth of coverage culminate the extended effort to complete this document. Volume 3 will address BMGR West.

AZ Site Stewards monitor this rock art panel, called Travelling Man, in a public access area of the BMGR East. Tribes describe this petroglyph as a map that documents their migrations through the desert.

Enabling the military training mission is Job #1 for the multi-disciplinary 56 RMO, and the cultural resources program certainly did its part in supporting the busiest primary training range in DoD. On several occasions new test or training activities were proposed which were departures from the norm. These required some survey in the field followed by consultations regarding potential impacts to cultural sites. The complexity of these consultations was compounded by the number of tribes (23) and the "purple" nature of the proposals to support the US Army, Marine Corps, Border Patrol, and other agencies. For example, the Marine Corps' semi-annual large-force exercise typically includes new ground maneuvers or other events that require consultation. These exercises make direct use of historic cultural resources, otherwise-abandoned World War II airfields, are used as assault strips and forward arming and refueling points for Marine Corps helicopters and KC-130 tankers. Close cooperation between the project proponents and cultural resources managers resulted in avoidance of known sensitive resources, thus expediting the consultations and enabling fully successful military training operations.

"56 RMO: Supporting military training, conserving resources entrusted to our care."