

EXECUTIVE SUMMARY

INTRODUCTION

Since its inception in 1941, the Barry M. Goldwater Range (BMGR) has been indispensable for producing and maintaining the combat-ready aircrews needed to defend the United States and its interests. From the perspective of land and airspace management and military operations, the BMGR is divided into eastern and western portions. The eastern portion of the BMGR, known as BMGR East, is assigned to the Secretary of the Air Force and is locally operated by Luke Air Force Base (AFB). The western portion of the range, known as BMGR West, is assigned to the Secretary of the Navy and is locally operated by Marine Corps Air Station (MCAS) Yuma. Although the Air Force and Marine Corps are the primary users of their respective portions of the BMGR, all aviation branches of the Armed Services use both portions of the range.

With technological advances in air defense systems, the tactics of modern combat continue to evolve. Therefore, the training features within the BMGR also must evolve to support training activities and operations that are relevant to the real-world air combat missions and threats.

This Environmental Impact Statement (EIS) focuses on actions proposed by the U.S. Air Force to upgrade and improve training assets and opportunities at BMGR East, including the Gila Bend Air Force Auxiliary Field (AFAF), which is located within BMGR East and directly supports the training and maintenance functions performed on the range. The 56th Fighter Wing (FW) Range Management Office (RMO) at Luke AFB, which executes the management and operational support functions for BMGR East, is the local command proponent of the proposed actions. The U.S. Fish and Wildlife Service (USFWS) is serving as a cooperating agency.

PURPOSE OF AND NEED FOR ACTION

Much of the training infrastructure currently in place at BMGR East (including physical and electronic simulations of targets and air defense systems) was installed or last upgraded during the Cold War era, which ended early in the 1990s. Since that time, many of the tactics of modern air combat have been altered by advancements in aircraft delivered air-to-ground weapons (including precision-guidance systems), electronic sensing and surveillance of the battle space, and air defense systems. Furthermore, as recent events in Iraq and Afghanistan have demonstrated, increased warfare in urban settings has placed new demands on airpower to counter threats and support friendly forces in an exceedingly complex environment.

The Air Force has determined that the training and range support infrastructure currently in place at BMGR East is in need of key additions, modifications, improvements, and upgrades to ensure

that aircrew training remains realistic and relevant. Similarly, there is need to upgrade Gila Bend AFAF to support flying operations. Certain new ground-based training activities that are components of the overall air power mission are also needed at BMGR East. Finally, improvements in some range maintenance facilities are needed to help the Air Force keep BMGR East fully functional.

This EIS includes ten proposed actions that would meet the general training and support needs at BMGR East and Gila Bend AFAF. While each action is supported by an individual purpose and need, the shared purpose and need for these actions is to:

- **Support air combat power.** The Air Force, Air Force Reserve, and Air National Guard air combat training that occurs at BMGR East is essential to U.S. combat readiness. More than 90 percent of the A-10 and F-16 pilots who participated in recent and/or ongoing conflicts in Bosnia, Iraq, and Afghanistan trained at BMGR East. Many Army National Guard, Marine Corps, Marine Corps Reserve, and Navy aircrews flying most types of U.S. tactical aircraft also train at BMGR East prior to engaging in military conflicts and peacekeeping missions.
- **Expand training value, flexibility, and capacity.** Implementation of the proposed actions would expand the overall training value, flexibility, and capacity of BMGR East to prepare aircrews qualified to fight in today's battlefield and to support readiness. Each of the proposed actions is synergistic with existing and future operations at the BMGR. The more training requirements that can be met at BMGR East, the less local Air Force F-16 and A-10 and other local users would need to deploy to other ranges in order to meet training requirements.
- **Invest in one of the nation's most capable and productive ranges.** BMGR East has long been one of the nation's most capable and productive ranges because of its (1) extensive size, (2) year-round-flying weather, (3) few operational limitations, and (4) close operational proximity to many military air bases. Investment to keep BMGR existing extensive training capabilities in line with the ever-advancing evolution of air combat technology and tactics is worthwhile and sound.

A summary of the purpose and need for each of the ten proposed actions follows. Proposals 1 through 7 address upgrades to training at BMGR East and Proposals 8 through 10 address the improvement of range management functions at Gila Bend AFAF and BMGR East.

1. Developing a Sensor Training Area (STA), which is a new target complex that would be used to train aircrews for air-to-ground combat in the modern urban environment through the use of laser sensors rather than by firing munitions at the targets.

Purpose and need: to provide regular and deployed users of the BMGR with realistic training in air-to-ground combat in urban settings. By investing in appropriate training facilities and technologies, the Air Force can enhance the safety of friendly forces and generate substantial advantages over enemies in urban terrain while avoiding civilian loss of life, damage to humanitarian missions (e.g., medical and aid facilities), and destruction of non-combatant property. The STA is needed within BMGR East to train regular and deployed users of the BMGR so that they are prepared to successfully execute military operations in urban terrain as assigned by combat commanders.

2. Establishing new procedures to address to guide environmental reviews and approvals for reconfiguration of existing air-to-ground tactical range target complexes to create more realistic simulations of today's battlefield.

Purpose and need: to reconfigure targets to accurately simulate the types of targets encountered in today's air-to-ground battlefield to provide a more realistic view of modern and futuristic combat conditions, and to support the training syllabus requirement that F-16 aircrew know about inertially aided munitions mission planning and deliveries.

3. Installing a moving vehicle target for air-to-ground attack training.

Purpose and need: to provide aircrews with realistic training in attacking moving vehicles.

4. Developing a new target for attack training with live (i.e., explosive) air-to-ground missiles.

Purpose and need: to enhance training with air-to-ground missiles by providing a target that could support missile attacks from multiple, realistic directions and altitudes without compromising range safety.

5. Lowering the altitude floor for regular flight training over a portion of the Cabeza Prieta National Wildlife Refuge (NWR).

Purpose and need: to enable realistic low-level approaches to targets located in South tactical range (South TAC) and low-level air-to-air intercepts.

6. Converting the southern portion of Manned Range 3 into a helicopter gunnery range.

Purpose and need: to provide more appropriate training for the Army National Guard and other rotary-wing units that train at BMGR East.

7. Allowing additional ground-based training on BMGR East in Air Force combat search and rescue (CSAR) and other land navigation and reconnaissance missions.

Purpose and need: to provide training to CSAR teams, Special Operation teams, Marine Corps units, and potentially other small squads of troops in conducting clandestine insertions and extractions from helicopters or vehicles, and performing cross-country land navigation and other on-the-ground exercises while traveling in stealth on foot.

8. Constructing a new taxiway and air traffic control tower at Gila Bend AFAF.

Purpose and need: to provide tactical aviation units with a simulation of the higher tempo airfield operations often required in actual war fighting theaters of action, to enhance the utility of Gila Bend AFAF for emergency aircraft recoveries, and to have an air traffic control tower that meets the minimally acceptable visual surveillance or depth perception standards specified by the Unified Facilities Criteria for military airfields.

9. Paving approximately 7 miles of an existing graded road within BMGR East.

Purpose and need: to eliminate much of the dust generated by the ongoing heavy use of the existing improved dirt road; to decrease road maintenance requirements by providing a cost-effective, durable, and long-lasting maintenance solution; and to reduce the vehicle maintenance burden resulting from disproportionate wear and tear on Air Force vehicles that frequently travel on this road.

10. Excavating, stockpiling, and using sand and gravel resources at BMGR East.

Purpose and need: to provide a more cost effective and ready source of sand and gravel for conducting on-range road maintenance, target reconfiguration, and target maintenance.

PUBLIC INVOLVEMENT AND ISSUES

The Air Force initiated public involvement on the proposed project by publishing a Notice of Intent to prepare an EIS in the *Federal Register* on December 28, 2007. The notice included an announcement of the dates and locations for public scoping meetings to determine the scope of issues that should be addressed through the environmental impact assessment process. In addition, notification letters were mailed to 570 parties and announcements for the scoping meetings were advertised in newspapers serving the Arizona communities of Glendale, Gila Bend, Yuma, and Tucson. Scoping meetings were held in Glendale, Tucson, and Gila Bend on January 15, 16, and 17, 2008, respectively.

A total of 25 individuals attended the public scoping meetings. Six written comments were submitted during the scoping meetings and three additional comment letters were received via postal mail before the scoping period concluded on January 28, 2008. The issues raised during the public scoping period included:

- Support for the military training value of the BMGR and the proposed improvements
- Opposition to the proposal for lowered flight training over the Cabeza Prieta NWR or consideration for alternative locations for such training in BMGR West or at other ranges
- Suggestion to implement a Leave No Trace ethic with search and rescue ground training
- Concern for potential impacts to soil erosion, reptiles and wildlife, and archaeological sites from the sand and gravel extraction and use proposal
- Concern that the moving vehicle target proposal may potentially impact Sonoran pronghorn
- Support for management that allows harvesting of bighorn sheep
- Concern about cumulative impacts to the Cabeza Prieta Wilderness associated with noise impacts from lowered flight training over the Cabeza Prieta NWR
- Concern that the proposed helicopter gunnery range at Manned Range 3 could potentially impact the Sonoran Desert National Monument
- Questions about the cost effectiveness of the sand and gravel extraction and use proposal, and the costs for Sonoran pronghorn monitoring for the moving vehicle target proposal

DESCRIPTION OF THE PROPOSED ACTIONS AND ALTERNATIVES

As noted, 10 different actions are proposed at BMGR East and Gila Bend AFAF to help ensure that the Air Force, Air Force Reserve, Air National Guard, Army National Guard, and other military units training at BMGR East can develop and maintain the state of readiness required to accomplish their assigned defense missions. All of the actions being proposed for BMGR East and Gila Bend AFAF are independent of each other and have stand-alone value for improving training operations. While full implementation of all the proposed actions is desired and would result in the greatest training benefit for aircrew and ground troop training, each of the proposals, if implemented alone, would have a positive effect on the use and/or management of BMGR East and/or Gila Bend AFAF.

Proposal 1 – Sensor Training Area

Three action alternatives are being considered for the proposed STA. Features that all three action alternatives have in common include:

- 640-acre site with approximately 400 acres developed over time and 240 acres left undeveloped. The developed areas would support two laser scoring systems; one unmanned threat emitter; one Smokey Surface-to-Air Missile (SAM) launcher system; and an urban complex of simulated homes, buildings, industrial areas, roads, a sports field, and other types of urban features
- An approximately 0.25-acre ground-based forward air controller observation point that is external to the STA
- Access roads to the STA and ground forward air controller point

Alternative 1.A, Air-to-Air Range Site – The proposed location for Alternative 1.A is within the San Cristobal Valley and underlying the Air-to-Air Range. This location offers optimum airspace for target ingress and egress as well as defensive maneuvering without interference with existing tactical or manned ranges, and acceptable communication with the existing microwave telemetry system. Alternative 1.A would require improvements to approximately 17 miles of existing road for access.

Alternative 1.B, South TAC Site – The proposed location for Alternative 1.B is within the former Target 220 site within South TAC. Advantages of this alternative include that it is within an area of former military disturbance with existing access and would not require new Explosive Ordnance Disposal (EOD) clearance. Disadvantages include that South TAC would be less available for other operations when the STA is activated for training.

Alternative 1.C, North TAC Site – The proposed location for Alternative 1.C is within North TAC, but outside of the existing North TAC target complexes. This location would reduce the availability of North TAC for other simultaneous training missions, but may be less disruptive to other tactical range missions than Alternative 1.B. This location could, however, interfere with concurrent airspace operations involving Manned Ranges 2 and 4. An advantage of Alternative 1.C is that it is outside of the current established range of the endangered Sonoran pronghorn, although individual pronghorn raised in captivity recently wandered into this area of BMGR East.

Alternative 1.D, No-Action Alternative – The STA would not be constructed or operated within BMGR East at this time with Alternative 1.D.

Proposal 2 – Target Reconfiguration

Alternative 2.A, Proposed Action – would establish environmental review and approval parameters that would allow most of the target reconfigurations needed to update BMGR East tactical ranges in a timely and efficient manner. The overall goal of proposed target reconfigurations at BMGR East is to bring the tactical ranges up-to-date in a comprehensive manner by partially or completely modifying a target simulation in its existing location, expanding the size or complexity of an existing target, eliminating an existing target that is no longer relevant to training, developing a target in a new location, or a combination of these actions. Although no specific individual target reconfigurations are proposed in this EIS, the environmental review and approval parameters would establish an efficient process for implementing target reconfigurations as needs are identified.

Alternative 2.B, No-Action Alternative – would result in continued use of the existing targets within BMGR East. No process would be established to streamline the review and approval process for future proposals to change target scenarios.

Proposal 3 – Moving Vehicle Target System

Three action alternatives are being considered for the proposed moving vehicle target system and differ primarily in their location. Each action alternative features the use of an existing road within North TAC to serve as part of a track that would be developed for towing a target pulled by a remotely operated, unoccupied vehicle. In each action alternative, the track would be relatively flat, approximately 50 feet wide, and routinely maintained to remove munitions impact scars. Approximately 85 percent of the time, the vehicle towing the target would be driven at speeds up to 45 miles per hour (mph) and 15 percent of the time, the vehicle would travel at speeds between 45 mph and 60 mph.

Alternative 3.A, Proposed Action – would be co-located with Target 104/106 (the old main airfield) complex.

Alternative 3.B – would be located west of and adjacent to the road that provides primary ground access to interior locations in North TAC, including the Target 104 complex.

Alternative 3.C – would be located southeast of the North TAC simulated rail yard and west of the double-bladed road that forms the eastern boundary of North TAC.

Alternative 3.D, No-Action Alternative – With Alternative 3.D, no moving vehicle target system would be introduced at BMGR East. Existing roads within North TAC would not be modified to form tracks for moving vehicle operations, but these existing roads would continue to be used for other military operations and support functions.

Proposal 4 – New Target for Air-to-Ground Missiles

Alternative 4.A, Proposed Action – would establish a second target within East TAC for live (exploding) air-to-ground missiles. The proposed live missile target would be more centrally positioned to allow attacks with Maverick missiles from a wider variety of headings and optimal altitudes. The proposed target location is within prior EOD clearance areas.

Alternative 4.B, No-Action Alternative – With the no-action alternative, the existing live air-to-ground missile target in East TAC would continue to be used for both Hellfire and Maverick missiles and an additional air-to-ground missile target for Maverick missile use would not be developed.

Proposal 5 – Lowering Flight Training Altitude Over a Portion of the Cabeza Prieta National Wildlife Refuge

Alternative 5.A, Proposed Action – would result in the renegotiation of a 1994 Memorandum of Understanding among the Departments of the Air Force, Navy, and the Interior to provide for lowering the flight training altitude floor over a portion of the Cabeza Prieta NWR from 1,500 feet above ground level (AGL) to 500 feet AGL to enable more realistic attack approaches to targets in South TAC and low-altitude intercepts in the air-to-air range. The area that would be affected by Alternative 5.A would be entirely within R-2301E and would extend from the west side of the Growler Mountains west to the R-2301E and R-2301W airspace boundary, and south of the South TAC boundary to a distance of 15 nautical miles. The R-2301E airspace from 500 feet AGL up to 1,500 feet AGL over the Cabeza Prieta NWR would be available to be scheduled for either day or night missions in association with R-2301E airspace above 1,500 feet AGL.

It is estimated that on an annual basis, between 4,200 and 6,200 sorties would use the airspace from 500 feet to 1,500 feet AGL over the Cabeza Prieta NWR with implementation of this alternative.

Alternative 5.B – would be similar to Alternative 5.A except that the lowered flight floor area would extend 8 NM south of South TAC rather than 15 NM to the south as proposed in Alternative 5.A.

Alternative 5.C, No-Action Alternative – With the no-action alternative, the 1994 Memorandum of Understanding would not be renegotiated and military aircraft would continue to fly at altitudes of 1,500 feet AGL or higher when in the airspace overlying the Cabeza Prieta NWR except for those currently authorized flights along mutually designated low-level corridors.

Proposal 6 – Reconfigure Manned Range 3 for Helicopter Training

Alternative 6.A, Proposed Action – would convert the southern portion of Manned Range 3, including the left conventional target south of the tower, into a helicopter gunnery range with fixed, moving, and pop-up targets to provide more appropriate training for the Army National Guard and other rotary-wing units that train at BMGR East. Helicopter crews would then strafe these targets with small munitions (such as .50-caliber).

Alternative 6.B, No-Action Alternative – With the no-action alternative, Manned Range 3 would not be reconfigured. Targets would not be added or removed and the range would continue to be used by fixed and rotary-wing aircraft.

Proposal 7 – On-the-Ground Training Exercises

Alternative 7.A, Proposed Action – would provide for CSAR and other small teams with the opportunity to use BMGR East for ground-based training activities, such as clandestine insertions and extractions from helicopters or vehicles driven on existing range roads, cross-country land navigation, or shooting at targets while traveling on foot. Teams could also travel by vehicle on existing, open roads.

Alternative 7.B, No-Action Alternative – Only previously authorized on-the-ground training would occur with Alternative 7.B; no new ground training exercises by CSAR or other units would be introduced within BMGR East.

Proposal 8 – New Taxiway and Air Traffic Control Tower at the Gila Bend Air Force Auxiliary Field

Alternative 8.A, Proposed Action – would result in the construction of a taxiway parallel to the airfield runway to increase the safety and capacity of the airfield, and construction of a new air traffic control tower designed to provide adequate views of the areas to be controlled. The taxiway would be approximately 8,500 feet long by 75 feet wide and include a 50-foot shoulder on each side of the main taxiway. The existing runway would be tied to the proposed taxiway by expanding the runway arming areas at each end of the runway to a dimension of about 1,075 feet by 200 feet. The proposed action may require the relocation of the existing helicopter landing pads.

The proposed location for the new air traffic control tower is approximately 3,100 feet north of the Runway 35 threshold and 1,600 feet west of the Runway 17/35 centerline. The proposed tower would consist of five floors and the control tower cab, with the tower cab floor approximately 55 feet above ground level.

Alternative 8.B, Alternative Tower Site B – would include the taxiway construction as described for Alternative 8.A, but the air traffic control tower would be located approximately 3,050 feet north of the Runway 35 threshold and 1,750 feet west of the Runway 17/35 centerline. Views from the tower would be somewhat obstructed by power lines and other base structures, but less obstructed than with the current tower.

Alternative 8.C, No-Action Alternative – With the no-action alternative, no taxiway would be constructed parallel to the runway and the existing control tower would continue to be used. Aircraft would continue to use the runway for taxiing.

Proposal 9 – Manned Range 1 to Range Munitions Consolidation Point 1 Road Pavement

Alternative 9.A, Proposed Action – would pave approximately 7 miles of the road from the main tower within Manned Range 1 to the water well and adjacent Range Munitions Consolidation Point (RMCP) 1 located near the boundary of the North and South TAC ranges to the west of Manned Range 1. The central 16 feet of the road would be paved, for a total paved area of approximately 13.5 acres.

Alternative 9.B, No-Action Alternative – would leave the existing road unpaved.

Proposal 10 – Sand and Gravel Excavation, Stockpiling, and Use on BMGR East

Alternative 10.A, Proposed Action – would allow the Air Force to excavate sand and gravel from ten sites within BMGR East; stockpile the materials in five alternative sites located near roads; and use the materials for on-range road maintenance, target reconstruction, and target maintenance.

Alternative 10.B, No-Action Alternative – would continue the ongoing practice of using funds, when available, to purchase sand and gravel from approved, outside, commercial sources that have the desired material composition and have them delivered to BMGR East for needed maintenance.

ENVIRONMENTAL ANALYSIS

The effects of the proposed and alternative actions were assessed for earth resources, water resources, air quality, biological resources, land use, outdoor recreation, health and safety, cultural resources, hazardous materials and waste management, socioeconomics and environmental justice, and noise. The following tables (Tables S-1 through S-10) present the key findings of the EIS in a comparative format.

Table S-1 Proposed Sensor Training Area Comparison of the Alternatives				
	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Earth Resources	<ul style="list-style-type: none"> • Short-term ground disturbance with establishment of the STA. • Most disturbance expected to be within 400 acres of the 640-acre site. • Activities would be subject to conditions of the AZPDES CGP, which would minimize construction-related impacts. 	Same as Alternative 1.A.	Similar to Alternative 1.A, except: <ul style="list-style-type: none"> • Approximately 2.5 acres of additional land would be disturbed for development of new road. • Upgrades to 4 miles of existing road would improve the long-term erosion potential. 	<ul style="list-style-type: none"> • Ongoing accelerated erosion associated with use of existing roads would continue.
Water Resources	<ul style="list-style-type: none"> • Potential sedimentation of San Cristobal Wash and minor tributaries down gradient from vegetation removal, grading, and construction activities. • Construction BMPs, storm water control features, and adherence to AZPDES CGP requirements would protect surface waters from sedimentation and minimize the potential impacts. 	Similar to Alternative 1.A, except: <ul style="list-style-type: none"> • Slightly higher potential risk of erosion since the site is previously disturbed. • Potential sedimentation of Growler Wash from vegetation removal, grading, and construction activities. 	Similar to Alternative 1.A, except: <ul style="list-style-type: none"> • Potential sedimentation of Tenmile Wash from vegetation removal, grading, and construction activities. 	<ul style="list-style-type: none"> • No impact to water resources within the study area.

Table S-1 Proposed Sensor Training Area Comparison of the Alternatives				
	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Air Quality	<ul style="list-style-type: none"> • Short term, localized increase in emissions, particularly dust, during construction activities over portions of 2010 and 2011: • Volatile organic compounds (VOC): 1.46 tons • Carbon monoxide (CO): 10.26 tons • Oxides of nitrogen (NO_x): 10.95 tons • Sulfur dioxide (SO₂): 1.12 tons • Particulate matter less than 10 microns in size (PM₁₀): 126.05 tons • Particulate matter less than 2.5 microns in size (PM_{2.5}): 13.10 tons • Construction activities would require an earthmoving permit from Maricopa County and would use construction BMPs to reduce emissions. • Estimated emissions from operation of the STA site: <ul style="list-style-type: none"> • VOC: 2.59 tons • CO: 0.32 tons • NO_x: 0.07 tons • SO₂: 0.18 tons • PM₁₀: 0.86 tons • PM_{2.5}: <0.86 tons 	Same as Alternative 1.A.	Same as Alternative 1.A.	<ul style="list-style-type: none"> • No impact to air quality within the study area.

Table S-1 Proposed Sensor Training Area Comparison of the Alternatives				
	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Biological Resources	<ul style="list-style-type: none"> • Construction and operation could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area. • Potential disturbance to individual Le Conte’s thrashers and individual western burrowing owls; but would not be expected to impact the distribution or overall abundance of the species in the San Cristobal Valley. • Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with the Endangered Species Act (ESA) Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. 	<ul style="list-style-type: none"> • Construction and operation could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area. • Potential disturbance to individual Le Conte’s thrashers and individual western burrowing owls; but would not be expected to impact the distribution or overall abundance of the species in the Growler Valley. • Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. 	<ul style="list-style-type: none"> • Construction and operation could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area. • Potential disturbance to individual Le Conte’s thrashers and individual western burrowing owls; but would not be expected to impact the distribution or overall abundance of the species in the Sentinel Plain. • Not considered to result in adverse affects to Sonoran pronghorn. In accordance with ESA Section 7 regulations, a determination that a proposed action may affect, but is not likely to adversely affect a listed species would require informal consultation with the USFWS; if the USFWS does not concur with the determination, a biological opinion may be issued with mandatory terms and conditions to minimize incidental take of the species. 	No impact to biological resources either within or adjacent to BMGR East.

Table S-1 Proposed Sensor Training Area Comparison of the Alternatives				
	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Land Use	<ul style="list-style-type: none"> • May result in reconfiguration of air-to-air low and air-to-air high ranges when STA activated. • Creates military training ground features within a currently natural area affecting 1 square mile. • Requires widening of 17 miles of existing road for access. • Requires new ground forward air controller point and access to this point. • Increases existing EOD clearance requirements • Minimally increases vehicular travel in the San Cristobal Valley. 	<ul style="list-style-type: none"> • Reduces availability of South TAC when STA activated. • Uses area of prior military disturbance (Target 220). • Requires no access road improvements. • No change in existing EOD clearance requirements. • Minimally increases vehicular travel in South TAC. 	<ul style="list-style-type: none"> • Reduces availability of North TAC when STA activated. • Creates military training ground features within a currently natural area affecting 1 square mile. • Requires upgrading of 4 miles of existing road for access. • Requires new ground forward air controller point and access to this point. • Reduces training capacity at Manned Ranges 2 and 4 due to airspace requirements. • Increases existing EOD clearance requirements. 	<ul style="list-style-type: none"> • Limits BMGR East to existing training opportunities. • No change to land use.
Outdoor Recreation	<ul style="list-style-type: none"> • Minimal, localized impacts from recreation access closures within the laser safety footprint while STA is in use. • Land available for big horn sheep hunts may be reduced from recreational access closures; however, sheep occur within other game management units and mountains in the vicinity. 	<ul style="list-style-type: none"> • No impact to recreation within the study area. 	Same as Alternative 1.B.	<ul style="list-style-type: none"> • No impact to recreation within the study area.

Table S-1 Proposed Sensor Training Area Comparison of the Alternatives				
	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Health and Safety	<ul style="list-style-type: none"> • Increased potential for contact with health and safety hazards during construction, maintenance, and training activities. • Positive impacts to traffic safety through widening and improving the roads. • Safety protocols needed to address hazard of potential damage to eyesight from lasers during firing operations and radar emissions produced by the threat emitter. • Slight potential for a wildfire to ignite from use of illuminating rockets and flares at the STA; however, limited vegetative fuel minimizes this risk. • Luke AFB Supplement to AFI 13-212 would be updated to address procedures, protocols, and logistics for the safe operation of the STA. 	Same as Alternative 1.A.	Same as Alternative 1.A.	<ul style="list-style-type: none"> • No health and safety impacts within the study area.

**Table S-1
Proposed Sensor Training Area
Comparison of the Alternatives**

	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Cultural Resources	<ul style="list-style-type: none"> Intensive cultural resource survey of 100 percent of the access road and the STA/EOD footprint identified 10 previously disturbed prehistoric and historical-period cultural resource sites recommended eligible to the NRHP along the proposed access road, Stoval Road. Proposed road improvements and maintenance activities would introduce new potential impacts from ground disturbing activity and associated erosion to these ten sites. Identification of historic properties in unsurveyed emitter locations, identification of Traditional Cultural Places (TCPs) throughout the project area, evaluation and determination of NRHP eligibility, assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA. 	<ul style="list-style-type: none"> Intensive cultural resource survey of 100 percent of the project area identified up to 21 prehistoric cultural resources recommended eligible to the NRHP. These sites are previously disturbed and subject to ongoing potential disturbance from military operations in South TAC. Additional impacts to these sites may occur from construction and maintenance of STA targets and equipment sites, EOD retrieval of items expended at the STA, increased road maintenance, and associated accelerated erosion. Identification of TCPs within the project area, evaluation and determination of NRHP eligibility, assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA. 	<ul style="list-style-type: none"> Intensive cultural resource survey has been completed for approximately 2 percent of the project area; four prehistoric cultural resources recommended eligible to the NRHP have been identified. Disturbance from construction, maintenance, and ongoing operation and use of the STA, including accelerated erosion, would potentially impact cultural resources within this project area. Identification and evaluation of historic properties (including TCPs) within unsurveyed portions of the project area, assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA. 	<ul style="list-style-type: none"> Baseline conditions for cultural resources (described in Section 3.9) would continue.

Table S-1 Proposed Sensor Training Area Comparison of the Alternatives				
	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> • Temporary increase in use of petroleum, oils, and lubricants (POL) and waste disposal from construction. • Minor long term increase in POL use to power equipment. • No change in overall levels of munitions delivered to BMGR East or increase potential for munitions constituents to be transported off-range. 	Same as Alternative 1.A.	Same as Alternative 1.A.	<ul style="list-style-type: none"> • No impact to hazardous materials and waste management within or adjacent to BMGR East.
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> • One-time regional economic gain during construction activities. • No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	Same as Alternative 1.A.	Same as Alternative 1.A.	<ul style="list-style-type: none"> • No socioeconomic impact or environmental justice concerns within the study area.

Table S-1 Proposed Sensor Training Area Comparison of the Alternatives				
	Alternative 1.A, Air-to-Air Range Site (Proposed Action)	Alternative 1.B, South TAC Site	Alternative 1.C, North TAC Site	Alternative 1.D, No-Action Alternative
Resources				
Noise	<ul style="list-style-type: none"> • Low to moderate increase in “A-weighted” Onset Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}) noise exposure level within the STA aircraft operating area. • Moderate temporary increases in noise levels ranging from 70 to 90 dBA from construction of the STA would occur during daytime working hours. • There may be slight increases in noise exposure levels within the Cabeza Prieta NWR, but no other off-range noise impacts. 	<p>Same as Alternative 1.A, except:</p> <ul style="list-style-type: none"> • Greater concentration of aircraft operations in South TAC could increase cumulative L_{dnmr} noise exposure at or above the 65 dB DNL threshold, but would be at interior locations to BMGR East and would not result in incompatible community noise levels. • Noise level increase would be less noticeable as compared to Alternative 1.A because there are more existing operations in the tactical ranges. 	<p>Same as Alternative 1.B, except:</p> <ul style="list-style-type: none"> • Noise exposure levels as described for Alternative 1.B would occur within North TAC as opposed to South TAC and potentially result in less noise exposure within Cabeza Prieta NWR as compared to Alternative 1.A. 	<ul style="list-style-type: none"> • No noise impacts within the study area.

Table S-2 Proposed Target Reconfiguration Comparison of the Alternatives		
	Alternative 2.A, Target Reconfiguration (Proposed Action)	Alternative 2.B, No-Action Alternative
Resources		
Earth Resources	<ul style="list-style-type: none"> Localized increased rates of erosion with land disturbance activities associated with target reconfiguration. Activities would be subject to AZPDES CGP, which would minimize construction-related impacts. 	<ul style="list-style-type: none"> Potential for localized increased rates of erosion with land disturbance activities that may occur with ongoing routine target maintenance.
Water Resources	<ul style="list-style-type: none"> Potential for increased sedimentation in runoff from target reconfiguration in Tenmile Wash, Growler Wash/Daniels Arroyo Wash, Quilotosa Wash, and Saucedo Wash systems. Adherence to AZPDES CGP requirements would minimize potential impacts. 	<ul style="list-style-type: none"> Potential for localized increased rates of sedimentation in runoff from land disturbance that may occur with ongoing routine target maintenance.
Air Quality	<ul style="list-style-type: none"> Construction activities at specific target locations may create short term, localized air emissions. 	<ul style="list-style-type: none"> Ongoing routine target maintenance activities would continue to result in some minor, short-term, localized air emissions.
Biological Resources	<ul style="list-style-type: none"> No impacts to vegetation, wildlife, or special status species for reconfiguration in areas with moderate to high prior military use. Actions in less disturbed areas would be reviewed for potential biological impacts on a site-specific basis. 	<ul style="list-style-type: none"> No impact to biological resources either within or adjacent to BMGR East.
Land Use	<ul style="list-style-type: none"> Establishes opportunities for modern, more realistic training. Focuses on reconfiguring targets within areas of prior military use, thereby minimizing changes to land use. 	<ul style="list-style-type: none"> Continues training with outdated target scenarios. No change to existing land use.
Outdoor Recreation	<ul style="list-style-type: none"> No impact to recreation within the study area. 	<ul style="list-style-type: none"> No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> No health and safety impacts within the study area. Luke AFB Supplement to AFI 13-212 would be updated with procedures for safe operation of reconfigured targets. 	<ul style="list-style-type: none"> No impact to health and safety.

Table S-2 Proposed Target Reconfiguration Comparison of the Alternatives		
	Alternative 2.A, Target Reconfiguration (Proposed Action)	Alternative 2.B, No-Action Alternative
Resources		
Cultural Resources	<ul style="list-style-type: none"> • Intensive cultural resource survey of approximately 95 percent of the pre-2001 5-year EOD footprint (negligible use category) has identified more than 861 prehistoric and historical period cultural resources. • Cultural resources identified within the pre-2007 annual EOD footprint and current annual, biennial, and decennial EOD footprint (active intensive use and active moderate use categories) exhibit the greatest amount of ground disturbance. Impacts, including to sites that have been recommended eligible to the NRHP, would continue. • Within the current biennial/pre-2007 annual EOD footprint (active intensive and active moderate use categories), ground disturbance may result in continued and renewed impacts to up to 86 unevaluated cultural resource recorded locations. • Impact from renewed ground disturbance would occur to cultural resources located in the vicinity of targets reconfigured outside of the existing biennial but within the pre-2001 5-year EOD footprint (infrequent moderate use and reserve light use categories) • New ground disturbance would likely impact cultural resources in currently undisturbed areas outside the pre-2001 5-year EOD footprint (negligible use category). • Identification of TCPs would occur in previously surveyed areas and identification of historic properties (including TCPs) would occur in unsurveyed areas. Evaluation and determination of NRHP eligibility, assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA for all of the actions. 	<ul style="list-style-type: none"> • Baseline cultural resource conditions (described in Section 3.9) would continue.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> • Temporary increase in POL use and waste disposal from construction occurring in increments over 10 or more years. • Changes in munitions constituents to be addressed through ongoing program to periodically review the potential for munitions constituents to be transported off-range. 	<ul style="list-style-type: none"> • No impact to hazardous materials and waste management within or adjacent to BMGR East.

Table S-2 Proposed Target Reconfiguration Comparison of the Alternatives		
	Alternative 2.A, Target Reconfiguration (Proposed Action)	Alternative 2.B, No-Action Alternative
Resources		
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> • Long-term minor economic gains from sporadic construction activities associated with reconfiguring targets as needs are identified. • No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> • No socioeconomic impact or environmental justice concerns within the study area.
Noise	<ul style="list-style-type: none"> • Equipment used for reconfiguration activities would create noise at the sites in the range of 70 to 90 dBA; sites are well within interior locations of BMGR East. 	<ul style="list-style-type: none"> • No noise impacts within the study area.

Table S-3 Proposed Moving Vehicle Target System Comparison of the Alternatives				
	Alternative 3.A, Establish Moving Vehicle Target System at Target 104/106 Complex(Proposed Action)	Alternative 3.B, Establish Moving Vehicle Target System West of Main Access Road to North TAC (Alternative Action)	Alternative 3.C, Establish Moving Vehicle Target System Southeast of Simulated Rail Yard (Alternative Action)	Alternative 3.D, No-Action Alternative
Resources				
Earth Resources	<ul style="list-style-type: none"> Disturbance of approximately 44 acres of previously disturbed soils for construction of track. Long term soil degradation from operation of the 4x4 vehicle that pulls the moving target. Adherence to AZPDES CGP requirements would minimize construction-related erosion potential. 	<p>Same as Alternative 3.A, except:</p> <ul style="list-style-type: none"> There is less previous disturbance at this site. 	<p>Similar to Alternative 3.A, except:</p> <ul style="list-style-type: none"> Disturbance of approximately 33 acres of relatively undisturbed soils for construction of track. Site location at base of Crater Range would experience higher erosion rates than Alternative 3.A and 3.B sites due to runoff and flash flooding following heavy rain events. 	<ul style="list-style-type: none"> No impact to earth resources within the study area.
Water Resources	<ul style="list-style-type: none"> Potential for increased sedimentation in tributary of Tenmile Wash from construction and ongoing operation of moving vehicle target system. Adherence to AZPDES CGP requirements would minimize the potential construction-related impact. 	<ul style="list-style-type: none"> Potential for increased sedimentation in tributaries of Tenmile Wash and San Cristobal Wash from cultural surveys, construction, munitions delivery, and EOD clearance activities. Adherence to AZPDES CGP requirements would minimize the potential construction-related impact. 	<ul style="list-style-type: none"> Similar to Alternative 3.A. and 3.B, but with the highest potential for increased sedimentation of Tenmile Wash since site drains directly into the main channel of the system instead of a tributary. Adherence to AZPDES CGP requirements would minimize the potential construction-related impact. 	<ul style="list-style-type: none"> No impact to water resources within the study area.

Table S-3 Proposed Moving Vehicle Target System Comparison of the Alternatives				
	Alternative 3.A, Establish Moving Vehicle Target System at Target 104/106 Complex(Proposed Action)	Alternative 3.B, Establish Moving Vehicle Target System West of Main Access Road to North TAC (Alternative Action)	Alternative 3.C, Establish Moving Vehicle Target System Southeast of Simulated Rail Yard (Alternative Action)	Alternative 3.D, No-Action Alternative
Resources				
Air Quality	<ul style="list-style-type: none"> • Short term, localized increase in emissions from road construction: <ul style="list-style-type: none"> • VOC: 0.02 tons • CO: 0.25 tons • NO_x: 0.13 tons • SO₂: 0.01 tons • PM₁₀: 5.15 tons • PM_{2.5}: 0.52 tons • An earth moving permit would be required from Maricopa County for construction activities. • Short term localized increase in dust (PM₁₀) emission would occur from operation of the moving vehicle target system on unpaved roads during training exercises. 	Same as Alternative 3.A.	Same as Alternative 3.A.	No air quality impacts within the study area.

Table S-3 Proposed Moving Vehicle Target System Comparison of the Alternatives				
	Alternative 3.A, Establish Moving Vehicle Target System at Target 104/106 Complex(Proposed Action)	Alternative 3.B, Establish Moving Vehicle Target System West of Main Access Road to North TAC (Alternative Action)	Alternative 3.C, Establish Moving Vehicle Target System Southeast of Simulated Rail Yard (Alternative Action)	Alternative 3.D, No-Action Alternative
Resources				
Biological Resources	<ul style="list-style-type: none"> Project activities could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area Potential for disturbance to individual Le Conte’s thrashers and individual burrowing owls, but would not be expected to impact the distribution or overall abundance of the species in the Childs Valley. Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required; (lesser impact to pronghorn than Alt. 3.B and 3.C due to the existing level of habitat degradation). Potential for disturbance to Yuma puma, it is not expected to limit the animal’s distribution or abundance on BMGR East. 	<ul style="list-style-type: none"> Project activities could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area. Potential for disturbance to individual Le Conte’s thrashers and individual burrowing owls, but would not be expected to impact the distribution or overall abundance of the species in the Childs Valley. Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. 	<ul style="list-style-type: none"> Project activities adjacent to Tenmile Wash could disrupt the ability of wildlife to effectively use this important habitat area to safely move across the landscape. Potential to impact individual crested saguaro. Could contribute to degradation of desert tortoise habitat and impact individual animals. Potential for disturbance to individual Le Conte’s thrashers and individual burrowing owls, but would not be expected to impact the distribution or overall abundance of the species in the Childs Valley. Could result in disturbance to individual peregrine falcons possibly associated with the cliffs of the Crater Range. Could result in disturbance to California leaf-nosed bats through modification of suitable foraging habitat. Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. Potential for disturbance to Yuma puma but not expected to limit the animal’s distribution or abundance on BMGR East. 	<ul style="list-style-type: none"> No biological resources impacts either within or adjacent to BMGR East.

Table S-3 Proposed Moving Vehicle Target System Comparison of the Alternatives				
	Alternative 3.A, Establish Moving Vehicle Target System at Target 104/106 Complex(Proposed Action)	Alternative 3.B, Establish Moving Vehicle Target System West of Main Access Road to North TAC (Alternative Action)	Alternative 3.C, Establish Moving Vehicle Target System Southeast of Simulated Rail Yard (Alternative Action)	Alternative 3.D, No-Action Alternative
Resources				
Land Use	<ul style="list-style-type: none"> Creates a loop road using some existing roadway, affecting 44 acres. Limits access to this area of North TAC during moving target training exercises. 	<ul style="list-style-type: none"> Creates a loop road using some existing roadway, affecting 44 acres. Limits access to this area of North TAC during moving target training exercises. 	<ul style="list-style-type: none"> Creates a loop road using some existing roadway, affecting 33 acres. Limits access to this area of North TAC during moving target training exercises. 	<ul style="list-style-type: none"> Limits training within BMGR East to static targets. No change to land use or range accessibility.
Outdoor Recreation	<ul style="list-style-type: none"> No impact to recreation within the study area. 	Same as Alternative 3.A.	Same as Alternative 3.A.	<ul style="list-style-type: none"> No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> Hazards associated with heavy equipment operation and vehicle use for construction activities would not differ substantially from those already encountered during periodic maintenance. Luke AFB Supplement to AFI 13-212 would be updated to address safe operation and training at the moving vehicle target system. 	Same as Alternative 3.A.	Same as Alternative 3.A.	<ul style="list-style-type: none"> No health and safety impacts within the study area.

Table S-3 Proposed Moving Vehicle Target System Comparison of the Alternatives				
	Alternative 3.A, Establish Moving Vehicle Target System at Target 104/106 Complex(Proposed Action)	Alternative 3.B, Establish Moving Vehicle Target System West of Main Access Road to North TAC (Alternative Action)	Alternative 3.C, Establish Moving Vehicle Target System Southeast of Simulated Rail Yard (Alternative Action)	Alternative 3.D, No-Action Alternative
Resources				
Cultural Resources	<ul style="list-style-type: none"> Intensive cultural resource survey of 100 percent of the project area identified one prehistoric site recommended eligible to the NRHP that has been previously disturbed. Continued ground disturbance and soil erosion at the project site associated with the proposed action would potentially result in impacts to this site, unless avoidance is possible. Identification and evaluation of historic properties (including TCPs), assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA. The preferred treatment is avoidance and protection. 	<ul style="list-style-type: none"> Intensive cultural resource survey of approximately 50-60 percent of the project area has not identified any cultural resources. Surface disturbance and associated erosion could impact cultural resources, if present in unsurveyed areas. Identification and evaluation of historic properties (including TCPs), assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan, would be completed in accordance with Section 106 of the NHPA. The preferred treatment is avoidance and protection. 	<ul style="list-style-type: none"> Intensive cultural resource survey of 100 percent of the project area did not identify any cultural resources. No impact to cultural resources. 	<ul style="list-style-type: none"> Baseline conditions for cultural resources (described in Section 3.9) would continue.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> Temporary increase in POL use and waste disposal from construction. Minor long term increase in POL use to power equipment. 	Same as Alternative 3.A.	Same as Alternative 3.A.	<ul style="list-style-type: none"> No impact to hazardous materials and waste management within or adjacent to BMGR East.

Table S-3 Proposed Moving Vehicle Target System Comparison of the Alternatives				
	Alternative 3.A, Establish Moving Vehicle Target System at Target 104/106 Complex(Proposed Action)	Alternative 3.B, Establish Moving Vehicle Target System West of Main Access Road to North TAC (Alternative Action)	Alternative 3.C, Establish Moving Vehicle Target System Southeast of Simulated Rail Yard (Alternative Action)	Alternative 3.D, No-Action Alternative
Resources				
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> One-time regional economic gain from expenditures for construction activities. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	Same as Alternative 3.A.	Same as Alternative 3.A.	<ul style="list-style-type: none"> No socioeconomic impact or environmental justice concern within the study area.
Noise	<ul style="list-style-type: none"> Moderate temporary increases in noise levels in the range of 70 to 90 dBA from construction of the moving vehicle target system. Intermittent noise-generating activity associated with operation of the moving vehicle target system. Site is well within the interior of BMGR East. 	Same as Alternative 3.A.	Same as Alternative 3.A.	<ul style="list-style-type: none"> No noise impacts within the study area.

**Table S-4
Proposed New Target for Air-To-Ground Missiles
Comparison of the Alternatives**

	Alternative 4.A, Establish New Target for Air-to-Ground Missiles (Proposed Action)	Alternative 4.B, No-Action Alternative
Resources		
Earth Resources	<ul style="list-style-type: none"> • Live air-to-ground missiles result in larger surface disturbance footprints as compared to inert munitions. • Estimated to be 75-acre disturbance area in area of some prior disturbance associated with inert munitions delivery. • Ongoing target maintenance and construction would have localized impacts to soils. 	<ul style="list-style-type: none"> • No impacts to earth resources within the study area.
Water Resources	<ul style="list-style-type: none"> • New target would be located in close proximity to Quilotosa Wash. • Delivery of live missiles at new target would destabilize soils in the area, increasing sedimentation in the wash during rain events which could alter flow of the channel. • No federal or state water quality standards would be exceeded and impacts would be localized. 	<ul style="list-style-type: none"> • No impacts to water resources within the study area.
Air Quality	<ul style="list-style-type: none"> • Although emissions from missile delivery would shift from one localized site to another, there would be no impact to air quality within the study area. 	<ul style="list-style-type: none"> • No impact to air quality within the study area.
Biological Resources	<ul style="list-style-type: none"> • Live fire activity could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife safely across the landscape. • Potential to impact individual crested saguaro and the wildlife that rely on saguaros for food and/ or shelter. • Potential for disturbance to individual Le Conte’s thrashers, but would not be expected to impact the distribution or overall abundance of the species. • Potential to impact individual California leaf-nosed bats but would not be expected to alter the local distribution or abundance of the bat. • Potential adverse effects to individual lesser long-nosed bats but would not be expected to alter the local distribution or abundance of the bat. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. 	<ul style="list-style-type: none"> • No impact to biological resources within or adjacent to BMGR East.

**Table S-4
Proposed New Target for Air-To-Ground Missiles
Comparison of the Alternatives**

	Alternative 4.A, Establish New Target for Air-to-Ground Missiles (Proposed Action)	Alternative 4.B, No-Action Alternative
Resources		
Land Use	<ul style="list-style-type: none"> Provides air-to-ground missile training opportunity with improved angles of attack. Establishes new target for live ordnance, precluding approximately 75 acres from other land uses for the life of the target. Compatible with other land uses in East TAC. 	<ul style="list-style-type: none"> Limits training to two live air-to-ground missile targets, one of which is constrained by its location in providing a full range of attack angles and altitudes of approach. No change to land use, thereby retaining the area for other future compatible land uses.
Outdoor Recreation	<ul style="list-style-type: none"> No impact to recreation within the study area. 	<ul style="list-style-type: none"> No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> Potential health and safety impacts associated with construction and ongoing operation would not differ from those that typically occur for periodic range clearance and maintenance. Luke AFB Supplement to AFI 13-212 would be updated to include safe procedures for this activity. 	<ul style="list-style-type: none"> No impact to health and safety within the study area.
Cultural Resources	<ul style="list-style-type: none"> Intensive cultural resource survey of 100 percent of the project area did not identify any cultural resources. No impact to cultural resources. 	<ul style="list-style-type: none"> Baseline conditions for cultural resources (described in Section 3.9) would continue.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> Temporary increase in POL use and waste disposal from construction. No increased potential for transport of munitions constituents off-range would be expected. 	<ul style="list-style-type: none"> No impact to hazardous materials and waste management within or adjacent to BMGR East.
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> One-time regional economic gain from expenditures for construction activities. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> No socioeconomic impact or environmental justice concerns within the study area.
Noise	<ul style="list-style-type: none"> Minor temporary increases in noise levels ranging from 70 to 90 dBA from construction of the target. Minor changes to noise exposure levels in the immediate vicinity of the new target, which is well within the interior of BMGR East. 	<ul style="list-style-type: none"> No noise impacts within the study area.

Table S-5 Proposed Lower Flight Training Altitude Over a Portion of the Cabeza Prieta National Wildlife Refuge Comparison of the Alternatives			
	Alternative 5.A, Lowering Flight Training Altitude for Distance of 15 NM South of Range Boundary (Proposed Action)	Alternative 5.B, Lowering Flight Training Altitude for Distance of 8 NM South of Range Boundary (Alternative Action)	Alternative 5.C, No-Action Alternative
Resources			
Earth Resources	<ul style="list-style-type: none"> No impacts to earth resources within the study area. 	Same as Alternative 5.A.	<ul style="list-style-type: none"> No impacts to earth resources within the study area.
Water Resources	<ul style="list-style-type: none"> No impact to water resources within the study area. 	Same as Alternative 5.A.	<ul style="list-style-type: none"> No impact to water resources within the study area.
Air Quality	<ul style="list-style-type: none"> Operation of aircraft at a lower altitude would not generate additional emissions, but rather impact a more localized area of the Cabeza Prieta NWR. Oxides of nitrogen estimated at highest quantity, in excess of 6 tons per year; actual impact would be a fraction of this estimate since aircraft operations already produce these emissions. All pollutant emissions would be considered negligible. 	<ul style="list-style-type: none"> Same as Alternative 5.A except that the area of potential effect would be about half the size of Alternative 5.A 	<ul style="list-style-type: none"> No impact to air quality within the study area.

Table S-5 Proposed Lower Flight Training Altitude Over a Portion of the Cabeza Prieta National Wildlife Refuge Comparison of the Alternatives			
	Alternative 5.A, Lowering Flight Training Altitude for Distance of 15 NM South of Range Boundary (Proposed Action)	Alternative 5.B, Lowering Flight Training Altitude for Distance of 8 NM South of Range Boundary (Alternative Action)	Alternative 5.C, No-Action Alternative
Resources			
Biological Resources	<ul style="list-style-type: none"> • Though some individuals of various species may be disturbed by the low level overflights, these activities are not expected to result in impacts to the distribution or abundance of wildlife. • Potential impacts to individual cactus ferruginous pygmy-owls, but would not be expected to alter the local distribution or abundance of the bird. • Potential impacts to individual Le Conte’s thrashers, but would not be expected to alter the local distribution or abundance of the bird. • Potential impacts to individual peregrine falcons but would not be expected to alter the local distribution or abundance of the bird. • Potential impacts to individual western burrowing owls, but would not be expected to alter the local distribution or abundance of the bird. • Potential impacts to individual California leaf-nosed bats but would not be expected to alter the local distribution or abundance of the bat. • Potential adverse effects to individual lesser long-nosed bats but would not be expected to alter the local distribution or abundance of the bat. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. • Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. • Potential impacts to individual Yuma puma but would not be expected to alter the local distribution of abundance of the Yuma puma. 	<ul style="list-style-type: none"> • Same as Alternative 5.A except that the area of potential effect would be about half the size of Alternative 5.A 	<ul style="list-style-type: none"> • No impact to biological resources within or adjacent to BMGR East.

Table S-5 Proposed Lower Flight Training Altitude Over a Portion of the Cabeza Prieta National Wildlife Refuge Comparison of the Alternatives			
	Alternative 5.A, Lowering Flight Training Altitude for Distance of 15 NM South of Range Boundary (Proposed Action)	Alternative 5.B, Lowering Flight Training Altitude for Distance of 8 NM South of Range Boundary (Alternative Action)	Alternative 5.C, No-Action Alternative
Resources			
Land Use	<ul style="list-style-type: none"> No impact to land surface (ground disturbance) either within BMGR East or Cabeza Prieta NWR. Requires new scheduling procedures so that authorized military and non-military users do not simultaneously use the affected airspace between 500 feet AGL and 1,500 feet AGL. Creates minor inconvenience in scheduling airspace for authorized non-military surveillance flights, such as those made by wildlife agencies or the Border Patrol. 	<ul style="list-style-type: none"> Same as Alternative 5.A except that only about half as much airspace would be affected by the change in scheduling procedures. 	<ul style="list-style-type: none"> No impact to land use either within or adjacent to BMGR East. Reduces realism in altitude of attack training for certain targets located near the southern boundary of BMGR East.
Outdoor Recreation	<ul style="list-style-type: none"> Minor overflight disturbance to recreation within the remote areas of Cabeza Prieta NWR and Wilderness and Organ Pipe Cactus National Monument and Wilderness. No impact to recreation within BMGR East. 	<ul style="list-style-type: none"> Same as Alternative 5.A except that overflight effects would be more concentrated on an area about half the size of Alternative 5.A in the northern portion of the Cabeza Prieta NWR and Wilderness. 	<ul style="list-style-type: none"> No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> Negligible increased risk of an aircraft mishap could occur with lower flight training altitude. Luke AFB Supplement AFI 13-212 would be updated to address safety procedures for lower flight training altitude. 	Same as Alternative 5.A.	<ul style="list-style-type: none"> No impact to health and safety within the study area.
Cultural Resources	<ul style="list-style-type: none"> Less than 1 percent of the land area underlying this airspace area has been surveyed for cultural resources. Seven prehistoric and historical-period cultural resources have been recorded. Auditory and visual intrusion and vibratory disturbance to cultural resources on these lands from aircraft overflights would potentially increase. 	<ul style="list-style-type: none"> Less than 1 percent of the land area underlying this airspace area has been surveyed for cultural resources. One prehistoric cultural resource has been recorded. Auditory and visual intrusion and vibratory disturbance to cultural resources on these lands from aircraft overflights would potentially increase. 	<ul style="list-style-type: none"> Auditory and visual intrusion and vibratory disturbance to cultural resources from overflights of Cabeza Prieta NWR would continue at current levels.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> Minor increase in potential for aircraft crashes, which would be addressed with crash response protocols already in place. 	Same as Alternative 5.A.	<ul style="list-style-type: none"> No impact to hazardous materials and waste management within or adjacent to BMGR East.

Table S-5 Proposed Lower Flight Training Altitude Over a Portion of the Cabeza Prieta National Wildlife Refuge Comparison of the Alternatives			
	Alternative 5.A, Lowering Flight Training Altitude for Distance of 15 NM South of Range Boundary (Proposed Action)	Alternative 5.B, Lowering Flight Training Altitude for Distance of 8 NM South of Range Boundary (Alternative Action)	Alternative 5.C, No-Action Alternative
Resources			
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> No socioeconomic impact. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	Same as Alternative 5.A.	<ul style="list-style-type: none"> No socioeconomic impact or environmental justice concern within the study area.
Noise	<ul style="list-style-type: none"> L_{dnmr} noise exposure levels in areas underlying the Air-to-Air range, including the Cabeza Prieta NWR would increase approximately 5 dB, but would remain significantly below community noise impact levels, ranging from 48 dB to below 45 dB. 	<ul style="list-style-type: none"> Noise exposure levels under Alternative 5.B would increase at the same magnitude as described for Alternative 5.A; however, the area exposed to the approximately 5dB increase would be reduced due to the reduced size of the lowered flight training area. 	<ul style="list-style-type: none"> No noise impacts within the study area.

**Table S-6
Proposed Reconfiguration of Manned Range 3 for Helicopter Training
Comparison of the Alternatives**

	Alternative 6.A, Reconfigure Manned Range 3 for Helicopter Training (Proposed Action)	Alternative 6.B, No-Action Alternative
Resources		
Earth Resources	<ul style="list-style-type: none"> Localized disturbance from EOD clearance activities prior to establishing targets. Disturbance at sites for the establishment of 15 to 25 pop-up systems to be dispersed within a 1,800-acre area. Activities would be subject to AZPDES CGP requirements, which would minimize construction-related impacts. Training activities and helicopter use would increase localized soil disturbance and erosion potential at the target area. 	<ul style="list-style-type: none"> No impact to earth resources within the study area.
Water Resources	<ul style="list-style-type: none"> Localized soil disturbance throughout 1,800-acre site from establishment of 15-25 pop-up systems could increase potential for sedimentation during heavy rain events in tributaries of Saucedo Wash. Adherence to AZPDES CGP requirements would minimize the construction-related impact. 	<ul style="list-style-type: none"> No impact to water resources within the study area.
Air Quality	<ul style="list-style-type: none"> Emissions associated with the minor construction of pop-up systems would be short term, negligible, and preclude quantification. 	<ul style="list-style-type: none"> No impact to air quality within the study area.
Biological Resources	<ul style="list-style-type: none"> Potential impacts to small areas of desert lowland vegetation. Live fire activity could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife across the landscape. Potential impacts to individual Le Conte’s thrashers and individual burrowing owls, but would not be expected to alter the local distribution or abundance of the bird. Potential adverse effects to individual lesser long-nosed bats but would not be expected to alter the local distribution or abundance of the bat. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. 	<ul style="list-style-type: none"> No impact to biological resources within or adjacent to BMGR East.
Land Use	<ul style="list-style-type: none"> Establishes new training opportunity for helicopter gunnery training that includes pop-up target systems Establishes targets in a new area within Manned Range 3, introducing new small munitions impacts and resulting in minor increase in EOD clearance area 	<ul style="list-style-type: none"> Limits helicopter gunnery training to existing opportunities. No change in land use.

**Table S-6
Proposed Reconfiguration of Manned Range 3 for Helicopter Training
Comparison of the Alternatives**

	Alternative 6.A, Reconfigure Manned Range 3 for Helicopter Training (Proposed Action)	Alternative 6.B, No-Action Alternative
Resources		
Outdoor Recreation	<ul style="list-style-type: none"> No impact to recreation within the study area. 	<ul style="list-style-type: none"> No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> Health and safety conditions would not differ appreciably from those already present at the range. Luke AFB Supplement AFI 13-212 would be updated to include safety procedures for the reconfigured range. 	<ul style="list-style-type: none"> No impact to health and safety within the study area.
Cultural Resources	<ul style="list-style-type: none"> Intensive cultural resource survey of 25 percent of the project area has identified eight prehistoric and historical-period cultural resources recommended eligible to the NRHP. Potential impacts would include ground disturbance during the construction and maintenance of targets and from strafing of targets with small munitions (e.g., .50 cal). Identification of historic properties (including TCPs) would occur in unsurveyed portions of the project area. Evaluation and determination of NRHP eligibility for historic properties, assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA. 	<ul style="list-style-type: none"> Baseline conditions for cultural resources (described in Section 3.9) would continue.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> Temporary increase in POL use and waste disposal from construction and, in the long-term, with target maintenance. No increased potential for transport of munitions constituents off-range. 	<ul style="list-style-type: none"> No impact to hazardous materials and waste management within or adjacent to BMGR East.
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> One-time regional economic gain would result from expenditures for construction activities. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> No socioeconomic impact or environmental justice concern within the study area.
Noise	<ul style="list-style-type: none"> During construction, there would be minor temporary increases in noise levels ranging from 70 to 90 dBA in this interior location within BMGR East. Minor changes to noise exposure levels in the immediate vicinity of the new targets associated with change in aerial gunnery and aircraft operations at the reconfigured target. 	<ul style="list-style-type: none"> No noise impacts within the study area.

**Table S-7
 Proposed On-the-Ground Training Exercises
 Comparison of the Alternatives**

	Alternative 7.A, Allow on-the-Ground Training by Small Teams (Proposed Action)	Alternative 7.B, No-Action Alternative
Resources		
Earth Resources	<ul style="list-style-type: none"> Minimal and localized erosion from foot traffic and vehicular use. Wind erosion from helicopter blade wash down at previously disturbed points of insertion/extraction. 	<ul style="list-style-type: none"> No impact to earth resources within the study area.
Water Resources	<ul style="list-style-type: none"> Minor, localized potential for increased erosion which could result in sedimentation from increased vehicular use on roads and parking on unpaved roadside shoulders. Ground-based training activities could slightly increase erosion potential, specifically when training occurs during or following a rain event in areas where there are semi-erodible and highly erodible soils. 	<ul style="list-style-type: none"> No impact to water resources within the study area.
Air Quality	<ul style="list-style-type: none"> Localized dust (PM₁₀) from helicopter blade wash down in insertion/extraction exercise, but no impact to air quality within the study area. 	<ul style="list-style-type: none"> No impact to air quality within the study area.

**Table S-7
Proposed On-the-Ground Training Exercises
Comparison of the Alternatives**

	Alternative 7.A, Allow on-the-Ground Training by Small Teams (Proposed Action)	Alternative 7.B, No-Action Alternative
Resources		
Biological Resources	<ul style="list-style-type: none"> • Clandestine activities by troops on foot would not be expected to generally disturb wildlife or vegetation; however there is potential for minimal impacts to vegetation associated with vehicle parking for troop insertion or extraction. • Troops camping in a fixed location may temporarily impact individual wildlife movements, but no lasting impacts are anticipated; no long-term change in movement patterns or habitat use is anticipated. • There is potential for minimal impacts to xeroriparian habitats by vehicle traffic in the area and maintenance activities at the targets, as well as minimal impacts to vegetation adjacent to wash channels in the vicinity of the new targets. • Potential impacts to individual desert tortoise but would not be expected to alter the local distribution or abundance of the tortoise. • Potential impacts to individual Le Conte’s thrashers and individual western burrowing owls, but would not be expected to alter the local distribution or abundance of the bird. • Potential impacts to the California leaf-nosed bat, if roost sites are entered or disturbed by troops moving through. • Potential adverse effects to individual lesser long-nosed bats but would not be expected to alter the local distribution or abundance of the bat. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. • Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. 	<ul style="list-style-type: none"> • No impact to biological resources within or adjacent to BMGR East.
Land Use	<ul style="list-style-type: none"> • Provides for land navigation and other on-the-ground training opportunities for CSAR and other small teams of troops. • Negligible effects on land use from dispersed cross-country travel on foot. 	<ul style="list-style-type: none"> • Limits CSAR ground training to locations outside of BMGR East. • No change in land use.

**Table S-7
Proposed On-the-Ground Training Exercises
Comparison of the Alternatives**

	Alternative 7.A, Allow on-the-Ground Training by Small Teams (Proposed Action)	Alternative 7.B, No-Action Alternative
Resources		
Outdoor Recreation	<ul style="list-style-type: none"> Minor impacts to recreationists within Area B from the possibility of observing a military training exercise. 	<ul style="list-style-type: none"> No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> Military personnel involved in training exercises would be exposed to various environmental health and safety issues; however, updates to Luke AFB Supplement to AFI 13-212 would establish safe training procedures to protect personnel. 	<ul style="list-style-type: none"> No impact to health and safety within the study area.
Cultural Resources	<ul style="list-style-type: none"> Intensive cultural resource survey in of 2,341 acres in sample survey blocks and along 80 miles of roads in Area B has identified 56 prehistoric and historical-period cultural resources. Cultural resources could be impacted by minimal ground disturbance from roadside vehicle parking, foot traffic, and helicopter rotor wash in previously disturbed and surveyed areas in tactical ranges and Area B, a portion of BMGR East that is open to the public. All forces conducting these activities are given training to avoid disturbing cultural resources. Identification of TCPs, evaluation of historic properties, assessment and application of the criteria of adverse effects, and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA. 	<ul style="list-style-type: none"> No impacts to cultural resources within the project area.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> Minor amount of use of fuels and coolants in equipment used for troop insertion and extraction. No impacts from small arms munitions use. Troops to carry out solid waste and bury human waste. 	<ul style="list-style-type: none"> No impact to hazardous materials and waste management within or adjacent to BMGR East.
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> Potential minor economic gain if deployed units seek services or supplies in the communities around BMGR East. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> No socioeconomic impact or environmental justice concern within the study area.
Noise	<ul style="list-style-type: none"> Minor, intermittent noise impacts associated with aircraft operations and activity from ground troops. 	<ul style="list-style-type: none"> No noise impacts within the study area.

**Table S-8
 Proposed New Taxiway and Air Traffic Control Tower at Gila Bend Air Force Auxiliary Field
 Comparison of the Alternatives**

	Alternative 8.A and 8.B, New Parallel Taxiway (Proposed Action and Common to all Alternatives)	Alternative 8.A, Air Traffic Control Tower Located 3,100 Feet North of the Runway 35 Threshold and 1,600 feet west of the Runway 17/35 centerline (Proposed Action)	Alternative 8.B, Air Traffic Control Tower Located 3,050 feet north of the Runway 35 threshold and 1,750 feet west of the Runway 17/35 centerline	Alternative 8.C, No Action Alternative
Resources				
Earth Resources	<ul style="list-style-type: none"> • Construction-related disturbance of 42 acres of previously disturbed soil for development of new taxiway. • Activities would be subject to AZPDES CGP requirements, which would minimize construction-related impact. • Long term stabilization of soil with addition of tarmac and asphalt surfaces for taxiway and design of drains and culverts to manage runoff from increased impervious surface. 	<ul style="list-style-type: none"> • Short term soil disturbance of less than 1 acre at previously disturbed site for air traffic control tower. • Existing storm water controls would minimize erosion impacts. • Activities may be subject to AZPDES CGP requirements if final design exceeds 1 acre, which would minimize construction-related impact. 	Same as Alternative 8.A air traffic control tower impacts.	<ul style="list-style-type: none"> • Proposed site would continue to be subject to wind and water erosion, but controlled through existing storm water culverts and controls at the airfield.

Table S-8 Proposed New Taxiway and Air Traffic Control Tower at Gila Bend Air Force Auxiliary Field Comparison of the Alternatives				
	Alternative 8.A and 8.B, New Parallel Taxiway (Proposed Action and Common to all Alternatives)	Alternative 8.A, Air Traffic Control Tower Located 3,100 Feet North of the Runway 35 Threshold and 1,600 feet west of the Runway 17/35 centerline (Proposed Action)	Alternative 8.B, Air Traffic Control Tower Located 3,050 feet north of the Runway 35 threshold and 1,750 feet west of the Runway 17/35 centerline	Alternative 8.C, No Action Alternative
Resources				
Water Resources	<ul style="list-style-type: none"> The taxiway would result in 42 acres of impervious surface that would eliminate natural infiltration and alter the flow and velocity of storm water. Utilizing Low Impact Development would minimize the potential long-term impacts from increased impervious surface and storm water runoff. Adherence to AZPDES CGP requirements would minimize potential construction-related impacts. 	<ul style="list-style-type: none"> New control tower would be constructed at a confined and disturbed site on disturbed land where existing storm water controls are present. Existing storm water controls and adherence to AZPDES CGP requirements during construction would minimize the potential impacts. 	Same as Alternative 8.A air traffic control tower impacts.	<ul style="list-style-type: none"> No impact to water resources within the study area.
Air Quality	<ul style="list-style-type: none"> Short term, localized increase in air emissions would occur during construction of taxiway and control tower: <ul style="list-style-type: none"> VOC: 2.60 tons CO: 2.09 tons NO_x: 4.26 tons SO₂: 0.48 tons PM₁₀: 15.60 tons PM_{2.5}: 1.77 tons A dust control permit would be required from Maricopa County for construction activities. 	Same as Alternative 8.A (emissions calculations included tower construction).	Same as Alternative 8.A.	<ul style="list-style-type: none"> No impact to air quality within the study area.

**Table S-8
 Proposed New Taxiway and Air Traffic Control Tower at Gila Bend Air Force Auxiliary Field
 Comparison of the Alternatives**

	Alternative 8.A and 8.B, New Parallel Taxiway (Proposed Action and Common to all Alternatives)	Alternative 8.A, Air Traffic Control Tower Located 3,100 Feet North of the Runway 35 Threshold and 1,600 feet west of the Runway 17/35 centerline (Proposed Action)	Alternative 8.B, Air Traffic Control Tower Located 3,050 feet north of the Runway 35 threshold and 1,750 feet west of the Runway 17/35 centerline	Alternative 8.C, No Action Alternative
Resources				
Biological Resources	<ul style="list-style-type: none"> The project area does not provide any substantial wildlife habitat. To accommodate the new taxiway configuration, Bird/wildlife-Aircraft Strike Hazard (BASH) survey protocols would be modified to minimize risk to pilots, aircraft, and wildlife. Potential impacts to individual burrowing owls but would not be expected to alter the local distribution or abundance of the bird. 	<ul style="list-style-type: none"> The project area does not provide any substantial wildlife habitat. Potential impacts to individual western burrowing owls but would not be expected to alter the local distribution or abundance of the bird. 	<ul style="list-style-type: none"> The project area does not provide any substantial wildlife habitat. Potential impacts to individual western burrowing owls but would not be expected to alter the local distribution or abundance of the bird. 	<ul style="list-style-type: none"> No impact to biological resources within or adjacent to BMGR East, including Gila Bend AFAP.

**Table S-8
Proposed New Taxiway and Air Traffic Control Tower at Gila Bend Air Force Auxiliary Field
Comparison of the Alternatives**

	Alternative 8.A and 8.B, New Parallel Taxiway (Proposed Action and Common to all Alternatives)	Alternative 8.A, Air Traffic Control Tower Located 3,100 Feet North of the Runway 35 Threshold and 1,600 feet west of the Runway 17/35 centerline (Proposed Action)	Alternative 8.B, Air Traffic Control Tower Located 3,050 feet north of the Runway 35 threshold and 1,750 feet west of the Runway 17/35 centerline	Alternative 8.C, No Action Alternative
Resources				
Land Use	<ul style="list-style-type: none"> • Benefits military operations by enhancing airfield capacity. • Requires replacement of existing air traffic control tower, which is also an element of proposal. • Potential adverse effect on existing land use if helicopter pads must be relocated (depends on final design). • Precludes other land uses within the approximately 42-acre area, although uses are already limited based on runway use and safety requirements. 	<ul style="list-style-type: none"> • Provides for an air traffic control tower that meets UFC requirements, which improves safe military land use and operations. 	<ul style="list-style-type: none"> • Provides for an improved air traffic control tower compared to existing conditions, improving safe military land use and operations but failing to meet all UFC requirements. 	<ul style="list-style-type: none"> • Potential for adverse effects on military operations during flight emergencies if the runway cannot be rapidly cleared of aircraft. • Continues use of existing air traffic control tower that does not provide adequate space or field of vision to meet UFC requirements.
Outdoor Recreation	<ul style="list-style-type: none"> • No impact to recreation within the study area. 	<ul style="list-style-type: none"> • No impact to recreation within the study area. 	<ul style="list-style-type: none"> • No impact to recreation within the study area. 	<ul style="list-style-type: none"> • No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> • Positive impact on flight safety by separating aircraft movement at the airfield through development of the taxiway. • Luke AFB Supplement to AFI 13-212 would be updated to address safety procedures associated with operations of the new taxiway. 	<ul style="list-style-type: none"> • Luke AFB Supplement to AFI 13-212 would be updated to address safety procedures associated with operation of new air traffic control tower. 	<ul style="list-style-type: none"> • The location for the control tower would not be optimal for safety improvements as the field of view from the tower would be impacted by power lines and other structures. 	<ul style="list-style-type: none"> • The existing runway would continue to function as the taxiway, maintaining the suboptimal airfield situation. • Existing air traffic control tower would continue to be inadequate for observing the entire unobstructed airfield.

**Table S-8
Proposed New Taxiway and Air Traffic Control Tower at Gila Bend Air Force Auxiliary Field
Comparison of the Alternatives**

	Alternative 8.A and 8.B, New Parallel Taxiway (Proposed Action and Common to all Alternatives)	Alternative 8.A, Air Traffic Control Tower Located 3,100 Feet North of the Runway 35 Threshold and 1,600 feet west of the Runway 17/35 centerline (Proposed Action)	Alternative 8.B, Air Traffic Control Tower Located 3,050 feet north of the Runway 35 threshold and 1,750 feet west of the Runway 17/35 centerline	Alternative 8.C, No Action Alternative
Resources				
Cultural Resources	<ul style="list-style-type: none"> An intensive cultural resource survey has been completed for 100 percent of the project area and no cultural resources have been identified. No impact to cultural resources. 	<ul style="list-style-type: none"> An intensive cultural resource survey has been completed for 100 percent of the project area and no cultural resources have been identified. No impact to cultural resources. 	<ul style="list-style-type: none"> Same as Alternative 8.A air traffic control tower impacts. 	<ul style="list-style-type: none"> Ongoing operations at the existing Gila Bend AFAP taxiways and air traffic control tower would continue with no impact to cultural resources.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> Temporary increase in POL use, including use of an asphalt batching plant, and waste generation during construction. 	<ul style="list-style-type: none"> Increase in POL use and waste generation during construction. Potential for asbestos containing materials and lead-based paint to be present in facilities to be demolished. Long-term demands on fuels for heating and power of the new air traffic control tower would likely be slightly less. 	<ul style="list-style-type: none"> Same as Alternative 8.A air traffic control tower impacts. 	<ul style="list-style-type: none"> No impact to hazardous materials and waste management within or adjacent to BMGR East.
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> One-time regional economic gain from expenditures for construction activities. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> One-time regional economic gain from expenditures for construction activities. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> Same as Alternative 8.A air traffic control tower impacts. 	<ul style="list-style-type: none"> No socioeconomic impact or environmental justice concern within the study area.

Table S-8 Proposed New Taxiway and Air Traffic Control Tower at Gila Bend Air Force Auxiliary Field Comparison of the Alternatives				
	Alternative 8.A and 8.B, New Parallel Taxiway (Proposed Action and Common to all Alternatives)	Alternative 8.A, Air Traffic Control Tower Located 3,100 Feet North of the Runway 35 Threshold and 1,600 feet west of the Runway 17/35 centerline (Proposed Action)	Alternative 8.B, Air Traffic Control Tower Located 3,050 feet north of the Runway 35 threshold and 1,750 feet west of the Runway 17/35 centerline	Alternative 8.C, No Action Alternative
Resources				
Noise	<ul style="list-style-type: none"> Minor temporary increases in noise levels ranging from 70 to 100 dBA from construction, which would be confined to the construction site within Gila Bend AFAF. 	<ul style="list-style-type: none"> Minor temporary increases in noise levels ranging from 70 to 100 dBA from construction, which would be confined to the construction site within Gila Bend AFAF. 	Same as Alternative 8.A air traffic control tower impacts.	<ul style="list-style-type: none"> No noise impacts within the study area.

**Table S-9
Proposed Paving of Road from Manned Range 1 to RMCP 1
Comparison of the Alternatives**

	Alternative 9.A, Pave Approximately 7 Miles of Road (Proposed Action)	Alternative 9.B, No-Action Alternative
Resources		
Earth Resources	<ul style="list-style-type: none"> • Disturbance of 23 acres of soils for road development. • Paving would stabilize soils and reduce erosion potential in the long term. • Activities would be subject to AZPDES CGP requirements, which would minimize construction-related impacts. • Over the long term, minimal impact from roadside runoff would occur; any problem spots would be addressed through engineering controls. 	<ul style="list-style-type: none"> • Erosion from frequent use and grading of the 7-mile unpaved road would continue.
Water Resources	<ul style="list-style-type: none"> • Improvement of current erosion and sedimentation problems associated with frequent use and maintenance of the 7-mile unpaved road. • Creation of additional impervious surface that could increase storm water runoff during heavy rain events creating erosion concerns along the roadside shoulders; however, these impacts could be minimized with the construction of culverts to manage the flow. 	<ul style="list-style-type: none"> • Erosion and subsequent sedimentation of natural surface water drainages would continue with frequent use and maintenance of the unpaved road.
Air Quality	<ul style="list-style-type: none"> • Construction activities would result in short term, minor, and localized increase in air emissions: <ul style="list-style-type: none"> • VOC: 0.46 tons • CO: 1.20 tons • NO_x: 1.17 tons • SO₂: 0.11 tons • PM₁₀: 6.87 tons • PM_{2.5}: 0.74 tons • A dust control permit would be required from Maricopa County for construction activities. • Over the long-term, reduction in fugitive dust emissions from frequent travel over a paved versus unpaved surface and frequent grading and maintenance activity. 	<ul style="list-style-type: none"> • Uncontrolled fugitive dust emissions would continue from the frequent use of the unpaved road.

Table S-9
Proposed Paving of Road from Manned Range 1 to RMCP 1
Comparison of the Alternatives

	Alternative 9.A, Pave Approximately 7 Miles of Road (Proposed Action)	Alternative 9.B, No-Action Alternative
Resources		
Biological Resources	<ul style="list-style-type: none"> The construction and potentially the use of a paved road could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area. Potential impacts to individual Le Conte’s thrashers and individual burrowing owls, but would not be expected to alter the local distribution or abundance of the bird. Potential disturbance to Sonoran pronghorn; could result in adverse effects to individual Sonoran pronghorn. In accordance with ESA Section 7 regulations, consultation with the USFWS and adherence to the terms and conditions issued as part of the USFWS biological opinion would be required. 	<ul style="list-style-type: none"> The existing road usage could frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area.
Land Use	<ul style="list-style-type: none"> Could result in minor inconveniences and delays for personnel needing to use the road during road preparation and paving. No change in the way the road is used. 	<ul style="list-style-type: none"> No change in land use or road and vehicle maintenance requirements.
Outdoor Recreation	<ul style="list-style-type: none"> No impact to recreation within the study area. 	<ul style="list-style-type: none"> No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> Positive impact to safety from reducing dust-impaired visibility along the road. 	<ul style="list-style-type: none"> Continued dust-impaired visibility would occur from frequent use of unpaved road.
Cultural Resources	<ul style="list-style-type: none"> An intensive cultural resource survey has been completed for 100 percent of the project area and no cultural resources have been identified. No impact to cultural resources. 	<ul style="list-style-type: none"> No impact to cultural resources within the project area.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> Temporary increase in POL use and use of an asphalt batching plant during construction. 	<ul style="list-style-type: none"> No impact to hazardous materials and waste management within or adjacent to BMGR East.
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> One-time regional economic gain from expenditures for construction activities. No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> No socioeconomic impact or environmental justice concern within the study area.
Noise	<ul style="list-style-type: none"> Minor temporary increases in noise levels in interior locations of BMGR East ranging from 70 to 90 dBA from construction. Periodic road grading would no longer be required, reducing noise exposure associated with this activity. 	<ul style="list-style-type: none"> Long-term intermittent noise associated with grading the unpaved road for maintenance would continue.

**Table S-10
Proposed Excavation and Use of Sand and Gravel on BMGR East
Comparison of the Alternatives**

	Alternative 10.A, Excavate, Transport, Stockpile, and Use BMGR East Sand and Gravel Resources (Proposed Action)	Alternative 10.B, No-Action Alternative
Resources		
Earth Resources	<ul style="list-style-type: none"> • Excavation of 12,990 cubic yards of sand and gravel annually would reduce the sand and gravel material at each excavation site. • Stockpiling the excavated material would have localized soil disturbance and minor increased erosion from runoff of the fine silts and sands integrated with the excavated material. • Using excavated material to reinforce surfaces susceptible to erosion would reduce erosion within BMGR East. • Effects from use of and transport of materials from off-range sand and gravel supply sites would discontinue. 	<ul style="list-style-type: none"> • Continued use of off-range sources for sand and gravel would create impacts at those excavation sites. • Using off-range sources would result in higher heavy vehicle traffic on range and other roads resulting in minimally greater levels of erosion.
Water Resources	<ul style="list-style-type: none"> • A combined area of 2.68 acres would be disturbed with excavation of sand and gravel from wash beds affecting Tenmile Wash, Quilotosa Wash, Daniels Arroyo, Saucedo Wash, and Midway Wash. • Excavation of the wash beds would alter the natural hydrology of each wash to a depth of 3 feet over an area ranging from 0.12 to 0.69 acres (depending on the wash). • The change in depth would be a localized impact and normal conditions would return to the wash beds over time as the excavation sites are filled with sediment from rain events. • Since the floodplains at BMGR East have not been delineated, they are exempt from permitting requirements of the Regulatory Division of the Flood Control District. 	<ul style="list-style-type: none"> • Continued use of off-range sources for sand and gravel would potentially contribute to the water resource impacts at these source sites.
Air Quality	<ul style="list-style-type: none"> • Annual operation emissions would be negligible with the exception of PM₁₀ (5.36 tons per year) generated by the movement of dump trucks on unpaved roads to and from stockpile locations: <ul style="list-style-type: none"> • VOC: 0.04 tons • CO: 0.15 tons • NO_x: 0.42 tons • SO₂: 0.04 tons • PM₁₀: 5.36 tons • PM_{2.5}: 0.56 tons • Fugitive dust generation would be short term and localized. • A dust control permit would be required from Maricopa County. 	<ul style="list-style-type: none"> • No impact to air quality within the study area.

**Table S-10
Proposed Excavation and Use of Sand and Gravel on BMGR East
Comparison of the Alternatives**

	Alternative 10.A, Excavate, Transport, Stockpile, and Use BMGR East Sand and Gravel Resources (Proposed Action)	Alternative 10.B, No-Action Alternative
Resources		
Biological Resources	<ul style="list-style-type: none"> • The excavation of sand and gravel in washes and the use of roads by heavy equipment could temporarily frighten animals away from the site, but would not be expected to inhibit or preclude movements of wildlife through the general area. • Potential for disturbance to xeroriparian vegetation at the excavation site and downstream of the site, as well as to associated floral and faunal communities. • Potential impacts to individual Le Conte’s thrashers and individual western burrowing owls, but would not be expected to alter the local distribution or abundance of the bird. • Not considered to result in adverse effects to Sonoran pronghorn. In accordance with ESA Section 7 regulations, a determination that a proposed action may affect, but is not likely to adversely affect a listed species would require informal consultation with the USFWS; if the USFWS does not concur with the determination, a biological opinion may be issued with mandatory terms and conditions to minimize incidental take of the species. 	<ul style="list-style-type: none"> • The use of commercial sand and gravel sources may potentially introduce noxious weed seeds that are not native to BMGR East if such seeds are in the sand and gravel materials.
Land Use	<ul style="list-style-type: none"> • Excavation and stockpile sites would be along existing roadways so no new access would be required. • Could result in minor inconveniences and delays for personnel needing to use the roads near excavation and stockpile site when materials are being loaded or unloaded. • May benefit military maintenance operations through more readily available sources of sand and gravel 	<ul style="list-style-type: none"> • Continues to require that sand and gravel be hauled from off-site sources to BMGR East over public roadways, resulting in a negligible adverse effect to some BMGR East and off-range roads.
Outdoor Recreation	<ul style="list-style-type: none"> • No impact to recreation within the study area. 	<ul style="list-style-type: none"> • No impact to recreation within the study area.
Health and Safety	<ul style="list-style-type: none"> • No impact to health and safety within the study area. 	<ul style="list-style-type: none"> • No impact to health and safety within the study area.

**Table S-10
Proposed Excavation and Use of Sand and Gravel on BMGR East
Comparison of the Alternatives**

	Alternative 10.A, Excavate, Transport, Stockpile, and Use BMGR East Sand and Gravel Resources (Proposed Action)	Alternative 10.B, No-Action Alternative
Resources		
Cultural Resources	<ul style="list-style-type: none"> • Intensive cultural resource survey has been completed for six of the proposed ten excavation sites and three of the five stockpile sites. • Ground disturbance from excavation of sand and gravel and stockpiling of material would potentially impact cultural resources at two currently identified sites and possibly at sites in unsurveyed portions of the project area. • Identification of historic properties (including TCPs) within the unsurveyed portions of the project area, evaluation and determination of NRHP eligibility, assessment and application of the criteria of adverse effects; and resolution of adverse effects through development of a mitigation plan would be completed in accordance with Section 106 of the NHPA. One site has been determined eligible to the NRHP, therefore, a “no effect” determination is not possible and mitigation would be required. Avoidance of cultural resources through project redesign is the preferred method of mitigation. 	<ul style="list-style-type: none"> • No impact to cultural resources within the project area.
Hazardous Materials and Waste Management	<ul style="list-style-type: none"> • Temporary, intermittent increase in use of POLs during operation of the excavation and transport equipment. 	<ul style="list-style-type: none"> • Continued increased fuel consumption associated with the longer distance transport of sand and gravel resources.
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> • Slight reduction in military spending in the local economy if sand and gravel are no longer purchased from outside sources. • Slight increase in military expense from using equipment to excavate, stockpile, and use sand and gravel on BMGR East; however, this would be less than what is currently spent using outside sources. • No adverse impacts have been identified that extend off-range; therefore, there are no environmental justice concerns. 	<ul style="list-style-type: none"> • No socioeconomic impact or environmental justice concern within the study area.
Noise	<ul style="list-style-type: none"> • Periodic and intermittent, short-term daytime noise ranging from 70 to 95 dBA from heavy equipment used to excavate, stockpile, and use material at dispersed locations within BMGR East. 	<ul style="list-style-type: none"> • Short term intermittent noise associated with transporting sand and gravel from off-range sources would continue.