FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

CONSTRUCTION OF GRAY EAGLE RUNWAY AT BLACK TOWER AND TESTING AND USE OF LASERS ON THE WEST RANGE, FORT HUACHUCA, ARIZONA



Prepared for:



U.S. Army Garrison Fort Huachuca, Arizona



2-13th Aviation Regiment Fort Huachuca, Arizona

Prepared by:



April 2018

FINDING OF NO SIGNIFICANT IMPACT FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT CONSTRUCTION OF GRAY EAGLE RUNWAY AT BLACK TOWER AND USE OF LASERS ON THE WEST RANGE, FORT HUACHUCA, ARIZONA

June 2018

Introduction: This Programmatic Environmental Assessment (PEA) was prepared to analyze the potential for significant environmental impacts associated with the demolition of the current Pioneer Runway and associated temporary facilities and construction of a new Gray Eagle UAS Runway and associated permanent facilities at Black Tower. This PEA also includes the use of lasers on the West Range during testing and training activities at Fort Huachuca, Arizona.

The PEA was prepared in accordance with the National Environmental Policy Act (NEPA) (Title 42 U.S. Code Section 4321, et seq.), Council on Environmental Quality (CEQ) regulations (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508), and *Environmental Analysis of Army Actions* (32 CFR 651). This Finding of No Significant Impact is a document that briefly states why the Proposed Action will not significantly affect the environment and that an Environmental Impact Statement will not be prepared.

Description of the Proposed Action: The Proposed Action includes demolition of Pioneer Runway and ten associated facilities, construction of a new Gray Eagle UAS runway and associated facilities, and laser technology testing and training activities on the West Range in Training Areas J, I, and M.

A new aircraft hangar and associated 4,500 FT runway, taxiway, and parking apron would be constructed to support increased UAS operator training activities to include instructional and flight simulator spaces. Additional features will include an apron with paved covered parking stalls mounted with photovoltaic (PV) panels overhead, and a taxiway complete with a hangar to accommodate UAS operator training specifically for the Gray Eagle UAS. The hangar will also be outfitted with a tool room, break rooms with vending areas, bathrooms with lockers and showers, and outside storage. The administrative function will include instructional space (classrooms, offices, and supply room) and flight simulator space.

Supporting facilities would include all utilities, a weather station, sewer holding tank, fuel point complete with spill containment, fire pump house and water storage tanks, hazmat/POL storage, hardstand and "bird box" storage, a fire waste pond, concrete pads for Ground Control Stations (GCSs), aggregate surfaced drive and pads for Ground Data Terminals (GDTs) and a Satellite Ground Data Terminal (SGDT), lightning protection, roadways, sidewalks, curbs and gutters, and storm drainage. Site improvements would include ramadas, xeriscaping, chain link fencing and gates, anti-terrorism measures, and building information systems. Heating and cooling will be provided by self-contained systems for the administrative spaces, with mechanical ventilation in the maintenance bays. The existing Pioneer Runway will be demolished and West Hemp Road will be excavated and rerouting of West Hemp Road. If additional fill is needed it could be brought in from LAAF. Facilities that will be demolished along with Pioneer runway include: concrete pad; HazMat storage area; temporary and permanent buildings used for storage, maintenance and training; overhead protection structures; and recreational shelter for a total of 52,935 SF.

Alternatives Considered: In addition to the Proposed Action, a No Action Alternative was evaluated. Under the No Action Alternative, the new runway would not be constructed and no additional laser testing would occur on the West Range. The No Action Alternative is required under the CEQ regulations implementing the NEPA, and serves as a baseline or benchmark to be used to compare the Proposed Action and alternatives.

Additional Alternatives: Five other alternatives were considered but eliminated from further analysis within the PEA. The Army considered renovating current facilities for UAS maintenance and testing; leasing of private, municipal, and public landing strips; and using other Department of Defense (DoD) or federal agency facilities. These three alternatives were dismissed due to lack of available facilities, infrastructure, and/or airspace. The Army reviewed converting the existing Hubbard dirt runway into a UAS runway and construct supporting facilities. This was determined to not be feasible since it conflicts with LAAF airspace. During the design of the Proposed Action another alignment considered but eliminated due to impacts on the Agave Management Area.

Anticipated Environmental Effects: Based on information gathered and presented in the PEA, it has been determined that implementation of the Proposed Action and the No Action Alternative would have no significant direct, indirect, or cumulative adverse impacts on the environment. Adverse impacts associated with implementing the Proposed Action would be minor in context and intensity, and most would be of a very temporary nature. Consequently, the overall environmental effect of implementing the Proposed Action is anticipated to be less than significant.

30-Day Public and Agency Review Period: The PEA and a draft copy of this Finding of No Significant Impact were available to the general public and applicable government agencies for review and comment during a 30-day period that commenced on 10 May 2018 with the publication of a Notice of Availability in the *Sierra Vista Herald*. Copies of the PEA along with instructions for submitting comments were available at the Sierra Vista Public Library, 2600 E. Tacoma Street, Sierra Vista, Arizona 85635 and online at https://aec.army.mil/index.php?cID=352.

Public and Agency Comments: A response was received from the Arizona Game and Fish Department. The demolished facilities will be checked for nesting birds and bats before demolition.

Findings: Based on the analysis contained in the PEA, I have concluded that implementation of the Proposed Action would not constitute a major federal action significantly affecting the quality of the human environment. Consequently, implementation of the Proposed Action does not require the preparation of an Environmental Impact Statement.

Approved By:

CHAD O. RAMBC Colonel, MI Commanding

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Date

HOW THIS ENVIRONMENTAL ASSESSMENT IS ORGANIZED

The EXECUTIVE SUMMARY briefly describes the Proposed Action and alternatives. Impacts and conclusions are summarized.

ACRONYMS AND ABBREVIATIONS

- SECTION 1 PURPOSE AND NEED discusses the purpose and need for the Proposed Action, the regulatory background surrounding this project, and the scope of this Environmental Assessment.
- SECTION 2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES discusses the Proposed Action and alternatives addressed in this Environmental Assessment.
- SECTION 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES describes the existing environment within the Region of Influence. It also provides a comparison of environmental consequences associated with the alternative. Conservation and mitigation measures are also addressed in this section.
- SECTION 4 FINDINGS AND CONCLUSIONS
- SECTION 5 REFERENCES provides bibliographical information for sources cited in the text of this Environmental Assessment.
- SECTION 6 LIST OF PREPARERS AND CONTRIBUTORS
- SECTION 7 DISTRIBUTION LIST
- SECTION 8 LIST OF INDIVIDUALS AND AGENCIES CONSULTED

FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF GRAY EAGLE RUNWAY AT BLACK TOWER AND TESTING AND USE OF LASERS ON THE WEST RANGE FORT HUACHUCA, ARIZONA

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APRIL 2018

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EXECUTIVE SUMMARY

Fort Huachuca is a U.S. Army Training and Doctrine Command (TRADOC) installation and is home to the U.S. Army Intelligence Center of Excellence. Fort Huachuca encompasses 73,142 acres located in the City of Sierra Vista, Cochise County, Arizona. Fort Huachuca is divided into an East Reservation (28,544 acres) and West Reservation (44,598 acres) by State Highway 90. The Black Tower complex is located on the West Range.

The 2nd Battalion - 13th Aviation Regiment (2-13th) is a U.S. Army unit based at Fort Huachuca whose primary mission is to train Soldiers in the operation and maintenance of Unmanned Aircraft Systems (UAS). The UAS mission is to be in front of the ground Soldier, looking and allowing them to engage targets that they could not see and attack targets they could not attack before. This battalion operates the largest UAS training center in the world with over 125,000 square feet of training space, four hangars, and three runways. UAS training is conducted at Fort Huachuca exclusively for all Army and U.S. Marine Corps UAS personnel, as well as select Allied Forces. The 2-13th conducts training for MQ-1C Gray Eagle and the RQ-7B Shadow UAS operators and repairers. Flight operations are conducted out of Fort Huachuca's LAAF and the Black Tower Complex.

This Programmatic Environmental Assessment (PEA) was prepared to analyze the potential for significant environmental impacts associated with the demolition of the current Pioneer Runway and associated temporary facilities and construction of a new Gray Eagle UAS Runway and associated permanent facilities at Black Tower. This PEA also includes the use of lasers on the West Range during testing and training activities at Fort Huachuca, Arizona. The PEA provides a programmatic evaluation of potential impacts that is broad enough in scope to assist in the evaluation of future unknown actions that are comparable to those projects and activities that are currently identified and evaluated in this PEA.

The purpose of the Proposed Action is to construct a new UAS runway for the Gray Eagle UAS at the Black Tower complex. The new runway would be better aligned with prevailing winds and not conflict with restricted airspace in use by LAAF. The current runway and associated temporary facilities are not adequate to support the UAS training mission on Fort Huachuca, nor the anticipated increase in TRADOC student throughput in the upcoming years.

Currently UAS training is being conducted at LAAF and at Pioneer and Rugge-Hamilton runways at the Black Tower complex. The use of LAAF is shared with the local community which limits Army usage, while the airstrips at the Black Tower complex are utilized for training various UASs. Attaining flight time through Class D airspace is the limiting training factor for the current mission.

This action also includes allowing the 2-13th to use lasers on the West Range of Fort Huachuca. Laser testing and training has been conducted on the installation on the East and South Ranges. The activities associated with the Proposed Action are to expand the use of laser testing on the installation to the West Range and use Class 1-4 lasers adjacent to roads and other disturbed areas.

Alternative One is presented as the Proposed Action, meaning that it is the preferred course of action by the 2-13th. Alternative One includes demolition of Pioneer Runway and ten associated facilities, construction of a new Gray Eagle UAS runway and associated facilities, and laser technology testing and training activities on the West Range in Training Areas J, I, and M.

A new aircraft hangar and associated 4,500 FT runway, taxiway, and parking apron would be constructed to support increased UAS operator training activities to include instructional and flight simulator spaces. Additional features will include an apron with paved covered parking stalls mounted with photovoltaic (PV) panels overhead, and a taxiway complete with a hangar to accommodate UAS operator training specifically for the Gray Eagle UAS. The hangar will also be outfitted with a tool room, break rooms with vending areas, bathrooms with lockers and showers, and outside storage. The administrative function will include instructional space (classrooms, offices, and supply room) and flight simulator space.

Supporting facilities would include all utilities, a weather station, sewer holding tank, fuel point complete with spill containment, fire pump house and water storage tanks, hazmat/POL storage, hardstand and "bird box" storage, a fire waste pond, concrete pads for Ground Control Stations (GCSs), aggregate surfaced drive and pads for Ground Data Terminals (GDTs) and a Satellite Ground Data Terminal (SGDT), lightning protection, roadways, sidewalks, curbs and gutters, and storm drainage. Site improvements would include ramadas, xeriscaping, chain link fencing and gates, anti-terrorism measures, and building information systems. Heating and cooling will be provided by self-contained systems for the administrative spaces, with mechanical ventilation in the maintenance bays. The existing Pioneer Runway will be demolished and West Hemp Road will be excavated and rerouted. Fill for the new runway, taxi, and apron will come from the demolition of Pioneer Runway and rerouting of West Hemp Road. If additional fill is needed it could be brought in from LAAF. Facilities that will be demolished along with Pioneer runway include: concrete pad; HazMat storage area; temporary and permanent buildings used for storage, maintenance and training; overhead protection structures; and recreational shelter for a total of 52,935 SF.

A summary of the potential impacts and measures to minimize adverse impacts is provided in Table EX-1. Adverse impacts associated with implementing the Proposed Action at Fort Huachuca, Arizona, would be local in context and of a very temporary nature. Based on the analysis contained herein, this PEA concludes that implementation of Alternative One (Proposed Action) or the No Action Alternative would not constitute a major federal action with significant impact on human health or the environment. It is recommended that a Finding of No Significant Impact be issued to complete the NEPA documentation.

Table EX-1. Summary of Potential Impacts and Measures to Minimize Impacts for Alternative One (Proposed Action)

	Level of Anticipated Impact		f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
Land Use		x		No significant direct or indirect impacts to Land use are anticipated. All testing and training events are evaluated and scheduled through appropriate channels prior to the start of training or testing exercise to reduce/eliminate scheduling conflicts. All proposed testing and training would occur in existing training areas and would not alter current land use. Demolition of Pioneer Runway and the construction of the new runway and associated facilities at the existing Black Tower Complex would not result in any significant impacts to land use.
Topography, Geology, and Soils		x		No significant impacts to topography, geology, or soils would result from the implementation of Alternative One. The Fort actively works to reduce erosion on the Installation and all testing, training, and construction activities associated with the Proposed Action would implement best management practices to reduce any impacts to soils. Minor impacts to soils would be expected during the demolition of Pioneer Runway and the construction of the new runway and associated facilities. The new runway will require permits for construction of the new runway and facility and for crossing the existing drainage channel.
Hydrology and Water Resources		x		No significant impacts to water resources are anticipated as a result of the implementation of Alternative One. Activities associated with the Proposed Action would not increase the demand for groundwater and would not directly impact any surface water. Minor, short-term impacts to surface water drainage could occur during the construction of the new runway and associates facilities. Additionally, long-term, minor impacts to surface water drainage on that site, may result as part of the Section 404 permitting process and as pervious surfaces are converted to impervious surfaces. Appropriate stormwater management design and implementation on site would minimize these impacts.
Biological Resources		x		No significant direct or indirect impacts to biological resources are anticipated. Potential risks to biological resources include wildlife eye and skin damage, and the potential for fires in dry habitat. Compliance with appropriate safety guidelines and regulations, and the Fort's Laser Standard Operating Procedure would minimize these risks. The construction of the new runway will encroach on an Agave Management Area (AMA). These impacts will be mitigated with the addition of 9 acres of agave habitat to the AMA. Some short-term minor impacts to biological resources may occur during construction activities; however, they would be minimal and would only last the duration of the construction.

	Ar	Level of nticipate Impact	f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
Cultural Resources			X No direct or indirect significant impacts and Measures to Measures to Measures to Measures to Measures to Measures to indirect or indirect significant impacts to cultural reso anticipated as a result of the implementation of Altern proposed laser and testing activities would be coordin Resources Manager to avoid areas with known signifi resources. The area for construction of the new runwa facilities were surveyed for cultural resources. It was new runway and associated facilities would not have a on significant cultural resources. If new utilities need to road change then those ground disturbing activities we evaluated. In the event that an unknown archaeologic discovered during testing, training, or construction activities would cease and the appropriate Fort personnel would	No direct or indirect significant impacts to cultural resources are anticipated as a result of the implementation of Alternative One. All proposed laser and testing activities would be coordinated with the Cultural Resources Manager to avoid areas with known significant cultural resources. The area for construction of the new runway and associated facilities were surveyed for cultural resources. It was determined that the new runway and associated facilities would not have any adverse impact on significant cultural resources. If new utilities need to be run or access road change then those ground disturbing activities would have to be evaluated. In the event that an unknown archaeological resource is discovered during testing, training, or construction activities, all activities would cease and the appropriate Fort personnel would be notified.
Air Quality		х		No significant direct or indirect impacts to air quality are anticipated under Alternative One. Indirect impacts from gas-powered vehicles and equipment used to transport laser platforms during testing activities would not be expected to significantly increase overall air emissions. Construction vehicles and equipment associated with the demolition of Pioneer Runway and construction of the new runway and associated facilities would have minor, short-term impacts to overall air emission, primarily from vehicle exhaust and dust generation during construction.
Noise		x		There would be no significant direct or indirect impacts to the noise environment under Alternative One. The lasers proposed for use would not directly produce any significant audible sound. Indirect impacts associated with the UAS the lasers are mounted on, may result during testing and training activities. However, all proposed UAS platforms are already in use by the Fort. Noise impacts associated with construction activities would be minor and short-term. The number of flights per day will remain relatively the same after construction of the new runway.
Visual Resources		x		No significant impacts to visual resources would result from the implementation of Alternative One. All of the UAS laser platforms discussed within this PEA are already in use by the Fort. Testing and training activities using visible laser beams would occur and may be visible on-and off-post. However, given the temporary nature of these activities, no permanent impacts to the overall aesthetics of the area would result. There would be no significant impact resulting from the new runway and associated facilities since this area is remote and already being used for aircraft activities.

	Level of Anticipated Impact		f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
Socioeconomics		х		There would be no significant direct or indirect impacts to local or regional population or economy. Minor short-term beneficial impacts to local sales economy may result during construction-related activities or during testing and training activities. However, none of the activities associated with the Proposed Action would result in an increase in population or result in any adverse impacts to minority or low-income areas.
Transportation and Circulation		Х		No significant direct or indirect impacts to transportation or circulation would result from the implementation of Alternative One. Minor, short-term impacts to local roadways on the Fort may occur during laser testing and training activities due to road closures on the training ranges. However, no significant increases in traffic volume are anticipated. All testing and training activities must be coordinated and scheduled through appropriate channels, therefore no significant impacts to airspace or range access are anticipated. Construction activities at the Black Tower Complex may increase traffic volumes on the Fort during construction; however these impacts would be less than significant and short-term.
Utilities		x		There would be no significant direct or indirect impacts to utilities. None of the proposed laser testing or training activities would require access to utilities. It is anticipated the new UAS facilities will use existing utilities. If it is later determined that utilities need to be upgraded then those impacts would need to be assessed.
Hazardous and Toxic Substances		х		No significant direct or indirect impacts resulting from the use of hazardous and toxic substances are anticipated. All use, storage, transport, and disposal of hazardous substances and hazardous waste must comply with applicable laws and regulations. Lasers proposed for use at the Fort would contain little to no hazardous substances. Any hazardous waste generated during construction activities would be disposed of off-post by the contractor, in compliance with applicable laws and regulations.
Health and Human Safety		х		No significant impacts to health and human safety would result from the implementation of Alternative One. Proper use, storage, and disposal of the lasers, along with the use of appropriate personal protective equipment, and compliance with applicable operating procedures and instructions would greatly reduce the risk of any human health or safety impacts. Impacts associated with construction activities would be minor, and temporary in nature.

	Level of Anticipated Impact		f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
Electromagnetic Spectrum			х	There would be no impacts to the electromagnetic spectrum under Alternative One. The lasers proposed for use at the Fort would range from infrared to ultraviolet, including visible radiation. These types of radiation are not known to interfere with the other types of radiation used on the Fort, specifically radio and other communications methods.

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LIST OF ACRONYMS

μm	Micrometer
2-13 th	2nd Battalion, 13th Aviation Regiment
ADEQ	Arizona Department of Environmental Quality
ADNL	A-Weighted Day Night Level
ADWR	Arizona Department of Water Resources
AEI	Air Emissions Inventory
AEL	Accessible Emission Limit
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AMA	Agave Management Area
AMSL	above mean sea level
ANSI	American National Standards Institute
AR	Army Regulation
ARPA	Archaeological Resources Protection Act
ASMO	Army Spectrum Management Office
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CAA	Clean Air Act
CDNL	C-weighted Day Night Level
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH ₄	Methane

CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CRM	Composite Risk Management
CWA	Clean Water Act
DA	Department of the Army
dB	Decibel
dBA	A-weighted Decibel
DNL	Day Night Level
DoD	Department of Defense
DPW	Directorate of Public Works
DPTMS	Directorate of Plans, Training, Mobilization, and Security
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EIS	Environmental Impact Statement
EM	Electromagnetic
ENRD	Environmental and Natural Resources Division
EO	Executive Order
EPA	Environmental Protection Agency
EPG	Electronic Proving Ground
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FD	Fire Department
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency

FIC	Facility Incident Commander		
FNSI	Finding of No Significant Impact		
ft	feet		
FTE	Full-time Equivalent		
FY	Fiscal Year		
GCS	Ground Control Stations		
GDT	Ground Data Terminals		
GHG	Greenhouse Gas		
GHz	Gigahertz		
GIS	Geographic Information Systems		
HAP	Hazardous Air Pollutant		
HAZMAT	Hazardous Material		
HMMP	Hazardous Material Management Program		
ICRMP	Integrated Cultural Resources Management Plan		
IMCOM	Installation Management Command		
INRMP	Integrated Natural Resources Management Plan		
IRP	Installation Restoration Program		
ISCP	Installation Spill Contingency Plan		
IWFMP	Integrated Wildland Fire Management Plan		
JLUS	Joint Land Use Study		
kW	kilowatt		
LA	Limiting Aperture		
LAAF	Libby Army Airfield		
LAMS	Large Area Maintenance Shelter		

LASER	Light Amplification by Stimulated Emission of Radiation	
LF	Linear Feet	
LLNB	Lesser Long-Nosed Bat	
LUPZ	Land Use Planning Zone	
MER	Military Electromagnetic Range	
mm	millimeter	
MPE	Maximum Permissible Exposure Limit	
MRR	Mandatory Reporting Rule	
MSO	Mexican Spotted Owl	
MT	Metric Ton	
MW	Megawatt	
N ₂ O	Nitrous Oxides	
NAGPRA	Native American Graves Protection and Repatriation Act	
NAAQS	National Ambient Air Quality Standards	
NEPA	National Environmental Policy Act	
NFA	No Further Action	
NHL	National Historic Landmark	
NHPA	National Historic Preservation Act	
nm	nanometer	
NOA	Notice of Availability	
NOI	Notice of Intent	
NOx	Nitrogen Oxides	
NRCS	Natural Resource Conservation Service	
NRHP	National Register of Historic Places	
NTIA	National Telecommunications and Information Administration	

ODS	Ozone Depleting Substance	
PAC	Protected Activity Center	
Pb	Lead	
PEA	Programmatic Environmental Assessment	
РМ	Particulate Matter, fine	
POL	Petroleum, Oil and Lubricant	
PPE	Personal Protective Equipment	
PSD	Prevention of Significant Deterioration	
PV	Photovoltaic	
QI	Qualified Individual	
REC	Record of Environmental Consideration	
RF	Radio Frequency	
RFMSS	Range Facility Management Support System	
RI	Remedial Investigation	
ROI	Region of Influence	
RPMP	Real Property Master Plan	
sf	square foot	
SGDT	Satellite Ground Data Terminal	
SHPO	State Historic Preservation Office	
SI	Site Inspection	
SO ₂	Sulfur Dioxide	
SOP	Standard Operating Procedure	
SPRNCA	San Pedro Riparian National Conservation Area	
SVRHC	Sierra Vista Regional Health Center	
SWPPP	Storm Water Pollution Prevention Plan	

TPH	Total Petroleum Hydrocarbons	
tpy	tons per year	
TNC	The Nature Conservancy	
TRADOC	U.S. Army Training and Doctrine Command	
U.S.	United States	
UAS	Unmanned Aircraft Systems	
UASTB	Unmanned Aerial Systems Training Battalion	
USAF	U.S. Air Force	
USAGFH	U.S. Army Garrison Fort Huachuca	
USC	U.S. Code	
USFS	U.S. Forest Service	
USFWS	U.S. Fish and Wildlife Service	
USGS	United States Geological Survey	
USPB	Upper San Pedro River Basin	
UST	Underground Storage Tank	
VOC	Volatile Organic Compound	
WWTP	Wastewater Treatment Plant	

1.0 PURPOSE AND NEED

1.1 Introduction

Fort Huachuca is a U.S. Army Training and Doctrine Command (TRADOC) installation and is home to the U.S. Army Intelligence Center of Excellence. Fort Huachuca encompasses 73,142 acres located in the City of Sierra Vista, Cochise County, Arizona. The Installation is approximately 75 miles southeast of Tucson and 63 miles northeast of Nogales, Arizona. The southernmost boundary of the Installation is approximately 8 miles from the international border with Mexico. Fort Huachuca is divided into an East Reservation (28,544 acres) and West Reservation (44,598 acres) by State Highway 90 (Figure 1-1). The East Reservation includes the East Range, which consists almost entirely of open/operational areas. The West Reservation includes the West Range, South Range, Cantonment, and Libby Army Airfield (LAAF). The Black Tower complex is located on the West Range.

The 2nd Battalion - 13th Aviation Regiment (2-13th) is a U.S. Army unit based at Fort Huachuca whose primary mission is to train Soldiers in the operation and maintenance of Unmanned Aircraft Systems (UAS). The UAS mission is to be in front of the ground Soldier, looking and allowing them to engage targets that they could not see and attack targets they could not attack before. This battalion operates the largest UAS training center in the world with over 125,000 square feet of training space, four hangars, and three runways. UAS training is conducted at Fort Huachuca exclusively for all Army and U.S. Marine Corps UAS personnel, as well as select Allied Forces. The 2-13th conducts training for MQ-1C Gray Eagle and the RQ-7B Shadow UAS operators and repairers. Flight operations are conducted out of Fort Huachuca's LAAF and the Black Tower Complex.

This Programmatic Environmental Assessment (PEA) was prepared to analyze the potential for significant environmental impacts associated with the demolition of the current Pioneer Runway and associated temporary facilities and construction of a new Gray Eagle UAS Runway and associated permanent facilities at Black Tower. This PEA also includes the use of lasers on the West Range during testing and training activities at Fort Huachuca, Arizona. The PEA provides a programmatic evaluation of potential impacts that is broad enough in scope to assist in the evaluation of future unknown actions that are comparable to those projects and activities that are currently identified and evaluated herein.





1.2 Purpose and Need for Action

The purpose of the Proposed Action is to construct a new UAS runway for the Gray Eagle UAS at the Black Tower complex. The new runway would be better aligned with prevailing winds and not conflict with restricted airspace in use by LAAF. The current runway and associated temporary facilities are not adequate to support the UAS training mission on Fort Huachuca, nor the anticipated increase in TRADOC student throughput in the upcoming years. Fiscal year (FY) 2016 training throughput experienced a 300 percent increase from FY 2015. Combat units are integrating UAS components in theater in support of Overseas Contingency Operations, thus requiring more classroom and hands-on training to support this increase in UAS usage and the required number of trained personnel.

Currently UAS training is being conducted at LAAF and at Pioneer and Rugge-Hamilton runways at the Black Tower complex. The use of LAAF is shared with the local community which limits Army usage, while the airstrips at the Black Tower complex are utilized for training various UASs. Attaining flight time through Class D airspace is the limiting training factor for the current mission. Joint use of LAAF is not expected to decrease in the foreseeable future.

Procedurally, the Gray Eagle UAS are scheduled through three shifts with the day shift operating three UASs; one for cadre currency requirements, one for taxi exercise, and one for engine laboratory work. No other flight takeoffs or landings are part of the day shift since LAAF is congested with other aircraft and operations would violate safety requirements. The swing shift and night shift provides the opportunity for students to use the UASs for automated takeoff and landing system training and down range training. The use of the UASs 24 hours a day has taken a significant toll on the equipment and training of cadre. The installation is finding it increasingly difficult to sustain the number of cadre necessary for a three shift training operation, especially the night shift. Additionally, the use of UAS with a training schedule of 24 hours a day has worn out the aircraft.

All current facilities dedicated to Gray Eagle UAS training are being overtaxed. One temporary modular structure, including modular classrooms and simulator training rooms, and a hangar on the LAAF runway are being utilized to meet current Gray Eagle UAS training needs. The temporary structure is not accessible by handicapped personnel. This affects the Army's ability to select highly trained instructors from the civilian sector if their disabilities will preclude access to these types of facilities.

Temporary facilities currently in use need to be replaced. The useful life of a 7,500 SF Large Area Maintenance Shelter (LAMS) is only five years and ones in use were added in 2005. The LAMS do not provide adequate facilities in which to conduct proper aircraft training. The LAMS also experience leakage during windy/rainy days, are extremely noisy, not handicap accessible, and susceptible to wildlife infestation. Limited heating is another concern during the winter months. There is little to no mechanical ventilation or air conditioning which is not conducive to

operating the highly sophisticated computers for training during the hot summer months, nor the learning environment of the operators being trained to fly the UASs.

This action also includes allowing the 2-13th to use lasers on the West Range of Fort Huachuca. Laser testing and training has been conducted on the installation on the East and South Ranges. The environmental impacts associated with previous testing activities were analyzed in the *Programmatic Environmental Assessment for the United States Army Electronic Proving Ground and the 2-13th Aviation Regiment – Testing and Use of Lasers* finalized is February 2013 (USAGFH 2013). The activities associated with the Proposed Action are to expand the use of laser testing on the installation to the West Range and use Class 1-4 lasers adjacent to roads and other disturbed areas.

The use of lasers by the 2-13th is necessary to support their military missions and allows the Army to stay technologically competitive in the development and use of lasers within the military community. As laser technology advances and the use of lasers by the military increases, the need for adequate laser testing facilities is important to sustaining military missions. Additionally, once laser systems are tested and approved for use by the Army, Soldiers must be properly trained on these lasers for use in theater and during sustainment operations. Fort Huachuca is the Army's premier UAS training facility and is the only location in the continental U.S. where Soldiers receive initial qualifying and training on the Gray Eagle and Shadow UAS. The Gray Eagle UAS is the main laser platform used at the Fort by the 2-13th.

1.3 Regulatory Framework

Congress enacted the National Environmental Policy Act (NEPA) in 1969 with accompanying regulations requiring federal agencies to consider potential impacts before taking actions that may impact the environment. The NEPA process is not intended to fulfill the specific requirements of other environmental statutes and regulations. However, the process is designed to provide the decision maker with an overview of the major environmental resources that may be affected, the interrelationship of these resources, and potential impacts to the natural and human environment. The NEPA process:

- Integrates other environmental processes;
- Summarizes technical information;
- Documents analyses and decisions;
- Interprets technical information for the decision-maker and public;
- Helps to identify potential alternatives to the Proposed Action; and
- Assists the decision-maker in selecting a preferred action.

The NEPA is intended to be incorporated in the early stages of the decision making process to ensure that planning and decisions reflect environmental values, to avoid delays later in the

process, and to head off potential conflicts. In addition, NEPA compliance provides for ongoing evaluation of environmental effects for actions that will continue over time. Since Army training and testing requirements continuously evolve to meet changes in Army mission, many of the proposed actions identified in this PEA are conceptual or programmatic in nature.

The NEPA anticipated the need for evaluation of these broad actions by including provisions for the development of programmatic documents. Whenever a broad Environmental Assessment (EA) or Environmental Impact Statement (EIS) has been prepared, and a subsequent environmental document is prepared on an action included within the entire program (such as a site specific action), then, the subsequent environmental document need only summarize the issues that are specific to the subsequent action. In these cases, it is only necessary to incorporate by reference any pertinent issues that have already been covered by an approved initial document. This PEA meets the intent of the NEPA by providing:

- A programmatic document that will be used by the Installation to incorporate environmental concerns in day to day operations that include the use of lasers and future testing and training requirements that include lasers; and
- A statement of existing conditions and typical impacts that can be used to support subsequent documents under provisions of the NEPA.

In addition to the NEPA, this PEA has been prepared in compliance with two Department of the Army (DA) regulations that provide guidance for environmental analyses:

- 32 Code of Federal Regulations (CFR) Part 651, Environmental Analysis of Army Actions dated 29 March 2002, is designed to provide policy, responsibilities, and procedures for integrating environmental considerations into Army planning and decision making. It establishes criteria for determining which of five review categories a particular action falls into, and thus, what type of environmental document should be prepared. If the Proposed Action is not covered adequately in any existing EA, PEA or EIS and cannot be categorically excluded from NEPA analysis, then a separate NEPA analysis must be completed prior to the commitment of resources (personnel, funding, or equipment) to the Proposed Action; and
- Army Regulation (AR) 200-1, Environmental Protection and Enhancement dated December 2007, describes DA responsibilities, policies, and procedures to preserve, protect, and restore the quality of the environment. The regulation incorporates a wide range of applicable statutory and regulatory requirements.

1.4 Use of this Programmatic Environmental Assessment

This PEA has been prepared as a programmatic environmental review. This approach has been taken to minimize the repetitive analysis of proposed laser training and testing activities, as well as the phased demolition of the Pioneer runway and temporary facilities and construction of the new runway and facilities at Black Tower.

This PEA analyzes and documents the potential for human health and environmental impacts associated with the construction of the new runway at Black Tower and the proposed testing and use of lasers on West Range of Fort Huachuca (Alternative One), relative to the No Action Alternative. The Environmental and Natural Resources Division (ENRD) at Fort Huachuca will use this PEA to determine whether a Finding of No Significant Impact (FNSI) is appropriate or if a Notice of Intent (NOI) to prepare an EIS should be issued.

Training mission requirements and testing capabilities at Fort Huachuca are subject to continuous evaluation and change as new technologies, equipment, and teaching methods are implemented in support of the Installation's mission to train military personnel. Recognizing the changing nature of training mission requirements and testing capabilities, this document provides a process that can be used to guide future management decisions and determine the level of additional environmental documentation that is required for those future actions.

This PEA should be used by Fort Huachuca ENRD personnel to evaluate any future change in Black Tower UAS facilities, laser testing and training requirements, or if there is a need for a new EA, EIS or Record of Environmental Consideration (REC). If Army agencies/organizations, other than the 2-13th at Fort Huachuca need to conduct laser testing or training that is the same as the activities identified within this PEA, only limited additional documentation would be necessary, most likely in the form of a REC. If it is determined that there is a need for additional environmental documentation, this PEA will serve as a primary source document that can be used to reduce the level of effort required to prepare future documents.

1.5 Public Participation Opportunities

In keeping with established Army policy to provide a transparent and open decision-making process, Fort Huachuca will make this PEA and draft decision document available to applicable federal and local agencies and the general public for review and comment. A Notice of Availability (NOA) will be published in the *Sierra Vista Herald* newspaper and a copy of the PEA will be made available to the general public at the following library:

Sierra Vista Public Library 2600 E. Tacoma Street Sierra Vista, Arizona 85635

Comments must be postmarked within 30 days of the publishing date of the NOA to be considered during the NEPA process. Comments should be submitted to:

NEPA Coordinator 3040 Butler Road, Building 22526 Fort Huachuca, Arizona 85613 Email: usarmy.huachuca.id-training.mbx.environmental-and-natural-resour@mail.mil Fax: (520) 533-3043 A final decision document in the form of a FNSI or a NOI to complete an EIS will be issued upon completion of the 30-day review period.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Two alternatives are considered in this PEA: Alternative One (Proposed Action) and the No Action Alternative.

2.1 Alternative One (Proposed Action)

Alternative One is presented as the Proposed Action, meaning that it is the preferred course of action by the 2-13th. Alternative One includes demolition of Pioneer Runway and ten associated facilities, construction of a new Gray Eagle UAS runway and associated facilities, and laser technology testing and training activities on the West Range in Training Areas J, I, and M (Figure 2-1).

Implementation of the Proposed Action would assist the 2-13th in meeting their training and testing requirement necessary to support their military mission, including handling the increase in student training on UASs and the associated testing and training on laser systems. The Proposed Action includes the use of several classes of lasers across Training Areas J, I, and M which provides the 2-13th increased options for conducting laser testing and training operations. A brief description of each of these proposed action components are presented below.

2.1.1 Demolition of Pioneer Runway and Construction of Gray Eagle UAS Runway and Associated Facilities

A new aircraft hangar and associated 4,500 FT runway, taxiway, and parking apron would be constructed to support increased UAS operator training activities to include instructional and flight simulator spaces (Figure 2-2). Additional features will include an apron with paved covered parking stalls mounted with photovoltaic (PV) panels overhead, and a taxiway complete with a hangar to accommodate UAS operator training specifically for the Gray Eagle UAS. The hangar will also be outfitted with a tool room, break rooms with vending areas, bathrooms with lockers and showers, and outside storage. The administrative function will include instructional space (classrooms, offices, and supply room) and flight simulator space.

Supporting facilities would include all utilities, a weather station, sewer holding tank, fuel point complete with spill containment, fire pump house and water storage tanks, hazmat/petroleum, oil, lubricant (POL) storage, hardstand and "bird box" storage, a fire waste pond, concrete pads for Ground Control Stations (GCSs), aggregate surfaced drive and pads for Ground Data Terminals (GDTs) and a Satellite Ground Data Terminal (SGDT), lightning protection, roadways, sidewalks, curbs and gutters, and storm drainage. Site improvements would include ramadas, xeriscaping, chain link fencing and gates, anti-terrorism measures, and building information systems. Heating and cooling will be provided by self-contained systems for the administrative spaces, with mechanical ventilation



Black Tower Complex Z Laser Testing Area

Property Boundary Training Areas



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in the maintenance bays. The existing Pioneer Runway will be demolished and West Hemp Road will be excavated and rerouted. Fill for the new runway, taxi, and apron will come from the demolition of Pioneer Runway and rerouting of West Hemp Road. If additional fill is needed it could be brought in from LAAF. Facilities that will be demolished along with Pioneer runway include those listed in the table below for a total of 52,935 SF.

Building Number	Current Use	Construction Date	SF
11640R	General Instruction	2017	2496
11642A	Aircraft System Instruction	2005	2300
11643A	Aircraft System Instruction	2005	2300
11647A	Aircraft Maintenance Instruction	2005	7500
11666C	Storage	1975	195
11669	Gen Inst	1972	3256
11670	Organizational Storage	1972	225
11677	Butler Building / Aircraft Maintenance Instruction	Unknown	3756
11678	Butler Building / Aircraft Maintenance Instruction	Unknown	3756
11684A	Aircraft System Instruction	2006	7500
11684R	Aircraft System Instruction	2018	2496
11691R	Administration	2018	2584
12605	Aircraft Maintenance	1990	4575
12605R	Aircraft Flight Operations	2018	2496
12608A	Aircraft Maintenance Instruction	2006	7500

Table 2-1. List of Facilities to be Demolished

2.1.2 Laser Technology

The term "laser" is an acronym for Light Amplification by Stimulated Emission of Radiation. Laser devices work by amplifying light and radiating single-color light beams through the stimulation of atoms. Unlike ordinary visible light, the photons of light generated by lasers are coherent and the photons are all on the same wavelength (monochromatic), creating a single beam of light. Lasers surround us in everyday life. They can be found in computer CD-readers, DVD players, and video gaming consoles. Lasers are also commonly used in the medical field to perform surgeries and in industrial settings during the manufacture of everything from computer chips to automobiles.

Lasers can be generated using many different methods, using various lasing mediums, and resulting in laser beams with a variety of different intensities, colors, and applications. Depending on their wavelength, lasers may be visible or invisible (ultraviolet or infrared). The

only type of laser proposed for use on Fort Huachuca is the solid state laser. Solid state lasers are lasers that use a solid gain medium or host material, rather than a liquid or gas.

All types of lasers, including solid state lasers, are categorized into classes: 1, 1M, 2, 2M, 3R, 3B, and 4. The class of a laser is determined by its potential for causing biological damage and is based on calculations of the energy of the laser beam, the wavelength of the emitted radiation, and the exposure time. These calculations are used to determine a factor defined as the Accessible Emission Limit (AEL), which is the mathematical product of the Maximum Permissible Exposure limit (MPE) provided in the American National Standards Institute (ANSI) Standard (Z136.1-2014), and an area factor computed from the defined term called the Limiting Aperture (LA). The ANSI Z136.1 Standard (LIA 2014) is the industry standard specific to laser use. The ANSI Standard classifies lasers based on the following AEL thresholds:

- **Class 1:** Considered to be incapable of producing damaging radiation levels during operation, and exempt from any control measures or other forms of surveillance.
- **Class 1M:** Considered to be incapable of producing hazardous exposure conditions during normal operation unless the beam is viewed with an optical instrument such as an eye-loupe (diverging beam) or a telescope (collimated beam), and exempt from any control measures other than to prevent potentially hazardous optically aided viewing; and is exempt from other forms of surveillance.
- **Class 2:** Emits in the visible portion of the spectrum (0.4 to 0.7 μm), and eye protection is normally afforded by the aversion response.
- **Class 2M:** Emits in the visible portion of the spectrum (0.4 to 0.7 µm), and eye protection is normally afforded by the aversion response for unaided viewing. However, are potentially hazardous if viewed with certain optical aids (e.g. binoculars and telescopes).
- **Class 3R:** Are potentially hazardous under some direct and specular reflection (reflection off of smooth surface such as a mirror or calm water) viewing condition if the eye is appropriately focused and stable, but the probability of an actual injury is small. This laser will not pose either a fire hazard or diffuse-reflection (reflection off of a rough surface such as clothing or a roadway) hazard.
- **Class 3B:** May be hazardous under direct and specular reflection viewing conditions, but is normally not a diffuse reflection, fire hazard, or laser generated air contaminant production hazard.
- **Class 4:** Is a hazard to the eye or skin from the direct beam, and may pose a diffuse reflection or fire hazard. It may also produce a laser generated air contaminant and hazardous plasma radiation. They require the highest level of personal protective equipment (PPE).

For purposes of this PEA, Class 1 and Class 1M lasers will collectively be referred to as Class 1 lasers. Also, Class 2 and Class 2M will collectively be referred to as Class 2.

Laser testing and training would be conducted via air to ground operations from Gray Eagle and Shadow UASs within Training Areas J, I, and M along existing roadways and disturbed areas. All targets will be driven in to their location. No air drops of targets will occur. Areas with water, power lines, and dense vegetation will be avoided. Naturally occurring berms and slopes will be used as back drops for laser targets to reduce the potential for lasers to reflect onto unintending areas. Laser operations may be conducted during the day or night, depending on the type of laser being used. There will be no laser testing or training activities that include lasing from the ground to an aerial target. The following is a representative list of the lasers/laser systems proposed for use at the Fort:

- Laser designators, which are near infrared, invisible lasers used to guide "smart munitions" to their targets. These lasers are typically Class 4.
- Invisible tactical laser pointers or illuminators may be used to point out a target or other item of interest. They are invisible to the human eye, but visible when using night vision goggles. These lasers are typically Class 3B but can also be Class 3R or 4.
- Visible tactical lasers may be used to point out a target or other item of interest. They may be mounted on weapons and used as aiming devices. They are typically Class 3B but may also be Class 3R or Class 4.
- Laser range finders, which are almost always invisible lasers, are typically Class 1 lasers. Older laser range finders may be Class 3R or 3B.
- Communications lasers are almost always invisible Class 1 lasers but may be Class 3R. These lasers are point to point and are each other's target.
- UAS-mounted laser systems such as the MQ-1C Gray Eagle system, Raytheon Common Sensor Payload and the RQ-7B Shadow Stark Aerospace POP 300D. These systems are designed to be mounted to specific UAS including the MQ-1C Gray Eagle and RQ-7B Shadow. These laser systems are Class 4.

Due to the nature of testing activities, no specific target or operational sites can be identified at this time, and the Proposed Action is inclusive of laser technology testing in accordance with the training areas identified above, subject to subsequent site-specific human health and environmental safety review (see *Section 2.1.4*).

2.1.3 Laser Range Standard Operating Procedures

The 2-13th would use lasers in accordance with the procedures outlined in the Laser Range Standard Operating Procedures (SOP) (USAGFH 2012), which is included as Appendix A. The Laser Range SOP applies to all military, civilian, and contractor personnel operating on Fort Huachuca. As specified in the Laser Range SOP, all requests for laser range scheduling will be made at least 30-days in advance, and must be accompanied with a thorough Composite Risk Management (CRM) Worksheet (DA Form 7566), and an Operations Order or scenario depicting the scope of the operation and all safety procedures being utilized, as well as laser

class and fact sheets. All laser testing and training will be coordinated with the Range Control Office.

2.1.4 Site-Specific Environmental and Human Health and Safety Review

As described in Section 2.1.4, all requests for laser range use must be coordinated at least 30days in advance through the Range Control Office, in accordance with the Fort's Laser SOP. In addition to following the Laser SOP scheduling process, all testing and training activities not specifically addressed within this EA will receive a site-specific environmental and human health and safety review. When the Range Control Office receives a request for laser range use, the ENRD will be contacted and provided with the details of the proposed laser range use, including but not limited to, what organization made the request, the proposed dates and times of the laser activities, the location of the proposed laser activities, and what type and quantity of laser is being proposed for use. Based on this information, the ENRD will determine whether the requested range use requires additional environmental review. The ENRD should provide the Range Control Office with a timely response to avoid scheduling conflicts and delays of the proposed testing and training.

2.2 No Action Alternative

The No Action Alternative is required under the Council of Environmental Quality regulations implementing the NEPA, and serves as a baseline or benchmark to be used to compare with the Proposed Action and Alternatives. Under the No Action Alternative UAS training will continue to be conducted LAAF and the existing airstrips, Pioneer and Rugge-Hamilton, at the Black Tower complex. Temporary undersized modular structures will continue to be utilized for UAS training and maintenance. Operations and current facilities for the Gray Eagle UAS will continue to be overtaxed. Laser testing and training would continue to be limited to the East and South Ranges. If restricted to the existing facilities and level of training and testing, the 2-13th would not be able to meet their military missions.

2.3 Alternatives Considered but Eliminated from Further Analysis

Five alternatives were considered but eliminated from further analysis within this PEA.

The Army considered renovating current facilities for UAS maintenance and testing. A review of current structures located on Fort Huachuca was conducted in August 2016. The review indicated all landing and take-off facilities were being used for current mission requirements. There were no facilities suitable for renovation or expansion to meet TRADOC requirements.

Leasing of private, municipal, and public landing strips was also considered. The requirement was for leasing a 4,500 LF runway with accompanying building space in one location. Restricted air space to ground surface is extremely critical in training UAS. Air strips at Hereford, AZ and three abandoned airstrips located within 20 miles of Fort Huachuca were

assessed for suitability. Hangars or instructional building space were not available. Restricted air space was also not available at any of the sites outside of Fort Huachuca's airspace.

The Army also looked at using other Department of Defense (DoD) or federal agency facilities. Davis Monthan Air Force Base is located 80 miles north of Fort Huachuca in Tucson, Arizona. It is the closest DoD facility available. Davis Monthan Air Force Base does not have hangar space or the restricted air space necessary for the flight training mission required by the UAS. Due to the lack of air space and hangar space for accommodating the UAS aircraft this alternative was not considered further.

The Army reviewed converting the existing Hubbard dirt runway into a UAS runway and construct supporting facilities. This was determined to not be feasible since it conflicts with LAAF airspace.

During the design of the Preferred Alternative another alignment (referred to as 701) for the new runway was considered (Figure 2-3). The alternative was eliminated due to conflicts with LAAF airspace and additional environmental impacts on the Agave Management Area (AMA).
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Section 3 describes conditions of, and possible impacts to, environmental resources potentially affected by the Proposed Action and Alternatives. The description of existing conditions provides a baseline understanding of the resources from which any changes that may be brought about by the implementation of an alternative can be identified and evaluated.

Following the description of environmental resources potentially affected, the potential changes or impacts to the resources are then described as environmental consequences. As stated in Council on Environmental Quality (CEQ) Guidelines, 40 CFR 1508.14, the "human environment potentially affected" is interpreted comprehensively to include the natural and physical resources and the relationship of people with those resources. The term "environment" as used in this report encompasses all aspects of the physical, biological, social, and cultural surroundings. In compliance with guidelines contained in NEPA and CEQ regulations, the description of the affected environment focuses only on those aspects potentially subject to impacts.

Finally, cumulative impacts for each resource area are addressed. Cumulative impacts are defined in the CEQ regulations (40 CFR 1500-1508) as those impacts attributable to the Proposed Action combined with other past, present, or reasonably foreseeable future impacts regardless of the source. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. However, in order to be considered a cumulative impact, the effects must:

- Occur in a common locale or region;
- Not be localized (i.e., they would contribute to effects of other actions);
- Impact a particular resource in a similar manner; and
- Be long-term (short-term impacts would be temporary and would not typically contribute to significant cumulative impacts).

Analysis of cumulative impacts requires the evaluation of a broad range of information that may have a relationship to the Proposed Action and Alternatives. A good understanding of the politics, sociology, economics, and environment of the region are key to this analysis, as is an accurate evaluation of factors that contribute to cumulative impacts.

3.1 Land Use

3.1.1 Affected Environment

Fort Huachuca Military Installation is located in the City of Sierra Vista, in the southwestern portion of Cochise County, Arizona. The Installation is operated by the Installation Management Command (IMCOM) West and is home to many tenants, including the Electronic Proving Ground (EPG) and the 2-13th Aviation Regiment.

The Installation encompasses 73,142 acres, which is divided into the East Reservation (28,544 acres) and the West Reservation (44,598 acres) by State Highway 90. Land uses within these two reservations are generally classified as either open/operational or developed areas. The ranges are further divided into 32 training areas depicted with alpha numeric assignments as shown in Figure 3-1.

The West Range (Figure 3-1), which includes approximately 16,000 acres is used primarily for intelligence training and equipment testing. Activities include tactical training, UAS operations at the Black Tower complex, and electronics and communications testing. There are no live-fire ranges located on the West Range. Special use regulations apply for training conducted in portions of the West Range where protected agave management areas are located. Some areas of the West Range are restricted for special status species wildlife habitat management and outdoor recreational activities.

The West Range is divided into Training Areas Golf, Hotel, India, Juliet, Kilo, Lima, Mike, November, Romeo, and Sierra. Training activities that occur on the West Range include intelligence and communications training and testing activities; patrolling and tactics training; land navigation; setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises; helicopter landing; and recreational activities including hiking, horseback riding, picnicking, and hunting. The Black Tower Unmanned Aerial Systems Training Battalion (UASTB) Complex is located in Training Area Juliet.

To help ensure compatible land uses between on-post military activity and surrounding development, a Joint Land Use Study (JLUS) was developed through a collaborative effort between Fort Huachuca and other stakeholders. The study was finalized in June 2007. Compatible land use agreements between all stakeholders are accomplished using a cooperative program of affected jurisdictions in Cochise and Santa Cruz counties that have the authority to implement land use regulations, along with Fort Huachuca and other interested parties (JLUS 2007). The JLUS identified operations occurring at the Installation that extend beyond the boundaries of the Fort and into the surrounding communities, including the potential for an increased need to demonstrate and test new laser technologies.





3.1.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action is not anticipated to result in any significant direct or indirect impacts to land use on Fort Huachuca.

Laser Testing

Utilization of test sites located within training areas is scheduled through the Fort Huachuca Training Division of the Directorate of Plans, Training, Mobilization, and Security (DPTMS) using a Range Facility Management Support System (RFMSS). Through RFMSS, the Fort Huachuca Training Division can schedule and monitor range utilization to reduce military testing-related incompatibilities and conflicts amongst the military community. The RFMSS also allows the Training Division to restrict training areas from recreational or non-military activities during testing events. While the potential exists for the laser testing activities to impact training areas utilization by other military tenants and organizations, these impacts are minor and managed according to standing mission prioritization guidelines, with access to the training area controlled by RFMSS. Short-term restriction of training area access for recreational and other non-military uses (e.g. Army land managers or DoD research contractor activities) will occur during some laser testing activities. This short-term restriction may limit access to hiking trails, hunting areas, and other recreational amenities but would not result in a change to land use within Fort Huachuca training areas.

Under the Proposed Action, the use of lasers by the 2-13th would be incorporated into their existing training activities that already occur on the East and West Ranges. The RFMSS deconflicts training activities on training ranges and minimizes training-related land use conflicts. The addition of laser use to the UAS systems is not anticipated to result in any significant training-related land use impacts.

Gray Eagle UAS Runway and Associated Facilities

Although the demolition of Pioneer Runway and construction of the new runway and associated aircraft facilities at the Black Tower Complex will change the existing land use in the immediate area, no significant change in overall installation land use would occur. The Black Tower Complex already contains a UAS runway and associated training facilities. All of the UAS platforms proposed for laser activities are already in use by the Fort, utilizing existing airspace. Development of this new runway and facilities would result in increased training area, which is expected to reduce potential training-related conflicts by providing additional UAS training and maintenance space. UAS training would require slight modifications to flight patterns due to the new runway orientation. However, no new airspace would be created.

No Action Alternative

Under the No Action Alternative, the 2-13th would continue utilization of the existing runway at the Black Tower Complex for UAS training at current training levels. Limited laser testing would continue on the West Range as currently permitted. There have been no identified significant impacts to land use resulting from the past laser testing activity at Fort Huachuca and within the region (USAGFH 1992, USAIC & FH 1993, USAEPG 1997a, USAEPG 1997b).

No impacts to land use are anticipated under the No Action Alternative.

Cumulative Impacts

Continued regional coordination between Fort Huachuca and off-post stakeholders will encourage compatible land uses on and around the Installation.

None of the alternatives are anticipated to contribute to cumulative impacts on land use at the local, regional, or statewide level.

3.2 Topography, Geology, and Soils

3.2.1 Affected Environment

Topography

Fort Huachuca is located in the Mexican highland section of the Basin and Range Physiographic Province. The landscape consists of isolated mountain ranges and broad, relatively flat valleys or basins. The mountains are of fault-block origin and linear orientation and range from Precambrian to Cretaceous time periods. The Huachuca Mountains, which trend northwest to southeast, run through parts of Fort Huachuca while the remainder lie southwest of the Installation and the Whetstone Mountains are situated northwest of Fort Huachuca on the north side of the Babocomari River (USACE 2008). Elevations at Fort Huachuca range from approximately 3,925 feet above mean sea level (amsl) in the northeast corner of the East Reservation near the San Pedro River to about 8,625 feet amsl at the crest of Sheelite Canyon in the Huachuca Mountains. Within the Cantonment Area the elevation is approximately 5,050 feet amsl. Steep slopes in the Western Reservation transition to gradual slopes toward the San Pedro River east of the Installation (USACE 2008).

This part of Arizona experiences periodic heavy rains that create dry washes known locally as arroyos. The Cantonment Area also is relatively flat and has a slope of roughly two percent, but this area is surrounded by foothills to the west with slopes of 35 degrees and mountains beyond the foothills with slopes over 50 degrees. Deeply incised ephemeral stream beds flow out of the mountains and across the Cantonment Area toward the San Pedro River and Babocomari River (USACE 2008).

Geology

The unconsolidated and semi-consolidated sediments of the Upper San Pedro River Basin (USPB) consist of three layers. The lowest unit is a thick, cemented conglomerate (Pantano Formation) that is overlain by the lower basin fill unit, composed of weakly to strongly cemented layers of interbedded sandy clay, silty sand, and sandy gravel. This layer is approximately 235 feet thick in the Fort Huachuca well field. The upper basin fill unit in the vicinity of the Fort consists of very permeable, flat-lying layers of weakly compacted clay, gravel, sand, and silt of middle to late Pleistocene age that is approximately 650 feet thick. When combined, the upper and lower basin fill units form the USPB's principal groundwater reservoir. The floodplain alluvium overlying the upper basin fill in the San Pedro River Valley is composed of highly permeable unconsolidated gravel, sand, and silt. Although limited in extent, the alluvium seems to play an important role in sustaining the flow of the Upper San Pedro River (USAGFH 2004).

The Huachuca Mountains along the southwestern edge of the Installation are comprised primarily of granitoid and sedimentary rocks. Further to the west, the composition of the Huachuca Mountains consists of sedimentary rocks with volcanic units (ADWR 2005).

The Huachuca fault zone occurs just west of the San Pedro River between the International Border and Arizona State Highway 90. The most recent rupture associated with this fault occurred 100,000 to 200,000 years ago. The fault displaces lower and middle Pleistocene alluvial-fan deposits, but the upper Pleistocene and Holocene deposits are not faulted (Pearthree 1996).

Soils

Fort Huachuca has a diverse assortment of soil types. This diversity is directly related to differences in climate, parent material and topography at the Installation. The soils exhibit wide variations in depth, texture, and chemical properties. Roughly 30 percent of the soils are less than two feet in depth over bedrock.

The Soil Survey of Fort Huachuca (NRCS 1997) characterizes the types of soils that occur at the installation, locations of the soil types, and potential constraints. This characterization classifies soils into one of four groups (Hydrologic Soil Groups A, B, C, and D) based upon infiltration capacity and ability to transmit water through them. Group D soil types have very slow infiltration rates when saturated and have an extremely low water transmission rate due to high percentages of clays, claypan or clay layers near the surface, or impervious bedrock near the surface. Group C soil types have moderate to slow infiltration rates when thoroughly wetted and slow water transmission rates. Storm-related runoff and stream flow are likely to occur with both Group C and D soil types. Conversely, Group A and B soil types have a high to medium (respectively) infiltration capability and water transmission rates. Fort Huachuca is dominated by soils classified in Group D with some types occurring in the Group C category, particularly on

the South and West Ranges, while some of the East Range soils are classified as Group B and Group C (NRCS 2009).

Many soils in the hilly and mountainous areas, particularly on the South and West Ranges, are shallow with steep slopes; these soils tend to have a low available water capacity and are susceptible to erosion. The high sodium and gypsum contents of many soils on the East Range make these soils subject to gully erosion and piping; they also are very corrosive to concrete and steel. The soil of the Cantonment Area consists of alluvial fan soils. Almost one-quarter of the post land area has deep red clay soils that have slow permeability and tend to be poorly drained. They become very slippery when wet and are susceptible to compaction. Other properties of soils on the Installation influencing land use and management are gravelly or rocky soils, soils with hard pans and deep, droughty, sandy soils (USAGFH 2004).

The Fort actively takes measures to reduce the effects of erosion on the Installation. Some of the practices to promote grass establishment include mesquite mastication and extraction, upland revegetation, the placement of gabions and erosion control structures, prohibiting vehicle traffic on designated roads, limiting operations during periods of heavy rains and wet soils and the retirement of unnecessary roads and fire breaks. All construction disturbances in excess of one acre require a Storm Water Pollution Prevention Plan (SWPPP). Most plan components include silt fencing, water bars, limiting operations during periods of heavy rain and wet soil, and other best management practices. In addition, soils mapping, plant inventories and cooperative efforts with other federal land managers and the Natural Resource Conservation Service (NRCS) assist in monitoring and developing improved conditions across the Installation.

3.2.2 Environmental Consequences

Alternative One (Proposed Action)

No significant impacts to topography, geology, or soils are anticipated to occur as a result of implementing the Proposed Action.

Laser Testing

The Fort actively takes measures to reduce the effects of erosion on the Installation. These practices include the promotion of grass establishment through mesquite mastication and extrication, upland revegetation, the placement of gabions and erosion control structures, prohibiting vehicle traffic off of designated roads, limiting operations during periods of heavy rains and wet soils, and the retirement of unnecessary roads and fire breaks.

No impacts would result from the addition of laser use to training or testing activities. Laser targets would be hauled into the area by vehicles and equipment that are already being used by the Fort, and would not result in a significant increase in the amount of vehicles, equipment, or personnel utilizing dirt/gravel roadways or pathways. Therefore, no significant impacts to soils would be anticipated due to foot-traffic or vehicle and equipment traffic.

Gray Eagle UAS Runway and Associated Facilities

Implementing the Proposed Action would result in localized impacts to the topography within the Black Tower Complex due to the required cut and fill necessary for construction. Excavation and earth-moving have the potential to result in short-term impacts to soil resources. The potential for impact would be mitigated by USACE requirements that the project's general contractor acquire and operate within the confines of a NPDES permit and Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would address the treatment and management of stormwater within the parking areas, which may contain contaminants from vehicular fluids, to reduce the potential of these impurities reaching special-status species and habitat downgradient. Applicable construction and post-construction BMPs would be implemented to reduce the potential for site erosion or downstream sedimentation transport. Examples of Best Management Practices (BMPs) that could be implemented include:

- Maintaining a protective vegetative cover in all areas not needed for site development
- Using materials for stabilization of soils that include gravel, fabrics, mulch, riprap, and recycled concrete and pavement that is environmentally safe and compatible with the site
- Using climatic/seasonal-related changes in soil erosion as a factor in scheduling intensive site disturbance activities, for example avoiding construction activities during high rainfall months
- Identifying and rehabilitating land disturbed by construction
- Using biological erosion control technologies such as revegetation with native species for surface stabilization

Earthwork (cut and fill) will be required to construct the new runway where the terrain is variable and a large drainage channel exists. However, with the implementation of required BMPs that will be identified during the permitting process, to reduce erosion and stabilize disturbed, undeveloped soils upon the completion of construction, the impact would be minor.

No Action Alternative

The No Action Alternative would not result in any impacts to topography, geology, or soils.

Cumulative Impacts

Based on the Fort's continued efforts to reduce erosion and the isolated ground-disturbing activities at the Black Tower Complex associated with the Proposed Action, no significant cumulative impacts to post topography, geology, or soils are anticipated. Erosion control measures and use of BMPs during construction, testing and training activities would help ensure the stability of soils throughout the Installation.

3.3 Hydrology and Water Resources

3.3.1 Affected Environment

Floodplains

Floodplains within Fort Huachuca are not represented on Federal Emergency Management Agency (FEMA) maps. However, available data indicates that a network of floodplains surrounds the main developed area within the Cantonment, with as many as 80 buildings on the Installation within a floodplain (USACE 2008). Most of the floodplains are located in open space, training areas, or recreation areas. The Real Property Master Plan (RPMP) identifies the need for an updated study and delineation of floodplains so that appropriate avoidance and mitigation measures can be taken to prevent issues with land development within affected areas.

Groundwater

The Arizona Department of Water Resources (ADWR) has divided the USPB into subwatersheds to better define and manage available water resources. Fort Huachuca, Sierra Vista and most of the San Pedro Riparian National Conservation Area (SPRNCA) occur within the Sierra Vista subwatershed. The boundaries of the subwatershed are the International Border on the south, Mule Mountains on the east, Huachuca and Mustang mountains on the west and State Route 82 on the north (USAGFH 2004).

The regional and the floodplain aquifers provide groundwater within the USPB. The regional aquifer is located within the upper and lower basin fill and, to a lesser extent, the Pantano Formation. The floodplain aquifer is generally recharged by stormwater runoff and discharge from the regional aquifer. In some reaches of the San Pedro River, recharge occurs through the stream channel.

Groundwater is believed to move from the valley margins towards the San Pedro River. However, an exception to this may occur near Fort Huachuca and Sierra Vista well fields where water is believed to flow towards a cone of depression where drawdowns up to 75 feet deep have been reported (Zia 2016).

Groundwater within the USPB is potable. Wells within the basin are used to meet all the water needs of the communities within the basin, which is depleting groundwater supplies. Potable water quality and services are addressed in *Section 3.11*, *Utilities*.

The declines in groundwater have had an adverse impact on the San Pedro River and the associated riparian habitat. In an effort to reduce the impacts associated with regional groundwater withdrawal, Fort Huachuca has implemented a broad spectrum of water conservation, recharge and reuse measures (Zia 2016). Measures that the Fort has implemented to accomplish water efficiency and savings include fixture upgrades (e.g. replacement of high water use plumbing fixtures with low water use fixtures), facility

infrastructure removal/consolidation (e.g. demolition of facilities), aggressive leak detection and repair, water conservation education, xeriscaping including the use of artificial turf, replacing natural turf areas with gravel, and implementation of a strict landscaping watering policy in the military family housing area.

The Fort has entered into agreements and partnerships with other groups and agencies for the purpose of reducing water use in the USPB. Agricultural pumping has decreased as a result of the retirement of agriculture associated with creation of the SPRNCA and through the purchase of conservation easements by Fort Huachuca in partnership with The Nature Conservancy (TNC), Cochise County, and Arizona Land and Water Trust. In addition, Fort Huachuca is an active member of the Upper San Pedro Partnership, a consortium of 21 agencies that collaborates to meet water needs in the region while protecting the San Pedro River (USACE 2008).

Surface Water

Fort Huachuca is located within the Sierra Vista subwatershed of the USPB (U.S. Geological Survey [USGS] Cataloging Unit: 15050202). The headwaters of the San Pedro River are located in Mexico. The river flows north for approximately 100 miles before converging with the Gila River. The SPRNCA encompasses approximately 40 miles of the Upper San Pedro River (USACE 2008). To the north of Fort Huachuca is the Babocomari River which sustains a perennial flow in two reaches totaling 12 miles (USDI and USPP 2008). This river drains the Mustang Mountains, Canelo Hills, and the north end of the Huachuca Mountains and carries this water to its confluence with the San Pedro River.

A majority of the surface water features on Fort Huachuca are ephemeral streams that consist of dry washes, arroyos, or continuous and discontinuous gullies. Ephemeral streams are usually dry and only flow in response to precipitation that is significant enough to achieve runoff conditions. Ephemeral streams on Fort Huachuca are typically narrow channels with a sand and gravel layer at the bottom of the channel. Some of these channels are deeply entrenched. The channels serve to carry runoff to larger drainage systems (USAGFH 2009). The U.S. Congress enacted the Clean Water Act (CWA) in 1972 to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (33 U.S.C. 1251 et seq.). Section 404 of the Clean Water Act delegates jurisdictional authority over wetlands to the Corps of Engineers and the Environmental Protection Agency (EPA).

Fort Huachuca has approximately 4.5 miles of perennial streams, 3.5 miles that occur in Garden Canyon and another 0.75 miles in Huachuca Canyon. Minor lengths of perennial reaches also occur in McClure and Blacktail Canyons. The perennial streams are typically fed by one or more of the Installation's 39 springs (USACE 2008). In addition, there are 16 ponds covering approximately 32 acres on Fort Huachuca. Most of the ponds are dry and only retain water during heavy rains. No surface water is used to meet Fort Huachuca's water needs.

The alluvial fans south of the Babocomari River Valley within the West Range are dissected by three major drainages: Blacktail Canyon, Slaughterhouse Canyon and Huachuca Canyon. Within the East Range, the primary drainage is Soldier Creek. These drainages are intermittent and flow in response to rainfall. Huachuca Canyon Creek serves as a major stormwater interceptor for Huachuca Canyon and the Fort's Cantonment Area (USAGFH 2004).

3.3.2 Environmental Consequences

Alternative One (Proposed Action)

The implementation of the Proposed Action would not result in significant impacts to water resources.

Laser Testing

The incorporation of lasers into testing and training activities conducted by the 2-13th would not result in any impacts to surface waters, ground waters or floodplains. Targets will be placed adjacent to existing roadways. Areas with standing water will be avoided to their potential to reflect laser beams. The lasers do not require water to operate.

Gray Eagle UAS Runway and Associated Facilities

The development of the new runway will result in changes to on-site surface water drainage. The new runway requires traversing a large drainage channel by either a combination of culverts and fill or a bridge which will require compliance with Section 404 of the Clean Water Act (CWA) ensure that downstream flow is maintained. The Section 404 program is jointly administered by the USACE and the Environmental Protection Agency (EPA). The USACE is responsible for the day-to-day administration and permit review and EPA provides program oversight. The fundamental rationale of the program is that no discharge of dredged or fill material should be permitted if there is a practicable alternative that would be less damaging to aquatic resources or if significant degradation would occur to the nation's waters. Permit review and issuance follows a sequence process that encourages avoidance of impacts, followed by minimizing impacts, and finally, requiring mitigation for unavoidable impacts to the aquatic environment. This sequence is described in the guidelines of Section 404(b)(1) of the CWA. As part of the permitting process the final runway design will attempt to replicate current surface flow conditions to the extent feasible. In addition, all necessary and applicable CWA Section 401, 402 and 404 permits or certifications would be obtained prior to any disturbances occurring at the site.

Construction activities converting undeveloped areas to impervious surfaces can create a higher level of on-site runoff and off-site erosion. Construction activities would require the use of BMPs that would reduce these impacts. Activities would also follow the guidelines included in the 2007 memo *Mitigation of Site Runoff Associated with Construction Projects at Fort Huachuca*. Long-term impacts associated with the additional impervious surfaces would be minor. Potable water

will be ran to the new facilities. Potable water quality and services are addressed in *Section 3.11*, *Utilities*.

No Action Alternative

There would be no impacts to water resources under the No Action Alternative.

Cumulative Impacts

No long-term cumulative impacts to water resources are anticipated to occur as a result of any of the Alternatives. The potential exists for minor short-term and long-term impacts associated with the construction of the new runway and associated facilities. The new runway will impact the existing drainage channel but flow will be maintained as part of the design and permitting process, so it is unlikely that the impact would result in any cumulative impacts to local or regional water resources.

3.4 Biological Resources

3.4.1 Affected Environment

Vegetation

A total of 12 plant communities have been documented on Fort Huachuca that vary according to gradient, moisture regime, and elevation. These are shrubland, open grassland, mesquite-grass savanna, oak-grass savanna, pine woodlands, mesquite woodlands, oak woodlands, mixed woodlands, deciduous woodlands, mahogany woodlands, pinyon-juniper woodlands, and urban and built land (Zia 2016). The dominant plant communities at Fort Huachuca are mesquite-grass savanna (14,182 acres), shrub-grassland (12,295 acres), and oak woodland (11,509 acres).

Vegetation on the West Range is open grassland occurring on the lower portions of the range in the north and east, transitioning through oak-grass savanna to oak and mixed woodlands in the south and west.

Wildlife

A variety of fauna including mammals, reptiles, birds, fish, amphibians, and invertebrates are present at Fort Huachuca. Of the almost 500 species of birds found in southeast Arizona, approximately 313 species occur on Fort Huachuca (Taylor 1995, Ireland 1981).

Approximately 18 species of reptiles, 18 species of small terrestrial mammals, 5 species of large mammals, 18 species of bats, 6 species of amphibians, and more than 180 species of invertebrates have been documented on Fort Huachuca (Sam Houston State University 1996, Bailowitz and Upson 1997, USAGFH 2010a). Non-native fish are the only fish species that have been documented on Fort Huachuca since 1893 due to stocking and introductions for

recreational fishing. These fish include rainbow trout (*Oncorhynchus mykiss*), bullhead (*Ameiurus spp.*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and redear sunfish (*L. microlophis*) (Sam Houston State University 1996).

Special Status Species

The federal Endangered Species Act (ESA) protects federally listed animal and plant species and their critical habitats. The U.S. Fish and Wildlife Service (USFWS) maintains a listing of species that are considered threatened, endangered, proposed, or candidates under the ESA. An endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species likely to become an endangered species in the foreseeable future. Candidate species are those that the USFWS has enough information on file to propose listing as threatened or endangered, but listing has been precluded by other agency priorities. Although Fort Huachuca is not required by the ESA to consider candidate species, AR 200-1 requires the Army to consider candidate species in all actions that may affect them. The Bald and Golden Eagle Protection Act (BGEPA) provides federal protection to bald and golden eagles, including their parts, nests, or eggs.

A list of fourteen threatened, endangered, proposed, and candidate species was generated by the U.S. Fish and Wildlife Service (USFWS) Arizona Ecological Services (Table 3-1). These species have been described in depth in Section 3.0 the Programmatic Biological Assessment (Leidos 2013) and the Programmatic Biological Opinion (PBO) (USFWS 2014).

Common Name	Scientific Name	Status	
		Federal/State	
Jaguar	Panthera onca	Endangered	
Ocelot	Leopardus (=Felis) pardalis	Endangered	
Lesser Long-nosed Bat	Leptonycteris curasoae yerbabuenae	Endangered	
Mexican Spotted Owl	Strix occidentalis lucida	Threatened	
Northern Aplomado Falcon	Falco femoralis septentrionalis	Experimental Population, Non-Essential	
Northern Mexican Gartersnake	Thamnophis eques megalops	Threatened	
Yellow-billed Cuckoo	Coccyzus americanus	Threatened	
Chiricahua Leopard Frog	Rana chiricahuensis	Threatened	

Table 3-2: Threatened, Endangered, Proposed, and Candidate Species within the Project Area and Vicinity

Common Name	Scientific Name	Status	
		Federal/State	
Desert Pupfish	Cyprinodon macularius	Endangered	
Huachuca Water-umbel	Lilaeopsis schaffneriana var.	Endangered	
	recurve		
Wright's Marsh Thistle	Cirsium wrightii	Candidate	
Canelo Hills Ladies Tresses	Spiranthes delitescens	Endangered	
Gila topminnow	Poeciliopsis occidentalis	Endangered	
Gila Chub	Gila intermedia	Endangered	

Notes: All species were addressed in the *Biological and Conference Opinion on the Programmatic Biological Opinion for Ongoing and Future Military Operations and Activities at Fort Huachuca, Arizona* (PBO) (USFWS 2014), with the exception of the Northern Aplomado Falcon and the Wright's marsh thistle. The Northern Aplomado Falcon was addressed in the *Programmatic Biological Assessment for Ongoing and Future Military Operations and Activities at Fort Huachuca, Arizona* (PBA) (Leidos 2013).

<u>Jaguar</u>

The occurrence and natural history of the Jaguar (*Panthera onca*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). Since publication of the PBO, individual jaguars have been documented via trail cameras in the Dos Cabezas Mountains in November 2016, and in the Huachuca Mountains in December 2016 (USFWS 2016a). The jaguar in the Huachuca's has been documented both within and outside of the Fort's boundary. Jaguars have been documented using areas from rugged mountains at 1,577 meter (m) (5,174 ft) to flat lowland desert floor at 877 m (2,877 ft) in elevation (McCain and Childs 2008).

The USFWS designated critical habitat for the jaguar on 5 March 2014 (Federal Register [FR] 2014). Although portions of Fort Huachuca contain the primary constituent elements of critical habitat, the Fort was excluded from critical habitat designation under section 4(a)(3)(B) of the Endangered Species Act (ESA) because of protections afforded by the installation's Integrated Natural Resource Management Plan (INRMP) (USAGH 2010a). Designated Critical Habitat for the jaguar occurs outside of the Fort's northwestern boundary within or adjacent to the project area.

<u>Ocelot</u>

The occurrence and natural history of the ocelot (*Leopardus* (=*Felis*) *pardalis*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). An ocelot continues to be documented, via trail cameras, both within and outside of the Fort's boundary. Habitat used by the ocelot throughout its range vary from tropical rainforest, pine forest, gallery forest, riparian forest, semi-deciduous forest, and dry tropical forest, to savanna, shrublands, and marshlands. Two individual ocelots detected from 2011 to 2013 in the Huachuca Mountains south of the Fort

were located in Madrean evergreen woodland and Madrean lower montane pine-oak forest and woodland (USFWS 2016b). While little is known of ocelot in Arizona, the ocelot requires dense vegetation (greater than 75 percent canopy cover, canopy height >2.4 m [8.2 ft], and vertical cover 90.4% visual obscurity at 1-2 m [3-6 ft]) in Texas. Its prey consists primarily of rabbits, rodents, birds, and lizards (USFWS 2016b). To date, no Critical Habitat has been designated for the ocelot.

Lesser Long-nosed Bat

The occurrence and natural history of the lesser long-nosed bat (LLNB) was presented in both the PBA (Leidos 2013) and the PBO (USFWS 2014). The LLNB feeds primarily on the fruit, nectar, and pollen of night-blooming agave and columnar cacti. Two primary resources are required for LLNB: caves and mines for roost sites, and suitable foraging habitats consisting of succulents such as Palmer's agave (*Agave palmeri*). Typical habitat for the LLNB consists of Sonoran desert scrub vegetation community during early summer, and semi-desert grasslands and oak woodlands in late summer. Roost disturbance and reduction in the quality and quantity of forage habitat have contributed to population declines (USFWS 1995).

Overall, the population of the LLNB appears relatively large, however the availability of roost sites is small. Known roost sites on Fort Huachuca include Manila Mine (approximately 3.2 kilometer (km) [5.8 mile (mi)] west of Action Area) and Pyeatt Cave (approximately 10.4 km [6.5 mi] west of the Action Area). Additionally, the species has been mist-netted in Woodcutters Canyon (approximately 4.2 km [2.6 mi] south of the Action Area) on Fort Huachuca. The population of LLNB on Fort Huachuca has ranged from just a few individuals in 1989 to a high of 26,000 in 2010 to 17,358 bats in 2016 (Zia EEC 2017). No Critical Habitat has been designated for the LLNB.

Mexican Spotted Owl

The occurrence and natural history of the Mexican Spotted Owl (*Strix occidentalis lucida*) is discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). This species inhabits rocky canyons, or complex forested structures located in madrean pine-oak forests and mixed-conifer forests. Nesting and roosting habitats consist of mature or old growth forest stands with uneven aged ages and dense understory plant species. Mexican Spotted Owls will also nest and roost in rock canyon settings, where they use rock crevices and caves for nest sites. This species forages in a variety of habitats, including unlogged forests, pinyon-juniper woodlands, mixed-conifer and ponderosa pine, rocky canyons, and riparian areas. Detrimental forest management practices such as fire suppression and unsustainable timber harvest practices have negatively impacted Mexican Spotted Owl habitat. More recently, uncharacteristic and severe fire events have reduced habitat for this species. Additionally, habitat loss for the Mexican Spotted Owl has resulted from the persistence and intensification of drought conditions in the U.S. southwest and associated tree stress, which has worsened fire intensity and extent (USFWS 2012).

The USFWS designated critical habitat for the Mexican spotted owl in 2004, comprising approximately 3.5 million hectares (ha) (8.6 million ac) on Federal lands in Arizona, Colorado, New Mexico, and Utah (FR 2004). Critical habitat occurs adjacent to the Fort, on the Coronado National Forest, along the southern and western boundaries of Fort Huachuca and approximately 6.4 km (4.0 mi) from the project area. No critical habitat was listed on Fort Huachuca, because the Fort's INRMP was determined to provide a benefit to this species (FR 2004).

Northern Aplomado Falcon

The Northern Aplomado Falcon (*Falco femoralis septentrionalis*) is described as an 'upland species' not known to occur within Fort Huachuca. Though the species is not known to occur at Fort Huachuca, it has potential for future occurrence due the release of experimental populations (Bagne et al. 2013). The species may use edges of woodland habitats, such as those located in the Action Area. To date, no Critical Habitat has been designated for the Northern Aplomado Falcon.

Northern Mexican Gartersnake

The occurrence and natural history of the Northern Mexican gartersnake (*Thamnophis eques megalops*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). The Northern Mexican gartersnake (*Thamnophis eques megalops*) is a riparian obligate, and therefore requires mesic habitats such as wetlands, stock tanks, and forests adjacent to waterways where it forages for insects, native fish, and leopard frogs. The species' occurrence and natural history was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). Habitat for the northern Mexican gartersnake has been significantly reduced due to destruction and modification of riparian areas and associated waterways. Predation from non-native species, such as bullfrogs and crayfish, have also resulted in population decline (USFWS 2013).

Designated Critical Habitat for the Northern Mexican Gartersnake is approximately 8 km (5 mi) southwest of the project area. The area lacks necessary habitat components for this species.

Yellow-billed Cuckoo

The occurrence and natural history of the Yellow-billed Cuckoo (*Coccyzus americanus*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). The Yellow-billed Cuckoo is a neotropical migrant requiring low to moderate elevation deciduous riparian woodland systems. They are generally associated with cottonwood-willow vegetation communities, however the composition of plant communities may vary across its range.

Proposed Critical Habitat is located approximately 17.7 km (11 mi) east of the project area. The area lacks necessary habitat components for this species.

Chiricahua leopard frog

The occurrence and natural history of the Chiricahua leopard frog (*Rana chiricahuensis*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). Habitat for the Chiricahua leopard frog (*Rana chiricahuensis*) includes wetland communities associated with rivers, livestock tanks, pools, lakes, and other water bodies found at elevations between 1 to 2.7 km (3,280 to 8,890 ft). Historic records indicate the Chiricahua leopard frog was present throughout Arizona as well as southwestern New Mexico.

Critical Habitat for the Chiricahua leopard frog is located 8.3 km (5.2 mi) southeast and 9.6 km (6 mi) southwest of the project area.

Desert pupfish

The occurrence and natural history of the desert pupfish (*Cyprinodon macularius*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). This species occurs in sloughs, seeps, springs, and slow-moving streams and is noted for its tolerance to wide temperature fluctuations, low dissolved oxygen concentrations, and high salinity. Declines in desert pupfish populations are due to habitat loss and modification, pollution, and the introduction of exotic fishes.

Critical Habitat for the desert pupfish is located approximately 257 km (160 mi) west of the project Action Area. The desert pupfish is known to occur in Cochise County, however the Action Area lacks aquatic necessary habitat components (USFWS 1993).

Huachuca water-umbel

The occurrence and natural history of the Huachuca water-umbel (*Lilaeopsis schaffneriana var. recurve*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). The Huachuca water-umbel is an herbaceous semi-aquatic perennial in the parsley family and is found in permanently saturated soils along perennial watercourses.

Critical Habitat for the Huachuca water-umbel is located 6.4 km (4 mi) south of the Action Area in Garden Canyon within Fort Huachuca and along the San Pedro River is 19 km (12 mi) west of the project area.

Wright's marsh thistle

Wright's marsh thistle (*Cirsium wrightii*) was petitioned as a candidate species in 2008 and is shown to currently exist in Cochise County. Wright's marsh thistle is in the sunflower family and occurs in mesic sites with alkaline soils between 3,450 and 8,500 ft in elevation. Wright's marsh thistle is a biennial or perennial obligate wetland species that occurs in saturated alkaline soils associated with springs, seeps, streams, and ponds from about 3,450 to 8,500 ft elevation. It flowers from August through October.

Canelo Hill ladies' tresses

The occurrence and natural history of the Canelo Hills ladies' tresses (*Spiranthes delitescens*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). Canelo Hills ladies' tresses occur in marshy wetland or cienega habitats intermixed with tall grasses and sedges. This plant grows on slopes near water in finely grained, highly organic soils that are seasonally or perennially saturated but well drained.

Gila topminnow

The occurrence and natural history of the Gila topminnow (*Poeciliopsis occidentalis occidentalis*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). The Gila topminnow occupies a variety of habitats including springs, marshes, permanent streams, intermittent streams, margins of large rivers and cienegas at elevations below 4,921 ft.

Critical habitat has not been designated for this species, but in 1998 a recovery plan was developed (USFWS 1998).

<u>Gila chub</u>

The occurrence and natural history of the Gila chub (*Gila intermedia*) was discussed in both the PBA (Leidos 2013) and the PBO (USFWS 2014). Gila chub inhabit small headwater streams, cienegas, springs and marshes of the Gila River basin. The species is not known to occur within Fort Huachuca; however, it has been documented in the nearby Babocomari River.

Critical habitat has been designated and includes portions of the Agua Fria, Babocomari, Gila, San Francisco, San Pedro, Santa Cruz, and upper Verde rivers in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties, Arizona, and in Grant County, New Mexico (USFWS 2005). Designated critical habitat includes Turkey and O'Donnell Canyons, which are tributaries of the Babocomari River and Bass, Hot Springs, and Redfield Canyons, which are tributaries of the lower San Pedro River (USFWS 2005).

3.4.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action impacts to biological resources was analyzed in the *Biological Assessment for the Reorientation of Runway and Laser Testing and Training at the Black Tower Complex* (USAGFH 2017). Potential direct effects on federally-listed species and designated critical habitat include habitat loss, fire, noise, eye damage/blindness, skin damage\burns, direct mortality, and erosion. Indirect effects include potential effects from erosion resulting from fire. All effects, except potential eye and skin damage that may occur from Class 4 laser training and testing, have been described in detail in the PBA (Leidos 2013).

The 2017 BA focused on the effects of the proposed action which were not identified in the PBO.

The primary concern for wildlife species with laser testing and training is damage to eyes and skin by Class 3 and 4 lasers. Avian eyes are resistant from damage from the sun's ultraviolet rays and low-powered laser beams (Glahn, et al. 2000); however, research on laser impacts to mammalian vision is limited but is likely similar to humans. Similarly, burn risk to wildlife generally is likely to be similar to the risks to humans. Lasers used in the proposed action would not target wildlife. The targets, the target area, and the associated buffer area would be surveyed for unsafe conditions prior to conducting laser training activities based on the Fort's Laser Standard Operating Procedures (SOP) (2012a, Appendix A). If during testing or training activities, any unsafe condition is identified, all laser activity would cease immediately until the deficiency is corrected. If an individual enters the path of a laser beam during operations, or if the laser beam misfires or misses the target, operations would stop and recalibrate to avoid further risk to nearby wildlife. Additionally, if the Fort's Environmental and Natural Resource Division (ENRD) has concerns about a specific plant or animal species that may be affected in a designated testing or training area, Range Control will be alerted during the site-specific review process, and applicable safety and/or avoidance measures should be implemented.

Species listed in Table 3-2 were determined in the 2017 BA to have no effect on the listed species.

Species	Status	Suitable Habitat	No Effect Justification
Chiricahua leopard frog	Т	Currently inhabits springs, livestock tanks, and streams in the upper portions of watersheds, ranging between 3,281 and 8,890 ft elevation (Platz and Mecham1979; Sredl et al. 1997; USFWS 2008).	The project area contains little suitable habitat due to the limited amount of standing water on or near the project area. Reflective surfaces are avoided by laser training, therefore the action should have no effect on this species.
Desert pupfish	E	Occupy shallow waters of springs, small streams, and marshes, and often associated with areas of soft substrates and clear water (USFWS 1993).	The project area contains no suitable habitat for this species. project area is outside of known distribution ranges.

Table 3-3.	Federal	Species -	No	Effect	Determination
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Species	Status	Suitable Habitat	No Effect Justification
Gila chub	E	Known to occur in San Pedro River (Bass, O'Donnell and Redfield Canyons, Babocomari River and Turkey Creek). Prefer smaller headwater streams, cienegas and springs or marshes of the Gila River basin.	The project area contains no suitable habitat and is outside of the range this species.
Gila topminnow	E	Typically occupies headwater springs, and vegetated margins and backwater areas of intermittent and perennial streams and rivers, and prefers shallow, warm water in a moderate current with dense aquatic vegetation and algae mats within riparian areas of cottonwoods and willows, and usually below 5,000 ft elevation.	The project area contains no suitable habitat and is a sufficient distance from known occurrences, therefore, the proposed action should have no effect on this species.
Northern Aplomado falcon	EP/NS	Extirpated from the state in the early 1900's, one of only two confirmed sightings near McNeal, Cochise County in 1939, and historically preferred semi- desert grassland or riparian associations with scattered trees and shrubs, 3,300- 4,900 ft in elevation.	Unlikely to occur on or adjacent to the project area. No effects are expected by the proposed action since the species has been extirpated in the area.
Northern Mexican garter snake	Т	In Arizona, three general habitat types are used: 1) source area ponds and cienegas; 2) lowland river riparian forests and woodlands; 3) upland stream gallery forests (Rosen and Schwalbe 1988).	Proposed designated habitat for this species has been documented within three miles of the project area; however, no suitable habitat exists in the project area, and no effects from the proposed action are expected.
Yellow-billed cuckoo	Т	Prefers riparian cottonwood-willow galleries and is present in salt cedar stands, as well as mesquite bosques.	The project area contains no significant riparian area consisting of cottonwood-willow galleries or significant salt cedar stands or mesquite bosques. The proposed action should have no effect on this species.

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Table 3-3	5. Federal Species	s – No Effect	Determination

Species	Status	Suitable Habitat	No Effect Justification
Canelo Hills ladies'- tresses	E	Marshy wetland or cienegas intermixed with tall grasses and sedges. Grows on slopes near water so soil is drained (aerated) although saturated. Grows in very dense vegetation. As slope increases, growth increases. Range is 4,585-4,970 ft elevation.	No marshy wetland or cienega is located on or adjacent to project area. project area is a sufficient distance from known populations and habitat. Proposed action should have no effect on this species.
Huachuca water-umbel	E	Prefers Cienegas or marshy wetlands at 2,000-6,000 ft elevation, within Sonoran desert-scrub, grassland or oak woodland, and conifer forest.	No suitable habitat exists on or adjacent to the project area. project area is a sufficient distance from known populations; therefore the proposed action should have no effect on this species.
Wright's marsh thistle	С	Prefers wet, alkaline soils in spring seeps, cienegas, and marshy edges of streams and ponds, in otherwise semi-arid to arid areas 3,450-8,500 ft elevation.	No suitable habitat exists on the project area due to the absence of wet, alkaline soils, marshy edges, streams and cienegas.

Table 3-3. Federal	Species - N	No Effect D	Determination
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T = Listed as Threatened under ESA, E = Listed as Endangered under ESA, EP/NS = Experimental Population/Non-Essential under USFWS, C = Candidate under ESA, DPS = Distinct Population Segment under the USFWS

Jaguar and Ocelot

No construction activities are proposed within designated critical habitat for the jaguar, so there would be no loss of critical habitat as a result of the proposed action. Despite the potential for temporary disturbance of foraging behavior for the jaguar and ocelot, no long-term adverse effects are projected due to the relatively small amount of acreage being constructed upon and altered, and the existing disturbance already taking place with flights from the current runway. Incidental take of prey is highly unlikely and habitat alterations will be minimal. There would be relatively minor human-induced disturbance activities associated with the placement of targets in Training Areas J, I, and M. These activities would occur in the daytime, during the inactive period of this species, and would not be expected to affect the Jaguar or Ocelot.

The proposed action may increase the potential for fire during construction activities, target placement, and Class 4 laser use. The effect of fire in the Huachuca Mountains could impact these species, however wildfire and actions taken by the Fort to manage against wildfire is discussed in detail in both the PBA (Leidos 2013) and the PBO (USFWS 2014).

Noise caused by the construction activities will be confined to the Black Tower Complex and is not expected to have any long-term effect on these species. Minor foraging habitat alterations and human avoidance measures may occur with the reorientation of the runway, however since there already exists a high level of disturbance from the current runway, adverse effects on this species by the proposed action are unlikely.

The proposed action may increase UAS activity and the associated noise produced by these flights on the West Range and over a portion of the Huachuca Mountains where these species are known to occur. It is unclear how existing flights (and increased flights) may impact this species. The minimum flight level is at or above 13,000 ft, which is consistent with that identified in the PBO.

The temporary noise and increased access to laser testing targets in Training Areas J, I, and M could potentially lead to avoidance behavior, however use of this area by these species is expected to be minimal and enough available habitat exists away from the Action Area to accommodate the secretive nature of these species.

It is unclear how laser technology affects wildlife in general, and how Class 3 and 4 lasers specifically could affect these species or their prey. Potential risks to biological resources include wildlife eye and skin damage. Compliance with appropriate safety guidelines and regulations, and the Fort's Laser SOP (2012) would minimize these risks. Since laser training will occur in Training Areas J, I, and M only, it would be highly unlikely that these species would be affected given that they are unlikely to frequent the area.

The BA (USAGFH 2017) concluded that the proposed action may affect, but is not likely to adversely affect the jaguar and ocelot.

Lesser Long-nosed Bat

High densities of agave plants exist on the South and West Ranges in the semi-desert grasslands and lower oak woodlands providing forage for this species during summer and early fall (Howell and Robinett 1995). The Fort has delineated Agave Management Areas (AMA) where Palmer agave is most prevalent. Though a considerable effort went into orienting the new runway to ensure the least amount of disturbance, the proposed footprint of the runway expansion extends into a portion (less than 5 ac) of the current AMA. This disturbance will be mitigated, as the Fort has selected 9 ac of appropriate replacement habitat elsewhere on the West Range, but outside of the proposed action area. This replacement acreage will be added to a current AMA.

Targets for laser testing and training placed in Training Areas J, I, and M would not likely damage or destroy forage resources for this species, since vehicles delivering the targets would follow existing roads and targets would be placed on previously disturbed grounds.

The proposed project has the potential to affect LLNB forage and roost resources through direct burns or wildfire cause by construction activities, target placement, and/or Class 4 laser training and testing. Although vegetation would not be targeted by lasers, a brief flash of the laser on dry vegetation could ignite a fire. The Fort's compliance with applicable safety regulations and guidelines, and established procedures in the Fort's 2012 Laser SOP, reduces the risk of incidental exposure of the laser beams to the vegetation. The effect of fire in the Huachuca Mountains could impact this species, however wildfire and actions taken by the Fort to manage against wildfire is discussed in detail in both the PBA (Leidos 2013) and the PBO (USFWS 2014).

Noise caused by the construction activities will be constrained to the Black Tower Complex and is not expected to have any effect on this species. The proposed action may increase UAS activity and the associated noise produced by these flights on the West Range and over a portion of the Huachuca Mountains where this species is known to roost. It is unclear how existing flights (and increased flights) may impact this species. The minimum flight level is at or above 13,000 ft, which is consistent with that identified in the PBO.

It is unclear how laser technology affects wildlife in general, and how Class 3 and 4 lasers specifically could affect this species during nightly foraging activities. Potential risks to biological resources include wildlife eye and skin damage. Compliance with appropriate safety guidelines and regulations, and the Fort's Laser SOP would minimize these risks. Since laser training will occur in Training Areas J, I, and M, there is a potential that this species could be affected by activities. There is a potential for direct mortality during nighttime Class 4 laser testing and training.

The BA (USAGFH 2017) determined that the proposed action may affect, and is likely to adversely affect this species, but would not appreciably reduce the likelihood of recovery of the species.

Mexican spotted Owl

No construction or laser testing and training activities are proposed within habitat for the Mexican spotted owl, so there would be no loss of habitat as a result of the proposed action. The proposed action may increase the potential for fire during construction activities, target placement, and Class 4 laser use. The effect of fire in the Huachuca Mountains could impact this species, however wildfire and actions taken by the Fort to manage against wildfire is discussed in detail in both the PBA (Leidos 2013) and the PBO (USFWS 2014).

Noise caused by the construction activities will be confined to the Black Tower Complex and is not expected to have any effect on this species. The proposed action may increase UAS activity and the associated noise produced by these flights on the West Range and over a portion of the Huachuca Mountains where this species are known to occur. It is unclear how, or if, increased

noise from UAS would affect these species. The minimum flight level is at or above 13,000 ft, which is consistent with that identified in the PBO.

It is unclear how laser technology affects wildlife in general, and how Class 3 and 4 lasers specifically could affect this species, which is known to travel among mountain ranges. Potential risks to biological resources include wildlife eye and skin damage; however this is not expected to be a threat to this species. Compliance with appropriate safety guidelines and regulations, and the Fort's Laser SOP would minimize these risks. Since laser training will occur in Training Areas J, I, and M only, it would be unlikely that this species would be affected given that it is unlikely to frequent the area.

The BA (USAGFH 2017) determined that the proposed action may affect, but is not likely to adversely affect the Mexican spotted owl.

Migratory Birds

The Migratory Bird Treaty Act of 1918 (6 USC 703-712) as amended makes it illegal to take and possess any migratory bird, or parts, nests, or eggs of a bird except under the terms of a valid permit from the USFWS. Migratory birds protected by this act may occur within the training areas used for laser testing. The proposed action is expected to have minor impacts to these species and their habitat. Potential risks to migratory birds include wildlife eye and skin damage. Compliance with appropriate safety guidelines and regulations, and the Fort's Laser SOP would minimize these risks.

Summary of Effects from Implementation of the Proposed Action

As described above the proposed action is not likely to jeopardize the continued existence of any endangered or threatened species, appreciably reduce the likelihood of the recovery of such species, or result in the destruction or adverse modification of such species' critical habitat. The effects determinations from the 2017 BA (USAGFH 2017) are as follows:

- "May affect, likely to adversely affect" is the determination for LLNB. However, the analysis concludes that the proposed action is not expected to appreciably reduce the likelihood of both survival and recovery of the listed species.
- "May affect, not likely to adversely affect" is the determination for the jaguar, ocelot, and Mexican spotted owl.
- "No Affect" is the determination for the northern aplomado falcon, yellow-billed cuckoo, northern Mexican gartersnake, Chiricahua leopard frog, Canelo Hills ladies' tresses, Wright's marsh thistle, desert pupfish, Gila chub, Huachuca water umbel, and Gila topminnow.

No Action Alternative

The No Action Alternative would have no impact to Biological Resources.

Cumulative Impacts

Threats to regional biological resources resulting from the conversion of rangelands to residential and commercial uses and the resulting incompatibilities between man and nature are expected to continue in and around Fort Huachuca. Several federal and state agencies in addition to numerous non-governmental organizations are active in the protection and conservation of special status and wildlife species in the area. Fort Huachuca is committed to the stewardship of its biological resources and is actively engaged in regional partnerships to mitigate potential impacts resulting from its ongoing missions. Due to the temporary and limited duration of individual laser testing events and the existing 2-13th's UAS training activities, and the limited potential for these actions to negatively influence biological resources, no cumulative impacts to biological resources are anticipated to result from implementation of any of the Alternatives.

3.5 Cultural Resources

3.5.1 Affected Environment

Cultural resources is a broad term that includes all aspects of human activities, including material remains of the past and the beliefs, traditions, rituals, and cultures of the present. As mandated by law, all federal installations and personnel must participate in the stewardship of cultural resources and must consider potential impacts to these resources prior to any installation undertaking. Resources include buildings, structures, sites, objects, and districts as defined by the NHPA, cultural items as defined by the Native American Graves Protection and Repatriation Act, archaeological resources as defined by the Archaeological Resources Protection Act, sacred sites as defined by EO 13007 (to which access is provided under the American Indian Religious Freedom Act and collections as defined in 36 CFR 79, *Curation of Federally Owned and Administrated Archaeological Collections* (DA 2007).

Most of the West Range of Fort Huachuca has been previously surveyed, with the exception of the higher elevations of the Huachuca Mountains. Large scale surveys began in 1987 with the initiation of a sample survey over the entire installation by Professional Archaeological Services and Technologies (PAST) and SRI (Altschul and Jones 1990; Stephen et al. 1987). Small and large-scale surveys continued sporadically from then until the present time.

Previous cultural resources studies and previously recorded sites within the project area were identified using the cultural resources GIS database maintained by Fort Huachuca and the Arizona State Museum's AZSITE database. Results indicate that the entire area had been previously surveyed for cultural resources during fifteen projects; a sixteenth project included site recording only. Three previous surveys overlapped the proposed new runway area; two surveys covered the current survey area, and a third covered the testing site. The West Hemp Road ROW fell within seven previous survey areas. Twenty-four archaeological sites have been

recorded within the project area. The only archaeological site within the proposed runway and access road area is AZ EE:7:398(ASM) (Damp and Tagg 2017).

AZ EE:7:398(ASM) was originally identified by SRI in 2012 (Vanderpot and Graves 2013). The site was described as an artifact scatter, probably used for lithic reduction and plant processing. No features were identified at the site and only 20 artifacts were located on the surface. The site was interpreted as utilized during the Formative Period (A.D. 1 to 1450) (Damp and Tagg 2017).

Harris Environmental surveyed a 67-acre area where the new runway will be constructed on 25 January 2017 and conducted testing at AZ EE:7:398(ASM). During the course of the survey, two isolated occurrences were identified, documented, and assessed. One was a Vietnam-era helicopter, which, according to a Fort Huachuca employee, was placed in the area within the last two years for training purposes. The second consists of approximately 50 .30-06 cartridges dating to 1943 and possibly 1948. The location and dating of these munitions suggests that the area was used for training purposes probably during World War II or slightly thereafter. The two occurrences were determined to be not eligible for the NRHP after consulting with the State Historic Preservation Officer (SHPO). No other archaeological sites were recorded during the survey, nor were any standing historic structures or other cultural materials identified (Damp and Tagg 2017).

In February 2017, archaeologists with Harris Environmental rerecorded and conducted eligibility testing of AZ EE:7:398(ASM) in advance of the construction of a new runway. Harris Environmental carried out surface mapping of the site and excavation of 15 one-by-one meter test units and five shove tests. They identified 37 artifacts, including 34 flaked stone and three sherds. Of the 15 test units excavated, only two yielded artifacts and both were found near the surface (within the vegetation zone). Nine artifacts, including the two found during excavation, were collected for curation. No subsurface deposits were identified. The site was determined to be not eligible for listing on the NRHP after consulting with the SHPO (Damp and Tagg 2017).

The NHPA of 1966 and AR 200-1 constrain land uses and development where cultural resources are affected. The Fort Huachuca Integrated Cultural Resources Management Plan (ICRMP) (USAGFH 2008) details the Installation's cultural resources management program. Specific guidance and procedures for managing and maintaining historic buildings is provided in TM 5-801-1, Historic Preservation Administrative Procedures, and TM 5-801-2, Historic Preservation Maintenance Procedures.

3.5.2 Environmental Consequences

Alternative One (Proposed Action)

The effects of the Proposed Action on cultural resources were analyzed in *Archaeological Survey and Site Testing for New UAS Runway Complex at Black Tower and Laser Testing on West Range, Fort Huachuca, Cochise County, Arizona* (Damp and Tagg 2017). The report addressed all access routes, construction sites, or any other use area required to construct, operate, and maintain the Black Tower UAS Runway. In addition, it considered the placement of the new laser range targets within training areas J, I, and M. The total area for the new runway and associated facilities consists of approximately 151 acres (141 acres for runway construction and 10 acres for the 2.8-mile access road and utility right-of-way). Sixty-seven acres were determined by Fort Huachuca to require a cultural resources survey. These acres were previously surveyed, but the survey may not have met current survey standards. The rest of the area was previously adequately surveyed for cultural resources or will not be subject to ground disturbance, thus it was not resurveyed. This project also involved National Register of Historic Places (NRHP) eligibility testing at AZ EE:7:398(ASM), which was previously recorded within the area (Damp and Tagg 2017).

There are no historic properties within the proposed runway and access road ROW. As currently planned, access to the runway will be on the paved West Hemp Road which will not be modified. Utilities are within the 30-ft. road right-of-way, and no upgrades are proposed at this time. Should upgrades be required, the Fort Huachuca Cultural Resources Manager will assess them at that time.

Facilities to be demolished as part of the proposed action (see Table 2-1) were not addressed in the report that was sent to SHPO. These facilities will be assessed to determine eligibility by the Fort Huachuca Cultural Resources Manager prior to demolition.

A records check was conducted to identify sites within J, I, and M that were bisected by or adjacent to a road and therefore, had the potential to be impacted by placement of laser targets. Laser targets cannot be placed within any sites. Laser target placement locations will be reviewed by the Cultural Resources Manager prior to placement to ensure historic sites are avoided.

Based on the results of the assessment, survey, and eligibility testing, it was determined that the Proposed Action will have no adverse effect on historic properties. During runway construction, supervisory personnel and crew should be alert to the potential presence of undiscovered cultural resources. If there is an inadvertent discovery during ground-disturbing activities, all work must immediately cease within 30 meters (100 feet) of the discovery. The Fort Huachuca Cultural Resources Manager must be notified of the discovery within 24 hours and will determine the appropriate action.

No Action Alternative

The No Action Alternative would not result in any impacts to cultural resources.

Cumulative Impacts

The Sierra Vista and San Pedro River Basin have a rich and diverse cultural history. A large number of cultural resources have been identified, many of which are located on Fort Huachuca. Many of these cultural resources have been determined to be eligible to or listed on

the National Register, or have yet to be evaluated, and are currently being protected. The SHPO concurred with the Army's findings that the proposed action would not have an adverse effect on historic properties. Cumulative impacts associated with cultural resources are not anticipated.

3.6 Air Quality

3.6.1 Affected Environment

Fort Huachuca is located in the Southeast Arizona Air Quality Control Region, which includes Cochise, Graham, Greenlee, and Santa Cruz Counties. The region benefits from favorable wind patterns and a lack of major pollutant sources (e.g., heavy industry and fossil fuel power plants) (JITC 2004). A region is either in "attainment" or "nonattainment" of the National Ambient Air Quality Standards (NAAQS) established under the Clean Air Act (CAA). Depending on the pollutant and averaging time, nonattainment status is classified as Extreme, Severe, Serious, Moderate, Marginal, and Submarginal (listed most significant to least significant).

Fort Huachuca and the immediate vicinity lies within an attainment area for all NAAQS and is not subject to a General Conformity Analysis, which only applies to Federal actions on property that lies within a nonattainment area.

The Fort's current annual emissions fall below the 100 tons per year (tpy) threshold that would classify it as a Title V Major Source, which is the most highly regulated permit. Staying under the Major Source threshold qualifies Fort Huachuca for a Class II synthetic minor air permit, which was issued in 2012 and was renewed in 2017. A synthetic minor permit, as defined by Arizona Administrative Code Title 18, Chapter 2, Section 306.01 (R18-2-306.01), includes voluntarily accepted emissions limitations, controls, or other requirements (for example, a cap on production rates or hours of operation, or limits on the type of fuel) meant to reduce the potential to emit to a level below the major source threshold.

As part of Fort Huachuca's regulatory reporting requirements, a comprehensive air pollution emissions statement, known as an Air Emissions Inventory (AEI), must be prepared annually. The AEI evaluates sources which emit any single regulated air pollutant in a quantity greater than 1 tpy or the amount listed in R18-2-101, whichever is less, as well as sources that emit any combination of regulated air pollutants in a quantity greater than 2.5 tpy (R18-2-327). The AEI quantifies emissions from seven criteria pollutants, including total suspended particulate, nitrogen oxide (NO_X), particulate matter, fine (PM₁₀), volatile organic compound (VOCs), sulfur dioxide (SO₂), lead (Pb), and carbon monoxide (CO). Additionally, the AEI includes annual emissions of hazardous air pollutants (HAPs) and ozone depleting substances (ODS).

Sources that emit criteria pollutants, HAPs, or ODS at Fort Huachuca include:

• Gas fired boilers, heaters, and hot water heaters

- Generators
- Fuel storage and dispensing operations
- Paint spray booth operations
- Abrasive blasting operations
- Firing range operations
- Chillers, air conditioners, and refrigeration units
- Welding operations
- Wastewater treatment operations
- Pesticide, herbicide, rodenticide, and insecticide usage
- Degreasing operations
- Miscellaneous chemical usage

Greenhouse Gases

Although the subject of global warming due to man-made production and release of greenhouse gases (GHGs) is still under debate, the EPA made an endangerment finding stating that "current and projected concentrations of the six key well-mixed greenhouse gases (CO₂, CH₄, N₂O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations" (EPA 2011). This finding has opened the door for the regulation of GHG emissions published in 75 FR 31514, which led to what is known as the prevention of significant deterioration (PSD) & Title V GHG Tailoring rule (FR 2010). For the purposes of PSD and Title V, this rule has set a major source threshold of 100,000 tpy carbon dioxide equivalent (CO₂e) and a 75,000 tpy CO₂e significance level (FR 2010).

In addition, on September 22, 2009, the Administrator of the EPA signed the Final Mandatory Reporting of GHG Rule, known as the Mandatory Reporting Rule (MRR). The final rule was published in the Federal Register (40 CFR Part 98) on 30 October 2009. The final rule requires reporting of GHG emissions from large sources, which are those sources that emit 25,000 metric tons (MT) CO₂e or more per year. With the exception of electric generating and cogeneration plants, all stationary facilities that emit more than 25,000 MT of CO₂e per year are considered covered and must report.

Fort Huachuca is not required to report under the Mandatory GHG Reporting Rule because its emissions do not exceed the reporting thresholds of 25,000 metric tons CO₂e per year as determined by the EPA Greenhouse Gas Reporting Program Applicability Tool. In the event the installation ever exceed those thresholds, Fort Huachuca would need to perform a comprehensive GHG emissions inventory to facilitate reporting.

3.6.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action is not anticipated to result in any significant direct or indirect impacts to air quality.

Laser Testing

Potential long-term impacts to air quality resulting from the Proposed Action are associated with the burning of fossil fuels in vehicles and equipment and the dust from using dirt roads to transport laser targets throughout training areas J, I, and M. While the use of these vehicles and equipment results in the emission of criteria air pollutants, the Proposed Action would not result in a significant increase in the number of vehicles and equipment being used by the Fort. Additionally, the lasers do not emit any criteria air pollutants.

Gray Eagle UAS Runway and Associated Facilities

Short-term impacts to air quality may result during the demolition of Pioneer Runway and construction of the new runway and associated facilities. These impacts would result from the vehicle and equipment emissions, and dust generated during construction activities on-site. The current air operating permit requires dust control measures be implemented to control dust generated during any operation or excavation activities. Control methods are specified in the air permit with associated monitoring and recordkeeping requirements to demonstrate compliance with the conditions of the air permit. Based on the localized scale of the project and the temporary nature of these activities, impacts are anticipated to be less than significant.

The limited use of fossil fuel vehicles and equipment is not anticipated to impact regional or local air quality conditions. Air emissions are not expected to exceed de minimis threshold levels or contribute emissions in violation of any federal, state, or local air quality regulations.

No Action Alternative

The No Action Alternative would not result in any impacts to local or regional air quality.

Cumulative Impacts

Air quality in the Sierra Vista area has consistently been within attainment of the NAAQS. In the past, ADEQ's annual evaluations at Fort Huachuca have shown emissions to be relatively low. The Fort has chosen to be a Title V Class II Synthetic Minor by placing caps on emissions by limiting our operational loads and run times for permitted equipment. The Fort's current operating permit articulates "permitted emission limit" for each type of permitted equipment or activity air source and aggregate insignificant air sources. The Fort's permit dictates that they prepare an air emissions inventory (AEI) to report actual emissions. This is one report that is used to show compliance with the operating permit. The Fort prepares and submits the annual report to demonstrate compliance.

Future air quality will likely be influenced by the development of areas surrounding Sierra Vista and Fort Huachuca. Urban development has tended to expand in areas surrounding Sierra Vista, which inherently brings about various types of air pollution sources.

Continued air quality monitoring, voluntary reduction of emissions, annual preparation of an AEI, and continued Greenhouse Gas monitoring aim to keep air quality at the Fort within attainment of the NAAQS. Given these air quality monitoring mechanisms, and the short duration of vehicle usage during construction and transport to laser testing sites, it is unlikely that the implementation of any of the Alternatives would result in cumulative impacts to air quality.

3.7 Noise

3.7.1 Affected Environment

Noise, by definition, is sound that is loud or unpleasant or that causes a disturbance. When sound interrupts daily activities such as sleeping or conversation, it becomes noise. The degree to which noise will become disruptive is dependent on the way that it is perceived by the receptors (people) living or working in the affected area. Noise is measured in decibels (dB) with zero being the least perceptible sound to more than 130 dB at which noise becomes a health hazard. Because the human ear is more sensitive to certain ranges of the sound spectrum, a weighted scale has been developed to more accurately reflect what the human ear perceives. These measurements are adjusted into units known as A-weighted decibels (dBA).

According to AR 200-1 (DA 2007), sensitivity to noise varies by the time of day, with receptors being more sensitive at night. To reflect this sensitivity, ambient noise measurements are normally adjusted by adding 10 dB to actual measurements between the hours of 2200 and 0700. Decibel levels adjusted in this way are known as day-night decibel measurements (DNL). Averaging noise levels over a protracted time period does not generally adequately assess the

probability of noise complaints coming from receptors in the nearby community. Therefore, the risk of noise complaints from large caliber impulsive noise resulting from testing and training activities (e.g., machine gun, mortars and demolition events), in terms of either peak sound pressure level (PK 15 (met)) or C-weighted day night level (CDNL) must also be assessed (DA 2007).

Table 3-3, summarizes decibel levels associated with four different noise zones (Land Use Planning Zone (LUPZ), Zone I, Zone II, and Zone III). Each zone is defined according to allowable noise limits, which increase in intensity from LUPZ to Zone III. Typically, land uses, such as housing, schools, and medical facilities are located within the LUPZ and noise Zone I, but construction of these uses is strongly discouraged in Zones II and III (DA 2007).

Noise Limits (dB)					
Noise Zone	Aviation ADNL	Impulsive CDNL	Small Arms PK 15 (met)		
LUPZ	60 - 65	57 – 62	N/A		
Zone I	< 65	< 62	< 87		
Zone II	65 – 75	62 – 70	87 – 104		
Zone III	> 75	> 70	> 104		

dB- decibel; LUPZ- land use planning zone; ADNL- A-weighted day-night levels; CDNL- C-weighted day-night levels; PK 15(met)- Single event peak level exceeded by 15 percent of events; N/A- Not Applicable

Chapter 14 of AR 200-1 (DA 2007) outlines the major goals of the Army's noise program, which include:

- Control operational noise to protect the health and welfare of people, on- and off-post, impacted by all Army produced noise, including on- and off-post noise sources
- Reduce community annoyance from operational noise to the extent feasible, consistent with Army training and materiel testing mission requirements
- Actively engage local communities in land use planning in areas subject to high levels of operational noise and a high potential for noise complaints

Activities that have the potential to produce noise at Fort Huachuca include construction, military and private vehicle use, aircraft operations, weapons discharge, and dismounted training (USACE 2008).

Construction activities can generate noticeable levels of noise. A single item of construction equipment may generate noise levels of 80 to 90 dBA at a distance of 50 feet. Numerous equipment items operating concurrently can produce relatively high noise levels within several hundred feet of active construction sites. Locations more than 1,000 feet from construction sites seldom experience significant levels of construction noise (USACE 2008).

Military vehicles use a mixture of public roads, on-post roads, and military vehicle trails. Vehicle type and speed influence noise levels produced. Vehicle speeds are relatively low on unpaved roads during vehicle maneuvers. Noise levels generated by High Mobility Multipurpose Wheeled Vehicle (HMMWVs) and two-axle military trucks are comparable to noise from medium trucks (about 65 to 70 dBA at 50 feet). Multi-axle heavy trucks would generate noise levels comparable to other heavy duty trucks (about 78 to 80 dBA at 50 feet). On average, peak noise levels drop by 15 dBA at a distance of 500 feet from the travel path (USACE 2008).

Noise related to airfield operations at LAAF are addressed by the Air Installation Compatible Use Zone (AICUZ) program. Fixed-wing manned flight operations produce the most prominent noises, while UASs generate relatively little noise. UAS support equipment and increased traffic to and from training and testing locations are also sources of noise relating to aviation activities. Activities associated with operating UASs tend to occur in and over sparsely populated areas, which reduces the number of receptors exposed to any level of noise caused by the events.

3.7.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action is not anticipated to result in any direct noise impacts.

Laser Testing

Lasers do not emit any significant audible sound and therefore, are not anticipated to result in any direct noise impacts. Indirect noise impacts under the Proposed Action include various military vehicles and equipment used to transport targets to the laser testing locations. The greatest noise impact would likely be the use of UAS aircraft during the laser testing activities. However, the Proposed Action is not expected to generate a significant increase in the amount of aircraft activities currently being conducted by the Fort. To help minimize noise impacts, pilots avoid populated areas sensitive to aircraft noise. UAS aircraft used during the laser testing typically flies at altitudes higher than 13,000 ft and will have little impact to noise conditions on the ground. Additionally, the Proposed Action does not include the introduction of any aircraft or any other vehicles or equipment not already being used by the Fort.

Gray Eagle UAS Runway and Associated Facilities

Construction activities associated with the demolition of Pioneer Runway and construction of the new runway and associated facilities would be temporary in nature and only last the duration of the construction period. UAS flights are already being conducted at the Black Tower Complex. Takeoff and landing patterns will be slightly altered due to the orientation of the new runway. Due to the Black Tower Complex's remote location within the West Range, the noises generated during construction and UAS operations are anticipated to result in less than significant impacts.

No Action Alternative

The No Action Alternative would not result in any noise impacts. UAS operations would continue utilizing the existing runway at the Black Tower Complex.

Cumulative Impacts

Noise in and around Sierra Vista has steadily increased as the community has grown into a small city supported by an active military installation. Noises associated with Fort Huachuca could grow as mission requirements change. Most of the noise created by military vehicles is comparable to typical existing civilian traffic noises off-post. Operations that require equipment with increased noise levels, such as generators, are typically in more remote areas that are further way from adjacent populations. Due to the temporary duration of construction and remote location on the West Range the indirect noise associated with proposed laser testing, none of the Alternatives are anticipated to result in cumulative noise impacts.

3.8 Visual Resources

3.8.1 Affected Environment

Much of Fort Huachuca consists of open space and areas of natural habitat that provide an aesthetically pleasing landscape from both within and outside the Installation boundaries. Fort Huachuca recognizes the importance of maintaining the natural beauty and unique landscape of the Installation.

The West Range is mostly open grasslands and mountainous areas, used for range and training exercises. The training areas are located in the foothills of the Huachuca Mountains, which serve as the Installation boundary for the Western Reservation. There is minimal military development within the South and West Ranges, providing the City of Sierra Vista and the Cantonment Area with a natural view of the Huachuca Mountains. There is little urban development located to the north, west or south of the West Reservation.

3.8.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action is not anticipated to result in any significant direct or indirect impacts to visual resources.

Laser Testing

Direct impacts are limited to the visibility of the laser beams while the laser is in use, and the visibility of the laser and associated UAS vehicle during laser testing activities. The laser targets are stationary and small enough to go largely unnoticed to observers not involved in the testing or training activities.

Many of the lasers proposed for use under the Proposed Action are invisible to the human eye and would therefore not create any impacts to visual resources. However, some lasers, such as visible tactical lasers, can be seen by the human eye. Additionally, some invisible lasers cannot be seen with the human eye alone, but can be seen using optical aids like night vision goggles. Although some of the lasers proposed for use generate visible laser beams, the short duration of the testing and training activities would not be expected to significantly impact the viewshed from on- or off-post. Daylight activities generating visible laser beams would be unlikely to be seen by the public. Some nighttime laser activities may generate beams visible by the public, but the short duration of the activity would limit any possible impacts to views of the night sky. Laser beams generated during proposed testing and training activities would have specific targets and would not be aimlessly pointed at objects on the Installation.

Gray Eagle Runway and Associated Facilities

The area where the new runway and associated facilities is part of the West Range that is not visible from populated areas surrounding the Installation. Since the Black Tower Complex is already used for UAS training, the new runway and facilities would not greatly alter the current aesthetics of the site.

No Action Alternative

The No Action Alternative would not result in any impacts to visual resources.

Cumulative Impacts

Pristine high desert views in the Sierra Vista area have diminished over time as urban development views have emerged. The State of Arizona in general consists of highly aesthetic views that continue to be influenced by human activity. Throughout the state and concentrated along the southern border, more military and law enforcement personnel and equipment can be observed within natural environments due to illegal immigrant activity and national terrorism threats. It can be anticipated that views throughout the state will continue to change as the human population and its interactions change.

Due to the limited potential for laser testing activities to negatively influence visual resource conditions, no cumulative impacts to visual resources are anticipated to result from implementation of any of the Alternatives.

3.9 Socioeconomics

3.9.1 Affected Environment

Socioeconomic resources are defined as basic attributes associated with the human environment, primarily population and economic activity. Population encompasses the magnitude, characteristics, and distribution of people, and economic activity refers to
employment distribution, business growth, and individual income. The Region of Influence (ROI) subject to this analysis includes Cochise County.

Fort Huachuca is located in the City of Sierra Vista, Cochise County, Arizona. Sierra Vista is the largest city in the county with a population in 2015 of 44,183 (Sierra Vista 2016). The total population for Cochise County in 2015 was 129,112 (Sierra Vista 2016). Both the City and the County's economy heavily rely on Fort Huachuca. The Installation has historically been and is currently the single largest employer in Cochise County. Other major industries in the County include services, retail trade and construction (Sierra Vista 2016).

The City of Sierra Vista's poverty rate was 14.1% in 2010 which lower than the county, state, and national averages (Sierra Vista, 2016). The median household income for 2015 was \$58,040 per year (Sierra Vista 2016). While some missions will change over time, employment at Fort Huachuca is predicted to remain constant according to Fort Huachuca personnel.

According to the September 2017 Fort Huachuca Post Population Count, the Installation had 11,314 full-time employees as of September 2017. Of that, 2,427 were permanent military personnel, 2,853 civilian personnel (full time equivalent (FTE)), 252 part-time civilian personnel, 2,092 students (FTE), and 3,518 full-time and 172 part-time contractors. Historically, the Installation's population has fluctuated by about 3,000 personnel to meet changing mission requirements and account for training cycles.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, ensures fair treatment and meaningful involvement of all people regardless of race, color, national origin or income, with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Fort Huachuca is not located in an area that has a disproportionately high concentration of minority or low-income populations.

3.9.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action would not result in an increase in the 2-13th's full-time personnel. Therefore, there would be no permenant impacts to the population on the Fort or in the surrounding ROI. There would be no adverse impacts to minority or low-income populations.

There may be a slight increase in students conducting UAS training during the year. The increase in students could result in temporary lodging on or off the Fort, which would provide beneficial impacts to the local economy. Additionally, the construction of the new runway and associated facilities would likely be completed by local contractors, which would provide a short-term indirect beneficial impact to the local economy through local employment and materials sales.

No Action Alternative

Implementation of the No Action Alternative would not result in any impacts to local or regional population or economy.

Cumulative Impacts

No significant cumulative impacts are anticipated as a result of the implementation of any of the Alternatives. Since there is no increase to population, no cumulative impacts to the ROI's population would be expected. The beneficial impacts to the local economy associated with the Proposed Alternative would have minor, long-term beneficial impacts when combined with the growth and development on and around the Installation.

3.10 Transportation and Circulation

3.10.1 Affected Environment

The main highway access to Fort Huachuca is Arizona State Highway 90, which divides the Installation into the East and West Reservations. The Main Gate is located immediately west of Highway 90, off Hatfield Street. The existing road network on Fort Huachuca provides access to all operational and residential areas on the Installation. There is approximately 200 miles of paved roadways, 130 miles of gravel roads, and 150 miles of firebreak roads and trails located on the Installation.

Primary roads are the main routes that connect the Cantonment Area the Black Tower Complex. Roads serving most of training areas J, I, and M are a combination of paved, gravel, or dirt. Due to the erosive character of the soils on the Fort, the condition of the unpaved roads varies, and in some cases, the roads are severely eroded. In addition, a number of roads within the ranges have been closed but have not been rehabilitated. These roads channel surface runoff in some cases and gullying and headcutting are occurring.

3.10.2 Environmental Consequences

Alternative One (Proposed Action)

Anticipated impacts to transportation and circulation within the Fort and surrounding communities would be less than significant.

Laser Testing

On-post roads are designed to handle the traffic created by military vehicles and equipment that transport the laser targets throughout training areas J, I, and M. Targets will be place adjacent to existing roads. No new roads will be created to place targets. The use of vehicles to transport laser targets is not anticipated to have a significant effect on traffic volume on Fort Huachuca.

Gray Eagle UAS Runway and Associated Facilities

The increase in vehicles and equipment accessing the Black Tower Complex during construction would be temporary, and given the site's remote location on the installation it is not anticipated to impact traffic or circulation.

Aircraft traffic is anticipated to significantly increase beyond current 2-13th flight levels due to the new orientation of the new runway allowing less conflict with LAAF traffic. The 2-13th training activities are not using any new UAS that are not currently used by the Fort. The 2-13th's laser testing would be incorporated into training activities that are already being conducted. Additionally, all training and testing activities would be coordinated and scheduled through the appropriate channels before any exercises could begin. All flights are coordinated through the air traffic controller at LAAF to ensure that there are no airspace conflicts. All aircraft testing and training activities must use approved flight paths and comply with all applicable laws, regulations, and policies governing airspace on and around the Fort. Therefore, no adverse impacts to air or ground traffic would occur.

No Action Alternative

The No Action Alternative would not result in any impacts to transportation or circulation on or around the Installation.

Cumulative Impacts

Due to Sierra Vista's and the surrounding communities' location adjacent to the national border, Interstate 10 and Highway 90 will continue as the main vehicular access to the community. A network of smaller roads connects other parts of the county to Sierra Vista and Fort Huachuca. The existing immediate roadways adequately serve the needs of the surrounding civilian communities and the mission of Fort Huachuca.

The RPMP for Fort Huachuca provides a list of identified transportation-related improvements to be addressed in future years to keep pace with development trends and provide a safe on-post environment. The Northwest Cochise County Long-Range Transportation Plan Final Report includes projects to address future deficiencies on the Highway 90 and projects to provide better connectivity within the immediate county.

With plans in place that anticipate growth in transportation needs for Sierra Vista area, Fort Huachuca and state-wide, the Proposed Alternative is not anticipated to contribute to adverse cumulative impacts on transportation at the local or regional level.

3.11 Utilities

3.11.1 Affected Environment

Tucson Electric Power and Sulfur Springs Valley Electric Cooperative supply electrical power to Sierra Vista, Fort Huachuca and the surrounding area. The Installation is served by six underground distribution circuits, which transfer to overhead poles. The existing distribution system adequately supports the current and future needs of the Installation (USACE 2008). Existing renewable energy systems located on the Fort include a solar array; solar hot water heaters; photovoltaic flat panels and combined integrated systems; daylighting; photovoltaic parking lot lighting; solar walls; a methane digester processer; a wood chip burner; GHPs at new barracks; a 10 kilowatt (kW) wind tower; and a 1 megawatt (MW) wind turbine.

Natural Gas is provided to the Installation by Southwest Gas. Gas is delivered via two 400 pounds-per-square-inch supply lines and distributed throughout the Installation. The system capacity is adequate to support current and future demands.

Solid waste accumulated at the Installation is transported off-post and primarily disposed of at the Huachuca City landfill. A small amount of solid waste is directed to the Elfrida landfill, which is also located in Cochise County. In addition to these landfills, there is a County operated landfill located in Huachuca City.

The only water supply at Fort Huachuca is groundwater from the Sierra Vista subwatershed regional aquifer. Fort Huachuca's water system is operated and maintained by an Installation service contractor. There are eight operational groundwater production wells on the Installation. Water is treated prior to entering the supply lines and the quality of the water is generally suitable for all uses. The greatest demand on the water supply comes from the Installation 's housing area. A water conservation program was developed to educate the Installation residents and personnel on methods to conserve the water supply. Other conservation methods are also implemented at Fort Huachuca, including the use of treated wastewater effluent rather than potable water for irrigation and recharge.

The Fort Huachuca wastewater collection and treatment system is operated and maintained by an Installation service contractor. Installation wastewater is directed to a single treatment facility. After treatment, wastewater is directed to seven effluent recharge basins located on the East Range or reused as irrigation water for the golf course.

3.11.2 Environmental Consequences

Alternative One (Proposed Action)

The Proposed Action would not result in any significant impacts to utilities.

Laser Testing

Laser testing would not require the addition of any new electrical, telecommunications, water, or wastewater lines. Additionally, the lasers would not result in a significant increase of solid waste generation. The lasers would be powered directly by the UAS they are attached to. Therefore, there would no impact to utilities as part of the laser testing activities.

Gray Eagle UAS Runway and Associated Facilities

Construction activities associated with the new runway and associated facilities at the Black Tower Complex are anticipated to be minimal. Electric, water, natural gas, and sewer utilities are available at the Black Tower Complex. The addition of laser testing to training activities and the construction of the new runway is not anticipated to impact the number of students being training at the Black Tower Complex or housed on the installation. Currently it is anticipated that the new UAS facilities will utilize current utilities and lines will not need to be upgraded. If during design it is determined that new utility lines need to run to add capacity to the Black Tower Complex area then it will be further review to determine level of impact. In addition the new facility will include the use of PVs on top of parking stall covers to generate additional electrical power.

No Action Alternative

There would be no impacts to utilities as a result of implementation of the No Action Alternative.

Cumulative Impacts

The growth and development on and around the Installation continues to increase the demand for utilities such as electrical, telecommunications, water, and wastewater. Fort Huachuca is continuously working to reduce the Installation's demand for non-renewable resources, as documented in their 2010 Renewable Energy Resources PEA (USAGFH 2010b). The Fort has entered into agreements and partnerships with other groups and agencies for the purpose of reducing water use in the USPB. In addition, Fort Huachuca is an active member of the Upper San Pedro Partnership, a consortium of 21 agencies that collaborates to meet water needs in the region while protecting the San Pedro River (USACE 2008). The Fort's and surrounding communities' reduction in water use and increased use of renewable energy sources is not only beneficial to the environment, but decreases the demand on existing utilities and necessity for new utilities. The less than significant impacts expected from implementation of any of the Alternatives are not expected to result in any cumulative adverse impacts.

3.12 Hazardous and Toxic Substances

3.12.1 Affected Environment

Hazardous materials (HAZMAT) is a term referring to any item or agent (biological, chemical, and physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Across the Army, the Hazardous Material Management Program (HMMP) is used to integrate the accountability for HAZMAT into day-to-day decision-making, planning, operations, and compliance across all Army missions, activities, and functions, The HMMP policies, including its objectives and goals, are set forth in AR 200-1 (DA 2007). A complete list of federally-recognized hazardous substances as well as their reportable quantities is provided in 40 CFR Part 302.4. There are many other substances which are not on this list that may be considered hazardous according to their ignitability, corrosivity, reactivity, or toxicity as defined by 40 CFR 261.20-24.

Fort Huachuca is an EPA-registered large quantity generator, defined as generating 1,000 kilograms per month or more of hazardous waste, more than 1 kilogram per month of acutely hazardous waste, or more than 100 kilograms per month of acute spill residue or soil. Vehicle and aircraft maintenance produce the majority of hazardous wastes generated by the Installation, and facility maintenance may also contribute. Hazardous substances typically associated with these operations such as fuels, antifreeze, paints, cleaners and petroleum, oil and lubricants (POL) are stored, transported and disposed of in accordance with applicable laws and regulations. The Hazardous Waste Management Program at Fort Huachuca complies with OSHA hazardous communications standards and EM 385-1-1 materials handling, storage, and disposal standards; the Installation Spill Contingency Plan; the Installation Hazardous Waste Management Plan; Department of Transportation regulations; and the Directorate of Public Works (DPW) Environmental Office (USACE 2008).

The Fort operates one 90-day accumulation center, approximately 200 satellite accumulation centers and a Hazardous Material Control Center, which allows for collection and withdrawal of usable hazardous materials on the Installation. Frequent inspections of hazardous waste storage and disposal sites are conducted by the DPW Environmental Office and state and federal regulatory agencies. The Defense Reutilization and Marketing Office (DRMO) provides contract service to transport and dispose of hazardous waste off-post.

Facilities that store, transport, dispose of, or utilize POLs at the Fort are strictly regulated by Federal and Department of Defense (DoD) regulations. The fundamental purpose of Federal and DoD regulations is to prevent or limit the accidental release of POL materials to surface water, groundwater, or soils at Fort Huachuca. Specific areas of regulatory focus are spill prevention plans, POL transfer operations, POL storage in containers, and used oil. The policy defined by AR 200-1 requires Fort Huachuca to "manage tank systems used to store oil and hazardous substances in an environmentally safe manner, prevent spills of these substances, and rapidly respond to spills." Among other things, AR 200-1 requires the development of an

Installation Spill Contingency Plan (ISCP) as well as a Spill Prevention Control and Countermeasures Plan for storage tank systems that hold POLs or hazardous substances. Response resources for Fort Huachuca are mobilized at the direction of the Qualified Individual (QI) or Facility Incident Commander (FIC). However, location and PPE requirements will dictate which unit initially responds and completes the response action.

Incident response priorities are established using prudent spill response procedures. Fort Huachuca's priorities are to protect against loss of life, fire/explosion, and release transport, respectively. All unit hazardous material coordinators are responsible for making all necessary emergency equipment available for the response action.

Spills may occur from mobile units such as fuel tanker trucks, trucks with fuel pods, or trucks carrying hazardous material/waste as well as aircraft that are parked, landing, or taking off. If any spills occur personnel must call 911 immediately. Response strategies involving these types of mobile units are handled in the following manner:

- Truck incidents Incident most likely to be a road side accident involving an overturned vehicle. Response by the Fire Department (FD) and the FD HAZMAT unit for initial containment and fire suppression. Additional containment and clean-up by the DPW contractor.
- Unmanned Aircraft Systems (UASs) all incident response, clean-up and investigation is conducted by the Garrison Response Team. Additional containment and clean-up by the DPW contractor.

The Army's Installation Restoration Program (IRP) is a comprehensive program to identify, investigate, and clean up contamination at Army Installations to eliminate risks to human health and the environment. The IRP includes, but is not limited to, the cleanup of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances, POLs, hazardous wastes and hazardous waste constituents, and low-level radioactive materials or wastes. Historically, there have been 58 IRP sites at Fort Huachuca (USACE 2008).

3.12.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action is not anticipated to cause any significant impacts resulting from the use of hazardous or toxic substances.

Laser Testing

The lasers proposed for use at the Fort are all solid state lasers. The solid lasing mediums associated with these lasers are typically crystals and are not a hazardous or toxic substance. Some solid state lasers may contain small amounts of hazardous substances that may require special storage, handling, or disposal techniques. However, appropriate use of the laser would

greatly reduce the risk of any exposure to these substances. Additionally, these types of lasers do not generate any hazardous or toxic by-products or waste.

The UAS laser platforms proposed for use within this EA are already being used by the Fort during laser testing and training activities. Therefore, the proposed laser testing and training would not result in any new risks associated with the use of those vehicles. Vehicles that would transport targets are outfitted with drip pans, plastic sheeting, and spill kits, which are used to prevent and clean up accidental spills

Gray Eagle UAS Runway and Associated Facilities

Fort Huachuca's current policies and procedures will minimize impacts from the use of hazardous or toxic substances during the implementation of the Proposed Action. In accordance with training requirements set forth in AR 200-1 and the procedures defined in Fort Huachuca's ISCP, vehicle and equipment operators are expected to be well-versed in the proper measures and notification processes necessary to handle accidental spills of hazardous or toxic substances including POLs.

Construction-related activities would not result in any significant impacts from the use of hazardous or toxic substances. The construction contractor would be responsible for the appropriate disposal of all waste generated during construction in compliance with applicable laws and regulations.

There would be no significant impacts from operational use of the site. The associated facilities will house maintenance, training, and administrative uses that are current being conducted at other facilities within the Black Tower Complex. The proposed facility would store hazardous materials in accordance with applicable federal regulations and generate very small quantities of hazardous wastes during its operation. The maintenance area would use and store fluids common to any vehicle maintenance facility including antifreeze, lubricant oil, batteries, cleaning solutions, and small amounts of fuel. The 2-13th would maintain adequate spill response and containment equipment on-site during operations and would comply with Installation policy in the event of an accidental spill.

No Action Alternative

Under the No Action Alternative there would be no impact to hazardous or toxic substances.

Cumulative Impacts

The quantity of hazardous and toxic substances stored and used on and in the area surrounding Fort Huachuca has grown over the years. Today, Fort Huachuca has a Hazardous Waste Management Program, an Emergency Planning and Community Right to Know Program, a Pollution Prevention Program, and several other hazardous materials handling programs and manuals to direct the use of these materials. Fort Huachuca additionally has a Hazardous Material Control Center whose purpose is to centrally manage and issue hazardous material as well as take back unused material that can be reissued, and works with the Defense Logistics Agency-Dispositions Program to manage the disposal of hazardous waste. Accidental spills of any size may occur no matter how many manuals and policies are in place, but materials and guidelines for dealing with the spills are more sophisticated, effective, and time responsive today than in the past. In addition, today's guidelines for handling hazardous materials are more proactive and equipment more appropriate for the required action, leading to fewer accidents.

Installation personnel have established safeguards to protect the environment from accidental spills of hazardous materials or POLs during testing and training activities. Fort Huachuca's ISCP describes the procedures to be implemented in the event of a spill of hazardous materials or POLs.

Due to the extensive policies and procedures in place for potential spills and mishandling of hazardous and toxic substances, and the limited types and quantities of hazardous materials and toxic substances, it is anticipated that none of the Alternatives would result in a cumulative local or regional impact from the use of hazardous and toxic substances.

3.13 Human Health and Safety

3.13.1 Affected Environment

Health and safety services can be obtained on Fort Huachuca and within the surrounding communities. On Fort Huachuca, the law enforcement division of the Directorate of Emergency Services has primary responsibility for the enforcement of rules and regulations and the security of the Installation (USAGFH 2004).

Medical services on Fort Huachuca can be received at the Raymond W. Bliss Army Health Center. This center provides services to active and retired military personnel and their families. Services include primary care, internal medicine, general surgery clinic including outpatient services, orthopedics, physical therapy, optometry (active duty only) and preventive medicine (U.S. Army Medical Department 2011). Accidents or illness requiring emergency room treatment are handled at the Sierra Vista Regional Health Center (SVRHC) or other local medical emergency clinics as necessary. More serious cases requiring emergency medical evacuation are sent to Tucson.

Agreements between Fort Huachuca, Sierra Vista, Cochise County and the USFS are in place to provide mutual assistance. The Sierra Vista Fire Department has three fire stations (Sierra Vista 2016). The Cochise County Fire District responds to calls occurring in the county and can provide additional assistance to other agencies when needed. The Fry Fire District has one station located within Sierra Vista and two additional stations in outlying areas within the county (Fry Fire District 2017). Fort Huachuca also has three stations. Personnel from these stations respond to emergencies on the Fort, at LAAF, and in the surrounding area. The USFS operates and maintains additional fire suppression facilities that are available to respond to forest and range fires within the Coronado National Forest, including lands within Fort Huachuca, pursuant to a cooperative agreement between the Installation and the USFS. The USFS has established a fire protection unit at LAAF and other units are stationed adjacent to Fort Huachuca (USAGFH 2004).

Fort Huachuca and the surrounding area have an active fire regime and wildland fires occur regularly. Fire management on the Fort is directed to meet the goals and objectives identified in the Fort Huachuca Integrated Wildland Fire Management Plan (IWFMP) (Zia 2016). These goals include protecting life as the highest priority, protecting the Installation and personal property, managing fire to support military training, managing fire to protect natural and cultural resources, and coordinating fire operations with neighboring land owners. The plan addresses the management of both wildfires and prescribed burns as well as the treatment of areas supporting sensitive resources (natural and cultural).

Range Control is responsible for coordinating and regulating activities on the ranges, supported by the law enforcement division and Fire Department. Ranges are secured and patrolled by Law Enforcement, while the Fire Department is responsible for fighting and extinguishing range fires and the scheduling of prescribed burns in conjunction with the ENRD. In addition, the Directorate of Public Works assists in maintaining fire breaks. Range Control regulations and standard operating procedures identify allowable range practices and precautions that must be taken (USAGFH 2004).

3.13.2 Environmental Consequences

Alternative One (Proposed Action)

Implementation of the Proposed Action is not anticipated to cause any significant impacts to human health and safety.

Laser Testing

Human health and safety related to the use of lasers is the primary concern associated with the implementation of the Proposed Action. In general, solid state lasers, when properly stored, used, and disposed of; pose very little risk to human health and safety. No significant direct or indirect impacts to human health or safety are anticipated.

The Fort has developed a SOP for the use of lasers (Appendix A), which establishes policies, defines responsibilities, and prescribes practices that will ensure personnel safety during laser testing and training operations within designated laser ranges at Fort Huachuca (USAGFH 2012). All Fort laser testing and training will comply with applicable laws and regulations, including but not limited to ANSI Z136.1, ANSI Z136.6, AR 385-63, DA PAM 385-63, MIL-HDBK-828B w/change 1, TB MED 524, and JP 3-09.3.

As described in *Section 2.1.2 Laser Technology*, lasers are categorized into classes based on specific characteristics, including the potential for causing biological damages. The lasers proposed for use would vary from Class 1 to Class 4 lasers. Each class of laser poses a certain potential for damaging radiation emissions and specific circumstances which must exist for the risk to be present. Although a laser classification designates a potential risk, it doesn't necessarily mean that the laser would actually cause harm. There are regulations and safety guidelines for each class of laser, specifying the proper usage and PPE level necessary for operation. Following regulations and complying with manufacturer instructions greatly reduce the risk to human health and safety.

When used properly, Class 1 and 2 lasers pose very little risk to human health and safety. Class 1 lasers are considered to be incapable of producing damaging radiation and require no control measures or PPE. Some Class 1M lasers may be slightly hazardous to the human eye if viewed for an extended period through an optical instrument, like a telescope. However, aside from ensuring that this type of laser use does not include optical instruments, requires no control measures or PPE. All Class 2 lasers are visible to the human eye, but pose very little risk of damage because of the eye's natural aversion response. Damage to the eye could result if the laser beam was aimed directly into the eye for an extended period of time. Additionally, if Class 2 lasers are viewed with an optical aid (i.e. telescope), the potential for eye damage could be slightly greater. However, no proposed testing or training activities target human eyes or any other part of the human body. The risk of incidental overexposure of the eye is almost non-existent.

Class 3R lasers pose a slightly greater risk of eye damage than Class 2 lasers, through direct and specular reflection viewing. However, the risk associated with the Proposed Action would be very small since no testing or training activities would target the human eye or any other human body part. Class 3B lasers may cause eye damage through direct or specular reflection viewing and in very rare instances may pose a diffuse reflection or fire hazard. Many Class 3B lasers require PPE, most commonly protective eyewear. Class 4 lasers can cause eye damage and can burn human skin. Class 4 lasers also pose the greatest fire hazard. Operations involving Class 4 lasers would require the greatest amount of control measures, including PPE which may include protective eyewear and clothing. The Fort's Laser SOP requires that an upto-date roster be maintained for all personnel authorized to use Class 3B and Class 4 lasers. Additionally, in compliance with ANSI Z136.1, personnel are required to undergo a vision/ocular assessment prior to use of Class 3B and Class 4 lasers. In accordance with the Laser SOP, all Class 3B and Class 4 lasers shall not be directed above the horizon, unless previously coordinated through the Range Safety Office (USAGFH 2012).

The Fort's Laser SOP requires that all requests for laser range usage be coordinated through the Range Safety Office at least 30 days in advance. All requests must be accompanied by a thorough Composite Risk Management Worksheet (DA Form 7566) and an Operations Order or Scenario depicting the scope of the operation and all safety procedures being utilized, as well as the class(es) of laser proposed for use. A Range Officer in Charge and Range Safety Officer will be appointed for all laser testing and training activities. These individuals will oversee training/testing and will be knowledgeable of the laser system being used and its safe operation. They will ensure that all personnel involved in the testing/training wear applicable PPE and are adequately informed of the safe operation of the laser(s) being used through a Preadmission/Safety Brief that will be conducted prior to the start of the testing/training activity. These individuals will also be responsible for maintaining radio communication with the Range Safety Office for the duration of the laser testing/training (USAGFH 2012).

Prior to any laser testing or training, the target and target areas would be surveyed to ensure that there are no unauthorized personnel or wildlife that could be harmed, or any specular reflectors (mirrors, glass, and still water) that could pose a risk to operations. For all aerial laser activities, a flyover over the entire testing/training area is required to ensure that these hazards are not present. In the event that any unsafe or marginally safe condition is noticed, or any unauthorized personnel or wildlife enter a restricted area, all laser operations would be suspended until the deficiency is corrected (USAGFH 2012).

Although minimal, the potential for fire exists during the use of Class 3B and Class 4 lasers. All personnel working at training and testing sites should have training on the fire risks associated with all vehicles and equipment and know the appropriate emergency services numbers to contact in the event of a fire. If necessary, Range Control may restrict Class 3B and 4 laser use during dry seasons and times of drought. Additionally, Range Control may require that certain Class 3B and 4 laser operations maintain additional on-site fire suppression equipment, and/or notify fire department personnel in advance of the laser activities to alert them of the potential risk of fire or require that fire personnel be on-site during the operations as a precautionary measure. Although, Class 3B and 4 lasers carry a risk of fire, it does not mean that they will cause a fire. When operated in accordance with manufacturer's guidelines, the Fort's Laser SOP, and applicable federal regulations, the risk of fire is minimal.

Gray Eagle UAS Runway and Associated Facilities

Construction contractors will comply with all required health and safety procedures during demolition of Pioneer Runway and construction of the new runway and associated facilities. UAS operation all already occurring at the Black Tower Complex and established UAS safety procedures will continue to be followed. Based on the extensive safety guidelines and instructions that would be implemented by Fort personnel during laser testing and UAS training activities, and the established procedures that must be followed in the event of an accident, the potential risks to human health and safety would not result in any significant impacts.

No Action Alternative

The No Action Alternative would not result in any human health and safety impacts.

Cumulative Impacts

Human health and safety services have increased over the years as Sierra Vista and surrounding communities have agreed to provide mutual support with fire and other emergency situations. Better routine medical services and emergency medical services are available for both civilians and military personnel. Serious emergency medical situations at Fort Huachuca still require evacuation to Tucson. However, today the trip takes 12 minutes by air versus approximately 1.5 hours by ground transport. The area is not seen as a hub for specialty medical services and will likely remain at the current level of service for the foreseeable future.

Safeguards of military and civilian personnel are taken seriously and standard operating procedures are dictated both verbally and provided in written form prior to any training or testing activities. With these guidelines in place, it is anticipated that none of the Alternatives would contribute to cumulative impacts on health and safety at the local or regional level.

3.14 Electromagnetic Spectrum

3.14.1 Affected Environment

The EM spectrum is the entire range of electromagnetic radiation, characterized by frequency and wave length. The EM spectrum extends from radio waves which have the longest wavelengths and lowest frequencies, to gamma rays which have the shortest wavelength and highest frequencies. Lasers occur in the infrared and visible portions of the EM as seen in Figure 3.2.

One of Fort Huachuca's unique operational roles for the DoD includes EM testing and training. The metal-bearing mountain chains surrounding Fort Huachuca create a unique topographic "bowl" that blocks external EM interference within the basin. This creates an ideal location for electronics testing and training. The natural topography provides the flexibility of using both military and commercial spectrum for operational and developmental testing.

The limited amount of developed land that surrounds the Installation provides an EM environment that is an unparalleled asset for testing. Due to the operational setting, the communications and electronic equipment testing function of the EPG moved to Fort Huachuca in 1954. The capability of both testing and training use made Fort Huachuca a unique spectrum asset for the Army. An area surrounding Fort Huachuca known as the Buffalo Soldier Military Electromagnetic Range (MER) is one of the only U.S. locations where regional electronic equipment testing can be effectively conducted. The MER is a frequency coordination zone protected by federal mandate (JLUS 2007). The EM environment is also a critical resource for many other tenants and organizations operating on the Installation and plays a vital role in the success of testing missions conducted by the EPG.



Source: LBNL 2012

Figure 3-2. Electromagnetic Spectrum

Spectrum-related activities associated with Fort Huachuca are subject to the policies and procedures of several Federal agencies. At the highest level, the spectrum management authority for all Federal agencies is the National Telecommunications and Information Administration, part of the Department of Commerce. The policies and procedures for spectrum use by Federal agencies are contained in the Manual of Regulations and Procedures for Federal Radio Frequency Management, commonly referred to as the National Telecommunications and Information Administration (NTIA) Manual. In addition to the NTIA, the DoD has well established and detailed policies and procedures for the use of the EM spectrum by DoD agencies. Finally, the U.S. Army has its own policies and procedures guiding the spectrum-dependent activities of Army entities. Regulations and procedures relevant to Army spectrum management issues are addressed in AR 5-12.

Principal responsibility for spectrum management within the U.S. Army rests with the Director of the Army Spectrum Management Office (ASMO) who is also the Army Spectrum Manager. The Director of ASMO reports to the Army Chief Information Officer (CIO)/G6. A number of Federal agencies have frequency assignments for radio frequency (RF) systems within the EM spectrum surrounding the Fort. All Federal agencies that use the EM spectrum have an office designated to perform the spectrum management function; typically this office reports to the agency's Chief Information Officer. Like DoD agencies, these agencies obtain authorized frequency assignments through the NTIA and the frequency assignment process contained in Chapter 8 of the NTIA manual. Non-Federal Government systems also contribute to the EM environment at Fort Huachuca. Commercial, state and local authorities are licensed to use the EM spectrum by the Federal Communications Commission.

3.14.2 Environmental Consequences

Alternative One (Proposed Action)

The wavelengths of lasers proposed for use under the Proposed Action would fall between infrared and ultraviolet, including visible wavelengths, on the EM spectrum (Figure 3-2). Ultraviolet radiation occurs at wavelengths between 180 and 400 nanometers (nm); visible radiation between 400 and 700 nm; and infrared radiation between 700 nm and 1 millimeter (mm). Lasers would not interfere with the Fort's other sources of EM testing, such as radar or radio communications systems, which operate on completely separate frequencies. However, the Fort's Spectrum Manager is notified of all laser testing activities.

No Action Alternative

Implementation of the No Action Alternative would not result in any impacts to the EM Spectrum.

Cumulative Impacts

There are no adverse impacts to the EM spectrum resulting from the implementation of any of the Alternatives. Therefore, there are no cumulative impacts anticipated.

4.0 FINDINGS AND CONCLUSIONS

A summary of the potential impacts and measures to minimize adverse impacts is provided in Table 4-1. Based on the analysis contained herein, this EA concludes that neither the implementation of Alternative One (Proposed Action), nor the No Action Alternative would constitute a major federal action with significant impact on human health or the environment. It is recommended that a Finding of No Significant Impact be issued to complete the NEPA documentation process.

 Table 5-1. Summary of Potential Impacts and Measures to Minimize Impacts for Alternative

 One (Proposed Action)

	Level of Anticipated Impact		f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
Land Use		x		No significant direct or indirect impacts to Land use are anticipated. All testing and training events are evaluated and scheduled through appropriate channels prior to the start of training or testing exercise to reduce/eliminate scheduling conflicts. All proposed testing and training would occur in existing training areas and would not alter current land use. Demolition of Pioneer Runway and the construction of the new runway and associated facilities at the existing Black Tower Complex would not result in any significant impacts to land use.
Topography, Geology, and Soils		x		No significant impacts to topography, geology, or soils would result from the implementation of Alternative One. The Fort actively works to reduce erosion on the Installation and all testing, training, and construction activities associated with the Proposed Action would implement best management practices to reduce any impacts to soils. Minor impacts to soils would be expected during the demolition of Pioneer Runway and the construction of the new runway and associated facilities. The new runway will require permits for construction of the new runway and facility and for crossing the existing drainage channel.
Hydrology and Water Resources		x		No significant impacts to water resources are anticipated as a result of the implementation of Alternative One. Activities associated with the Proposed Action would not increase the demand for groundwater and would not directly impact any surface water. Minor, short-term impacts to surface water drainage could occur during the construction of the new runway and associates facilities. Additionally, long-term, minor impacts to surface water drainage on that site, may result as part of the Section 404 permitting process and as pervious surfaces are converted to impervious surfaces. Appropriate stormwater management design and implementation on site would minimize these impacts.

	Level of Anticipated Impact		f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
Biological Resources		X		No significant direct or indirect impacts to biological resources are anticipated. Potential risks to biological resources include wildlife eye and skin damage, and the potential for fires in dry habitat. Compliance with appropriate safety guidelines and regulations, and the Fort's Laser Standard Operating Procedure would minimize these risks. The construction of the new runway will encroach on an AMA. These impacts will be mitigated with the addition of 9 acres of agave habitat to the AMA. Some short-term minor impacts to biological resources may occur during construction activities; however, they would be minimal and would only last the duration of the construction.
Cultural Resources			x	No direct or indirect impacts to significant cultural resources are anticipated as a result of the implementation of Alternative One. All proposed laser and testing activities would be coordinated with the Cultural Resources Manager to avoid areas with known significant cultural resources. The construction of the new runway and associated facilities would not have any adverse impact on significant cultural resources. If new utilities need to be run or access road change then those ground disturbing activities would have to be evaluated. In the event that an unknown archaeological resource is discovered during testing, training, or construction activities, all activities would cease and the appropriate Fort personnel would be notified.
Air Quality		x		No significant direct or indirect impacts to air quality are anticipated under Alternative One. Indirect impacts from gas-powered vehicles and equipment used to transport laser platforms during testing activities would not be expected to significantly increase overall air emissions. Construction vehicles and equipment associated with the demolition of Pioneer Runway and construction of the new runway and associated facilities would have minor, short-term impacts to overall air emission, primarily from vehicle exhaust and dust generation during construction.
Noise		х		There would be no significant direct or indirect impacts to the noise environment under Alternative One. The lasers proposed for use would not directly produce any significant audible sound. Indirect impacts associated with the UAS the lasers are mounted on, may result during testing and training activities. However, all proposed UAS platforms are already in use by the Fort. Noise impacts associated with construction activities would be minor and short-term.
Visual Resources		x		No significant impacts to visual resources would result from the implementation of Alternative One. All of the UAS laser platforms discussed within this PEA are already in use by the Fort. Testing and training activities using visible laser beams would occur and may be visible

	Level of Anticipated Impact		f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
				on-and off-post. However, given the temporary nature of these activities, no permanent impacts to the overall aesthetics of the area would result. There would be no significant impact resulting from the new runway and associated facilities since this area is remote and already being used for aircraft activities.
Socioeconomics		х		There would be no significant direct or indirect impacts to local or regional population or economy. Minor short-term beneficial impacts to local sales economy may result during construction-related activities or during testing and training activities. However, none of the activities associated with the Proposed Action would result in an increase in population or result in any adverse impacts to minority or low-income areas.
Transportation and Circulation		Х		No significant direct or indirect impacts to transportation or circulation would result from the implementation of Alternative One. Minor, short-term impacts to local roadways on the Fort may occur during laser testing and training activities due to road closures on the training ranges. However, no significant increases in traffic volume are anticipated. All testing and training activities must be coordinated and scheduled through appropriate channels, therefore no significant impacts to airspace or range access are anticipated. Construction activities at the Black Tower Complex may increase traffic volumes on the Fort during construction; however these impacts would be less than significant and short-term.
Utilities		x		There would be no significant direct or indirect impacts to utilities. None of the proposed laser testing or training activities would require access to utilities. It is anticipated the new UAS facilities will use existing utilities. If it is later determined that utilities need to be upgraded then those impacts would need to be assessed.
Hazardous and Toxic Substances		х		No significant direct or indirect impacts resulting from the use of hazardous and toxic substances are anticipated. All use, storage, transport, and disposal of hazardous substances and hazardous waste must comply with applicable laws and regulations. Lasers proposed for use at the Fort would contain little to no hazardous substances. Any hazardous waste generated during construction activities would be disposed of off-post by the contractor, in compliance with applicable laws and regulations.

	Level of Anticipated Impact		f ed	
Resource Area	Significant	Less than Significant	No Impact	Summary of Potential Impacts and Measures to Minimize Impacts
Health and Human Safety		х		No significant impacts to health and human safety would result from the implementation of Alternative One. Proper use, storage, and disposal of the lasers, along with the use of appropriate personal protective equipment, and compliance with applicable operating procedures and instructions would greatly reduce the risk of any human health or safety impacts. Impacts associated with construction activities would be minor, and temporary in nature.
Electromagnetic Spectrum			х	There would be no impacts to the electromagnetic spectrum under Alternative One. The lasers proposed for use at the Fort would range from infrared to ultraviolet, including visible radiation. These types of radiation are not known to interfere with the other types of radiation used on the Fort, specifically radio and other communications methods.

5.0 REFERENCES

- ADWR (Arizona Department of Water Resources). 2005. Figure 3-1 Upper San Pedro Basin, Generalized Geologic Map (Arizona Geologic Survey, 2000). Phoenix, Arizona. March.
- Altschul, Jeffrey H., and Bruce A. Jones. 1990. Settlement Trends in the Middle San Pedro Valley: A Cultural Resources Sample Survey of the Fort Huachuca Military Reservation. Technical Series 19. Statistical Research, Inc., Tucson.
- Bagne, Karen E. and Finch, Deborah M. 2013. Vulnerability of species to climate change in the Southwest: threatened, endangered, and at-risk species at Fort Huachuca, Arizona. Gen. Tech. Rep. RMRS-GTR-302. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 183 p.
- Bailowitz and Upson. 1997. Fort Huachuca, Arizona Butterfly List. [Online] [Accessed 22 December 2009.] http://www.naba.org/chapters/nabasa/Fort%20Huachuca%20Butterfly%20List%20-%20page%201.html.
- **DA (Department of the Army). 2007.** AR (Army Regulation) 200-1: Environmental Protection and Enhancement. 13 December 2007.
- Damp and Tagg. 2017. Archaeological Survey and Site Testing for New UAS Runway Complex at Black Tower and Laser Testing on West Range, Fort Huachuca, Cochise County, Arizona. Fort Huachuca Cultural Resources Report FH-17-3. Harris Environmental Group, Tucson. Environmental and Natural Resources Division, Directorate of Public Works, U.S. Army Garrison, Fort Huachuca, Arizona.
- EPA (Environmental Protection Agency). 2011. High Global Warming Potential (GWP) Gases. [Online] February 9, 2011. [Accessed 27 April 2011.] http://www.epa.gov/highgwp1/scientific.html.
- **FR (Federal Register). 2010.** 75 FR 31514 Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule. June 3, 2010.
- Fry Fire District. 2017. Station Locations. [Online] [Accessed 15 October 2017.] http://www.fryfiredistrict.com/about-us/station-locations/.
- Glahn, et al. 2000. Evaluation of moderate and low-powered lasers for dispersing doublecrested cormorants from their night roosts. [Online] [Accessed: 3 December 2012.] http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1010&context=icwdm_wdmco nfproc.
- Howell, D. and D. Robinett. 1995. Agave Management Plan Fort Huachuca,

Arizona. Report filed with the Environmental and Natural Resources Department, Fort Huachuca, Arizona.

- Ireland, W. 1981. Birds of Fort Huachuca (an informational checklist) compiled by William R. Ireland, Wildlife Biologist. Published by Game and Fish Management Section, Fort Huachuca; 1981, 48 pp.
- **JLUS. 2007.** Fort Huachuca Joint Land Use Study. Arizona Military Regional Compatibility Project. Arizona Department of Commerce. June 2007.
- LBNL (Lawrence Berkley National Laboratory). 2012. Electromagnetic Spectrum. [Online] [Accessed 11 September 2012.] http://www.lbl.gov/MicroWorlds/ALSTool/EMSpec/EMSpec2.html.
- Leidos. 2013. Programmatic Biological Assessment for Ongoing and Future Military Operations and Activities at Fort Huachuca. 254 pp.
- LIA (Laser Institute of America). 2014. American National Standard for Safe Use of Lasers. ANSI Z136.1-2014. American National Standards Institute, Inc. Approved 10 December 2013.
- McCain, E. B. and Jack L. Childs. 2008. Evidence of resident jaguars (Panthera onca) in the southwestern United States and the implications for conservation. Journal of Mammalogy 89(1):1-10.
- NRCS (Natural Resource Conservation Service). 1997. Soil Survey of the San Pedro River Valley, Arizona, An interim report from the Soil Survey of Cochise County, Douglas -Tombstone Part.
- NRCS (Natural Resource Conservation Service). 2009. Web Soil Survey. [Online] [Accessed 9 September 2008.] http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- **Pearthree, P.A., compiler, 1996.** Fault number 932, Huachuca fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, http://earthquakes.usgs.gov/regional/qfaults.
- Platz, J.E. and J.S. Mecham. 1979. Rana chiricahuensis, a new species of leopard frog (Rana pipiens Complex) from Arizona. Copeia 3:383-390.
- Rosen, P.C. and C.R. Schwalbe. 1988. Status of the Mexican and Narrow-headed Garter Snakes (Thamnophis eques megalops and Thamnophis rulipunctatus rulipunctatus) in Arizona. Unpublished report from Arizona Game and Fish Department (Phoenix, Arizona) to U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

- Sam Houston State University. 1996. Fish and Wildlife Section for the Integrated Natural Resources Management Plan. Draft. Sam Houston State University, Department of Biological Sciences, Huntsville, Texas.
- Sierra Vista. 2016. Community Overview. Spring 2016 edition.
- Sredl, M.J., Howland, J.M., Wallace, J.E., and L.S. Taylor. 1997. Status and distribution of Arizona's native ranid frogs. pp. 37-89 In M.J. Sredl, editor. Ranid frog conservation and management. Nongame and Endangered Wildlife Program Technical Report 121. Arizona Game and Fish Department, Phoenix, Arizona.
- Stephen, David V.M., James R. Billings, John J. Regan, Judith A. Roman, and Deni J. Seymour. 1987. A Systematic Archaeological Survey of Selected Areas within the Fort Huachuca Military Reservation, Cochise County, Arizona. Job No. 86105. Professional Archaeological Services and Technologies, Tucson.
- Taylor, R. 1995. A Birder's Guide to Southeastern Arizona. American Birding Association, Inc., Colorado Springs, Colorado.
- U.S. Army Medical Department. 2011. Raymond W. Bliss Army Health Center, General Information. [Online] [Accessed 27 April 2011]. http://rwbach.huachuca.amedd.army.mil/gen-info.html.
- USACE (U.S. Army Corps of Engineers). 2008. Fort Huachuca Real Property Master Plan Update. October 2008.
- USAEPG (U.S. Army Electronic Proving Ground) 1997a. Environmental Assessment Renewal of Six Joint-Use Property Leases in Support of the U.S. Army Electronic Proving Ground. March 1997.
- USAEPG (U.S. Army Electronic Proving Ground) 1997b. Relocation of Three Existing Electronic Proving Ground Low Powered Repeaters. June 1997.
- **USAGFH (U.S. Army Garrison Fort Huachuca**). **1992.** Environmental Assessment for the U.S. Army Electronic Proving Ground Communication-Electronic Testing and Use of Test Sites in Southern Arizona and Fort Huachuca. Fort Huachuca, Arizona.
- **USAGFH (U.S. Army Garrison Fort Huachuca). 2004.** Programmatic Environmental Assessment Future Development Plan, U.S. Army Intelligence Center, Fort Huachuca. Environmental and Natural Resources Division. November 2004.
- USAGFH (U.S. Army Garrison, Fort Huachuca). 2008. Integrated Cultural Resources Management Plan for Fort Huachuca Military Reservation, Cochise County, Arizona. Prepared for: U.S. Army Garrison and Engineering and Environmental Consultants, Inc., Prepared by: SWCA Environmental Consultants. July 2008.

- USAGFH (United States Army Garrison Fort Huachuca). 2009. Final Environmental Assessment for the Integrated Natural Resource Management Plan and Real Property Master Plan. Environmental and Natural Resources Division, Directorate of Public Works, U.S. Army Garrison, Fort Huachuca, Arizona. 2009.
- USAGFH (United States Army Garrison Fort Huachuca). 2010a. Integrated Natural Resources Management Plan Update. Contract W9124A-08-D-0002 Task Order 3. Environmental and Natural Resources Division, Directorate of Public Works, U.S. Army Garrison, Fort Huachuca, Arizona.
- USAGFH (United States Army Garrison Fort Huachuca). 2010b. Programmatic Environmental Assessment, Use of Renewable Energy Resources, Fort Huachuca, Arizona. Environmental and Natural Resources Division, Directorate of Public Works, U.S. Army Garrison, Fort Huachuca, Arizona. February 2010.
- **USAGFH (U.S. Army Garrison, Fort Huachuca). 2012.** Fort Huachuca Laser Range Standard Operating Procedure (SOP). Installation Management Command, Directorate of Plans, Training, Mobilization, and Security. 30 November 2012.
- USAGFH (U.S. Army Garrison, Fort Huachuca). 2013. Programmatic Environmental Assessment for the United States Army Electronic Proving Ground and the 2-13th Aviation Regiment – Testing and Use of Lasers. Environmental and Natural Resources Division, Directorate of Public Works, U.S. Army Garrison, Fort Huachuca, Arizona. February 2013.
- USAGFH (U.S. Army Garrison, Fort Huachuca). 2017. Biological Assessment for the Reorientation of Runway and Laser Testing and Training at the Black Tower Complex. Environmental and Natural Resources Division, Directorate of Public Works, U.S. Army Garrison, Fort Huachuca, Arizona. December 2017.
- USAIC & FH (U.S. Army Intelligence Center and Fort Huachuca). 1993. Environmental Assessment for Training and Communications-Electronics Testing at Fort Huachuca. 1993. 13 pp.
- USDI (United States Department of Interior) and USPP (Upper San Pedro Partnership). 2008. Water Management of the Regional Aquifer in the Sierra Vista Subwatershed, Arizona – 2007 Report to Congress. Prepared in consultation with the Secretaries of Agriculture and Defense and in cooperation with the Upper San Pedro Partnership in response to Public Law 108-136, Section 321. U.S. Geological Survey, Reston, Virginia. [Online] [Accessed 26 October 2009.]

http://www.usppartnership.com/docs/Sec3212007Rep011309.pdf. 2008.

- USFWS (U.S. Fish and Wildlife Service). 1993. Desert Pupfish Recovery Plan. Phoenix, Arizona. pp. 67. Weedman, D.A. et. al. 1997. Status of the Gila Topminnow and Desert Pupfish in Arizona. AFGD Non-Game Technical Report #118. 1-144 pp.
- USFWS (U.S. Fish and Wildlife Service). 1995. Recovery Plan for the Mexican Spotted Owl: Vol. I. Albuquerque, New Mexico. 172 pp.
- USFWS (U.S. Fish and Wildlife Service). Updated 2008. Web abstract: Chiricahua leopard frog (Lithobates [Rana] chiricahuensis). Accessed 03-08-2017, (http://www.fws.gov/southwest/es/arizona/CLF.htm).
- **USFWS (U.S. Fish and Wildlife Service). 2012.** *Mexican Spotted Owl Recovery Plan,* First Revision (*Strix occidentalis lucida*). Southwest Region U.S. Fish and Wildlife Service. Albuquerque, New Mexico. 414pp. September 2012.
- USFWS (U.S. Fish and Wildlife Service). 2013. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Northern Mexican Gartersnake and Narrow-Headed Gartersnake. Federal Register / Vol. 78, No. 132: 41550–41608.
- USFWS (U.S. Fish and Wildlife Service). 2014. Biological Opinion for Ongoing and Future Military Operations and Activities at Fort Huachuca, Arizona; Final non-jeopardy rule USFWS Arizona Ecological Field Office (AESO/SE22410-2013-F-0247), Phoenix Arizona 31 March 2014.
- **USFWS (U.S. Fish and Wildlife Service). 2016a.** Jaguar (Panthera onca) Draft Recovery Plan. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.
- **USFWS (U.S. Fish and Wildlife Service). 2016b.** *Recovery Plan for the Ocelot (Leopardus pardalis)* First Revision. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.
- Vanderpot, Rein, and William M. Graves (editors). 2013. A 3,977 Intensive Survey and NRHP-Eligibility Evaluations of 25 Previously Recorded Sites on Fort Huachuca, Arizona. Technical Report 12-31, Fort Huachuca Cultural Resources Report FH-12-7. Statistical Research, Inc., Tucson.
- Zia Engineering and Environmental Consultants Incorporated. 2016. Final Revised Integrated Wildland Fire Management Plan. U.S. Army Garrison Fort Huachuca. September 2016.
- Zia Engineering and Environmental Consultants Incorporated. 2017. Annual Monitoring: Endangered lesser long-nosed bat (Leptonycteris yerbabueane) on Fort Huachuca, Arizona. Report to Fort Huachuca - Environmental and Natural Resources Division.

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Organizations

Dr. Robin Silver, Conservation Chair The Center for Biological Diversity P.O. Box 710 Tucson, AZ 85702-0710

Huachuca Audubon Society 3327 Eagle Ridge Drive Sierra Vista, AZ 85650

Sierra Vista Chamber of Commerce 21 E. Wilcox Dr. Sierra Vista, AZ 85635

Sierra Vista Public Library 2600 E. Tacoma Street Sierra Vista, AZ 85635

The Nature Conservancy 1510 E. Fort Lowell Tucson, AZ 85719

8.0 LIST OF INDIVIDUALS AND AGENCIES CONSULTED

Mark Brandibur, Range Control Officer, DPTMS, U.S. Army Garrison, Fort Huachuca, Arizona

Chris Higgins, Water Programs and IRP Manager, ENRD, DPW, U.S. Army Garrison, Fort Huachuca, Arizona

Scott Miller, Training Division Chief, DPTMS, U.S. Army Garrison, Fort Huachuca, Arizona

Mike Ortiz, 2-13th Aviation Regiment, U.S. Army Garrison, Fort Huachuca, Arizona

Betty Phillips, NEPA Coordinator, ENRD, DPW, U.S. Army Garrison, Fort Huachuca, Arizona

Thomas Roberts, 2-13th Aviation Regiment, U.S. Army Garrison, Fort Huachuca, Arizona

Marty Tagg, Cultural Resources Manager, ENRD, DPW, U.S. Army Garrison, Fort Huachuca, Arizona

FORMAT PAGE

APPENDIX A

FORT HUACHUCA



Laser SOP

30 November 2012

DEPARTMENT OF THE ARMY

INSTALLATION MANAGEMENT COMMAND DIRECTORATE OF PLANS, TRAINING, MOBILIZATION AND SECURITY 72 CHRISTY AVENUE FORT HUACHUCA ARIZONA 85613-7009

IMWE-HUA-PL

Safety

LASER TESTING AND OPERATIONS FORT HUACHUCA, ARIZONA

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1. <u>Purpose</u>. To establish policies, define responsibilities and prescribe practices that will ensure personnel safety during FDA approved commercial and government laser operations and the FDA non-approved (i.e., military exempt for national defense, training and war time) lasers operations within designated laser range, Fort Huachuca, Arizona.

2. <u>Scope</u>. This Standard Operating Procedure (SOP) applies to all military, civilian and contractor personnel operating at Fort Huachuca, Arizona.

3. <u>Policy</u>. All requests for scheduling the laser range shall be made through the Fort Huachuca Range Safety Office at 520-533-1014, with at least 30 days notice.

- a. All requests must be accompanied with a thorough Composite Risk Management (CRM) Worksheet (DA Form 7566) an Operations Order (OPORD) or Scenario depicting the scope of the operation and all safety procedures being utilized, as well as laser class and facts sheet.
- b. Laser class restrictions will be implemented as follows:
 - 1. East Range Class I IV
 - 2. West Range Class I only
 - 3. South Range (Ranges 6, 8, 9, 10) Class I III
 - 4. Wilcox Playa Class I IV (with appropriate mitigation processes)

4. <u>Responsibilities</u>. Accident prevention is the responsibility of all personnel. All personnel are expected to refrain from unsafe acts and to conform to safety rules and regulations.
- a. The Fort Huachuca Range Operations Officer is responsible to the Commanding General, Fort Huachuca, Arizona for the control, supervision, safety, issuance, clearance, and coordination of all range activities, facilities and training areas on this installation.
- b. The Range Officer in Charge (OIC) and Range Safety Officer (RSO) shall be appointed by an accountable supervisor on a memorandum signed by their commander, and approved by the Fort Huachuca Range Operations Laser Safety Officer (LSO) and the Range Operations Officer. The OIC and RSO will be technically qualified by virtue of education, training or experience as determined by the LSO. The OIC and RSO must also be certified through the Fort Huachuca Installation Range Safety Certification Program, IAW AR 385-63, prior to using the Laser Range East. This course is NOT a laser training course, but will inform the OIC and RSO of their responsibilities and the requirements while training on Fort Huachuca. The OIC must be an E6/GS-7 or above and the RSO must be an E5/GS-5 or above.
 - (1) The OIC for any laser use shall be either a fully qualified government or military person and will be in charge of the group conducting training/testing and will be fully knowledgeable of the system and will operate IAW Appendices A and B of this SOP. The OIC will:
 - (a) Coordinate the scheduling of laser operations on the range with the Fort Huachuca Laser Safety Officer and the Range Operations Officer. The Fort Huachuca Laser Utilization Request Form will be used. The request form is available through Fort Huachuca Range Operations and Appendix E of this SOP.
 - (b) Prior to occupying the laser range and upon completion of the laser range, the OIC must process in and out through the Fort Huachuca Range Operations Fire Desk.
 - (c) Inform the RSO of all procedures of the laser range.
 - (d) Inform the RSO of the potential hazard of any operations to be performed.
 - (e) Establish and maintain radio communication with the Fort Huachuca Range Operations Fire Desk.
 - (f) Ensure the appropriate laser eyewear and any required Personal Protective Equipment (PPE) is available for the number of personnel participating in the laser operations.
 - (g) Ensure that each person involved in the laser operations have had their baseline laser eye examination.
 - (2) The RSO will be a fully qualified government or military person responsible for overseeing the safety operations during laser operations and must be fully knowledgeable of the system and operate IAW Appendices A, B and C of this SOP. The RSO will:

- (a) Ensure that personnel operating lasers and supporting equipment receive adequate instructions that will provide them an understanding of the hazards associated with that particular laser and prescribe, if needed, proper protective equipment.
- (b) Conduct a "Pre-admission/Safety Brief" prior to laser operations. The brief shall include as a minimum:
 - 1. Maps depicting the targets and/or target areas and their laser hazard area.
 - 2. Drawings and/or photographs of the target/targets to be utilized.
 - 3. Run-in headings and flight profiles to be used (Airborne Laser Operations).
 - 4. Permissible firing fans.
 - 5. Radio frequency to be employed.
- (c) Preclude the entry of unauthorized personnel onto the range.
- (d) Approve all range and test setups.
- (e) Establish and maintain two-way communications with all down range personnel to ensure that protective laser eyewear is in place before activation of the laser/laser system, and to notify of any hazardous conditions.
- (f) Close all gates and post appropriate laser warning signs and notices at designated locations.
- (g) Assure that adequate danger zones have been established and that strict control of traffic is maintained as necessary.
- (h) Check the range of all specular reflectors and remove as required.
- (i) Enforce laser standard operating procedures, laser safety rules and special precautions.
- (j) Establish first aid procedures, which will be developed in coordination with the local medical authority that provides health services to the installation. First aid should not be attempted for damage produced by laser energy to human eye tissue. Therefore, prompt reporting to medical treatment facilities is imperative for known or suspected laser injuries.
- (k) Ensure that a litter capable vehicle, litter, Combat Lifesaver, and a driver capable of medical evacuation are on site at all times.
- (I) Coordinate the laser testing with other activities within the laser range area and furnish all required information to control tower operations

(airborne laser testing) and authorized ground control stations (groundbased laser testing) associated with the laser testing.

- (3) Work Party Supervisor in charge of a maintenance party planning to enter the controlled area during cold times (no laser operations) shall:
 - (a) Obtain clearance from the OIC before entering the area. The request for clearance shall be during cold times only and shall include:
 - 1. Nature and location of work to be done.
 - 2. Name of person in charge of the work party.
 - 3. Number of people in the work party.
 - 4. Expected duration of stay in the area.
 - (b) Establish and maintain radio contact with the OIC at all times while on site.
 - (c) Ascertain work party is confining their activities to the area for which the clearance is granted and follow the prescribed routes to and from the area.
 - (d) Cancel all clearances when leaving the test area.
- (4) Laser Operating Personnel will be responsible for the following:
 - (a) Know and adhere to this SOP, safety rules and special instructions.
 - (b) Immediately report to the RSO and/or OIC any known or suspected laser accident or personal injury.
 - (c) Have certification that a baseline laser eye examination has been administered.
 - (d) Assure that operation of laser equipment will not injure other personnel who may be present.
 - (e) Be in direct two-way communication with the OIC and/or RSO at all times.
 - (f) Wear appropriate laser eyewear when lasers are in operation.
- (5) Visitors who are present to witness a laser test are required to do the following:
 - (a) Obtain clearance from the OIC.
 - (b) Bring and wear the appropriate laser protective eyewear for the wavelength of the laser being tested.

5. Exposure Response and Reporting Requirements.

- a. Response to laser injuries. Any Soldier or civilian employee with a confirmed or suspected, unprotected exposure to a class 3B or 4 laser should have a diagnostic vision examination as soon as possible (no later than 24 hours) by an optometrist or ophthalmologist at the nearest military treatment facility (MTF). Immediate notification of injury shall be reported to Fort Huachuca Range Operations. Documentation of the injury should include a history of the event and a thorough vision and ocular examination. The examination should include ocular history, distance visual acuity, Amsler grid (or similar central visual field) test, slit lamp examination, ocular fundus evaluation through dilated pupil, ocular fundus photographs that depict the extent of injury or lack of injury, and photographs of any external or anterior segment injury. If ophthalmic photographic capabilities are not available, then a detailed representation of the finding may be hand-drawn or the patient should be referred to the nearest MTF (or authorized civilian provider) that has such capabilities. Individuals with confirmed exposure should be examined by a retinal specialist.
- b. Reporting.
 - (1) Once the optometrist or ophthalmologist suspects or confirms an acute laser overexposure incident, he/she will notify:
 - (a) The Installation Laser Safety Officer (LSO) and/or Radiation Protection Officer (RPO).
 - (b) The Tri-Service Laser Injury Hotline (DSN 798-3764 or commercial 937-938-3764 or 1-800-473-3549) (email: <u>esoh.service.center@wpafb.af.mil</u>).
 - (c) The US Army Institute for Public Health (USAIPH) Laser/Optical Radiation Program (DSN 584-3932/2331 or commercial 410-436-3932/2331 or 1-800-222-9698) (email: laserincident@amedd.army.mil).
 - (d) The USAIPH Tri-Service Vision Conservation and Readiness Program (TVCRP) Manager (DSN 584-2714 or commercial 410-436-2714) (email: <u>laserincident@amedd.army.mil</u>). After normal duty hours, contact the USAIPH personnel via the staff duty officer (DSN 584-4375 or commercial 410-436-4375 or 1-800-222-9698).
 - (2) Information to be reported includes:
 - (a) Patient name, grade, and SSN (based on PII protection requirements).
 - (b) Unit name.
 - (c) Hospital providing care and registration number.

- (d) Exposure date and source.
- (e) Duty being performed at the time of the incident.
- (f) Summary of symptoms and evaluation.
- (g) Any follow-up information
- (3) The Unit LSO or RPO, with the help of the safety office or representative, will secure the laser in question (Do not send the laser equipment to maintenance for repairs). The USAIPH Laser/Optical Radiation Program will initiate a technical evaluation of the incident and of the laser equipment involved and will render a technical report as soon as possible after the incident. The U.S. Army Medical Research Detachment of the Walter Reed Army Institute of Research (USAMRD-WRAIR) Ocular Hazards Division, in cooperation with the USAIPH TVCRP, will coordinate the initial and follow-up care of the patient and will render a report on the patient's status and prognosis.
- 6. References.
- c. AR 385-63, Range Safety
- d. DA PAM 385-63, Range Safety
- e. TB MED 524, Occupational and Environmental Health: Control of Hazards to Health from Laser Radiation.
- f. MIL-HDBK-828B w/Change 1, Range Laser Safety
- g. Joint Publication 3-09.3, Close Air Support

6. Proponent.

The proponent for this SOP is DPTMS, Range Operations, Fort Huachuca, AZ.

WESLEY A. LEISINGER Director of Plans, Training Mobilization and Security

Appendix A

Laser Safety Practices for Ground-Based and Air Laser Operations

The laser safety practices for ground-based and air laser operations that need to be instituted to safely conduct laser operations are:

1. Laser safety requirements as defined in TB MED 524, ANSI Z136.1, AR 385-63, DA PAM 385-63, MIL-HDBK-828B w/Change 1, Joint Publication 3-09.3 and this SOP shall be strictly adhered to during laser operations.

2. All employees assigned to work with laser equipment will receive full instructions with respect to the hazards associated with the equipment, the laser beam and with the proper use of the equipment. An up-to-date roster of personnel authorized to use Class 3B and Class 4 laser equipment will be maintained by the unit and a copy submitted to Range Operations.

3. The target and the target areas must be free of any specular reflectors (mirrors, glass, still water, etc.), unless they are necessary for the purpose of the operation. In such cases, specular surfaces will be oriented to assure that hazardous reflections will not be directed into controlled areas or toward unprotected personnel, and in which the beam will not leave the defined perimeters of the Laser Range. Where specular surfaces exist in the target area, optical instruments such as field glasses or telescopes will not be used to observe the target area unless they are fitted with appropriate attenuating filters. For <u>Airborne Laser Operations</u>, a flyover of the range is also required at the onset of the laser test, *in addition* to the initial ground survey of the range.

4. The OIC and RSO must be constantly alert for any unauthorized personnel wondering within the boundaries of the Laser Range. Hunting season occurs throughout the year on Fort Huachuca, as well as undocumented illegal alien traffic.

5. Laser operations warning signs, **in addition to those required by this SOP**, shall be posted at the discretion of the OIC and/or RSO to warn unauthorized personnel of the laser operations.

6. A "Safety Brief" shall be conducted prior to laser operations. The brief shall include at a minimum:

- a. Maps depicting the targets and/or areas and their laser hazard area
- b. Drawings or photographs of the target/targets to be utilized
- c. Permissible Firing Fans

7. A two-way communication link between the OIC, RSO, laser operator, and down range personnel shall be maintained throughout the laser operations. During <u>Airborne Laser</u> <u>Operations</u>, the pilot must also maintain contact with the OIC.

8. The OIC must maintain constant radio contact with the Fort Huachuca Range Operations during testing and will be required to conduct communications checks every 30 minutes during hot times.

9. System equipment requiring electrical power shall be adequately tested for proper operation prior to operations and operating personnel shall make certain that no sub-system electrical overload exists.

10. Before lasing, operating personnel shall ensure that the laser is pointing down range and aimed at the ground or a point on the target within the firing parameters as submitted to Range Operations. For safety reasons, it is recommended that only lasers mounted on a stabilized platform be used down range against the targets within the Laser Range. A 10-mil buffer must be maintained around all target areas.

11. During <u>Airborne Laser Operations</u>, the aircraft must be on a run-in heading of 90 degrees magnetic north when designating or range finding targets located within the Laser Range. If a different run-in heading is required, contact the Range Operations Laser Safety Officer. A 10-mil buffer must be maintained around all targets areas and no airborne laser will be fired outside of the defined boundaries of the Laser Range.

12. All personnel in the immediate area of the laser firing position must be behind the operator while the laser is in use. Personnel should never wander into the beam path, its associated buffer, or the laser target area without appropriate laser eye protection. Such eye protection shall have the appropriate optical density equal to or greater at the laser wavelength.

13. Personnel must report to the OIC and/or RSO immediately on any suspected injury or defective equipment (e.g., misalignment of the laser beam with the pointing optics) so that appropriate action can be taken.

14. In the event an unsafe condition or a marginally safe condition is found to exist in project equipment (electrical and/or mechanical installation), operations shall be suspended until the deficiency is corrected. The laser operator shall immediately terminate power to the laser system should they observe any unsafe condition, including any unprotected or unauthorized personnel entering the area.

15. Only the authorized target may be designated or ranged.

16. Do not designate or range aircraft.

17. Prior to lasing, the target must be positively identified under the crosshairs of the scope or on the operator's monitor. Upon firing the laser, the laser operator will notify everyone involved in the operation "LASER GO." Upon completion of the test run, the laser shall be turned off, everyone involved in the operation will be notified "LASER STOP" and arm/enabled power removed before the aircraft leaves the range area.

18. The laser will not be operated or used experimentally outside the range area without such operation being specifically authorized by the Fort Huachuca Laser Safety Officer and the Fort Huachuca Range Operations Officer.

19. The laser exit port of all ground based laser systems will be covered by an opaque dust cover when the laser is located outside the range area or is not in use.

20. No special precautions are necessary for firing during rain, fog or snowfall. However, laser operations must cease if water begins ponding either on the ground, snow or ice. In the event

that the installation is closed due to inclement weather conditions, the Laser Range will also be closed.

21. In the event of electrical storms with excessive winds, all laser tests shall be discontinued. During Airborne Laser Operations, should marginal wind conditions exist, the OIC, RSO and pilot shall consult as to the safety of continuing airborne operations.

22. All Class 3B and Class 4 lasers shall not be directed above the horizon unless coordinated with the Fort Huachuca Laser Safety Officer and the Range Operations Officer.

23. Upon completion of the operation, the laser shall be turned off and disconnected from its power supply and OIC is notified of the cessation of laser operations.

24. Laser safety eyewear exposed to very intense energy or power levels may lose effectiveness. A field expedient method to determine if laser eyewear is defective is to visually hold eyewear up to a strong light. Any holes, cracks or damage would indicate defects. Defective eyewear should be discarded unless they can be repaired to meet the specifications for new eyewear. If the eyewear is designed to serve also as impact resistant safety spectacles, replaced filter lenses should meet the requirements of ANSI Z87.1.

25. Unattended hazardous laser operations are not authorized and will not be permitted at the Laser Range. However, if a non-hazardous system is intended for unattended operation and it's design assures personal safety, a request must be submitted to the Fort Huachuca Laser Safety Officer not less than 30 days prior to proposed operating dates. The Fort Huachuca Laser Safety Officer and the Range Operations Officer approval must be done before such operations can take place.

26. Only qualified personnel will be permitted to work on laser systems. Non-maintenance work should not be performed on laser systems until the power is off and the residual charge in any power supply capacitors has been "bled-off."

Appendix B

Safety Responsibilities for Laser Operations

Overall responsibility for safety control during laser operations is assigned to the OIC. The following is a list of responsibilities delegated to the OIC and RSO when a laser test is about to begin:

1. Officer In Charge (OIC) will:

a. Complete a Laser Range Utilization Request (Appendix D) no less than 30 days prior to the start of operations and route through for signatures.

b. Obtain approval for the operation of lasers from the Fort Huachuca Laser Safety Officer.

c. Coordinate the scheduling of the Laser Range with the Range Operations scheduler.

d. Be familiar with FH REG 385-8, Fort Huachuca Training and Range Regulations, and Field Manuals, Technical Manual's and/or manuals applicable to the laser being used. Fort Huachuca Regulations can be obtained from Range Operations (Bldg 15424).

e. Ensure that any non-standard operation, such as smoke, pyrotechnics and digging are coordinated no less than two weeks prior to the start of the operation. Overlays, Records of Environmental Consideration (REC), Fire Plans and Risk Assessments may be required for non-standard testing. Initial coordination will be made with the Range Operations Officer at (520) 533-7095.

f. Ensure that the OIC and RSOs are validated by a command certification memorandum (Appendix E), briefed by Fort Huachuca Range Operations and have valid Range Safety Certification Cards in their possession.

g. Process in through the Range Operations Fire Desk (Bldg 15424) prior to occupying the laser range, and process out through Range Operations Fire Desk at the conclusion of operations.

h. Sign for and be responsible for accountability and turn in of all range facility equipment, radios and keys.

i. Open the range and establish radio communications with Fort Huachuca Range Operations immediately after entering the range facility. Ensure that radio communications are maintained and monitored on dedicated radio/phone until the facility is cleared. Radio checks will be completed every 30 minutes while range is in a "hot status".

j. Ensure red flag is displayed from the range facility flagpole before requesting "hot status." The OIC will request a "hot time" prior to the start of laser operations. Range Operations will be notified of any cease-fire exceeding 30 minutes. At the completion of lasing, the OIC will request a "cold time" and give an approximate time for clearing the range facility.

k. Ensure that barricades are in place and medical evacuation vehicle and driver are available. Ensure danger signs are at designated locations.

I. Designate each person a specific task and brief the entire group so that everyone understands the test operation.

m. Be present with the RSO during all lasing operations on the facility.

n. Ensure that a safety and information briefing is conducted for all personnel on duds, the use of eye protection, seasonal warnings, laser hazard warnings and "cease-fire" prior to laser operations.

o. Ensure that all safety procedures are rigidly followed.

p. Physically check range for safety violations.

q. Maintain radio communication with RSO and all personnel involved. Lasing will cease immediately if communication is lost and will not resume until OIC is confident that reliable communications has been established.

r. Proved indoctrination of personnel as required for safety operations.

s. Ensure range has been checked for flat and specular surfaces and have been either removed or covered. The OIC must notify Range Operations that the area has been inspected and found free of specular surfaces prior to receiving permission to go "hot."

t. Approve all laser operations set-ups. Make final determination that it is safe to fire.

u. Notify RSO to close access to the laser range.

v. Terminate range operations when an unsafe condition occurs.

w. Call in a cold time with Range Operations at the end of the day.

x. In the event of the cancellation of any day(s) during the scheduled range time, the OIC MUST notify Range Operations of the cancellation <u>no less than</u> one day prior to the scheduled range time.

2. Range Safety Officer (RSO)

a. Notify the OIC that pre-operation preparations are beginning.

b. Ensure that lasers are properly mounted and are in proper location.

c. Ensure that a vehicle and a driver capable of medical evacuation are available. For eye injuries, the medical evacuation vehicle can be accomplished by the unit. In the event of more serious injuries, such as a fall, head injury or other serious injury, call 911 and inform Range Operations immediately.

d. Conduct a safety briefing for all personnel. Safe operation of the laser being used and any known hazards will be outlined and explained.

e. Visually inspect the range for reflective surfaces, removing any that exist.

f. Obtain latest weather information.

g. Ensure that the visibility level is such that all targets to be lased are clearly visible.

h. Establish and maintain continuous communication with range personnel in the target area.

i. Notify all teams to begin pre-operations preparations.

j. Receive notification that pre-operations preparations have been completed.

k. Obtain OIC approval for the operation and verify airspace clearance.

I. Notify all personnel that a hazardous condition exists.

m. Ensure all personnel wear eye protection in the range facility during lasing as required. Eyewear must be approved for the wavelength and the laser device being fired.

n. Verify range flag is in place.

o. Notify all personnel that laser operations will begin in 5 minutes.

p. Obtain OIC approval for laser activation.

q. Notify all personnel of lasing conditions "LASER GO."

r. After operations are complete, notify the OIC and all personnel when eye safe conditions exist "LASER STOP."

					LASER RANGE EAST					
LASER RANGE UTILIZATION REQUEST					Fort Huachuca, Arizona					
TEST/OPERATION CLASSIFICATION					TEST/OPERATION NAME					
Tect Dates			PANGEO				Range Certificati	ion Expiration Date		
From	To		RANGEC				nunge eertineut		TELEPHONE	
From	10		-							
			RSO				Range Certificat	ion Expiration Date	TELEPHONE	
							-			
Number of Personnel						TES	ST/OPERATIONS PL	AN STATUS		
CIVILIAN OFFICER ENLISTED CONTRACTOR VIP'S FOREIGN					Attached Forthcoming Brief description on back					
LASER SYSTEMS(S) INFORMATION										
LASING MEDIUM										
CLASS (I, II, IIIA/B, IV)										
WAVE LENGTH										
BEAM DIVERGENCE										
DEAM DIVERGENCE										
CW OR PULSE										
OUTPUT POWER										
OTHER SAFETY HAZARDS (noise,										
gasses, etc.)										
NOHD Unaided										
NOUD Aided 7xE0										
NOHD Alded 7x50										
USAPHC CERTIFIED?										
NAME AND TITLE, LASER USER TEAM CHIEF			SIGNATURE					DATE	DATE	
NAME AND TITLE OF LASER SAFETY OPERATIONS			SIG	SIGNATURE				DATE		
APPROVING OFFICER										
SUPPORT REQUESTED										
FIELD SUPPORT PERSONNEL/FUNC	TION D Check here if not r	equired								
DAILY SCHEDULE (Days/Hours) PI FASE ATTACH DAILY SCHEDULE F TO THIS FORM										
AIRCRAFT INVOLVED FTAS REQUIRED			ITPE AI	THE AND NO. OF AIRCRAFT		FUEL/ HIVIES		ALITUDES	ALITIODES	
DOWN RANGE REQUIREMENTS (targets, smoke, mowing, gravel, etc.)										
NAMIE AND TITLE OF KANGE AND SCHEDULING SIGNAT					URE			DATE		
APPROVING OFFICER										

APPENDIX D

LETTERHEAD

OFFICE SYMBOL

DATE

MEMORANDUM FOR Range Operations, Fort Huachuca, AZ

SUBJECT: Commander's Certification of Laser Range Officer in Charge (OIC) and Laser Range Safety Officer (RSO)

1. The personnel listed below are certified to perform duties as the OIC/RSO for the Fort Huachuca Laser Range for my unit. They have been thoroughly trained and have demonstrated a complete knowledge of laser and/or unmanned aerial systems (UAS) that will be used on the laser range at Fort Huachuca.

2. The individuals named below know and understand the requirements directed by AR 385-63, DA PAM 385-63, FH Reg 385-8, FH Reg 385-3 and all pertinent Army and DOD Laser and UAS regulations. They are additionally aware that they must have a current Range Certification on file at Range Operations while acting in the capacity of OIC/RSO.

3. NAME GRADE/RANK LAST FOUR

4. POC for this action is the undersigned at (xxx) xxx-xxxx.

SIGNATURE BLOCK OF COMMANDER