

INTEGRATED NATURAL RESOURCE MANAGEMENT PLAN

FORT HUACHUCA ARIZONA

Prepared by:

Environmental and Natural
Resource Division
Directorate of Public Works
U.S. Army Garrison
Fort Huachuca, Arizona



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May 2021

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Fort Huachuca, Arizona

Approved by:

A handwritten signature in black ink, appearing to read "Jarrod P. Moreland".

JARROD P. MORELAND
COL, MI
Commander, U.S. Army Garrison

June 2021

Format Page

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Environmental and Natural Resources Division
Directorate of Public Works
U.S. Army Garrison
Fort Huachuca, Arizona

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Amy Lueders
Regional Director, Southwest Region
U.S. Fish and Wildlife Service

September 2021

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Prepared by:



Environmental and Natural Resources Division
Directorate of Public Works U.S.
Army Garrison
Fort Huachuca, Arizona

Approved by:

A handwritten signature in black ink, appearing to read "Tom Finley".

TOM FINLEY
Assistant Director
Arizona Game and Fish Department

May 2021

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CHAPTER 1 OVERVIEW

1.1 Purpose

The purpose of this Integrated Natural Resource Management Plan (INRMP) is to guide the implementation and integration of the natural resources program on the United States (U.S.) Army Garrison Fort Huachuca, Arizona (hereinafter called Fort Huachuca or the Fort). This INRMP is Fort Huachuca's plan of action for the management of natural resources and military training and operational activities occurring among those resources. The Fort is a proactive steward of natural resources on its real property and makes sound decisions regarding the use of such resources in support of the military mission and needs of the region and the nation. Implementation of the INRMP helps ensure the maintenance of high quality training lands to sustain Fort Huachuca's critical military mission and ensure that natural resources conservation measures and Army military activities are integrated and consistent with federal stewardship requirements.

1.2 Scope

It is Department of Defense (DoD) policy to implement and maintain natural resource conservation programs to ensure access to land, air, and water resources for realistic military training and testing while ensuring that the natural resources under the Secretary of Defense's stewardship and control are managed to support and be consistent with the military mission (DoD 4715.03). This INRMP addresses the management of natural resources on all Fort lands, ranges, leased lands, or lands set aside for its use. The plan provides the basis and criteria for protecting and enhancing natural resources using ecosystem-based watershed, landscape, and ecosystem management perspectives, consistent with the military mission. This INRMP also guides Fort Huachuca's cooperation in renewable natural resources conservation at the regional level.

Provisions of the INRMP apply to each directorate, command, tenant unit, lands occupied by tenants or lessees at Fort Huachuca, contractors (government and private), private groups, dependents, and individuals who either directly or indirectly use the installation's natural resources, as well as units and outlying detachments of personnel assigned or attached to the installation. The DoD Component permitting authorities may include provisions in leases, permits, or licenses requiring the grantee to perform natural resources conservation duties as a condition of occupancy or use of the parcel. Installation commanders still address natural resources management on any of these lands.

1.3 Army Environmental Policy Statement

Army Environmental Policy as directed by Army Regulation (AR) 200-1 requires all Army organizations and activities to:

- comply with applicable federal, state, and local environmental laws, regulations, executive orders (EOs), or overseas Final Governing Standards (FGS); to develop and implement pollution prevention and control strategies; and to establish environmental priorities in consideration of the benefits to the sustainment of missions and operations;
- strive to achieve continual improvement in overall environmental performance and supporting management systems;
- ensure that policy directives found in AR 200-1 are implemented, maintained, and communicated to all military and civilian employees and supporting contractors. In addition, this policy will be made readily available to the public upon request; and

- require that all contracts and contract modifications specify that contractors are liable for any enforcement actions, fines, and/or penalties resulting from their failure to comply with applicable environmental requirements.

1.4 Command Environmental Policy

Responsible environmental stewardship is critical for all missions on Fort Huachuca, as well as lands set aside or lands leased for use by Fort Huachuca. To ensure the continued ability to accomplish the Fort's missions, every leader, soldier, family member and civilian or contract employee, living on, working for, or acting on behalf of Fort Huachuca must do everything possible to prevent pollution, conserve natural and cultural resources, and comply with all relevant laws, regulations, and policies.

Fort Huachuca actively seeks continuous improvement opportunities in conservation and environmental programs. Commanders at all levels ensure environmental requirements are integrated into mission and training planning and execution, as well as work practices and family life. Commanders ensure environmental awareness and compliance are integral to all operations, not afterthoughts. Protecting the environment guarantees mission readiness at Fort Huachuca. An understanding of the mission-critical importance of environmental stewardship must be integrated throughout all activities and with all personnel on the installation.

1.5 Army Strategy for the Environment

Fort Huachuca is committed to environmental stewardship in all actions as an integral part of its mission and to ensure sustainability. This INRMP supports the *Army Strategy for the Environment: Sustain the Mission – Secure the Future* (OASA-I&E 2004) which establishes a long-range vision for a sustainable Army, and the goals upon which the vision is based. The Fort has adopted the following high-level goals in order to achieve an enduring Army enabled by sustainable operations, installations, systems, and communities. These are the building blocks of Army sustainability, and they spring from the internal processes in the Army's Strategic Readiness System. These goals create the structure to provide a clear linkage between the Army's strategic objectives and the actions needed to achieve those objectives.

- Goal 1: Foster a Sustainability Ethic.** Fort Huachuca shall foster an ethic within the Army that moves beyond environmental compliance to sustainability.
- Goal 2: Strengthen Army Operations.** Fort Huachuca shall strengthen Army operational capabilities by reducing its environmental footprint through more sustainable practices.
- Goal 3: Meet Test, Training, and Mission Requirements.** Fort Huachuca shall meet current and future training, testing, and other mission requirements by sustaining land, air, and water resources.
- Goal 4: Minimize Impacts and Total Ownership Costs.** Fort Huachuca shall minimize impacts and total ownership costs of Army systems, materiel, facilities, and operations by integrating the principles and practices of sustainability.
- Goal 5: Enhance Well-Being.** Fort Huachuca shall enhance the well-being of its soldiers, civilians, families, neighbors, and communities through leadership in sustainability.
- Goal 6: Drive Innovation.** Fort Huachuca shall use innovative technology and the principles of sustainability to meet user needs and anticipated future Army challenges.

1.6 Development and Implementation Responsibility

The Garrison Commander implements policies and directives of the Department of the Army (DA) and the Installation Management Command (IMCOM). They direct and are responsible for all aspects of Garrison operations at Fort Huachuca, including natural resources management. IMCOM Directorate - Training (ID-T) headquartered at Fort Eustis, Virginia with Headquarter IMCOM at Fort Sam Houston, Texas (TX) is the higher command for Fort Huachuca. The Fort Huachuca Garrison Commander reports to the civilian Region Director at ID-T.

The Garrison provides a multitude of functions and services that keep the 80,912-acre installation operating so other organizations on post may concentrate on their primary missions (updated acreage from 2019 Geographic Information System (GIS) data from the Fort's Real Property Master Planning Division). As a city unto itself, the Garrison provides support to Fort Huachuca, just as any city government supports its community. For instance, the Garrison provides such services as military and civilian personnel, legal, inspector general, logistic support, facilities engineering, fire and safety, intelligence and security, housing, public affairs, resource management, internal audit compliance and review, and crime prevention and law enforcement. The Garrison also maintains community facilities and infrastructure and provides necessary services for religious, health, welfare, and entertainment activities. The Garrison is responsible for maintaining Fort Huachuca's quality of life.

Primary responsibility for the development and implementation of this INRMP rests with the Environmental and Natural Resource Division (ENRD), which resides within the Garrison's Directorate of Public Works (DPW). The organization of the ENRD, shown below, consists of Department of Army civilians (DAC):

- Chief, Environmental and Natural Resources Division
 - Hydrologist
- Chief, Conservation Branch
 - Archaeologist
 - Forester
 - National Environmental Policy Act (NEPA) Coordinator
 - Wildlife Biologist
- Chief, Compliance Management Branch
 - Environmental Protection Specialist (Air / Noise)
 - Environmental Protection Specialist (Hazardous Waste)
 - Environmental Protection Specialist (Inspections)
 - Environmental Protection Specialist (General)
 - Physical Science Technician

While DACs provide the foundation and fulfill the managerial roles, ENRD is also supported by an in-house environmental contract and Oakridge Institute for Science and Education (ORISE) interns when possible. This support is necessary to continue a successful natural resource program given the reduction in government positions.

General responsibilities of the ENRD related to natural resource management include:

- managing natural resources to support the military mission;

- enhancing wildlife habitat;
- ensuring compliance with state and federal laws and regulations involving natural resources and historic properties;
- protecting land investments from depreciation by adopting land management practices based upon soil capabilities;
- administering the hunting and fishing program;
- implementing general wildlife management and research;
- maintaining and implementing the INRMP;
- maintaining a trained, professional staff;
- cooperating with state and other federal natural resources agencies;
- protecting and, whenever possible, enhancing wetlands;
- minimizing erosion; and
- protecting threatened, endangered, and other special status species.

1.7 Internal Stakeholders

Internal Stakeholders are defined as those organizations within the Garrison that are responsible in some part for the management of natural resources on the Fort.

1.7.1 Directorate of Public Works

The Fort Huachuca DPW serves as principal adviser to the Garrison Commander and staff on all matters pertaining to the DPW. The DPW directs and provides operational control of all Fort Huachuca engineering and housing activities including housing of all military personnel, engineering design and services, master planning, wildlife and land management, historical preservation, environmental protection, restoration and hazardous waste management, custodial and refuse services, real estate/real property control, and energy management.

1.7.2 Directorate of Plans, Training, Mobilization, and Security

The Directorate of Plans, Training, Mobilization and Security (DPTMS) serves as the installation's central tasking authority and the Garrison Commander's primary staff proponent for command and control in support of antiterrorism/force protection, security, training, and planning. In addition, the DPTMS is responsible for coordinating, synchronizing and directing all Installation and Garrison level activities and events.

Range Operations resides within the DPTMS and provides access to ranges to accomplish the provisions of this Plan, assists in enforcing environmental considerations within range regulations, and is directly responsible for implementation and/or support of portions of this INRMP that directly affect or interact with training responsibilities.

1.7.3 Directorate of Emergency Services

The Directorate of Emergency Services (DES) includes the installation Fire Prevention / Protection Division (FPPD) and the Law Enforcement Division. The primary mission of the FPPD is the protection of life and property. Secondary missions of the FPPD include wildfire suppression, fire planning, prescribed burning, and fire-related training and safety. The Law Enforcement Division is responsible for enforcement of federal, state, and installation hunting and fishing regulations and other applicable natural resource and environmental laws and regulations.

1.7.4 Directorate of Family, Morale, Welfare, and Recreation

The Director of Family, Morale, Welfare, and Recreation (FMWR) establishes procedures and governs installation outdoor recreation activities, except hunting and fishing (AR 215-1). Programs that particularly affect Fort Huachuca natural resources include equestrian programs, picnicking, camping, hiking, and golf.

1.7.5 Veterinary Treatment Facility

The mission of the Fort Huachuca Veterinary Treatment Facility (VTF) is to control zoonotic diseases (diseases which are transmittable from animals to humans). Fort Huachuca Regulation 40-116 *Control and Care of Pets, Horses, and Transient Animals* is the regulation that governs animals on Fort Huachuca. It applies to all military personnel and their dependents as well as civilians while they are on the installation. This regulation requires registration of any pets brought onto Fort Huachuca with the VTF within five workdays of their arrival or acquisition. All dogs and cats are required to be microchipped, and immunized against rabies and registered annually.

1.7.6 Public Affairs Office

The Public Affairs Office (PAO) is responsible for promoting an understanding of Fort Huachuca among its various publics and providing professional public affairs advice and support to installation leaders and activities. The PAO is an important component of the natural resources program for Fort Huachuca, especially in disseminating information critical to the success of the program.

1.7.7 Combined Legal Office

The Combined Legal Office (CLO) provides legal advice, counsel, and services to Command, Staff, and subordinate elements of Fort Huachuca. Specific CLO responsibilities with regard to integrated natural resource management include:

- conducting legal research and preparing legal opinions pertaining to interpretation and application of laws, regulations, statutes, and other directives;
- coordinating with the Department of Justice, Environmental Law Division of the Office of the Judge Advocate General, and other governmental agencies on matters pertaining to litigation for the Federal Government;
- advising the DPW on compliance with NEPA, especially with regard to management of federally-listed species on Fort Huachuca; and
- advising the Range Operations Office on laws and regulations that affect training land use, management, and compliance.

1.7.8 Inspector General

Inspectors General are an extension of the eyes, ears, and conscience of their commanders and report upon the mission accomplishment, state of discipline, training and readiness, and morale of their commands. Inspector Generals gather information through the use of inspections, investigations, and by processing requests for assistance or complaints from the military and civilian communities. The installation Inspector General determines whether the provisions of Department of Defense's Instruction (DODI) 4715.03 are being adequately accomplished on Fort Huachuca in accordance with this Plan and appropriate Army regulations.

1.7.9 Other Installation Organizations

Implementation of this Plan will require assistance from other directorates and organizations. Such organizations include the Army Contracting Command (ACC) Directorate of Contracting

(procurement), commanders of major subordinate organizations, and commanders of tenant units and activities.

1.8 External Federal Stakeholders

External federal stakeholders are defined as federal organizations outside of the Garrison that are in some part involved in the management of natural resources on the Fort or the frequent use of those resources in support of mission requirements.

1.8.1 Installation Management Command

The IMCOM, a subordinate command of Army Materiel Command (AMC), is a single organization with six regional offices worldwide. The IMCOM was activated on 24 October 2006 to reduce bureaucracy, apply a uniform business structure to manage U.S. Army installations, sustain the environment, and enhance the well-being of the military community.

IMCOM oversees all facets of installation management such as construction; barracks and family housing; family care; food management; environmental programs; well-being; soldier and family morale, welfare, and recreation programs; logistics; public works; and installation funding. The IMCOM, headquartered at Fort Sam Houston, TX, is the higher command for Fort Huachuca. The Fort Huachuca Garrison Commander reports to the civilian Region Director at IMCOM.

The U.S. Army Environmental Command (AEC) provides oversight, centralized management, and execution of Army environmental programs and projects. It has support capabilities in the areas of NEPA, endangered species, historic properties, Integrated Training Area Management (ITAM), environmental compliance, and related areas. The Western Regional Office in San Antonio, TX has responsibility for Fort Huachuca.

1.8.2 U.S. Army Training and Doctrine Command

The U.S. Army Training and Doctrine Command (TRADOC) recruits, trains, and educates the Army's Soldiers; develops leaders; supports training in units; develops doctrine; establishes standards; and builds the future Army. The TRADOC is the architect of the Army and "thinks for the Army" to meet the demands of a nation at war, while simultaneously anticipating solutions to the challenges of tomorrow. The TRADOC operates 32 schools organized under ten Centers of Excellence including the U.S. Army Intelligence Center of Excellence (USAICoE) (formerly known as U.S. Army Intelligence Center and School (USAICS) at Fort Huachuca.

1.8.3 U.S. Army Intelligence Center of Excellence

The USAICoE is responsible for Military Intelligence (MI) doctrine for the U.S. Army. Additionally, the USAICoE oversees training of MI personnel from U.S. Army, U.S. Air Force (USAF) and U.S. Marine Corps (USMC) students throughout their career progression. The USAICoE includes several directorates for doctrinal work, one training brigade (the 111th MI Brigade), three training battalions (the 304th, 309th, and the 311th) and several training detachments from other U.S. armed services. The MI Brigades provide intelligence and electronic warfare training, testing, maintenance and support to the USAICoE and Fort Huachuca.

1.8.4 2nd Battalion, 13th Aviation Regiment

The 2nd Battalion (Bn), 13th Aviation Regiment (2-13th) was activated on Fort Huachuca in 2011 with the responsibility for development and administration of unmanned aircraft systems (UAS) training. This training is conducted at the Black Tower Complex, approximately six miles west of the Cantonment area in the West Range. Their mission is to train UAS operators and ground support personnel for the U.S. Army and U.S. Marines.

1.8.5 Development Test Command's Electronic Proving Ground

The U.S. Army Electronic Proving Ground (EPG) is a direct reporting unit to the U.S. Army Test and Evaluation Command (ATEC) in Aberdeen Proving Ground, Maryland. The mission of the EPG is to conduct laboratory and field tests to evaluate new and proposed military network, electronic warfare (EW), and Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems. Approximately one quarter of these tests are located at any one of about 2,400 on-post and 675 off-post Army Survey Area (ASA) site field locations. The balance of the tests uses EPG facilities located in the Cantonment.

1.8.6 Defense Information System's Joint Interoperability Test Command

Joint Interoperability Test Command (JITC) is a Defense Information Systems Agency (DISA). JITC supports the Warfighter in their efforts to manage information on and off the battlefield and is responsible for operational and interoperability testing of electronic equipment. Fort Huachuca serves as a major range and test facility base for this command.

1.8.7 Intelligence Electronic Warfare Test Directorate

The Intelligence Electronic Warfare Test Directorate (IEWTD) is responsible for conducting realistic operational tests of new and/or upgraded Intelligence and Electronic Warfare equipment and direction finding UAS and other electronic warfare systems. Most tests are conducted within the confines of the IEWTD compound on Fort Huachuca with occasional use of off-post areas and roadways.

1.8.8 Network Enterprise Technology Cmd/9th Army Signal Command/11th Signal Brigade

Network Enterprise Technology Command (NETCOM) is a global strategic and operational command dispersed in 20 countries and 17 Army installations in the Continental U.S. (CONUS) and overseas. The NETCOM leads global operations for the Army's portion of the DoD Information Network (DoDIN), ensuring freedom of action in cyberspace while denying the same to our adversaries. The NETCOM is the Army's varsity communicators, conducting decisive cyberspace operations in support of Unified Action.

1.8.9 U.S. Army Communications Electronics Command

U.S. Army Communications Electronics Command (CECOM) is part of the U.S. Army Electronics Command headquartered at Fort Monmouth, New Jersey, and handles communication security equipment and training to support the communication equipment. The U.S. Information Systems Engineering Command (ISEC) is a subordinate command of CECOM and AMC. The ISEC is the U.S. Army System Engineer and works primarily on Army projects with some assistance to other government agencies and DoD branches as directed. The ISEC and CECOM operations occur during normal working hours from three buildings on the Fort, including Greely Hall.

1.8.10 Joint Center of Excellence

The Joint Center of Excellence (HT-JCOE) supports the Human Intelligence (HUMINT) warfighter by providing professional training to fully prepare them to meet current and emerging requirements of the Defense HUMINT Enterprise. Joint Center of Excellence is headquartered at Fort Huachuca collocating with USAICoE to provide a "one-stop" shop for advanced technical HUMINT training for all of the DoD services and agencies.

1.8.11 Air National Guard

Fort Huachuca supports the Arizona Air National Guard (AZ ANG) and Missouri Air National Guard (MO ANG), including the Arizona-based 162nd Fighter Wing and the Missouri-based 139th Airlift Wing. Fort Huachuca is also home to the 214th Reconnaissance Group of the 162nd Fighter

Wing. The 214th, located at Davis-Monthan Air Force Base (AFB), launches local sorties from Libby Army Airfield (LAAF) with UAS aircraft providing national defense. In addition, three units of the MO ANG 139th Airlift Wing perform training missions at Fort Huachuca. The units conduct night-vision, mountainous terrain flight operations, airdrop, and air-land assault training operations through the unit's Advanced Airlift Tactics Training Center (AATTC) located at Fort Huachuca.

1.8.12 Davis Monthan Air Force Base

Davis Monthan AFB selected Fort Huachuca as its alternate airfield in 1981 and formalized it in a Joint Use Agreement in 1983. The Joint Use agreement includes the USAF ANG, which includes the 162d Wing and umbrellas the 139th Airlift Wing and 214th Attack Group. As Davis Monthan's alternate airfield, they fly A-10s, C-130s, and HH-60s into/out of LAAF on a daily basis. The USAF purchased the Instrument Landing System (ILS) and the Tactical Navigation system (TACAN) for their training needs. They signed these assets over to the Army and pay for consumable parts. The Army agreed to maintain the navigational aids with USAF paying for required maintenance training. The A-10s conduct precision approaches to meet their training and proficiency requirements. There are two sets of C-130s: EC-130s conduct frequency tests/exercises and work with EPG; the other is 79th Rescue Squadron which conducts personnel and equipment drops on the East Range. Davis Monthan conducts a major exercise each year involving rescue (Red Flag Rescue), which is a multi-national exercise and includes personnel transfers at Hubbard Landing Zone (LZ).

1.8.13 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers, Los Angeles District, Los Angeles, California assists Fort Huachuca by administering contracts for outside or other agency support and administering wetland permits in accordance with Section 404 and 401 of the Clean Water Act (CWA). These contracts include those involved with special-status species surveys.

1.8.14 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service's (USFWS) Region 2 Ecological Services Office is located in Phoenix, Arizona, with a sub-office in Tucson, Arizona. These offices provide technical advice for the management of natural resources on Fort Huachuca, specifically endangered and threatened species. AR 200-1 provides guidance to be followed by Fort Huachuca when dealing with the USFWS for endangered species management. The USFWS is a signatory cooperator in implementation of this INRMP in accordance with the Sikes Act. USFWS national wildlife refuge law enforcement personnel periodically provide conservation, outdoor recreation, and law enforcement advice.

1.8.15 Bureau of Land Management

The Bureau of Land Management (BLM) has responsibility for lands that adjoin the installation and for the San Pedro Riparian National Conservation Area (SPRNCA). The BLM also administers subsurface mineral rights on several thousand acres of non-federal land around Fort Huachuca and monitors some of the conservation easements purchased by the Army. BLM maintains and houses a hotshot crew for wildland fire fighting on the installation.

1.8.16 National Park Service

The National Park Service (NPS) is responsible for management of the Coronado National Memorial located south of Fort Huachuca. The NPS also has an important role in the protection of historic properties on federal land, and as such, could be involved in issues that affect cultural resource management on Fort Huachuca.

1.8.17 U.S. Geological Survey

The U.S. Geological Survey (USGS) actively conducts geological and hydrological research on and near Fort Huachuca, to better manage water and ecosystem resources, and operates two stream gauges on post. The USGS is a member of the Upper San Pedro Partnership. The Biological Resource Division (BRD) of USGS maintains a Cooperative Fish and Wildlife Research Unit at the University of Arizona. In addition to biologists from other BRD Science Centers, this unit has conducted wildlife research, primarily on birds and their habitat use, on or near Fort Huachuca.

1.8.18 Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) provides technical planning and assistance upon request as personnel and resources allow. For instance, the NRCS prepared the draft 1997 INRMP in cooperation with the ENRD, completed a range inventory on the West Range, and assisted in preparation of a Fire Management Plan and the Agave Management Plan (Howell and Robinett 1995).

1.8.19 U.S. Animal Health Inspection Service

The U.S. Animal and Plant Health Inspection Service (APHIS) is a multi-faceted Agency with a broad mission area that includes protecting and promoting U.S. agricultural health, regulating genetically engineered organisms, administering the Animal Welfare Act, and carrying out wildlife damage management activities. The APHIS provides technical expertise and support for non-native invasive plant control and for wildlife depredation and wildlife disease issues on the installation. The APHIS also provides Fort Huachuca with expertise to resolve wildlife conflicts and create a balance that allows people and wildlife to coexist peacefully.

1.8.20 U.S. Forest Service

The U.S. Forest Service (USFS) manages the Coronado National Forest (CNF), which is adjacent to Fort Huachuca to the southwest. Coronado National Forest personnel provide forest management project support and firefighting capability and coordination with the installation under an Interservice Support Agreement. Fort Huachuca reimburses the USFS for fire suppression and fuel load reduction conducted on the installation.

The Flagstaff Forestry Sciences Laboratory of the USFS Rocky Mountain Research Station (RMRS) has an ongoing research work unit on Ecosystem Management of the Southwestern Borderlands in southeastern Arizona. Fort Huachuca and RMRS have mutual concerns about improving grassland and woodland management, particularly the effects of fire on grassland and savanna ecosystems, and land uses. The RMRS has funded and administered jointly-funded work on soils and agave on post.

1.8.21 United States Customs and Border Patrol

Customs and Border Protection (CBP) safeguards America's borders, thereby protecting the public from dangerous people and materials while enhancing the Nation's global economic competitiveness by enabling legitimate trade and travel. Housed within CBP is the Air and Marine Operations (AMO) which is a federal law enforcement organization dedicated to serving and protecting the American people by applying advanced aeronautical and maritime capabilities and employing unique skill sets to preserve America's security interests.

1.9 External Tribal Stakeholders

External Tribal stakeholders are defined as Native American Tribal governments with whom the Fort maintains government to government consultations, and are in some part involved in the management of resources on the Fort or the use of natural resources within the Fort's boundaries.

Consultation with federally recognized Tribes is required by NHPA, NAGPRA, AIRFA, EO 13007 (Indian Sacred Sites), EO 13175 (Consultation and Coordination with Indian Tribal Governments), and further promulgated by DoD Instructions and Army policies. Fort Huachuca consults with 11 Native American Tribes who claim cultural affiliation and/or traditional interest in Fort Huachuca's managed lands and resources. The AIRFA protects the rights of Native Americans to exercise their traditional religions and activities by ensuring access to sites and resources on federal land, unless that access has an impact to the agency mission. Consulting tribes include: the Ak-Chin Indian Community, Fort Sill Apache Tribe, Gila River Indian Community, the Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, the Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, and the White Mountain Apache Tribe. All 11 tribes were provided an opportunity to consult in the development of this INRMP.

1.10 External State and Local Stakeholders

External state and local stakeholders are defined as state and local organizations outside of the Garrison that are in some part involved in the management of natural resources on the Fort or the frequent use of those resources in support of mission requirements.

1.10.1 Arizona Game and Fish Department

The Arizona Game and Fish Department (AGFD) is responsible for the management of most fish and wildlife within the state. The AGFD provides oversight for hunting and fishing on the installation, assists in managing nongame fish and wildlife, assists in managing nongame fish and wildlife, and enforces state wildlife laws. Department personnel review Fort Huachuca natural resource management plans and NEPA documents to evaluate potential effects of activities on wildlife and their habitat and help keep common species common. The agency maintains a list of species of concern titled Arizona Species of Greatest Conservation Need (SGCN). This SGCN list is part of the department's State Wildlife Action Plan (SWAP) (AGFD 2012). The SWAP helps guide the department's efforts to promote the conservation of all species on the SGCN.

1.10.2 Arizona Department of Agriculture

The Arizona Department of Agriculture (ADA) is responsible for oversight of the implementation of the Native Plant Law. The ADA also maintains the Protected Native Plants List and the Noxious Weed List.

1.10.3 Arizona Department of Environmental Quality

The Arizona Department of Environmental Quality (ADEQ) inspects environmental programs and ensures the installation is in compliance with State environmental laws. The ADEQ administers the Clean Air Act and CWA (including Section 401 certification authority) in Arizona, and a smoke management coordinator reviews all prescribed burning plans in the state.

1.10.4 Arizona Department of Water Resources

The Arizona Department of Water Resources (ADWR) administers the State Groundwater Management Act, Arizona Public Water Code, Arizona Surface Water Rights Law, and the Well Construction and Licensing of Well Drillers. In addition, ADWR administers and enforces surface and groundwater rights.

1.10.5 Arizona State Land Department

The Arizona State Land Department (ASLD) owns land on the installation's East Range, which is leased to the Army. The ASLD also provides environmental education and natural resource management assistance through Natural Resources Conservation Districts.

1.10.6 Arizona Department of Health Services

The Arizona Department of Health Services (ADHS) Office of Infectious Disease Services program is responsible for monitoring, controlling and preventing diseases transmitted from animals or arthropod vectors to humans. They perform West Nile Virus surveillance and prevention; monitor the occurrence and trends of vector-borne and zoonotic diseases through passive surveillance for human disease and epidemiologic investigations; and coordinate animal surveillance for zoonoses. The ADHS provides technical consultation to Fort Huachuca on zoonotic diseases evaluation and response.

1.10.7 Universities and Colleges

Regional universities have provided specialized expertise to help manage natural resources on the Fort. The University of Arizona (UA) has conducted numerous, varied environmental studies for many years. Both Arizona State University (ASU) and Northern Arizona University (NAU) have engaged in projects on and near the Fort. Additional university cooperators include Oregon State, State University of New York, Colorado State, and the University of Washington. Through a cooperative service agreement with IMCOM, Colorado State University provides staff support to three ITAM components: Range and Training Land Assessment (RTLTA), Land Rehabilitation and Maintenance, and GIS. Cochise College has provided technical support of automatic remote monitoring of wildlife on the Fort. University of Puerto Rico developed and funded this remote monitoring technology under a DoD Legacy Program grant.

1.10.8 Sentinel Landscape Partnership

Fort Huachuca was designated a Sentinel Landscape in 2015. The Sentinel Landscape Partnership (SLP) provides a cost-effective means to advance multi-agency interests by aligning resources in areas where agency priorities overlap. Within the Fort Huachuca Sentinel Landscape, the USFWS, NRCS, USFWS, and DoD are working with the Arizona Land and Water Trust, the Arizona Department of Forestry, and more than 40 other local, state, and federal partners to discourage incompatible land development, preserve native grassland and working ranches, and ensure the availability of scarce groundwater resources for the entire region to protect Fort Huachuca from encroachment challenges.

1.10.9 Municipalities

The City of Sierra Vista is responsible for maintaining flood control basins along Buffalo Soldier Trail that have been authorized through a drainage easement. Huachuca City manages a sewage treatment facility and landfill adjacent to the installation. Huachuca City also has a cooperative fire management agreement with Fort Huachuca. Cooperative relationships such as these and the Upper San Pedro Partnership will continue to be fostered.

1.10.10 Other Interested Parties

General public interest in natural resource management at Fort Huachuca is moderately high, in part due to issues associated with water resources. The Center for Biological Diversity has expressed serious concerns with regard to groundwater withdrawals occurring at Fort Huachuca. Birding, lepidopterist, native plant, and wildlife photography groups maintain active interests in the biological diversity and natural features in the region.

1.11 Authority

This INRMP replaces the 2010 *Integrated Natural Resources Management Plan Fort Huachuca Arizona*. Preparation and implementation of this INRMP is required by the Sikes Act Improvement Act of 1997 (16 U.S.C. 670 et seq.), DODI 4715.03 (Natural Resources Conservation Program), and AR 200-1 (Environmental Protection and Enhancement).

Public Law 105-85, the Sikes Act Improvement Act of 1997, requires that INRMPs include:

- wildlife management, land management, and wildlife-oriented recreation;
- fish and wildlife habitat enhancement or modifications;
- wetland protection, enhancement, and restoration where necessary for support of fish, wildlife, or plants;
- integration of, and consistency among, the various activities conducted under the plan;
- establishment of specific natural resource management goals and objectives and time frames for proposed action;
- sustainable use of natural resources by the public to the extent that the use is not inconsistent with the needs of fish and wildlife resources;
- public access to the military installation that is necessary or is appropriate for sustainable use of natural resources by the public, to the extent that the use is consistent with the needs of fish and wildlife resources, and subject to requirements necessary to ensure safety and military security;
- enforcement of applicable natural resource laws (including regulations);
- no net loss in the capability of military installation lands to support the military mission of the installation to the extent appropriate and applicable;
- regular review of an INRMP and its effects, not less often than every five years;
- exemption from procurement of services under Office of Management and Budget Circular A-76 and any of its successor circulars; and
- priority for contracts involving implementation of the INRMP to state and federal agencies having responsibility for conservation of fish and wildlife.

The fundamental goal of an INRMP is to assist the installation commander in efforts to conserve and rehabilitate natural resources and balance the use of air, land, and water resources for military training and testing with the need to conserve wildlife resources for future generations. The INRMP is a comprehensive approach to ecosystem management in a holistic and proactive way. This INRMP update was prepared using DoDI 4715.03, 25 November, 2013. This plan also describes how Fort Huachuca will implement provisions of AR 200-1, local regulations, and Fort Huachuca Regulation 385-8 (Range and Training Area Operations).

The AGFD and USFWS provide written concurrence on the INRMP, which indicates their mutual agreement on those elements of the INRMP concerning the conservation, protection, and management of fish and wildlife resources. Building on previous consultations, many details from the *Programmatic Biological Assessment for Ongoing and Future Military Operations and Activities at Fort Huachuca, Arizona* (Leidos 2013) and the *Programmatic Biological Opinion for Ongoing and Future Military Operations and Activities at Fort Huachuca, Arizona* (USFWS 2014d) are incorporated into this INRMP.

1.12 Stewardship and Compliance

Fort Huachuca is determined to conduct its training mission successfully, and an integral part of that mission is good environmental stewardship. Principles followed on Fort Huachuca managed lands include the ecosystem-based management of soil, vegetation, water, and wildlife resources and proper military mission planning and scheduling. Management of natural resources supports the military mission by maintaining mission-ready training areas and facilities.

Complying with federal environmental and natural resource laws and regulations is also consistent with the Army's commitment to be good environmental stewards but is a separate Command requirement. This INRMP helps Fort Huachuca comply with federal and state laws including laws associated with environmental documentation, wetlands, special status species, and wildlife management by coordinating policy and program implementation.

1.13 Plan Review and Revision Process

The Sikes Act directs that INRMPs be reviewed for operation and effect. The Act emphasizes that the review is intended to determine whether existing INRMPs are being implemented to meet the requirements of the Sikes Act, and whether these INRMPs contribute to the conservation and rehabilitation of natural resources on military installations.

1.13.1 Annual Reviews

The INRMP is to be reviewed annually by installations; cooperation with other partner agencies is encouraged. Annual reviews will be initiated by the installation and consist of an annual INRMP Implementation report. Annual reviews are documented with a memorandum for record (MFR) or email exchange between the partner agencies.

Annual reviews are used, as appropriate, to determine if revisions are necessary. The annual reviews may be used to expedite the more formal review for operation and effect, or, if comprehensive and supported with documentation that ensures mutual agreement of the three parties, may accomplish the more formal review for operation and effect. Annual reviews shall verify that:

- current information on INRMP conservation metrics as described in the Army Environmental Database - Environmental Quality (AEDB-EQ) is available;
- all "must fund" projects and activities have been budgeted for and implementation is on schedule;
- all required trained natural resources positions (identified in Section 1.6) are filled or are in the process of being filled;
- projects and activities for the upcoming year have been identified and included in the INRMP. An updated project list does not necessitate revision of the INRMP;
- all required coordination has occurred or is in process;
- all significant changes to the installation's mission requirements or its natural resources have been identified;
- the INRMP goals and objectives are still valid; and
- no net loss of training capability has occurred due to implementation of the INRMP in accordance with the Sikes Act.

1.13.2 Five Year Review for Operation and Effect

The Sikes Act specifically directs that the INRMPs be reviewed “as to operation and effect,” emphasizing that the review is intended to determine whether the existing INRMP is being implemented to meet the requirements of the Sikes Act and contribute to the conservation and rehabilitation of natural resources on military installations. Reviews for operation and effect must be performed every five years by all parties to the INRMP. A 5-year review is final once the installation, the USFWS, and the AGFD have documented mutual agreement. There are three ways to reflect mutual agreement:

- a jointly executed signed letter;
- receive signed letters back from USFWS Regional Director and Director of AGFD that they are in agreement with the INRMP; or
- signed new signature pages to the INRMP

The requirement to review the INRMP regularly does not mean that the document needs to be revised. If the review process determines that an INRMP needs revising, there is no set time limit to complete the revision. Until the USFWS Regional Director and the Director of AGFD mutually agree upon the INRMP revision, the current INRMP remains in effect. A timeline should be coordinated by the installation with the USFWS and AGFD to ensure that the installation is addressing the revision in a timely matter.

1.14 Management Strategy

1.14.1 Goal of Ecosystem Management

Department of Defense Instruction 4715.03, 18 March 2011 directs DoD Installations to work to guarantee DoD continued access to its land, air, and water resources for realistic military training and testing and to sustain the long-term ecological integrity of the resource base and the ecosystem services it provides. The directive suggests that over the long term, the ecosystem approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting multiple uses when appropriate and facilitate the mission over the long-term in a cost-effective manner.

1.14.2 Principles and Guidelines

DODI 4715.03 provides for the following ecosystem management principles and guidelines to be adopted on all DoD Installations:

- Manage natural resources to facilitate testing and training, mission readiness, and range sustainability in a long-term, comprehensive, coordinated, and cost-effective manner.
- Demonstrate stewardship of natural resources by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services.
- Manage lands, waters, airspace, and coastal resources or natural resources for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.
- Integrate natural resources conservation programs with mission activities, installation planning and programming, and other activities as appropriate.
- Plan, program, and budget to achieve, monitor, and maintain compliance with all applicable federal natural resources statutory and regulatory requirements, EOs, and Presidential memorandums.

- Follow an ecosystem-based management approach to natural resources-related practices and decisions, using scientifically sound conservation procedures, techniques, and data.

1.15 Other Plan Integration

Management of real property facilities, training ranges, and the natural environment at Army installations is influenced by many factors, both internal and external. Guiding this management is a collection of plans written to aid decision makers, all of whom are struggling to meet mission requirements with increasingly limited resources – both natural and fiscal. The content of these planning documents, as well as the planning procedures to create the documents, are specified in Army Regulations, Army Pamphlets (PAM), and other guidance documents (See Appendix 6 for a list of active plans).

A common critique of resource planning efforts within DoD is that the various planning processes are often disjointed and fragmented. Each planning requirement has a specific and important function to address. Very little interaction and coordination exists amongst planning efforts, resulting in ineffective and inefficient outcomes. The reasons for the coordination problems are complex. Organizational structure and funding issues are major influences, as well as the underlying complexity of an organizational environment where many (often conflicting) goals are being pursued simultaneously. This INRMP is intended to integrate common goals and objectives across the installation resource management spectrum by providing five elements key to an integrated natural resource management and planning framework:

- a common vision, purpose, or goal;
- a common data source;
- cross-functional coordination;
- a supporting organizational structure; and
- an overarching management system.

Together, this INRMP and supporting planning documents are meant to provide an integrated Garrison Command response to its natural resource management and stewardship obligations and responsibilities.

CHAPTER 2 CURRENT CONDITIONS AND USE

2.1 Land Use, Mission and Major Activities

2.1.1 General Description and Garrison History

Fort Huachuca is a military installation located in the San Pedro River Valley, approximately 75 miles southeast of Tucson, Arizona, and eight miles north of the Mexican Border in Cochise County, Arizona (Figure 2.1). Adjacent to Fort Huachuca are the SPRNCA and the City of Sierra Vista to the east, Huachuca City to the north, and the CNF to the west and south. The Huachuca Mountains form the southern and western boundaries of Fort Huachuca. The northern border parallels Babocomari River, a tributary of the San Pedro River. Other communities in the region include Benson (31 miles north), Tombstone (18 miles east), Nogales (63 miles southwest), Bisbee (28 miles southeast), and Douglas (60 miles southeast).

At the beginning of the historical period, the area occupied by Fort Huachuca was home to native, river-dwelling peoples, such as the Sobaipuri and Pima who lived at San Xavier del Bac on the Santa Cruz River and along the San Pedro River. In 1540, the territory was claimed for Spain by Captain General Francisco de Coronado. Mexico took possession of the territory in 1821, and the U.S. acquired Arizona north of the Gila River via the Mexican War of 1846 and the treaty of Guadalupe Hidalgo in 1848. The area that is now Fort Huachuca was part of the Gadsden Purchase of 1853.

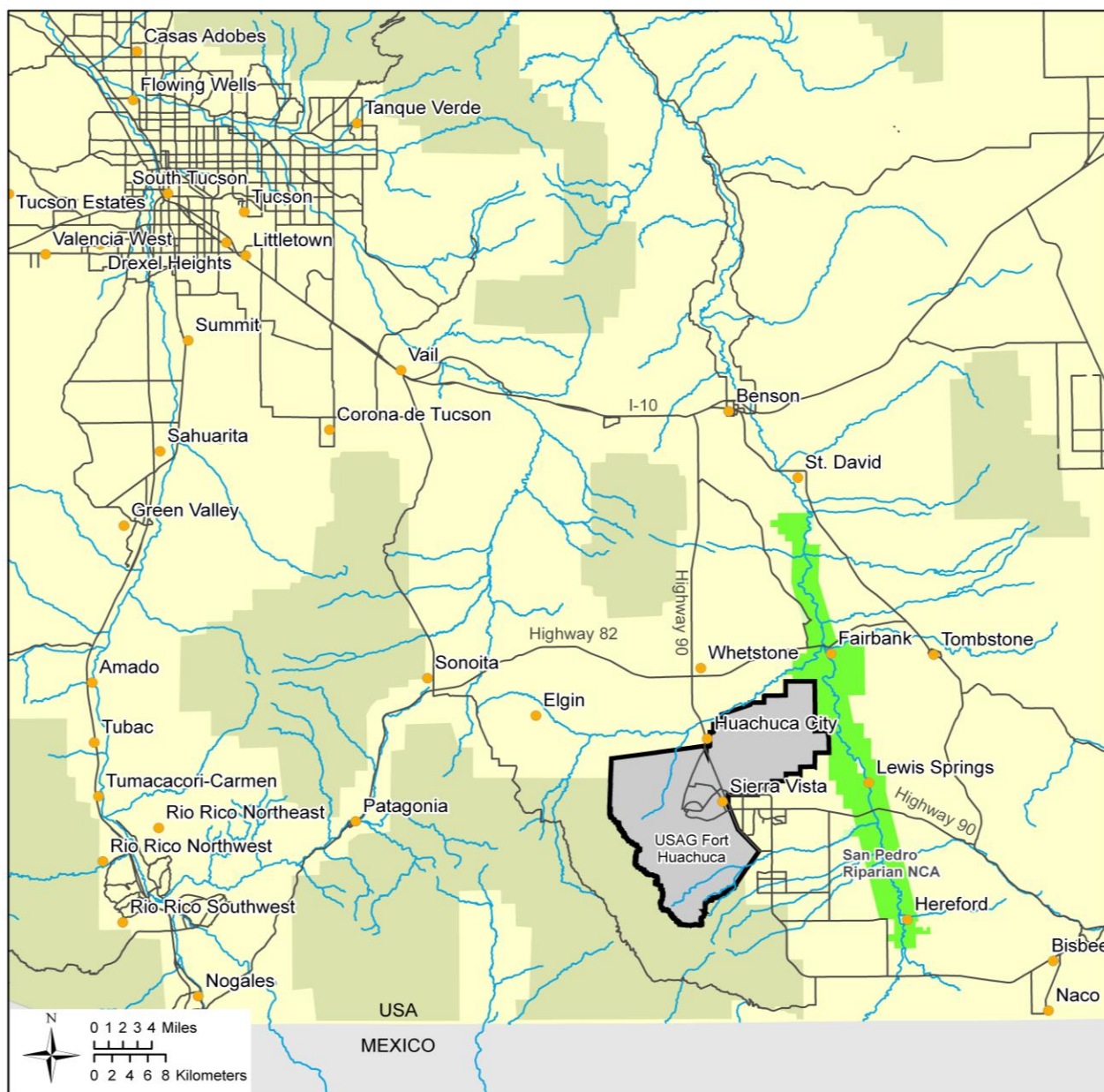
Camp Huachuca was established in 1877 by Captain Marmaduke Whitside. The location served several military purposes: to control Native American disturbances; to effect a stronger military presence along the international boundary; to facilitate the location and construction of a railroad linking Tucson to the Pacific Coast, El Paso, Albuquerque and the port city of Guaymas, Mexico; and to protect ranchers and miners on a sparsely settled frontier (Herbert et al. 1990). Camp Huachuca's status and name was changed to Fort Huachuca in 1882. Fort Huachuca's cavalry primarily tried to control marauding Apaches and Mexican bandits until the surrender of Geronimo in 1886.

From 1886 to 1910, the area was relatively calm. The Mexican Revolution of 1910-1920 brought border troubles. Buffalo Soldiers of the 9th and 10th cavalry regiments and the 24th and 25th infantry regiments served at Fort Huachuca beginning in 1892 (Smith 1976) and were included in the expedition to capture or kill Pancho Villa.

During World War II, soldiers from Fort Huachuca in the 92nd (Buffalo) and the 93rd (Blue Helmet) Infantry Divisions were active in Europe and the Pacific, respectively. The 93rd was reactivated on Fort Huachuca in 1942 and included parts of the "old" 24th Infantry Regiment. The 92nd transferred to Fort Huachuca in 1943 and included parts of the "old" 25th Infantry Regiment (Smith 1976). In 1947, Fort Huachuca was deactivated.

Fort Huachuca was reactivated temporarily by the USAF from January 1951 to June 1953 to support the Korean War. In 1954, Fort Huachuca was reactivated again and put under the control of the U.S. Army Signal Corps. The installation also served as the EPG. In 1967, the installation became the Headquarters for the U.S. Army Strategic Communications Command (STRATCOM), which later was renamed the U.S. Army Communications Command. In 1973, the U.S. Army Communications Management Information Systems Activity was assigned to Fort Huachuca. This and the Communications Command were combined into the U.S. Army Information Systems Command. In 1971 the U.S. Army Intelligence Center and School, now known as U.S. Army Intelligence Center of Excellence (USAICoE), moved to Fort Huachuca from Fort Holabird, Maryland. In 1988, the U.S. Army Intelligence School mission of Fort Devens, Massachusetts, was relocated to Fort Huachuca.

Figure 2.1 Fort Huachuca Regional Location



Data Source: Fort Huachuca ITAM 2009

Legend

- Towns
- Major Roads
- Rivers/Streams
- San Pedro Riparian NCA
- National Forests
- Fort Huachuca

Base Closure and Realignment Actions brought several activities to Fort Huachuca along with over 2,000 attendant personnel. In 1996, the U.S. Army Information Systems Command was deactivated, and portions of the staff were re-allocated to other commands at the installation. The remaining U.S. Army Information Systems Command mission was re-designated as the U.S. Army Signal Command and now NETCOM, which remains at Fort Huachuca. Other significant units currently based at Fort Huachuca include the 11th Signal Brigade, JITC, Raymond W. Bliss Army Clinic, the 111th MI Brigade, IEWTD, the 2-13th, EPG, CECOM, CBP, and Air National Guard (USAG & Vernadero 2014).

2.1.2 Regional Land Use

Fort Huachuca covers 80,912 acres. Lands surrounding the Fort are directly affected by Cochise County, Santa Cruz County, and the City of Sierra Vista's land use restrictions. A large portion of land adjacent to the installation falls under the jurisdiction of the BLM and the USFS (Figure 2.2).

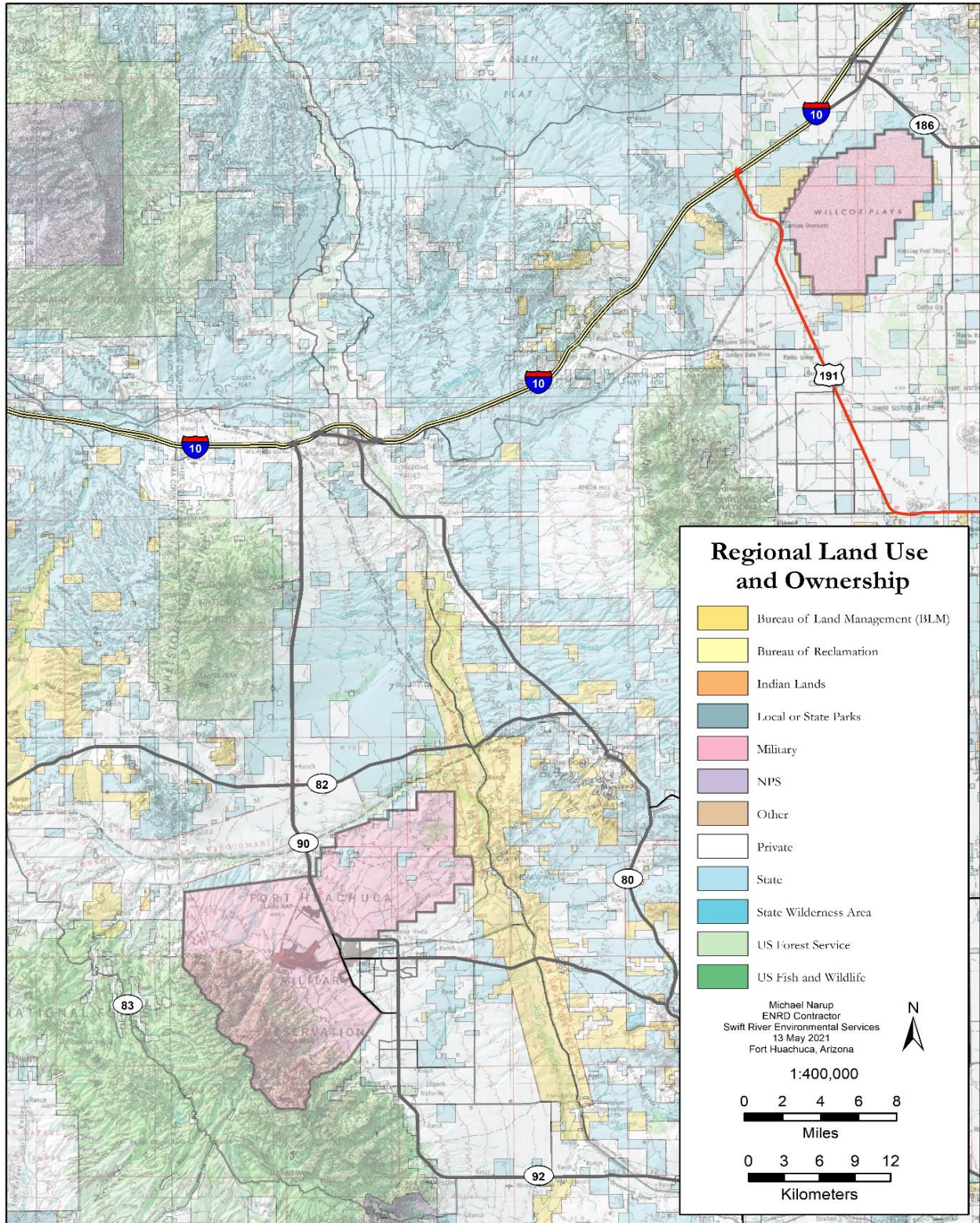
Cochise County zoning districts and Comprehensive Plan (Cochise County 2015) directs the land use throughout the county. According to the Comprehensive Plan Growth Areas and Land Jurisdiction Map (Cochise County 2013), the Cochise County land adjacent to the installation consists primarily of privately owned and State Trust lands. Growth areas are identified southeast of the installation; south of Sierra Vista; north of the East Range; and north of the installation along Highway 90. According to the Cochise County Zoning District Map (Cochise County 2017), the majority of the lands adjoining the installation on the northern, southern, and portions of the western and eastern borders are zoned RU-4, which are residential in use and require a minimum lot size of four acres. A small TR-36 zone occurs on the northern boundary of the Fort east of Highway 90. A TR-36 zone indicates single- and multiple-household dwellings with a minimum lot size of 36,000 square feet (ft). To the east of Highway 90, an area designated as HI or heavy industrial occurs, which includes uses such as manufacturing, recycling centers, and junkyards. Along the eastern border of the installation within the areas indicated for growth on the Land Jurisdiction Map, larger areas of TR-36 as well as SR-43 zoning are indicated. The SR-43 zone represents single-household dwellings with a minimum lot size of 1 acre.

Santa Cruz County is located just west of Fort Huachuca. Land use within Santa Cruz County is controlled by the Santa Cruz County Comprehensive Plan (Santa Cruz County 2016). According to this plan, the land nearest Fort Huachuca is designated as public lands consisting of the USFS CNF and a few scattered areas of private property that are designated as ranches.

Sierra Vista land use is directed by the VISTA 2030 General Plan (City of Sierra Vista 2012). The land use within Sierra Vista adjacent to Fort Huachuca is predominantly residential, with higher densities occurring in the northern part of the city and lower densities along the south and northeast edges of the city where it occurs south of the East Range of Fort Huachuca. High-density residential allows for 4.51 dwellings per acre or more with a minimum lot size for single-family lots being 4,500 square ft. Mobile home residential is permitted in high-density districts. Low-density residential allows for 0 to 2.0 dwellings per acre. Minimum lot sizes for single-family lots vary from 18,000 to 36,000 square ft, with urban ranches being larger. Commercial development is located along Fry Boulevard at the northern end of the City and Buffalo Soldier Trail along the western edge of the City. Open space occurs intermittently through the residential areas with a larger area indicated at the southern end of the city just north of Ramsey Road.

The Sierra Vista Ranger District of the CNF encompasses 75,000 acres (117 square miles) of forest land in the Huachuca Mountains immediately to the south and southwest of the installation. The management of this land is directed through the Coronado National Forest Plan (USDA FS 2018). This land is predominately undeveloped and contains very few major access roads, campgrounds, or other high-volume recreation facilities. The Forest Plan delineates management

Figure 2.2 Regional Land Use and Ownership



areas adjacent to the installation for visual resources, livestock grazing, game habitat, fuel wood harvest, and wilderness (USDA FS 2018).

The SPRNCA, established by an Act of Congress in 1988, is managed by the BLM Tucson Field Office. It is the dominant geographic feature in the San Pedro Basin and is managed for a variety of wildlife, environmental, and recreational uses (see Figure 2.1). Management of this area is directed by the SPRNCA Resource Management Plan and Environmental Impact Statement (BLM 2018), with the purpose of protecting the riparian area and the aquatic wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resources within the authorized boundary of the area. The SPRNCA extends as a publicly-owned corridor from the community of Curtis at its north end to a few miles south of Hereford, immediately north of the Mexican border. The SPRNCA corridor lies adjacent to the northeastern boundary of the installation, and approximately 10 miles separate the boundaries of the two federal properties to the south. The SPRNCA is approximately five-miles wide at its widest point and encompasses approximately 40 miles in length of the San Pedro River.

2.1.3 Fort Huachuca Land Use

Fort Huachuca is divided into an East Reservation (28,544 acres) and West Reservation (44,504 acres) by Highway 90 (Figure 2.3). Land uses on these two reservations are generally classified as either open/operational or developed areas. 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 area, Black Tower, EPG testing facilities, and LAAF.

The open/operational areas on the West and East Reservations are used as training and test ranges and are comprised of 66,662 acres or approximately 92 percent (%) of the installation. The developed areas on the installation include the Cantonment area, the obstacle and confidence course, Black Tower, EPG facilities, and LAAF. These areas occupy 7,380 acres collectively or approximately 8 % of the installation. Both are located on the eastern edge of the West Reservation.

The West Range is located on the West Reservation, west of the Cantonment area, and covers approximately 12,585 acres of land (Figure 2.3). No live-fire training occurs on the West Range. Part of the West Range is used for field training exercises. The EPG performs research and development testing throughout the area, and maneuver trails dissecting the range are used for support vehicle light maneuver driving training exercises. The northwest corner of the West Range, known as Training Area Juliet, is predominantly used by the MI School for training related to UAS. Takeoff and landing of UAS occurs on two runways (Pioneer and Rugge-Hamilton) within the UAS facility (Black Tower) in Training Area Juliet. In addition, laser testing and training is conducted via air to ground operations from UAS within training areas India, Juliet, and Mike. Demonstration hill in Training Area Kilo, Site Maverick in Training Area Lima, Site Freedom in Training Area November, and a land navigation course in Training Area Mike are permanent training sites on the West Range.

The South Range is located on the West Reservation, south of the Cantonment area. It covers approximately 31,919 acres, including most of the installation's portion of the Huachuca Mountains (Figure 2.3). The eastern slopes of the mountains on the southern portion of the Fort are used, in part, as impact areas for the small arms firing positions located in the flat terrain of the eastern portion of the range. Training and some testing occur in the northern portion of the mountains. The range is divided into 16 training areas, 16 firing ranges, and several impact areas.

Permanent training sites/facilities on the South Range include Sites Papa and Uniform, one land navigation course in Training Area Uniform, one land navigation course in Training Area Uniform-

1, the Battle Lab, and Urban Operations Site (UOS), the Rope Bridge Construction and Air Deployment Training, and the Leadership Reaction Course.

The East Range is located on the East Reservation, east of the Cantonment area and covers 28,544 acres (Figure 2.3). Approximately 13,463 of these acres consist of public domain land that has been withdrawn from public use for military purposes pursuant to the Order of the Secretary of Interior (Public Land Order 1471, 22 August 1957). These lands are managed primarily for military training purposes consistent with the stated purpose of the secretarial withdrawal. The Resource Management Plan of the Safford District of the BLM identifies these lands as being managed for military purposes and provides for resource management coordination with the Fort consistent with the requirements of the Federal Land Protection and Management Act (FLPMA) (BLM 1991). The BLM's most recent management plan, the SPRNCA proposed resource management plan (2019), does not address this acreage. The East Range serves as a platform for research and development testing and training. It contains six training areas, a tactical assault landing strip, one Dudded Impact Area (Zulu), and six drop zones (DZ). The Convoy Life Fire Exercise (CLFX) range, UOS and two light demolition ranges (WIT1 and WIT2) are within a cleared footprint in the Dudded Impact Area Zulu. Historically, Dudded Impact Area Zulu was a 6,646-acre impact area for various types of self-propelled artillery and mortars. When live-fire exercises occur on the East Range, training activities are restricted in training areas Alpha, Echo, Delta and Bravo depending on the exercise. Area Zulu is always closed to training activities other than CLFX, light explosive demolition, explosive ordnance disposal (EOD) training, and electronics testing.

The majority of buildings and structures on the installation are located within the Cantonment area and Black tower UAS compound on the West Range. The Cantonment area provides a variety of housing and community support services, as well as administrative and operational directorates and training facilities. Major command headquarters are located in the Cantonment area, as are maintenance and storage facilities and facilities for research, development and testing, medical care, and training. More than 1,889 buildings are located within the Cantonment area (USAIC & FH 2006). Within the Cantonment and other built areas, land management activities and maintenance fall under the direction of the Fort Huachuca DPW.

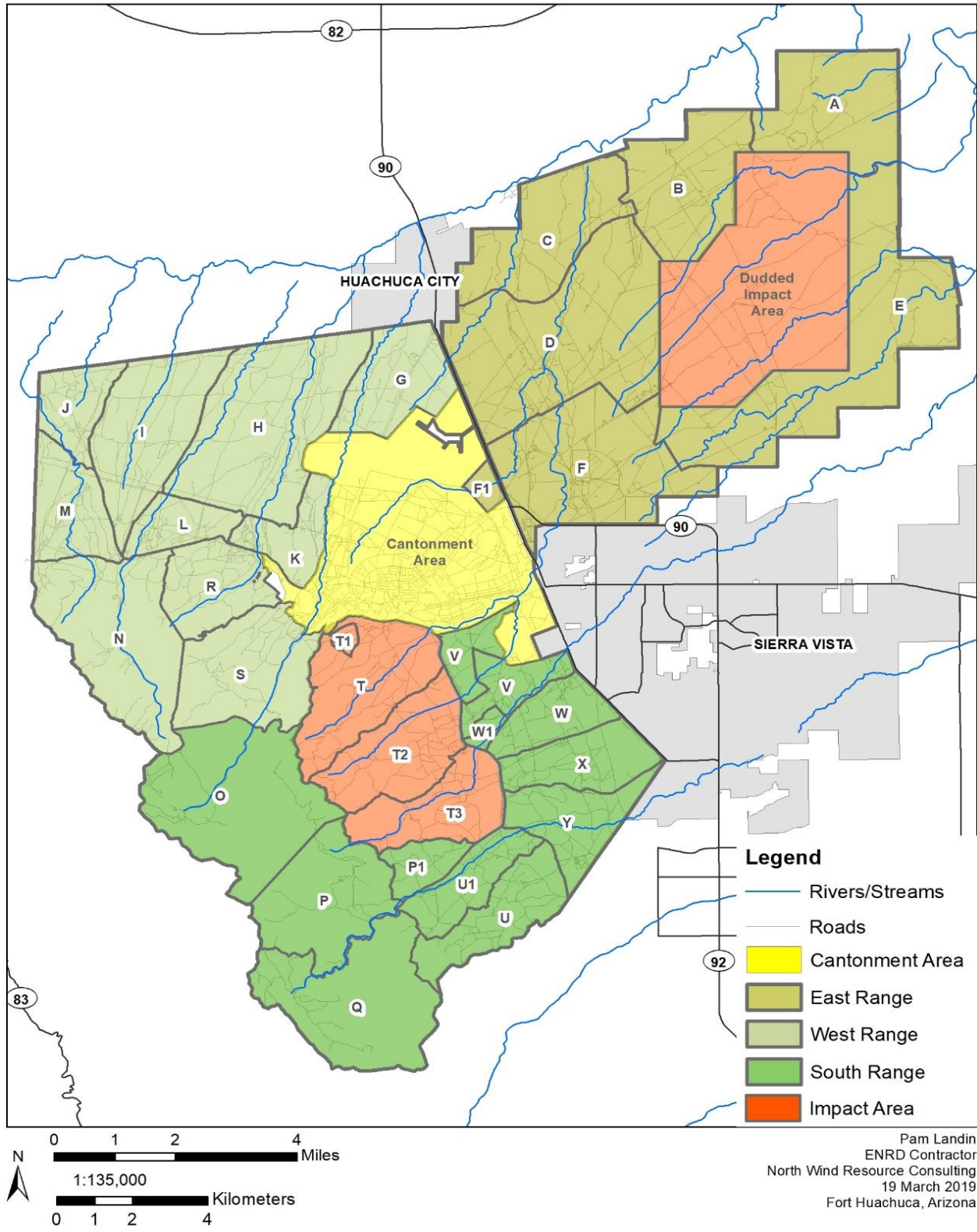
The DPW is responsible for ensuring that all parts of the installation are in compliance with environmental laws and regulations.

LAAF has three intersecting runways: Runway 08/26, Runway 12/30, and Runway 03/21. Runway 08/26 is the primary runway and accounts for 90% of total operations (USACE 2008). It is the longest runway, at 12,001 ft and oriented on an east-west axis. Runway 12/30 is the secondary runway, which crosses the primary runway on the southeast-northwest axis. It is used by occasional general aviation arrivals and departures (USAG & Vernadero 2014). Support facilities include a flight control tower, navigational aids building, airfield operations building, and an airfield fire and rescue station. Storage buildings are located along the southern side of the primary runway and within the operational land use zone. Maintenance facilities and the City of Sierra Vista Municipal Airport air terminal are located on the north side of the airfield.

2.1.1 Fort Huachuca Mission and Major Activities

This section describes Fort Huachuca's missions and major activities. It concludes with summary descriptions of operations and activities that occur in, or are programmed for, training areas across the installation.

Figure 2.3 Fort Huachuca Land Use



Military Mission and Activities

The majority of operational testing and training at Fort Huachuca is related to intelligence, electronic warfare, and communications systems. Units are engaged in the development and testing of various types of electronic equipment. These units are also involved in training soldiers in the use of this equipment in classrooms and during field training exercises. Fort Huachuca is also used for field training exercises by various operational units and other DoD and non-DoD agencies and currently provides MI training to over 2,753 students annually according to the Fort's census 2018 census data. Major missions assigned to the installation exist to:

- research, develop, test, and evaluate concepts, doctrine, materials, and equipment in the areas of intelligence, electronic warfare, and information systems;
- develop, conduct, and evaluate training in intelligence, electronic warfare, and information systems;
- provide trained operational forces in the areas of intelligence and communications;
- operate, manage, and defend the Army's information operations and infrastructure;
- perform aviation operations; and
- provide training opportunities for Active Duty, Reserve, and National Guard forces.

Intelligence and Unmanned Aviation Warfighter Training

The primary missions on Fort Huachuca are Intelligence and Unmanned Aviation Warfighter training, Army global network management, mission-ready forces deployment and redeployment, UAS training, Army and Air Force manned aircraft training and operational missions, and testing of Command, Control, Communications, Computer, C4ISR systems. All of these training and testing missions take advantage of the extremely quiet radio frequency (RF) environment and frequency authorizations assigned to the Fort within DoD. Fort Huachuca serves the Army by providing the highly qualified Soldiers who are vital to the Army's ground combat role. Over 15,000 military personnel train at Fort Huachuca annually in various MI and Aviation disciplines. Additionally, the Fort hosts several critical Department of Homeland Security training and operational missions.

Fort Huachuca is considered one of the Army's primary C4ISR testing and UAS training installations. The Fort was rated 21st of 97 installations in overall importance to the U.S. Army in the 2005 Base Realignment and Closure (BRAC) rankings. A stable strategic environment in the "sky islands" is critically important. Due to the low levels of electronic interference and lines of sight in the immediate vicinity, it is essential to preserve USAG-FH's C4ISR test range, which completes a military 'virtual test range' that extends from the White Sands/Fort Bliss complex in the east to Edwards AFB on the west. Having the ability to test systems and equipment over long distances in real-world conditions is critical to fielding the best equipment for our military.

Fort Huachuca's unconventional training infrastructure includes the 946 square miles of the R2303 Military Air Complex, the Army's only UAScentric airspace for training and operations (Figure 2.4). The complex is used by the U.S. Army UAS School, the U.S. Army Intelligence Center, and multiple other DoD and federal agencies for their manned and UAS operations. The airspace is unique in that it is also available for use for manned military aircraft and general aviation. The USAF, and both active Army and Air National Guard have a daily presence in the R2303.

The installation contains major airfield facilities for both manned and unmanned aircraft. The manned aircraft facilities are located at LAAF, while current UAS facilities are located primarily at

Rugge-Hamilton and Pioneer Airstrips plus the Shadow runway facilities. A remote, minimally improved, landing strip for manned aircraft is located on the installation's East Range, Hubbard LZ. Remote helipads are situated throughout the mountainous portion of the installation, but are used primarily for firefighting and interdiction operations against smugglers of both contraband and undocumented immigrants.

Libby Army Airfield, located north of the installation Cantonment area, has one of the Army's largest runways and can accommodate any aircraft in the DoD inventory. The airfield has two runways, a 12,000 ft instrumented runway plus runups, and a 5,366 ft secondary (cross-wind) runway, for fixed wing aircraft. Assigned units (as well as other active and reserve components, USAF, Border Patrol (CBP) and USFS units) use LAAF as a deployment platform to transport Soldiers and equipment directly to the Theater of Operation. The Army conducts manned and unmanned aviation training and C4ISR training and testing. LAAF is capable of operating as a full-service 24/7/365 DoD airfield, but currently operates a 24/5 schedule to support mission operations. Approximately 130,000 air operations are conducted at LAAF annually.

Hubbard LZ, an unpaved Forward Landing Strip, is located in the eastern portion of the installation. This landing strip supports joint-land training operations and is capable of handling C-130 and C-17 aircraft. Hubbard LZ provides fixed-wing aircraft with the ability to perform assault landings, and is primarily used by the U.S. Air Force regularly during the AATTC classes, offered one week each month.

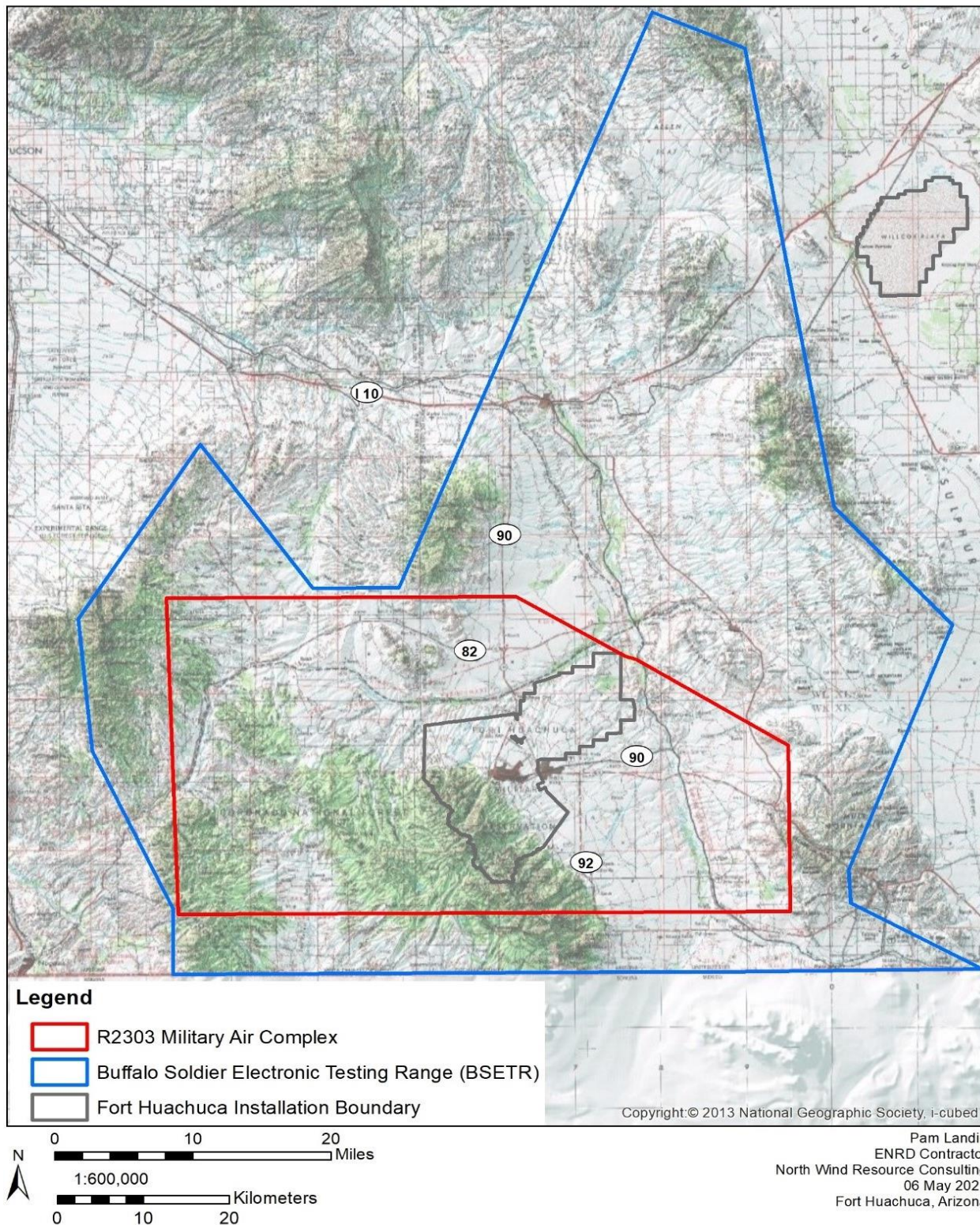
Fort Huachuca's airfield facilities, training areas, and firing ranges are used 365 days a year by Soldiers assigned to the Fort as well as active component Army units from other installations and U.S. Army Reserve, National Guard, U.S. Air Force, and Marine units. The primary users are assigned Army Signal, Aviation, and MI units and the DoD testing commands. Several brigade-level exercises and numerous battalion-level and other collective-unit training exercises also occur throughout the year.

Several major range and training facilities were constructed or upgraded since 2006. Major projects include the addition of the three-mile Convoy Live Fire Range, two Elevated Sniper Ranges, a Defensive Live Fire Range, a Law Enforcement Weapons Training and Qualification multiple firing point Range, a Small Arms Squad and Platoon Infantry Maneuver Range, and Urban Operations Site, as well as a laser range, renovated Obstacle Course and Rappel Tower.

Unit Training Requirements

Fort Huachuca is home to two TRADOC training missions; USAICoE and the 2-13th, a tenant unit of the USAICoE for all Army UAS training. During the peak operations of Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) 2008-2011, graduates from the TRADOC units would often deploy directly to units already deployed in combat operations in Theater. The 40th Expeditionary Signal Battalion (40th ESB), a Forces Command (FORSCOM) unit assigned to Fort Huachuca, deploys routinely in support of Army Signal missions in support of operations around the world. These deployment rotations are expected to continue well into the foreseeable future. To maintain the required level of mission readiness, the 40th ESB needs to have the ability to conduct realistic ground training on and around the installation. In addition to this requirement, the pivot from Counter Insurgency (COIN) operations to preparing for future peer/near peer conflicts will require a shift in the use of our testing and training assets with a focus on expanding Electronic Warfare/Signals Intelligence (EW/SIGINT) individual Soldier skills as well as unit training going forward. The combination of the R2303 Military Restricted Airspace and the clean electromagnetic environment of the Fort's electronic test ranges make this an ideal location for this type of individual and unit training. To support this evolving mission, Fort Huachuca will require the ability to conduct combined air and ground operations over the entire installation and

Figure 2.4 Fort Huachuca Airspace



also be able to overfly large expanses of land outside of the installation (to simulate an in-theater battlespace). To properly train, some of these units, particularly the AATTC, need the ability to fly high altitude and nap-of-the earth missions over large, minimally lit, undeveloped areas located on and around the installation and Hubbard Assault Strip. The evolving EW/SIGINT training mission will also use these capabilities to conduct ground and aerial EW/SIGINT training operations in preparation for real-world missions.

Critical Testing Capabilities

Fort Huachuca was chosen as the home for EPG, due to the remote location and low electromagnetic ambient environment in southeast Arizona. This environment is due in large part to the region's Sky Island topography that delineates the high altitude bowl in which the fort is positioned. In 2008, the Arizona State Legislature designated 2,500 square miles of that bowl in State Statute as a military electronic testing range and named it the Buffalo Soldier Electronic Testing range (BSETR) (Figure 2.4).

In conjunction with the Fort Huachuca training mission, EPG uses all of the general purpose ground space and airspace in the BSETR and the Willcox Dry Lake bed primarily for C4ISR testing. In addition, EPG is authorized to operate high power (up to 10,000 Watts) open air offensive jamming operations at any frequency. The Blacktail Canyon complex is the only area in the CONUS with the ability to conduct this important defense mission. Because of the pristine electromagnetic environment at Fort Huachuca and the mission of EPG, the National Telecommunications and Information Administration (NTIA), as part of its Manual of Regulations for Federal RF Management, mandated Fort Huachuca and the surrounding area be protected from electromagnetic encroachment.

As a result, EPG along with Fort Huachuca, is the only Major Range and Test Facility Base to have been afforded this protection. EPG is a principal Army test center for C4ISR systems, UAS payloads, and navigation and avionics systems; the primary Army activity for the test of distributed communication systems with emphasis on the testing of systems of systems; and developer of the Virtual Electronic Proving Ground which allows for the conduct of testing in a combined real, virtual, and constructive simulation environment. EPG facilities at Fort Huachuca include those needed for testing electromagnetic compatibility and vulnerability of tactical electronic equipment, the intra-/interoperability of tactical automated C4ISR systems (including software and documentation), Telecommunications Electronics Material Protected from Emanating Spurious Transmissions (TEMPEST) testing, and electronic counter-measures testing. EPG has an in-house developed suite of test instrumentation which includes test control, test stimulation, test data acquisition and virtual jamming.

The EPG is also the Army's flight test facility for UAS payloads; it has extensive test capabilities in the areas of Global Positioning System (GPS) testing, propagation simulation, C4I battlefield simulations, and the use of existing battle simulations in test and training activities. Concurrently with EPG's development of testing capabilities, other test organizations such as the IEWTD and DISA, JITC have co-located at Fort Huachuca to take advantage of the superb electromagnetic interference-free testing-environment and to share experiences/systems/ knowledge with EPG.

The EPG currently experiences an excellent rapport with Fort Huachuca, other tenant units; local, county, state and federal agencies that control the surrounding ground and airspace; and neighboring military installations such as Yuma Proving Ground, Davis Monthan AFB, and White Sands Missile Range. Test scenarios often require the use of thousands of square miles of land and airspace and almost exclusive access to the RF spectrum including non-DoD frequencies. To date this has not been a problem due to this outstanding rapport with all of these organizations.

Field Training Exercises

Fort Huachuca is used for training by various operational units, Army Reserve and Arizona National Guard units, Fort Huachuca partner organizations, CBP, and MO ANG units. All training activities requiring the use of range facilities are scheduled, coordinated, and controlled through Range Operations. Field training exercises consist of land navigation, patrolling and tactics training, individual development training, and vehicle maneuver training. Just over 135 miles of maneuver trails are maintained by ITAM for field training exercises.

On occasion, locations across the Fort are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Specific bivouac areas vary from exercise to exercise and do not always coincide with existing ASAs or pre-defined bivouac sites (Figure 2.5). Use of any site must be requested a minimum of 21 days in advance from Range Operations with an eight-digit grid coordinate location.

No vegetation clearing is authorized during the establishment of a bivouac. On occasion and through consultation with the environmental office, vegetation is removed to provide line of sight unit movement and maneuverability, and to accommodate unit assembly training areas. Fox holes and firing positions can only be dug into the ground with prior permission from Range Operations and environmental. Concrete pads in some permanent bivouac areas are used for cooking purposes to prevent wastewater from seeping into the ground in case of spills.

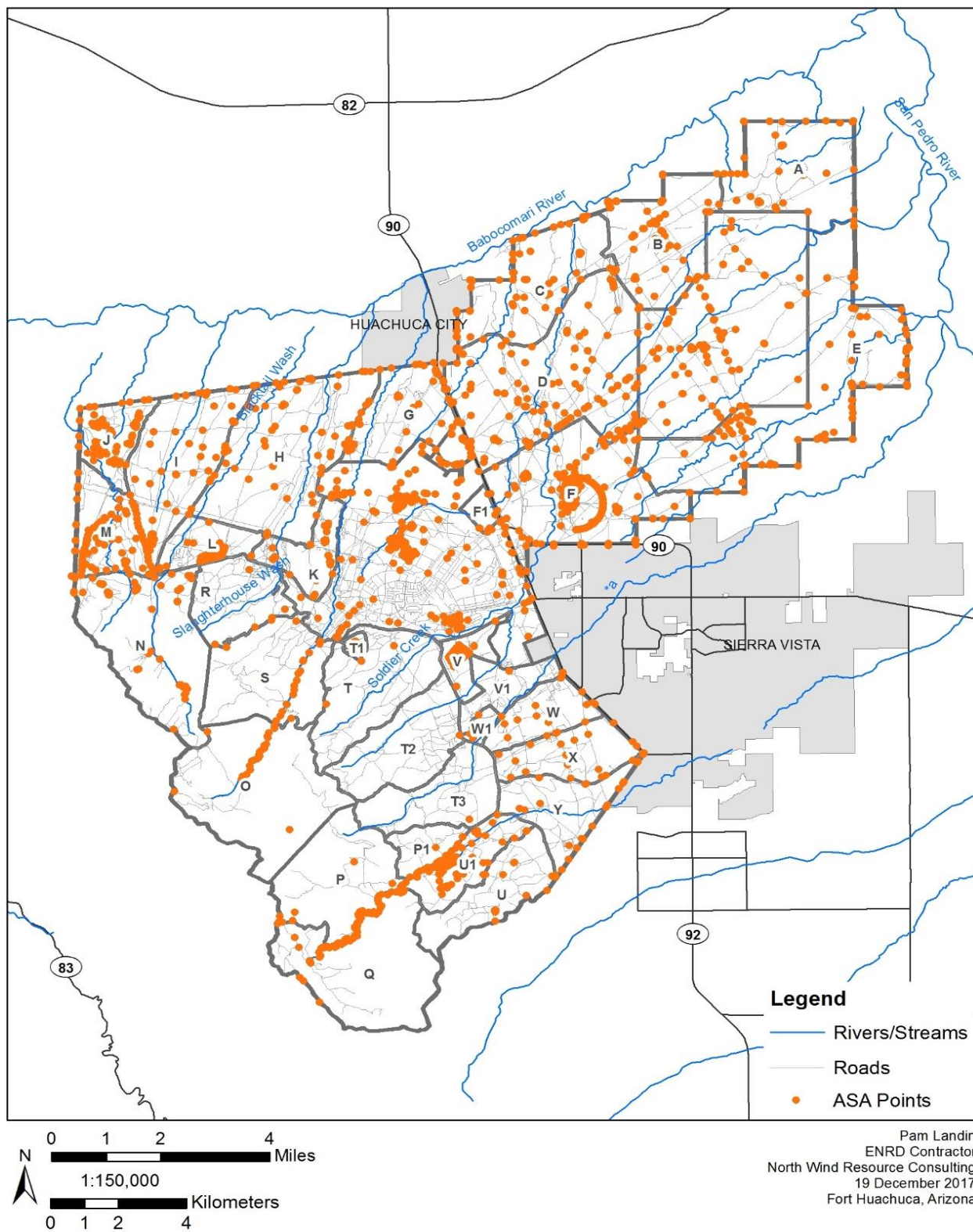
There are ten established bivouac areas on the installation located in Training Areas Bravo, Golf, Delta, Echo, Foxtrot, Tango, and Whiskey. On occasion Havoc DZ is scheduled for bivouac and unit assembly training activities (Figure 2.6). Additionally, there are 25 training facilities on the installation. Combined, these bivouac sites and facilities are utilized on a more frequent basis for the larger scale communications testing and training activities. Facilities and established bivouac sites are maintained as permanent areas of repeated use in order to minimize the need to establish additional set up areas.

Land Navigation Training

Land navigation involves the training of personnel to accurately navigate the terrain on foot and locate pre-established sites and locations. Land navigation exercises typically involve 15 to 20 personnel and four to five vehicles for transportation of personnel to and from the field-site. Operations generally last for one day from morning until evening and are conducted year-around except in agave management areas (AMA) when practicable. All vehicles are kept on existing roads and trails. No live fire, firing of blanks, or use of pyrotechnics is permitted. There are three existing land navigation courses on the installation:

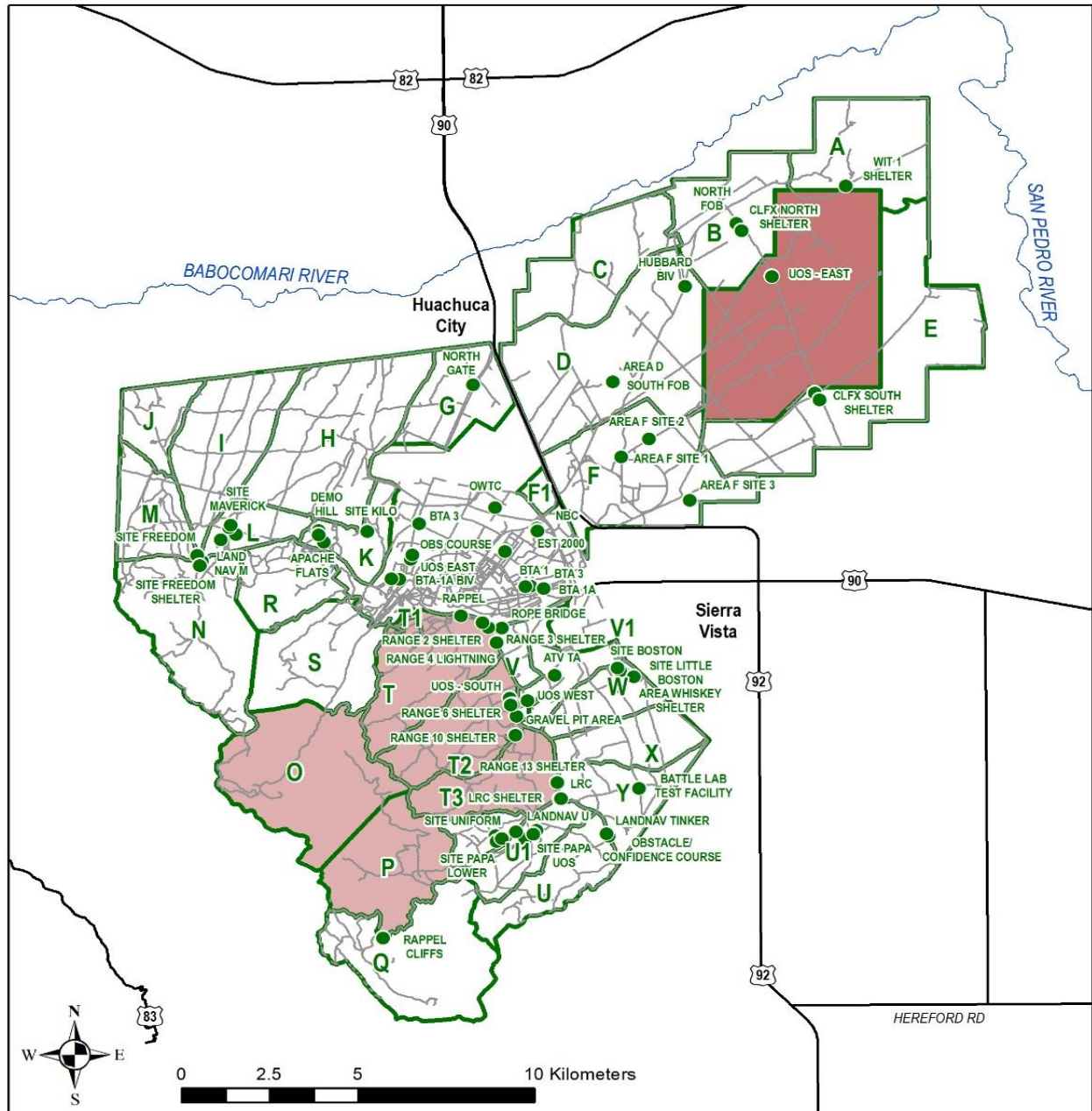
- One land navigation course in Training Area Uniform consisting of 44 surveyed concrete points with ASA markers;
- One land navigation course in Training Area Uniform-1 consisting of 26 surveyed points; and
- One land navigation course in Training Area Mike consisting of 58 surveyed concrete points with ASA markers.
- Unit patrols and ruck marches are conducted across the West and South ranges. This training is similar to that which occurs on land navigation courses. Vehicles are used to transport personnel to and from the field and are kept on existing roads, trails, or parking areas at all times. No live fire, firing of blanks, or use of pyrotechnics is permitted.

Figure 2.5 ASA Sites on Fort Huachuca



Pam Landin
 ENRD Contractor
 North Wind Resource Consulting
 19 December 2017
 Fort Huachuca, Arizona

Figure 2.6 Training Sites on Fort Huachuca



Data Source: Fort Huachuca ITAM 2019

Legend

- Training Sites
- Major Roads
- Installation Roads
- Rivers/Streams
- ▭ Training Area Boundaries
- ▭ Impact Area Dudded
- ▭ Impact Area Non-Dudded

- Activities are conducted during day- and nighttime, except within AMAs where night operations are limited, due to human safety concerns and for protection of sensitive and ecologically important agave resources.

Patrolling and Tactics Training

Patrolling and tactics training occurs across the South and West Ranges. The exercises, which generally last three days, are conducted every month of the year. Approximately 50 personnel are involved in the operations each month. Ammunition used during these operations includes pyrotechnics, smoke, and M16A2 blanks.

In these training exercises, soldiers maneuver on foot along trails and cross-country. They occasionally dig holes about 5 inches deep with permission of Range Operations to bury sensors near the trails and major roads. All vehicles used during this training are kept on existing roads and trails.

Training may take place during the day or at night. No firing of blanks or pyrotechnics can occur within 0.25 mile of AMAs when practicable. Firing of blanks is also prohibited if it is determined by Range Operations or the Fort Huachuca Fire Chief that a fire hazard exists. Activities are conducted during the day or at night, except within AMAs where night operations are limited when practicable.

Occasionally, a Special Forces unit will request to conduct patrolling training in the Huachuca Mountains on Fort Huachuca. These exercises usually involve teams of less than 12 personnel. Personnel are provided training on environmental awareness and are prohibited from making campfires or killing wildlife during their patrolling training.

Individual Development Training

Several individual development training facilities are located on the South and West Ranges and within the Cantonment area including:

- Rappelling Tower (Training Area Tango) – A four-level tower platform used for rappelling practices;
- Rappelling Cliffs (Training Area Quebec) – Cliffs located in Garden Canyon which vary in height from approximately 70 to 100 ft;
- Rope Bridge Training Site (Training Site Victor) – An open area with four upright telephone pole tops, approximately 4 ft high;
- Leadership Reaction Course (Training Area Yankee) – Eight stations, each depicting a situation that requires the negotiation of obstacles by expedient means;
- Demonstration Hill (Training Area Kilo) – May be used to conduct various types of demonstrations;
- Warrior Task Complex (Cantonment Area) – Six stations, each requiring soldiers to negotiate obstacles using the Military Decision Making Process;
- Obstacle Course (Cantonment Area) – Clover shaped with 17 obstacles. This course is a test of a soldier's basic motor skills and physical conditioning; and
- Confidence Course (Cantonment Area) – Clover shaped with four groups of higher and more difficult obstacles than the obstacle course designed to give soldiers confidence in their mental and physical abilities.
- Challenge Course (Cantonment Area) – Ropes course designed to provide a combination of mental and physical challenges requiring groups to work as a team.

Vehicle Maneuver Training

Vehicle maneuver and driver training activities occur across the installation on various existing roads and trails. The ITAM program assesses and maintains just over 135 miles of maneuver and tactical movement trails for condition (drivability and erodibility) and status (open or closed). These trails are defined as unpaved trails within a maneuver area used for mounted or dismounted maneuvers. The majority of all vehicle maneuver training consists of wheeled-vehicles with occasional tracked-vehicle training. Wheeled-vehicle training maneuvers can include attaching and detaching trailers, loading and unloading equipment, and driver training across the installation. All maneuvering activities are confined to the existing roads and trails.

Oversized vehicles are restricted to roads, whereas light vehicles can use roads, unpaved trails, and fire breaks. No cross-country maneuvering or other use of existing off-road maneuvering lanes occurs or is planned, except as described for the MO ANG below or emergency situations (safety, fire, etc.). All existing and planned vehicle maneuver training adheres to the following regulations:

- Fort Huachuca Regulation 385-8, Safety - Range and Training Area Operations;
- Installation Spill Contingency Plan - Fort Huachuca, Arizona (2005); and
- Use of the web-based scheduling system Range Facility Management Support System (RFMSS) for approval prior to commencement of maneuvers that require access to the East Range.

Limited off-road vehicle travel is only authorized for military training purposes as outlined in the Training Area Activities section. Humor DZ is located within Training Area Bravo and is used in support of AZ ANG and MO ANG training, consisting of dropping palletized loads from aircraft. As part of the training effort, approximately four short off-road recovery trips will be required for each of the 25 classes offered by the MO ANG. No other off-road vehicle maneuver is presently occurring or is planned on the installation.

Live Fire Qualification and Training

Most live fire activities take place on weapons qualifications ranges in Training Area Tango. Maximum ammunition and associated noise levels used on these ranges are listed in Table 2-1. Locations of these firing ranges and their associated safety fans are provided in Figure 2.7. When conditions allow, tracer rounds can be authorized by Range Operations on all live firing ranges with the exception of Ranges 2, 3, and 4.

Small arms qualification and live fire at Fort Huachuca occur on twelve live fire ranges located in Training Area Tango, Training Area Alpha (Table 2-1) at the WIT 1 and 2 facilities in Training Area Zulu on the East Range, and on the convoy live fire course in Training Area Zulu and two live fire ranges on the east range. Firing positions and safety fans for these ranges are provided in Figure 2.6. Firing ranges are used for personnel qualification and training throughout the year. Live fire does not take place at night on Ranges 2, 3, and 4 during the period 1 July through 31 October.

The East Range contains several surveyed firing points usable for mortar and artillery firing into Impact Area Zulu. Mortar and artillery firing points are currently inactive.

Administrative and Support Activities

The administrative and support activities performed at Fort Huachuca are those activities associated with the day-to-day operation of the installation and the ranges, inclusive of those activities performed by the directorates and partner organizations. Several administrative and

support organizations exist to support the installation's ongoing role as a major Army testing and training installation. Most personnel from these organizations are located in the Cantonment area.

Fort Huachuca's garrison organization reflects IMCOM's Standard Garrison Organization (SGO) structure. The term "Standard Garrison Organization" supports the Army's goal to standardize the organizational structure that operates the installations and provides services to its community. All Army garrisons are to have the same structure, in terms of programs and divisions within the garrison. And all internal organizations are to have the same names and the functions and be aligned consistently.

In addition to standardizing the garrison structure itself, the SGO approach is aimed at establishing and maintaining Common Levels of Support (CLS) for personnel across the Army. This standardized level of support ensures the delivery of high quality base operation services with services performed to the same degree of excellence across installations.

The Army & Air Force Exchange Service (AAFES) provides support for many of the commercial needs of soldiers and their families. Currently, AAFES provides the following on-post locations for services: Main Post Exchange, Shoppette/Mini Mall with gasoline dispensing, Main Gate Shoppette/Mini Mall with gasoline dispensing, several food service operations, laundry and dry cleaning services, laundromat (self-serve), and Military Clothing Sales.

Aviation Activities

Aviation activities include fixed-wing and rotary-wing piloted aircraft training, UAS testing and training, and aerostat surveillance balloon operations. Aviation activities generally occur at LAAF, which is a military-civilian joint-use facility. The LAAF supports military aircraft involved in test and training programs; troop movements; and standard military, commercial, and private travel operations. Three runways, several taxiways, aprons, and parking areas for fixed and rotary-wing aircraft cover the largest portion of the airfield area. Air operations are sustained by numerous support facilities, including a flight control tower, navigational aids building, airfield operations building, airfield fire and rescue station, utilities support structures, and storage buildings. Flight corridors and other aviation-related training areas are shown in Figure 2.8 and include:

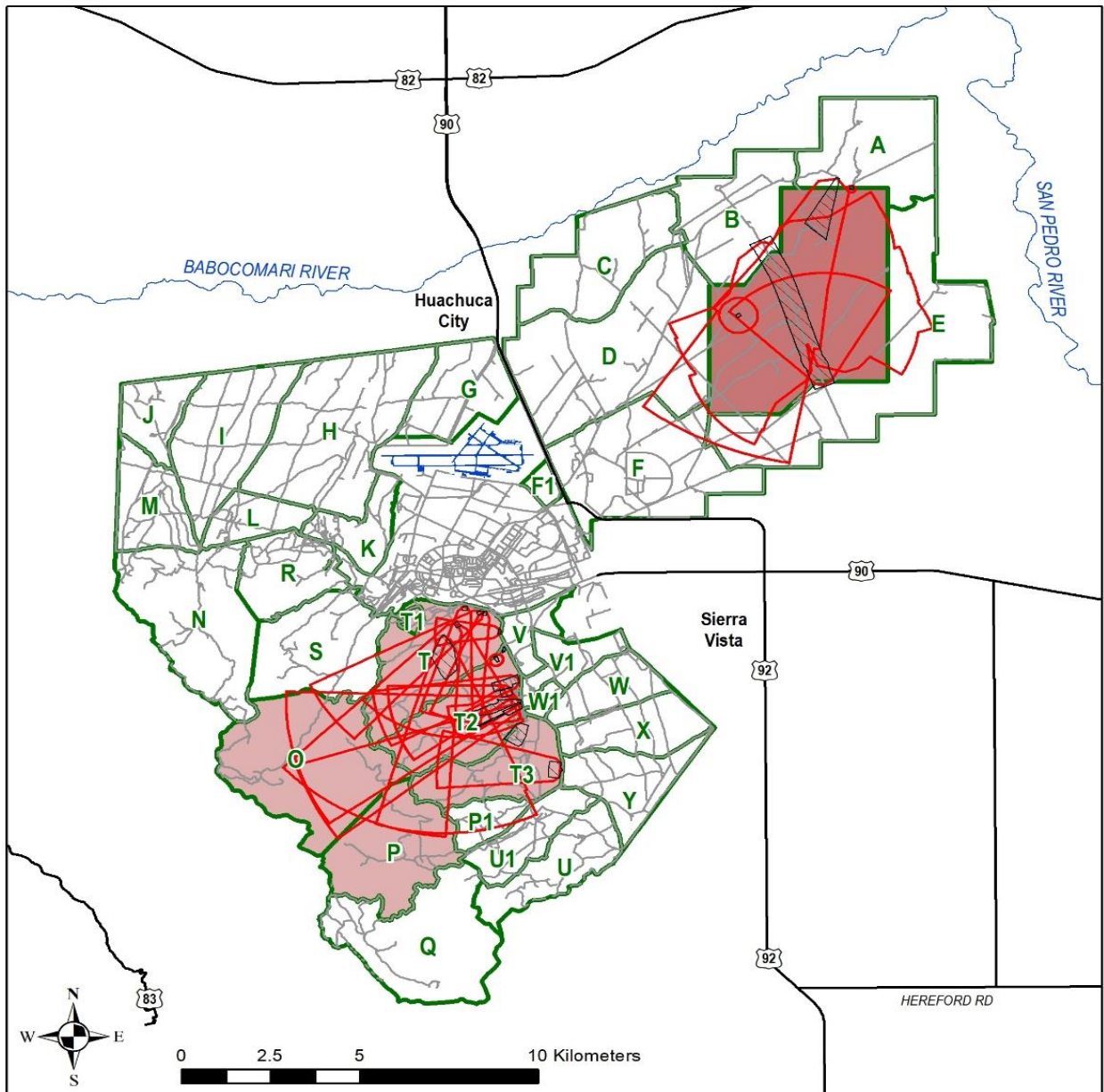
- a C-5A aircraft training mock-up (Training Area Victor) – a concrete platform depicting a C-5A aircraft cargo bay used to simulate cargo loading;
- an emergency helicopter landing area (Training Area Victor);
- helicopter landing areas for proficiency and emergency operations (Training Areas November, Romeo, India, and Kilo);
- Hubbard Assault Airstrip (Training Areas Bravo and Delta) – a dirt assault strip/LZ, surveyed and approved by the USAF that can accommodate C-130 aircraft (112 x 3,463 meters [m]);
- Hubbard DZ (Training Areas Charlie and Delta) 917 x 2,740 m;
- Humor DZ (Training Area Bravo) 912 x 2,119 m;
- Havoc DZ (Training Areas Charlie and Delta) 910 x 1,830 m;
- Hyena DZ (Training Area Echo) 848 x 1,830 m;
- Tombstone DZ (Training Area Bravo, Charlie, and Delta) 1,830 x 738 m; and
- Dust Devil DZ (Training Area Bravo) 1,340 x 2,510 m.

Table 2-1 Firing Ranges on Fort Huachuca

Range	Range Utilization	Maximum Ammo Permitted	Maximum Noise Level at Firing Point¹
Range 1	Elevated Sniper Range with two firing points (220 m – 1300 m)		
Range 1B	Defensive Fire Range with six firing points consisting of six firing lanes (25 m – 200 m)		
Range 2	M-16 Rifle Marksmanship Zero Range with 40 firing points and a target width of 300 m.	5.56 millimeter (mm)	156 decibels peak (dbP)
Range 2B	Law Enforcement Weapons Training and Qualifications with six firing points consisting of 12 lanes (2 m – 100 m)		
Range 3	Small bore multi-weapon range with 15 firing points, and 100 m maximum range.	7.62 mm	156 dbP
Range 4	U.S. Army Standard Combat Pistol Qualification course (CPQC) consisting of 15 lanes (31 m).	.45 caliber (cal)	162 dbP
Range 5	A hand grenade inert assault course (HGAC), using dummy bodies with or without practice fuses due to fire danger.		
Range 5A	Currently inactive due to safety considerations. A high explosive hand grenade range (HEHR) with 12 firing points.	N/A	N/A
Range 6	Zero and known distance Fifty firing points and six firing lines from 100 to 1,000 m.	.50 cal	159 dbP
Range 8	Automated modified record fire range with 10 firing points and target distances from 50 to 300 m.	5.56 mm	156 dbP
Range 9	A multi-purpose machine gun range with four firing points (800 m)	.50 cal, 40 mm MK -19, No HE	160 dbP
Range 10	M-203/M320 grenade zero and qualification range (1500 m). High Explosive (HE) cannot be fired on this range.	.50 caliber qualifications (Cal quals)	154 dbP
Range 11	Small arms quad/platoon infantry maneuver, non-standard events (700 m)		
Range 12A	Currently inactive .50 caliber, 7.62 mm, and 40 mm live fire weapons range.	None	N/A
Range 12B	Currently inactive tank gunnery range.	None	N/A
Range 12C	Currently inactive tank gunnery range.	None	N/A
Range 13	M-16 marksmanship modified record and zero fire range with 16 firing positions and targets from 50 to 300 m.	5.56 mm	156 dbP
Range 18	Elevated sniper range with 4 firing points (470 m – 1750 m)		
Wit 1	Explosives and pyrotechnics, high risk training event		
Wit 2	Explosive and pyrotechnics, high risk training event		
Convoy Live Fire Range	3 miles	5.56 mm	156 dbP










1. Based on impulse noise levels and do not represent steady noise or time-weighted average.

Figure 2.7 Firing Range and Surface Danger Zones on Fort Huachuca



Data Source: Fort Huachuca ITAM 2019

Legend

- | | |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  Firing Ranges |  Training Area Boundaries |
|  Surface Danger Zones |  Impact Area Dudded |
|  Major Roads |  Impact Area Non-Dudded |
|  Installation Roads |  Rivers/Streams |
|  Libby Army Airfield | |

Approximately 130,000 aviation evolutions occur at LAAF annually (each landing or departure counts as one evolution). Military operations include approximately 110,500 evolutions or 85% of all activity.

Approaches to LAAF are considered Class D Airspace since the facility contains a manned operating control tower. The airport's airspace includes a horizontal radius of 4.3 nautical miles (NM) from the airport, extending from the surface up to 7,200 ft above mean sea level (AMSL). When the Restricted Area (R-2303) is activated, the Class D airspace reduces to 3 NM. Aircraft are not permitted to enter the airspace until the Air Traffic Control (ATC) tower is contacted for clearance to do so. During the time the ATC tower is closed, the airspace reverts to Class G, or uncontrolled airspace with Class E extensions.

Restricted areas contain airspace identified by an area on the surface of the earth within which the flight of aircraft is subject to restrictions. If the Restricted Area is active, the ATC facility having jurisdiction over the airspace needs to authorize clearances to aircraft requesting to transit the area either to land or pass through. If the Restricted Area is not active and has been released to the controlling agency (Federal Aviation Administration [FAA]), the aircraft can make their request for service with the FAA. Four Restricted Areas (R-2303A, R-2303B, R-2303C, and R-2312) are located in the vicinity of LAAF. Flight operations originating at LAAF (i.e., helicopter, fixed-wing, and UAS operations) use only a small portion of this airspace. Davis Monthan AFB and the AZ ANG conduct at least 49% of the activities in this airspace.

Other fixed wing activities at LAAF include tenants at Fort Huachuca, such as the USFS Air Tanker base and the CBP activities. Occasionally, other agencies use LAAF on a temporary basis, including North Atlantic Treaty Organization (NATO) partner aircraft, and transient USAF operational aircraft.

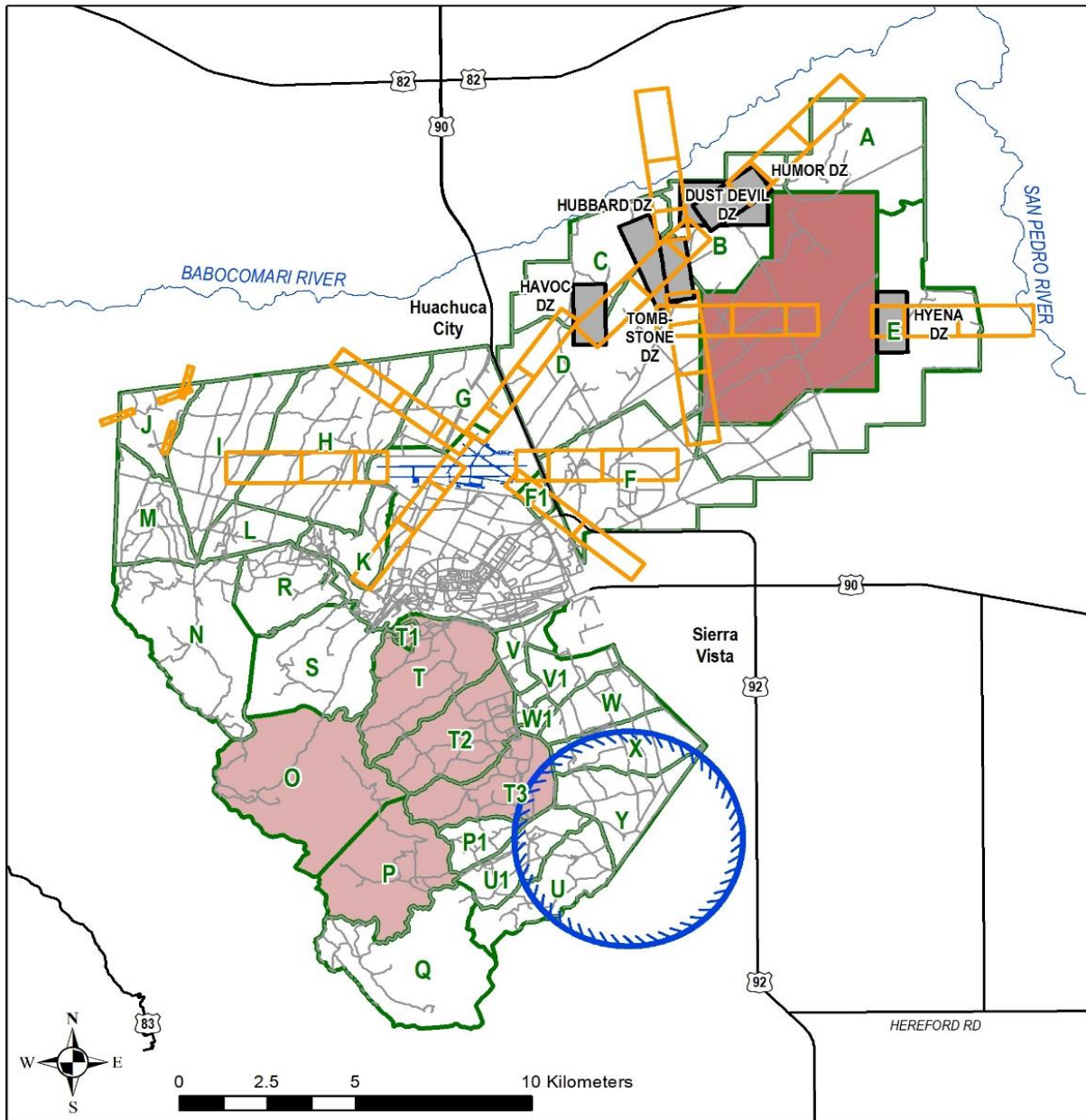
Fixed-Wing Piloted Aircraft Training

Fort Huachuca airspace and facilities are used by other DoD agencies for proficiency testing and training during exercises originating at other installations. Fort Huachuca is not the proponent for any military fixed-wing piloted aircraft training activity based at the Fort or any other installation. The following summary discussion represents aviation activities that use Fort Huachuca airspace or facilities during training or testing operations.

Individual pilot proficiency training for the USAF and USAF Reserve is conducted in Fort Huachuca airspace and at LAAF facilities. The most common aircraft is the ground attack A-10 aircraft flown out of Davis-Monthan AFB in Tucson, Arizona. These A-10s averaged 30,000 flight evolutions at LAAF for calendar years 1993-2005, for an average of 35% of the annual military activity at the airfield (USAIC & FH 2006). This training consists of low approaches (simulated aircraft landings and take-offs where aircraft are flown to LAAF and make approaches to the airfield, simulate a landing, and depart without actually grounding the aircraft). The LAAF air zone used during this activity is shown in Figure 2.7.











The AZ ANG 162nd Wing and MO ANG use Fort Huachuca airspace and LAAF facilities on a continuous basis for individual proficiency training for pilots. The AZ ANG maintains a training center on post for the MO ANG's training course: AATTC. They have 4-6/C130s and/or 1-2/C17s at a time, 10-12 training classes per year. All personnel are qualified on their aircraft (i.e., the pilots are qualified to fly their aircraft already), and they are learning to evade surface to air fire, drop pallet loads from the aircraft, and avoid detection. The AZ ANG 162nd Wing, headquartered at Tucson International Airport (TIA) uses LAAF for instrument approach procedures, missed approach procedures, instrument departure procedures, and touch-and-go takeoffs and landings.

Figure 2.8 Flight Corridors and Aviation Training Areas



Data Source: Fort Huachuca ITAM 2019

Legend

- | | |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  Air Safety Zones |  Libby Army Airfield |
|  Drop Zones |  Training Area Boundaries |
|  AEROSTAT Restricted Airspace |  Impact Area Dudded |
|  Major Roads |  Impact Area Non-Dudded |
|  Installation Roads |  Rivers/Streams |

The AZ ANG is flying the F-16. The MO ANG's training is conducted using the Lockheed C-130 aircraft, a four-engine turboprop-powered tactical transport. Other similar turboprop transports, such as the two-engine Transall C-160, are used by some training units. The AZ ANG and MO ANG aircraft have used LAAF for an annual average of 40,000 flight evolutions, or approximately 40% of the annual military activity at the airfield (USAIC & FH 2006).

Humor DZ on the East Range and the Hubbard LZ are used by the MO ANG as training flight destinations/objectives where actual airdrops or landings can be practiced. The Hubbard LZ provides tactical airlift crews a rare peacetime opportunity to land and takeoff from a dirt runway. The Hubbard LZ is presently used by each training aircrew for four landings and takeoffs during the class period. Annual operations for the LZ are approximately 720 evolutions. The Humor DZ was recently expanded to 1,800 x 3,000 m accommodate air drops of palletized loads. The Hubbard LZ air zone used during this activity is shown in Figure 2.8.

Unmanned Aircraft Systems

The 2-13th operates the Gray Eagle (MQ-1C) wingspan of 66 ft and weight of 3,600 pounds (lbs.) and the Shadow (RQ-7B) UAS wingspan of 20 ft and weight of 460 lbs. The 2-13th is responsible to train Soldiers to operate and maintain these UAS platforms that sustain the Army manpower requirements for the life of the systems.

Operation and training of the RQ-7B is conducted at the Black Tower complex footprint approximately 16 hours a day Monday through Friday ending by 2300 hours. The student strength for RQ-7B operators is 498 for fiscal year (FY) 18 and 651 maintained students for FY18. The RQ-7B normally operates between 9,000 and 15,000 ft AMSL within the R-2303 airspace. The West Range ground elevation varies. Using an average of 5,000 ft, the UAS will fly an approximate altitude of 5,000 to 10,000 ft above ground level (AGL). During training activities, the minimum altitude at which the UAS fly (excluding take-off and landing approaches) is 1,000 ft AGL. Normally the RQ-7B operates above the West range and the west of Fort Huachuca. Common core, general instruction for these students and maintenance students is located in the Applied Instruction Building (AIB) (Bldg 11640), buildings adjacent to the Black Tower and temporary buildings at Site Black to include Pioneer and Rugge-Hamilton runways. These runways are located approximately six miles west of the Cantonment area on the West Range. The number of cadre can exceed 375 for this system at any given time. Class IV Laser operations for both platforms will take place west and south-west of the Black Tower whenever flights are on-going at 12,000 to 16,000 ft AMSL.

Operation and training of the MQ-1C takes place at LAAF area, to include temporary training facilities North and South sites, located just south of LAAF. There are approx. 240 student maintainers designated for FY18 and 266 Operators for MQ-1C. Operators are trained in Hangar 5. Flight operations from LAAF are 24 hours 5 days a week. Operations normally are at 9,000 ft to 25,000 ft AMSL or pattern operations at LAAF at 1,000 ft above ground. Total instructor cadre at these locations are approximately 150.

Unmanned Drug Surveillance Balloon Operation

In 1987, an Aerostat Drug Surveillance Balloon became operational in the southern portion of the South Range. The blimp-type balloon is ground tethered and is an aerial platform for radar equipment used to detect aircraft illegally entering the U.S. (Zillgens 1991). The radar data is for U.S. Customs, the DoD, and the FAA, and this system is in operation year around, 24 hours per day within approximately 23 acres of the South Range. Airspace used for the aerostat balloon is shown in Figure 2.7. This airspace is restricted for aerostat activities only.

Outdoor Recreational Opportunities

Southeastern Arizona is a popular destination for local visitors, as well as national and international travelers. The addition of the SPRNCA, CNF, Coronado National Memorial, Ramsey Canyon Preserve, Kartchner Caverns State Park, and other unique tourist and recreational attractions further enhance visitor interest in Cochise County. Although current recreational use in the Sierra Vista area is mostly concentrated in areas just outside the Fort (Ramsey and Carr Canyons and the SPRNCA); Garden and Huachuca Canyons are also popular recreational sites.

Fort Huachuca is open to the public, in accordance with the Sikes Act, and areas outside the firing ranges and impact areas provide numerous recreational opportunities. Fort Huachuca provides access to activities such as hunting, fishing, hiking, bird watching, horseback riding, golfing, biking, and fuelwood cutting.

Public Access

Any person accessing the Fort, including recreationists, must possess a valid DoD identification card or a Fort Huachuca Access Badge. Civilians can gain access to the installation by going to the Visitor Control Center located at the Fort's Van Deman Gate and completing an access request form. A form of government issued photo identification is required to obtain an access badge. Additionally, any non-DoD person entering the installation, regardless of affiliation, must pass a criminal background check. All international guests must schedule an approved DoD escort. Vehicle registration and proof of insurance are required for every vehicle that is driven on the installation.

Fort Huachuca controls the types, locations and magnitude of recreational activities to ensure that such uses do not adversely affect natural resources or interfere with the military mission. The Fort requires all recreational and research activities associated with natural resources to be coordinated with FMWR (recreation) and DPW ENRD (research) for review and approval prior to engaging in any such activity. Group and special events are evaluated on a case-by-case basis for potential impacts to resources and mission. Currently, hunting is controlled and monitored through the use of iSportsman, a software program that allows for the control of recreational access on the installation. The fishing program will be managed through this same program once re-initiated.

The military mission takes priority over all outdoor recreation. The installation or portions of it may be closed, without prior notice, for mission and security considerations. Fort Huachuca is not a public recreation area but is instead a military training installation that allows natural resource-based recreation only when it is compatible with the military mission and security.

Handicap Access

Handicap accessible recreational opportunities are outlined in the Fort's Outdoor Recreation Management Plan. In addition, the Fort currently supports the access for hunting by honoring the AGFD designation of Challenged Hunter Access Mobility Permits (CHAMP), which allows a disabled person to discharge a firearm from a motor vehicle and to designate an assistant to track and dispatch a wounded animal. Access to recreational opportunities for persons with disabilities is a requirement of the Americans with Disabilities Act of 1990, and provisions of the Sikes Act that ensure disabled veterans and other persons with disabilities have access to the same outdoor recreation opportunities as the non-disabled public.

Hunting

If managed properly, hunting is an effective management tool to achieve desired population levels beneficial to a given species, without negatively affecting other species or their habitats. The Sikes

Act requires that harvesting of wildlife from DoD installations be done in accordance to the game and fish laws of the state or territory in which it is located. Hunters on Fort Huachuca must possess a current Arizona state hunting license. They must also have a current Fort Huachuca hunting permit. Information (rules, regulations, maps, new information, etc.) regarding the Fort's hunting and fishing program can be located on the Fort Huachuca iSportsman (www.fthuachuca.isportsman.net) website. iSportsman is an automated check-in/check-out system by which hunters are able to view open areas, check-in/check-out of the field, purchase hunting permits, and record harvests via the internet, smart phones, or other compatible electronic devices.

There are 26 game management areas which coincide with the installation training areas. For game management purposes, some ranges are further subdivided numerically (W-1, U-1, P-1, etc.) (Figure 2.9). Fort Huachuca hunting seasons and bag limits are set in coordination with the AGFD.

Mule deer (*Odocoileus hemionus eremicus*), white-tailed deer (*Odocoileus virginianus couesi*), Chihuahuan pronghorn antelope (*Antilocapra americana*), javelina (*Pecari tajacu*), black bear (*Ursus americanus*), mountain lion (*Puma concolor*), and Gould's turkey (*Meleagris gallapavo mexicana*) are historically the big game species hunted on the Fort. Hunters also have the opportunity to hunt three species of quail, two species of dove, and several other small game species. The trapping of furbearers and predators for recreation or routine management is not permitted.

The Fort has developed management plans for game species on the installation, including the *Whitetail Deer, Mule Deer, and Antelope Harvest Report and Management Plan*; the *Javelina Management Plan*; the *Gould Turkey Reintroduction Plan*; the multi-agency *Southeastern Arizona Turkey Management Plan* (Heffelfinger et al. 2000), and the *Problem Bear Plan*. These plans provide information on hunter numbers, harvest results, survey results, population size and health, management strategies, and habitat improvements. Most of these plans are in need of update, but aspects of each management plan have been incorporated into other installation plans. The Fort, in coordination with AGFD, continues to complete surveys for white-tailed deer, mule deer, pronghorn, javelina, and Gould's turkey as part of an effort to develop baseline population estimates for big game on the installation. As part of the effort the Fort has also developed comprehensive big game population survey reports annually.

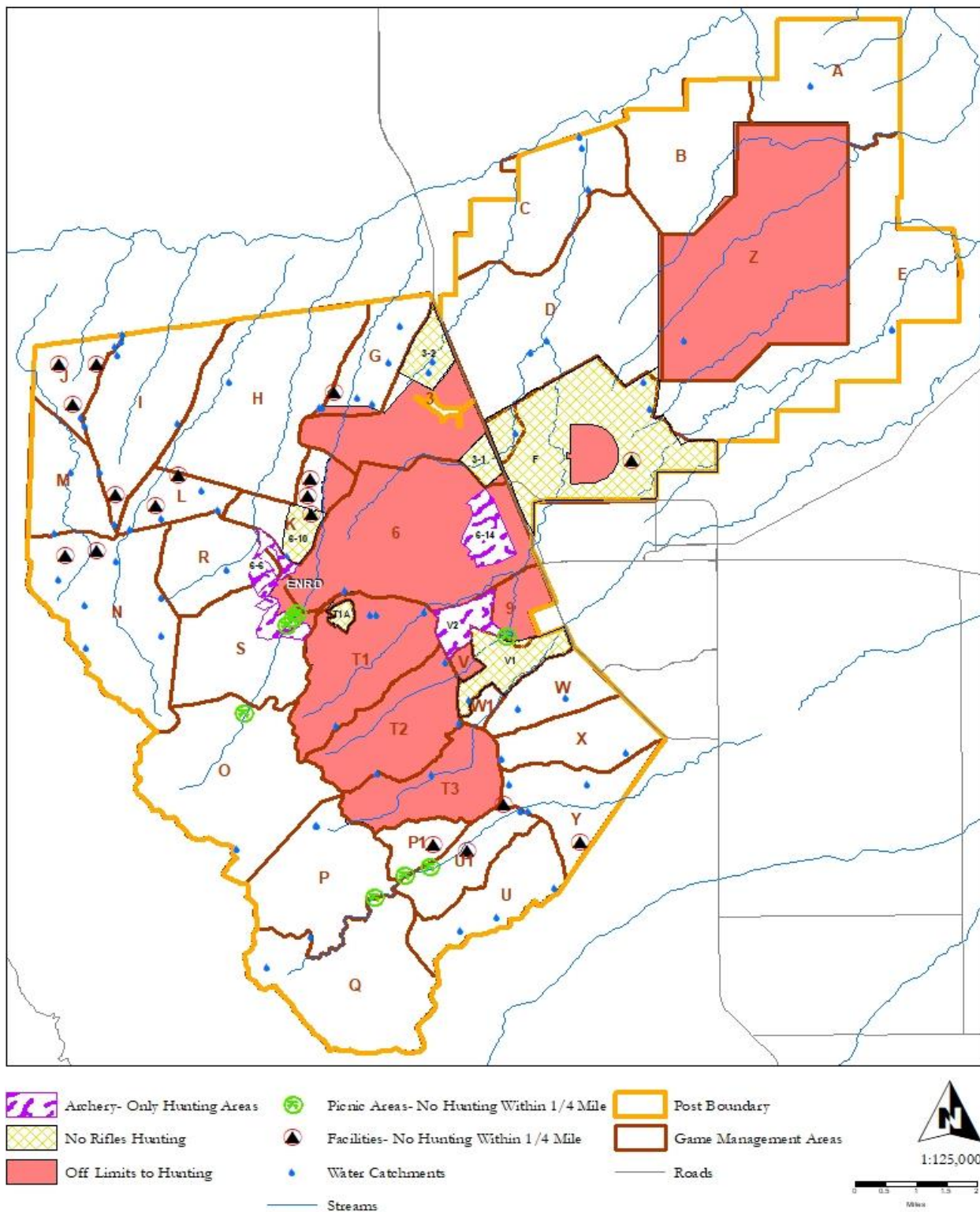
The Fort maintains a fish and wildlife conservation fund, in accordance with the Sikes Act, which allows installations to establish fees for hunting or fishing. Hunting permit fees are collected and are used for fish and wildlife related expenses, such as protection, conservation, and management of fish and wildlife habitat, on the installation. Fees will follow DoDI 4715.03, Enclosure 3(6)(c)(3) and Headquarters Department of Army (HQDA) 2018 program guidance.

Fishing

Historically, the Fort's fishing program consisted of up to 15 ponds (depending on annual precipitation) encompassing approximately 32 acres (Figure 2.4). Most of these ponds only retained water during heavy rains; therefore, the fishing program was reduced to eight perennial impoundments. In addition to these ponds Garden Creek, with approximately four miles of flow, was stocked for a put-and-take fishery. Stocking hasn't occurred anywhere on the installation since 2007. In the 1990s and early 2000s, the Fort's recreational fishing resources were reduced even further to a zone relatively accessible and close to the Cantonment area, which included six ponds that may or may not have been stocked in any given year: Golf Course, Gravel Pit, Woodcutters, Lakeside (Officers' Club), and Sycamore ponds I and II. Other ponds and the 4 mile

Figure 2.9 Game Management Areas and Recreational Facilities

Fort Huachuca Hunting Areas



reach of Garden Creek previously managed as fisheries had been eliminated from the program due to several factors, including issues associated with water usage in the San Pedro Basin, management of threatened and endangered amphibians, decreasing accessibility, and/or difficulty in maintaining water levels. The Fort does not currently support a recreational fishing program; however, there are plans to re-establish fishing in a single pond, Lakeside (Officer's Club), which may or may not be stocked in any given year, subject to funding and/or water levels. All other ponds historically managed as fisheries have been excluded from the program and are now managed for wildlife and habitat values.

Lakeside has been identified as an ideal location to allow fishing activities for the following reasons: the water source is completely precipitation runoff requiring no additional water usage to maintain water levels; it holds water perennially which provides the best habitat to support a year-round fish population; and the pond is contained within the Cantonment providing easy access to persons of all abilities. Lakeside is a man-made reservoir created in 1922 and has been recently rehabilitated. In 2018, the Fort drained and dredged the basin to repair a leak in the dam, removed silt, and removed invasive plant and animal species (i.e., water milfoil (*Myriophyllum* subspecies [ssp.])), red-eared sliders, largemouth bass, and bluegill. The leak was repaired, the dam epoxy coated to minimize water loss, and the water aerator replaced. In early 2019, the Fort coordinated with the Boys Scouts of America to add some manmade fish habitat structures; six structures were placed in the deepest parts of the pond near the dam. Spawning habitat was also created in four spots along the shoreline. No fish have been added to date, due to water quality issues. The Fort will coordinate fish stocking proposals with state and federal partners as required and will complete the permitting process prior to stocking.

The Fort will follow state fishing regulations and develop and make available on iSportsman (www.fthuachuca.isportsman.net) fishing guidelines and regulations. Anglers on the Fort will be required to possess a current Arizona state fishing license and any associated stamps, as well as a current Fort Huachuca fishing permit. Fishing eligibility will be determined as the program is being developed and eligibility requirements will be outlined in the Fort's fishing regulations. Though the Fort follows state fishing regulations, additional Fort Huachuca fishing regulations also apply. The use of live bait (e.g., salamanders, fish, frogs, and crayfish) for fishing on the Fort is prohibited.

Birding

Southeastern Arizona possesses one of the greatest diversities of bird species of any similarly-sized region in North America. More than 400 bird species occur here each year, and a total of almost 500 bird species has been recorded (Taylor 1995). A substantial portion of the Fort lies within the Huachuca Mountain Important Breeding Area (IBA). The installation receives a large number of visitations by birders year-round; however, peak seasons for birding are from April through mid-May and mid-July through mid-September. An estimated 8,000 trips/year by an estimated 5,000 individual birders were estimated to occur annually on the Fort in the 2010 INRMP. At present, the Fort has no means of estimating usage.

The number of birders visiting the Fort represents not only individuals but also organized groups, such as Audubon Society groups. In addition, at least five commercial birding companies and two or three local guides lead groups on birding tours on the installation. The 2010 INRMP estimated this usage to be approximately 1,000 to 2,000 trips of the 8,000 trips/year are guided.

The degree of use by birders raises concerns relative to the military mission and installation natural resources. The more people using Fort Huachuca for unrestricted recreation, the more likely there will be conflicts with the military mission. In addition, there is some live-fire risk, particularly along the access route to Garden Canyon. Natural resource concerns involve the

large number of people and the impacts of frequent, prolonged visitation. There are often hundreds to a few thousand people using an area of a few acres near active bird nests or along trails over the span of a year. For example, the federally-threatened Mexican spotted owl nests in a few locations close to trails on the Fort. These birds draw many birders to the area for the opportunity to observe such a rare species. Frequent, prolonged visits often result in nesting disturbance, trampling of vegetation, and creation of new trails to nests. These impacts may result in failed nesting, increased risks of predation, and erosion problems. Other problems associated with high numbers of people visiting birding areas include limited road access, damage to roads and parking areas, and lack of sanitation facilities for people using these areas. Another issue with regard to the demand for birding is that it is currently impossible to interact with most of these users. Future recreation management on the Fort, using a permit process, will provide a valuable means of identifying use by the birding community and provide a mechanism to obtain additional funding for habitat management in high use recreation areas.

Caving

Recreational caving is strictly prohibited on Fort Huachuca. All caves were closed to recreational caving in 2013 out of concern for human safety and to eliminate the possibility of human transmission of an invasive disease decimating bat populations (Leidos 2013, USFWS 2014d). When the Fort's caves were open to recreational caving, the Military Police (MP) managed access and were involved in cave rescue and extraction to some extent. The primary dangers in recreational caving include rock falls, slips at edges of drops, and trips and/or falls along the uneven cave passages. The most recent caving accident on the Fort occurred in 2006 when a recreational caver was extracted from an unfenced cave. Due to the technical nature of the cave, the rescue required over 100 people and multiple agencies to safely rescue the caver. The rescue resulted in tremendous damage to the most decorated room in the cave (Zia 2016b). A fatal accident occurred in the early 1970s when a spelunker fell into the pit in the first main room of Lower Pyeatt Cave (Zia 2016b). The 1970's fatality resulted in the gating of three caves (Upper Pyeatt, Lower Pyeatt, and Indecision) and one mine (Manila), to deter human use and out of concern for human safety. It was not realized until later that this gating restricted access not only to humans, but to bats as well.

In the late 1980s, the lesser long-nosed bat (*Leptonycteris yerbabuena*, LLNB) was federally listed as an endangered species (Section 2.3.4). After years of open cave access, a substantial amount of local spelunking and at least two unsuccessful attempts to gate caves in an effort to protect the resources, LLNB abandoned the sites (Zia 2016b). In the 1990's, a significant effort went into improving the cave resources for LLNB. Once the gate structures were removed and seasonal cave closures were implemented, bats reoccupied the sites (Zia 2016b). The entrances of roost sites were returned to a more natural appearance, proper air exchange was restored, and access was drastically improved for bats. Perimeter fences were installed away from the entrances, providing reasonable access control and safety for people. Alarm systems were also installed at Lower Pyeatt Cave and Manila Mine to alert the MP office of illegal access, and roads leading to these sites were fenced and gated. Between 1990 and 1993, the number of LLNB increased from double to triple digits and have continued to increase since that time. Currently, the Fort hosts one of the most significant post-maternity roosts for the LLNB, and three critical maternity colonies for other sensitive bat species.

The protection of cave resources became a significantly higher natural resource priority after a new fatal bat disease, white-nose syndrome (WNS), was reported in certain species of hibernating bats. Infected bats were observed arousing in the middle of winter and then dying in large numbers in eastern U.S. hibernacula. White-nose syndrome is caused by a cold-loving fungal pathogen *Pseudogymnoascus destructans* (*Pd*) that has been moving westward since its

introduction into a commercial cave in New York State in 2006. As of 2019, 13 species of bat in North America were confirmed to have WNS, and over 6.5 million hibernating bats have died across 34 U.S. States and 7 Canadian Provinces (Figure 2.10 or visit <https://www.whitenosesyndrome.org> for updates).

Species that were once common, the little brown bat (*Myotis lucifugus*), northern long-eared bat (*M. septentrionalis*), and tricolored bat (*Perimyotis subflavus*), have been decimated. The little brown bat was once the most common bat in North America, but is now considered for protection under the Endangered Species Act (ESA). The northern long-eared bat has recently been listed as threatened under the ESA due to population losses from WNS. The fungus grows on the skin tissues of hibernating bats, causing them to repeatedly arouse from winter hibernation. These repeated arousals cause the bats to consume their winter fat stores and starve to death before spring. In addition, the fungus is keratin-loving and invades the cells walls of wings and tail membrane. This causes severe disruption of physiological processes which leads to mortality.

Because *Pd* spores can last a long time on surfaces such as clothes, shoes and caving gear, people entering an infected cave unknowingly move the fungus from one place to another. White-nose syndrome is causing massive population declines for multiple hibernating bat species. Although WNS is not yet documented in Arizona it is known in species of bat that reside on the Fort. There is currently no cure for WNS. Microclimate measurements made in 9 of the Fort's caves indicate that a number of the roosts have appropriate temperatures and relative humidity for *Pd* (Buecher 2020). As a result of the continued and fast-paced westward movement of WNS, the Fort joined other Federal agencies, including BLM, National Forest Service, and NPS in closing caves and abandoned mines to protect cave-roosting bats.

Hiking and Bicycling

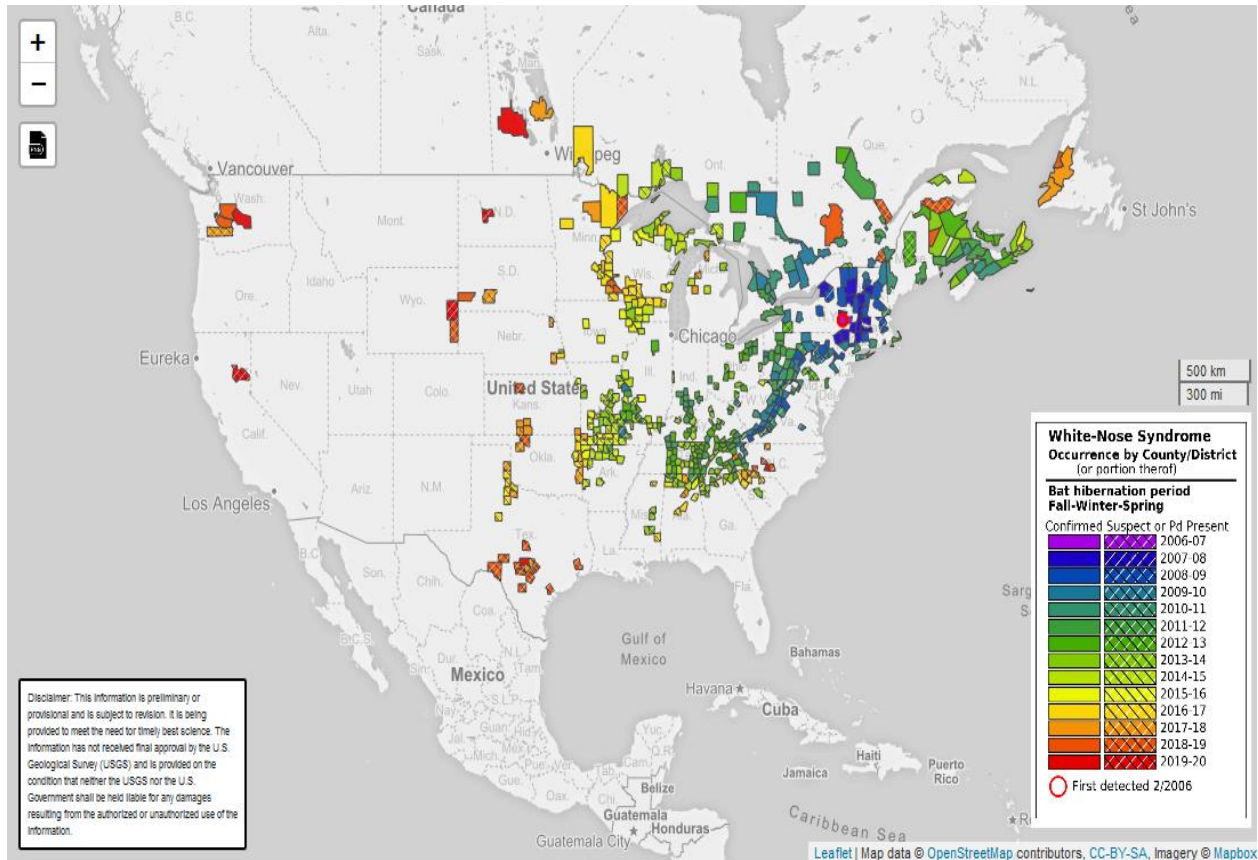
The Huachuca Mountains are rough, rocky, and dry. High-country weather conditions can change rapidly, and unreliable water sources make backcountry hiking in the mountains of Fort Huachuca a challenge to even experienced hikers. The *Trails of Fort Huachuca*, developed by the Forestry Section in 1986, is the most comprehensive listing and guide to established hiking trails on the installation, though the information is dated and may not represent current conditions. Most trails can be hiked in a day and vary from 0.5 - 3.0 miles in length. Due to an abundance of dirt roads and jeep trails on the installation and the adjoining CNF, hikers have many options from short hikes to combining several trails and roads for multi-day hikes.

Trails are not regularly maintained. A limited amount of maintenance is done by Scout groups and troops, but this is infrequent. The goal of trail maintenance is minimal maintenance while keeping trails identifiable for hikers, fire fighters, and resources survey personnel. Mountain biking on the Fort's dirt roads, jeep trails, and hiking trails has increased in popularity over the last several years. If races or special biking events are planned, they are coordinated with ENRD and other pertinent organizations by FMWR. Future recreation management on the Fort, using a permit process, will provide a valuable means of identifying use by the hiking and bicycling community and provide a mechanism to obtain additional funding for habitat management in high use recreation areas.

Horseback Riding and Grazing

Horses can be rented by the hour or by the day from FMWR at the Buffalo Corral Riding Stables located on Canelo Road. Boarding of privately-owned horses is also available. Three areas are used for grazing horses at Fort Huachuca and support approximately 50 to 60 horses. Use of these areas is rotated on a seasonal basis.

Figure 2.10 Map Showing Presence of Pd Spores and Mortality from WNS



Pasture A is approximately 946 acres and is used on an infrequent basis from May to October. Pasture B is approximately 175 acres and is used between the months of March and May. Pasture C is approximately 312 acres and divided into two sections with rotation between the two. Horses are grazed in Area C from May to October. At other times, horses are kept in the corral and are not grazed. Horseback riding is authorized across the installation with the exception of the firing ranges (when in use), impact areas, Cantonment area, and areas of the installation with special-status species. Future recreation management on the Fort, using a permit process, will provide a valuable means of identifying use by the recreational horseback riding community and provide a mechanism to obtain additional funding for habitat management in high use recreation areas.

Off-Highway Vehicles

Off-Highway Vehicles (OHV) are defined as two or four wheeled vehicles that are designed to be operated off highways and derive their power from any source other than muscle or wind, to include All Terrain Vehicles (ATVs) and Off-Road Vehicles (ORVs) (three wheel OHVs are not permitted on Fort Huachuca). Off-Highway Vehicles are permitted on established roads intended for public use. Off-Highway Vehicle operation outside of the Cantonment area is limited to established roadways and firebreaks at a maximum speed of 25 mph unless otherwise posted. Cross-country driving is prohibited except in the case of an emergency. Recently, with the popularization and reduced costs of utility task vehicle (UTV), OHV use has greatly increased. The improper operation of OHVs has required closing firing ranges and has the potential for serious impacts on natural and cultural resources. The increased use of UTV's is beginning to correspond to less than positive interactions with hikers and the birding community, and in some cases reducing the experience for non-motorized recreation. In addition to the potential impact on

military training, OHV use can cause soil erosion, damage vegetation, spread invasive species, and create noise and dust problems, and potentially impact sensitive or threatened or endangered species. All OHV users are required to observe the Fort's OHV policy. Future recreation management on the Fort, using a permit process, will provide a valuable means of identifying and managing use by the OHV community and provide a mechanism to obtain additional funding for habitat management in high use recreation areas.

Camping and Sports

There are a number of picnicking and camping amenities available on the Fort:

- Lower Garden Canyon picnic area has sites with tables and grills and is open to tent and self-contained recreation vehicle camping (requires an FMWR permit). The area includes a comfort station (restrooms), playgrounds, and a ramada for protection from the sun and rain;
- Middle Garden Canyon picnic area has picnic tables, grills, a playground, and a ramada;
- Upper Garden Canyon picnic area has picnic tables, grills, a playground, and a ramada;
- Huachuca Canyon picnic area has picnic tables, grills, a playground, and ramadas;
- The Golf Course has 12 picnicking sites with tables, grills, and ramadas. A comfort station and softball field are located on-site; and
- Apache Flats Recreational Vehicle (RV) Park has 50 spaces for RVs with electricity, picnic tables, grills, and a dump station. Water is available at all 50 spaces;
- Sportsman's Center RV Park has 12 spaces for RVs with electricity, picnic tables and grills. Water is available at all 12 spaces.

Garden and Huachuca Canyon areas offer a wooded site for picnicking away from the main post. Reservoir Hill offers a spectacular view of much of the San Pedro Valley. Camping on post is permitted only in designated campgrounds, and canyon areas are accessible only during daylight hours.

Recreational rock climbing and rappelling is prohibited. An existing 18-hole golf course serves both military and civilian personnel and is located on the eastern end of the Cantonment area just south of the Main Gate.

Numerous fitness facilities are available at Fort Huachuca. These include baseball fields, running tracks, swimming pools, playgrounds, and multiple court areas. The Sportsman Center provides skeet, trap, pellet gun, archery, and paintball ranges. A private organization, the Huachuca Mountain Bowhunters and Archers, also have an archery range on Fort Huachuca. Other outdoor recreation activities include nature study, butterfly collecting, photography, pictograph viewing, and general nature enjoyment.

Cantonment Activities

The Cantonment area and other developed lands on the Fort cover approximately 7,380 acres, or approximately 8% of the installation. The majority of the buildings are located within the main Cantonment area. Fort Huachuca maintains and operates a number of facilities and conducts activities associated with operating the military installation. These include: 1) operation and maintenance of a permitted 2.0 million gallon (mg) per day wastewater treatment plant; 2) collection of solid waste with disposal occurring primarily at the Huachuca City landfill and some material going to the Cochise County landfill; 3) a network of roads, most of which are primary or

collector streets in the Cantonment area, and many unpaved routes on the training ranges; 4) operation of three gates to the installation: the Buffalo Soldier, Van Deman, and West Gates; 5) distribution by Sulphur Springs Valley Electric Cooperative (SSVEC) and electricity supplied by Tucson Electric Power (TEP) Company; 6) distribution and use of stationary fuels, such as natural gas furnished by Southwest Gas Company and propane; 7) distribution, storage, and use of vehicle and aircraft fuels; and 8) operation of a Hazardous Material Control Center (hazardous material storage complies with Occupational Safety and Health Administration hazardous communications standards and National Fire Prevention Association standard codes, the Installation Spill Contingency Plan, and the Installation Hazardous Waste Management Plan).

The following outdoor training facilities are located within the Cantonment area:

- Obstacle Course - Clover shaped with 17 obstacles. This course is a test of a soldier's basic motor skills and physical conditioning;
- Confidence Course - Clover shaped with four groups of higher and more difficult obstacles than the obstacle course. Designed to give soldiers confidence in their mental and physical abilities; and
- Three Battalion Training Areas (BTA 1, BTA 1A, and BTA 3) collectively just over 24 acres. Military field training exercises are conducted at these sites.

Training Area Activities

This section describes each of the training areas on the installation and the activities conducted in these areas, including the infrastructure and facilities in the training areas, the military operations, and the recreational use of each training area. Table 2-2 provides a listing of individual training areas and the type of traffic (both on-road and off-road) permitted in each area.

Training Area Alpha

Training Area Alpha has a high desert terrain and is primarily used for intelligence and communications testing activities. Only wheeled vehicles are permitted in this area. During all such operations, vehicles are required by Range Operations to stay on existing roads and trails. No off-road vehicle use is permitted.

This training area contains one elevated sniper range and several surveyed firing points usable for mortar and artillery firing into Impact Area Zulu (see Figure 2.6). These points support 60 mm, 80 mm, and 4.2 inch mortars, as well as the use of HE, illumination, smoke, and weapons piercing rounds for training. This use of this area is currently inactive.

Training Area Alpha is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Bravo

Training Area Bravo covers an area of 2,459 acres. The area has a high desert terrain and is primarily used for intelligence and communications testing activities. On occasion, locations across the area are also used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Both tracked and wheeled vehicles are permitted in this area. During all operations, vehicles are required by Range Operations to stay on existing roads and trails, with the exception of some off-road vehicle movement necessary for pallet recovery in support of AZ ANG and MO ANG training.

This training area contains several surveyed firing points usable for mortar and artillery firing into Impact Area Zulu, which is permitted from this area upon approval from Range Operations (Figure 2.6). These points support 60 mm, 80 mm, and 4.2 inch mortars, as well as the use of HE,

illumination, smoke, and weapons piercing rounds for training. The use of this area is currently inactive.

A portion of the Hubbard Assault Airstrip is located in Training Area Bravo and is comprised of a dirt assault strip/LZ surveyed and approved by the USAF. The airstrip can accommodate C-130 and C-17 aircraft (112 x 3,463 m).

The training area contains the Humor (912 x 2,119 m), Dust Devil (1,340 x 2,510 m), and a portion of the Tombstone (1,830 x 738 m) DZs. Drop zones are areas of sparse vegetation situated on the northern half of the training area used for air drops during AZ ANG and MO ANG training maneuvers.

Training Area Bravo is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Charlie

Training Area Charlie covers an area of 2,498 acres. The area has a high desert terrain and is primarily used for intelligence and communications testing activities. On occasion, locations across the training area are also used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Both tracked and wheeled vehicles are permitted in this area. During all operations vehicles are required by Range Operations to stay on existing roads and trails.

This training area contains several surveyed firing points usable for mortar and artillery firing into Impact Area Zulu, which is permitted from this area upon approval from Range Operations. These points support 60 mm, 80 mm, and 4.2 inch mortars, as well as the use of HE, illumination, smoke, and weapons piercing rounds for training. The use of this area is currently inactive.

This area also contains a portion of the approximately 5,172 acres within the East Range where off-road vehicle travel occurred up to 1994. No off-road vehicle activity presently occurs or is planned in Training Area Charlie by Fort Huachuca.

This area contains a portion of the Hubbard (917 x 2,740 m) and Tombstone DZs, and the majority of Havoc DZ (910 x 1,830 m). These areas of sparse vegetation on the eastern and southern half of the training area are used for air drops during AZ ANG and MO ANG training maneuvers.

Training Area Charlie is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Delta

Training Area Delta is located between Training Areas Charlie and Foxtrot and covers approximately 5,234 acres. Training Area Delta has a high desert terrain and is primarily used for intelligence and communications testing activities. On occasion, locations across the area are also used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Both tracked and wheeled vehicles are permitted in this area. During all operations, vehicles are required by Range Operations to stay on existing roads and trails. This area contains a portion of the approximately 5,172 acres within the East Range where off-road vehicle travel occurred until 1994. No off-road vehicle activity presently occurs or is planned by Fort Huachuca.

Mortar firing into Impact Area Zulu is permitted from this area upon approval from Range Operations. This training area contains several surveyed firing points usable for mortar and artillery firing into Impact Area Zulu. These points support 60 mm, 80 mm, and 4.2 inch mortars,

as well as the use of HE, illumination, smoke, and weapons piercing rounds for training. The use of this area is currently inactive.

This area contains portions of the Hubbard Assault Airstrip and the Hubbard, Havoc, and Tombstone DZs. The Hubbard Assault Airstrip is a dirt assault strip/LZ that has been surveyed and approved by the USAF and can accommodate both C-130 and C-17 aircraft (112 x 3,463 m). The Hubbard DZ (917 x 2,740 m), a portion of the Tombstone (1,830 x 738 m), and a small portion of Havoc DZ (910 x 1,830 m) consist of areas of sparse vegetation on the northern edge of the training area that are used for air drops during AZ ANG and MO ANG training maneuvers.

Training Area Delta is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Echo

With approximately 5,299 acres, Training Area Echo is the largest training area on the East Range. The area has a high desert terrain and is primarily used for intelligence and communications testing activities. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Only wheeled vehicles are permitted in this area. During all operations, vehicles are required by Range Operations to stay on existing roads and trails. No off-road vehicle use is permitted.

This training area also contains several surveyed firing points usable for mortar and artillery firing into Impact Area Zulu, which is permitted from this area upon approval from Range Operations. These points support 60 mm, 80 mm, and 4.2 inch mortars, as well as the use of HE, illumination, smoke, and weapons piercing rounds for training. The use of this area is currently inactive.

The area contains Hyena DZ (848 x 1,830 m). This area of sparse vegetation in the central portion of the training area is used for air drops during AZ ANG and MO ANG training maneuvers. The area also contains a pre-existing dirt runway.

Training Area Echo is used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Foxtrot

Training Area Foxtrot is located between Training Areas Charlie and Echo and covers an area of 3,774 acres. The area is primarily used for intelligence and communications training and testing, and has a higher level of military activity than other training areas on the East Range. On occasion, locations across the area are also used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Only wheeled vehicles are allowed on existing roads and trails in this area. No off-road vehicle use is permitted. This training area contains several surveyed firing points usable for mortar and artillery firing into Impact Area Zulu, which is permitted from this area upon approval from Range Operations. These points support 60 mm, 80 mm, and 4.2 inch mortars, as well as the use of HE, illumination, smoke, and weapons piercing rounds for training. The use of this area is currently inactive.

Located to the east of LAAF, air space over portions of this area is located within landing and departure zones of primary runways at LAAF (Figure 2.7).

Area Foxtrot is divided into two game management areas: F1 and F2 for hunting with shotgun or bow and arrow.

Table 2-2 Terrain Type and Traffic Permitted by Training Area

Training Area	Location by Range	Total Acres*	Terrain Type	Traffic Permitted on Existing Roads and Trails	Traffic Permitted Off Existing Roads and Trails
Alpha	East	2,578	High Desert	Foot/Wheel	Foot
Bravo	East	2,459	High Desert	Foot/Wheel/Tracked	Foot/Wheel
Charlie	East	2,498	High Desert	Foot/Wheel/Tracked	Foot/Wheel/Tracked ¹
Delta	East	5,234	High Desert	Foot/Wheel/Tracked	Foot/Wheel/Tracked ¹
Echo	East	5,299	High Desert	Foot/Wheel	Foot
Foxtrot	East	3,774	High Desert	Foot/Wheel/Tracked	Foot
Foxtrot-1	West	211	High Desert	Foot/Wheel	Foot
Golf	West	1,671	High Desert	Foot/Wheel	Foot
Hotel	West	4,140	High Desert	Foot/Wheel	Foot
India	West	2,616	High Desert	Foot/Wheel	Foot
Juliet	West	978	High Desert	Foot/Wheel	Foot
Kilo	West	947	High Desert	Foot/Wheel	Foot
Lima	West	831	High Desert	Foot/Wheel	Foot
Mike	West	1,398	High Desert	Foot/Wheel	Foot
November	West	3,478	Mountain	Foot/Wheel	Foot
Oscar	South	3,974	Mountain	Foot/Wheel	Foot
Papa	South	2,441	Mountain	Foot/Wheel	Foot
Papa-1	South	595	Mountain	Foot/Wheel	Foot
Quebec	South	3,288	Mountain	Foot/Wheel	Foot
Romeo	West	1,478	Mountain	Foot/Wheel	Foot
Sierra	South	2,484	Mountain	Foot/Wheel	Foot
Tango	South	2,380	Mountain	Foot/Wheel	Foot
Tango -1	South	101	Mountain	Foot/Wheel	Foot
Tango-2	South	2020	Mountain	Foot/Wheel	Foot
Tango -3	South	1689	Mountain	Foot/Wheel	Foot
Uniform	South	1571	Mountain	Foot/Wheel	Foot
Uniform-1	South	1125	Mountain	Foot/Wheel	Foot
Victor	South	566	High Desert	Foot/Wheel	Foot
Victor-1	South	784	High Desert	Foot/Wheel	Foot
Whiskey	South	1,038	High Desert	Foot/Wheel	Foot
Whiskey-1	South	171	High Desert	Foot/Wheel	Foot
X-Ray	South	1,363	High Desert	Foot/Wheel	Foot
Yankee	South	1,466	High Desert	Foot/Wheel	Foot
Zulu	East	6,646	High Desert	Foot/Wheel	None

*The acreages reported may conflict with the total installation area and installation use areas listed. These acreages were derived from GIS and included overlapping range areas.

¹ Off-road wheeled and tracked-vehicle traffic is restricted to existing off-road maneuvering lanes. These lanes are currently inactive and have no programmed use. As of this time, there is no authorized off-road activity in these lanes.

Training Area Golf

Training Area Golf is located on the West Range and covers an area of 1,671 acres. This area has a high desert terrain and is primarily used for intelligence and communications training and testing. On occasion, locations across the area are also utilized by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Only wheeled vehicles are allowed on the existing roads in the area. No off-road vehicle use is permitted.

Located to the north of LAAF, air space over portions of this area is located within landing and departure zones of secondary runways at LAAF (Figure 2.7).

Training Area Golf is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Hotel

Training Area Hotel covers an area of 4,140 acres. This area is primarily used for intelligence and communications training and testing activities. On occasion, locations across the area are also used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

Portions of the installation grazing lands are located in this area. Training Area Hotel is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area India

Training Area India is located on the West Range and covers a land area of 2,616 acres. This area is primarily used for intelligence and communications training and testing activities and patrolling and tactics training. In addition, locations are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises on occasion. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted. A helicopter landing pad occurs in this training area.

Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

A UAS Class 1-4 Laser Testing and Training Range is located within training Area India. Laser testing and training is conducted via air to ground operations from UAS. Targets are placed along roadways and previously disturbed areas, avoiding areas that have water, powerlines, or dense vegetation.

Training Area India is used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary. Antelope and Hidden Ponds are located in this area.

Training Area Juliet

Training Area Juliet is located on the West Range and covers a land area of 978 acres. This area is primarily used for intelligence and communications training and testing activities and UAS operations. Patrolling and tactics training is also conducted in this area. In addition, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises on occasion. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted. Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

The Black Tower Joint Services Unmanned Aircraft Systems Training Battalion (UASTB) Training Complex is located in area Juliet. This consists of a permanent block of structures, temporary trailers, and buildings encompassing the Shadow Training Facility and an unpaved fixed wing runway (Pioneer LZ (154m x 1863m), the Advanced Instruction Building, and paved Rugge-Hamilton UAS runway.

A UAS Class 1-4 Laser Testing and Training Range is located within training Area Juliet. Laser testing and training is conducted via air to ground operations from UAS. Targets are placed along roadways and previously disturbed areas, avoiding areas that have water, powerlines, or dense vegetation.

Training Area Juliet is used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary. In addition, the Sycamore II Pond is located in this area.

Training Area Kilo

Training Area Kilo is located on the West Range and covers an area of 947 acres. This area is primarily used for intelligence and communications training and testing activities, and patrolling and tactics training is conducted in this area. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

This area contains one Helicopter Landing Area for proficiency and emergency operations. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;

- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

Portions of the installation's grazing lands are located in this area. Training Area Kilo is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary. Laundry Ridge Pond basin is located in this area.

Training Area Lima

Training Area Lima covers an area of 831 acres, and a large percentage of its land is in a protected AMA. This area is primarily used for intelligence and communications training and testing activities, with patrolling and land maneuvering training occurring in this area. In addition, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises on occasion. This area contains Site Maverick, an established 40-acre permanent bivouac site.

Training Area Lima is used for hunting activities and has a picnic area for recreational activities. Hunters are required to observe a 0.25-mile safety zone around buildings and permanent test sites.

Training Area Mike

Training Area Mike is located on the West Range and covers an area of 1,398 acres. This area is primarily used for intelligence and communications training and testing activities, with some patrolling and tactics training conducted. In addition, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October, when practicable.

A land navigation course consisting of 58 surveyed concrete points with ASA markers is found in Training Area Mike. One large (40 acre) permanent bivouac site is located in this area. This site is approximately 1,600 ft from the AMA.

A UAS Class 1-4 Laser Testing and Training Range is located within training Area Mike. Laser testing and training is conducted via air to ground operations from UAS. Targets are placed along roadways and previously disturbed areas, avoiding areas that have water, powerlines, or dense vegetation.

Training Area Mike is also used for hunting and fishing activities. Hunters are required to observe a 0.25-mile safety zone around buildings and permanent test sites. The Kino and Sycamore I Pond basins are located in the area.

Training Area November

Training Area November covers an area of 3,478 acres. The general terrain of the area is mountainous; therefore, military activities in the area are restricted to the relatively flat areas. This training area is primarily used for intelligence and communications training and testing activities, with patrolling and tactics training also conducted. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

This area contains one Helicopter Landing Area for proficiency and emergency operations. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. This area contains Site Freedom, an established 54-acre permanent bivouac site.

For the purpose of game management, the area is divided into two parts, N1 and N2. Training Area November is also used for hunting activities. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary. Blacktail Pond is located in the N2 Game Management Area.

Training Area Oscar

Training Area Oscar is part of the South Range and covers an area of 3,974 acres. The general terrain of the area is mountainous; therefore, military activities in the area are restricted to the relatively flat areas. This area is primarily used for intelligence and communications training and testing activities; patrolling and tactics training also occur. In addition, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises on occasion. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

Training Area Oscar is among the areas heavily used for recreational activities. The Huachuca Canyon picnic area is located in the northern part of the area. Hunting activities also occur, and hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Papa

Training Area Papa is located on the South Range and covers an area of 2,441 acres. The general terrain of the area is mountainous; therefore, military activities in the area are restricted to the relatively flat portions. This area is primarily used for intelligence and communications training and testing activities, with some patrolling and tactics training occurring. Locations across the area are also used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

Training Area Papa also contains a four-acre simulated Forward Operating Base (FOB) and Training Village used by installation tenants for dismounted intelligence student training. The site includes dirt access roads, temporary communication facilities, bivouac areas, and perimeter chain linked fencing. While students are typically bused to the site, onsite parking is available for trainers and other training participants.

The topography of the area contributes to the heavy recreational use of the area. Three picnic areas are located in Garden Canyon, and they include play areas, grills, and ramadas. There are also numerous hiking and horseback riding trails in this area. Recreational users are prohibited from rock climbing and rappelling. For the purpose of game management, the area is divided into two parts, P and P1. Hunting activities are permitted in Training Area Papa. Hunters are required

to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Papa 1

Training Area Papa 1 is a light forces maneuver training area covering just over 595 acres located on the South Range and is contiguous with Training Area Papa.

Training Area Quebec

Training Area Quebec is located on the South Range and covers an area of 3,288 acres. The general terrain of the area is mountainous; therefore, military activities in the area are restricted to the relatively flat areas. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

The topography of the area contributes to the heavy recreational use of the area. There are numerous hiking and horseback riding trails in this area. Recreational users are prohibited from rock climbing and rappelling. Upper Garden Canyon Pond basin is located in this area. Hunting activities are permitted in Training Area Quebec. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Romeo

Training Area Romeo is located on the West Range and has a land area of 1,478 acres. This area is primarily used for intelligence and communications training and testing activities, and patrolling and tactics training occur. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

This area contains one Helicopter Landing Area for proficiency and emergency operations. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises.

Hunting is permitted in Training Area Romeo. Hunters are required to observe a 0.25-mile safety zone around buildings and permanent test sites.

Training Area Sierra

Training Area Sierra is located on the South Range and covers a land area of 2,484 acres. This area is primarily used for intelligence and communications training and testing activities, with some patrolling and tactics training occurring. In addition, locations across the area are utilized by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises, on occasion. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

The topography of the area contributes to the heavy recreational use of the area. Numerous hiking and horseback riding trails occur in this area. Recreational users are prohibited from rock climbing and rappelling. Hunting activities are permitted in Training Area Sierra. Hunters are required to observe a 0.25-mile safety zone around buildings and permanent test sites.

Training Area Tango

Training Area Tango is located south of the Cantonment area and covers a land area of 2,380 acres. This area is characterized by 12 live firing ranges. See Table 2-1 for range descriptions and the types of weapons used and Figure 2.6 for locations of firing ranges. Portions of Training Area Tango are used for personnel development training by most units on the installation. Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas without special permission;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

Within Training Area Tango, there is a small arms impact area. No explosive munitions are used in this impact area, and no testing or training activity is permitted in this portion of the training area. No recreation or hunting is permitted in this area.

Training Area Tango 1

Training Area Tango 1 is a light forces maneuver training area covering 101 acres. This area is considered a non-duded impact area for small arms training. This area is characterized by five live firing ranges and one five-acre defensive fire range bivouac site. AMAs are located within Tango 1. Testing and training sites located in this training area adhere to special use regulations as stated above.

Training Area Tango 2

Training Area Tango 2 is a light forces maneuver training area covering 2020 acres. It is also considered a non-duded impact area for small arms training. Gravel Pit Pond is located in this area. Five live firing ranges are located in this area. No recreation or hunting is permitted in this area.

Training Area Tango 3

Training Area Tango 3 is a light forces maneuver training area that covers 1,689 acres and includes two live firing ranges. This area is considered a non-duded impact area for small arms training. Woodcutters Pond is located in this area. No recreation or hunting is permitted in this area.

Training Area Uniform

Training Area Uniform is located on the South Range and covers a land area of 2,696 acres. This area is primarily used for intelligence and communications training and testing activities. Patrolling and tactics training also occur. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted.

One land navigation course is located in area Uniform. The Tinker land navigation course was completed in 2008, consists of 26 surveyed points and is the most utilized land navigation course on the installations. Vehicles are required to stay on the existing roads and trails. Training Area Uniform also contains a four-acre simulated FOB and a four-acre Arab-themed Training Village used by 309th MI Bn and other installation tenants for dismounted intelligence. The site includes dirt access roads, several small wooden and stucco-finished training structures, communication facilities and bivouac areas. While students are typically bused to the site, onsite parking is available for trainers and other training participants.

Training Area Uniform is also popular for its recreational facilities. Picnic areas are located in this portion of Garden Canyon, and the area is used for hiking and hunting. For the purpose of game management, the area is divided into two parts, U and U1. Hunters are required to observe a

0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary. Tinker Pond is located in Training Area Uniform.

Training Area Victor

Training Area Victor is located on the South Range and covers a land area of 566 acres and has a desert type terrain. This area is primarily used for intelligence and communications training and testing activities. Patrolling and tactics training also occur. Only wheeled vehicles are permitted on the existing roads in the area. No off-road vehicle use is permitted.

Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

This area contains one Helicopter Landing Area for proficiency and emergency operations. On occasion, locations across the area are utilized by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises. An Urban Operation Site, consisting of 29 containerized buildings, was recently completed and is used for patrolling and tactics training in this area.

For the purpose of game management, the area is divided into two parts: V and V1. Training Area V has a golf course and Golf Course Pond. Hunting is not permitted in this area.

Training Area Victor 1

Training Area Victor 1 covers 784 acres. This area is primarily used for intelligence and communications training and testing activities. Patrolling and tactics training also occur. Only wheeled vehicles are permitted on the existing trails in the area. No off-road vehicle use is permitted.

Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

Training Area Whiskey

Training Area Whiskey covers a land area of 1,038 acres and has a desert type terrain. This area is primarily used for intelligence and communications training and testing activities. Patrolling and tactics training also occurs. Only wheeled vehicles are permitted on existing roads in the area. No off-road vehicle use is permitted.

The Site Boston field training exercise (FTX) area is located in Training Area Whiskey. Large brigade-level exercises are conducted at Site Boston. The 86th Signal Bn conducts two battalion and one brigade level exercise each year, with about 42 and 100 personnel, respectively, participating in the training. While 17 vehicles may be used at the battalion level training, 42 are

used at the brigade level. Activities during these training exercises include radio systems training, setting tactical field sites, tents, antennas, and mobile kitchens. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercises.

Hiking and hunting are permitted in Training Area Whiskey. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Whiskey 1

Training Area Whiskey 1 is a light forces maneuver training area that covers 171 acres. Only wheeled vehicles are permitted on existing roads in the area. No off-road vehicle use is permitted.

Training Area X-Ray

Training Area X-Ray covers a land area of 1,363 acres and has a desert type terrain. This area is primarily used for intelligence and communications training and testing activities. Patrolling and tactics training also occurs. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities for the execution of field training exercise. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted. As with Training Area Whiskey, large brigade level exercises are conducted in this area with the same vehicles and personnel quantities and activities.

Testing and training sites located in AMAs within this training area adhere to special use regulations:

- No firing of blanks or pyrotechnics within 0.25 miles of these areas;
- Training and test sites will not be used by personnel on foot unless the activity has a Range Operations approved plan for fire suppression and minimal firefighting equipment; and
- Night operations are prohibited from 1 July to 31 October when practicable.

Hiking and hunting are allowed in Training Area X-Ray. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary.

Training Area Yankee

Training Area Yankee covers a land area of 1,466 acres and has a desert type terrain. This area is primarily used for intelligence and communications training and testing activities. Patrolling and tactics training and large brigade level exercises also occur. On occasion, locations across the area are used by training units for setting up bivouacs containing sleeping, mess, and other related facilities, such as the Leadership Obstacle Course and Battle Lab Test Facility for the execution of field training exercises. Only wheeled vehicles are allowed on existing roads in the area. No off-road vehicle use is permitted. The aerostat operations facility and tethered balloon is located in this area.

Training Area Yankee is also used for hunting. Hunters are required to observe a 0.25-mile safety zone around buildings, permanent test sites, and houses near the installation boundary. Lower Garden Canyon Pond basin is located in this area.

Impact Area Zulu

Impact Area Zulu, also known as the "Dudded Impact Zone," is a part of the East Range. This 6,646-acre area contains various types of targets for artillery and mortars. High explosive

ammunition may be fired in this area, and some areas may contain unexploded ordnance (UXO). The use of this area is currently inactive with the exception of two Weapons Intelligence Training (WIT) light demolition ranges and one CLFX range. Two semi-permanent helipads, used for emergency situations, are associated with the CLFX range. Range Operations has declared off-road areas in this zone permanently "off-limits" to recreational activities and warning signs are posted in the area to alert visitors and troops.

This area is sometimes used for intelligence and communications training and testing activities and may have non-recoverable or explosive payloads dropped from UAS or other aircraft in the future. Army survey area sites are located along existing roads and trails in this area and can be used for intelligence and communications testing and training. No off-road vehicle use is permitted. A CLFX that provides a practice area for convoy live-fire exercises is located in this training area. No recreation or hunting is permitted in this area.

Off-post Activities Authorized or Carried Out by Fort Huachuca

Fort Huachuca controls areas that are leased, withdrawn, or permitted from federal, state, county, and municipal agencies, and, in a few cases, private individuals. Although most leased/withdrawn land is in Cochise County, the Fort also leases land near Phoenix, Gila Bend (Oatman Mountain), Mount Graham, and Mount Lemmon, Arizona; and Lordsburg, New Mexico. The parcels leased vary in size from less than an acre to 638-acre on Oatman Mountain. An additional 29,046 acres on the Willcox Playa, Cochise County, is withdrawn from public entry. The Fort has a 14,000-acre special-use permit with the USFS in Sunnyside, and is presently working to increase the acreage of this permit to 195,000 acres. Many of the equipment tests and field training exercises conducted by a variety of training units at the Fort require placement of equipment over a large geographic area. Off-post sites accommodate these activities. Some off-post lease properties are used by EPG to conduct C4ISR system testing and for communications sites (antennas, microwave towers, etc.), while others are pull-off sites along roadways where equipment is temporarily operated. Operation of equipment is usually temporary.

2.2 Physical Environment

2.2.1 Climate

Weather patterns on the Fort are as varied as the topography, ranging from hot, dry valley bottoms to cooler and moist canyons. The principal meteorological station is located just south of LAAF at an elevation 4,664 ft AMSL. Other meteorological stations are also maintained by the EPG. The area of the Upper San Pedro Basin has a dry climate with relatively mild winters and warm summers. The summer average high temperature is 88 degrees Fahrenheit (° F), and the average winter low is 32° F. Clear skies or high thin clouds are common and permit intense surface heating during the day and radiant cooling at night. This creates a large diurnal temperature fluctuation, which averages approximately 30° F. The average wind velocity is 9.8 mph. Wind gusts of 20 to 30 mph are common during the daytime (Leidos 2013).

Precipitation mainly occurs during two periods of the year, the first period being between May and October when Gulf of Mexico atmospheric moisture falls as afternoon and evening thundershowers. The other period is during winter when Pacific frontal storms reach the area and can produce several days of gentle rains in the valley and snow on the surrounding mountains (Putman et al. 1988). This pattern may be changing; however, due to the effects of climate change. Projections for precipitation are difficult due to the high level of variation observed between precipitation models (Bagne and Finch 2013). Putman also states that the amount of snow is an insignificant contribution to annual precipitation totals, although the snow may be visible on the mountains for several days to several weeks. The Huachuca Mountains receive an

average annual precipitation of 22 inches per year, while the valley averages approximately 15 inches per year (ADWR 2009).

Climate Change

A variety of climate change models have projected temperature increases in the U.S. overall, and in the Southwest specifically. The Southwest is predicted to become hotter and drier, with longer and hotter heat waves in the summer. Average precipitation is predicted to decrease, and precipitation extremes in winter are expected to become more frequent and more intense. Late-season snowpack is predicted to continue to decrease, declines in river flow and soil moisture will continue, flooding will become more frequent and intense in some seasons and less frequent and intense in other seasons, and droughts in parts of the Southwest will become hotter, more severe, and more frequent (Garfin et al. 2013).

The region has experienced effects of long term regional drought to include a decrease in precipitation. Previous 30-year precipitation averages in the mountains was estimated at 30 inches per year (ADWR 2005), compared to 22 inches per year for the recent 30 year average precipitation ranging from years 1987 to 2017 (PRISM Climate Group 2019). Work from Garfin et al. (2017) projects a longer fire season, higher fire severity, higher post-fire flooding intensity, increased insect outbreaks, and increasing tree mortality as issues that the Fort will be facing. Projections suggest that annual average temperatures are expected to increase by more than 4° F by 2050, due to increasing levels of CO² (Bagne and Finch 2013, Garfin et al. 2013).

The climate in the Southwest is already changing. Bagne and Finch (2013) note that in 2002, recorded temperatures were already indicating a regional warming at a rate unprecedented in the last 400 years. Average daily temperatures between 2001 and 2010 were the highest in the Southwest than the period between 1901 and 2010, and fewer cold waves and more heat waves occurred during the decade (Garfin et al. 2013). Over the past century, Arizona's average temperature has gradually increased around 34 – 35° F.

Changes in temperature and precipitation affect natural ecosystems. As discussed in Section 2.2.5, a number of historically wetted springs and ponds are no longer wetted. This condition is expected to increase due to projected increases in droughts and increased temperatures (Bagne and Finch 2013, Garfin et al. 2017). The fall and winter of 2019; however, have been exceedingly wet and ponds and springs have rebounded, if only for a short period.

Vegetation communities are affected in a variety of ways, including vegetation mortality, changes in phenology, changes in competitive ability, and shifts in range. Recent work in the Huachuca Mountains has identified higher incidence of disease in oak trees as a result of stress. This work was initiated as a result of increased oak mortality observed during the 2018 Aerial Detection Survey and on the ground observations by both the USFS and DoD (Wilhelmi and Gaylord 2018). Damage observed on oaks included large sections of bark peeling off revealing cankers, apparent emergence holes from beetles, as well as branch and whole tree mortality. Wilhelmi noted that the ongoing drought and increased temperatures in the Southwest have placed significant water stress on host trees and is likely playing a major role in the proliferation of disease. Shifts in plant phenology are also being documented. For example, in the Santa Catalina Mountains of southeastern Arizona, Crimmin et al. (2009) recorded flowering dates of several hundred plant species over the period 1984 to 2003. Ninety-three species (25.6%) showed a significant shift in flowering range between the first half and the latter half of the study period. These changes coincided with a general warming in most seasons between the first half and the latter half of the 20-year study period. As an example of a shift in range, native grasslands have seen significant changes in recent times. The Fort's grasslands have been transitioning from primarily native to non-native invasive African species. The number of invasive grass species occurring on the Fort

have steadily increased within the last five years. African species are better adapted to deal with the altered climate and the resulting fire regime, and will continue to expand through travel corridors and with increased fires, and further encourage conversion of the remaining native habitats to non-native grasslands. Furthermore, Garfin et al. (2017) predicts a shift in higher elevation species and projects a future devoid of pine trees as they are replaced by shrubland. This conversion will alter ecosystem processes and relationships and will ultimately result in the continued reduction of biodiversity (Bagne and Finch 2013). Changes in vegetation health, structure, and distribution lead to changes in the distribution and diversity of associated animal species. Computer models developed to associate climate with species distribution indicate that, by 2100 the locations occupied by individual species may change substantially (Garfin et al. 2013).

The DoD has made significant efforts to identify the potential effects of climate change and identify and explore natural resource asset management issues through the Strategic Environmental Research and Development Program/Environmental Security Technology Certification Program (SERDP/ESTCP), the Legacy program, and by developing a guide to incorporate climate considerations and identify necessary adaptations for DoD Natural Resource Managers (Stein et al. 2019). A number of projects with this focus have been funded and completed on the Fort (Cooper et al. 2015, Levick et al. 2015, Olden and Lytle 2015, Stromberg et al. 2015, Argonne 2017, Castro 2017, Garfin et al. 2017, Goldberg et al. 2017, Piorkowski and Diamond 2015). Since 2014, a substantial effort has gone into the management of forest resources with an eye toward maintaining high elevation species, and thus biodiversity, by reducing competition through the Fort's High Elevation Fuels Treatment (HEFT) program. The HEFT program was initially an idea developed as three individual projects identified in the 2010 INRMP (Appendix 5 – Potential Future Research). These projects resulted in the development of the Fort's 10-Year Fuels Treatment and Implementation Plan (Hollingsworth 2014). The plan was first implemented in 2015 and annual treatments have occurred since that time (Figure 2.11). Garfin et al. (2017) modeled the effect of this treatment plan against the backdrop of climate change. They found that implementation of this plan would reduce fire severity and flood risk and promote diversity and retention of some tree species over the short term (20 years); however, they saw little effect for preserving forest cover. They project a significant reduction in forest cover in the Huachuca's, to include a loss of large old pine, Douglas-fir, and aspen forests from much of the upper elevation; a conversion to oak woodland and shrubland species; increased fire severity due to conversion to shrubland; and high fire severity and higher peak run-off and sediment yield. They found no evidence that this first iteration of thinning will significantly slow the rate of forest cover loss, but suggested that thinning in conjunction with fire may slow climate-induced changes and mitigate some risk to infrastructure. It is important to note that this modeling effort considered planned treatment areas only and not future treatment areas. The 10-year HEFT plan is the Fort's initial penetration into large-scale management of the high elevation zone. New treatment areas will be developed and treated, and this expanded effort is expected to move the needle in the positive direction for the species that inhabit the high elevation zone.

2.2.2 Soils

Fort Huachuca has a diverse assortment of soil types. This diversity is directly related to differences in climate, parent material, and topography. The soils exhibit wide variations in depth, texture, and chemical properties. Roughly 30% of the soils are less than two ft in depth over bedrock. The physical and chemical properties of the soil have an influence on the plant communities that exist, and the uses and management of soils by the Army. Soil management is a significant operational consideration. The Soil Survey of Fort Huachuca (NRCS 2003) characterizes the types of soils that occur at the installation, locations of the soil types, and potential uses (Figure 2.12).

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 installation's 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.

2.2.3 Physiography

The San Pedro River Basin is typical of the basin and range physiographic province, with elongated north-south trending block-faulted mountains surrounding a central valley filled with deep alluvium (Figure 2.12). The San Pedro River Basin is divided into two distinct geographic units, referenced as the Upper San Pedro Basin (USPB) and Lower San Pedro Basin (LSPB). The USPB extends from the headwaters in Mexico to "the narrows" north of Benson, and the LSPB extends from the narrows to the Gila River (ADWR 2005). The USPB is further divided into the Benson and the Sierra Vista Subwatersheds. The Sierra Vista Subwatershed of the USPB contains Fort Huachuca, the City of Sierra Vista, Huachuca City, and most of the SPRNCA.

The USPB comprises an area of approximately 2,500 square miles. The basin slopes gradually from south to north, resulting in a northward surface water flow. Of the Basin's 2,500 square miles, 696 square miles lie within the northern parts of Republic of Mexico. Approximately 54 square miles drain from the west side of the Huachuca Mountains into Mexico and then to the San Pedro River (Putman et al. 1988). Within the U.S., the west side of the San Pedro watershed is bounded by the Whetstone, Rincon, Mustang, and Huachuca mountains along with the Canelo Hills. The Winchester, Little Dragoon, Dragoon, and the Mule Mountains along with the Tombstone Hills bound the east side of the watershed. Mountain elevations vary from 6,597 ft AMSL for the Mule Mountains to more than 9,466 ft AMSL for the Huachuca Mountains. The elevation of the river where it enters the U.S. at the international border with the Republic of Mexico is 4,260 ft AMSL, and it exits the subbasin at "the narrows" at an elevation of 3,300 ft AMSL (Huckleberry 1996).

2.2.4 Regional Surface Water

The San Pedro River originates in the desert grasslands near Cananea, Sonora, Mexico and drains approximately 696 square miles before entering the U.S. (BLM 2018). The San Pedro River is part of an alluvial river system – a river formed in fluvial sediments transported, deposited, and reworked by the river itself. The river and its riparian zone are dynamic systems that undergo constant adjustments in response to changes in runoff, sedimentation rates, and channel and floodplain conditions. Today, most of the main channel of the San Pedro River is incised. By most accounts, the San Pedro River system has changed both in terms of historic hydrologic condition and habitat diversity. That change is associated closely with an episode of human and flood induced channel entrenchment as well as an earthquake that occurred between 1880 and 1926, which resulted in the loss of cienega habitat and further incised entrenched reaches (BLM 1987). The BLM (1987) reports that incision of the channel has resulted in declines in the local water tables.

Entrenchment sets into motion a number of important geomorphic, hydrologic, and biologic adjustment processes. Most of these adjustments are still occurring and may have an influence on future resource conditions along the San Pedro River (BLM 1987). Where floodplains are narrow, channel incision has been on the order of 10 ft. In other sections of the river, erosion has

progressed laterally to create a broad channel occupied by a relatively narrow zone of river flow during periods of drought. During floods, the channel is filled by a turbid, erosive river.

Surface water drainages originating within the San Pedro Basin are tributaries to either the San Pedro or Babocomari Rivers (Figure 2.14). The Basin also includes several smaller watersheds that are locally significant but contribute little to the regional surface and groundwater resources. The Babocomari drains the northwestern sections of the Sierra Vista Subwatershed, including the Mustang Mountains, Canelo Hills, and the northern end of the Huachuca Mountains. It discharges into the San Pedro River just south of Fairbank. The Babocomari River is ephemeral throughout most of its length, although a reach near the headwaters about 15 miles above its confluence with the San Pedro and another reach about 4 miles above the confluence sustain perennial flow due to special geologic conditions (ADWR 2005). Together, these two reaches of the Babocomari sustain perennial flow for approximately 12 miles. The area near the Babocomari Ranch appears to be strongly influenced by the presence of a volcanic dike which may restrict the flow of groundwater and force it to the surface (Thomas and Pool 2006). Several drainages including O'Donnell Creek, Turkey Creek, and Lyle Canyon flow into the Babocomari and probably contribute runoff during floods. Regular gauging of flows in the Babocomari occurs at two sites, near Huachuca City and Tombstone (USGS 2009).

Most of the information concerning the flow regime in the Babocomari was acquired by Schwartzman (1990). Perennial and seasonally flowing portions of the Babocomari are supported by shallow water tables and generally exhibit stable baseflows between late October and early April. Winter rainfall may cause short-term runoff events between December and February. Stream flows are depleted during the hot summer months preceding the monsoon season of mid-July through late September. The monsoon rains generally restore stream flows to or above the winter baseflows. High runoff periods are associated with individual monsoon rainfall events. Stream flows may fall below winter levels toward the end of the growing season in early October and return to winter conditions after the growing season. Schwartzman (1990) divided the Babocomari into ten sections and reported the results of stream gauging conducted in March and June of 1988. Streamflow ranged from 0.01 cubic ft per second (cfs) to 2.72 cfs depending on the stream section in March and from 0.29 cfs to 0.35 cfs in the only three sections where measurable flow occurred in June. Sharma et al. (1997) report measurements on the Babocomari ranging from no flow to 1.5 cfs based on intermittent gauging between 1990 and 1995. However, Sharma et al. (1997) did not feel their data were representative and stated that an accurate data set of generated surface flows at this site was not feasible.

2.2.1 Fort Huachuca Surface Water

Fort Huachuca lies in the Babocomari and Garden Canyon watersheds, as defined by the NRCS. Combined, these watersheds represent a 539-square-mile drainage area making up 31.7% of the USBP (ENRD 1997). A majority of the surface water features on the Fort are ephemeral streams, consisting of dry washes, arroyos, or continuous and discontinuous gullies. Ponds, springs, and wildlife water catchments make up a minor but important portion of surface water on the Fort. 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.

Figure 2.11 High Elevation Fuel Treatment 2015-2020

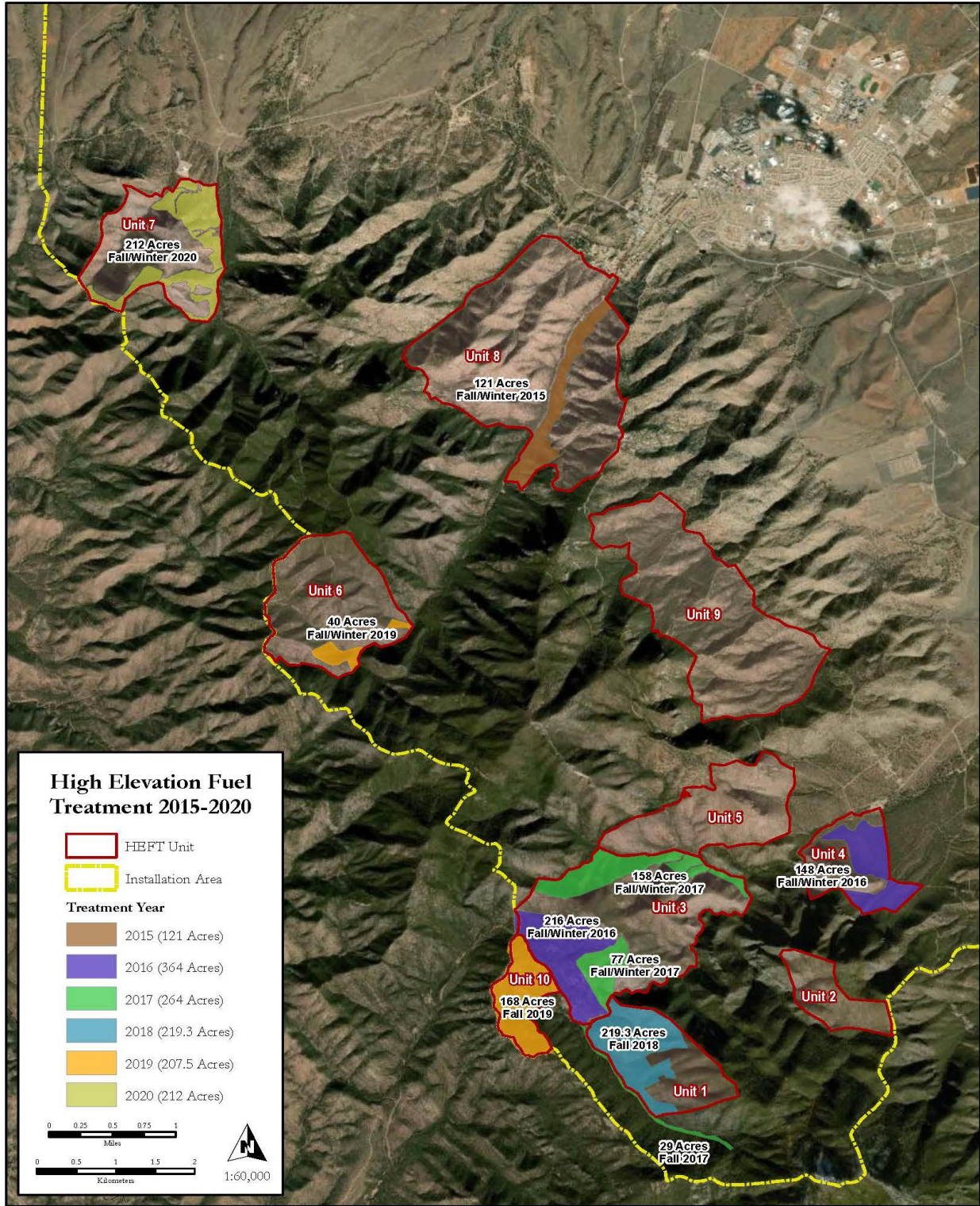


Figure 2.12 Fort Huachuca Soils

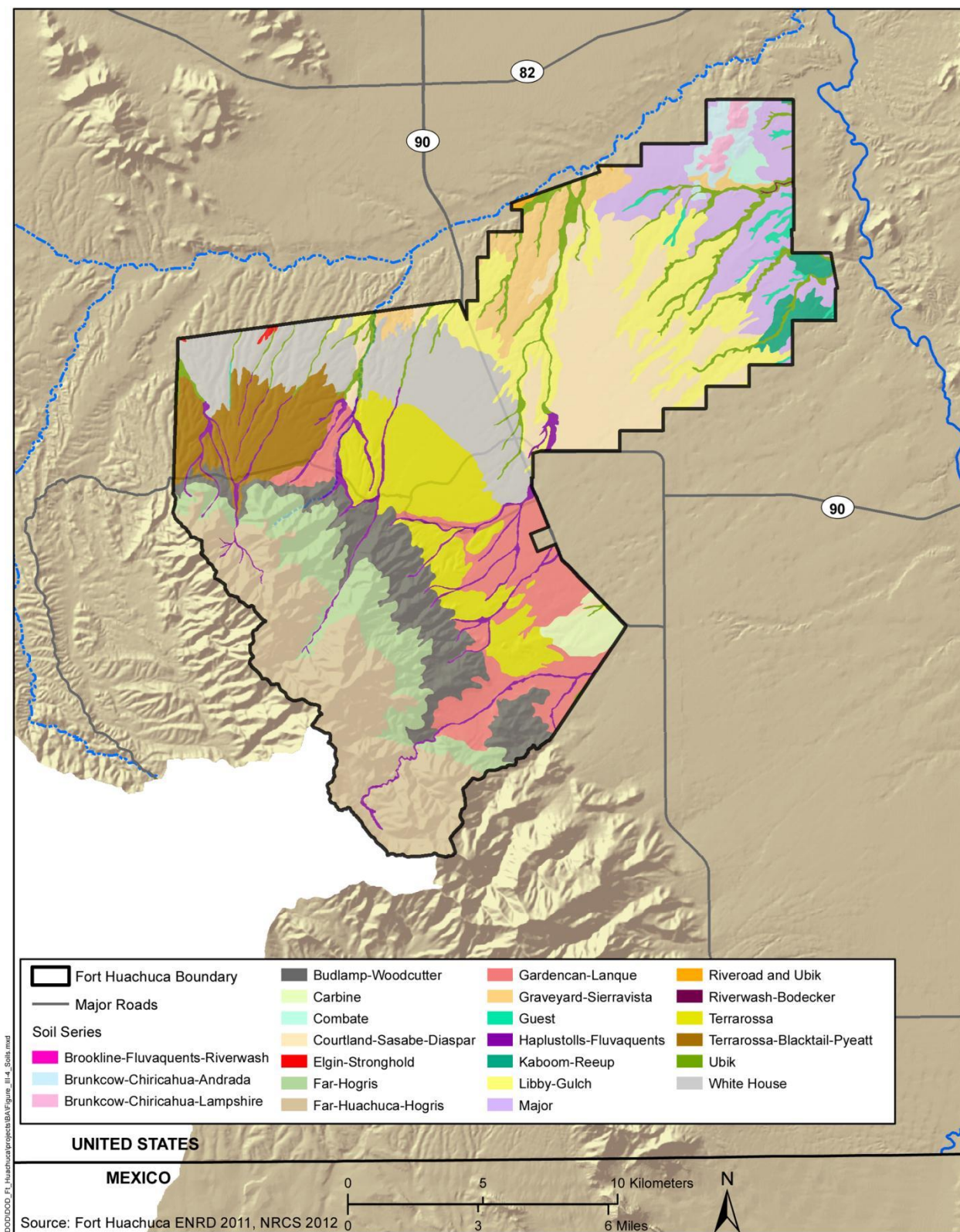
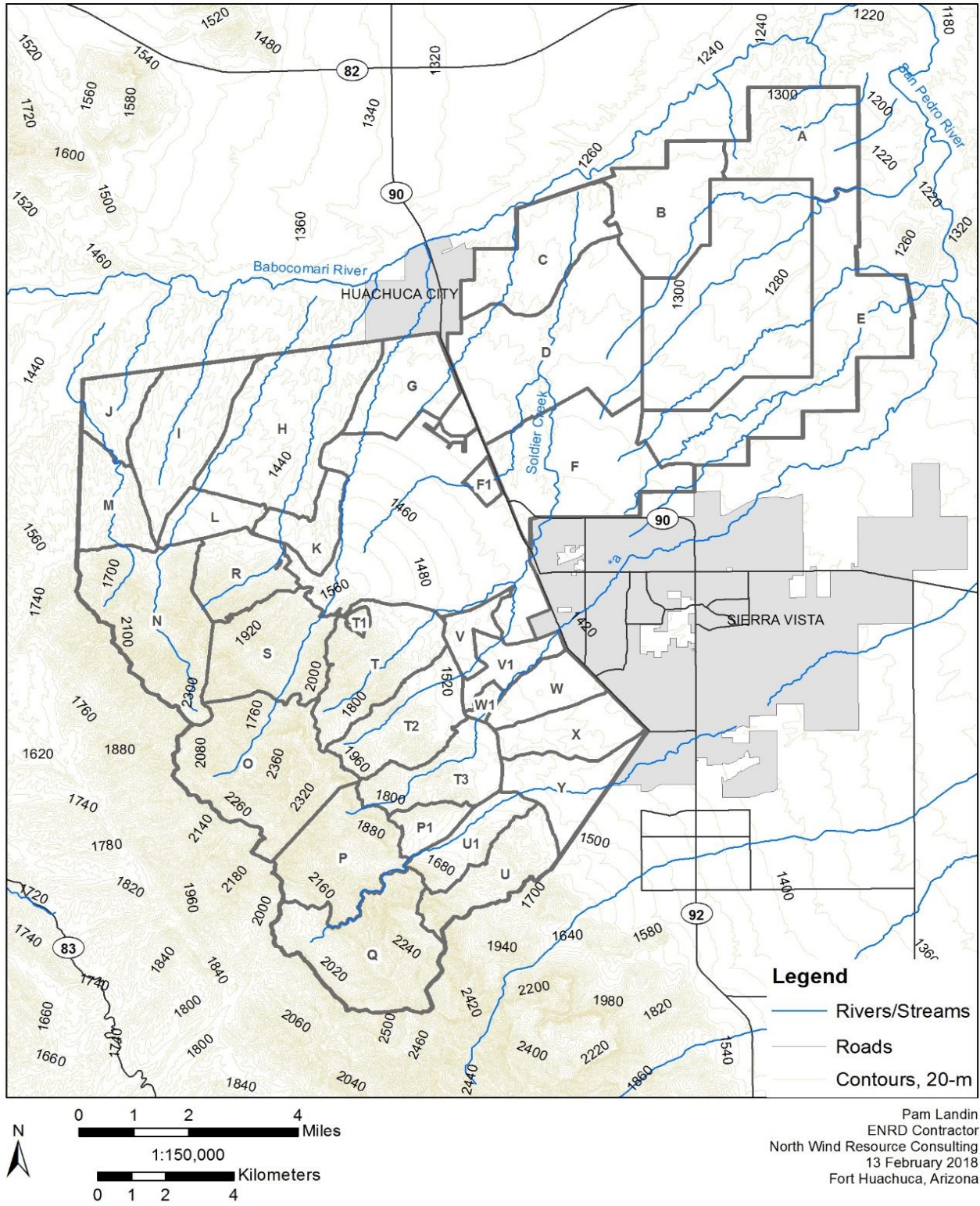


Figure 2.13 Topography on Fort Huachuca



Streams

Fort Huachuca has approximately 4.5 miles of perennial streams, 3.5 miles which occur in Garden Canyon and another 0.75 miles in Huachuca Canyon. Minor lengths of perennial reaches also occur in McClure and Blacktail Canyons. No exploitable surface water sources exist to meet Fort Huachuca's potable water needs. The following description of the Fort's surface water resources and use of these resources is taken from the report of survey work conducted on the installation's spring resources commissioned in 2015 (Harris Environmental 2018), and provides a thorough description of why the Fort's surface water is unexploitable for potable water needs. The historical issues identified below with obtaining any surface water supplies to meet mission requirements are magnified today with additional issues related to extensive drought, water quality requirements, and climate change.

Numerous drainages flow west to east and east to west into the San Pedro River. The most prominent tributary is the Babocomari River, originating in the Canelo Hills and running east along the northern boundary of the Fort and into the San Pedro River. It was once a substantial stream flanked by lush riparian vegetation, *cieneegas*, and a broad floodplain covered with a luxuriant growth of grass. It is still perennial (for 12 miles [19 km] along two reaches but not at its mouth) and still has *cieneegas* along its course (ADWR 1990). In the southern portion of the Fort, the most notable drainages—Garden Creek and its tributary, Woodcutters Creek, as well as Graveyard Gulch, which originates in Sierra Vista and flows along the southern edge of the East Range—flow directly into the San Pedro River. The drainages north of these flow into the Babocomari River (Norman et al. 2019). Major streams running east from the Huachuca Mountains are Huachuca, Garden, Ramsey, and Miller Creeks. Other important but more-ephemeral drainages at the Fort that flow from the mountains toward the Babocomari River are Sycamore, Blacktail, Slaughterhouse, Coyote Canyon, and Split Rock Canyon washes and Rock Spring Canyon and Soldier creeks.

The water system of Fort Huachuca was dependent upon springs from inception in 1877 until the 1930s (Herbert et al. 1990). The location of the Fort was initially recommended in 1881 in part because it contained sufficient water and springs (Herbert et al. 1990). Between the time of establishment, as a temporary camp until 1883, the Fort obtained water from Huachuca Creek and two springs located within the camp (Herbert et al. 1990). Due to lack of continuous surface water flow during the dry season, the Fort dug a well near the sawmill on the border of Huachuca Creek (Herbert et al. 1990). The well supplied water for use on the post, and provided water for operating the portable steam engine that powered the sawmill. A small check dam was constructed further down the creek to collect drinking water for horses (Herbert et al. 1990). After the establishment as a permanent post in 1882, plans were made for the installation of a gravity flow system of pipes to bring water from Huachuca Canyon to the post, utilizing a spring about a half mile up the canyon as the source.

Pipes were temporarily placed for the water system by November 1883 (Herbert et al. 1990). Plans for the permanent pipe system were revised in 1884 to include reservoir storage and the use of Sawmill Spring, located three miles up Huachuca Canyon, as the primary water source. This spring was noted as having a significant volume (Herbert et al. 1990). The system was put into place in 1884.

With the water supply dependent on springs, periodic shortages were experienced. An attempt to enhance the water supply was made in the late 1880s, with the construction of a check dam across Huachuca Creek, just above Sawmill Spring, and a rock-lined reservoir tank constructed in the creek bed below the dam, which collected water from the check dam and from a spring 50 ft to the west (Herbert et al. 1990). In another attempt to increase water supply in 1889, agricultural drain tiles were installed underground near the original spring used in Huachuca Canyon, and

another spring at an unspecified location was also tapped into the water system (Herbert et al. 1990). Still more water was needed after a dry year in 1893, and yet another new spring in Huachuca Canyon was tapped to supplement the supply.

An 1893 annual report by the Post Surgeon described the Fort's water supply system as consisting of several springs located 2.5 to 3 miles above the post at an altitude of 400 to 600 ft above hilltop reservoirs. Water was conducted in iron pipes from the springs, or catch basins near them, to the reservoirs which were excavated from solid rock and were cement-lined. The reservoirs were covered by a substantial building with a shingled roof. Latticework and screens protected the sides to keep animals out (Herbert et al. 1990). Despite significant development and population increases on the Fort in 1904, water on post continued to come exclusively from springs in Huachuca Canyon, stored in the two hilltop reservoirs and a reservoir constructed in 1904 that captured waste water from an ice plant near the parade grounds (Herbert et al. 1990). With an increase in troops in 1911, the water system was expanded into Garden Canyon. By the end of 1911, 45,000 ft of 8 inch diameter steel water line was completed and collection works were constructed near the junction of Garden and McClure Canyons with small pipelines running up the canyons to several springs. Water was carried approximately seven miles from these collection works to the post's storage reservoir and a tank near Carnahan Hill (Herbert et al. 1990).

As a result of water shortages in the 1910s, in 1918, the army incorporated additional springs in Garden Canyon into the water system and improved several old springs with the construction of inlet boxes. Concrete check dams were constructed to trap surface flows from deep springs between already developed springs in the canyon (Herbert et al. 1990). During the 1920s, army personnel were detailed to construct concrete inlet boxes, dams, and catch basins in Garden and Huachuca canyons to augment water supplies (Herbert et al. 1990).

In 1928-1929, blasts of dynamite were set off in an attempt to increase water flow from the springs in Huachuca Canyon. At this time, the post's population had greatly increased and water demand was higher than summer flows could provide. These efforts failed, cracking the bedrock and moving the stream below ground. Other efforts to increase spring flow include experimenting with concentrating flow into a central spring through excavation of tunnels (Herbert et al. 1990).

It was not until 1930 that the Fort drilled a well at the mouth of Garden Canyon. A pumping plant to draw water from the well was constructed in 1934, representing the first time the Fort's water system would not rely completely on springs (Herbert et al. 1990). The pumping plant was only intended to provide supplemental water for the existing Garden Canyon facilities and would only be operated when the springs could not deliver the amount of water required (Herbert et al. 1990).

Additional wells were drilled on the east side of the Fort in 1936, 1940, and 1942 (Herbert et al. 1990). By 1958, the water supply was almost completely reliant on ground wells and their associated reservoirs (Herbert et al. 1990).

Between 1959 and 1964, the USGS evaluated the water sources on the Fort and recommended utilizing Huachuca and Garden Canyon spring water for recharging the underground water supply, which was being depleted as a result of heavy pumping on post and in surrounding communities (Herbert et al. 1990). A 1964 report by the USGS indicated that the major springs of Garden Canyon were Spring 2, Spring 1, and Picnic Spring (Herbert et al. 1990).

Construction on the spring water collection project occurred between 1969 and 1970 (Herbert et al. 1990). A 12 inch line was installed connecting the Garden Canyon springs to a 1.5 million-gallon reservoir and an 8 inch (20 line was installed bringing water from the Huachuca Canyon springs to the Old Post reservoirs. Water systems tapping springs and stream flows in Garden and Huachuca canyons were damaged by flood flows in 1977 (Herbert et al. 1990). By the early 1980s, the Garden and Huachuca canyon diversions were no longer used for potable water

supply. No exploitable surface water sources exist on Fort Huachuca to meet the Fort's current or future potable water needs.

Springs and Ponds

As noted above, ponds, springs, and wildlife water catchments make up a minor but important portion of surface water on the Fort. Along with streams, these surface water resources are among the most unique, biodiverse, and sensitive natural systems in the world and play an important ecological role. The most recent spring resources survey was commissioned by the Fort in 2015. A survey was conducted in the fall of 2016 through fall of 2017 and recorded only 46 of 79 possible springs (Harris Environmental 2018). Eight of the 46 springs documented were dry. The remaining 33 were either permanently or temporarily dry or had insufficient location information. The excess precipitation received during the fall and winter of 2019 will have undoubtedly activated additional springs that are proving important wildlife values, if only for a short period of time.

The Fort has 15 ponds which cover approximately 32 acres (Table 2-3). Though ponds were originally developed and improved for the fishing program (Section 2.1.2), they have been managed for habitat and species diversity values since the late 2000's. Most of the ponds are dry, and only retain water following consistent and heavy rains, excepting a single pond (Blacktail Pond), which appears to be sustained by a spring source and is perennial. A number of wildlife drinkers have been developed over the years, primarily for the hunting program, and a small number continue to be managed today.

The small wetland features are key components of a wider landscape scale and provide essential regulating services such as nutrient cycling, via water movement and uptake from plant life, as well as carbon sequestration by capturing and storing atmospheric CO² through a geologic and biological process (Cereghino et al. 2014). Networks of springs, streams and ponds provide opportunities for certain taxa to move through the landscape fulfilling life-cycle requirements. This specifically pertains to a number of highly sensitive species that occur on the Fort. Emerging adult insects from breeding ponds are the primary food source for some bats, birds and spiders. Amphibians, which require these aquatic environments, are targeted as prey by snakes, hawks, owls, herons and medium-size predatory mammals (Hocking 2014). Ponds and other small water sources are important hotspots for biodiversity and are considered as a keystone habitat component for migratory birds and larger and long-ranging species such as pronghorn, ocelot, black bear and jaguar.

2.2.1 Fort Huachuca Surface Water Regulatory Acts

Fort Huachuca's surface waters are regulated by several national acts. The U.S. Congress enacted the 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 CWA delegates jurisdictional authority over wetlands to the U.S. Army Corps of Engineers (Corps) and the Environmental Protection Agency (EPA). In June 2007, the Corps and the EPA issued a joint memorandum that clarifies CWA jurisdiction following the Supreme Court's decision in the Rapanos case.

The Rapanos decision did not change CWA jurisdiction for traditionally navigable waters (TNW) of the U.S. These waters include rivers, waters used for interstate or foreign commerce, interstate wetlands, tributaries, and wetlands adjacent to TNWs. By definition, adjacent wetlands may have a continuous surface water connection to TNWs, but may also be separated from these waters by a berm or dike.

With the Rapanos decision, CWA jurisdiction may also be extended to waters that are not TNWs of the U.S. if either of the following two standards are met:

1. non-navigable tributaries of TNWs that are relatively permanent (tributaries flow year-round or have continuous flow at least seasonally; e.g., typically 3 months) and wetlands that directly abut (there is a surface connection) these waters, and
2. a case-by-case determination (“significant nexus” analysis) for non-relatively permanent tributaries and adjacent wetlands that have characteristics that may significantly affect TNWs.

Table 2-3 Ponds Located on Fort Huachuca

Pond	Game Management Area	Depth (Ft)(Ft)
Golf Course	V	>14
Officers Club	Cantonment Area	>15
Gravel Pit	T-2	>13
Woodcutters	T-3	>15
Fly	T-1	2
Lower Garden	Y	8
Middle Garden	U	8
Sycamore I	H	15
Sycamore II	J	7
Tinker Canyon	U	8
Blacktail	N-2	--
Hidden	I	2.5
Antelope	I	4
Laundry Ridge	K	--
Upper Garden	Q	--

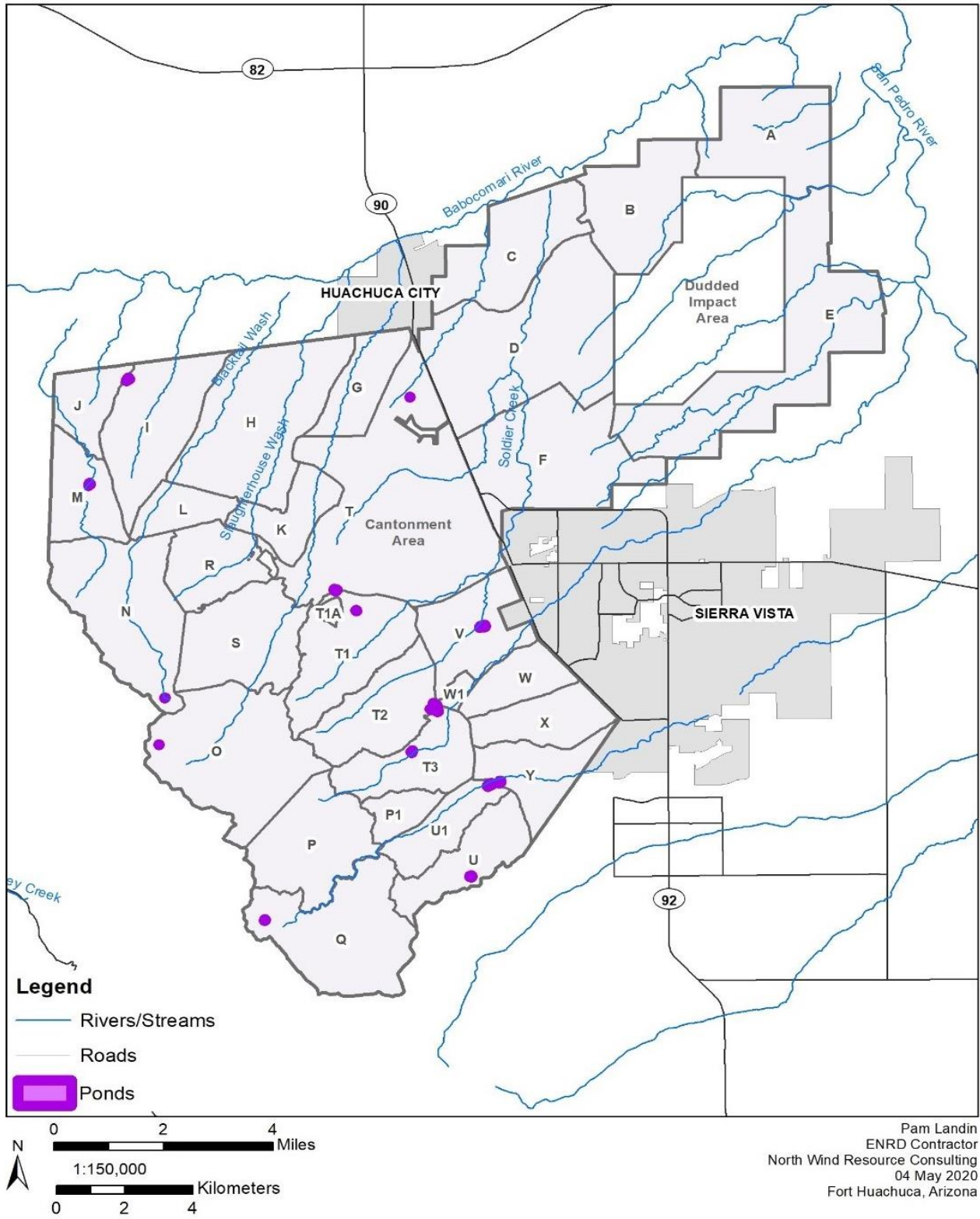
2.2.2 Regional Groundwater

As is characteristic of the Basin and Range Province, the Sierra Vista Subwatershed consists of several deep troughs filled with alluvial material eroded from surrounding mountain ranges. The bedrock forming the base and surrounding mountain ranges contains granitic sedimentary rocks (ADWR 2005). Using gravimetric surveying techniques to detect depth to bedrock, Gettings and Houser (2000) found two deep structural troughs in the Sierra Vista Subwatershed on the west side of the San Pedro River, to the north and south of Sierra Vista.

These troughs contain the aquifer-forming geologic units known as the Pantano Formation and the Upper and Lower Basin Fill units. The San Pedro River and nearby floodplains are underlain by a shallow, but hydrologically significant, alluvial aquifer.

The Pantano formation is described as a semi-consolidated conglomerate and recognized as a locally important aquifer unit where it occurs at or near the ground surface (Pool and Coes 1999). Because of its consolidated nature, water yielded by the Pantano is from fractures, and aquifer storage is very limited. The lower and upper basin fill units comprise the major aquifer units in the Sierra Vista/Fort Huachuca area, with combined thicknesses of about 800 to 1,200 ft in the Sierra Vista subbasin (Pool and Coes 1999; Gettings and Houser 2000). ADWR (2005) estimated that the upper and lower basin fill units contain about 15.6 million acre-ft area (afa) of groundwater in storage in the Sierra Vista subbasin (Sierra Vista and Benson sub areas). This compares to a total of 19.8 to 26.1 million afa estimated for total groundwater storage in the Sierra Vista subbasin (ADWR 2005).

Figure 2.14 Surface Water Network on Fort Huachuca



A detailed discussion of regional groundwater resources and their interrelation with water use on the Fort can be found in the Fort Huachuca Programmatic Biological Assessment (PBA) (Leidos 2013).

2.2.3 Fort Huachuca Water Use

Local surface water is generated as storm runoff, snowmelt, and discharge from springs into the stream channels of Garden and Huachuca Canyons. Other canyons located within the boundaries of the Fort yield little water except for short durations following precipitation. As noted above, springs were at one time the sole source of water on the Fort. By 1983, the Fort no longer used springs as a source of potable water.

Fort Huachuca predates most development in the USPB. The installation has some of the oldest reserved surface water claims in the state of Arizona. Most on-post surface water features are ephemeral, fed only through snowmelt and runoff from the Huachuca Mountains. Under current conditions, there are no exploitable surface water supplies on the Fort. All on-post water uses are met by a series of groundwater wells. The Fort is responsible for only a portion of total aquifer storage change due to pumping in the subwatershed, with the remainder being attributable to cumulative effects for which the Fort must consider, but is not accountable (Public Law 108-136, Section 321).

The total quantity of groundwater pumped by the post in calendar year (CY) 2018 was 1,312 afa. Eight wells on the Fort are considered municipal water supply wells with well depths between 710 and 1,230 ft. Two of the wells (800 gallons per minute pump capacity) are located on the East Range, and six wells (500-750 gallons per minute pump capacity) are located on-post between the main gate and the east gate. Another five wells support military testing and research activities across the post and have minimal production.

Water consumption at the installation has steadily decreased as a result of the use of treated effluent for irrigation, demolition of WWII buildings and water infrastructure, leak detection surveys, and an aggressive water conservation program. The Fort currently uses effluent to irrigate the golf course. Fort Huachuca's golf course is the only golf course in the subwatershed irrigated with treated effluent. A total of 246.21 afa of treated effluent was delivered to the Fort's recharge facility on the East Range in 2018.

2.3 General Biotic Environment

2.3.1 Vegetation / Flora

The vegetation of Fort Huachuca is representative of the basin and range region of southeastern Arizona. Plant species composition and vegetation productivity is largely determined by rainfall distribution (as influenced by topography) and soil type as derived from bedrock. At lower elevations within the San Pedro River Valley, xerophytic (adapted to life in dry environments) shrubs and grasses provide sparse vegetative cover, while on the more moist slopes of the Huachuca Mountains, stands of trees and shrubs dominate. Fort Huachuca includes vegetation types ranging from shrublands, open grasslands, and mesquite-grass savannas of the lowlands, through the oak-grass savannas and oak woodlands of the foothills, to the pinyon-juniper and pine woodlands of upper elevations. Thirteen vegetation types have been mapped (Figure 2.15). Of particular importance to maintenance of biological diversity is the conservation of grassland, riparian, and woodland vegetation types/environments. Table 2-4 compares occurrence of these vegetation types on the South, West, and East ranges. The vegetation of the ranges is discussed in more detail below.

Table 2-4 Vegetation Types Present on Fort Huachuca Ranges

Vegetation type ²	South Range	West Range	East Range	*Total	Percent %
	Acres	Acres	Acres	Acres	
Shrubland	0	0	10,414	10,414	14
Open Grassland	2,872	5,483	0	8,355	12
Shrub-Grassland	3	1,487	10,805	12,295	17
Mesquite Woodland	0	0	1,108	1,108	2
Mesquite-Grass Savanna	4,296	3,687	6,199	14,182	19
Oak-Grass Savanna	1,703	200	0	1,903	3
Oak Woodland	7,548	3,961	0	11,509	16
Mixed Woodland	2,459	510	0	2,969	4
Pine Woodland	1,800	27	0	1,827	2
Deciduous Woodland	759	230	18	1,007	1
Mahogany Woodland	1,117	234	0	1,351	2
Pinyon-Juniper	318	184	0	502	1
Urban and Built Land	0	5,270	0	5,720	7
TOTAL	31,919	12,585	28,544	73,142	100

Source: Leidos 2013

² Riparian vegetation types are not included in this table.

* Total acreage in this table does not sum to the newly derived (via GIS) Installation acreage of 80,912 acres.

South Range

The dominant vegetation in the eastern portions of the south range is open grassland and mesquite-grass savanna with elevations for this habitat type ranging from approximately 4,200 to 5,100 ft AMSL. Together, these two types cover the largest area on the Fort. Common species include velvet mesquite, agaves (*Agave palmeri* and *A. parryi*), yuccas (*Yucca* ssp.), sotol (*Dasyilirion wheeleri*), rabbit brush (*Chrysothamnus nauseosus*), and a variety of grasses including grammas (*Bouteloua* ssp.), lovegrass (*Eragrostis* ssp.), and muhly (*Muhlenbergia* ssp.). The lovegrasses, nearly all of which are invasive, and other African species now make up a significant portion of the grass cover. These species have colonized the travel corridor. Cacti, such as cholla (*Cylindropuntia* ssp.) and prickly pear (*Opuntia* ssp.), pincushion (*Mammillaria* ssp.), and hedgehog (*Echinocereus* ssp.) are also common. Oak-grass savanna covers approximately 1,700 acres and occurs from approximately 5,000 to 5,800 ft AMSL. Typical tree species are evergreen oaks (including *Quercus arizonica* and *Q. emoryi*) and alligator juniper (*Juniperus deppeana*). Mesquite also occurs in this type. Canopy cover of trees is generally less than 15%.

Important grass species include bullgrass (*Muhlenbergia emersleyi*), deergrass (*M. rigens*), sideoats grama (*Bouteloua curtipendula*), pinyon ricegrass (*Piptochaetium fimbriatum*), prairie junegrass (*Koeleria macrantha*), plains lovegrass (*Eragrostis intermedia*), dryland sedge (*Carex occidentalis*), and beggartick (*Aristida orcuttiana*), though invasive grasses have reduced this native mix substantially.

Woodlands dominate the higher elevations of the range. These types include oak (7,548 acres), mahogany (1,117 acres), and mixed woodlands (2,459 acres). These types occur at elevations ranging from 5,200 to 7,200 ft AMSL. Arizona white, Emory, and silverleaf (*Quercus hypoleucoides*) oaks dominate, while alligator juniper and Mexican pinyon (*Pinus cembroides*) are important co-dominants. On limestone parent materials, mountain mahogany (*Cercocarpus* ssp.) is a dominant species. Within this type of woodland, in canyon bottoms or on cool northern exposures, pine species such as Apache (*Pinus latifolia*), Chihuahuan (*Pinus leiophylla* var.

chihuahuana), and ponderosa (*Pinus ponderosa*) occur, as do unique species such as Arizona madrone (*Arbutus arizonica*) and Arizona rosewood (*Vauquelinia californica*).

Important shrubs include sacahuista (*Nolina microcarpa*), Schott yucca (*Yucca schottii*), manzanita (*Arctostaphylos patula.*), Wright silktassle (*Garrya wrightii*), skunkbush sumac (*Rhus trilobata*), sotol, *Dasyilirion wheeleri*, agave, Mearn's sumac (*Rhus virens*), narrowleaf hoptree (*Ptelea angustifolia*), prickly pear, hedgehog, and rainbow cactus (*Echinocereus rigidissimus*). Common grasses and forbs are prairie junegrass, pinyon ricegrass, bullgrass, muttongrass (*Poa fendleriana*), sedges (*Carex* spp.), bouvardia (*Bouvardia glaberrima*), meadow rue (*Thalictrum fendlerii*), wild beans (*Phaseolus* spp.), goosegrass (*Eleusine indica*), wood-sorrel (*Oxalis* spp.), gentian (*Gentiana* spp.), and crane's-bill (*Geranium* spp.). Non-native invasive grass species are also entering this area.

Pine woodlands of the Madrean montane conifer type occur at higher elevations ranging from 6,000 to 8,600 ft AMSL. The pine woodland is dominated by ponderosa pine and covers approximately 1,800 acres. Co-dominants include Chihuahuan and Apache pine. On steep northern exposures, Douglas-fir (*Pseudotsuga menziesii*) and southwestern white pine (*Pinus strobiformis*) form associations with ponderosa pine. Quaking aspen (*Populus tremuloides*) is found in a few places, usually in areas with moist soils. Important understory trees include silverleaf oak, Arizona white oak, alligator juniper, Mexican pinyon, Arizona madrone, and Gambel oak (*Quercus gambelii*). The major shrubs are Fendler buckbrush (*Ceanothus fendleri*), netleaf oak (*Quercus rugosa*), New Mexico locust (*Robinia neomexicana*), snowberry (*Symphoricarpos* spp.), Schott yucca, sacahuista, mountain mahogany, and southwest thimbleberry (*Rubus neomexicanus*). Important grasses include mountain muhly (*Muhlenbergia montana*), longtongue muhly (*Muhlenbergia longiligula*), bullgrass, sideoats grama, muttongrass, prairie junegrass, nodding brome (*Bromus anomalus*), fringed brome (*Bromus ciliatus*), bulb panic grass (*Panicum bulbosum*), screwleaf muhly (*Muhlenbergia virescens*), pine dropseed (*Sporobolus* spp.), and wedgescale (*Spenopholis* spp.). Common forbs are mule ears (*Wyethia* spp.), meadow rue, goosegrass, wood-sorrel, crane's-bill, sneezeweed (*Helenium* spp.), goldenrod (*Solidago* spp.), avens (*Geum* spp.), gentian, rock cress (*Arabis* spp.), and pussytoes (*Antennariain* spp.).

In the firing range areas, disturbance includes paved and unpaved roads (including many fire breaks) and their berms, parking areas, towers, firing structures, and areas of frequent accidental or managed vegetation burns in the flat areas and lower slopes of the foothills.

West Range

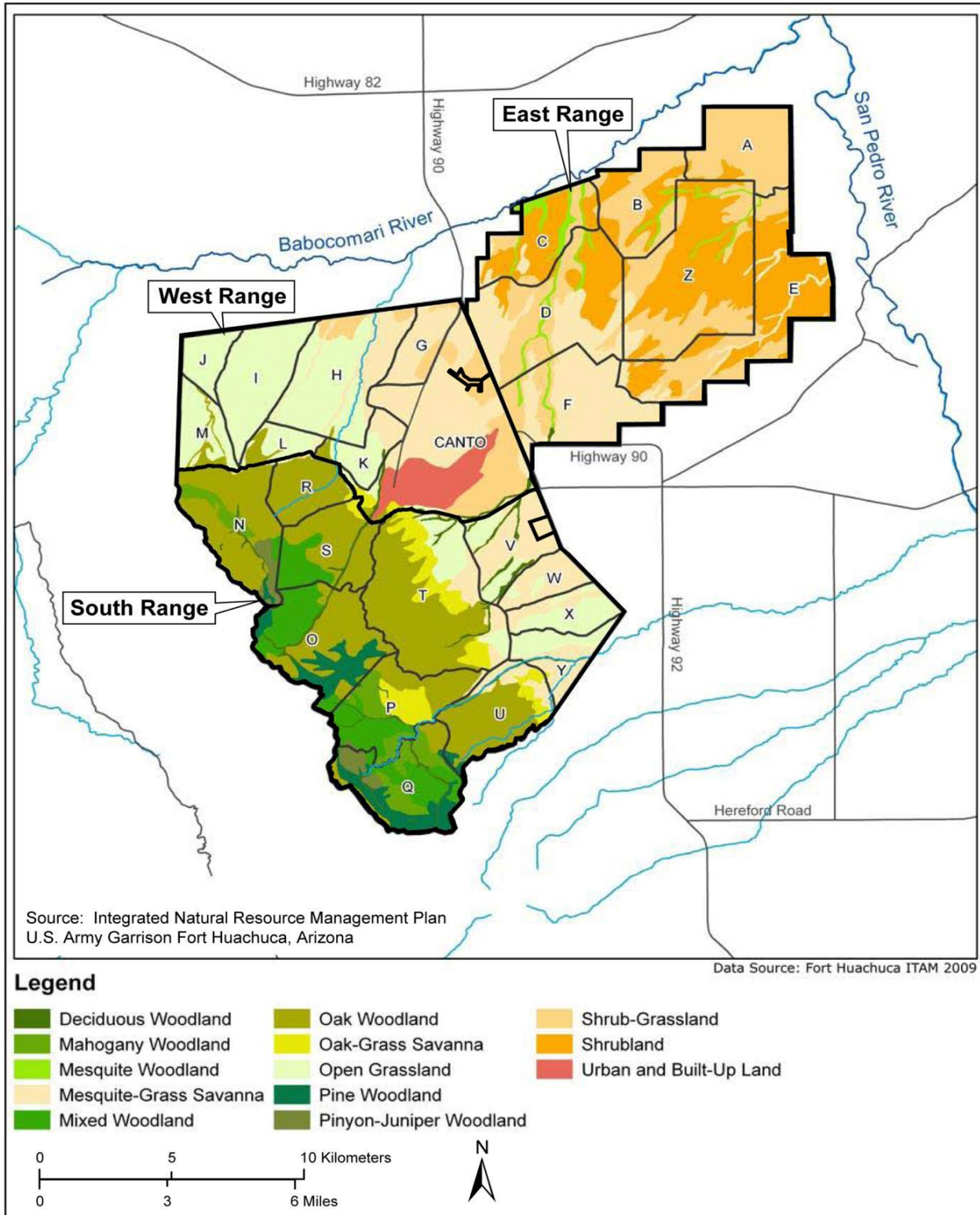
Vegetation on the West Range is similar to that of the South Range, with open grassland occurring on the lower portions of the range in the north and east, transitioning through oak-grass savanna to oak and mixed woodlands in the south and west (Figure 2.15). Many of these oak woodlands occupy the bottoms of the major drainage downslopes. Invasive grasses make up a significant component of the Range and have colonized the travel corridor.

Disturbed areas include paved and unpaved roads and their berms, parking areas, a concrete helipad, powerlines, a pipeline, several buildings and antenna installations, the airfield, and UAS sites. Deciduous riparian vegetation is found near Antelope Pond and the Blacktail, Slaughterhouse, and Huachuca drainages.

East Range

The major plant community occurring on the East Range is shrublands of the Chihuahuan desert scrub type. Elevations for this habitat type range from 3,900 to 4,400 ft AMSL. The desert scrub community was historically desert grassland but was altered by livestock overgrazing prior to government ownership. Dominant woody plants include creosote bush (*Larrea tridentata*),

Figure 2.15 Fort Huachuca Vegetation



mesquite (*Prosopis* spp.), desert broom (*Baccharis sarothroides*), tarbush (*Flourensia cernua*), and whitethorn acacia. Other important species include bush muhly (*Muhlenbergia porteri*), black grama (*Bouteloua eriopoda*), blue threeawn (*Aristida purpurea*), fluffgrass (*Dasyochloa pulchella*), false goldfields (*Bahia* spp.), and twinberry (*Lonicera* spp.). Since 1960, when the Army fenced the East Range, the area has been improving, but bushy and non-native species have largely replaced the natural desert grassland. Lehmann lovegrass (*Eragrostis lehmanniana*), an introduced invasive annual grass, is abundant within most Mesquite grassland vegetation associations on the East Range. Other species of non-native African lovegrasses have also been introduced and become more abundant on this Range.

The East Range has been disturbed to varying degrees. Unpaved roads, tracks, and jeep trails are common. An unpaved airstrip is present in the east-central region of the site, and roads have been changed to circumvent this area. This area in the northwestern corner of the Range contains a large amount of litter and debris from a neighboring landfill located off the installation in Huachuca City. An old agricultural field and an observation platform are present near the center of the northern border. Testing equipment and buildings also occur in this area.

2.3.2 Common Fauna

The significant wildlife diversity found on the Fort is directly related to the habitat diversity in this region. The isolation of the Huachuca Mountains from other mountain ranges in the area by intervening lowland biological community types results in a “sky island” effect. Sky islands are known for their diversity of vegetation types, usually along an elevational gradient, and typically exhibit high degrees of species endemism. In addition, the close proximity to Mexico results in some wildlife species that are not known to occur elsewhere in the U.S., or that are more commonly associated with the tropics. As a result, southeastern Arizona possesses one of the greatest diversities of bird species of any similarly-sized region in North America (Taylor 1995). More than 400 species occur here each year, and a total of almost 500 species has been recorded (Taylor 1995). Another example of the diversity of the region is the 75 species of amphibians and reptiles that occur in the Huachuca Mountains and Upper San Pedro River (Taylor 1995). Also, more than 180 species of butterfly have the potential to occur in various habitats throughout the Fort.

Invertebrates

A wide variety of invertebrates inhabit the installation, including mollusks (snails) and arthropods (insects, arachnids, crustaceans, and myriapods). Spiders, such as the black widow (*Latrodectus hesperus*) and various tarantula species (*Aphonopelma* spp.), scorpions (*Buthidae*), sunspiders (*Solpugidae*), whip scorpions or vinegaroons (*Trithyreus* spp.), and centipedes (*Chilopoda*) are but a few of the invertebrates that may be encountered. As discussed in Section 2.3.4, the Huachuca springsnail (*Pyrgulopsis thompsoni*), a former federal candidate species and an Arizona Wildlife SGCN, occurs on the Fort and is managed under a Candidate Conservation Agreement (CCA).

Though there has been no systematic survey for invertebrates on the installation, data have been collected in certain habitat types (aquatic and grasslands). The DoD SERDP funded aquatic invertebrate work in Garden and Huachuca Canyons between 2012 and 2014 and again in 2017. This work identified specimens from Odonata, Coleoptera, Ephemeroptera, Plecoptera, and Trichoptera and other invertebrate groups and identified an exceptional diversity of 313 from the Fort (Lytle 2016). This work identified either a range extension or new species of mayfly, *Farrodes*, previously known in the U.S. from a single locality in Texas. Over 130 individuals of *Farrodes* sp. were documented on the Fort (Lytle 2016). Ten specimens of the mayfly, *Paracloeodes*, were documented from the SPRNCA and Lytle noted that, since there are only two known species in

North America neither of which have been found in Arizona, the specimens were either a range extension (of a species known only from North Carolina) or a new species (Lytle 2016). A number of single-species focused projects (springsnail) have been conducted and are further discussed in Section 2.3.4 (Huachuca Springsnail). Grassland arthropod diversity was assessed on the installation between 2014 and 2015. In this work, Andersen et al. (2019) evaluated the effect of invasion by non-native grasses on the abundance and richness of foliage-dwelling arthropods. They found that non-native grasses reduced total arthropod abundance and diversity due to the specialized nature of many arthropod species. This effect was documented most among predators and specialist herbivores, while most generalist herbivores were lowest at intermediate points of invasion. As invasive grasses continue to spread and displace native vegetation, there is potential to alter broadscale ecological processes (energy flow and nutrient cycling) and reduce food resources for insectivores (lizards, bats, birds, etc.), which can have negative and cascading effects on sensitive and diminishing grassland ecosystems (Andersen et al. 2019).

In addition to this work, information regarding invertebrates has been and continues to be obtained via Fort Huachuca's scientific research permit process (Appendix 3). The unauthorized removal of any material from the installation is prohibited, and this includes scientific collecting, therefore ENRD issues invertebrate collecting permits to bona fide scientists, educators, and serious collectors with institutional affiliation only. Collectors are required to submit a permit application and, if approved, are required to provide the installation with a list of species and number of individuals of each species collected, date and location of collection, and institution where specimens will be held at the end of the permit period. ENRD strives to develop a cooperative relationship with permittees. The information received through this process provides information, though spotty and not entirely dependable from year to year, to identify noted changes and potential issues. Information from these permits is managed in a species database for management purposes and at present consists of observations from Garden Canyon only.

The Huachuca Mountain range has a high diversity of native land snails, representing 13 families of mollusks and at least as many as 24 species. Some of the larger genera of land snails - the talussnails (*Sonorella*), mountainsnails (*Oreohelix*), and woodlandsnails (*Ashmunella*) are endemic only to the Huachuca Mountain range, and are listed as SGCN. There is an interest in documenting the status and distribution of many of the talussnails, mountainsnails, and woodlandsnails in the Huachuca Mountains. The AGFD has a standardized land snail survey protocol that can be used to assess land snail populations, their habitat associations, and observed/known threats. The Fort has received this protocol and will include this monitoring while conducting other fieldwork. The Huachuca woodlandsnail (*Ashmunell alevettei*) is one of 12 mollusks being evaluated in the upcoming years to determine whether the species should be listed as threatened or endangered.

In response to significant declines in pollinators from the environment, a 20 June 2014 Presidential Memorandum titled *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*, a Federal Pollinator Health Task Force (Task Force) was established. The goal of this Task Force, which DoD serves on, was to promote pollinator health of bees, birds, butterflies, bats, and other animals that provide pollination, through research, habitat creation, education and outreach, and public-private partnerships. The memorandum identifies butterflies and other native pollinators as integral parts of managed and natural ecosystems that provide billions of dollars in pollination services a year. In May 2015, the *Promote the Health of Honey Bees and Other Pollinators Strategy* was released, and describes needs and priority actions to better understand pollinator losses and improve the health of pollinators in the U.S. The Strategy also directed federal entities to increase and improve pollinator habitat and to develop Best Management Practices (BMPs) emphasizing pollinator needs in managing for diverse native plant communities. These BMPs were provided in 2015. From this, the Task Force developed the

Pollinator Research Action Plan, designed to focus Federal efforts on producing the scientific information needed to understand, minimize, and recover from pollinator losses (Pollinator Health Task Force 2016). The Research Action Plan directs federal agencies to partner with non-federal entities to study pollinator habitat requirements and support habitat creation, restoration, and enhancement efforts. The Fort has been engaged in pollinator conservation since at least 2016 by including pollinator forb species in the approved native grass re-seed mixtures; conducting overstory thinning, which increases plant diversity and nectar sources; conducting prescribed burns; invasive plant management; and entering cooperative efforts for the collection of native seed, to include milkweed, for propagation and seed banking.

In 2019, the Western Association of Fish and Wildlife Agencies (WAFWA) completed the Western Monarch Butterfly Conservation Plan in response to a 2014 petition to list the monarch as a threatened species under the ESA. The purpose of this plan is to promote a shared set of coordinated, ecosystem-based conservation strategies across partner agencies to achieve the vision of a viable western monarch population (WAFWA 2019). The Fort lies within the core breeding area of the western monarch population and is internationally known as one of the best locations in the U.S. to observe and collect a diversity of butterfly species. The Fort will work in coordination with WAFWA to protect this species. In 2013, a butterfly inventory was conducted for the development of an installation-wide butterfly checklist. This checklist can be obtained from the North American Butterfly Association webpage (Halbedel 2013) and includes 130 species from 10 families, as described below. The installation, particularly Garden Canyon, receives significant demand for butterfly collection, and impacts of collection are a natural resource concern. The concerns are primarily about over collecting in a place that is popular, accessible, and relatively small, and about destructive collecting to find certain life stages of invertebrates, such as plant destruction to obtain larvae of butterflies.

Species of butterfly identified represent the following families: *Hesperiidae* (55 species), *Papilionidae* (5 species), *Pieridae* (17 species), *Lycaenidae* (14 species), *Riodinidae* (6 species), *Libytheidae* (1 species), *Heliconiidae* (1 species), *Nymphalidae* (22 species), *Satyridae* (6 species), and *Danaidae* (2 species).

Fish

Native fish have not been documented on the Fort since 1983. Though potential habitat for the federally-listed Gila topminnow was suggested as present on the Fort in 1998 (SAIC 1998), suitable habitat does not presently occur due to the seasonally intermittent nature of both Garden and Huachuca Canyon Creeks. The Fort had a substantial fishing program in the past and it stocked both non-native and native species, as discussed in Section 2.1.4 (Fishing). Desert pupfish and Gila topminnow were stocked in Buffalo Corral Pond-Spring between 1983 and 1988, this pond was selected for stocking for its long record for holding water (Coleman 1988). Earlier records for reintroduction of Gila topminnow exist, and Gila chub were released in Garden Canyon Creek (see Section 2.3.4). A total of 138 Desert pupfish, 1,285 Gila Topminnows, and 150 Gila Chubs were stocked between 1983 and 1988 (Coleman 1988), but all releases ultimately failed (Weedman and Young 1997, USFWS 1998).

Non-native fish species have been stocked in the past, and include rainbow trout (*Oncorhynchus mykiss*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), bluegill sunfish (*Lepomis macrochirus*), and redear sunfish (*L. microlophus*) (Sam Houston State University 1996). For example, until 2002, about 12,000 rainbow trout were annually acquired from a USFWS hatchery and were stocked in the nine installation ponds, until water temperatures became too warm to sustain a year-round trout population. Loss of water in some impoundments, loss of funding due to lower license sales, drought, and issues associated with stocking a non-indigenous species, reduced the non-native stocking program.

Amphibians and Reptiles

Taylor (1995) identified the occurrence of 75 species of amphibian and reptile in the Huachuca Mountains and Upper San Pedro River. DoD Legacy, SERDP, and Fort Huachuca has confirmed 53 species of amphibian and reptile on the Fort (Table 2-5). A number of herpetofauna surveys have been conducted since 1985. Between 1985 and 1986 the Fort contracted with the University of California, Berkeley to conduct an inventory of herpetofauna within Garden Canyon. The goal of this project was to develop an amphibian and reptile guide for Fort personnel and visitors. The follow-on to this work was conducted in 1992 and included areas in the upland vegetation types (outside of the riparian zone) for amphibians, reptiles, and Huachuca Springsnails. This work documented one amphibian species and 14 reptile species in upland habitats, with the mixed pine-oak forest having the largest abundance of species (Morrison et al. 1995). An inventory for sensitive herpetofauna of the Huachuca Mountains was contracted with the AGFD between 1995 and 1998 and resulted in an inventory report and management plan for amphibians on the Fort. Species-specific surveys have been funded to monitor the Arizona treefrog (Vernadero 2012), a genetic assessment of the Arizona treefrog on and around the Fort (Mims and Olden 2015), a genetic assessment of salamanders on and around the Fort (Storfer 2016), and eDNA analysis of aquatic vertebrates on and around the Fort (Goldberg et al. 2018).

Historically, the three most commonly found amphibians on the installation were the red spotted toad (*Anaxyrus punctatus*), Couch's spade foot (*Scaphiophus couchi*), and the introduced bullfrog (*Lithobates catesbeianus*) (Sam Houston State University 1996). Additional work conducted between 1995 and 1998, by AGFD, documented Chiricahua leopard frogs (*Lithobates chiricahuensis*) in large numbers, Arizona Treefrogs (*Hyla wrightorum*), and Sonora tiger salamander (*Ambystoma mavortium stebbinsi*) (Sredl et al. 2000).

Lizards are the most abundant reptiles on the Fort (Morrison et al. 1995). Lizards found on the installation include the Ornate tree lizard (*Urosaurus ornatus*), Madrean alligator lizard (*Elgaria kingi*), Mountain skink (*Plestiodon callicephalus*), Desert grassland whiptail (*Aspidoscelis uniparens*), Sonoran spotted whiptail (*A. sonorae*), Yarrow's spiny lizard (*Sceloporus jarrovi*), Clark's spiny lizard (*S. clarki*), and other *Sceloporus* spp., Some of the more renowned snakes found on the Fort include the black-tailed rattlesnake (*Crotalus molossus*), western diamondback rattlesnake (*C. atrox*), banded rock rattlesnake (*C. lepidus*), twin-spotted rattlesnake (*C. pricei*), ridge-nosed rattlesnake (*C. willardi*), Sonoran mountain king snake (*Lampropeltis pyromelana*), Sonoran gopher snake (*Pituophis catenifer affinis*), and Sonoran whipsnake (*Coluber bilineatus*) (Sam Houston State University 1996). Two native turtles are found on the Fort, the ornate box turtle (*Terrapene ornata*) and the Sonora mud turtle (*Kinosternon sonoriensi*). The box turtle is a terrestrial species that is found throughout the grasslands and canyons. The mud turtle is an aquatic species of turtle that is found in the ponds and creeks on the Fort.

The DoD partners with various other federal agencies, via a memorandum of agreement, to carry out the mission of Partners in Amphibian and Reptile Conservation (PARC). The purpose of PARC is to "conserve amphibians, reptiles, and their habitats as integral parts of our ecosystems and culture through proactive and coordinated public/private partnerships" (Appendix 7). The goal of DoD PARC is to support herpetofauna management and conservation goals which will assist with no net loss in military mission capability while enhancing training and testing capabilities to the maximum extent practicable. In furtherance of this agreement, the DoD PARC program supports installation program managers in the management of herpetofauna at the installation-level. In 2021, DoD PARC and installation biologists conducted a three-day survey of installation's herpetofauna. This survey added one previously undocumented species to installation's species list.

The Fort has managed against aquatic invasives for a long period of time; however, annual bullfrog management activities were first initiated in 2012. This recent work has reduced the presence of the bullfrog to the exception rather than the rule. Between 2012 and 2015, 113 bullfrogs were removed (XCEL 2015a, 2015b, North Wind and ENRD 2016) and annual surveys since 2015 have documented from 0 to 2 bullfrogs installation-wide (North Wind and ENRD 2018). Two federally-listed amphibians, the Sonora tiger salamander and the Chiricahua leopard frog, and one federally-listed reptile, the Northern Mexican gartersnake (*Thamnophis eques megalops*), occur or have occurred on the Fort. The Arizona Treefrog, recently deemed unwarranted for protection under the ESA, remains a special status species and is designated as a Tier 1 SGCN (AGFD 2012). These species are further discussed in Section 2.3.4.

Birds

The Huachuca Mountains support an incredible number of populations of 26 species of conservation concern, as discussed in Section 2.3.4 (Birds of Conservation Concern), some of which are found only in the U.S. in the border "Sky Island" mountain ranges of southeastern Arizona. The Huachuca's also support rare neo-tropical species found only in the most southern Sky Island Mountains of Arizona. The Huachuca's support a possibly greater taxa diversity, in this single connected habitat gradient, than anywhere in the U.S. For example, 15 species of hummingbirds, 9 species of owls, the largest number of breeding pairs of elegant trogons in the U.S., and likely the largest population of whiskered screech-owl. The *Birds of Fort Huachuca - An Informational Checklist* (Breland 1981) identifies 313 bird species found on the installation, including 48 families representing 18 orders. These include 254 neo-tropical migrants that spend some time on the installation. A checklist has also been published by ENRD (ENRD 2007). The canyons on the Fort are heavily visited by the birding public, and species lists are available on the online repository eBird.

Some of the more common or conspicuous bird species include the Mexican jay (*Aphelocoma ultramarina*), Steller's jay (*A. coerulescens*), bridled titmouse (*Baeolophus wollweberi*), American redstart (*Myioborus pictus*), gray vireo (*Vireo vicinior*), warbling vireo (*V. gilvus*), gray flycatcher (*Empidonax wrightii*), vermilion flycatcher (*Pyrocephalus rubinus*), summer tanager (*Ipiranga rubra*), yellow warbler (*Dendroica petechia*), and elegant trogon (*Trogon elegans*). The northern buff-breasted flycatcher (*Empidonax fulvifrons pygmaeus*) has a limited distribution in the U.S., but sustains a well-known breeding population in Sawmill Canyon. Common game birds include the mourning dove (*Zenaida macroura*), white-winged dove (*Z. asiatica*), Gambel's quail (*Lophortyx gambelli*), scaled quail (*Callipepla squamata*), Montezuma quail (*Cyrtonyx montezumae*), and Gould's wild turkey (*Meleagris gallapavo mexicana*) (Sam Houston State University 1996).

The installation was part of a coordinated effort to document breeding birds in Arizona between the years of 1993-2000. This work was published in the 2005 *Arizona Breeding Bird Atlas*. Many research projects have added to the information available on bird species that occur on the Fort, several in cooperation with AGFD. Elegant trogon surveys and research in riparian and upland forest habitat (Hall 1996), and buff-breasted flycatcher surveys and research in pine-oak and mixed conifer habitat (Corman and Wise-Gervais 2005) provide much information on forest breeding bird species. Historical studies of ecological effects of grassland fire (Aid 1990) and more recent work on the response of grassland birds to differing degrees of non-native plant invasion (Andersen and Steidl 2019) have provided important information. Montezuma quail habitat use and development of quail census methods were studied by AGFD through 2000. Gould's turkey habitat use has been analyzed, mapped, and modeled, and results are available for planning habitat improvements (Heffelfinger et al. 2000). Turkey surveys along established routes have been performed on the installation and surrounding areas in cooperation with AGFD

Table 2-5 Herptiles of Fort Huachuca

Common Name	Scientific Name	Presence
Red-spotted Toad	<i>Anaxyrus punctatus</i>	Confirmed
Woodhouse's Toad	<i>Anaxyrus woodhousii</i>	Confirmed
Canyon Treefrog	<i>Hyla arenicolor</i>	Confirmed
Arizona Treefrog	<i>Hyla wrightorum</i>	Confirmed
American Bullfrog	<i>Lithobates catesbeianus</i>	Confirmed
Chiricahua Leopard Frog	<i>Lithobates chiricahuensis</i>	Confirmed
Couch's Spadefoot	<i>Scaphiopus couchii</i>	Confirmed
Mexican Spadefoot	<i>Spea multiplicata</i>	Confirmed
Canyon Spotted Whiptail	<i>Aspidoscelis burti</i>	Confirmed
Sonoran Spotted Whiptail	<i>Aspidoscelis sonorae</i>	Confirmed
Little Striped Whiptail	<i>Aspidoscelis inornata arizonae</i>	Confirmed
Desert Grassland Whiptail	<i>Aspidoscelis uniparens</i>	Confirmed
Elegant Earless Lizard	<i>Holbrookia elegans</i>	Confirmed
Madrean Alligator Lizard	<i>Elgaria kingii</i>	Confirmed
Zebra-tailed Lizard	<i>Callisaurus draconoides</i>	Newly Confirmed
Mediterranean Gecko	<i>Hemidactylus turcicus</i>	Confirmed
Gila Monster	<i>Heloderma suspectum</i>	Confirmed
Greater Short-horned Lizard	<i>Phrynosoma hernandesi</i>	Confirmed
Regal Horned Lizard	<i>Phrynosoma solare</i>	Confirmed
Mountain Skink	<i>Plestiodon callicephalus</i>	Confirmed
Great Plains Snake	<i>Plestiodon obsoletus</i>	Confirmed
Clark's Spiny Lizard	<i>Sceloporus clarkii</i>	Confirmed
Yarrow's Spiny Lizard	<i>Sceloporus jarrovii</i>	Confirmed
Bunchgrass Lizard	<i>Sceloporus scalaris</i>	Confirmed
Eastern Fence Lizard	<i>Sceloporus undulatus</i>	Confirmed
Ornate Tree Lizard	<i>Urosaurus ornatus</i>	Confirmed
Sonora Tiger Salamander	<i>Ambystoma mavortium stebbinsi</i>	Confirmed
Barred Tiger Salamander	<i>Ambystoma mavortium</i>	Confirmed
Sonoran Whipsnake	<i>Coluber bilineatus</i>	Confirmed
Coachwhip	<i>Coluber flagellum</i>	Confirmed
Western Diamond-backed Rattlesnake	<i>Crotalus atrox</i>	Confirmed
Rock Rattlesnake	<i>Crotalus lepidus</i>	Confirmed
Western Black-tailed Rattlesnake	<i>Crotalus molossus</i>	Confirmed
Twin-spotted Rattlesnake	<i>Crotalus pricei</i>	Confirmed
Mohave Rattlesnake	<i>Crotalus scutulatus</i>	Confirmed
Ridge-nosed Rattlesnake	<i>Crotalus willardi</i>	Confirmed
Ring-necked Snake	<i>Diadophis punctatus</i>	Confirmed
Coast Nightsnake	<i>Hypsiglena ochrorhyncha</i>	Confirmed
Common Kingsnake	<i>Lampropeltis getulus</i>	Confirmed
Pyro Mountain Kingsnake	<i>Lampropeltis pyromelana</i>	Confirmed
Sonoran Coralsnake	<i>Micruroides euryxanthus</i>	Confirmed
Sonoran Gopher snake	<i>Pituophis catenifer affinis</i>	Confirmed
Long-nosed Snake	<i>Rhinocheilus lecontei</i>	Confirmed
Eastern Patch-nosed Snake	<i>Salvadora grahamiae</i>	Confirmed
Chihuahuan Black-headed Snake	<i>Tantilla wilcoxi</i>	Confirmed

Common Name	Scientific Name	Presence
Black-necked Gartersnake	<i>Thamnophis cyrtopsis</i>	Confirmed
Mexican Gartersnake	<i>Thamnophis eques megalops</i>	Confirmed
Checkered Gartersnake	<i>Thamnophis marcianus</i>	Confirmed
Western Lyresnake	<i>Trimorphodon biscutatus</i>	Confirmed
Massassauga	<i>Sistrurus catenatus</i>	Confirmed
Sonoran Mud Turtle	<i>Kinosternon sonoriense</i>	Confirmed
Ornate Box Turtle	<i>Terrapene ornata</i>	Confirmed
Red-eared Slider	<i>Trachemys scripta elegans</i>	Confirmed

and other groups, both historically and currently (Abbate 2017). Cowbird populations and their potential impacts to threatened and endangered species, particularly the southwestern willow flycatcher, have been studied by independent researchers. Independent research on the effects of varying degrees of non-native grass invasion on songbirds has been conducted (2013 and 2015). Grassland birds also face encroachment of woody vegetation into their grassland habitat, primarily from mesquite. While overall occupancy and species richness of breeding birds tends to increase with woody encroachment, obligate grassland birds have shown a relatively consistent decrease in both occurrence and abundance. Facultative grassland birds tended to increase occupancy in early stages of encroachment, when the presence of shrubs provided perches and nesting sites. Non-grassland birds have shown varying occupancies throughout levels of encroachment, with occupancy tending to increase (Andersen and Steidl 2019). Mexican spotted owl research and monitoring has been conducted on the Fort since 1990. This research has provided locally specific data, contributed to the differentiation between subspecies, and provided insight into the degree of genetic diversity within subspecies (Haig et al. 2001, 2004, Barrowclough 2006). Southwestern willow flycatcher and opportunistic yellow-billed cuckoo surveys were conducted along the SPRNCA and on the Fort between 2000 and 2012.

Raptors are a highly important components of properly functioning ecosystems. Arizona hosts 39 species of raptor, 26 in the order Falconiforms (kites eagles, hawks, and falcons) and 13 in the order Strigiformes (owls) (Glinski 1998). The Fort is known to host at least 23 of these (Table 2-6). This is due to the variety of habitat types contained within the installation's boundary, and the Fort's focus on conservation of these resources through ecosystem rather than a single species management approach. Efforts to manage and conserve suitable quality and quantity of these habitat types is documented in plans, project assessment documents, and management actions (e.g., High Elevation Fuels Management (Hollingsworth 2014) and grassland management (Collins et al. 2005).

Waterfowl commonly occurring on the Fort include surface-feeding ducks which use available bodies of water, and diving ducks that use several of the larger ponds. The most common surface feeders include the mallard (*Anas platyrhynchos*), green-winged teal (*A. carolinensis*), and northern shoveler (*Spatula clypeata*). The most common divers include ring-necked duck (*Aythya collaris*) and ruddy duck (*Oxyura jamaicensis*). The American coot (*Fulica americana*) is widespread and common on the installation. The most commonly observed wading and shorebirds are the great blue heron (*Ardea herodias*), white-faced ibis (*Plegadis chihi*), common snipe (*Capella gallinago*), and various other sandpipers and plovers.

Table 2-6 Raptors of Fort Huachuca

Species	Latin name	Habitat
Golden Eagle	<i>Aquila chrysaetos</i>	d,g,s,w
Northern Harrier	<i>Circus hudsonius</i>	a,g
Sharp-shinned Hawk	<i>Accipiter striatus</i>	f,r,w
Cooper's Hawk	<i>Accipiter cooperia</i>	d,f,r,s,w
Gray Hawk	<i>Buteo plagiatus</i>	r,w
Swainson's Hawk	<i>Buteo swainsoni</i>	a,g,s
Zone-tailed Hawk	<i>Buteo albonotatus</i>	d,f,g,r,s,w
Prairie Falcon	<i>Falco mexicanus</i>	a,d,f,g,r,s,w
Red-tailed Hawk	<i>Buteo jamaicensis</i>	r,w
Northern Goshawk	<i>Accipiter gentilis</i>	f,r,w
Ferruginous Hawk	<i>Buteo regalis</i>	a,g
Merlin	<i>Falco columbarius</i>	a,g,s
Peregrine Falcon	<i>Falco peregrinus</i>	a,d,f,g,l,r,s,w
American Kestrel	<i>Falco sparverius</i>	a,d,f,g,r,w,w
Great Horned Owl	<i>Bubo virginianus</i>	d,f,g,r,s,w
Barn Owl	<i>Tyto alba</i>	a,d,g,r,s
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	f,r,w
Long-eared Owl	<i>Asio otus</i>	a,d,f,g,r,s,w
Northern Pygmy-Owl	<i>Glaucidium gnoma or Glaucidium californicum</i>	f,r,w
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	f,r,s,w
Whiskered Screech-Owl	<i>Megascops trichopsis</i>	d,f,r,s,w
Western Screech-Owl	<i>Megascops kennicottii</i>	d,f,r,s,w
Elf Owl	<i>Micrathene whitneyi</i>	d,r,s,w

Table modified from Glinski (1998) using sightings documented on eBird within the last 10 years and unpublished Fort Huachuca data. Habitat: a=agriculture; d=desert; f=forest; g=grassland; l=lake; r=riparian; s=scrublands; w=woodland

Mammals

Large mammals on the Fort include the Coues white-tailed deer (*Odocoileus virginianus couesi*), desert mule deer (*O. hemionus eremicus*), Chihuahuan pronghorn antelope (*Antilocapra americana*), collared peccary or javelina (*Pecari tajacu*), mountain lion (*Puma concolor*), jaguar (*Panthera onca*), and black bear (*Ursus americanus*). Large mammal surveys, outside of game surveys, have been conducted for only a small number of species. From 1989 to 2009 the Fort conducted an annual track count, where volunteers were trained in monitoring techniques. A regional conservation group coordinated the training and monitoring event, which was led by biologists from around the southwest. These independent wildlife scientists performed data management and analysis. Each June, standard routes were used to perform track counts and teach the techniques needed to monitor presence of bear and mountain lion. This effort and expertise also provided information on other infrequently seen species, and could be used to survey for rare carnivores that may occur on the installation. Since 2013 the Fort has maintained a felid monitoring program, based entirely on photo-stations.

Common small to medium-sized mammals include the desert cottontail (*Sylvilagus auduboni*), eastern cottontail (*S. floridanus*), black-tailed jackrabbit (*Lepus californicus*), antelope jackrabbit (*L. alleni*), spotted ground squirrel (*Spermophilus spilosoma*), rock squirrel (*S. variegatus*), Huachuca gray squirrel (*Sciurus arizonensis huachuca*), hooded skunk (*Mephitis macroura*), striped skunk (*M. mephitis*), spotted skunk (*Spilogale gracilis*), hog-nosed skunk (*Conepatus*

mesoleucus), Sonoran opossum (*Didelphis virginiana californica*), coati (*Nasua narica*), ringtail (*Bassariscus astutus*), raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), and gray fox (*Urocyon cinereoargenteus*) (Sam Houston State University 1996).

The ocelot (*Leopardus pardalis*), a federally listed species, was documented again on the installation in 2013 and has been documented consistently since that time. The black-tailed prairie dog (*Cynomys ludovicianus*) occurred on or adjacent to the Fort until 1938, and potential habitat still exists on the South and West ranges (AGFD 1999). Less common mammals include the cliff chipmunk (*Tamias dorsalis*). The cliff chipmunk is the first species of chipmunk known to the Huachuca Mountains. This species was first identified from a specimen collected while conducting bat monitoring in 2003 (Sidner and Stone 2005). A live specimen was subsequently documented within the Huachuca's, outside of the Fort's boundaries in 2010 (Cudworth and Koprowski 2010), and the species has been documented with increasing frequency on the Fort since 2012.

A number of UA graduate projects have been conducted on small to medium-sized mammals to include the gray squirrel and coati. With the exclusion of bats, small mammals have not been inventoried comprehensively in the past two decades. Hoffmeister's work (1986) was the last extensive survey of the area; however, mammal data have been collected in certain vegetation types (Steidl et al. 2002, Litt and Steidl 2011). Work conducted by Morrison et al. (1995) found the Arizona shrew (*Sorex arizonae*), a SGCN, occurs in limited areas of montane riparian habitat in Garden, Huachuca, and Blacktail canyons. The Fort's small mammal monitoring program, initiated in 2017 and designed to assess the effects of high elevation thinning, is yielding useful information. Mexican long-tongued bats were fitted with radio transmitters in 1999 to monitor foraging behavior and use of agave. Intensive research on skunk was initiated in 2000 under an AGFD Heritage grant. AGFD Heritage funding also supported detailed research on Arizona shrews and Arizona gray squirrels on and near the Fort. A focused effort on small mammal populations was part of a grassland fire effects investigation initiated in 2000.

Mines and natural caves on the installation provide roosting habitat for bats. Bats also use the many cliff faces and rocky ledges of mountain ranges for roosting sites. Annual monitoring has documented at least 17 species of bat on the installation (Buecher 2020), seven of these are identified as Arizona SGCN as referenced in Section 1.9.1. Documented species include the lesser long-nosed, cave myotis (*Myotis velifer*), Mexican long-tongued bat (*Choeronycteris mexicana*), Western red bat (*Lasiurus blossevillii*), Western yellow bat (*Lasiurus xanthinus*), Southwestern myotis (*Myotis auriculus*), Mexican free-tailed bat (*Tadarida brasiliensis*), big brown bat (*Eptesicus fuscus*), California myotis (*Myotis californicus*), canyon bat (*Parastrellus hesperus*), fringed myotis (*Myotis thysanodes*), hoary bat (*Lasiurus cinereus*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), silver-haired bat (*Lasionycteris noctivagans*), long-legged myotis (*Myotis volans*), and Western small-footed bat (*Myotis ciliolabrum*). The Fort continues to collaborate with the research community and other federal and state agencies to further the state of science on bat movement, disease, and distribution through the following activities: collaboration with an on-going passive integrated transponder (PIT) tagging project in Southeastern Arizona. This work identifies any tagged species of bat, and has already provided useful information on the local movement of LLNB between USFS lands and the Fort during the 2018 pilot study. This work provides important information regarding foraging behaviors and ranging distances of post-maternity LLNB and other likely tagged species. The Fort continues collaboration with Northern Arizona University and USGS to sample bat hibernacula for *Pd*. The Fort is also collaborating with USGS as a NABat Monitoring Program site. These projects provide information and benefit to all bat species. The Fort strives for multi- rather than single-species management, therefore the LLNB has historically served as an umbrella species and a funding source for this entire guild.

ENRD monitors big game harvest by utilizing a mandatory hunter self-check-in station. In addition, harvest metrics are collected during the sign out process on the Fort Huachuca iSportsman website (<https://fthuachuca.isportsman.net>) for all species harvested on the installation. Harvest data, including the number of animals, weight, general age, number of antler points for bucks, harvest area, and hunter effort, are collected for deer and antelope. Probably the most useful harvest data collected is the weight of yearling male deer, which gives an indication of habitat conditions. Harvest data including number of animals, weight, sex, general age, harvest area, and hunter effort are collected for javelina, black bear, mountain lion and Gould's turkey. Fort Huachuca also assists AGFD with premolar tooth extraction and tissue sample for black bear and mountain lion harvests. Hunting permits are sold via the iSportsman website.

Small game species are not monitored directly, but hunter sign-out sheets collect data on number of hunter days by species or group of species. These records are filed, but data have not been analyzed.

2.3.3 Wetlands and Riparian Areas

A National Wetlands Inventory of Fort Huachuca was completed in 2000 for the entire installation (USFWS 2000). The Fort contains 64 acres of wetlands and 770 acres of riparian habitat. This acreage amounts to about 1% of the installation's total area. Palustrine unconsolidated bottom wetlands are the predominant type, representing about 65% of the installation's wetlands. The next most common wetland type is palustrine emergent wetlands totaling 13 acres.

The predominant riparian type is emergent alkali sacaton, totaling 188 acres or 24% of the riparian vegetation. Linear wetlands and riparian habitats account for 275 miles including rivers, streams, and vegetated habitats (2.1 miles of wetlands and 69.6 miles of riparian and 203 miles of rivers and streams respectively). About 79% of linear features depicted on the maps are intermittently flooded stream beds (USFWS 2000). Garden and Huachuca canyons support most of the riparian habitat at the Fort.

South Range

Several riparian zones are found on the South Range. Madrean Riparian Deciduous Forests are of the Mixed Broadleaf-Mixed Conifer Series and are associated with Garden, Scheelite, Sawmill and McClure canyons. Proportions of dominant trees vary but include: bigtooth maple (*Acer grandidentatum*), Douglas-fir (*Pseudotsuga menziesii*), Arizona sycamore (*Platanus wrightii*), Fremont cottonwood (*Populus fremontii*), Arizona walnut (*Juglans major*), Goodding's willow (*Salix gooddingii*), Chihuahuan ash (*Fraxinus papillosa*), Arizona madrone (*Arbutus arizonica*), Arizona white (*Quercus arizonica*), silverleaf (*Quercus hypoleucoides*), netleaf (*Quercus reticulata*), and canyon live (*Quercus chrysolepis*) oaks. Shrub and vine species include: canyon grape (*Vitis arizonica*), Virginia creeper (*Parthenocissus quinquefolia*), New Mexico raspberry (*Rubus neomexicana*), western white honeysuckle (*Lonicera albiflora*), skunkbush sumac (*Rhus trilobata*), Wilcox's barberry (*Berberis wilcoxii*), smooth sumac (*Rhus glabra*), western poison ivy (*Toxicodendron rydbergii*), arroyo willow (*Salix lasiolepis*) and birchleaf buckthorn (*Frangula betulifolia*). Common forbs and grasses include: deergrass (*Muhlenbergia rigens*), nodding brome (*Bromus anomalus*), fringed brome (*Bromus ciliatus*), bulb panic grass (*Panicum bulbosum*), Fendler's meadow rue, woodsorrel, golden columbine (*Aquilegia chrysantha*), Rothrock's basketflower (*Centaurea rothrockii*), hummingbird trumpet (*Epilobium canum*), coralbells (*Heuchera sanguinea*), Chiricahua mountain larkspur (*Delphinium andesicola*), and wormwood (*Artemisia dracuncululus*). The streams within these riparian forests are often bordered by marsh vegetation including giant sedge (*Carex ultra*), horsetails (*Equisetum* ssp.), scarlet monkeyflower (*Mimulus cardinalis*), and various other sedges (*Carex* ssp.) and rushes (*Juncus* ssp.). Watercress, an alien species (*Rorippa nasturtium-aquaticum*), is often abundant in these

marshes. Less prevalent marsh species include Santa Rita mountain aster (*Aster potosinus*), Huachuca water umbel (*Lilaeopsis schaffneriana* subspecies *recurva*), and Chiricahua dock (*Rumex orthoneurus*).

Interior Southwestern Riparian Deciduous Forests are dominated by Arizona sycamore, Fremont cottonwood, Arizona walnut, Goodding's willow, velvet ash (*Fraxinus velutina*), western soapberry (*Sapindus saponaria* variety *drummondii*), desert willow (*Chilopsis linearis*), netleaf hackberry (*Celtis laevigata* variety *reticulata*) and alligator juniper. Shrubs include those found in Madrean Riparian Forests except that cat-claw mimosa (*Mimosa aculeaticarpa* variety *biuncifera*), littleleaf sumac (*Rhus microphylla*), Chihuahuan brickellbush (*Brickellia floribunda*) and mule's fat (*Baccharis salicifolia*) may also be common. Many of the same forbs and grasses of Madrean riparian forests are also found here.

West Range

Riparian forests of the West Range differ in the two main canyons - Huachuca and Blacktail. Huachuca Canyon contains Interior Southwestern Riparian Deciduous Forests and Rocky Mountain Riparian Deciduous Forests. The latter is not found in any of the canyons of the South Range. Blacktail Canyon contains Rocky Mountain Riparian Deciduous Forests, Madrean Riparian Deciduous Forests and Interior Southwestern Riparian Deciduous Forests. The latter are found near Antelope Pond and on lower Blacktail, Slaughtertown, and Huachuca creeks.

Rocky Mountain Riparian Deciduous Forests are similar to Madrean Riparian Forests but also contain box elder (*Acer negundo*) and lack bigtooth maple and Douglas-fir. This type of forest is only found on the Fort in segments of Blacktail Canyon and an area in Huachuca Canyon around Moss Falls. Many of the same shrub types are found here that are characteristic of Madrean Riparian Forests. An additional species in the Rocky Mountain type is oceanspray (*Holodiscus discolor*). Likewise, many of the grasses and forbs are found in both riparian forests. In Rocky Mountain Riparian Forests, one can sometimes find Columbian monkshood (*Aconitum columbianum*), darkthroat shootingstar (*Dodecatheon pulchellum*), and lemon lily (*Lilium parryi*).

East Range

The intermittent washes of the East Range are occupied by xero-riparian communities. Interior Southwestern Riparian Deciduous Forest, Woodland of Mesquite Bosques, and the Mixed Broadleaf Series are extensive. There are also areas of Riparian Scrub of the Sumac-Sacaton Series on the floodplains (*Rhus microphylla*-*Sporobolus wrightii* Association).

2.3.4 Special Status Species

Special status species are threatened, endangered, candidate, or proposed for listing under the ESA, and AGFD species of concern. The Fort's PBA (Leidos 2013) provides an in-depth analysis of most of the threatened, endangered, proposed, and candidate species known to occur, or which have occurred, on the Fort and on the SPRNCA (Table 2-7). Although the Fort is not required by the ESA to consider candidate species, management/conservation consideration for candidate species can help preclude the need to list the species and avoid potential mission impacts and funding requirements for compliance.

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. Under the previous regulations, the USFWS had issued a "blanket 4(d) rule" that automatically extended to threatened species the same prohibitions that endangered species get unless a species-specific 4(d) rule was put into place (typically to give specific protections to the newly listed species). Under the new regulation (84 FR 44753), the USFWS has removed the blanket rule so that now every newly listed threatened

species must have a species-specific 4(d) rule that defines prohibited actions and protections on a case-by-case basis. Candidate species are those which the USFWS has enough information on file to propose listing as threatened or endangered, but listing has been precluded by other agency priorities. Proposed species are those proposed in the Federal Register (FR), but a final decision has not been made. A generalized depiction of threatened and endangered species and critical habitat on the Fort is provided in Figure 2.16.

Species of concern are those identified by the State of Arizona, which has regulatory authority over a number of species which occur on the Fort. At the state-level, the lawful take of some wildlife species listed in the SWAP are regulated (e.g., closed or open season, time of year, bag limit) by AGFD Commission Orders. Species identified as SGCN are identified as species of concern. The ADA administers the Arizona Native Plant Law, which designates species with diminishing populations or populations at risk. Designations include highly safeguarded species, salvage restricted, export restricted, salvage assessed, and harvest restricted. Collection of highly safeguarded species is prohibited without a permit from the ADA (ADA 2004).

Huachuca Water Umbel

The Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *recurva*) (water umbel) was listed as an endangered plant in 1997 (62 FR 665), and is classified as a “high concern” by the Arizona Rare Plant Advisory Group (ARPA 2014). A total of 51.7 miles of streams or rivers in Cochise and Santa Cruz counties, Arizona, are designated as critical habitat (64 FR 37441), including 3.8 miles in the Garden Canyon watershed on the Fort and 33.7 miles in the upper San Pedro floodplain (USFWS 2017c). The Huachuca water umbel is an herbaceous, semi-aquatic to aquatic, perennial plant belonging to the parsley family. It has bright yellow-green, cylindrical, hollow leaves with no pith, and typically borne two or three per node, having septa (thin partitions) at regular intervals. The flowers of this plant (3 to 10) are very small and are borne on an umbel shorter than the leaves, arising from the root nodes. This plant is found at elevations of 2,001 to 7,100 ft AMSL and requires perennial water or moisture, gentle stream gradients, small- to medium-sized drainage areas, and muddy or silty substrates with some organic content (USFWS 2017c).

Huachuca water umbel has an opportunistic life-history strategy that ensures its survival in healthy riparian systems of cienegas, wetlands, and low gradient streams. In the upper portions of watersheds, where scouring floods generally do not occur, water umbel occurs in higher density when interspecific plant competition is low. In stream and river habitats, this plant can occur in side channels and backwaters. It appears that this species is best adapted to periodic, low-intensity disturbances (Warren et al. 1991b). Density of umbel plants and population sizes fluctuate in response to both flood cycles and site characteristics.

Huachuca water umbel had previously been documented at 50 sites in Arizona and Sonora, Mexico, west of the continental divide (EEC 2007), presently only 38 sites are known to exist (USFWS 2017c). This species has been extirpated from 8 of the 50 sites (USFWS 2017c). Areas within southeastern Arizona known to have populations of the water umbel include: 1) SPRNCA, 2) Santa Cruz River watershed including Bear Canyon, Lone Mountain Canyon, Scotia Canyon, and Sunnyside Canyon, 3) four springs in the Canelo Hills or San Rafael Valley, 4) two springs near Sonoita Creek, all on the west side of the Huachuca Mountains; 5) the Rio Yaqui watershed including San Bernardino National Wildlife Refuge and Leslie Canyon National Wildlife Refuge; 6) the Garden Canyon watershed on the Fort, including Garden Canyon, Sawmill Canyon, and McClure Canyon, 7) Bingham Cienega (EEC 2008a), and 8) Babocomari (Ibid).

Figure 2.16 Sensitive Species and Critical Habitat on Fort Huachuca

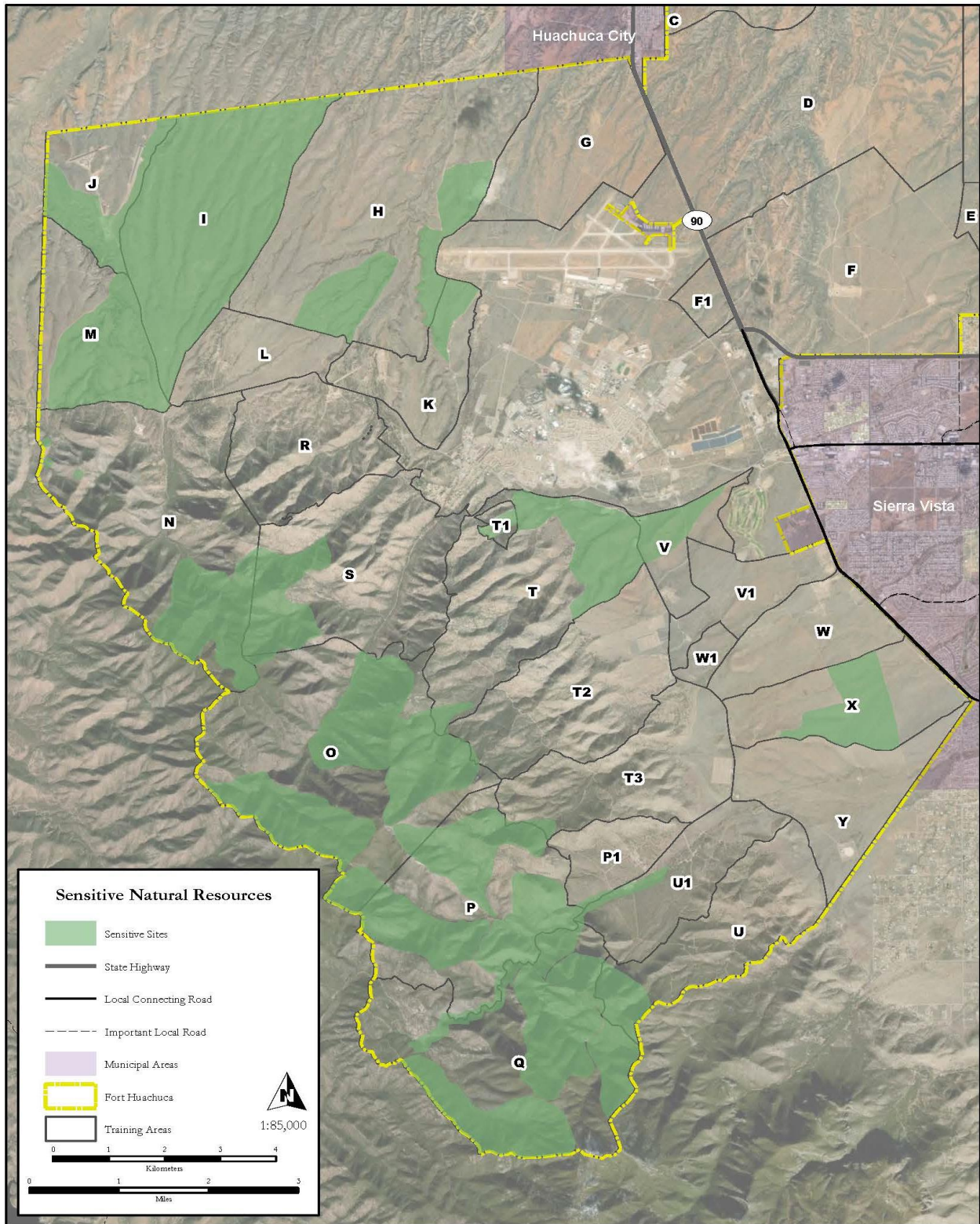


Table 2-7 Threatened, Endangered, and Candidate Species and Their Occurrence at Fort Huachuca and the SPRNCA

Species	Federal Status	Occurrence	
		Fort Huachuca	SPRNCA
PLANTS			
Huachuca water umbel (<i>Lilaeopsis schaffneriana</i> ssp. <i>recurva</i>)	Endangered	1	4
Lemmon fleabane (<i>Erigeron lemmonii</i>)	CCA	1	6
Beardless Chinchweed (<i>Pectis imberbis</i>)	Proposed Endangered	2	5
Bartram's stonecrop (<i>Graptopetalum bartramii</i>)	Proposed Threatened	2	5
Arizona Eryngo (<i>Eryngium sparganophyllum</i>)	Endangered	2	4
INVERTEBRATES			
Huachuca springsnail (<i>Pyrgulopsis thompsoni</i>)	CCA	1	5
BIRDS			
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened	1	6
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Endangered	3	4
Yellow-billed cuckoo DPS (<i>Coccyzus americanus</i>)	Threatened	1	4
MAMMALS			
*Lesser long-nosed bat (<i>Leptonycteris yerbabuena</i>)	Delisted	1	6
Jaguar (<i>Panthera onca</i>)	Endangered	1	5
Ocelot (<i>Felis pardalis</i>)	Endangered	1	5
AMPHIBIANS			
Sonora tiger salamander (<i>Ambystoma mavortium stebbinsi</i>)	Endangered	1	6
Chiricahua leopard frog (<i>Lithobates chiricahuensis</i>)	Threatened	1	5
REPTILES			
Northern Mexican gartersnake (<i>Thamnophis eques megalops</i>)	Threatened	2	6
FISH			
Gila chub (<i>Gila intermedia</i>)	Endangered	3	5
Spikedace (<i>Meda fulgida</i>)	Endangered	3	5
Gila topminnow (<i>Poeciliopsis occidentalis occidentalis</i>)	Endangered	3	5
Desert pupfish (<i>Cyprinodon macularius</i>)	Endangered	3	5
Loach minnow (<i>Tiaroga cobitis</i>)	Endangered	3	5

*Species recently de-listed, but continues to be managed under a post-delisting monitoring plan
Occurrence Status:

1. Species occurs on Fort Huachuca
2. Potential habitat is present but species currently not known to occur on Fort Huachuca
3. Suitable habitat no longer present; species historically present, but not currently known to occur on Fort Huachuca
4. Species occurs on SPRNCA
5. Potential habitat present, species may have occurred historically, but not known to occur on SPRNCA
6. No potential habitat present and species is not known to occur on SPRNCA

Prior to 1988, this plant was known from only seven locations in southern Arizona (Warren and Reichenbacher 1991). Outside of Arizona, in northern Sonora, the water umbel has been found at 21 localities including populations in the Santa Cruz, San Pedro, Rio Yaqui, Rio Sonora, and Rio Concepcion watersheds (USFWS 2017c).

Water umbel has been documented in Garden Canyon since 1958 (EEC 2001b) and in Sawmill Canyon since 1979 (Tandy 1997). Warren and Reichenbacher (1991) surveyed the Fort for rare plant species from June to September 1989, and located water umbel in upper Garden Canyon and at Sawmill Spring. Microhabitats where the plants were found were low-gradient cienega habitats with apparently permanent water and stable, non-eroded channels. The population in McClure Canyon was documented in 1997. Since 2000, nine monitoring efforts have been completed in these three watersheds (2001, 2002, 2003, 2004, 2006, 2008, 2011, 2016, and 2019). Installation inventories of potential habitat were completed in 1999, 2002, and 2005, 2009, and 2013. Water umbel continues to be found in new areas within these watersheds (Vernadero 2009a, ENRD 2012, ENRD 2013, ENRD 2019).

Water umbel has been documented in the SPRNCA since 1994. Mark Fredlake (BLM, Sierra Vista) and Peter Warren and Dave Gori (The Nature Conservancy [TNC], Tucson) located 43 patches of Huachuca water umbel during 1995 and 1996 (EEC 2002a). Haas and Frye (1997) identified eight additional patches in 1997. These patches were found in six disjunct areas, including approximately two miles downstream of Fairbank; near Brunchow Hill upstream of Charleston; in the river at Lewis Springs; approximately one-mile north and south of Highway 90; approximately 2.5 miles downstream of Highway 90; and from Hereford Bridge north for approximately one mile. Haas and Frye (1997) also documented the species on the SPRNCA approximately one-half mile south of the international boundary. Since 2001, eight surveys have been conducted along the 31.7 miles of designated critical habitat within the SPRNCA (2001, 2004, 2007, 2008, 2009, 2010, 2015, and 2018). A total of 43 meta-populations, including 17 new locations when compared with BLM records dated 1995-1999, were identified in 2001 (EEC 2002a). Surveys in 2004 documented 30 meta-populations within the SPRNCA. Fourteen of the 30 meta-populations appear to be located at previously documented sites in 2001 (EEC 2005). Surveys in 2007 documented 28 historic water umbel meta-populations and 12 new meta-populations. The 2007 inventories revealed the continued persistence of the water umbel at some sites, including 14 re-documented 2004 and 12 re-documented 2001 meta-populations. The water umbel occupancy along the SPRNCA between 2004 and 2007 appeared relatively stable (EEC 2008a). Surveys in 2008 documented 29 meta-populations, of which 21 were re-documented and 8 were new sites (Vernadero 2009b). Surveys in 2009 identified 63 meta-populations (Vernadero 2010a) while surveys in 2010 yielded 44 (Vernadero 2011a). Forty-five meta-populations (24 new) were documented in 2015. Surveys in 2018 were truncated due to unseasonal weather conditions. A large rainfall event occurred during the month of October causing flooding and high turbidity. Substantially fewer meta-populations were observed in those areas surveyed, and significant habitat degradation was observed. For example, a non-native invasive grass species, Johnson grass (*Sorghum halepense*), had moved from the flood plain, as observed in previous years, into large sections of the channel and its banks. This grass was observed to reach 8 -12 ft and taller, and spanned 100's of meters from the channel along the floodplain, during the 2018 survey. The increased distribution of Johnson grass on the flood plain, along the banks, and within the channel, has substantially increased the fuel load and potential fire severity along the SPRNCA. The roots of this grass appear to be undermining the soil structure along the river's banks, rather than acting as a soil stabilizer. A marked degree of bank sloughing and erosion, due to dry and cracking soil, invasive grass, and cattle, was observed.

Four threats to the species are identified in the recovery plan: aquatic habitat degradation, including unsustainable groundwater withdrawal; the effects of drought and climate change;

wildfire and resulting sedimentation and scouring; invasive non-native plant competition; and poorly managed livestock grazing (USFWS 2017c). Erosion and stability of perennial water systems are the primary management factors of concern for this species. Excessive rates of erosion and disturbance near a site from wildfires, recreational use, livestock use, or road construction could increase the chance of a flash flood that could scour a population. The increased rate of competition from nonnative species is reducing potential habitat for water umbel (EEC 2008a, Vernadero 2009a, Vernadero 2009b, Vernadero 2009a, USFWS 2017c). Watercress, an invasive aquatic plant, was observed to rapidly increase at water umbel sites in the early 2000s (Vernadero 2009a, Vernadero 2010a). At least six management and mapping efforts have been conducted in Garden canyon since 2011 to manage this species (in 2011, 2012, 2015, 2016, 2017, and 2018). Opportunistic management at sites in Huachuca Canyon is conducted by ENRD. The species continues to be present, but at a much lower degree and density than it would have been without management.

In 2008, in coordination with the USFWS and BLM, the Fort implemented a project to collect, propagate, and transplant water umbel (EEC 2008b). The purpose of this project was to guard against the possibility of eradication in the event of a catastrophic disturbance. Water umbel was collected from two sites on the Fort and two sites on the SPRNCA in October of 2007 (EEC 2008b). Transplant efforts were conducted in the spring of 2009 at four sites on the Fort (Vernadero 2010b), and three sites on the SPRNCA in the winter of 2010 (Vernadero 2011b). The original plugs are currently being maintained at the Arizona Sonora Desert Museum. The Desert Botanical Garden's greenhouse continues to maintain a portion of the Fort's propagules. A long term monitoring (LTM) plan was developed, and monitoring has been conducted at transplant sites since 2010. Monitoring has been conducted annually between 2010 and 2015, and has been conducted every three years since 2015. 2019 marked the eighth year of monitoring on the Fort and the seventh year on the SPRNCA. The most recent monitoring survey was conducted in 2019. Monitoring results indicate that introduction efforts continue to be successful at many locations, and has been successful overall with an additional 17 m of occupied habitat on the Fort and an additional 123 m on the SPRNCA as of 2019 (ENRD 2020). Transplanted water umbel is dispersing, increasing in extent at many locations, and is sexually reproducing.

In 2010, the Fort funded a project to collect genetic material from 10 distinct geographically distributed water umbel patches within Arizona and Mexico, and conduct follow-on genetic analysis to assess the degree of genetic diversity within and across populations. Soil and water samples were also collected within specific water umbel patches, in an effort to assess and compare characteristics of soil (nutrients, moisture, temperature, texture, composition, pH, seed content and seed viability) and water chemistry and quality (dissolved oxygen, sodium, hardness, pH, and coliform). Additional habitat variables were collected, to include radiant energy (quality, intensity, and duration of sunlight) and ambient temperature and humidity. This work revealed that populations exhibited low genetic diversity, with most of the observed variability attributed to differences found within populations (Vernadero and DBG 2012). A small percentage of the variability observed was attributed to differences among populations and among watersheds. Populations in close geographic proximity were often most similar genetically; but in some cases geographically distant populations were similar. Variations in habitat characteristics on population size did not prove statistically significant, and support the idea that HWU can tolerate a wide variety of environmental conditions, except de-watering (Vernadero 2012b).

Lemmon Fleabane

The Lemmon fleabane (*Erigeron lemmonii*) was removed from the USFWS's candidate species list in 2012 (77 FR 60509) following the development of the CCA (USFWS & USAGFH 2013). The species continues to be listed as a USFS sensitive plant, and is protected by the Arizona Native

Plant Law of 1993 as a “highly safeguarded” species in Arizona. Although not federally listed, *E. lemmonii* is extremely rare, being known from only from one location, a single canyon on the Fort. The species is the target of ongoing conservation and management efforts by multiple partners.

Lemmon fleabane is a small, flowering, prostrate perennial found in dense clumps on vertical cliffs. This plant has stems that spread 4 to 8 inches in length and the flowers are daisy-like in appearance with white or light-purple outer petals and yellow inner petals at the end of leafy branches (Warren et al. 1991a). This plant is endemic to Scheelite (Warren et al. 1991a), and according to Malusa (2019) has a “seemingly absolute affinity” for Escabrosa limestone. Initial surveys in Scheelite Canyon in 1990 found 414 plants (Malusa 2006). Follow-up surveys in 2006, documented nearly double the amount of plants (954s) on various cliffs in Scheelite and into Garden Canyon, though more time was allocated to searching the area in 2006 (Malusa 2006). Permanent photographic monitoring plots were installed during the 2006 visit. In 2012, a re-census of the permanent plots (6% of the total population) found that two of the original 58 plants had died and six recruits had established, bringing the total census population to 62 suggesting a stable population (Malusa 2012). The area was re-censused in 2019 and there were two recruits and six deaths, for a net loss of 4 plants (Malusa 2019). Malusa found that the 51 survivors, which comprised 88% of the study population, were each at least 13 years old.

In 2010, the DoD’s Legacy Program funded the collection of seeds and genetic material from sensitive plant species on military installations, for the purpose of developing a seed bank and conducting genetic analyses. Lemmon fleabane was a focal species for this project (USFWS 2012c). This work provided the material for additional research to include Edwards et al.’s (2014) work on levels and patterns of genetic variation in *E. lemmonii* and its widespread relative *E. arisolius*. This work found both species to be highly outcrossing and suggested that widespread gene flow is occurring within each species. They found no evidence for inbreeding or a genetic bottleneck in *E. lemmonii*, and noted that the species’ lower genetic diversity, compared that of *E. arisolius*, may be the result of genetic drift. This was followed by Noyes and Bailey’s (2014) work, which assessed reproduction in Lemmon fleabane in a greenhouse setting. They found that isolated lemmon fleabane plants failed to set seed in a greenhouse setting, but that controlled crosses yielded seed. They also found the plant to be easy to propagate in a greenhouse setting, and noted that ex situ propagation would likely not be problematic in the event of a catastrophic event. Hundreds of viable seeds were collected for long-term storage at the Desert Botanical Garden to offset impacts to the species in the event of a devastating wildfire (USFWS 2012c).

The Fort will continue conservation efforts as stated in the signed CCA. The purpose of this CCA is for the Fort to join with the Service to implement conservation measures for *E. lemmonii* that reduce and/or eliminate identified threats and improve the species status, thereby promoting the conservation of the species (USFWS & USAGFH 2012). The Fort will support biological monitoring in accordance with the protocol developed by Malusa (2006).

Beardless Chinchweed

Beardless chinchweed (*Pectis imberbis*) was proposed for listing as an endangered plant with approximately 10,604 acres of proposed critical habitat (in eight units) in 2019 (84 FR 67060). In Arizona, the species has been collected from the Atascosa-Pajarito, Huachuca, Patagonia, and Santa Rita Mountains, and the Canelo Hills, where it has been found from 3,799 to 5,699 ft in elevation. The two known populations in the Huachuca Mountains include Scotia Canyon and Coronado National Memorial. Most of the mountain ranges in the U.S. have been surveyed for the species, and it is unlikely that any large populations remain unaccounted. According to Warren and Reichenbacher (1991), there is an early collection of this species from the Fort. The species was not documented during their 1989-1990 sensitive plant species survey, but they suggest that the species should be considered to occur on the Fort.

Beardless chinchweed is an erect, many-branched, perennial herb of the Asteraceae, or sunflower family, growing 1 to 4 ft from a slender, woody, taprooted stem-base. Daisy-like flower heads containing yellow ray and disk flowers are solitary or in open, flat-topped clusters at the tips of the branch. The petals are dotted with oil glands. Flowering occurs from August to October when the plants are over 1.6 ft in height. The species is known to inhabit desert grasslands and oak savannas (at lower elevations) and oak woodlands (at higher elevations) in southeastern Arizona. It is known to occur on steep, south-facing, sunny to partially shaded hillslopes, with eroding bedrock and open areas with little competition from other plants, and occurs along trails, roads, cow paths, and on mine tailings or overburden (USFWS 2018c). While more typically found in oak woodlands at higher elevations, and desert grasslands and oak savannas at lower elevations, the species has been found on disturbed road cuts, arroyo cuts, and unstable rocky slopes, where it has little competition for sunlight, nutrients, and space (84 FR 67060). The species has not been found in any location dominated by nonnative grasses (USFWS 2018c).

Bartram's Stonecrop

Bartram's stonecrop (*Graptopetalum bartramii*) was a candidate for listing between 1980 and 1996. The species was proposed for listing as threatened without critical habitat in 2019 (84 FR 67060). At that time, the USFWS issued a rule under section 4(d) of the Act to provide for the conservation of this threatened species. Bartram's stonecrop is known from sky island mountain ranges of southern Arizona, including the Atascosa, Baboquivari, Chiricahua, Dragoon, Empire, Mule, Pajarito, Patagonia, Rincon, Santa Rita, and Whetstone Mountains at elevations ranging from 3,500 to 6,700 ft (USFWS 2018d). Most of the mountain ranges in the U.S. have been surveyed for the species, and it is unlikely that any large populations remain unaccounted for. No populations are known to occur on the Fort.

Bartram's stonecrop is a small, succulent, non-stemmed perennial plant in the Crassulaceae or stonecrop family. The plant has a basal rosette comprising 20 or more flat-to-concave, smooth, blue-green leaves. Flower stalks are up to 12 inches in height and topped with panicles. Each panicle produces 1 to 3 five-petaled brown-to-red spotted flowers that are 1 inch or more across, produced from September to November. This species typically occurs on rocky outcrops in deep, narrow canyons in heavy cover of litter and shade; and typically within 32.8 ft of streambeds, springs, or seeps. The plants root into crevices in solid bedrock or in shallow soil pockets on rock ledges and cliffs of various aspect and on a variety of substrates.

Arizona Eryngo

Arizona eryngo (*Eryngium sparganophyllum*) was proposed for listing as endangered, with approximately 13.0 acres of proposed critical habitat in Pima and Cochise Counties, Arizona, on 4 March 2021 (86 FR 12563). The species is a wetland obligate known to occur in the Lewis Springs Cienega within the SPRNCA. No populations are known to occur on the Fort.

Arizona eryngo is a herbaceous perennial dicot in the Apiaceae, or carrot family that grows to a height of about 5 ft with long, linear, parallel-veined leaves that emerge from a basal rosette. The plant is conspicuous when flowering, having cream-colored flowers clustered in dense heads at the end of a branching inflorescence, produced from June to September. While the species does reproduce asexually, pollinators are likely needed for sexual reproduction necessary to maintain genetic diversity (USFWS 2020c). This species requires perennially moist, organic alkali soils found in spring-fed cienegas; growing best in full sun in areas with few nonnative plant species, limited woody vegetation, or other vegetation that may shade or otherwise outcompete them (USFWS 2020c).

Lemon Lily

Lemon lily (*Lilium parryi*) was listed as a Category 2 candidate for listing in 1980; however, this category was eliminated by the USFWS on 19 July 1995 (61 FR 64481). Category 2 species were those which information indicated proposing to list as endangered or threatened was possibly appropriate, but for which persuasive evidence on biological vulnerability and threat were not currently available to support proposed rules. The species is currently protected by the Arizona Native Plant Law of 1993 as a “salvage restricted” and is listed as a USFS sensitive plant. Although not federally listed, *L. parryi* is rare in Arizona and is only known to occur in the sky island mountain ranges of southeastern Arizona, including the Huachuca, Chiricahua, and Santa Rita Mountains at elevations ranging from 5,500 to 7,800 ft (AGFD 2001c). The largest populations are in the Huachuca Mountains in Miller, Huachuca, Carr, and Bear canyons (Warren and Reichenbacher 1991).

Lemon lily is a bulbous, herbaceous, perennial herb in the Liliaceae, or lily family, and is the only true lily in Arizona (AGFD 2001c). The plant grows from an erect stem up to 5 ft tall, with long, lanceolate leaves that grow in whorls or alternately spaced along the stem. Flower stalks produce 1 to 6 fragrant, showy, bright lemon-yellow, trumpet-shaped flowers with reddish spots inside the flower. Flowering occurs from May to June; fruiting occurs between July and August. This species requires year-round moist, sandy organic soils found in mesic, well shaded canyon bottoms along perennial streams or adjacent hillside springs (AGFD 2021c).

Threats to the species include human activities, such as bulb collectors, flower cutting, trampling, water diversion, grazing, and introduction of exotic species, unnaturally frequent forest fires, development, logging and mining. Boring insects have been observed to damage flowering stalks of this species as well (Warren and Reichenbacher 1990). This species was not assessed for climate change related vulnerability by Bagne and Finch (2013); however, due to the current trend in warmer and drier conditions and future projected conditions due to climate change, the habitat of this species is at risk of decline. In addition to these external threats, the species shows low genetic variability in the majority of its range in Arizona (Friar et al. 1995)

The species is known from both Garden and Huachuca Canyons on the Fort. In 1991, the Fort funded a project to survey sensitive plant occurrences and potential habitat and evaluate management needs of these sensitive areas. Monitoring surveys for the species were conducted in 1998, 2005, and 2008 through 2015. An internal assessment of the monitoring protocol was initiated in 2016. Monitoring will be reinitiated, with an altered methodology, in 2021.

Huachuca Springsnail

The Huachuca springsnail (*Pyrgulopsis thompsoni*) was listed as a candidate species in 1996 (61 FR 7601). The USFWS was petitioned to list the species as endangered with critical habitat in 2004. The Species Status Assessment analysis found listing warranted but precluded, and the species retained its candidate status. A CCA was developed by the Huachuca springsnail Working Group in 2016 (HSWG 2016). Following completion of the CCA, the species was determined unwarranted for threatened or endangered status (81 FR 64843). The Huachuca springsnail is identified as a Tier 1A SGCN (AGFD 2012).

The Huachuca springsnail is a small 0.07 to 0.13 inch-long aquatic snail belonging to the class Gastropoda. The shell is conical in shape with three to five convex whorls. This species occupies the shallow areas of springs and cienegas that are typically marshy with various aquatic and emergent plant species that occur within plains grassland, oak and pine-oak woodlands, and coniferous forest vegetation communities. These springs contain vegetation and have a slow to moderate flow, with firm substrates such as roots, wood, and rocks. Populations are locally abundant, but suitable habitat is typically very limited.

This springsnail is found in springs of southern Santa Cruz and Cochise counties, as well as northern Sonora, Mexico. In 1992, 16 areas with potential habitat were surveyed on the Fort, and nine populations were located within the higher elevations in Garden, Sawmill, McClure, Huachuca, and Blacktail canyons (USFWS 1997c and 2016a). Potential habitat exists in spring outlets, limited aquatic areas of cienegas with a spring source (USFWS 1997c), and in some perennial stream flows below the spring outlet (Tsai et al. 2007). The Garden Canyon watershed, with its Sawmill and McClure Canyon tributaries, seems to be the most important for springsnail on the Fort in terms of the number of populations and amount of good quality habitat, as compared to Huachuca and Blacktail Canyons. Most of the Garden Canyon springsnail habitat is within designated critical habitat for Huachuca water umbel.

In 1992, Landye (1993) conducted a survey for springsnail on the Fort, and noted that the extensive populations in the spring riparian areas on the Fort were unique in the American Southwest. These sites were later visited in 2012 when a presence/absence assessment of *P. thompsoni* in the Huachuca's was conducted (Piorkowski and Mulligan 2012). In this work, 9 of the 17 assessed sites were found to contain springsnails, and only two sites, one on the Fort, contained high individual counts of springsnails. Several dry springs were documented, due to the unusually dry conditions experienced in the Huachuca's in the preceding 12 months (Piorkowski and Mulligan 2012). A DoD Legacy funded project afforded additional work on the springsnail, with the goal of determining presence/absence of springsnails, development of a comprehensive database, a comparison of various survey protocols to identify the most efficient springsnail identification method, and conducting a genetic assessment. This work documented the first re-colonization in Huachuca Canyon since 2012 (Piorkowski and Diamond 2015). The last positive identification of a springsnail in Huachuca Canyon was in 2003, and follow-up surveys in 2012 failed to document springsnails, suggesting a potential extirpation event within the canyon system (Piorkowski and Diamond 2015). Springsnails were not documented in Blacktail Spring, which may suggest a localized extinction in that drainage, nor were springsnails documented at downstream historical location in Huachuca Canyon. From this work, three *P. thompsoni* genetic haplotypes were identified from the Fort. This work provided useful recommendations for managing the species and identified an effective survey protocol. Springsnail and their habitat are annually monitored on the Fort as agreed to in the CCA.

Threats to the species include habitat destruction by development, water diversions, spring development, recreational use, timber harvesting, altered fire regimes, genetic deterioration and livestock grazing (USFWS and HSWG 2016). This species was not assessed for climate change related vulnerability by Bagne and Finch (2013); however, Hershler et al. (2014) note that, due to their strong groundwater dependency, springsnails are especially vulnerable to extirpation and extinction. Due to the current trend in warmer and drier conditions and future projected conditions due to climate change, the habitat of this species is at risk of decline. Conservation of ground water resources will be imperative to maintaining this species.

Annual monitoring of Huachuca springsnail sites on the Fort and CNF started in 2016, with continued implementation of the signed 25-year duration CCA. Once a year, the signatory partners to the CCA meet as a working group to identify upcoming springs to survey, provide updates to annual CCA progress reports, and to coordinate and recommend any changes to the CCA, the monitoring program, and five-year action plans. The Fort will continue cooperative efforts as stated in the signed CCA when practicable. The purpose of this CCA is for the cooperating agencies to implement conservation measures for *P. thompsoni* that reduce or minimize the likelihood of extirpation or extinction of the species, and prevent loss and improve quality of the species habitat in Arizona (HSWG 2016).

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was once considered an endangered species in most states, but was reclassified as threatened in 1995 (64 FR 36454) because of significant increases in the number of breeding pairs. The species, excluding the Sonoran Desert population, was removed as a federally protected species in 2007 (72 FR 37346). Eagles nesting in the Sonoran Desert were removed in 2011 (76 FR 54711), but remain protected under the Bald and Golden Eagle Protection Act (16 U.S.C. §§668-668d).

The bald eagle inhabits estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats. While this eagle breeds throughout most of North America, sizable breeding populations occur near sparsely human populated coasts, rivers, and large lakes. Eagles feed primarily on fish and waterbirds, but also on small mammals and mammal carcasses. In addition to food, another important component of eagle ecology is the availability of roosting habitat. Roosting habitat consists of trees that extend above the forest canopy and provide a protected microclimate for resting eagles (Stalmaster 1987).

Bald eagle nesting populations in Arizona are found primarily below elevations of 3,500 ft in the central Sonoran Riparian Scrubland and the Sonoran Interior Strands. Nesting sites are typically located within a mile of a water source, although several breeding areas are located in disturbed riparian zones near Phoenix. The majority of breeding areas in 2019 were located along the Verde River, the Salt River, and lakes with elevations greater than 5,500 ft (AGFD 2019). Of the 89 identified Arizona breeding areas in 2019, 74 were occupied, producing 65 fledglings from 41 pairs; the number of known breeding areas has continued to increase since the 1990s (AGFD 2019). No documented breeding areas in Southern Arizona were documented, and only three bald eagles were counted in Cochise County. A total of 212 Arizona-wintering bald eagles were counted in 2019. Average wintering numbers from 2005-2018 were 248 individuals; the decrease in 2019's count is attributed to January's partial government shutdown and inclement weather (ADGF 2019). A few transient bald eagles have been recorded along the San Pedro River since winter surveys were initiated in 1993, and a small number may winter intermittently in large cottonwood or sycamore trees in the SPRNCA (Beatty 1998). The only record on the Fort was a bald eagle flying over the West Range in February 1998. Bald eagle use of the Fort is expected to be very sporadic because suitable nesting or winter concentration habitat is not present. The bald eagle has been reported from Willcox Playa area (SAIC 1998).

Historically, the primary threats to the bald eagle included the use of pesticides and shooting or intentional poisoning. Today, threats still include illegal shooting as well as the disturbance and/or loss of habitat.

Golden Eagle

The golden eagle (*Aquila chrysaetos*) is protected under the Bald and Golden Eagle Protection Act and is designated as a Tier 1B SGCN by AGFD (2012). The species is also protected under the 1972 amendment of the Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§703-711).

The golden eagle is a large bird-of-prey, naturally existing from Alaska across Canada and into the western U.S. and northern Mexico. Historically this species was regularly present in the eastern states but is considered rare or irregular visitors (Katzner et al. 2012). In Arizona, this raptor is known to occupy a variety of habitat types, such as open country, mountain, hills and cliffs characterized by eight biotic communities including Sonoran desertscrub, semidesert grassland, interior chaparral, mixed woodlands and Rocky Mountain montane conifer forests within elevations ranging from approximately 600-2,400 m. This species primarily preys on mammals, including jackrabbits, rock squirrels, skunks, woodrats, ringtail, javelina, bull snakes, etc. are taken (Glinski 1998).

Golden eagles are also scavengers of wildlife killed on roads and have met their fate while feeding in this way (Glinski 1998). This species requires open areas for hunting, and the grasslands of Fort Huachuca and the surround area provide this basic need.

Information on the status, distribution and life history of breeding golden eagles in Arizona was limited and most observational records collected by AGFD were dated in the 1970's (McCarty et al. 2016). In 2010, the Southwestern Golden Eagle Management Committee was formed in order to enhance coordination, increase communication and provide oversight for Arizona golden eagle management. From 2011 to 2015, the committee conducted state-wide aerial occupancy and nest survey efforts for cliff-nesting golden eagles (McCarty et al. 2016). Results indicated that by the end of the 2016 breeding season there were 255 current golden eagle breeding areas in Arizona (McCarty et al. 2016). In addition, the committee developed a 50 km tessellated grid for the entire state of Arizona totaling 133 grid cells identifying golden eagle breeding areas in order to be used as a strategic method in identifying new breeding areas. The Fort is located within one of these grids. Though not often observed, golden eagles have consistently been observed on the Fort, specifically in the Blacktail Canyon and surrounding area.

Although widespread in some areas, many parts of their range have experienced sharp population declines due to habitat destruction, degradation, illegal shooting and the contamination of its food source. One of the biggest threats is collisions with man-made objects, specifically wind turbines. In a 2016 report the Altamont Wind Resource Area in California reported more than 2,000 golden eagle fatalities since 1998, and calculates the mortality rate to be approximately 75-110 individual eagles per year (American Bird Conservancy 2016). In addition, lead poisoning is another major threat to this species. Similar to California Condors and other raptors the golden eagle hunts and scavenges in areas where lead is often left in the environment and without treatment the ingestion of lead can lead to death (Squadrone et al. 2018). Electrocutation is another major threat, since raptors utilize power poles and electric structures to perch and inadvertently come into contact with unprotected high-voltage lines resulting in death. The Fort's 2014 HEFT activities, invasive flora treatment, and protection and enhancement of large areas of grassland provide a benefit to this species.

Mexican Spotted Owl

The Mexican spotted owl (*Strix occidentalis lucida*) was listed as a threatened species on 16 March 1993 (58 FR 14248), and is designated as a Tier 1 SGCN by AGFD (2012). On 30 September 2004, the USFWS designated 8.6 million acres on Federal lands in Arizona, New Mexico, Colorado, and Utah as critical habitat for this species. No critical habitat was listed on the Fort, due to the protections provided by the INRMP.

The current known range of the Mexican spotted owl extends north from Aguascalientes, Mexico through the mountains of Arizona, New Mexico, and western Texas, to the canyons of southern Utah and southwestern Colorado, and the Front Range of central Colorado. The range of the Mexican spotted owl in the U.S. has been divided into five Ecological Management Units (EMUs), the Fort lies within the Basin and Range-West EMU, as described in the Recovery Plan (USFWS 2012d). This EMU includes most of southern Arizona and a small portion of southwestern New Mexico.

In the Basin and Range-West EMU, spotted owls have been located in rocky canyons or in several forest types at elevations ranging from 3,690 to 9,610 ft AMSL. Below 4,264 ft, spotted owls were found in steep canyons containing cliffs and stands of live oak, Mexican pine, and broad-leaved riparian vegetation (Ganey and Balda 1989). Above 5,904 ft, spotted owls were found in mixed conifer and pine-oak forests. Mid-elevation observations included sites with Arizona cypress and the other forest types previously mentioned (USFWS 2012d). The habitat characteristics of

nesting and roosting sites generally consist of multi-layered, uneven-aged forests with high canopy closure or rocky, shaded canyons (USFWS 2012d). In the Huachuca Mountains, many spotted owl nest sites were described as Madrean pine-oak woodland with montane conifer species and some broadleaf riparian component (Duncan 1991). Cliffs are present at some sites and used for nesting.

Mexican spotted owl management units consist of Protected Activity Centers (PACs) and Inventory Area (IAs). PACs are areas of no less than 600 acres that enclose the best owl habitat in the area, with the nest or activity center near the center. IAs are potential foraging, nesting, or roosting habitats. There are eleven PACs and one IA on the Fort (see Figure 2.16) (ENRD 2018b). The delineated PACs cover 6,729 acres and occur in the higher elevations of the Fort in the Huachuca Mountains. The Mexican spotted owl has been monitored on the Fort for 30 years from 1990 through 2019. This monitoring dataset is likely the most extensive available on MSO within a single locality. In addition to annual monitoring, the Fort has funded and supported research including periodic color-banding and blood and feather collections, for genetic analysis (Duncan and Speich 2002), and high elevation fuel load modeling, and fuels reduction plan (Hollingsworth 2014). This research has provided locally specific data, contributed to the differentiation between subspecies, provided insight into the degree of genetic diversity within subspecies (Haig et al. 2001 and 2004, Barrowclough 2006), and provided an implementable plan (HEFT) to reduce both fuel load and the potential for catastrophic wildfires in MSO habitat (Hollingsworth 2014, Zia 2016a). In addition to this research, the Fort has implemented prey-base monitoring in and around treatment areas, monitors environmental conditions (temperature and humidity) in core areas, and is treating invasive grass encroachment to the extent currently practicable. It should be emphasized that the majority of the above projects provide a benefit to a wide range of species that inhabit the Fort's high elevation zone. The Fort strives for multi- rather than single-species management, therefore the MSO has served as an umbrella species and a funding source for a much larger spectrum of species.

Threats to the Mexican spotted owl, such as activities that open up or remove mature or old-growth forest components (non-focused logging, wildfire, widespread tree mortality, road or site construction that results in fragmentation of the forest), and human activity (hiking, shooting, off-road vehicle activity) in or near nesting, roosting, or foraging sites, may result in reduced reproductive rate or abandonment of an area. Trampling, vegetation removal, invasive species, and increased fire adversely affect the Mexican spotted owl's habitat and thereby indirectly affect the Mexican spotted owl. Climate change is expected to have a negative effect on this species. Noticeable differences have recently been observed in this species' habitat, due to increased temperatures and decreased precipitation. In modeling various climate scenarios (emission scenarios) on three spotted owl populations in the Southwestern U.S., Peery et al. (2011) predict that owl populations in Arizona will decline rapidly over the next century and have a much greater probability of extinction under all scenarios than under current conditions. Bagne and Finch (2013) also found the species to be vulnerable to declines related to the upward shift of forest habitats, physiological thresholds, and fluctuations in prey populations. Garfin et al. (2017) predicts full-scale habitat replacement in forest structure, gradually due to climate change or more quickly in the event of a catastrophic fire, in projected climate conditions. This is a significant threat that would immediately affect this species. The Fort's 2014 HEFT plan was developed specifically for this umbrella species, as protection of this high elevation zone benefits a substantial portion of the Fort's sensitive species. It is important to note that the current conversion from native to invasive grass species, and the resultant altered fire regime, is a continuing threat to high elevation resources. The spread of invasive species by seed transport via recreation, management activities, and invasive-transitioned travel corridors, is a significant problem.

The Fort's invasive species management program is increasingly important in the race against species replacement.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*) was listed as an endangered species in 1995 (58 FR 39495) and is designated as a Tier 1A SGCN by AGFD (2012). Critical habitat was designated in 2005 and was updated in 2013 Code of Federal Regulations (50 CFR Part 17). It includes part of the middle/lower San Pedro River extending 60.5 miles to the Gila River. The final recovery plan was published in 2002 (USFWS 2002b). The SPRNCA is not included in the critical habitat, and the nearest designated critical habitat is approximately 28 miles to the north in the Middle Gila and San Pedro Management Unit (70 FR 60885).

The southwestern willow flycatcher is one of four subspecies. It is a neo-tropical migrant that breeds in the southwestern U.S. from approximately 1 April to 1 September and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Unitt 1987, Stiles and Skutch 1989, Peterson 1990, Browning 1993, Ridgely and Tudor 1994, Howell and Webb 1995). The flycatcher is a riparian obligate, nesting along rivers, streams, and other wetlands where dense growths of willow (*Salix* sp.), seepwillow (*Baccharis* sp.), buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix chinensis*), or other plants are present, often with a scattered overstory of cottonwood and/or willow. Flying insects, particularly *Hymenoptera* (ants, bees, and wasps), *Diptera* (flies), and *Hemiptera* (true bugs), are the most important prey of the southwestern willow flycatchers; however, they will also glean larvae of non-flying insects, such as *Lepidoptera* (butterflies and moths), from vegetation (Drost et al. 1998).

The historical range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987). In Arizona, 526 nesting attempts were documented statewide at 36 sites in 2005 (English et al. 2006). The lower San Pedro River is one of the most important nesting sites. In 2005, a major concentration of southwestern willow flycatchers was documented in the Winkleman Study Area near the confluence of the Gila and San Pedro Rivers where 124 flycatchers were known to fledge. The flycatchers nested primarily in saltcedar, but a few nests were found in buttonbush and willow, and the first record of a nest in greythorn (*Ziziphus obtusifolia*) (English et al. 2006).

Few southwestern willow flycatcher nesting attempts have been documented from the upper San Pedro River in the recent past, and none are known from the Fort. Between 2001 and 2012, 11 flycatchers, mostly migrants, have been detected within the SPRNCA with detections occurring in six of the nine surveyed transects (Lowery and Blackman 2012). This species was observed along the river near St. David in 1996, a failed nest attempt near the Kingfisher Pond and two territorial males upstream and downstream of this pond were documented in 1997, one flycatcher was detected near the Kingfisher Pond (unknown if bird was nesting or a migrant) and three territorial birds just north of the SPRNCA (not known if they nested) in 1998, and two flycatchers that were likely migrants were reported in 1999 (McCarthy et al. 1998, Paradzick et al. 1999). Surveys between 2000 and 2012 along the SPRNCA resulted in the detection of zero flycatchers in 2001 and 2002; migrating flycatchers in 2002, 2003, and 2004; one nesting attempt that failed in 2005; and no flycatchers detected in 2006 and 2012 (EEC 2000, 2001a, 2001b, 2002b, 2003, 2004, 2005, 2006, Vernadero 2009c, Lowery and Blackman 2012). The final and most recent Fort Huachuca flycatcher survey season along the SPRNCA was in 2012. The upper San Pedro River is less productive southwestern willow flycatcher habitat than the lower San Pedro River, probably due to the relatively narrow corridor of riparian forest; a lack of understory in most areas, and a history and present condition of grazing that reduces understory foliage density. In addition,

saltcedar, which is an important nesting substrate on the lower San Pedro, is less abundant on the upper San Pedro River. Following removal of most of the cattle under the moratorium of the newly established SPRNCA, foliage density in the understory increased, with resulting increasing quality of flycatcher habitat. Nesting by riparian bird species had increased in a relatively short time (EEC 2002b). Cattle are again roaming the SPRNCA, and unless managed effectively the condition of the habitat will only decline. The upper San Pedro River may also serve as a migration corridor for flycatchers moving between wintering grounds in Latin America and the lower San Pedro or other sites to the north.

The Babocomari River has not been well surveyed for southwestern willow flycatchers; however, most of the habitat on the river is probably unsuitable due to intermittent flows and lack of sufficient riparian vegetation cover. The Babocomari Cienega upstream of Huachuca City at the Babocomari Ranch may have potential to support nesting southwestern willow flycatchers (Leidos 2013). The area consists of an impoundment surrounded by a healthy stand of cottonwoods, and farther upstream, a thick stand of short willows (Leidos 2013). Avian surveys from 3 April to 14 May over a four-year period (1989, 1991, 1993, 1994) documented in no detections of willow flycatchers (Skagen 1995).

Riparian habitat suitable for nesting southwestern willow flycatchers is generally lacking on the Fort. Marginal habitat was reported near Highway 90 just north of the main gate in 1998 (SAIC 1998) and on-post at Gravel Pit Pond and Middle Garden Canyon Pond. These sites were re-evaluated in May 2000 and were reclassified as unsuitable nesting habitat based on habitat structure used by the southwestern willow flycatcher for nesting (EEC 2000).

The principal factor in the decline of this species has been the extensive loss, modification, and fragmentation of its riparian breeding habitat from river flow management and diversions, agricultural clearing, sand and gravel extraction, urban development, recreation, grazing, groundwater pumping, pollution, fire, flooding, erosion, and exotic plant invasion (Krueper 1993), and brood parasitism by brown-headed cowbird (*Molothrus ater*) (Sogge et al. 1997). This species has been identified as being vulnerable to climate change (Bagne and Finch 2013). Climate change is expected to exacerbate riparian area decline. Bagne and Finch (2013) projected that in addition to the dewatering of the channel, willow flycatcher declines will be associated with timing of floods and insect emergence, thermal tolerances, and brood parasitism by brown-headed cowbirds. They suggested that water inputs and control of exotic invasive plants are important to manage for this species.

Northern Aplomado Falcon

The northern aplomado falcon (*Falco femoralis septentrionalis*) was listed as an endangered species in 1986 (51 FR 6690) and is designated as a Tier 1A SGCN by AGFD (2012). No designated critical habitat has been identified. A recovery plan was established in 1990 with the goal of achieving 60 breeding pairs within the U.S. (USFWS 1990a). The USFWS designated falcons that may occur in Arizona and New Mexico as a nonessential, experimental population under Section 10(j) of the ESA (USFWS 2006). With this final rule, captive-raised falcons were released in southern New Mexico and were allowed to disperse into Arizona.

The aplomado falcons historically occupied yucca-covered sand ridges in coastal prairies, riparian woodlands in open grasslands, and scattered mesquite and yucca in desert grasslands in the U.S. (USFWS 1990a). Montoya et al. (1997) found that aplomado falcons in north-central Mexico occupied the few relict desert grasslands with dense ground cover of grasses interspersed with tall yuccas. In Arizona, it has been reported from wooded riparian areas that meander through grasslands and open grasslands with scattered yucca (Corman 1992). The northern aplomado falcon diet consists of small birds, insects, rodents, and reptiles, with small bird abundance

probably being the most important determinant of potential breeding habitat for this species (Hector 1985; USFWS 1990a). Typically, the falcons use the nests of corvids and raptors as platforms to lay two to four eggs (Palmer 1988). In north-central Mexico, six nests were in yucca and four in honey mesquite (Montoya et al. 1997). Incubation lasts 31 to 32 days, nestlings fledge at 32 to 40 days, and the post-fledgling period lasts approximately 4 weeks (USFWS 1990a).

Historically, the northern aplomado falcon was fairly common from southeastern Arizona and southwestern Texas through Guatemala and Nicaragua. Most breeding records within the U.S. occurred near Brownsville, Texas, but there were some records from the Fort. The original species description came from specimens collected on the Fort in 1887 (USFWS 2007b). This species disappeared from most of the U.S. by 1940 (Palmer 1988, USFWS 1990a). More recently, there have been occasional sightings of this species from western Texas and eastern New Mexico, but no confirmed sightings from Arizona (Ward and Ingraldi 1994). The nearest known breeding population to the Fort is in northern Chihuahua, Mexico, within dispersal distance from the Fort (Burnham et al. 2002).

The aplomado falcon recovery plan recommends reestablishing this species to its historic range. Ongoing reestablishment began in Texas in 1993, and over 1,813 falcons were released through 2012 in coastal Texas, the Chihuahuan Desert of Texas, and New Mexico (Hunt et al. 2013). The coastal plain of southern Texas was the only successful reintroduction site with approximately 30 pairs established in 2 population sites with habitat structure being the primary limiting factor (Hunt et al. 2013). Falcons continue to be documented from these sites (Cornell Lab of Ornithology 2019). Released falcons in west Texas and New Mexico disappeared by 2013 and appeared to be limited by drought conditions, reduction of prey, and high mortality from other raptors (Hunt et al. 2013). Currently there are no plans for releases in Arizona. The northern aplomado falcon has not been observed on the Fort or in Arizona, probably since the 1940s. Based on the AGFD evaluations in 1992, semi-desert grassland and riparian communities on the Fort have a strong potential to support released or re-colonizing aplomado falcons, especially given the proximity of abundant songbird populations in the SPRNCA and the rehabilitation and recovery of mesquite-grass savanna and shrub-grassland ecosystems on the East Range.

The principal factor in the decline of this species has been the degradation of its habitat due to brush encroachment fostered by overgrazing and fire suppression, over-collecting, and reproductive failure caused by organochlorine pesticide use (DDT) (USFWS 2001). Wind-based power generation is a newly emerging threat to aplomado falcons. Woodlands and riparian forests, important habitat associates for this species, will be threatened by the increased occurrence of high severity wildfires and declining water tables (Bagne and Finch 2013).

Yellow-Billed Cuckoo

The western distinct population segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus*) was listed as a threatened species in 2014 (79 FR 59992), and is designated as a Tier 1A SGCN by AGFD (2012). Critical habitat was proposed in 2014 (79 FR 48548). This proposal was revised in 2020 (85 FR 11458) and includes 493,665 acres Arizona, California, Colorado, Idaho, New Mexico, Texas, and Utah. (USFWS 2020a).

The yellow-billed cuckoo is still relatively common east of the Rocky Mountains. However, it is estimated that 90 to 95% of its streamside habitat has been lost or degraded in Arizona (USFWS 2014b), and populations appear to be extremely reduced from historic numbers (AGFD 1998, Corman and Magill 2000). Downward population trends have been documented on two of the few locations which have received semi-regular monitoring, the Bill Williams and the San Pedro River.

In Arizona, this species nests in mature Sonoran riparian deciduous forest, cottonwood-willow series, Sonoran riparian scrub, and in well-developed mesquite bosques (Corman and Magill

2000). The yellow-billed cuckoo nests primarily in the central and southern parts of Arizona, and the peak nesting period is between 15 June and 10 August. Breeding often coincides with outbreaks of cicadas, tent caterpillars, and other prey species. Breeding sites within Arizona occur primarily along the lower Colorado River and in the following watersheds: Bill Williams, Big Sandy, Agua Fria, Verde River, Gila River, Santa Cruz River, and San Pedro River (Haltermann et al. 2015). While migration routes are poorly documented, it is known that the San Pedro River is a migratory corridor (Haltermann et al. 2015).

Historically the yellow-billed cuckoo was believed to be locally widespread and common in California and Arizona. In Arizona the species was a common resident in the lower Sonoran zones of the southern, central, and western portions of Arizona. Surveys along the San Pedro River have shown that the SPRNCA has the highest concentration of breeding yellow-billed cuckoos in Arizona and throughout the southwestern U.S. (EEC 2001c). Thirty-six cuckoos (paired and single), were incidentally detected during willow flycatcher surveys in the SPRNCA in 2001 (EEC 2002b), 81 were incidentally detected in 2002 (EEC 2002b), while 47, 24, 34, 35, 28, and 19 were incidentally detected in 2003, 2004, 2005, 2006, 2009, and 2012 respectively (EEC 2003, 2004, 2005, 2006, Vernadero 2009c, Lowery and Blackman 2012). Cuckoos have been found to use xeroriparian drainages of mountains in southeastern Arizona and detections have been made in the Huachucas during breeding season (USFWS 2016a). In September 2001, a single male cuckoo was heard calling at Middle Garden Canyon Pond during Huachuca water umbel surveys on the Fort (Leidos 2013). Since 2012, approximately 20 cuckoo observations have been documented in Garden and Huachuca Canyons (eBird data).

The primary threat to this species is the continued loss, degradation, and fragmentation of mature cottonwood-willow riparian habitat. Major threats to the habitat include stream diversion, water management, agriculture, urbanization, overgrazing, recreation, and invasion of nonnative species (USFWS 2020a). The yellow-billed cuckoo is likely to be subjected to greater stresses by the effects of climate change (Bagne and Finch 2013). Garfin et al. (2017) predicts full-scale habitat replacement in forest structure, gradually due to climate change or more quickly in the event of a catastrophic fire, in projected climate conditions. This is likely to affect individuals of this species that are known to opportunistically use the higher elevations of the Fort. The Fort's HEFT and invasive species management programs are providing protection to the habitat of this species.

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) had been listed as an endangered species, but was delisted in 1999 (64 FR 46541). This decision was based, at least in large part, by the results of a five year study to locate and monitor breeding peregrine falcons to determine occupancy and productivity initiated by AGFD. The species is designated as a Tier 1A SGCN by AGFD (2012). In Arizona, peregrine falcons occupy habitat with tall cliffs suitable for nesting and nearby water or vegetation capable of providing habitat for its prey, primarily birds.

In southeastern Arizona, breeding peregrine falcons are probably year-around residents. It is likely that non-resident peregrines winter in the area and others migrate through. In 1996, peregrine falcons established a nesting territory on the Fort (SAIC 1996). This was the first nesting attempt recorded for the peregrine falcon on the Fort in recent years; it appeared that the birds were incubating eggs, but the outcome of the nesting attempt was not determined (SAIC 1996). Surveys indicated this species did not nest on the Fort in 1997 (Duncan 1997) or 1998, but an immature (probable young of the year) was seen in 1998 soaring not far from the 1996 nest (Snyder 2000). Three large chicks near fledging were seen in 1999, at or near the 1996 nest site (Snyder 2000). Nesting occurred in 2001, but the single chick died in the nest (EEC 2001a). Two young were hatched and a single female fledged in 2002 (Snyder 2002). This was a year of

extreme drought, and the production of offspring is an indication that the Fort contains high-quality peregrine falcon habitat (Snyder 2002). Peregrine falcon pairs also occupy breeding territories in the Dragoon and Chiricahua Mountains, 30 miles and 65 miles northeast of the Fort, respectively.

Suitable cliff habitat on the South Range is limited to several cliffs in Woodcutters, Rock Spring, Huachuca, Scheelite, and Tinker canyons. The few small cliffs in Blacktail Canyon on the West Range may provide marginal habitat for nesting peregrines. Blacktail Canyon has not been surveyed using standard survey protocol (SAIC 1998). Suitable peregrine falcon nesting habitat does not exist on the East Range, but foraging habitat is present. A peregrine falcon was observed at a reservoir in the southwestern corner of the East Range. Waterbirds, such as ducks, shorebirds, and passerines, use the reservoirs and associated vegetation and are prey species favored by peregrine falcons.

Primary threats to peregrine falcons include ingestion of DDT and other organochlorides in wintering areas, habitat loss, and declining prey populations. Human disturbances include noise associated with construction, aircraft, transportation, and recreation (Groves 1996). Individual birds vary in their tolerance to human disturbance. Bagne and Finch (2013) suggest that, although the species habitat in Arizona is expected to remain suitable, this species will be exposed to other climate change effects at wintering and stopover sites.

Apache Northern Goshawk

The Apache Northern goshawk (*Accipiter gentiles*), one of two subspecies of the Northern goshawk, is designated as a Tier 1B SGCN by AGFD (2012). As of 2019, there have been no new petitions to list the species as threatened or endangered. The status of the Apache goshawk has been of concern to wildlife managers in the southwestern U.S. for a number of years. The Apache goshawk is the southernmost form of the goshawk in the Western Hemisphere. This species occurs in extreme southeast Arizona, southwest New Mexico, and the Sierra Madre of Mexico. The U.S. range for this species is roughly bounded by the Gila River on the north, the Atascosa Mountains on the west, and the Animas Mountains on the east, creating an area roughly 160 miles by 100 miles (Snyder 2000).

Fort Huachuca has three known historic Apache goshawk nesting areas. In addition, habitat on the installation is used for foraging by pairs nesting outside the installation and presumably by both resident and migrant goshawks in winter. During 1998, 1999, 2001, and 2002, Apache goshawks were observed and active nests were located on and adjacent to the Fort (EEC 2001a, Snyder 2000, 2002).

Timber harvest is the principal threat to breeding populations. Northern goshawks were assessed to be somewhat vulnerable to declines associated with climate change, as mature forest with high canopy closure, the preferred breeding habitat, is vulnerable to the increased effect of drought mortality and fires (Bagne and Finch 2013). In addition to the relatively long-term impacts of removing nest trees and degrading habitat by reducing stand density and canopy cover, logging activities conducted near nests during the incubation and nestling periods can have an immediate impact, consisting of nest failure due to abandonment (AGFD 2003). Primary threats to goshawks on the Fort are poaching of nestlings for falconry, catastrophic wildfire, and tree die-off (e.g. beetle kill).

Lesser Long-Nosed Bat

The lesser long-nosed bat (*Leptonycteris yerbabuena*) (LLNB) was federally listed as endangered in 1988 (53 FR 38456) and was designated as a Tier 1A SGCN by AGFD (2012). Although critical habitat was never designated, a recovery plan was approved in 1994 (USFWS 1994). The LLNB was delisted in 2018 (83 FR 17093) and a Draft Post-Delisting Monitoring Plan

was developed in 2019 (USFWS 2019); however, the plan has not yet been finalized. The draft post-delisting plan proposes a 15-year monitoring period to allow sufficient monitoring to ensure the species remains recovered. The LLNB is migratory and is found throughout its historic range, which extends from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. Roosts in Arizona had typically been occupied from April to November (Cockrum and Petryszyn 1991, Sidner 2000, 2008); the LLNB was rarely recorded outside of this time period in Arizona (USFWS 1995b, Hoffmeister 1986). On the Fort, LLNBs have been recorded as late as 5 January (Buecher 2020), although dates in mid to early December have been more common.

Fort Huachuca is located within the LLNB's migratory corridor, which is used during the southward seasonal movement of post-maternity dispersal of juveniles and adult females, and hosts major LLNB roost sites. In spring, adult females, most of which are pregnant, arrive in southwestern Arizona and gather into maternity colonies. These roosts are typically at low elevations near concentrations of flowering columnar cacti such as organ pipe cactus (*Stenocereus thurberi*) and saguaro (*Carnegiea gigantea*). Adult males typically occupy separate roosts, forming bachelor colonies mostly in the Chiricahua Mountains, but are also known to occur with adult females and young of the year at the maternity sites (USFWS 1995b). After the young are weaned, colonies disband in July and August and some females and young move to higher elevations, primarily in southeastern Arizona near concentrations of blooming paniculate agaves such as Palmer's (*Agave palmeri*) and Parry's agave (*A. parryi*). Lesser long-nosed bats are opportunistic foragers and efficient fliers known to fly long distances from day roosts to foraging sites. For example, one-way night flights from maternity colonies to flowering columnar cacti of 15 miles in Arizona and 25 to 38 miles in Mexico have been documented (Dalton et al. 1994). Palmer's agave exists on the South and West ranges and is the primary LLNB food source on the Fort (Howell and Robinett 1995). Several of these stands are protected under the AMA designation (Howell and Robinett 1995, ENRD 2006). AMAs have relatively high densities of agave as compared with other areas across the installation. Semi desert grasslands and lower oak woodlands on the Fort provide critical summer and early fall foraging habitat, enabling bats to gain the body mass critical for survival during their southward migration for the winter (Sidner 1996).

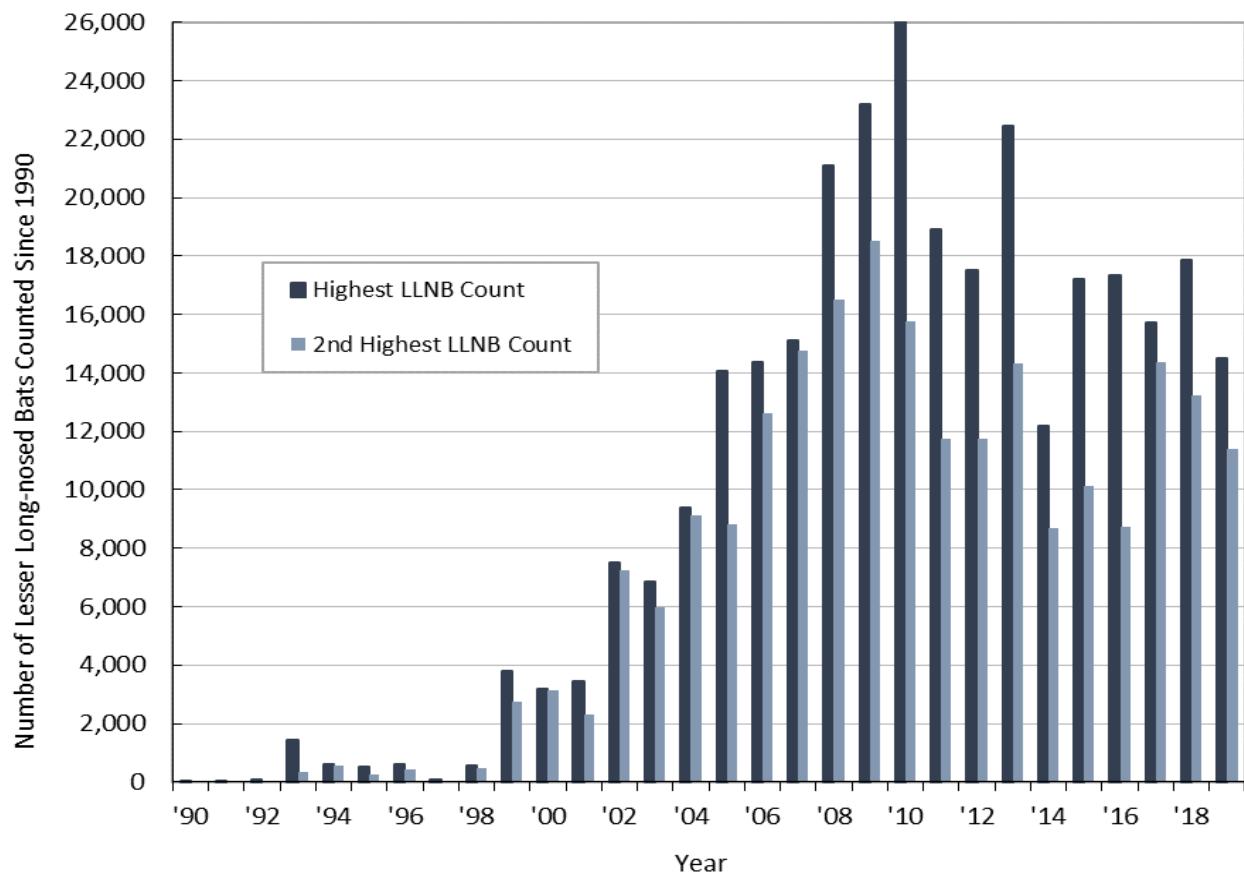
Between 1990 and 2013, due to the sensitivity of LLNB to human disturbance, Manila Mine, Lower Pyeatt Cave, and Upper Pyeatt Cave are seasonally closed during the period of LLNB residence. Entrances to LLNB roosts were surrounded by chain link fence, to prevent illegal human entry while enabling unfettered access to bats. Caves were signed to identify seasonal restrictions and the sensitive nature of the resource, after it was learned that the sites were still entered by spelunkers (Sidner 1990). To reduce access, roads were gated and locked during the LLNB residence period. In 2013, further restrictions were required and all caves on the installation were closed to recreational use (USFWS 2014d) to protect all bat roosting-sites from the introduction of WNS. A more detailed discussion of these activities can be found in Section 2.1.3 (Caving).

The Fort has funded annual low-disturbance LLNB surveys since 1990. This monitoring dataset is one of the two most extensive datasets available on LLNB within a single locality. The other site with an extensive data set is Copper Mountain, a maternity site at Organ Pipe Cactus National Monument. The Fort's surveys have resulted in discovery of new roosting sites and consistent monitoring of LLNB day, night, and potential roost sites, has provided better understanding of the Fort's entire bat community. Lesser long-nosed bats have been found day roosting at Upper Pyeatt Cave, Lower Pyeatt Cave, and Manila Mine (some night roosting occurs at these sites as well). Lesser long-nosed bat night roost at Wren Bridge, and were mist netted in Woodcutters Canyon in the late 1990's (Sidner 1994, 1996, 1999). Indecision Cave is considered a potential day roost, but the species has yet to be documented during surveys at this site (Sidner 1996, 1999, 2000, 2005, 2007). A number of other sensitive bat species have been documented using

this cave (Buecher 2020). Upper Pyeatt Cave had always been considered a potential day roost, but LLNB were not documented using this site until 2007 when they were identified via slow motion video (Sidner 2008). This has been an important site since that time. A LLNB banded at Wren Bridge was found the next night at the Patagonia Bat Cave and a bat tagged at the Big Hatchett LLNB roost in New Mexico on 24 August 2019 was detected day roosting Fort Huachuca on 21 September 2019. This demonstrates that individuals of this species not only move relatively long distances, but that bats which use the Fort are part of a larger regional population (Sidner 1996, Howell 1996, Buecher 2020). Manila Mine, Upper Pyeatt, and Lower Pyeatt Caves are also used by other bat species and these roost sites are important for bat colonies at least six months of the year.

Colony size of LLNB at Lower Pyeatt Cave typically peaks in early September; however the peak was observed in August of 2006 and 2007, and was two weeks late in 2019 (Sidner 2007, 2008, Buecher 2020). Between 1990 and 1998 Manila Mine was the major LLNB roost on the Fort. Once the entrance to Lower Pyeatt Cave was restored to its original state in 1998, this cave became the significant roost and continues to host the highest number of LLNB (Buecher 2020). The bats began using a third cave for day roosting in 2010 (Upper Pyeatt Cave) (Buecher 2020). The highest recorded count at Lower Pyeatt Cave to date was during 2010. This peak number of LLNB may have resulted from disturbance at other day-roosts. Since then the population has decreased from this peak colony size (Figure 2.17).

Figure 2.17 Annual High Counts of LLNB on FH 1990-2019



The low numbers in 2014 were due to a late start on the year's contract (Taken from Buecher 2020)

The LLNB has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County), southeast to the Chiricahua Mountains (Cochise County), and south to the international boundary. The greatest densities of bats are in northern Mexico and southern Arizona (USFWS 1995b). Advances in technology have greatly improved since the species' original listing in 1988, but regional population size is still difficult to estimate (USFWS 2017a). Roost location data has significantly improved and known roost sites in the U.S. have risen from approximately 14 at the time of listing to approximately 75 in 2016 (USFWS 2017a) and 25-30 known roost sites in Mexico (USFWS 2016c). On the other hand, one significant maternity roost in Mexico, the Pinacate Cave in Sonora, appears to have experienced a high mortality event in June 2016.

Anecdotal reports that adult females had apparently left the roost one evening and flown east to forage but unusually strong winds came in from the west. It is hypothesized that some of the LLNB were unable to successfully fly back to the day-roost against the headwind. The following daytime temperatures were 122°F and bats were reportedly found dead or dying between Organ Pipe National Monument and the maternity roost in the basalt flow (Buecher 2020). Since then the yearly count at the roost had decreased from 148,000 LLNB in June 2016 to 20,547 in 2017, to 30,000 in 2018, and back down to 15,000 in 2019 (Buecher 2020). The decline of approximately 90% at this important maternity roost has not been fully explained, except for the hypothesis that the weather played a critical role in the colony collapse (Buecher 2020). It is also possible that the bats moved to other roosts (USFWS 2018a) but there have been no reports of roosts that have spikes in their LLNB population since this event. Buecher (2020) suggests that this could affect the peak count at Lower Pyeatt Cave if the LLNB using the Fort are migrating from the Pinacate/Organ Pipe National Monument region.

Though fewer LLNB's were documented during the Fort's 2019 high count, the lowest maximum colony size since 2014, it is impossible to draw a correlation because LLNB roosts have a history of counts fluctuating from year to year. The largest maternity roost in Arizona is approximately 150 miles from the Fort in Organ Pipe Cactus National Monument, with an estimated average of 40,000 bats since 2010 (USFWS 2016c). The limited numbers of maternity roosts is still considered to be the critical factor in the survival of this species.

Risks to the species include disturbance and loss of roost and foraging habitat, climate change, and human perceptions (USFWS 2016c). Because of the species' gregarious roosting behavior, it will always be vulnerable to catastrophic population loss through human disturbance of its roost sites. In the 1994 Recovery Plan it was noted that loss of even one maternity site could eliminate a significant portion of the total population and contribute to the local extinction of the species (USFWS 1994). We are hopeful that this does not occur as a result of the reduction observed at the Pinacate. The recovery plan also noted that the protection of the forage plant's habitat is essential to the survival of the species. Maintenance of roost sites without assuring that there will be viable populations of food plants within an appropriate distance does nothing to stabilize the status of the species (USFWS 1995). Though the species is recorded to be able to travel vast distances to forage, traveling longer distances to obtain sustenance increases the risk that environmental stress or man-made objects (e.g. wind turbines or vehicle collision) would increase the risk of individual or mass mortality. Perhaps this capacity for the LLNB to travel long distances will allow the species to hold on a little longer if food resources crash, but it is not bio-energetically efficient and is unlikely to be a successful long-term strategy. Fortunately, the LLNB is not considered to be at risk for contracting WNS, because it is a non-hibernating species and roosts in areas not conducive to the fungus that causes the disease. However it could potentially act as a vector and distribute the disease to caves where other susceptible species coexist (Buecher 2020).

Bagne and Finch (2013) identified this species as being moderately vulnerable to climate change, roost disturbance, reliance on the quantity and timing of flowering of a limited number of plant species, loss of foraging habitats, and the interactive effects of fire occurrence and non-native invasive grasses. In addition to these affects LLNB, like other bat species, face threats by the effects of fighting climate change (mass mortalities at wind farms). An estimated 600,000 bats died from encounters with wind turbines at wind energy facilities in the U.S. in 2012 (Hayes 2013). An analysis of bats taken in the southwest, conducted in 2018, found that the median bat fatality rate was 3.3 bats/MW/year with a range of 0.1 to 36.9 bats/MW/year. The bat fatality estimate at Red Horse Wind Farm in Arizona was estimated at 33.21 bats/MW/year in its third year of operation, 42.44 in the second year, and even higher in the first year. At least 8 species of bat, including LLNB, were taken. Suitable day roosts, adequate concentrations of food plants, and habitat connectivity for migration routes are crucial to maintain this species' viability (USFWS 1995b, USFWS 2016c).

The Fort will implement the Post-Delisting Monitoring Plan to the degree practicable, when the plan is finalized, and will ensure that its LLNB management program continues to be adaptively managed and responsive to population indicators. The following activities identified in the Draft Plan will be implemented as time, funding, and mission allow: continued cave and mine protection, continued low disturbance monitoring, and continued maintenance of AMAs. The current conversion from native to invasive grass species, and the resultant altered fire regime, is a continuing threat to high elevation resources and agave plant recruitment. The Fort's HEFT, invasive species, disease testing, and habitat management programs are providing a benefit to the species. The DoD is dedicated to maintaining the successful status and recovery of the lesser long-nosed bat, and will ensure the Fort's LLNB management program continues to be adaptively managed and respond to population indicators (DA 2017a). The continued management for delisted species on DoD lands is authorized under 16 USC 671 et seq.

Jaguar

The jaguar was listed as an endangered species in 1997 (37 FR 6476), is designated as a Tier 1A SGCN by AGFD, and is considered endangered in Mexico and South America. While the identification of critical habitat was found not prudent in 1997 (USFWS 1997b), critical habitat was designated in 2014 (FR 79 12572). The AGFD released a Conservation Assessment and Strategy (Johnson and Van Pelt 1997) for the jaguar in Arizona and New Mexico in 1997, along with a Memorandum of Agreement (MOA) to unite 17 agencies in order to identify and assess the risks and to promote the expansion of the jaguar population.

Despite a long history of presence in the southern Arizona/Mexico borderlands, jaguar conservation did not begin in the area until 1996 (Johnson et al. 2009). A Jaguar Recovery Team (JRT) was convened in 2010 by the USFWS, and a recovery plan was developed in 2018 (USFWS 2018b). The plan designated two major units for jaguar recovery: the Northwestern Recovery Unit (NRU) and the Pan-American Recovery Unit (PARU). Because only 5% of one of the two units is located in the US, focus on recovery will occur in countries containing larger percentages of units. The plan seeks maintenance of at least two corridors between the U.S and Mexico for species dispersal and habitat connectivity. The plan does not include jaguar reintroduction, but instead stipulates sustainment of habitat, improving human perception of the species, and eliminating poaching.

Jaguar use a variety of habitats, including various forest types in South and Central America and evergreen and semi-evergreen rain and montane forests in Mexico. In the arid southwest, they inhabit pine-oak woodland, Madrean woodland, and Sinaloan thornscrub. Den sites vary but often consist of a natural cave, abandoned mine, an overhang or copse of dense vegetation (Brown and López González 2001). Jaguar home range size can be 10 to 20 square miles depending

upon the available prey base (Hoffmeister 1986), but a male documented in Arizona from 1996-2007 had a home range of 524.7 square miles (McCain and Childs 2008). They feed on a wide variety of animals; along the U.S./Mexico border, deer (*Odocoileus* sp.) and javelina (*Pecari tajacu*) are its primary prey base (USFWS 1997b).

Historically, the jaguar occurred in 21 countries and its range extended from Argentina north into Louisiana, Texas, New Mexico, Arizona, and possibly southern California (Johnson and Van Pelt 1997; USFWS 1997b). Currently the jaguar occurs in 19 countries (USFWS 2018b). There may have been a resident population in southwestern Arizona (USFWS 1997b); however, there is no evidence they are breeding in Arizona now, nor is there consensus that they bred here historically (Brown and López González 2001). From 1848 to 1997, only 84 jaguar occurrences were recorded in Arizona, and most were assumed to be transients (Johnson and Van Pelt 1997). Seven individual jaguars, and possibly eight, have been documented in the U.S. since 1996 (USFWS 2018b). A jaguar was recorded in the Huachuca Mountains between December 2016 and January 2018 and was documented using the Fort. This animal was poached in Mexico in June 2018. Another individual was photographed in the Dos Cabezas Mountains in November 2016 (USFWS 2017a) and continues to be observed, bringing the number to 4 individuals detected in Arizona since 2009. These individuals are assumed to be transient males from core areas in Mexico (USFWS 2018b).

There are 764,207 acres of critical habitat in the U.S. (USFWS 2014a). Lands owned and managed by the Fort were exempt from critical habitat designation, due to management actions addressed in the 2013 version of the INRMP (USFWS 2014a). As a requirement of the Fort's Programmatic Biological Opinion (PBO), the Fort monitors for this species. The increased detection of jaguar north and south of the border is a result of the use of remote automated cameras. These cameras are deployed throughout the environment and are generally white flash. The effect of the increased surveillance on jaguars is not known, physiologically (stress related) or otherwise, since this would be highly difficult to determine in the natural environment. It is generally assumed that if an animal maintains its route, it must not be negatively affected by this habitat manipulation. There are a number of reasons to question this line of reasoning; however, and the Fort is moving toward the use of more non-flash cameras in its monitoring program.

Primary threats to the jaguar population are loss and modification of habitat, poaching, and decline of prey species (USFWS 2018b). Jaguars in the U.S. are likely dispersing males from breeding populations in northern Mexico. Movement corridors are imperative to maintain; however, human developments may block access to corridors or fragment contiguous habitats needed to sustain a home range. Fences and highways may be particularly damaging for movement corridors (USFWS 2018b). Climate change models suggest full-scale habitat modification as well. Garfin et al. (2017) predicts replacement of the forest structure required by this species, gradually due to climate change or more quickly in the event of a catastrophic fire. The current conversion from native to invasive grass species, and the resultant altered fire regime, is a continuing threat to this habitat.

The Fort's HEFT program is providing increasing levels of protection to the habitat of this species, and the Fort's invasive species management program is increasingly important in the race against species replacement. Finally, while remote cameras provide biologists a useful tool to study jaguar activity, the same advantage is provided to poachers. This new tool may now pose a threat to the species. As noted above, the Fort is implementing the use of more non-flash cameras to reduce the potential for ill effect on the species.

Ocelot

Due to an inadvertent oversight, the U.S. population of the ocelot was not federally protected until 1982, when it was designated an endangered species (47 FR 31670). The species is designated as a Tier 1A SGCN by AGFD (2012). Critical habitat has not been designated; it was determined that it would not be in the best interest for conservation of the species (47 FR 31670). A recovery plan was developed in 1990 (USFWS 1990b) and the first revision was published in 2016 (USFWS 2016b).

The ocelot ranges from northern Argentina to the southern portions of Arizona and Texas (Hoffmeister 1986). In tropical America, the ocelot is found more often in forested habitats (Hoffmeister 1986). A study conducted in Texas revealed that ocelots occur in habitats with very dense brush, typically with greater than 99% cover. Optimal habitat consists of 95% canopy coverage in a contiguous dense brush stand of 100 acres or several small acres of good habitat if they cumulatively total a minimum of 100 acres and are in proximity to one another with brush between patches as a corridor (Tewes and Everett 1982). In Arizona, ocelot detections have occurred in semidesert grassland and Madrean evergreen woodland biotic communities with an average tree cover of 23% (Culver 2016).

One individual is known from as far north as Globe Arizona. Six individual ocelots have been documented in Arizona since 2009. Three of these animals have occurred in the Huachuca Mountains, one of which was killed in a collision with a vehicle in September of 2018. Before the 2009 detection in the Whetstone Mountains, the last confirmed ocelot observation in Arizona was in 1964 in the Huachuca Mountains (Girmendonk 1994). This occurred at high elevation just south of the Fort boundary. As a requirement of the Fort's PBO, the Fort monitors for this species. The use of remote automated cameras is responsible for the increased detection of ocelot north of the border. Unfortunately, most of these cameras use white flash and are heavily peppered throughout the animal's environment. It is not known what the effect of this increased surveillance may be having on the ocelot, physiologically (stress related) or otherwise, as this would be highly difficult to determine in the natural environment. There is one known incident of an ocelot rapidly reversing direction of travel upon receiving a flash camera frontal assault (D. Brewer personal observation).

Historically, the main threat to the ocelot was poaching and collection for the pet and fur trade, but habitat disturbance and loss, such as clearing brush for agricultural purposes at the northern end of this species' range and mining, are currently the largest threat to the species (USFWS 2016b). Garfin et al. (2017) predicts full-scale habitat replacement in forest structure, gradually due to climate change or more quickly in the event of a catastrophic fire, in projected climate conditions. This is likely to pose a significant threat to this species. The current conversion from native to invasive grass species, and the resultant altered fire regime, is a continuing threat to high elevation resources. Finally, as with the jaguar, while remote cameras provide biologists a useful tool to study ocelot activity, the same advantage is provided to poachers. This new tool may now pose a threat to the species.

The Fort's HEFT program is providing increasing levels of protection to the habitat of this species, and the Fort's invasive species management program is increasingly important in the race against species replacement. As noted above, the Fort is implementing the use of more non-flash cameras to reduce the potential for ill effect on the species.

Mexican Wolf

The Mexican wolf (*Canis lupus baileyi*), a subspecies of the gray wolf, was listed as an endangered species in 2015 (80 FR 2512) and is designated as a Tier 1A SGCN by AGFD (2012). Concurrently with the 2015 listing, a nonessential experimental population within the Mexican

Wolf Experimental Population Area (MWEPA) in Arizona and Mexico was approved, under Section 10(j) of the ESA to improve the population's ability to contribute to recovery. This area is located south of Interstate 40 in Arizona and New Mexico and into Mexico, encompassing the historical range of the species. The MWEPA was revised in 2015 (80 FR 2512). A recovery plan was developed in 1982 and has recently undergone its first revision, the 2017 binational Mexican Wolf Recovery Plan, First Revision (USFWS 2017b). The primary objectives of the first recovery plan were to halt extinction and explore the possibility of reestablishment in the wild, and those objectives were achieved (USFWS 2017b). The First Revision is focused on the strategy, criteria, and actions to fully recover the species.

Mexican wolves were initially released back into the wild in 1998 (63 FR 1752) in the MWEPA and the population in the U.S. has generally experienced robust growth since 2009. Between 2009 and 2017, 14 releases totaling 42 animals has grown to 113 wolves (as of December 2016) and wild-born wolves have been breeding and rearing pups successfully. This experience has demonstrated that population growth is driven by natural reproduction rather than captive release (USFWS 2017b). Fort Huachuca lies within Wolf Management Zone 2 of the MWEPA.

The most significant threats to the Mexican wolf are the destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreation, scientific, or education purposes; disease or predation (to include human-cause mortality); inadequacy of regulatory mechanisms; other natural or manmade factors. Of particular concern is lack of genetic diversity within the species, since the wolves in the U.S. are so closely related to one another. Genetic diversity is required for species' to adapt to environmental changes, and the potential for inbreeding depression to negatively affect future population growth of this species is real. The recovery plan addresses the need to insert genetic diversity from the captive population.

Sonora Tiger Salamander

The Sonora tiger salamander (*Ambystoma mavortium stebbinsi*) was listed as an endangered species in 1997 (USFWS 1997a), and is designated as a Tier 1A SGCN by AGFD (2012). Critical habitat has not been designated, but a recovery plan was approved in 2002 (USFWS 2002a).

Sonora tiger salamander eggs hatch in the spring or summer, and the larval stage of this salamander is aquatic. Approximately 30% of the larvae metamorphose into terrestrial adults in late summer and early fall. The remaining larvae either overwinter as larvae or mature into branchiataes (gilled aquatic adults). This species inhabits springs, cienegas, and livestock tanks (USFWS 1997a). Historically, the Sonora tiger salamander probably inhabited springs, cienegas, and possibly backwater pools that were extant long enough to support breeding and metamorphosis (at least two months), but ideally were permanent or nearly permanent, allowing survival of mature branchiataes.

The Sonora tiger salamander has been confirmed from the San Rafael Valley and adjacent portions of the Patagonia and Huachuca mountains in Santa Cruz and Cochise counties, Arizona. Currently known populations are in San Raphael Valley, Harshaw and Cooper canyons, Coronado National Memorial, and on Fort Huachuca. Salamanders suspected of being Sonora tiger salamanders were found in the Los Fresnos cienega in Mexico in 1990 (USFWS 2002a), but were not found during subsequent visits (USFWS 2007c). Three populations of Sonora tiger salamanders have been known to exist in the Huachuca Mountains. These salamanders occur in Scotia and Copper canyons off the installation and in Upper Garden Canyon on the installation. On Fort Huachuca, tiger salamanders are known from Upper Garden Canyon Pond near the crest of the Huachuca Mountains and the junction of Sawmill and Garden canyons. Five branchiate salamanders were salvaged from this pond in March 2013 as the pond was drying. Subsequent testing from tail clippings determined 4 of the 5 salamanders were Sonora tiger salamanders and

one was hybridized with the barred tiger salamander subspecies (*Ambystoma mavortium*) (Micheletti and Storfer 2016). No salamanders have been observed in this pond since the salvage took place in 2013. In 2014 the pond was rehabilitated by removal of excess sediment, to permit a longer retention period. Historically, salamanders were also found in the wastewater treatment ponds 4 and 5 and the golf course pond, however they were identified as the barred subspecies by Storfer et al. (1999). Populations in the wastewater treatment ponds were eradicated in the early 2000's when those ponds were drained and reconfigured as infiltration ponds, maintaining surface water for only brief periods of time.

Primary threats to the salamander include predation by non-native fish and bullfrogs, diseases (*Batrachochytrium dendrobatidis*, *Ambystoma tigrinum* virus, and ranavirus), catastrophic floods and drought, illegal collecting, introduction of other subspecies of salamanders that could genetically swamp Sonora tiger salamander populations, stochastic extirpations or extinction characteristic of small populations with low genetic variability (USFWS 2002a). Bagne and Finch (2013) predict loss of habitat with increased temperatures and Garfin et al. (2017) predict full-scale habitat replacement in forest structure, which will pose a significant threat to the habitat of this species.

Due to threats posed to the Sonora tiger salamander by predation and hybridization, a substantial effort has gone into monitoring and management of pond habitat. Upper Garden Canyon Pond habitat was rehabilitated in 2014, to increase water permanence and prohibit vehicular access. The Fort conducts annual monitoring to focus annual invasive management efforts. A total of 183 crayfish (*Orconectes virilis*) were removed from Upper Garden Canyon Pond between 2015 and 2016, and have not yet been re-documented. The first large scale effort to manage invasive salamanders and crayfish from other ponds which could serve as dispersal site was initiated in 2016. Since 2016, approximately 16,564 barred salamanders have been removed from woodcutters and gravel pit ponds and approximately 4,000 crayfish from Blacktail. The Fort will continue to opportunistically test for disease in Upper Garden Canyon pond. The current conversion from native to invasive grass species, and the resultant altered fire regime, is a continuing threat to high elevation resources. The Fort's HEFT and invasive flora and fauna management programs are providing increasing levels of protection to the habitat of this species.

Arizona Treefrog

The Huachuca/Canelo population of the Arizona treefrog (*Hyla wrightorum*) was identified as a candidate for federal listing in 2007 (USFWS 2007a). The USFWS determined that this population segment of Arizona treefrog, while discrete based on geography, did not meet the requirements of a distinct population segment and the species did not gain federal protection (USFWS 2016a). The species is designated as a Tier 1A SGCN by AGFD (2012).

The Huachuca/Canelo population of the Arizona treefrog breeds during and after rains occurring in June through August. Breeding occurs in shallow pools, ponds, and slow moving streams. Breeding choruses typically last for only 2-3 days, after which most frogs leave the breeding habitats. Eggs are laid in clusters attached to vegetation (Rorabaugh 2008). Tadpoles metamorphose in about 6-11 weeks (AGFD 2007a). Outside of the breeding habitat, little is known about this species. They have been found in trees as well as on the ground in wet or damp places such as meadows (Rorabaugh 2008). They are also found in caves in Arizona, including in the Huachuca Mountains on the Fort. This species feeds on a variety of small invertebrates, including spiders, beetles, and flies.

The USFWS recognizes 3 populations of Arizona tree frog: Mogollon Rim, Huachuca-Canelo, and Mexico (USFWS 2016a). Historically the Huachuca-Canelo population was known to occur in 13-15 locations isolated within the Huachuca Mountains and Canelo Hills. This population is known

from Madrean oak woodland and savannah, pine-oak woodland, and mixed conifer forest at elevations of approximately 5,000 to 8,500 ft AMSL (USFWS 2007a). It was previously estimated that the total breeding habitat for this population was less than 10 acres cumulatively, approximately 30% of which occurs on the Fort, with the remaining 70% occurring in the CNF (USFWS 2016a). However, information received after the candidate proposal in 2007 indicates that this population is much more widespread and numerous than previously thought (USFWS 2016a). More than 30 localities are known to exist with some being outside of the distinct population segment boundary of the Huachuca/Canelo population, but still within the Huachuca Mountains and Canelo Hills area (USFWS 2016a).

Species-specific monitoring and testing for the presence of chytrid fungus was initiated on the Fort in 2011. Both metamorphosed frogs and tadpoles were detected; animals tested negative for chytrid (Vernadero 2012a). Follow-on monitoring was conducted by the Fort between 2014 and 2017, where animals were tested opportunistically. Results of 24 samples revealed a single positive chytrid animal. In 2015, the Fort funded a study examining Arizona treefrog population diversity, structure, and connectivity within the Huachuca Mountain Critical Habitat region. This work found evidence of larger than expected effective population sizes, significant genetic differentiation between populations, and evidence of distance being the primary driver of gene flow between populations (Mims and Olden 2015). Gene flow was observed between populations despite significant genetic differentiation, suggesting that the breeding sites within the Huachuca's constitute a metapopulation. This work suggested that Arizona treefrog breeding populations in the region might be larger and more connected than previously understood (Mims and Olden 2015). One of the sites on the Fort; however, was found to be a large and genetically distinct population.

The most significant threats to the existence of the Huachuca/Canelo population of the Arizona treefrog are disruption of metapopulation dynamics, habitat loss, direct mortality due to catastrophic fire or drought, predation by introduced species, and habitat degradation caused by livestock grazing, off-highway vehicles, and environmental contamination (USFWS 2016a). Disease is also a threat as tree frogs are susceptible to Chytridiomycosis (Bradley et al. 2002). Threats and loss of habitat for this species is expected to increase with increased temperatures and wetland drying, due to climate change (Bagne and Finch 2013). Garfin et al. (2017) predict full-scale habitat replacement in forest structure, gradually due to climate change or more quickly in the event of a catastrophic fire, in projected climate conditions. This is likely to pose a significant threat to the habitat of this species. The current conversion from native to invasive grass species, and the resultant altered fire regime, is a continuing threat to high elevation resources. The Fort's HEFT, invasive species, habitat management, and disease testing programs are providing increasing levels of protection to this species.

Chiricahua Leopard Frog

The Chiricahua leopard frog (*Lithobates chiricahuensis*) (CLF) was listed as a threatened species in 2002 (67 FR 40789) and is designated as a Tier 1A SGCN by AGFD (2012). Prior to listing, the species had a documented decline of from 96 frogs in 1990 to 26 frogs in 1995 (Davies (1996). As a result, the USFWS, TNC, AGFD, USFS, a private land owner, and the Fort developed a 5-year conservation agreement to reduce threats to the species, stabilize its population, and maintain its habitat (USFWS and AGFD 1996). The agreement was implemented, but was ultimately unsuccessful. A final recovery plan was published in 2007 (72 FR 30820) and critical habitat was designated in 2012 (77 FR 16324) in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai Counties, Arizona (USFWS 2012b).

The CLF is known from nine sites in two canyons on the southeastern portion of the Huachuca Mountains including the Fort (RCLFCT 2000). The CLF inhabits a variety of water sources such

as rocky streams with deep rock-bound pools, river overflow ponds, oxbows, permanent springs, earthen stock tanks, and stock pond that are 1.0 to 4.3 ft deep. This species is limited to artificial ponds in Brown, Ramsey, Miller, Carr, and historically Tinker Canyon within a 3.7-mile radius on the east slope of the Huachuca Mountains (AGFD 2001b). Though the Tinker Canyon population was documented through 2000, it was one of the only sites where CLF co-occurred with invasive species. It was noted; however, that the CLF had not yet established in this pond and habitat manipulation (removal of 1000 tons of excess sediment, adding dead branches around the perimeter to increase habitat heterogeneity and predator avoidance/oviposition sites, perimeter bouldering to prevent vehicle access, and supplemental filling) was required (RCLCFT 2000).

As part of the CCA, CLF was introduced into the Lower Garden Canyon pond in September of 1996; the population was extirpated by late 1997. Based on observations, predation by exotic bullfrogs may have been an important factor and potentially water quality may have played a role as it was not precisely measured or monitored at the site (RCLFCT 2000). Other than this short-lived translocation site, surveys conducted by recovery team members between 1994 and 2000 did not document any additional populations of CLF outside of Tinker Pond on the Fort. According to Sheridan Stone (pers. comm. 2008), the Tinker Canyon population of CLF had not been observed on the Fort since Tinker Pond dried out in the early 2000s. Monitoring records from 2000 indicate that, between the months of April and October, no more than eight CLF were documented at a time and no more than 20 were documented in 1999 (John Roberts [EEC] unpublished year 2000 monitoring data). It is unknown whether the population decline was due to disease or other, but chytridiomycosis (chytrid) was documented during wintertime monitoring in January 1999 (RCLCFT 2000).

This species continues to decline in Arizona and it is suspected that predation by introduced non-native species (bullfrogs and fish) and disease (chytrid) are consistently more important threats than habitat-based factors (mining, contaminants, dams; diversions; stream channelization, groundwater pumping, woodcutting, urban and agricultural development, road construction, grazing, climate change, and altered fire regimes (USFWS 2012b). Threats to the species include loss of genetic variation and demographic stochasticity that result in increased probability of extirpation in small populations, environmental stochasticity in the form of floods, drought, habitat destruction, disease. Threats and loss of habitat for this species is expected to increase with increased temperatures and wetland drying, due to climate change (Bagne and Finch 2013). The Fort's HEFT, invasive species, habitat management (e.g. restoration of Tinker Canyon Pond in 2015 [Harris Environmental 2015]), and disease testing programs are providing increasing levels of protection to this species.

Northern Mexican Gartersnake

The Northern Mexican gartersnake (*Thamnophis eques megalops*) was listed as a threatened species in 2014 (79 FR 38677) and is designated as a Tier 1A SGCN (AGFD 2012). Designation of critical habitat was proposed in 2014 (78 FR 41550), but was not finalized. A revised critical habitat proposal (85 FR 23608) identifies approximately 27,784 acres in La Paz, Mohave, Yavapai, Gila, Cochise, Santa Cruz (Upper San Pedro River and Babocomari River etc.), and Pima Counties in Arizona, and in Grant County in New Mexico is awaiting finalization (USFWS 2020b).

This species ranges from southeastern Arizona and extreme southwestern New Mexico, southward into the highlands of western and southern Mexico, to Oaxaca (Stebbins 1985). The current distribution within the United States is believed to be constrained to the middle/upper Verde River drainage, middle/lower Tonto Creek, and the Cienega Creek drainage as well as in a small number of isolated wetland habitats in southeastern Arizona. The northern Mexican gartersnake has been found at Buffalo Springs in Area H on the West Range of Fort Huachuca.

Scotia Canyon of the Huachuca Mountains also has records of historical occurrence. The USFS and AGFD recently reintroduced this species in Scotia Canyon, just outside of the installation's boundary. Specifics of this reintroduction are unknown, but this species could easily move into Upper Garden Canyon Pond on the Fort due to the close proximity of the release site.

The northern Mexican gartersnake lives in dense vegetation along the banks or in the shallows of wetlands (cienegas and stock tanks) and streamside (riparian) woodlands from 3,000 and 5,000 ft (914 - 1525 m) (Rosen and Schwalbe 1988), but may reach elevations of 8,500 ft (2593 m). It feeds mainly in water on native fish and frogs and supplement their diet with organisms such as earthworms, lizards and small rodents (73 FR 71789). Females give live birth to their young.

Population numbers have been decreasing, with extirpations at several localities since 1950, as habitat is changed and introduced predators invade (Rosen and Schwalbe 1988). The snake is largely extirpated from its former range, now only occurring in a few isolated populations (Bagne and Finch 2013). The range-wide decline appears to coincide with the expanding range of introduced non-native species such as bullfrogs, crayfish, and non-native fish that directly prey upon and compete with the northern Mexican gartersnake and its prey base. Habitat loss resulting from improper livestock grazing, development, urbanization, water diversions, groundwater pumping, and climate change is also a significant threat.

Threats to the species include loss of genetic variation and demographic stochasticity that result in increased probability of extirpation in small populations, environmental stochasticity in the form of floods, drought, habitat destruction, disease, introduction of non-native predators, and vandalism. Threats and loss of habitat for this species is expected to increase with increased temperatures and wetland drying, due to climate change (Bagne and Finch 2013).

Gila Chub

The Gila chub (*Gila intermedia*) was listed as endangered in 2005 (70 FR 66664), is designated as a Tier 1A SGCN (AGFD 2012), and is listed as a sensitive species by USFS, Region 3 (AGFD 1996). Critical habitat was 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). Potential habitat may be present on the SPRNCA, but the species is not known to occur there. A draft recovery plan was developed for the species in 2014 (USFWS 2014c).

Gila chub are normally found in pools of smaller streams and cienegas throughout its range at elevations between 2,000 to 5,500 ft. Associated riparian plants include willows, tamarisk, cottonwood, seep-willow, and ash. The species is highly secretive and is dependent on undercut banks, terrestrial vegetation, boulders, root wads, fallen logs, and thick overhanging or aquatic vegetation for cover. Based on season and age, Gila chubs utilize diverse habitat types. Adults have been collected from deep pools with heavily vegetated margins and undercut banks while juveniles have been collected from riffles, pools, and undercut banks of runs. In larger stream systems the Gila chub utilize heavily vegetated backwaters for cover and feeding. Twenty-two Gila chub populations are assumed to remain (representing 10-15% of its historical range), including 3 populations repatriated populations, 2 in 1995 and 1 in 2005 (USFWS 2014c). These small and fragmented populations are susceptible to environmental conditions such as drought, flood events.

As previously discussed in Section 2.3.2, the species was released into Garden Canyon Creek in 1988 (from Turkey Creek in Canelo, Santa Cruz County) (Coleman 1988). According the USFWS (1998) reporting, the species was released in Garden Canyon Creek and a Fort Lake previous to

this in 1972. The Gila chub unable to establish itself on the Fort and was listed as absent in 1994 (USFWS 1998).

Threats to this species include climate change, aquifer pumping, stream diversion, habitat alteration, and competition by non-native crayfish as well as predation by and competition with non-native fishes. The Fort's efforts through the Army Compatible Use Buffer (ACUB), to encumber land to reduce groundwater withdrawal and through the Sentinel Landscape Partnership may provide a benefit to the Gila Chub.

Beautiful Shiner

The beautiful shiner (*Cyprinella formosa*) was listed as a threatened with critical habitat in 1984 (49 FR 34490), and is designated as a Tier 1A SGCN (AGFD 2012). Critical habitat for this species includes all aquatic habitats on the San Bernardino National Wildlife Refuge, located approximately 70 miles southeast of the Fort. A recovery plan has also been developed (USFWS 1995).

The beautiful shiner occurs mainly in pools of small to medium streams with sand, gravel, and rock bottoms. It has also been introduced into man-made ponds. Hendrickson et al. (1980) reported the largest populations found in the Rio Yaqui area were on riffles of smaller streams, or in intermittent pools of creeks that have a high percentage of riffle habitat in wetter periods. This species feeds on drifting aquatic and terrestrial invertebrates (Minckley and Rinne 1991). This shiner, like its close relatives, is likely an omnivore (Abarca 1991).

In Arizona, the beautiful shiner was previously found only in San Bernardino Creek, Cochise County. The species was extirpated from the U.S. by 1970. Over 700 fish were captured in Mexico and transported to Dexter National Fish Hatchery, New Mexico to establish a captive breeding program. A population was reintroduced into San Bernardino National Wildlife Refuge in 1990 and was still in existence in 2013 (Minckley 2013). Hendrickson et al. (1980) described this species as "relatively scarce throughout its wide range in the Rio Yaqui area." The beautiful shiner is not known to occur on the Fort or the upper San Pedro River basin.

Threats to this species include climate change, aquifer pumping, reduction in stream flows, water diversion, drought, and predation by and competition with non-native fishes (AGFD 2001b). The Fort's efforts through ACUB, to encumber land to reduce groundwater withdrawal and through the Sentinel Landscape Partnership may provide a benefit to this species.

Spikedace

The spikedace (*Meda fulgida*) is listed as an endangered species with critical habitat in 2012 (77 FR 10810) and is designated as a Tier 1A SGCN (AGFD 2012). This was an uplisting of the species' original designation as a threatened species in 1986 (51 FR 23769) and a revision of the critical habitat designated in 2007 (72 FR 13355). Revised critical habitat includes portions of the Verde River sub-basin, Gila River sub-basin, San Pedro River sub-basin, Eagle Creek sub-basin, San Francisco River sub-basin, and Bonita Creek sub-basin (USFWS 2012a). The spikedace recovery plan was published in 1991 (USFWS 1991).

Spikedace live in flowing water with slow to moderate water velocities over sand, gravel, and cobble substrate (Propst et al. 1986, Rinne and Kroeger 1988). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges (Propst et al. 1986). Spikedace live about two years with reproduction occurring primarily in one-year old fish. It feeds primarily on aquatic and terrestrial insects (Schreiber 1978, Barber and Minckley 1983, Marsh et al. 1989).

Historically, the spikedace is endemic to the Gila River basin of New Mexico, Arizona, and Sonora, Mexico (SFB 1996). In Arizona, this species was once widespread and occupied up to 1,600 miles of streams throughout the larger river systems, including the Gila, Salt, Verde, San Francisco, and San Pedro river systems (AGFD 1996). Reports of spikedace in the San Pedro River exist from as early as 1846 up through the 1950s and 1960s (SFB 1996; BLM 1989). Spikedace are currently known from a few creeks and rivers in Arizona and New Mexico, and the Aravaipa Creek population is the only extant population in the San Pedro River basin (NMDGF 2018a). This fish has otherwise been extirpated from the mainstream of the San Pedro River and its tributaries (SFB 1996; BLM 1989).

Spikedace do not occur on the Fort or in the SPRNCA; however, the upper San Pedro River is considered important recovery habitat. The BLM management plan for the SPRNCA contains specific objectives for reintroducing spikedace (BLM 2018). The USFWS recovery plan proposes reintroducing the spikedace within its historical range, and the San Pedro River system including the Babocomari River, north of the Fort, represents the most amenable historical areas in which to reestablish the spikedace (USFWS 1991).

Habitat destruction, and competition and predation from introduced non-native fish species are the primary causes of the species decline (Miller 1961, Williams et al. 1985, Douglas et al. 1994). Activities contributing to habitat loss include alteration of natural flow regimes, livestock grazing, mining, agriculture, timber harvest, and other developments. Introduction of non-native fish has resulted in increased predation upon the spikedace and increased competition for suitable habitat with other species of fish, particularly the red shiner (*Cyprinella lutrensis*) (USFWS 1991). Threats to the habitat of this species will only increase due to the effects of climate change. The Fort's efforts through ACUB, to encumber land to reduce groundwater withdrawal and through the Sentinel Landscape Partnership may provide a benefit to this species.

Gila Topminnow

The Gila topminnow (*Poeciliopsis occidentalis occidentalis*) is listed as an endangered species in 1967 (32 FH 4001) and is designated as a Tier 1A SGCN (AGFD 2012). A revised recovery plan was developed in 1998 (USFWS 1998). As of 2020, critical habitat for this species has not been designated.

The Gila topminnow inhabits marshes, permanent streams, intermittent streams, and cienegas at elevations below 4,500 ft AMSL. This species prefers areas with dense matings of algae, debris, and emergent or aquatic vegetation in slow-moving water. True to its name, the topminnow tends to congregate in shallower waters or near the surface of deeper waters in areas of moderate current, below riffles, and along the margins (Minckley 1999). The topminnow is omnivorous, foraging on organic detritus, algae and other plants, and invertebrates such as crustaceans, insects, and mosquito larvae (Minckley 1999).

In Arizona, the Gila topminnow was once common in the Rio Yaqui and Gila River basins, including the San Pedro River until the mid to late 1970s (BLM 1989). Reintroduction of this species in Arizona has been successful in restoring and establishing new populations in some areas (Sheller et al. 2006). Since the 1960s, at least 180 reintroductions have occurred throughout its historic range, and 37 of these attempts were on the Fort, Aravaipa Creek, and Babocomari Creek; most of these reintroduced populations have since disappeared (SFB 1996). The Gila topminnow now occurs in approximately 11 indigenous localities in southern Arizona. This species was re-introduced into Murray Springs, Horse Thief Draw, Ben Spring, and Little Joe Wetland on the SPRNCA (BLM 2018).

Threats to the species include habitat destruction by stream channelization, desiccation, removal of shoreline vegetation and competition with and predation by the non-native mosquitofish

(NMDGF 2018b). Threats to the habitat of this species will only increase due to the effects of climate change. The Fort's efforts through ACUB, to encumber land to reduce groundwater withdrawal and through the Sentinel Landscape Partnership may provide a benefit to this species.

Desert Pupfish

The desert pupfish (*Cyprinodon macularius*) was listed as an endangered species with critical habitat designated in 1986 (51 FR 10842) and is designated as a Tier 1A SGCN (AGFD 2012). The species is also listed as a USFS sensitive species and is endangered in Mexico. A federal recovery plan was approved in 1993 (USFWS 1993). Critical habitat was designated at Quitobaquito Springs, in Pima County, Arizona (USFWS 1986).

Pupfish were first described in the literature in 1853 from collections taken from the San Pedro River. The pupfish has since been the subject of considerable study because of its remarkable ability to survive under conditions of high water temperatures (100° F), low dissolved oxygen concentrations, high salinity, and abrupt changes in salinity and temperature. The desert pupfish typically occupy cienegas, springs, small streams, and the edges of larger bodies of water with shallow, clear water and soft substrates (USFWS 1993). Desert pupfish are opportunistic, diurnal omnivores that eat a wide variety of food items such as detritus, algae, ostracods, copepods, insects, worms, and mollusks. Young, larval pupfish appear to consume tiny invertebrates and become more opportunistic with age.

Despite its hardy nature, the pupfish has suffered severe population decline. Historically, the desert pupfish was common, but not continuous, below 5,000 ft AMSL in southern Arizona, southeastern California, and Mexico. In Arizona, the desert pupfish was once found within the Gila River basin, and probably within the lower Colorado, Agua Fria, Hassayampa, and Verde rivers (USFWS 1993). Only one indigenous population of desert pupfish exists in Arizona at the Quitobaquito Spring (SFB 1996). Reintroduction endeavors have been made in a number of locations throughout Arizona, including three unsuccessful reintroductions on the Fort: at Boston Water Catchment and Kino Springs in 1982 and Buffalo Corral Spring in 1988 (SFB 1996). Reintroduction of the Desert pupfish was recently conducted by the BLM into four locations on the SPRNCA: at Murray Springs, Horse Thief Draw, Ben Spring, and Little Joe Wetland. Additional reintroduction endeavors could occur within the Gila, Hassayampa, Agua Fria, San Pedro, Santa Cruz, Salt, and Verde River drainages (USFWS 1993).

Reasons for decline in pupfish numbers include groundwater pumping, dewatering of springs, stream impoundment, channelization, livestock grazing, timber harvest, mining, road construction, pesticide application, and interactions with non-native species (USFWS 1993). Exotic fishes, such as the western mosquitofish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), largemouth bass (*Micropterus salmoides*), and juvenile cichlids (*Oreochromis* ssp. and *Tilapia* ssp.) pose the greatest threat to extant desert pupfish populations (USFWS 1993). In addition, non-native bullfrogs may also prove to be a serious management concern for future reintroduction efforts. Threats to the habitat of this species will only increase due to the effects of climate change. The Fort's efforts through ACUB, to encumber land to reduce groundwater withdrawal and through the Sentinel Landscape Partnership may provide a benefit to this species.

Birds of Conservation Concern

In cooperation with Partners-in-Flight (PIF), the DoD prepared a management plan for bird species of conservation concern in 2014 (DoDPIF 2014). The *Strategic Plan for Bird Conservation and Management on DoD Lands*, identifies actions compatible and supportive of the military mission that achieve the overall PIF goal of maintaining secure populations of priority birds. The DoDPIF Policy is to work with partners to conserve birds and their habitats by protecting vital DoD lands and ecosystems, enhancing biodiversity, and maintaining healthy and productive natural

systems consistent with the military mission (DoDPIF 2014). The DoD's bird conservation goals, as identified in the DoD's Strategic Plan include: Bird/Wildlife Aircraft Strike Hazard (BASH), encroachment minimization, stewardship, habitat and species management, monitoring, research, partnership/cooperation, communication and education, and enhancing the Quality of life.

The DoD first partnered with the PIF initiative in 1991, and will celebrate its 30th anniversary in 2021. This partnership allows the DoD to be a leader in bird conservation and blend conservation actions with military preparedness on its lands. The DoDPIF provides expertise on the management and conservation of birds and their habitats to sustain and enhance the military mission, through the Army-PIF Center of Expertise (Center). The Center maintains an experienced group of professionals that provide technical support and guidance for managing and conserving migratory and at risk birds and their habitats. This includes both Army and DoD-wide PIF representatives whom are to be used as a resource for avian related support in addressing natural resource based issues and challenges (DoDPIF 2014). This contact list is posted to the Defense Environmental Network Information Exchange (DENIX) website.

Initially, the focus of bird species of conservation concern was on species that breed in temperate North America and winter in the tropics (neo-tropical migrants) that are in decline. Habitat loss, degradation, and fragmentation of the temperate breeding and tropical wintering grounds are likely the major reasons for these declines (Flather and Sauer 1996, Sherry and Holmes 1996), as is the loss of important stop-over habitat used during migration (Moore et al. 1993). In response to these declines, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued on 10 January 2001. This EO requires federal agencies to evaluate the effects of their actions and plans on migratory bird species of concern. Species of concern refers to those species listed in the periodic report *Birds of Conservation Concern*, produced by the USFWS and last updated in 2008. This list includes some non-MBTA-protected species, because their conservation status is of concern. The USFW's scale is based on the following plans or documents:

- Priority migratory bird species are documented in PIF Bird Conservation Plans,
- Waterfowl identified with a high or moderately high continental priority are identified in the North American Waterfowl Management Plan and the U.S. Shorebird Conservation Plan,
- Threatened and endangered bird species are documented in 50 CFR 17.11, and
- Migratory birds below desired population sizes are listed in 50 CFR 10.13.

In February 2007, the USFWS issued a Rule that authorizes incidental take of migratory birds for military readiness activities provided the installation has considered the environmental impacts of that activity through the NEPA process using the best scientific data available, and provided the Military Services' confer and cooperate with USFWS to develop and implement appropriate conservation measures to minimize or mitigate significant adverse effects of the proposed action. Regardless of whether an activity is readiness related or not, the impacts of the activity must be assessed through the NEPA process. The most recently signed cooperative agreement between the DoD and the USFWS, to promote the conservation of migratory birds, is the 2014 memorandum of understanding (MOU). Documentation and guidance related to MBTA management on Fort Huachuca is located in Appendix 4.

In addition to the MBTA, two species of eagles native to the U.S., the bald and golden eagle, have additional protections under the Bald and Golden Eagle Protection Act. This Act prohibits taking bald and golden eagles, their nests, parts and eggs, and defines take as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturbance" relates to activities

that affect the viability of eagle populations (e.g., from nest or chick abandonment), which would result from otherwise normal, lawful business practices such as operating a communication tower or powering a grid.

Birds are highly visible, via both sight and sound, and play an important ecological role. Birds disperse seeds and pollinate plants; insect-eating birds control insect pest outbreaks in forests, grasslands and croplands; raptors control rodent and other pest populations; and scavengers play a large role in nutrient recycling and preventing disease outbreaks. As such, birds are a sentinel of biodiversity and ecosystem health wherever they are found. Not only do they provide highly important ecosystem services that would be impossible and expensive to duplicate, but birds contribute to our quality of life and provide a grounding to the natural environment of which we are part of, but which we find ourselves ever increasingly separated. As a result of this important positive effect on our quality of life, birds drive ecotourism and bring direct benefits to many communities. Seventy-five percent of bird species that nest only in arid lands are in decline (DoDPIF 2014). Among mainland species, bird populations in grassland and xeric (dry and desert shrublands) habitats have shown the most rapid declines over the past 40 years (DoDPIF 2014). Birds that depend on intact forests also are declining, except wetland species and hunted waterfowl, whose populations have increased due largely to the strong focus on wetland conservation. Climate change has already influenced the abundance, distribution, and timing of migration and breeding for many bird species. Migratory bird species face significant population declines due to habitat loss and alteration, impacts from climate change, and other causes. Without intervention and proper management, some of these species may become listed as threatened or endangered under the ESA. Fort Huachuca's bird conservation goal is to maintain the testing and training mission while keeping common birds common, and to implement the proper intervention and management actions that will avoid species endangerment and reduce the potential that additional species become listed under the ESA.

Successful conservation of both listed and common species requires accurate and current information about the species, its population, habitat, and life-cycle. An understanding of the status of bird populations on the Fort is important from both a regulatory and an ecological perspective. In many cases, learning about the overall status of bird populations, including sizes and trends, requires working at regional and national scales, and will be incorporated as required, using the Coordinated Bird Monitoring (CBM): Technical Recommendations for Military Lands. CBM Technical Recommendations provide a thorough set of guidelines for the design of bird monitoring surveys on DoD lands (when, where, and how to monitor), and will be incorporated as applicable.

Breeding bird monitoring has been conducted on the Fort, as described in Section 2.3.2 (Birds). The grassland species listed in Table 2-8 include only those species identified as species of conservation concern, and were determined from the work of Aid (1990), Albrecht et al. (2008), and Andersen and Steidl (2019). The information for the species of conservation concern within woodland and forest habitats in Table 2-8 is taken from data collected from the nearby Patagonia North American Breeding Bird Survey (BBS) Route. This route traverses mostly shrubland and wooded habitat, and surveys have been conducted along this route from 1968 to 2018 (Pardieck et al. 2019). Species detected along this route would be expected to occur in the shrubland and woodland habitat on the Fort. The Patagonia BBS data were also compared with the Fort Huachuca eBird sightings to verify species have actually occurred on the Fort. In addition to species listed in the Birds of Conservation Concern 2008 report, the 2012-2022 Arizona State Wildlife Action Plan was also used to develop this table. Only Tier 1A and Tier 1B species have been included; Tier 1C species are not included due to their unknown status.

A total of 13 relatively common bird species have been detected on the grasslands of the Fort, 6 of which are identified as species of conservation concern. The grasshopper (*Ammodramus savannarum*) and Botteri's (*Aimophila botterii*) sparrow were the most abundant grassland species averaging over 4 birds per hectare. Twenty-four species of conservation concern were detected in the shrubland and woodland habitat along the Patagonia BBS route. Of these, the most abundant were the Lucy's warbler (*Vermivora luciae*) with over 1000 total detections. The dusky-capped flycatcher (*Myiarchus tuberculifer*) was the second-most abundant with over 500 total detections. The third-most abundant was the Canyon towhee (*Pipilo fuscus*) with over 400 total detections. All other species had below 400 total detections (Pardieck et al. 2019). These species, as well as many of the other species detected along the Patagonia BBS route, would be expected to occur in the shrubland and woodland habitat on the Fort. The careful use of the eBird data repository can be expected to provide a more accurate picture than the use of the Patagonia BBS route data to determine woodland habitat species occurrences, and will be used in the future. A total of 6 species of conservation concern were detected along the SPRNCA in 1997 (Table 2-8). The bell's vireo (*Pipilo aberti*) was the most common species based on total birds recorded during each survey period (Burt 1997). Here again, the careful use of eBird may provide useful insight to the accuracy of this number.

Table 2-8 Bird Species of Conservation Concern from Grassland Habitat on Fort Huachuca, Shrublands and Woodlands near the Fort, and SPRNCA Riparian Habitat

Common Name	Scientific Name	Grasslands ^{a,b,c}	Shrublands / Woodlands ^d	Riparian (SPRNCA) ^e
Abert's towhee	<i>Pipilo aberti</i>			X
Arizona woodpecker	<i>Dryobates arizonae</i>		X	
Bell's vireo	<i>Vireo belli</i>		X	X
Bendire's thrasher	<i>Toxostoma bendirei</i>		X	
Black-chinned sparrow	<i>Spizella atrogularis</i>		X	
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>		X	
Botteri's sparrow	<i>Aimophila botterii</i>	X	X	
Broad-billed hummingbird	<i>Cyanthus latirostris</i>		X	
Canyon towhee	<i>Pipilo fuscus</i>	X	X	
Cassin's sparrow	<i>Aimophila cassinii</i>	X		
Common nighthawk	<i>Chordeiles minor</i>		X	
Costa's hummingbird	<i>Calypte costae</i>		X	
Dusky-capped flycatcher	<i>Myiarchus tuberculifer</i>		X	
Elegant Trogon	<i>Trogon elegans</i>		X	
Gila woodpecker	<i>Melanerpes uropygialis</i>		X	
Gilded Flicker	<i>Colaptes chrysoides</i>		X	
Grasshopper sparrow	<i>Ammodramus savannarum</i>	X	X	
Lucy's warbler	<i>Vermivora luciae</i>	X	X	X
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>		X	
Phainopepla	<i>Phainopepla nitens</i>			X
Rufous-crowned sparrow	<i>Aimophila ruficeps</i>	X		
Rufous-winged sparrow	<i>Peucaea carpalis</i>		X	
Sulphur-bellied flycatcher	<i>Myiodynastes luteiventris</i>		X	
Thick-billed kingbird	<i>Tyrannus crassirostris</i>		X	
Varied bunting	<i>Passerina versicolor</i>		X	X
Violet-crowned hummingbird	<i>Amazilia violiceps</i>		X	
Yellow warbler	<i>Setophaga petechia</i>		X	
Yellow-billed cuckoo	<i>Coccyzus americanus</i>		X	X
Total		6	24	6

^a Andersen and Steidl 2019; ^b Albrecht et al. 2008; ^c Aid 1990 ^d Pardieck et al. 2019; ^e Burt 1997.

CHAPTER 3 ENVIRONMENTAL MANAGEMENT STRATEGY

This section presents the Fort's environmental management strategy within the context of the Army Strategy for the Environment and sustainability policies and programs. Sections 3.1 and 3.2 provide a summary of the Army Strategy for the Environment and a review of established Army sustainability programs and tools. Section 3.3 identifies the Fort's efforts in sustainability and outlines the proposed ecosystem management approach and adaptive management implementation process.

3.1 Army Environmental Strategy

In October 2004, the Army revised its basic strategy for managing the environmental concerns that affect its missions. The 2004 strategy, "Sustain the Mission--Secure the Future", was the first revision of fundamental Army thinking on the environment in 12 years and remains the strategy today. This strategy represented a major advancement in the Army's appreciation of the interdependence between the mission, the community, and the environment. The Strategy aimed to transition the Army's compliance-based environmental program to a mission-oriented approach based on the principles of sustainability, allowing the Army to meet its mission today and into the future.

The strategy is based on fostering recognition of the interrelationships among the Army's missions, the natural environment in which the Army trains and operates, and the communities that are affected by Army activities. It applies a community, regional, and ecosystem approach to managing natural resources on Army installations and has the following six U.S. Army goals:

- Foster an ethic within the Army that moves beyond complying with environmental laws and regulations to incorporating sustainability into all functional areas.
- Strengthen Army operations by reducing the Army's environmental footprint through more sustainable practices. For example, zero emissions of heat, light, noise, and waste, while improving environmental quality, also will reduce the Army's operational signature, environmental footprint, and logistical support tail.
- Meet current and future training, testing, and other mission requirements by sustaining land, air, and water resources.
- Minimize impacts and total ownership costs of Army systems, materiel, facilities, and operations by integrating the principles and practices of sustainability.
- Enhance the health, safety, and well-being of soldiers, Army civilians and families, and installation neighbors.
- Adopt innovative technology to meet Army sustainability goals.

These goals help Army leaders focus their thinking to address both present and future needs while strengthening community partnerships that improve the Army's ability to organize, equip, train, and deploy Soldiers as part of the joint force. It is the Army's obligation to ensure that Soldiers today and of the future, have the land, water, and air resources they need to train; a healthy environment in which to live; and the support of local communities and the American people (OASA-I&E 2004).

Along with Army Business Transformation, another highlighted Army Sustainability effort is to find means for improving Army efficiency without a loss of effectiveness. Further, Army Sustainability and the Army's Energy and Water Program mutually support reduced demand for energy and water and increased efficiency in their use, development of renewable energy, increased energy independence and cost savings from the sustainable and efficient use of energy and water.

3.2 Army Sustainability

Considerable progress has been made toward the integration and implementation of the Army Strategy for the Environment at the Major Command level. Much of the progress has manifested itself through the creation of new sustainability programs and the adoption of sustainability practices in existing Army strategic and resource planning. At the Installation or Regional Command level these new sustainability programs and changes to existing policy continue to be used in support of maintaining mission capabilities. The following sustainability programs have been widely adopted and promulgated within the Army community.

3.2.1 Army Installation Sustainability Planning

To build upon past successes in Army sustainability planning, the Army has re-tooled and re-organized its sustainability planning approach to more effectively integrate sustainability goals and objectives into the installation's existing Strategic Plans and organizational objectives. Through the experience of several recent projects at Fort Hood and Fort Carson, IMCOM has established a unique approach of customizing the sustainability planning process to allow for effective integration with existing strategic management systems. The IMCOM sustainability planning model has been or is being implemented at many Army installations including Fort Huachuca.

The Army's 2007 Sustainability Report marked the first time a U.S. government agency reported its sustainability measure using the framework and indicators established under the Global Reporting Initiative (GRI). The annual sustainability reports have both informed and engaged the Army's primary stakeholders on their progress to embody the principles of sustainability. They also challenged all members of the Army team to do all they can to learn about sustainability and become active agents for change and innovation in their mission areas. More than just highlighting success stories, the annual reports provide a complete index to all 87 recommended GRI sustainability performance metrics and identifies if the Army fully or partially reports the data. Of the 87 GRI recommended economic, environmental, and social responsibility performance metrics, the Army fully reported data for 33 and partially reported data on another 13. This level of reporting enables the Army to issue this report in accordance with GRI Application Level B. Fort Huachuca's renewable solar electricity generation achievements, of 17,415 kilowatts between FY14 and FY15, were recently highlighted in the 2016 Sustainability Report (OASAI E&E 2016).

3.2.2 Army Compatible Use Buffer Program

The ACUB program is an integral component of the Army's sustainability triple bottom line: mission, environment, and community. The program is an innovative tool to address adjacent land use issues and achieve conservation objectives by proactively addressing encroachment that causes costly workarounds or compromises training realism. Title 10, Section 2684a of the U.S. Code authorizes the DoD to partner with non-Federal governments or private organizations to establish buffers around installations for the protection of mission critical resources that sometimes extend outside the actual installation boundaries. The Army implements this authority through the ACUB program, which is managed jointly at Army Headquarters level by the offices of the Assistant Chief of Staff for Installation Management and the Director of Training.

ACUB allows an installation to work with partners to acquire/encumber land to protect habitat and training without acquiring any new land under Army ownership. Through the ACUB program, the Army reaches out to eligible partners to address the use or development of real property in the vicinity of, or ecologically related to, a military installation or military airspace, identify mutual objectives of land conservation and to prevent development of critical open areas. The program allows the Army to contribute funds to the partner's purchase of easements or properties from

willing landowners. These partnerships can preserve high-value habitat and limit incompatible development in the vicinity of military installations

3.2.3 Sustainable Range Program

The Sustainable Range Program (SRP) is the Army's overall approach for improving the way in which it designs, manages, and uses its ranges to ensure long-term sustainability. The SRP is defined by its core programs, the Range and Training Land Program (RTLTP) and the ITAM Program, which focus on the doctrinal capability of the Army's ranges and training land. To ensure the accessibility and availability of Army ranges and training land, the SRP core programs are integrated with the facilities management, environmental management, munitions management, and safety program functions to support the doctrinal capability.

The RTLTP provides the central management, programming, and policy for modernization of the Army's ranges and their day-to-day operations. The ITAM program monitors and maintains training sites and areas to help the Army meet its training requirements. ITAM provides the SRP with the capability to manage and maintain training ranges, sites, and areas by integrating mission requirements with environmental regulations and sound land management practices.

3.2.4 Sustainable Army Communities

The Army has developed and implemented a landmark policy to create Sustainable Army Communities that will improve the mission capabilities and quality of life for a worldwide network of over 180 Army bases that serve a population of over one million soldiers, civilians, and family members. The seminal Sustainable Army Communities Policy directs that the principles of Sustainable Design and Development be incorporated into all actions and decisions affecting Army bases, environmental planning, community operation, and infrastructure projects. The Sustainable Army Communities initiative will ensure that there is a systematic consideration of current and future impacts of an activity, product or life cycle decision on the environment, energy uses, natural resources, the economy, and quality of life on Army bases.

3.2.5 Energy and Water Goal Attainment Responsibility

The Army's goal is to obtain secure access to energy and water as well as to appropriately manage our natural resources with a goal of net zero energy, water, and solid waste at installations (DA 2017b). This policy requires installations to establish an installation energy and water masterplan that outlines the way in which installation's will meet specific energy and water security and reduction goals and renewable energy goals through management policies, behavior change, adoption of energy and water efficiency measures, investment in renewable energy and energy security technologies, and BMPs for operations and maintenance. Fort Huachuca's master plans are slated to be submitted in 2020.

3.2.6 Green Procurement

Green procurement is the purchase of environmentally friendly, or "green", products and services. It enhances and sustains mission readiness through cost effective acquisition that not only meets regulatory requirements, but also reduces resource consumption and waste generation. Army and DoD green procurement policy requires procurement and environmental organizations to assist purchasers in making the right decisions that result in cost effective, mission-enabling, and environmentally sound purchases.

The Army's procurement of green products and services contributes to sound management of financial resources, natural resources, and energy. In day-to-day operations, there is both the opportunity and the obligation to be environmentally and energy conscious in the selection and use of products and services. Proper attention to green procurement enhances the Army's

credibility and demonstrates commitment to environmental stewardship by becoming a model consumer of green products and services.

3.3 Fort Huachuca Sustainability

At Fort Huachuca, Sustainability planning is the responsibility of the Planning, Analysis, and Integration Office (PAIO). The current Fort Huachuca Sustainability Planning Team includes representatives from DPTMS, ENRD, PAIO, and Command staff. Many achievements have been made toward the integration and implementation of the Army's Strategy for the Environment on the Fort. Programs such as water conservation and water recharge, energy efficiency, pollution prevention, and ITAM have demonstrated the value of sustainable resource management at the Fort.

Following the IMCOM model for strategic planning for sustainability, the Fort is currently involved in the integrated planning process for the development of an Installation Sustainability Plan. The following high-level goals, designed to meet Strategic requirements and achieve sustainable operations, have been identified.

- Goal 1:** Fort Huachuca is the employer of choice - hiring, training, sustaining and supporting the right number of people with the right knowledge, skills, abilities, diversity, and motivation to work in the right jobs at the right time.
- Goal 2: Open Installation.** Through an open installation, for appropriate use by the entire community, incrementally provide state-of-the-art, accessible safe and secure services, facilities and amenities for residences on and off Post, that meet the needs of the entire community while embracing the unique environment and culture of the surrounding area.
- Goal 3: IT Infrastructure and Services.** All Fort Huachuca organizations have IT infrastructure and services at a level of service and availability that optimally balances total cost of ownership, mission requirements, and risk of system failures. Wherever possible and mutually beneficial, IT systems will be blended with community systems.
- Goal 4: Spectrum Management and Protection.** Safe, responsive and effective management of the RF environment on-post and off that accommodates both real-time and long-term mission support of all authorized users.
- Goal 5: Airspace Protection.** Management of the airspace is optimized to easily accommodate rapidly emerging national security requirements.
- Goal 6: Regional Land Use Cooperation.** Mutually beneficial land use planning and management with local stakeholders that supports regional, sustainable development that is compatible with mission (now and into the future), i.e., protects RF, airspace, and all other mission critical resources.
- Goal 7: Sustainable Facilities.** Fort Huachuca will provide sustainable, highly efficient facilities that maximize use of renewable energy and space to support dynamic mission requirements.
- Goal 8: Transportation.** Possess a multi-modal transportation capability to meet or exceed all mission requirements in an efficient and sustainable manner, such as maximizing the use of alternative fuels, local resources, education, and Army/community/state partnerships.

Goal 9: Maintenance. Be the regional provider of choice for field level and sustainment level maintenance, maximizing the use of green/innovative technology and a highly skilled local workforce.

Goal 10: Establish and fully implement an Army/community sustainability joint venture (non-profit organization) aimed toward incrementally maximizing sustainability initiatives such as:

- alternative energy generation;
- revolving fund for sustainability;
- creation of a sustainability officer position (strategic planning spec.);
- resource conservation;
- waste reduction / recycling;
- maximize space management;
- human resource efficiencies;
- job training programs; and
- sustainable yield of groundwater

These high-level goals are meant to consider the entire range of applicability for sustainable practices across the Garrison and its tenant Commands. These high-level goals provide a frame of reference for the development or continuation of sustainability programs and goals at the resource management level. Many existing sustainability programs occur at Fort Huachuca or are used by its Command and staff to maintain mission readiness.

A summary of the most notable occurrences related to the natural environment are listed below, followed by an overview of ecosystem management principals and the adaptive management implementation process, which both guide the execution of natural resource management goals and objectives identified in this INRMP.

3.3.1 Future Development Planning Goals

The Commander of U.S. Army Garrison, Fort Huachuca has established the following Mission and Vision Statement pertaining to future development in support of mission readiness at Fort Huachuca (USAG & Vernadero 2014):

“Fort Huachuca’s mission is to provide quality base operations support and installation services to our Soldiers, Families, Civilians, and Retirees that is commensurate to their service and sacrifice to our nation. Fort Huachuca’s vision is to lead the Army in environmental stewardship while fully supporting current and future missions through the consistent delivery of customer-focused services and programs that enhance the quality of life, safety, and security of the community.”

The manner in which Fort Huachuca sustainably supports its mission requirements from a built-environment perspective is guided by long-range planning in the Real Property Master Plan (RPMP). Future Development Planning goals are general statements stemming from the Commander’s Vision about ideal ends that the RPMP strives to support. The following set of long-term planning goals to drive future development of the Fort are presented in the RPMP: (USAG & Vernadero 2014).

- Soldier, Family, and Civilian Readiness: Ensure Fort Huachuca Soldiers, Families, and Civilians are able to meet the challenges of deployment and the Army’s Sustainable

Readiness Model (SRM) process as we provide proper training support, responsive services, and communities of excellence;

- Soldier, Family, and Civilian Well-being: Ensure Fort Huachuca Soldiers, Families, and Civilians are being cared for; and that the programs and services we provide enhance community life, foster readiness, and deliver a quality working and living environment;
- Installation Readiness: Ensure Fort Huachuca remains a platform of readiness supporting the Senior Commander's current and future requirements through regular modernization and new construction of standardized facilities to maintain efficient and sustainable operations and to enable the provisioning of effective services to our Soldiers, Families, and Civilians;
- Safety and Security: Incorporate Antiterrorism and Force Protection (ATFP) standards into future development and redevelopment. Also create a safe and functional installation;
- Energy and Water Efficiency: Create an energy and water efficient installation by holding users accountable for usage, modernizing facilities, installing new technologies, and leveraging partnerships that provide the Senior Commander an increased level of energy and water security, leading to a sustainable and resilient infrastructure and mission assurance at Fort Huachuca;
- Ecosystem Management: Implement an ecosystem management strategy to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Over the long term, the ecosystem approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies, human use, and the environment required for realistic military training operations.

Together these RPMP Future Development Planning Goals represent not only the future direction of facility development at Fort Huachuca, but also an acknowledgement of the adoption of the principles of sustainability within the real property master planning process.

3.3.2 Partnering for Sustainability

Fort Huachuca maintains collaborative relationships with a number of federal, state, and local entities. Effective partnerships and collaborations result in efficient and effective cooperative natural resource management. These relationships provide a means by which the Fort and other agencies, organizations, and individuals can share ideas, talent, and financial resources, providing a means in which natural resource can be managed and protected across administrative boundaries. These relationships have become essential to the Fort's success in implementing its Sustainability goals and objectives.

Encroachment Reduction

As with many installations, the Fort experiences training and testing limitations due to urban development and regulatory requirements. Local growth is increasing throughout the region and threatens to impact Fort airfields, EM spectrum, and training areas. If left unchecked, this growth and its associated impacts on airspace, water, and the electromagnetic spectrum will ultimately result in the degradation of military training and deployment capabilities. The Fort has tapped the ACUB program to reduce the potential for incompatible land use by buffering agricultural and undeveloped areas under the R2303 airspace; manage the regional water table adjacent to the San Pedro Riparian Area that contains critical habitat for the Huachuca water umbel and potentially other species; and minimize the expansion of electromagnetic background noise that

could adversely impact installation abilities to conduct realistic electromagnetic training and testing.

The Fort is leading a multi-agency collaborative effort and has entered into a cooperative agreement under the ACUB program for the establishment of conservation easements within the Sierra Vista Subwatershed (See Appendix 7). Cooperating partners for this program include TNC, AZLWT, Cochise County, USFWS, BLM, Sentinel Landscape committees, and the Upper San Pedro Partnership (USPP) who are all actively working on water use, endangered species management, and open space issues within the Sierra Vista Subwatershed. The ACUB program will assist the Fort in implementing the Sikes Act, endangered species management, and recovery programs on the Fort and within the SPRNCA and the Sierra Vista Subwatershed. The Fort will continue to work with the cooperating agencies, and any other willing partners to aggressively search for conservation easement opportunities.

The State of Arizona Military Affairs Commission was created by EO 2004-04, on March 2, 2004. The Commission is the permanent body to monitor and make recommendations to the Governor on executive, legislative and federal actions necessary to sustain and grow Arizona's network of military installations, training and testing ranges and associated airspace.

Water Conservation

Fort Huachuca is a member of the USPP, formed in 1998 to implement sound water resource management and conservation strategies for the intended purpose of preserving the SPRNCA and to ensure the long-term viability of the Fort. The Partnership is a consortium of 21 agencies and organizations, public and private, which own and or manage land or water use in the Sierra Vista Subwatershed of the Upper San Pedro River Basin. Member agencies signed a MOU that commits them "to coordinate and cooperate in the identification, prioritization and implementation of comprehensive policies and projects to assist in meeting water needs in the Sierra Vista Sub watershed" and to identify funding for projects that address this goal.

The Cochise Conservation and Recharge Network (CCRN) was established in 2015 and is a collaborative partnership of several municipalities and Cochise County to implement tangible water management projects that will increase groundwater availability to meet current and future water demands in the region. The CCRN has several active projects in the region that are promoting water conservation and recharge. The Fort is not a member of the CCRN, but does work collaboratively with the CCRN members to help increase water conservation and recharge in the region.

In addition to the above partnership, the Fort has engaged in a mutually beneficial partnership with Huachuca City. The Fort and the City of Huachuca City have entered into an Intergovernmental Agreement in which the Fort has agreed to accept raw effluent from Huachuca City. This supplemental water, after treatment is used for additional aquifer recharge and reuse on the Fort. The combined infrastructure of the forced main at the Fort, and the holding basins at Huachuca City, was completed and the system became operational in July, 2016. In calendar year 2018, the total raw wastewater received from Huachuca City was 15,625,000 gallons or 47.93 afa. The Intergovernmental Agreement has resulted in an increase in aquifer recharge. In 2018, the total aquifer recharge was 246.21 afa.

Regional Wildland Fire Planning

Interagency and mutual aid agreements along with coordination with the USFS, State Parks, State Lands, TNC, SPRNCA, the Audubon Research Ranch, and private ranchers providing opportunities for the Fort to participate in the Huachuca Firescape Management Plan (HFMP) covering the 500,000-acre borderline-area, allowing cross-jurisdiction collaborations on wildland

fire use, prescribed burns, suppression, and non-fire fuels reduction around developed and other sensitive areas. The intent of the HFMP is to take on projects that participants are unable to accomplish on their own. In addition, the Fort cooperates with seven local fire districts on fire management activities covering mutual assistance for both structural and wildland fire. This agreement can be found in the Integrated Wildland Fire Management Plan.

The Fort's 2014 HEFT Plan identified nine treatment units on the Fort and two treatment units on adjacent USFS. The Fort is now in its fifth year of fuels reduction treatments in the high elevation zone, and is serving as a model which the USFS is planning future work in HEFT units adjacent to the Fort's boundary. This will greatly enhance the Fort's efforts and reduce the potential of widespread, high severity, stand-replacing fire across jurisdictional boundaries and protect special-status species habitat.

State and Federal Comprehensive Wildlife Planning

The Comprehensive Wildlife Conservation Strategy (CWCS), developed by AGFD and accepted by the USFWS in April 2006, integrated diverse stakeholders' ideas and concerns into a single, comprehensive vision for managing Arizona's fish, wildlife, and wildlife habitats. In 2012, the SWCS was revised by AGFD and its partners, and is now called SWAP. The current SWAP can be viewed on AGFD's website: http://www.azgfd.gov/w_c/cwcs.shtml. The SWAP complements existing plans, conservation projects, strategies, and conservation actions aimed at promoting partnerships and coordination efforts.

Fort biologists are involved in committees or working groups (WG) formed by AGFD for a number of species and they turn applicable conservation recommendations into management actions. The Fort will continue to coordinate with AGFD to protect special-status species occurring on the Fort.

The BLM manages the SPRNCA. The Fort coordinates with BLM to conduct threatened and endangered species surveys activities on the SPRNCA. The BLM SPRNCA Resource Management Plan can be viewed and obtained from the BLM website: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage¤tPageId=48115>

3.3.3 Tools for Sustainability

Effective tools for sustainability in natural resource planning include NEPA documentation, USFWS consultation, and adaptive ecosystem management. These procedures provide a means by which projects are reviewed and experts consulted to identify areas of natural resource concern and develop the most effective solution to meet mission needs and environmental requirements.

NEPA

NEPA is the Fort's primary planning tool for the evaluation of projects and actions that may potentially affect the environment. The purpose of NEPA is to include environmental consideration into Federal agency planning and action. This is done by providing decision makers and other stakeholders with the information they need to understand potential environmental impacts of proposed actions. One of the basic principles of NEPA is that people make better decisions when they have clear information about the consequences and trade-offs associated with taking any given course of action. Title 32, CFR Part 651 is the Army's NEPA regulation. An important benefit of proper NEPA implementation is that projects are often enhanced by the effort. Siting is one of the most common examples of project enhancement. When natural resources managers understand mission/project requirements in terms of land features and requirements, they often not only offer more potential site options to mission or project planners, but also offer alternatives

to avoid future environmental conflicts. The ENRD of the DPW has primary responsibility for NEPA implementation on the Fort. An Environmental Assessment (EA) is prepared to cover Fort actions providing for current, comprehensive NEPA documentation for the natural resources program as a whole.

USFWS Consultation

Fort Huachuca ENRD coordinates all activities that may have an effect on threatened and endangered species or their habitat with the USFWS. Prior to 1993, consultation on listed species was combined with NEPA compliance documents. Since 1993 threatened and endangered species consultations have taken the form of USFWS concurrence on Army determinations of “no affect” or “not likely to adversely affect”. However, by 1993 as more species on the installation began to receive Federal protection, programmatic consultations were initiated. The 1995 PBA and the resulting 1999 PBO were the first documents developed for programmatic consultation. This effort was followed by programmatic consultations and resultant Biological Opinion’s in 2000, 2007, and 2014. The Fort completed its most recent PBA in 2013 and is presently managing relevant species according to requirements outlined in the 2014 PBO issued by the USFWS. This Programmatic agreement was developed to cover future expectations and is expected to cover all near-term mission-related activities through 2024. In addition to the 2013 PBA, separate Biological Assessments were developed to cover live fire range on the South range (Range 1B) and the demolition of a current runway, development of a new runway, and the development of a UAS Class 1-4 Laser Testing and Training Range on the West Range. The Fort will continue to engage with the USFWS as future actions require in regard to the ESA and AR-200-1. This INRMP has undergone USFWS and AGFD review.

Ecosystem Management

Ecosystem management is widely encouraged at the Installation level as a solution to many local, regional, national, and international natural resource management issues. The importance of focusing on the management of ecological processes instead of products, and the use of integrated ecosystem management cannot be understated. The disjointed nature of solely managing for specific priority species has proven inefficient and ineffective in the long-term. While specific priority species are being protected for the time being, the habitat and ecosystems around and beyond them are being denied necessary management, thereby increasing their susceptibility to disruption due to invasion of exotic species, increased fuel loads, fragmentation, and the potential effects of climate change.

Most Army natural resource managers agree on the general substance of ecosystem management; that is, management that preserves and sustains the ecosystem while providing a range of goods and services to current and future stakeholders. This viewpoint is shared by Fort Huachuca’s resource managers. Grumbine (1994) surveyed published papers and several federal and state-level documents to determine whether an agreement on the meaning of ecosystem management exists. He found that within the overall goal of sustaining ecological integrity, five specific goals were frequently endorsed:

- Maintain viable populations of all native species in situ;
- Represent, within protected areas, all native ecosystem types across their natural range of variation;
- Maintain evolutionary and ecological processes (i.e., disturbance regimes, hydrological processes, nutrient cycles, etc.);
- Manage over periods of time long enough to maintain the evolutionary potential of species and ecosystems; and

- Accommodate human use and occupancy within these constraints.

The real challenge, however, is to develop a robust process to decide how to apply ecosystem management at the Installation level. To do this requires not only an understanding of what an ecosystem is, but just as importantly how we apply the management paradigm and how ecosystems and management paradigms interact.

Regardless of whether they are multiple-use, dominant use, maximum sustained yield, maximum equilibrium yield, optimum sustained yield, scientific management, watershed management, natural resources management, or environmental protection, natural resource management paradigms are based on values and priorities. Each paradigm has, either formally or informally, accepted a set of values and priorities. There may have been a formal process to derive values and priorities or they may have been imposed by legislative action or DoD policy, but the basis is some assumption about the Army's values and priorities. Ecosystem management is no different.

Lackey (1998) provides the following useful and practical pillars of ecosystem management that complement the Army Strategy for the Environment:

- Ecosystem management reflects a stage in the continuing evolution of social values and priorities; it is neither a beginning nor an end.
- Ecosystem management is place-based and the boundaries of the place of concern must be clearly and formally defined.
- Ecosystem management should maintain ecosystems in the appropriate condition to achieve desired social benefits; the desired social benefits are defined by society, not scientists.
- Ecosystem management can take advantage of the ability of ecosystems to respond to a variety of stressors, natural and man-made, but there is a limit in the ability of all ecosystems to accommodate stressors and maintain a desired state.
- Ecosystem management may or may not result in emphasis on biological diversity as a desired social benefit.
- The term sustainability, if used at all in ecosystem management, should be clearly defined - specifically, the time frame of concern, the benefits and costs of concern, and the relative priority of the benefits and costs.
- Scientific information is important for effective ecosystem management, but is only one element in the decision-making process that is fundamentally one of public or private choice.

Together, these seven pillars can assist Army natural resource managers to better implement ecosystem management at the Installation level through a better understanding of the current Army policy, values, and priorities.

Adaptive Management Implementation Framework

Adaptive management is widely recognized as an intelligent approach to the management of natural resources under uncertainty. As originally conceived, adaptive management can be defined as the systematic acquisition and application of reliable information to improve management over time. Although developed in the 1970s (Holling 1978), adaptive management is still a poorly understood concept that has been repeatedly misapplied or misappropriated. Many natural resource managers are not aware of the scientific principles underlying genuine adaptive management.

Adaptive management is a cyclic, learning-oriented approach to the management of complex environmental systems that are characterized by high levels of uncertainty about system

processes and the potential ecological, social and economic impacts of different management options (Jacobsen 2003). As a generic approach, adaptive management is characterized by management that monitors the results of policies and/or management actions, and integrates this new learning, adapting policy and management actions as necessary (Yousefpour et al. 2012). As a specific approach, it involves the integration of multiple knowledges (scientific, local, and indigenous) in the exploration of a management "problem", in management goal setting, and in management planning (Yousefpour et al. 2012). Quantitative models of the ecological system are then used to explore management uncertainties and assumptions in knowledge and to assess policy and management options. Policy and management is then implemented experimentally, actions are monitored, and the results are integrated to modify policies and management actions, to reassess assumptions in models, and to re-assess goals.

Understanding of adaptive management can be enhanced by first understanding the alternatives: deferred action and trial and error (Walters 1978). Under deferred action, an ecosystem is not managed until after it is understood. Only minimal disturbance is allowed while basic research is conducted to determine key processes and relationships. Deferred action is an ecologically cautious approach, but it has an economic cost due to the discounting of future revenues. The longer management is deferred, the larger the loss in net present value (Herfindahl 1975). Consequently, deferred action is unattractive to most DoD land managers in addition to a sound scientific argument against deferred action. Behavior of an undisturbed ecosystem can be dramatically different than that of a managed ecosystem, so knowledge acquired while deferring action may not be valid for the managed ecosystem (Walters 1978).

Trial-and-error has been and continues to be the dominant paradigm in natural resource management. Trial and error typically emphasizes the "trial", which entails resource utilization and produces revenue, but neglects error detection, which entails costly monitoring. Trial-and-error approaches are also referred to as "learning by doing" or "evolutionary"; both monikers are misleading. Managers undoubtedly learn by doing, but particular types of learning do more harm than good. Casual observations, anecdotal reports, and unreplicated case studies lack statistically valid experimental design and are likely to yield unreliable information. Managers relying on these types of learning may fail to detect errors that cause damage to the environment and risk perpetuating harmful policy. Although biological evolution might be a trial-and-error process, each individual in a population is a trial, so there are many trials running simultaneously. Under trial-and-error, managers typically implement a single policy and assume it is satisfactory until proven otherwise. Trial-and-error undervalues information, so data collection is poorly funded. For this reason, trial-and-error appears to be relatively inexpensive, and it will be if all goes as expected. But natural resource management is full of surprises and if all costs are considered, the costs of undetected environmental damage, management inefficiencies, interrupted operations, lawsuits then trial and error may be relatively expensive over the long run. The heated controversy over management of national forests in the Pacific Northwest demonstrates the myriad shortcomings of trial and error. Adaptive management was developed to reduce such uncertainties and to provide a strategic process to assess the underlying factors and cross-scale interactions affecting ecosystem productivity (Birge et al. 2016).

Major drivers of change are generated internally under adaptive management and regular adjustments to policies are acknowledged as necessary and desirable. Information is highly valued, so data collection is well funded. The costs of research and monitoring make adaptive management seem relatively expensive but if all costs are considered, then adaptive management may be relatively inexpensive over the long run. In theory, investments in reliable information should yield excellent returns in the sustainable use of natural resources. Furthermore, adaptive management forces natural resource managers to acknowledge uncertainty and to construct a plan by which decisions and strategies are modified as knowledge

accumulates from experience. We can expect more continued failures if adaptive management is not implemented in a determined and widespread manner within natural resource programs and operation activities.

CHAPTER 4 PROGRAM ELEMENTS

This chapter provides a summary of the natural resource program elements and defines specific management goals and objectives necessary to effectively manage the natural resources on the Fort while supporting the mission. Listed under each program element is a series of actions that support the management of that element, including current and proposed management goals and objectives, which will enable the Fort to continue moving from compliance-based management to a mission-oriented approach based on the principles of sustainability, or sustainable ecosystem management.

4.1 Philosophy, Guiding Principles, and General Approach

To achieve the Army Strategy for the Environment: *Sustain the Mission, Secure the Future*, each entity must incorporate the “Triple-bottom Line” of Mission, Environment, and Community into all plans, processes, and actions. Fort Huachuca’s natural resources management program is driven by the need to maintain sufficient natural areas and varied vegetation that will allow sound and realistic tactical training and support sensitive species and their habitats into the future. Fort Huachuca’s natural resources management philosophy is to enhance the capability and resiliency of its acreage to sustain current and future military training requirements through coordination, within and outside installation boundaries, and implementation of programs and that achieve and surpass the conservation-relevant regulatory requirements. Using sustainability as a conceptual planning framework requires the Fort to proactively identify future requirements and challenges and take appropriate action to mitigate or eliminate obstacles before they impede the mission.

4.2 Special Status Species Management

This program element includes federal threatened, endangered, candidate species and species of concern to include state SGCN and other sensitive species, as well as critical and sensitive habitats. The Fort conducts annual surveys for a number of special-status species and develops and implements species management plans where applicable. Natural resource specialists within ENRD manage for these species and either coordinate with the state or consult either formally or informally as needed and required by the ESA.

4.2.1 Federally Listed Species

The ESA requires all federal agencies to conserve listed species. Conservation, as defined by the ESA, means the use of all methods and procedures necessary to bring any listed species to the point where protections pursuant to the ESA are no longer necessary. The act specifically requires agencies not to “take” or “jeopardize” the continued existence of any endangered or threatened species, or to destroy or adversely modify habitat critical to any endangered or threatened species. Under Section 9 of the act, *take* means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect”; under Section 7, “jeopardize” means to engage in any action that would be expected to “reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.”

On 27 September 1994 the DoD signed a multi-agency MOU on implementing the ESA. The purpose of the MOU was to establish a general framework for greater cooperation and participation among the agencies exercising their responsibilities under the ESA. The MOU states that the departments will work together to achieve the common goals of (1) conserving species Federally listed as threatened or endangered, (2) using existing Federal authorities and programs to further the purposes of the ESA, and (3) improving the efficiency and effectiveness of interagency consultations conducted pursuant to Section 7(a) of the ESA.

On 25 June 2018 the DoD signed a second MOU, directly between the DoD and the USFWS, establishing a partnership to develop and promote effective ecosystem and species conservation and recovery initiatives to reduce or eliminate the need for federal protection and regulation under the ESA and provide for increased flexibility for military mission activities. This cooperation will occur through the Recovery and Sustainment Partnership Initiative and the development of a Recovery and Sustainment Coordination Committee. The goals of this initiative are to facilitate decision making for species review and down/de-listing through existing processes; identify and establish collaborative conservation initiatives to move species towards recovery and/or preclude the need to list additional species, and develop innovative regulatory approaches and tools for achieving ESA objectives in a manner consistent with military mission needs and objectives.

Army policy on listed species includes the following elements: balancing mission requirements with endangered species protection, cooperating with regulatory agencies, and conserving biological diversity within the context of the military mission. As required by AR 200-1, the Army must ensure that it carries out mission requirements in harmony with the requirements of the ESA. All Army land uses, including military training and testing, recreation, and grazing, are subject to ESA requirements for the protection of listed species and critical habitat. In fulfilling its conservation responsibilities, the Army is required to work closely and cooperatively with the USFWS and National Marine Fisheries Service (NMFS). Installations are encouraged to engage in informal consultation with the USFWS and NMFS during the planning of projects or activities to ensure ESA compliance. In conserving biological diversity, installation commanders and Army natural resource managers are required to develop and implement policies and strategies to maintain viable populations of native plants and animals, maintain natural genetic variability within and among populations, maintain functioning representations of the full spectrum of ecosystems and biological communities, and integrate human activities with the conservation of biological diversity. The Army requires installations to prepare and implement an Endangered Species Management Component (ESMC) to the INRMP consistent with current policy and guidance. Endangered Species Management Components must prescribe area-specific measures necessary to meet the installation's conservation goals for species and critical habitats.

4.2.2 State Listed Species of Greatest Conservation Need

This list includes only those species that AGFD considers most in need of conservation actions and for which they have statutory responsibility as defined in Arizona Revised Statutes Title 17. DoD/DA policy (DoDI 4715.03, Enclosure 3(3)(d) and AR 200-1, 4-3[5][w]) requires that garrisons/installations provide for the protection and conservation of state protected species when practicable. That is to say, it should provide similar conservation measures for state-listed species as are provided to species listed under the ESA, as long as such measures are not in direct conflict with the military mission. When conflicts do occur, consultations should be conducted with AGFD to determine if any conservation measures can be feasibly implemented to mitigate impacts.

4.3 Management Goals and Objectives

Goals and objectives are presented for each program element listed below. The intent of each goal is to be visionary, ideal, and general in character and to provide long-term guidance in defining the direction and purpose of the program. The program element objectives represent tangible and measurable benchmarks to help meet program goals.

4.3.1 Special Status Species

Fort Huachuca's management goals for special status species are to preserve these species and conserve their habitat in accordance with the ESA, Endangered Species Recovery Plans, approved ESMCs, U.S. Army regulations and guidance, science-based ecosystem management

(a land use decision-making and land management practice that takes into account the ecosystem's full suite of organisms and natural processes), and ecological sustainability (the tendency of a system or process to be maintained or preserved over time without loss or decline) to the extent practicable.

Goal A-1 Manage for ecosystem integrity to enhance the military mission, moving beyond single species conservation to improve the native biodiversity, sustainability, and resilience of ecosystems.

Objective A-1 Collaborate with stakeholders to develop a shared vision of what constitutes desirable future ecosystem conditions, and to begin to develop a coordinated approach to working toward this vision.

Objective A-2 Incorporate ecological functions, climate change considerations, and landscape-level planning in all proposed projects, through NEPA or other appropriate environmental review processes, to adjust limiting factors and promote endemic species.

Objective A-3 Incorporate roadside maintenance BMPs to maintain or increase nectar sources for pollinators.

Objective A-4 Establish and implement a habitat monitoring plan to document and assess changes that may be occurring due to climate change and provide information with which effective habitat and species management can be based.

Objective A-5 Develop and implement a plan to manage for dark skies and against light pollution, which provides for safety, secures habitat values, protects species natural biorhythms, and elevates Fort Huachuca as a recognized dark skies location. Annually assess lighting and lighting practices, identify lighting in conflict with these goals, and implement a replacement and realignment program to bring lighting in alignment with Plan goals.

Objective A-6 Develop and implement a plan to assess and manage Fort Huachuca's soundscape relevant to wildlife needs (resource procurement, predator avoidance, and mating and reproduction needs), as well as the enhancement of the recreational experience. Identify proactive measures to reduce or eliminate anthropogenic noise in the natural environment, while enhancing military training.

Goal A-2 Manage special-status species and their habitats in a manner consistent with accepted scientific principles and in compliance with federal, state, and local environmental laws and regulations. Emphasis will be placed on the maintenance and restoration of habitat favorable to the production of indigenous species. The potential effects of climate change will be considered and inform the management of these resources.

Objective A-7 Review special-status species (Section 2.3.4) management plans and schedule updates and development where appropriate. Ensure annual monitoring components and habitat enhancement projects are implemented.

Objective A-8 Conduct annual reviews of the INRMP, and update as necessary, to serve as a management and conservation plan that benefits any new federally listed, proposed or candidate species, or other special-status species that occur on lands used by Fort Huachuca to obviate the need for critical habitat designation on the installation.

Objective A-9 Annually attend symposia, workshops, and conferences that present information on research and management of federally listed, proposed, or candidate species and other special-status species that occur on or near lands used by the Fort and integrate knowledge to improve management programs for these species.

Goal A-3 Integrate the Adaptive Management Approach into the design and implementation of all projects and activities.

Objective A-10 Develop and implement an effective monitoring component designed to evaluate the effectiveness of activities for all current and future proposed projects.

Objective A-11 Conduct annual reviews and assessments of all monitoring programs to ensure implementation of appropriate, science-based adjustments as necessary.

4.3.2 Terrestrial and Aquatic Wildlife

Fish and wildlife management is primarily focused on the management of the largest extent of each natural habitat type, thereby permitting the natural system to retain its inherent ability to self-maintain, which ultimately requires fewer external resources to manage species. Resource specialists within ENRD emphasize the maintenance, restoration, and enhancement of habitat favorable to the production of indigenous terrestrial and aquatic species and their habitats, and ultimately to ecosystem sustainability and biological diversity. Fort Huachuca is committed to the management of terrestrial and aquatic wildlife populations and their habitats consistent with accepted scientific principles and in compliance with the ESA and other applicable laws and regulations.

Goal B-1 Manage wildlife in order to conserve and enhance diversity and ecosystem integrity while supporting and enhancing the immediate and long-term military mission.

Objective B-1 Implement annual habitat restoration projects in coordination with ITAM where possible.

Objective B-2 Establish and implement a wildlife monitoring plan and schedule in coordination with ITAM to identify the condition (e.g., species richness, species diversity, relative abundance, density, distribution, viability, and habitat condition) of terrestrial and aquatic wildlife resources on Fort Huachuca's training lands.

Objective B-3 Develop and implement a plan to maintain and develop, as needed, supplemental sources of surface water for wildlife to mitigate loss of natural water sources.

Objective B-4 Establish and implement a cooperative review and analysis for game species management with AGFD as needed.

Objective B-5 Review and implement, where appropriate, AGFD's game species management guidelines, SWAP, and other applicable wildlife management guidelines.

Objective B-6 Coordinate with Range Operations and project proponents to reduce the footprint of development and training facilities, increase co-use of facilities, and cluster placement of projects to retain large, continuous, and connected natural

areas that increase native flora and fauna's capability to naturally maintain themselves, thereby requiring fewer management resource inputs.

Objective B-7 Manage cave and mine resources to provide protection from the introduction of disease agents (e.g. white-nose syndrome), disturbance of resident species, and alteration, disturbance, damage and destruction of natural resource values. Using best scientific principles, manage special status species in the case of disease introduction or other habitat variable disturbance.

Goal B-2 Continue long-term assessments of changes in vegetation cover and botanical and wildlife composition under varying levels and types of use and maintain floral and faunal databases.

Objective B-8 Develop and maintain an active natural resource monitoring program and database for up-to-date environmental analyses and assessment. This includes sharing natural resources data reciprocally with ITAM.

4.3.3 Migratory Birds

Migratory bird management is based on maintaining compliance with the MBTA and its regulations, DA policy, and fulfilling objectives identified in the DoDPIF Strategic Plan. Resource specialists from ENRD work to protect, restore, enhance, and manage habitat of migratory birds, and prevent or minimize the loss or degradation of nesting and feeding habitats in accordance with the MBTA and the DoDPIF Strategic Plan.

Goal C-1 Actively manage natural resources to support the training mission and flight safety goals, while pursuing a sound conservation ethic for migratory birds in accordance with the DoDPIF Strategic Plan.

Objective C-1 Assess and document, through the project planning process and through NEPA when applicable, the effect of proposed actions on migratory birds. Use best available demographic, population, or habitat association data in the assessment of effects upon species of concern and develop and implement conservation measures that would avoid or minimize adverse effects to birds or their habitat.

Objective C-2 Implement applicable migratory bird conservation goals and objectives outlined in the DoDPIF Strategic Plan. Consider the potential effects of climate change on birds and their habitat when developing habitat management projects.

Objective C-3 Support International Migratory Bird Day and other national PIF outreach efforts.

Objective C-4 Maintain and restore priority habitats (feeding and nesting) for migratory and resident bird populations.

Objective C-5 Reduce or eliminate pesticide use in sensitive habitats, especially in and around wetlands and riparian areas.

Objective C-6 Reduce the spread and impact to birds and their habitats of invasive and nuisance species, including feral and free-roaming house cats.

Goal C-2 Determine the status of migratory and resident bird populations, and the causes of population fluctuations if they exist.

Objective C-7 Develop and implement new and/or existing inventory and monitoring programs, at appropriate scales, using national standardized protocols (e.g., CBM and Avian Knowledge Network [AKN]) to assess the status and trends of

bird populations and habitats using the guidelines developed by DoDPIF, pertinent AGFD strategic plans, and the U.S. North American Bird Conservation Initiative (NABCI). Ensure birds of prey are included in inventory and monitoring programs.

Objective C-8 Participate in bird conservation planning and implementation at local, state, regional, national, and international levels.

Objective C-9 Facilitate cooperative partnership efforts consistent with the military mission.

4.3.4 Airport Wildlife and Bird Aircraft Strike Hazard

Since pilots and aircrews use the same low altitude airspace as large concentrations of birds, the prevention of bird strikes is of serious concern. The proximity of wildlife and aircraft pose hazards to personal safety, operations, and conservation. LAAF is situated under the extreme eastern edge of a major migratory route and attracts numerous species. Specific wildlife hazards to LAAF air operations include raptors (birds of prey), ravens, mourning doves, and mammals such as deer and javelina. Large fowl transit the area seasonally and provide a hazard due to their habit of nocturnal flight. LAAF maintains a Wildlife Aircraft Strike Hazard Plan (WASH) and directly manages the program, while resource specialists from ENRD provide technical support as needed.

Goal D-1 Reduce the risk of aircraft striking birds or wildlife primarily through vegetation and habitat management

Objective D-1 Develop and ensure adequate updates of a comprehensive wildlife risk assessment and management plan for the LAAF area in accordance with DoDPIF recommendations.

Goal D-2 Provide an active program to minimize bird and other wildlife strikes to aircraft.

Objective D-2 Annually review wildlife strike data and wildlife strike hazards and evaluate the effectiveness of the WASH program on the Fort.

Objective D-3 Coordinate with military air operations on WASH issues and provide natural resource information as needed.

Objective D-4 Manage habitat immediately adjacent to the runways in a way that makes it less attractive to wildlife that pose the greatest risk to aircraft.

Objective D-5 Monitor habitat and wildlife usage and perform Wildlife Hazard Assessments, as necessary, on and around LAAF.

4.3.5 Groundwater Resources

Water resource management is a primary focus on the Fort. Mitigating the potential effects of groundwater pumping on endangered species and associated critical habitat in the sub-watershed is a high priority per the 2014 PBO. Resource specialists from ENRD collaborate with partners within and outside installation boundaries to achieve the Fort's water management goals.

Goal E-1 Develop and implement an Army Water Resource Management Plan (AWRMP) that will achieve sustainable water usage to support ecosystem health, conservation of special status species, and mission sustainability.

Objective E-1 Develop and maintain a peer-reviewed, publicly accessible groundwater model through cooperative relationships.

- Objective E-2 Evaluate and quantify the anticipated impacts of ongoing and potential mitigation activities on and off Fort Huachuca when appropriate tools are available.
- Objective E-3 Continue to explore alternative mitigation sites and activities that may bring more immediate and focused improvements to critical habitat and endangered species threatened by groundwater pumping.
- Objective E-4 Conduct a feasibility analysis on potential mitigation projects and implement those deemed appropriate.
- Objective E-5 Incorporate effective monitoring into project implementation to measure the success of the projects.
- Objective E-6 Continue to reduce the Fort's net water use through implementation of water conservation, re-use, and recharge projects.
- Objective E-7 Participate with regional authorities in the development and implementation of water resource initiatives and plans.

4.3.6 Floodplain and Wetlands

Executive Order 11988 is the basis for policies and practices of floodplain management. To date, Federal Emergency Management Agency (FEMA) designated floodplains have not been mapped on the Fort; however, low risk floodplains do occur in the Cantonment area as well as in open space, training, and recreation areas. It is estimated that approximately 80 buildings may occur within a floodplain (USACE 2008), some of which are critical to the installation. The CWA, the Rivers and Harbors Act, and EO11990 are the basis for policies and practices of wetland management. Wetlands include springs and riparian areas surrounding streams and ponds. Although the total wetland acreage on the Fort is small (see Section 2.3.3), wetlands are of critical importance to the protection and maintenance of living resources, including a significant number of special status species. In addition, wetlands protect the quality of surface waters by impeding the erosive forces of moving water and trapping waterborne sediment and associated pollutants. They protect regional water supplies by assisting in the purification of surface and groundwater resources, and they maintain the base flow to surface waters through the gradual release of stored flood waters and groundwater. Finally, wetlands provide a natural means of flood control and storm damage protection through the absorption and storage of water during high runoff periods. Resource specialists and the NEPA coordinator in ENRD are responsible for floodplain and wetlands management. The Fort will ensure the inventory, delineation, classification, and protection of all wetlands.

Goal F-1 Avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

- Objective F-1 Factor floodplain considerations into all planning and development decisions early in the planning process, through NEPA or other appropriate environmental review processes, and avoid development within the floodplains whenever possible if projects may have potential impacts.
- Objective F-2 Maintain up-to-date digitally available floodplain data to aid in the decision making process.
- Objective F-3 Develop and implement mitigation measures if development in floodplains cannot be avoided.

- Goal F-2** **Ensure the protection of wetland resources aimed at minimizing actions that contribute to the loss or degradation of wetlands, per EO 11990, and promote land use functions that result in “no net loss” when practicable, per AR 200-1.**
- Objective F-4 Factor wetland considerations into all planning and development decisions early in the planning process, through NEPA or other appropriate environmental review processes, and avoid development within wetlands whenever possible.
- Objective F-5 Develop and implement a management strategy for springs and wetlands that outlines appropriate monitoring plans and schedules, burned area management techniques for post-fire rehabilitation, and data development requirements.
- Objective F-6 Conduct reviews of wetland resources and update the GIS database as needed, to ensure current inventory, delineation, and classification data are maintained.
- Objective F-7 Develop and implement mitigation measures if development in wetlands cannot be avoided.
- Objective F-8 Apply BMPs to reduce potential for soil runoff into wetland areas during construction or other land disturbing projects.

4.3.7 Vegetation Resources

Army Regulation (AR) 200-1 requires that vegetation management be conducted in a manner that will conserve and enhance existing flora and fauna with the goal of conserving, protecting, and sustaining biological diversity while supporting the accomplishment of the military mission. AR 200-1 requires that the highest consideration be given to the management of federally listed and proposed species, followed by state listed species of conservation concern, and to other environmentally sensitive areas and areas of special concern. The Fort's vegetation management program focuses on identifying and reducing non-native invasive plants and native weedy species that have been transforming historic floral and faunal communities, and reducing the extent of bare ground and soil movement using native plant restoration.

The primary goal of vegetation management on the Fort is to manage for and protect native plant communities through the use of integrated ecosystem management principles while accommodating military training needs. Efforts such as the mesquite mastication program, the HEFT program, native re-seeding, and invasive species management are effecting positive changes to landscape dynamics across many parts of the Fort.

- Goal G-1** **Restore or rehabilitate and enhance native habitats across Fort Huachuca lands where non-native plant invasion or soil disturbing activities have occurred.**
- Objective G-1 Implement the East Range Watershed Improvement Plan and update as necessary.
- Objective G-2 Use data collected during natural resource surveys and monitoring, site-specific surveys, sensitive plant species surveys, and other projects to continually update the flora inventory (including herbarium mounts as new species are found).

- Objective G-3 Conduct annual restoration projects, in coordination with ITAM, to reduce the amount of bare ground, thereby decreasing the likelihood of non-indigenous plant invasion and loss of soil through erosion, thus increasing efficiency and cost sharing opportunities.
- Objective G-4 Conduct annual monitoring to assess the effect of invasive species management actions and the rate and degree of grassland conversion and erosion potential.
- Objective G-5 Continue to treat and rehabilitate mesquite invaded grasslands by appropriate and effective techniques.
- Objective G-6 Review projects through NEPA or other environmental review processes to promote revegetation on disturbed soils and ensure non-native plant species are not introduced.
- Objective G-7 Work with universities, state agencies, federal agencies, and non-governmental organizations to gather basic data on natural resources; develop planning and evaluation tools.

4.3.8 Grassland Resources

The Fort's semidesert grasslands contribute to regional biodiversity. The Fort's major grassland management goal is to ensure that ongoing and proposed future actions and activities do not further regional grassland loss and fragmentation. Grasslands support an array of species specific to this habitat-type and have been experiencing degradation by the encroachment of woody plants and, most recently, non-native invasive grass conversion. The Fort has experienced a shift from a multi-species native grassland assemblage to either a nearly monotypic Lehmann's lovegrass stand, or more recently to areas of little to no native component and a variety of invasive species, and is experiencing the negative effects of this high fuel load. Fort Huachuca is arguably a leader with regard to invasive management; nevertheless the once native grassland at the lower elevations have nearly entirely converted to mixed or dominate invasive grasslands. The higher elevation grasslands have fared better; however, once fire or disturbance is introduced these grasslands are quick to convert. The Fort's efforts to restore its grasslands from woody encroachment has met with greater success, and more desertscrub is being returned to grassland.

The maintenance and enhancement of grasslands on the Fort is imperative to maintaining biological diversity, as well as training realism. Because grasslands are relatively easy to develop, compared to other land cover types, development has had a disproportionate impact on this vegetation type on the Fort and in the region. Regional grassland degradation, loss, and fragmentation is an important issue that requires a substantial collaborative approach to affect the diminishing distribution and quality of the grasslands within the region.

Resource specialists within ENRD manage grassland resources to support and enhance the immediate and long-term military mission and meet natural resource stewardship requirements.

Goal H-1 Avoid adverse contribution to regional grassland loss and fragmentation.

- Objective H-1 Maintain and enhance the Forts grasslands while achieving mission requirements.
- Objective H-2 Continue to protect higher quality grassland habitat from degradation, fragmentation, and conversion. High quality grassland include AMAs, due to the higher species diversity within these designated units, and areas with a higher proportion of native to invasive species.

- Objective H-3 Conduct inventory and monitoring for additional special status grassland species if and when they are known or suspected.
- Objective H-4 Demonstrate positive trends in agave distribution and density, or other special status grassland species.
- Goal H-2 Conserve populations of grassland species of concern through protection, conservation, and restoration of special management areas.**
- Objective H-5 Conserve populations of grassland species of concern by demonstrating positive trends in habitat availability and quality, or other factors affecting grassland species of concern.
- Objective H-6 Collect additional baseline data on birds of conservation concern (e.g., grassland nesting birds, prey-base of birds of birds of prey), pronghorn, and other grassland game species.
- Objective H-7 Continue to survey and conduct follow-up surveys where necessary for other species that occur in grasslands such as small mammals and medium to large carnivores.
- Goal H-3 Execute grassland management to establish desired future conditions that focus on ecological processes that will sustain wildlife populations and support the long-term military mission.**
- Objective H-8 Maintain unfragmented grassland to the degree practicable. Identify the extent of unfragmented grassland and document annually.
- Objective H-9 Conduct surveys to monitor grassland condition to include connectivity, species diversity, percent native vs invasive composition, percent bareground, etc. and digitize data for GIS analysis.
- Objective H-10 Develop, implement, and enforce a grassland management plan to restore and/or protect quality grassland habitat in as extensive and contiguous units as practicable to protect special status species of wildlife dependent on grassland resources.
- Objective H-11 Assist Range Operations and other internal partners with the sighting of new transportation, training sites, and development to reduce the potential for fragmentation, conversion, or degradation of grassland habitat.
- Objective H-12 Enforce off-road travel restrictions and close and restore wildcat roads when they are observed.
- Objective H-13 Manage invasive species to the extent practicable.
- Objective H-14 Minimize (to the extent practicable) all unavoidable loss to Category 1 and 2 grassland habitat on the Fort.

4.3.9 Land Resources

Land resources are the ranges, Cantonment areas, and associated natural resources (to include soils and the biota they support). Land management practices are focused on the improvement, use, and maintenance of land resources for the appropriate long-term net public benefit while supporting the mission. Resource specialists within ENRD manage land resources in a manner that is consistent with the latest conservation and land management principles. ENRD is an active participant in all planning and decision-making activities regarding uses of the land to ensure that current and planned mission activities (e.g., master planning, construction requests, site approval

requests, and training exercise plans) are conducted in a manner that is as compatible with natural resources and other environmental requirements as practicable.

Goal I-1 Comply with applicable federal, state, and local regulations regarding land resources management and permitting where applicable.

Objective I-1 Assist Range Operations with the development of a range plan to ensure that management plans address range operations and activities, as appropriate.

Objective I-2 Continue to identify environmental encroachment and assess external buffer zone possibilities to enhance testing and training capabilities.

Goal I-2 Improve and enhance soil stability and productivity to reduce the potential for excess erosion, sedimentation, compaction, and non-indigenous plant invasion.

Objective I-3 Develop, implement, and enforce BMP policies for ground disturbing projects.

Objective I-4 Conduct surveys, as needed, to monitor general soil condition, identify and characterize erosion sites, identify effects of erosion control, and digitize data for GIS analysis.

Objective I-5 Evaluate remote sensing capabilities and effectiveness for monitoring soil attributes such as percentage of bare ground and change detection over time.

Objective I-6 Review and analyze effects of proposed projects on soil resources, using NEPA or other natural resource review processes as appropriate, and provide recommendations for enhancing the project and soil conditions.

Objective I-7 Develop and/or provide the most up-to-date soil inventory data to enable informed decisions regarding land use, restoration options, and wildlife habitat management options.

4.3.10 Forest Resources

Resource specialists within ENRD manage forest resources to support and enhance the immediate and long-term military mission and meet natural resource stewardship requirements. Forest resources outside the Cantonment area on the Fort are managed to benefit natural resources and to improve and sustain habitat that supports wildlife and special-status species. The recently revised *Integrated Wildland Fire Management Plan (IWFMP)* (Zia 2016a) integrates the HEFT Plan and addresses the management of wild and prescribed fire, as well as silviculture treatments, to remove ladder fuels and break-up fuel continuity in woodland areas. The Fort's forest resources are being managed as part of the programs planned for the installation as a whole, especially through the IWFMP. Forest resources within the Cantonment area are managed through the urban forestry program. The Fort's forest resources warrant a fire wood sales program but does not support a timber sales program due to lack of merchantable timber on the installation.

Goal J-1 Maintain an aesthetically pleasing Cantonment area using principles of urban forestry and xeriscaping.

Objective J-1 Implement the Presidential Memorandum on *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds* (Office of the President 1994).

Objective J-2 Monitor species being planted to ensure they are on Fort Huachuca's list of approved plants, in accordance with the installation design guide.

- Goal J-2** **Execute forest management to establish desired future conditions that focus on ecological processes that will sustain wildlife populations and support the long-term military mission.**
- Objective J-3 Implement the Integrated Wildland Fire Management Plan.
- Objective J-4 Implement pre/post-treatment monitoring through RTLA or other appropriate means.
- Objective J-5 Continue to reduce woodland fuel load, using the best available science and effective planning and coordination, to include slash pile prescribed burning, and wood cutting treatments and track in database. Develop and implement area-specific guidelines and prescriptions for fuel reduction projects, to reduce the potential for stand replacing fires and to protect habitat-dependent species.
- Objective J-6 Develop, implement, and review as necessary, both a Fuels Treatment and Reduction Plan and an Urban Forest Management Plan to move from protection-based management to ecosystem enhancement and sustainability.

4.3.11 Wildland Fire

Wildland fire management is primarily concerned with the reduction of extreme wildfire potential on the installation using appropriate management practices such as fire suppression, prescribed burning, fuels reduction projects, firebreak maintenance, etc. The Fort completed a revision of the IWFMP in September 2016 and manages wildland fire and fuels in accordance with this plan. This plan provides Fort Huachuca natural resource specialists, the Fire Department, Range Operations, and outside cooperators a comprehensive guide to help make decisions about managing fires to safeguard life and property, support training, and protect the Fort's natural resources.

- Goal K-1** **Manage wildland fire and use prescribed fire on Fort Huachuca and in coordination with neighboring land owners to protect life and property and benefit historic properties and natural resources while supporting the military mission.**
- Objective K-1 Annually review and update, as necessary, the IWFMP in coordination with all staff resource professionals.
- Objective K-2 Identify additional funding and cooperative opportunities to obtain sufficient funding for the annual implementation of the IWFMP.
- Goal K-2** **Move toward restoring natural fire regimes, where appropriate, on Fort Huachuca.**
- Objective K-3 Conduct fuel reduction treatments, in coordination with staff resource professionals, on the Fort by conducting ecologically appropriate mechanical thinning or other suitable techniques.
- Objective K-4 Identify additional funding and cooperative opportunities to obtain sufficient funding for annual implementation of ecosystem-enhancement fuel reduction activities.
- Objective K-5 Consider the potential effects of climate change on forest make-up and resources when designing Forest Treatment Plans.
- Objective K-6 Seek training opportunities in the area of forest and fire ecology and fire-effects for the installation forester and/or other appropriate natural resource managers.

4.3.12 Invasive Species

Invasive species are plants or animals that are non-indigenous to an area and whose introduction causes or is likely to cause economic or environmental harm or harm to human health or safety. Invasive species on The Fort pose threats to indigenous vegetation, special-status species, and can impede training activities and result in the loss or degradation of training lands. More specifically, they threaten wetland ecosystems and terrestrial resources for special-status species, alter wildland fire ecology, complicate land restoration projects, and in general threaten ecosystem functionality. In the grassland ecosystem, invasion of non-native grasses often decreases floristic diversity and structural heterogeneity, altering the quality and quantity of habitat for some species of native wildlife. Recent work by Andersen et al. (2019) on the Fort, found that abundances of most arthropod predators and specialist herbivores decreased as dominance of non-native grasses increased. They noted that this alteration of grassland insectivores could have adverse and cascading effects on imperiled grassland ecosystems. Fort Huachuca is dedicated to the management of invasive species, as per EO 13112. Invasive wildlife, such as bullfrogs, barred tiger salamanders, and crayfish, and plants such as Lehmann's lovegrass, boer lovegrass, weeping lovegrass, tamarisk, Bermuda grass, Johnson grass, yellow bluestem (*Bothriochloa ischaemum*), Russian thistle, rabbits foot grass and flannel mullein are but a few of the invasive species on the Fort. ENRD has been managing invasive flora on an increasingly larger scale since 2013. The resources at hand, however, are minor compared to this monumental task, and invasive species continue to outpace management efforts. ENRD maintains a robust program to manage against these invasive aquatics since 2016. The Fort has removed thousands of crayfish and barred tiger salamanders, and is effectively managing bullfrogs on the installation.

Goal L-1 Conduct mission and construction and landscaping activities in a manner that precludes the introduction and reduces or eliminates the spread of invasive species.

Objective L-1 Continue to update, and identify avenues for distribution, the BMPs reference list for preventing further spread of invasive species that will cover and apply to all construction projects, training activities, and other land use and land management activities. Continue to improve coordination with grounds maintenance to broaden treatment and management practices.

Objective L-2 Implement a program to ensure the use of BMPs is included in all contract language on all proposed projects and all activities that include ground disturbing activities.

Objective L-3 Manage travel corridors in a way that eliminates or reduces the extent and degree of non-native and invasive species, and favors native species diversity, to reduce the spread of invasives into currently untransformed sensitive habitat.

Objective L-4 Develop a surveillance route plan and invasive management and cost-share agreement with CBP to manage against invasive plants introduced on the extensive routes used into sensitive species habitat.

Goal L-2 Control and eradicate noxious invasive, non-indigenous plants and non-indigenous animal species to promote sustained ecosystem function, favor native species biodiversity, support the military mission, and add to the quality of life of the Fort Huachuca community.

- Objective L-5 Develop, implement, and update as necessary, an Invasive Species Management Plan.
- Objective L-6 Continue to conduct invasive species mapping surveys.
- Objective L-7 Continue to implement and grow Invasive Species control/eradication projects focused primarily outside the Cantonment area
- Objective L-8 Develop and implement an invasive treatment monitoring component to the degree practical, without effecting the resources to conduct invasive management proper.
- Objective L-9 Continue to coordinate with ITAM to synchronize invasive species management to increase effectiveness and cost sharing opportunities.
- Objective L-10 Develop an invasive species management volunteer program.

4.3.13 Integrated Pest

Integrated pest management (IPM) on the Fort will employ modern strategies to avoid heavy reliance on chemical pesticides in favor of the many available techniques to eliminate or reduce damage by pests while posing minimum risks to the environment. Fort Huachuca completed a revision of the Integrated Pest Management Plan (IPMP) in October 2016. The IPMP describes possible pests and outlines the resources necessary for the surveillance and control of these pests including any administrative, safety or environmental requirements. The Fort intends to use information about the pest’s biology and environment, as well as the roles of engineering, culture, genetics, and other disciplines for overall control. The IPM approach is the best way to control pests, reduce pesticide resistance, and meet mandates to reduce environmental risks from hazardous chemicals. The Environmental and Operation and Maintenance Division of DPW is responsible for managing the IPM program.

Goal M-1 Manage installation pests via an Integrated Pest Management approach to protect real property and the health of soldiers, civilians, and family members.

- Objective M-1 Maintain and implement an IPMP, that is consistent with the INRMP and that defines pest management requirements, responsibilities, and resources.
- Objective M-2 Conduct annual reviews to ensure the IPMP is implemented and updated and ensure personnel applying chemicals on installation lands are state-certified applicators.
- Objective M-3 Manage “nuisance wildlife” which includes but is not limited to skunks, bats, javelina and other wildlife to protect the health and safety of residents and personnel.
- Objective M-4 Manage domestic stray animals in accordance to Fort Huachuca’s IPMP to ensure health and safety of residents and personnel.

4.3.14 Outdoor Recreation

Outdoor recreation and interpretive opportunities enhance the quality of life for military and civilian personnel. For the purposes of this INRMP, and to be consistent with AR 200-1, outdoor recreation is defined as recreational programs, activities, or opportunities that depend on the natural environment. Resource specialists from ENRD will work closely with the MP and FMWR to manage outdoor recreation in a manner that enhances outdoor experiences while protecting

natural resources. Outdoor recreation on the Fort is managed according to the 2019 Outdoor Recreation Plan

Goal N-1 Provide sustainable opportunities for the Fort Huachuca community and the public to participate in high-quality, safe outdoor recreation.

Objective N-1 Assist with the implementation of Fort Huachuca's Outdoor Recreation Plan and ensure that it is consistent with ecosystem management, regulatory requirements, and mission needs, and that aims to accommodate existing and future demands and level of activities.

Objective N-2 Annually review, and update as necessary, Fort Huachuca's policies toward appropriate public access based on specific requirements or management objectives to ensure natural resources are protected.

Objective N-3 Conduct further research on the development and implementation of a recreational use permit program as authorized by the Sikes Act, to collect funds to offset the costs of law enforcement, maintenance, conservation, and enhancement of natural resources and to provide a means of measuring the number of visitors and type of recreation occurring.

Objective N-4 Develop a comprehensive interpretive and awareness strategy and effective environmental awareness material that supports the strategy, and identify effective distribution channels to users.

Goal N-2 Provide broad hunting opportunities on Fort Huachuca, and fishing opportunities when appropriate, consistent with AGFD regulations and requirements of the military mission.

Objective N-5 Regularly inventory game populations, as needed, to collect the necessary information with which to set harvest limits. Consult with AGFD when determining or modifying game and fish harvest limits.

Objective N-6 Prepare reviews and updates, as necessary, of the Fort hunting and fishing regulations.

4.3.15 Law Enforcement of Natural Resources Laws and Regulations

Natural resource management, such as endangered species protection and protection of sensitive areas, as well as hunting and fishing recreation, protection of historic properties, cave protection, wood and natural resource harvesting, is dependent upon effective environmental law enforcement. Enforcement of natural resource laws and regulations on Fort Huachuca is carried out by the MP and Conservation Law Enforcement Officers (CLEO). Resource specialists from ENRD work directly with the MP and CLEO's to provide natural resource information and support as needed.

Goal O-1 Develop an effective partnership between ENRD and law enforcement to provide active and focused protection of natural resource and historic properties, as well as federal, state, and installation law and regulation enforcement.

Objective O-1 Develop and implement a plan for maintaining trained, professional natural resource law enforcement officers, for both consumptive and non-consumptive resource use.

Objective O-2 Coordinate pertinent activities and share information regarding wildlife resource management or concerns with AGFD law enforcement.

4.3.16 Sustainability

Sustainability, in an ecological context, can be defined as the ability of an ecosystem to maintain ecological processes, functions, biodiversity. However, as an appeal for action, sustainability is open to many interpretations as to how it can be achieved. By establishing quantitative measures for sustainability it is possible to set goals and measure progress. The PAIO and ENRD will be responsible for integrating sustainability into Command mission and natural resource management, respectively.

Goal P-1 Integrate Sustainable Management into all aspects of resource management.

Objective P-1 Assist with the completion of the Installation Strategic Sustainability Plan.

Objective P-2 Develop measurable entities or metrics for sustainability that provide a way to assess progress.

Objective P-3 Initiate an integrated planning process that identifies objectives, initiatives, monitoring and assessment tools.

4.3.17 Geographic Information System Management, Data Integration, Access, and Reporting

GIS management and data integration, access, and reporting are essential components of the natural resource program. The capability to store, retrieve, and analyze data is central to professional management of natural resources, and is critical to implementing the adaptive management aspect of ecosystem management. The Fort is committed to providing efficient, cost-effective systems for data storage and analysis.

Goal Q-1 Store, update, analyze, and use natural resource data in an efficient, cost-effective manner that enhances resources and the military mission.

Objective Q-1 Integrate GIS and data analysis with proposed project review, to assist in efficient and effective decision making by resource personnel.

Objective Q-2 Work towards acquiring a position in ENRD that can develop, analyze, and maintain a GIS database.

Objective Q-3 Upgrade GIS hardware and software as needed.

Objective Q-4 Provide GIS training for ENRD personnel to ensure staff can effectively use this tool.

Objective Q-5 Annually review and update remote imagery as needed for improved decision making for military activities, environmental management, natural resources and historic properties management and protection.

4.3.18 Training of Natural Resource Personnel

The Conservation Branch of ENRD presently maintains as resource management professionals, a biologist, a forester, an archaeologist, a physical scientist/NEPA coordinator, and a branch chief. Interdisciplinary training is essential for DoD natural resource managers. Training should address practical job disciplines, statutory compliance requirements, applicable DoD/DA regulations, pertinent state and local laws, current scientific and professional standards as related to the conservation of our nation's natural resources, and applied management approaches and techniques. The natural resource training objective is to identify technical requirements as well as the resources (cooperative agreements, ITAM, MOUs, and so forth) available to implement and execute a successful and proactive program. The goal is to maintain and enhance the military

mission, biodiversity, conservation stewardship, and the management of the total ecosystem from the practical standpoint of day to day operations as well as long-term planning.

Goal R-1 Ensure natural resources personnel are trained in ecosystem and sustainable management practices.

Objective R-1 Improve staff technical knowledge of management strategies and their implementation, at the current state of knowledge, through training and participating in, or hosting, workshops, research presentations, and other activities of regional, interstate, and international professional natural resources research and conservation programs. Specifically, the Fort will send at least one person to annual workshops or professional conferences and other specialized trainings as appropriate (dependent on availability of funding). These may include but are not limited to: International Erosion Control Association, National Military Fish and Wildlife Association Annual Workshop, North American Natural Resource Conference, The Wildlife Society Conference, Species-specific certification training, GIS workshops and training, American Fisheries Society Annual Workshop, Invasive species symposia and workshops, Bat/mammalogy conferences and workshops, Ornithological conferences and workshops, Invertebrate conferences and workshops, Hydrology workshops and symposia, and Forestry workshops and conferences.

Objective R-2 Encourage membership and participation in The Wildlife Society, American Fisheries Society, Society of American Foresters, Society for Range Management and National Military Fish and Wildlife Association, or other relevant professional associations.

Objective R-3 Promote individual review of technical and scientific literature as a necessary commitment to maintain updated professional knowledge.

Objective R-4 Promote active participation in DoD WGs to include the Pollinators WG, Bat and Bird WGs, Wildland Fire WG, DoD PARC or Herp WG, or other relevant WG's.

4.3.19 Alternative Energy Resource Development

Advanced energy technology (solar, wind, biomass, hydrogen, etc.) development is an essential endeavor on DoD facilities. The DoD has set a goal that 25% of its energy should come from renewable sources by 2025. These alternative forms of energy will not only reduce the costs of facility management and reduce the Army's environmental footprint; they will provide a buffer to protect forces from disruption in petroleum supplies. The careful development of Alternative Energy Resource Development (AED) is essential to the protection of many special-status species. The thoughtful, strategic, and responsible development of various alternative energy resource types is the future direction on the Fort. Resource specialists within ENRD will provide environmental review and technical expertise in the sustainable development of AED.

Goal S-1 Develop effective alternative energy resources without negatively impacting wildlife populations or their habitat.

Objective S-1 Research alternative energy technology and develop and implement an alternative energy resource plan for the Fort.

Objective S-2 Implement effective, appropriate, and timely monitoring of wildlife use and mortality at current AED sites, before construction and after the facility begins

operation. Provide results to AED monitoring to AGFD and USFWS as appropriate.

Objective S-3 Apply current research and coordinate with expert agencies/organizations, Universities, and other professional organizations, to ensure the best and most appropriate methods are used for assessing and mitigating impacts to wildlife from AED projects.

4.3.20 Out-Grants

Out-grants at Fort Huachuca have been negotiated with a variety of entities that range from local municipalities, institutions, and organizations to the state and federal governments. Out-grants are represented through the use of licenses, leases, easements, permits, and deeds. Fort Huachuca's family housing was recently taken over by the private sector. In total, the Fort maintains 735 acres of out-grants (USACE 2008). Resource specialists within ENRD provide technical support in out-grant-related decisions as needed.

Goal T-1 Create and maintain an awareness among tenant organizations and lease holders of their responsibilities regarding natural resource management on Fort Huachuca.

Objective T-1 Develop, and update as necessary, various media products to educate lease holders about sensitive resources and inform them of requirements they are obligated to meet as a lease holder.

Objective T-2 Conduct reviews of tenant organization's compliance with natural resource requirements.

4.3.21 In-Grants

In-grants exist off-post and support testing and training activities that take place away from the installation. The Fort maintains a number of in-grants. The largest in-grant is Willcox Dry Lake Bed, which is a 27,760-acre site located approximately 65 miles northeast of the installation. This land is being leased to the Fort by the Department of the Interior. Sustainability practices occur not only within installation boundaries, but are also employed at all off-post testing and training sites. Resource specialists within ENRD provide technical support on in-grants as requested.

Goal U-1 Ensure training activities are compliant with lease agreements, natural resource laws, and regulations and are conducted in an environmentally sensitive and sustainable manner.

Objective U-1 Conduct preliminary natural resource screenings of potential or newly leased lands to identify significant natural resources and document baseline environmental conditions.

Objective U-2 Conduct inspections of off-post leased lands where significant natural resources may be present.

Objective U-3 Coordinate with training units to ensure units remain in compliance with maintenance, conservation, and environmental requirements, and report noncompliance when it occurs.

CHAPTER 5 IMPLEMENTATION

This chapter identifies the Fort's strategy for implementing the INRMP. Section 5.1 presents the Fort's process of identifying requirements, Section 5.2 addresses "no net loss" in the mission training capability, Section 5.3 addresses sustainability of the military mission, Section 5.4 identifies roles and responsibilities for plan implementation, Section 5.5 identifies personnel resources and cooperative agreements and their importance for implementation of the INRMP, Section 5.6 describes the funding process which is of central importance for obtaining the appropriate resources with which to implement INRMP requirements.

5.1 The Process of Identifying Requirements

The management of training ranges and natural resources on the Fort is influenced by a variety of factors. Guiding this management are Army Policy documents and Army Regulations (e.g. AR 200-1) written to aid installation decision makers in complying with applicable federal, state, and local environmental laws, regulations, and EOs where applicable (applicable guidance documents and regulatory requirements are listed in Table 1 of Appendix 6). These rules and regulations make up the primary tier in the hierarchy of requirement identification and are the basis of the goals and objectives of installation planning. Installation plans form the second tier. The Fort has approximately 15 functional area plans that are focused on particular aspects of installation operations (Appendix 6). Finally, installation policies form a third tier in the identification of requirements (Appendix 6).

Given the abundance of the above requirements on the Fort, required funding levels are never met by IMCOM; therefore, particular requirements within a given fiscal year may be fulfilled, partially fulfilled, or remain unfunded. The Fort prioritizes requirements on an annual basis based on funding provided by IMCOM.

5.2 Supporting Sustainability of the Military Mission and Natural Environment

The INRMP must provide for no net loss in the capability of the installation lands to support the military mission, to the extent appropriate and applicable, and natural resource managers should identify and address threats to mission land use and give high priority to management objectives that protect mission capabilities of installation lands. Army Regulation 200-1 requires each installation to have an appropriate number of designated natural resources managers, who are knowledgeable and trained in the particular resource issues for that installation. At Fort Huachuca, environmental and natural resource staff are responsible for ensuring natural resources on the installation are managed as required by federal, state, and Army regulation and guidance. Fort Huachuca environmental and natural resource personnel will integrate environmental protection, conservation, enhancement/restoration, and outdoor recreation within the constraints of the installation's military mission. At the same time, they will identify risks to the environment that might result from military activities and assist with the development of alternatives to reduce or eliminate the potential impacts.

The Fort has been managing installation lands at no net loss under the INRMP since 2002. Spatial and temporal limitations do exist due to the number of special status species that occur on the installation; however, alternative use areas are available, thereby reducing the potential loss of training capability. In fact, implementation of Fort Huachuca's INRMP has increased the training capability on the Fort. The Fort has experienced benefit from those projects for which funding was made available. Funding allocated for watershed management, erosion control, and reduction of shrub-invaded grassland have increased the acreage available for mission training.

5.3 Organizational Enhancement, Roles, and Responsibilities

The ecosystem management approach described in this INRMP can be implemented by the installation's existing organization. The Conservation Branch of ENRD has the primary role and responsibility for the implementation of this INRMP, which addresses the period from FY21 through FY26. Other organizations with duties and responsibilities regarding implementation of the INRMP include DPW Maintenance Division, DPW Engineering and Services Division, DPW Real Property Planning Division, DES, and DPTMS. Implementation of a number of the projects discussed in this INRMP may require assistance from external sources.

An annual review is required to track any changes and evaluate effectiveness with the USFWS and appropriate state agencies. Each INRMP must be reviewed for operation and effect at least every 5 years. If found current, a new INRMP is not required; however, each agency must provide written concurrence to this affect. No changes of organization are expected to implement this INRMP.

5.4 Staffing

The Conservation Branch of ENRD maintains a core staff of professionally trained natural resource management personnel to implement this INRMP. The staff consists of one wildlife biologist (Threatened and Endangered Species Program Management and Co-Sikes Act Program Management), one forester (Pest Management Program Management and Urban/Wildland Forestry/Fire Program Management), one NEPA coordinator and Co-Sikes Act Program Management, one hydrologist, and a branch chief. Due to the limited number of approved professional Branch positions, staffing is supplemented with interns or contract support when possible. The natural resources management professionals provide the foundation and fulfill both the technical and managerial roles necessary to manage the natural resources program on Fort Huachuca.

5.4.1 Outside Assistance and Cooperative Agreements

Assistance may come from universities, contractors, internships, volunteers, private consortiums and organizations, or state and federal agencies. Using these resources in some instances may be the most efficient and cost-effective method for acquiring expertise on a temporary basis, when Army personnel are unavailable. External sources will be reimbursed through contractual agreements or as agreed by cooperative agreements.

Cooperative agreements include agreements with other agencies, states, non-profit groups, and individuals. Unlike collaborative relationships, cooperative agreements are written and signed documents between partners and some level of the DoD. Cooperative agreements complement procurement contracts and other instruments used for the purpose of acquiring goods and services for the direct benefit or use of the U.S. Government. These agreements may take the form of Memoranda of Understanding (MOU) or MOA. Cooperative agreements have demonstrated they are valuable tools for INRMP implementation at Fort Huachuca.

Fort Huachuca maintains a number of important cooperative agreements to assist in the implementation of the INRMP. Some specific cooperative agreements were previously described in Section 3.3.2 *Partnering for Sustainability*. Natural resource cooperative agreements entered into by Fort Huachuca, the Army or DoD are provided in Appendix 7.

5.5 Funding

Funding is a vital element to the implementation of a successful resource management plan. Fort Huachuca has a range of alternative funding mechanisms available by which specific INRMP

requirement funds can be requested. These mechanisms include appropriated funding, non-appropriated funding to a much lesser degree, and grants or other funding sources.

All requirements set forth in this INRMP requiring the expenditure of funds are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. Section 1341). No obligation undertaken by Fort Huachuca under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose.

5.5.1 Appropriated Funding

At the Garrison level, DoD-appropriated funding is allocated one year at a time; however, the DoD must plan its funding needs for the Environmental Program 10-20 years out. Funding guidance documents are updated annually and posted on an Army Sharepoint website. Appropriated funds are identified as either *recurring* activities, products, and services or *non-recurring* projects. Each component is requested and handled based on this distinction.

Recurring requirements are those that occur annually, are considered routine, or occur on a predictable cycle. The CLS process is used to identify and fund predictable and generally recurring environmental requirements as identified by the Service Support Programs (SSPs) within each of the three Environmental Service Areas: Conservation, Compliance, and Pollution Prevention. The Garrison ranks and funds requirements by SSPs. IMCOM makes a decision on funding level using the Environmental Cost System (ECS) model.

Non-recurring requirements are projects that are needed to address environmental requirements that are performed one time or are needed for a limited amount of time. Non-recurring requirements are not included within the specific SSPs and are not funded through the CLS. Projects are submitted via Status Tool for the Environmental Program (STEP) to IMCOM Headquarters where they are reviewed for completeness. At this higher level, the projects are ranked and applied against available funding by AEC. Garrisons are responsible for defining and maintaining an updated prioritized list of recurring and non-recurring requirements for environmental work planned for execution.

5.5.2 Non-Appropriated Funding

Non-appropriated funding plays a small role on Fort Huachuca. Within the Army, revenues derived from the outleasing of agricultural lands, the sale of commercial forestry products, and the sale of hunting and fishing permits make up this funding source. The procedure for the collection, expenditure and accounting of these funds is provided in DoD Instruction 4715.03, which reinforces legal mandates for each funding source. Fort Huachuca does not outlease agricultural lands, and commercial forestry is not viable; therefore, funds derived from hunting and fishing are presently the sole source of non-appropriated income.

5.5.3 Other Funding Sources

Other funding sources are available to natural resources managers, including research grants, cooperative partnerships with other government agencies, and cooperative agreements with nongovernmental organizations. One very important source of funding for DoD natural and cultural resources projects is the Legacy Resource Management Program, a special Congressional appropriation established in 1991 specifically to fund natural and cultural resources projects on military lands. The ESTCP supports the demonstration and validation of environmental technologies that address priority DoD environmental requirements. The goal of ESTCP is to transition mature environmental science and technology projects through the demonstration and validation phase, thereby enabling promising technologies to receive regulatory and DoD end-user acceptance and to be fielded and commercialized more effectively.

and more rapidly. The SERDP, which focuses on cross-service requirements and pursues high-risk/high-payoff solutions to the DoD's most intractable environmental problems, may provide a source for implementation funds. Arizona Game and Fish Department's Heritage Fund grants have provided funds for research conducted on Fort Huachuca in the past. In particular, the Identification, Inventory, Acquisition, Protection and Management of Sensitive Habitat (IIAPM) fund may prove a useful funding mechanism for INRMP implementation. Finally, the INRMP is an installation-wide plan; therefore, its funding is not solely the responsibility of the environmental program. Programs such as the Army Sustainable Range are able to provide funding for INRMP implementation.

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APPENDIX 1

LIST OF ACRONYMS

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ACRONYMS AND ABBREVIATIONS

° F	Degrees Fahrenheit	APHIS	Animal and Plant Health Inspection Service
40 th ESB	40 th Expeditionary Signal Battalion	AR	Army Regulation
AAFES	Army & Air Force Exchange Service	ASA	Army Survey Area
AATTC	Advanced Airlift Tactics Training Center	ASLD	Arizona State Land Department
ACC	Army Contracting Command	ASU	Arizona State University
ACUB	Army Compatible Use Buffer	ATC	Air Traffic Control
ADA	Arizona Department of Agriculture	ATEC	Army Test and Evaluation Command
ADEQ	Arizona Department of Environmental Quality	ATFP	Antiterrorism and Force Protection
ADHS	Arizona Department of Health Services	ATV	All-Terrain Vehicle
ADWR	Arizona Department of Water Resources	AWRMP	Army Water Resource Management Plan
AEC	Army Environmental Command	AZ ANG	Arizona Air National Guard
AED	Alternative Energy Resource Development	BA	Biological Assessments
AEDB-EQ	Army Environmental Database-Environmental Quality	BBS	Breeding Bird Survey
afa	acre-feet annually	BLM	Bureau of Land Management
AFB	Air Force Base	BMPs	Best Management Practices
AGFD	Arizona Game and Fish Department	Bn	Battalion
AGL	above ground level	BRAC	Base Realignment and Closure
AIB	Applied Instruction Building	BRD	Biological Resource Division
AKN	Avian Knowledge Network	BSETR	Buffalo Soldier Electronic Testing range
AMA	Agave Management Area	BTA	Battalion Training Areas
AMC	Army Materiel Command	C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
AMO	Air and Marine Operations	cal	caliber
AMSL	above mean sea level	Cal quals	Caliber qualifications
		CBM	Coordinated Bird Monitoring

CBP	Customs and Border Protection	DES	Directorate of Emergency Services
CCA	Candidate Conservation Agreement	DISA	Defense Information Systems Agency
CCRN	Cochise Conservation and Recharge Network	DoD	Department of Defense
CECOM	Communications Electronics Command	DoDIN	DoD Information Network
		DODI	Department of Defense Instruction
CFR	Code of Federal Regulations	DPS	Distinct Population Segment
cfs	cubic feet per second	DPTMS	Directorate of Plans, Training, Mobilization, and Security
CHAMP	Challenged Hunter Access Mobility Permits	DPW	Directorate of Public Works
CLEO	Conservation Law Enforcement Officers	DZ	Drop Zone
		EA	Environmental Assessment
CLFX	Convoy Life Fire Exercise	ECS	Environmental Cost System
CLO	Combined Legal Office	ENRD	Environmental and Natural Resource Division
CLS	Common Levels of Support		
CNF	Coronado National Forest	EMU	Ecological Management Unit
COIN	Counter Insurgency	EO	Executive Order
CONUS	Continental U.S.	EOD	Explosive Ordnance Disposal
Corps	U.S. Army Corps of Engineers	EPA	Environmental Protection Agency
CPQC	Combat Pistol Qualification Course	EPG	Electronic Proving Ground
CWA	Clean Water Act	ESA	Endangered Species Act
CWCS	Comprehensive Wildlife Conservation Strategy	ESMP	Endangered Species Management Plans
CY	Calendar Year	ESMC	Endangered Species Management Component
DA	Department of the Army	ESTCP	Environmental Security Technology Certification Program
DAC	Department of Army civilians		
dbP	decibels peak	EW	Electronic Warfare
DDT	Dichloro-Diphenyl-Trichloroethane (organochlorine pesticide)	EW/SIGINT	Electronic Warfare/Signals Intelligence
DENIX	Defense Environmental Network Information Exchange	FAA	Federal Aviation Administration

FEMA	Federal Emergency Management Agency	IEWTD	Intelligence Electronic Warfare Test Directorate
FGS	Final Governing Standards	IIAPM	Identification, Inventory, Acquisition, Protection and Management of Sensitive Habitat
FLPMA	Federal Land Protection and Management Act	ILS	Instrument Landing System
FMWR	Family, Morale, Welfare, and Recreation	IMCOM	Installation Management Command
FOB	Forward Operating Base	ID-T	IMCOM Directorate-Training
FORSCOM	Forces Command	INRMP	Integrated Natural Resource Management Plan
FPPD	Fire Prevention / Protection Division	IPM	Integrated Pest Management
FR	Federal Register	IPMP	Integrated Pest Management Plan
ft	foot or feet	ISEC	Information Systems Engineering Command
FTX	Field Training Exercise	ITAM	Integrated Training Area Management
FY	Fiscal Year	IWFMP	Integrated Wildland Fire Management Plan
GIS	Geographic Information System	JITC	Joint Interoperability Test Command
GPS	Global Positioning System	JRT	Jaguar Recovery Team
GRI	Global Reporting Initiative	LAAF	Libby Army Airfield
HE	High Explosive	lbs	pounds
HEFT	High Elevation Fuels Treatment	LLNB	Lesser Long-nosed Bat
HEHR	High Explosive Hand Grenade Range	LSPB	Lower San Pedro Basin
HFMP	Huachuca Firescape Management Plan	LTM	Long Term Monitoring
HGAC	Hand Grenade Assault Course	LZ	Landing Zone
HQDA	Headquarter Department of Army	m	meter
HI	Heavy Industrial	MBTA	Migratory Bird Treaty Act
HT-JCOE	Joint Center of Excellence	MFR	Memorandum for Record
HUMINT	Human Intelligence	mg	million gallon
IA	Inventory Area	MI	Military Intelligence
IBA	Important Breeding Area		

mm	millimeter	PAO	Public Affairs Office
MO ANG	Missouri Air National Guard	PARC	Partners in Amphibian and Reptile Conservation
MOA	Memorandum of Agreement	PBA	Programmatic Biological Assessment
MOU	Memorandum of Understanding	PBO	Programmatic Biological Opinion
MP	Military Police	<i>PD</i>	<i>Pseudogymnoascus destructans</i>
MWEPA	Mexican Wolf Experimental Population Area	PIF	Partners In Flight
NATO	North Atlantic Treaty Organization	PIT	Passive Integrated Transponder
NABCI	North American Bird Conservation Initiative	RF	Radio Frequency
NAU	Northern Arizona University	RFMSS	Range Facility Management Support System
NEPA	National Environmental Policy Act	RMRS	Rocky Mountain Research Station
NETCOM	Network Enterprise Technology Command	RPMP	Real Property Master Plan
NM	Nautical Miles	RTLA	Range Training Land Assessment
NMFS	National Marine Fisheries Service	RTLPL	Range and Training Land Program
NPS	National Park Service	RU-4	Residential Units on a minimum lot size of 4 acres
NRCS	Natural Resources Conservation Service	RV	Recreational Vehicle
NTIA	National Telecommunications and Information Administration	SERDP	Strategic Environmental Research and Development Program
ORISE	Oakridge Institute for Science and Education	SGCN	Species of Greatest Conservation Need
OHV	Off-Highway Vehicle	SGO	Standard Garrison Organization
OIF/OEF	Operation Iraqi Freedom/Operation Enduring Freedom	SLP	Sentinel Landscape Partnership
ORV	Off-Road Vehicles	SPRNCA	San Pedro Riparian National Conservation Area
PAC	Protected Activity Center	SR-43	Single-household dwellings with minimum lot size of 1 acre
PAM	Army Pamphlets	SRP	Sustainable Range Program
PAIO	Planning, Analysis, and Integration Office	SSPs	Service Support Programs
		ssp.	subspecies

SSVEC	Sulphur Springs Valley Electric Cooperative	USDA	US Department of Agriculture
		USFS	US Forest Service
STEP	Status Tool for the Environmental Program	USFWS	US Fish and Wildlife Service
STRATCOM	U.S. Army Strategic Communications Command	USGS	US Geological Survey
		USMC	US Marine Corps
SWAP	State Wildlife Action Plan	USPB	Upper San Pedro Basin
TACAN	Tactical air Navigation System	USPP	Upper San Pedro Partnership
TEMPEST	Telecommunication, Electronics, Material Protected From Emanating Spurious Transmissions	UTV	Utility Task Vehicle
		UXO	Unexploded Ordnance
TEP	Tucson Electric Power	VTF	Veterinary Treatment Facility
TIA	Tucson International Airport	WAFWA	Western Association of Fish and Wildlife Agencies
TNC	The Nature Conservancy		
TNW	Traditionally Navigable Waters	WG	Working Groups
TR-36	Transitional Residence zoning single, multi-family homes with minimum lot size of 36,000 square feet	WIT	Weapons Intelligence Training
		WNS	White-nose Syndrome
TRADOC	Training and Doctrine Command	WASH	Wildlife Aircraft Strike Hazard
TX	Texas		
UA	University of Arizona		
UASTB	Unmanned Aircraft Systems Training Battalion		
UAS	Unmanned Aircraft Systems		
UOS	Urban Operations Site		
U.S.	United States		
USAF	U.S. Air Force		
U.S.C.	U.S. Code		
USAICoE	U.S. Army Intelligence Center of Excellence		
USAICS	US Army Intelligence Center and School		

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APPENDIX 2

5 YEAR PLAN / LIST OF PROJECTS

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INRMP Management Goal	Driver (Law/Reg / Agreement)	Proposed Project Title	Execution Timeframe	Monitoring Frequency	Reporting
A-1-A-3; B-1-B-2	Sikes Act	Bat monitoring and LLNB post-delisting monitoring plan implementation	2021-2025	Annual	Annual Report
A-1-A-3; B-1-B-2	ESA, AR200-1, Sikes Act	Felid Monitoring	2021-2025	NA	Per Incident
A-1-A-3; B-1-B-2	ESA, AR200-1, Sikes Act	Riparian and spring protection for endangered HWU populations and Huachuca springsnail populations	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2	ESA	Development of Conservation Easement to support off-post recovery of special status species	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2	ESA; AR200-1	Coordination with the USFWS, AGFD, and BLM as necessary for activities that have the potential to impact listed, proposed, or candidate species	2021-2025	NA	NA
A-1-A-3; B-1-B-2	ESA, AR200-1, Sikes Act	Annual surveys for federally listed species which may be identified in the future, and coordinate activities with USFWS and/or AGFD in a proactive manner	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2	ESA	Monitoring of past and current research on special status species and their habitats that occur or could occur on or near Fort Huachuca, the SPRNCA, or leased lands and use this information to improve the management of special status species where applicable	2021-2025	NA	NA
A-1-A-3; B-1-B-2	ESA	Monitor and maintain appropriate habitat protection around HWU populations and fund habitat management or restoration where habitat has been degraded or lost	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2	AR200-1, Sikes Act	Pre-construction surveys for Palmer's agave	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2	AR200-1, Sikes Act	Implement Huachuca springsnail monitoring per the CCA	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2	ESA, AR200-1, Sikes Act	YBCU monitoring as required by the mission	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2; E-1; F-2	ESA	Erosion control conservation measures for the protection of special status species habitat	2021-2025	NA	NA
A-1-A-3; B-1-B-2	ESA	Endangered STS annual monitoring & monitor take or habitat destruction	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2; G-1	ESA	Recreational closures to protect special status species and their habitat	2021-2025	NA	NA
B-1; H-1-H-3	AR200-1, Sikes Act	Fence improvements to enhance wildlife access to grassland habitat	2021-2025	NA	Annual Report

INRMP Management Goal	Driver (Law/Reg / Agreement)	Proposed Project Title	Execution Timeframe	Monitoring Frequency	Reporting
E-1; F-1	AR200-1	Development of hardened stream crossings	2021-2025	NA	NA
E-1	ESA	Increase stormwater runoff control and purification in developed areas	2021-2025	NA	NA
A1-A2; B-1; C-1-C-2	ESA, Sikes Act	Conduct Dark Skies assessments within and outside of the cantonement when possible to identify the potential to affect sensitive species and their habitat and identify prescriptions to reduce DoD produced light pollution	2021-2025	Annually	Annual Report
J-1-J-2; K-1-K-2	AR200-1	Urban Forest Management Plan implementation and update as necessary	2021-2025	NA	NA
J-1-J-2; K-1-K-2	AR200-1	Sale of wood or plant permits to reduce fuel loads and manage forest resources	2021-2025	NA	NA
J-1-J-2; K-1-K-2	AR200-1	Dead and down wood and snag removal for human safety	2021-2025	NA	NA
L-1-L-2	EO 13112	Flannel mullein control through hand pulling or other treatment of individual plants	2021-2025	NA	Annual Report
M-1	AR200-1, Sikes Act	Environmental awareness program implementation to educate residents about wildlife species that live in the area to reduce management issues	2021-2025	NA	Annual Report
M-1	AR200-1, Sikes Act	Maintain human/wildlife conflict response program to include response and documentation of time spent responding	2021-2025	NA	NA
M-1	AR200-1, Sikes Act	Development and implementation of techniques to prevent wildlife from sheltering in historic structures to reduce damage to these structures	2021-2025	NA	NA
A-2; B-1-B-2; O-1	AR200-1, Sikes Act, *FCRPA	Implement cave management program, per the Cave Management Plan, that includes management of unauthorized cave access	2021-2025	NA	NA
A-2; B-1-B-2; O-1	*ARPA, AR200-1, Sikes Act	Coordinate with agencies (USFWS, AGFD and USFS) and regional caving clubs to ensure that all entities are aware of closure to recreational use.	2021-2025	NA	NA
R-1	AR200-1	Personnel training and participation in annual workshops, training sessions, and conferences	2021-2025	NA	Annual Report
R-1	AR200-1	Partnering with groups and agencies to provide external specialized skills and resources to support the management of natural resources on the Fort	2021-2025	NA	Annual Report
R-1	AR200-1	Personnel and manpower enhancement through IPA, ORISE, cooperative agreements with universities, Student Conservation Association, contractors, and volunteers for labor, technical expertise, and research capabilities	2021-2025	NA	Annual Report
N-1-N-2	AR200-1, Sikes Act	Opportunistic hiking trail maintenance on the Fort in cooperation with groups such as Scouts, hiking clubs and other volunteer organizations	2021-2025	NA	NA
F-1-F2	EO11990; AR200-1; DODI 4715.3	Certified jurisdictional wetland delineations and permit application if necessary for any project that is planned in or near a suspected wetland	2021-2025	NA	NA

INRMP Management Goal	Driver (Law/Reg / Agreement)	Proposed Project Title	Execution Timeframe	Monitoring Frequency	Reporting
A-2; B-1	AR200-1	Development and implementation of management and conservation programs for non-game species which are considered likely to be proposed for federal listing	2021-2025	NA	Annual Report
A-1-A-3; B-1-B-2	AR200-1	Update and maintain butterfly inventory from outside sources through the use of written lists compiled by collectors as a condition of collection permit renewal, etc.	2021-2025	NA	NA
B-1-B-2	AR200-1, Sikes Act	Support research on the effectiveness of Fort management actions on indicator species when possible	2021-2025	NA	Annual Report
B-1; C-1; O-1	ESA; AR200-1, Sikes Act, MBTA;	Work to gain increased law enforcement presence to manage natural resource exploitation and protect sensitive species and their habitat	2021-2025	NA	NA
A-1-A-3	ESA, AR200-1, Sikes Act	Conduct MSO Genetic Assesment	2021-2022	NA	Final Report
A-1-A-3; B-1-B-2	ESA, Sikes Act	Conduct HWU Genetic Assesment	2021-2022	NA	Final Report
A-1-A-3	ESA	Develop HEFT Implementation Plan - Phase 2 for MSO Habitat Protection in the face of Climate Change	2022-2024	NA	Final Plan
A-1-A-3; B-1-B-2	ESA	Monitor naturally occuring and transplant HWU populations	2022 & 2025	NA	Annual Report
D-1-D-2	MBTA; AR200-1, Sikes Act	Update BWASH Plan	2021	NA	Final Plan
H-1-H-3	Sikes Act, AR 200-1	Identify and develop a plan to protect high quality grassland habitat from degradation, fragmentation, and conversion.	2022	NA	Final Plan
A-1-A-3; B-1-B-2	AR200-1	Invertebrate species inventory development using invertebrate collecting permit tracking system other field project data	2022	NA	Annual Report
D-1-D-2	MBTA; AR200-1, Sikes Act	Wildlife strike database development	2022	NA	Annual Report
B-1; E-1; G-1; I-2	AR200-1, Sikes Act	Update East Range Watershed Management Plan	2022	NA	Final Report
A-1-A-3; B-1-B-2	AR200-1, Sikes Act	Monitor Palmer's agave population on the West and South ranges as necessary to determine trends in bat forage resources	2022	NA	Final Report
A-1-A-3; B-1-B-2	ESA, AR200-1, Sikes Act	STS genetic accessment - Phase 2	2022	NA	Final Report
B-1; N-2	AR200-1, Sikes Act	Update javelina management plans in cooperation with AGFD	2023	NA	Final Report
B-1-B-2	AR200-1, Sikes Act	Amphibian and reptile baseline inventory update and maintenance	2023	NA	Final Report

INRMP Management Goal	Driver (Law/Reg / Agreement)	Proposed Project Title	Execution Timeframe	Monitoring Frequency	Reporting
B-1	AR200-1, Sikes Act	Develop a pollinator awareness and conservation program	2023	NA	Annual Report
M-1	AR200-1, Sikes Act	Nuisance wildlife trapping program reassessment to determine goals and justification and develop control policy that minimizes relocation with minimized euthanasia.	2023	NA	NA
M-1	DA Memo	Update guidelines and policy for wildlife feeding on the installation	2023	NA	Annual Report
A1-A2; B-1-B-2; H-1-H-3	AR200-1, Sikes Act	Develop native grassland management plan with the focus of identifying areas of significant diversity for preservation	2023	NA	Final Plan
A-2; B-2; C-1-C-2	AR200-1, Sikes Act	Maintain and update baseline inventory of bird species occurrence their habitat affinities, and population trends using DoD PIF methodologies and making information widely available and permanently preserved through use of the Coordinated Bird Monitoring Database maintained by the USGS in combination with the eBird program. and the Avian Knowledge Network.	2023	NA	Final Report
M-1	AR200-1; DODI 4150.7	Reassessment of management options regarding control of problem species (e.g. vaccinate and release protocols) to prevent risk to humans, wildlife, and ecosystems	2024	NA	NA
N-1-N-2	ESA, AR200-1, Sikes Act	Evaluate the management of recreational activities such as horseback riding and birding to ascertain the ability to maintain the natural environment	2024	NA	NA
Q-1	AR200-1	Digitized geomorphic surface map development of the installation	2024	NA	NA
N-1-N-2	AR200-1, Sikes Act	Evaluation of a recreational permit sales program and adjust as needed based on site use and management requirements	2024	NA	NA
A-1-A-3; B-1-B-2	Sikes Act	Lemmon fleabane monitoring per the CCA	2025	NA	Annual Report
B-1; N-2	AR200-1, Sikes Act	Update white-tailed and mule deer management plan in cooperation with AGFD	2025	NA	Final Report
A-1-A-3; B-1-B-2	AR200-1	Develop invertebrate monitoring program focused on species that may indicate plant diversity or ecological function	2025	NA	Annual Report
L-1-L-2	AR200-1, Sikes Act, EO11312	Formally develop Invasive Species Management Plan	2025	NA	Final Plan
I-1; P-1	AR200-1	Evaluation of the effect of military and recreational activities on terrestrial wildlife habitat	2025	NA	NA

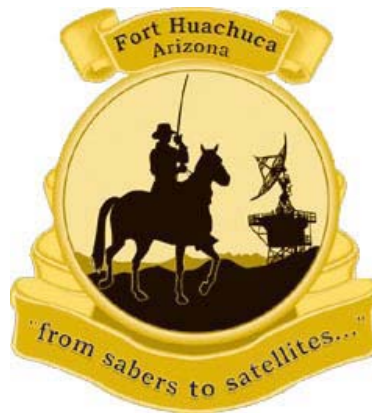
*ARPA -Archaeological Resources Protection Act October 31, 1979 (16 U.S.C. 470aa); FCRPA-Federal Cave Resources Protection Act

APPENDIX 3

RESEARCH APPLICATION

Format Page

PROCEDURES AND REQUIREMENTS IN APPLICATION FOR SCIENTIFIC RESEARCH AND COLLECTING PERMITS



Environmental and Natural Resources Division
Directorate of Public Works
U.S. Army Garrison
Fort Huachuca, Arizona

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Appendix A Scientific Research and Collection Permit Application

Appendix B Investigator's Annual Report

1.0 GENERAL AND POLICY REQUIREMENTS

The Environment and Natural Resources Division (ENRD) for the U.S. Army Garrison at Fort Huachuca welcomes your interest and consideration of Fort Huachuca as your research site. The responsibilities of the ENRD are to protect, manage, and enhance natural resources (wildlife, wetlands, historical properties, land investments, threatened and endangered species), while supporting the military mission. Conserving Fort Huachuca's natural resources requires a complete understanding of local natural resource components, processes, and their interrelationships with each other and with the military mission. This thorough understanding of the Fort's natural resources can only be obtained by scientific research and analysis accumulated over long periods of time. The ENRD recognizes that reliable scientific information of the highest quality is crucial for sound decision making and program management. The ENRD manages scientific studies on Fort Huachuca to ensure that the Fort's natural resources are protected and conserved. In order to conduct any form of research that involves Fort Huachuca's natural resources, a scientific research and collection permit is required. This permit can be obtained from the ENRD through the application process described below. Harassment of federally protected species, collection or destruction of natural resources without a scientific research and collection permit is unlawful and prosecutable. The ENRD welcomes proposals for scientific studies that enhance and increase the understanding of ecological, human, military, and natural resources at Fort Huachuca for the benefit of the military mission and science.

1.1 Scientific Research and Collecting Permits

A scientific research and collecting permit is required for all natural resources studies on Fort Huachuca that involve specimen collection, field observations, and/or have the potential to disturb natural resources. In some instances, other federal or state agency permits may be required before an application for scientific research and collecting permit is processed by ENRD. Such required permits may include scientific collection permits from the Arizona Game and Fish Department, threatened and endangered species permits issued by the U.S. Fish and Wildlife Service (USFWS), or migratory bird permits issued by the USFWS. When handling or collecting specimens is proposed, approvals by an Institutional Animal Care and Use Committee may also be required. The principle investigator is responsible for obtaining and supplying copies of these permits when they submit an application for proposed research on the Fort. Applicants are encouraged to contact ENRD staff to determine if additional permits are required for their proposed research.

1.2 Eligible Applicants

Any individual that represents an accredited education or scientific institution, a federal, tribal, or state agency, or has highly regarded qualifications and experiences to conduct scientific research.

1.3 Timeframe for Application

The ENRD recommends that the principle investigator applies at 120 days in advance of the first planned field activity date for your research project. A more extensive and longer proposal review may occur for projects requiring access to restricted or sensitive locations on Fort Huachuca, proposing research with sensitive natural resources (such as endangered or threatened species), or occurring on sensitive cultural sites.

1.4 Application Materials and Submittal Procedures

All individuals are required to complete an application form (Appendix A) and submit it along with a written research proposal to the ENRD. All application materials should be submitted by mail or email to Debbie Brewer of the ENRD at:

Debbie Brewer-Wildlife Biologist
Environmental and Natural Resource Division (ENRD)
U.S. Army Garrison
IMWE-HUA-PWB
3040 Butler Road, Building 22526
Ft. Huachuca, AZ 85613-7010

Email: debbie.a.brewer.civ@mail.mil

Voice: (520) 533-2724

1.5 Research Proposal

An application for research and collecting permits must include a research proposal prepared by the principle investigator. The proposal must include all applicable components outlined in Section 2.0.

1.6 Proposal Review

All proposals will be reviewed by ENRD staff for compliance with Army Regulation (AR) 200-1, Command Environmental Policy ATZS-CG 130 (24 SEPT 2007), National Environmental Policy Act (NEPA) requirements, current sensitivity issues, and other state and federal regulations, policies, and laws. The ENRD staff may also call for an external and/or internal scientific review, depending on the sensitivity or complexity of the proposed research. You can expedite the review process by providing names and mailing or email addresses of potential external reviewers, or by submitting a photocopy of existing peer reviews.

1.7 How to Obtain a Favorable Decision

ENRD staff will make the decision to approve a research and collecting permit based on an evaluation of apparent benefits, risks, and favorable and/or unfavorable aspects of the research. Even though ENRD staff will work with applicants to reach an acceptable research design when

possible, some design components will have no acceptable mitigating procedures and the application may be denied. The time and effort it takes to make a permitting decision will depend on the type and extent of the proposed research. If a single non-invasive visit is required, the review of a research proposal will be relatively fast. A highly invasive or complex investigation involving rare, delicate, or protected natural resources may require a more extensive review. Favorable and unfavorable factors influencing permitting decision are outlined below.

Favorable Factors

- The proposed research contributes to a greater understanding/interpretation of Fort Huachuca's natural resources, effective management of those resources, and provides scientific publications, databases, maps, or other information to the Fort.
- The proposed research addresses questions or issues of importance to Fort Huachuca or to science.
- The proposed research does not have the potential to cause disturbance to the Fort's natural and cultural resources, military operations, and residents.
- The proposed research is supported financially and academically which ensures the completion of the fieldwork, analysis, and reporting in a reasonable amount of time.
- The proposed research involves a principal investigator and supporting researchers that have a record of accomplishments in the proposed study and are in good standing with the scientific community.
- The principle investigator can demonstrate his/her ability to work safely in the proposed research environment and accomplish the research in a reasonable time frame.
- The proposal identifies a clear plan on how specimens will be collected, curated, and cataloged.
- The proposed research provides summaries of findings for the Fort's use.
- The proposal provides details for meeting all perceived logistical requirements.

Unfavorable Factors

- The proposal demonstrates a potential to generate a high risk of hazard or to have the potential to adversely impact the military mission, residents, contractors, natural resources, non-renewable resources, cultural resource, or personnel of Fort Huachuca and adjacent areas.
- The proposal provides extensive collection of natural resources relative to known abundance, distribution, and sensitivity.
- The proposal unnecessarily replicates previous research completed on Fort Huachuca.
- The proposed research requires extensive administrative or logistical monitoring by ENRD staff.
- The proposal is not submitted in a timely manner to allow appropriate and full review.
- The principle investigator lacks sufficient experience conducting scientific research or affiliation with an accredited education or scientific institution.
- The submitted proposal lacks sufficient justification to support the objectives of the research.

1.8 ENRD's Response to Proposed Research

A written notice of approval or rejection for the proposed research should be received by the principle investigator via mail or email. Any modification to an unacceptable proposal that will make the proposal acceptable will also be received at the same time. If the application is rejected, an applicant can contact the appropriate ENRD staff member to clarify the ruling and determine if reconsideration is possible.

1.9 Permitted Principle Investigator's Response to Approved Research

If a proposed research project is approved, the principle investigator will receive a copy of the permit that he/she must sign and return a copy of the signed permit to ENRD via mail or email. Any individual conducting research or collection under the direction of this approved permit must carry a copy of it on their person at all times and present it to authorized personnel (e.g., Military Police officers or Range Control personnel) for inspection at their request.

1.10 Permit Stipulations

Permits will be issued for up to a full calendar year and will expire at year's end, but may be reissued. Any requirements and restrictions on the research project will be attached to all issued research and collecting permits. Permit recipients must abide by all conditions identified in the permit and only activities authorized by the permit are permitted. If any changes in activities are required, the principle investigator must notify the appropriate ENRD staff in writing. A request for major changes may require a re-evaluation of the conditions under the permit and a revision to the proposed research. See Section 3.0 for more details.

1.11 Research Products and Deliverables

For each year covered by a research permit (including the final year), principle investigators are required to complete an Annual Report Form (Appendix B). The ENRD will contact permit holders if an Annual Report Form has not been received by February 20th, failure to submit the Annual Report Form can result in the permit non-renewal. Annual Report Forms are used by the ENRD to document research accomplishments on Fort Huachuca. The principle investigator is responsible for all content within their reports and the ENRD will not alter the reports unless requested to do so by the principle investigator in writing. ENRD requires copies of data, reports, publications, and may request copies of field notes, photos, and/or other materials resulting from all research conducted on Fort Huachuca.

A Final Report must be completed and submitted by the principle investigator to the ENRD within three years of the permitted project's completion. This Final Report should summarize the purpose, methods, findings, conclusions/recommendations for all research conducted under the scientific research permit. Project reporting formats used for granting sources, university or agency reporting, or journal manuscripts should suffice. All reporting documents, manuscripts, and all other material developed from research conducted on Fort Huachuca must be reviewed and approved in the draft form by ENRD and prior to publication.

1.12 Non-disclosure Policy

Information submitted by a principle investigator in application for scientific research and collecting permits will be used by ENRD staff only to determine whether to approve or reject the issuance of a scientific research and collecting permit. Any proposal submitted to the ENRD will be the intellectual property of the authors and details of research questions, study design, methods, or analyses will not be shared outside the ENRD. Information submitted in an Annual Report Form or Final Report will be used by ENRD staff to aid in making natural resource management decisions and to inform management decision-makers, other researchers, the public, and residents of Fort Huachuca about the purpose and progress of the research.

2.0 RESEARCH PROPOSAL GUIDELINES

An application for scientific research and collecting permits must include a detailed written research proposal that an educated non-specialist can clearly understand what you are planning to do. Proposal lengths will vary depending on the complexity and scope of the proposed research. Some proposals may consist of only a couple of pages if the study is expected to have no significant impact on the Fort's natural and cultural resources. Complex and lengthy research questions that require extensive collection of data or natural resources, or which have the potential to negatively affect natural resources generally tend to have more detailed and longer proposals. Research involving special-status species or sensitive cultural resources generally will also require longer and more detailed proposals. Illegible, incomplete, disorganized, and confusing proposals may be returned for revisions and may be denied if resubmittals are not improved

Below is a guideline for how a research proposal, for submittal of a scientific research and collection permit on Fort Huachuca, should be written. All italicized categories in Section 2.1 should be clearly labeled within your research proposal. If any additional information is required, it can be provided as a supplement or in your cover letter if appropriate. Any required topic that does not apply to your proposed research can be addressed by listing the topic and writing "not applicable." Attached to the front of your proposal should be a cover letter and the scientific research and collection permit application form.

2.1 Proposal Format

Cover Page

- Title
- Date of proposal
- Name of principle investigator and his/her institutional affiliation

Executive Summary

- Provide a brief summary describing the proposed research project.

Table of Contents

- Suggested for long and/or complicated proposals.

Investigators

- Principle Investigator—Provide her/his name, title, mailing address, email address, phone number, and institutional affiliation.
- All additional investigators—Provide their names and affiliations.

Background

- Summarize the proposed research on Fort Huachuca by describing the problems and issues being investigated and its importance and relevance to science and to Fort Huachuca.
- Background information should clearly describe the need for such a project and why it is valuable for this research to be conducted on Fort Huachuca.
- Describe any previous pertinent research that supports the questions, details, or issues you will be addressing in your research.
- Explain the overall scope (geographic and scientific) of the research project.
- Detail how products from this research will be used.

Objectives

- Describe the specific objectives of the proposed research.
- If applicable, the objectives should be stated as testable hypotheses.

Methods

- Detail the proposed design for the research by explaining all methods and protocols being employed in the field and laboratory. Describe how the proposed field techniques will affect the Fort's land uses and natural resources.
- Clearly describe the study area, required conditions, vegetation types, number and size of plots, etc. Provide maps, names, and geographic coordinates if applicable.
- Note if the work will be taking place in a sensitive natural resource or cultural resource location.
- Clearly and thoroughly identify any expected manipulations or impacts to the Fort's lands and resources.
- Present a detailed schedule that includes the preferred start date, length of fieldwork, dates for analysis, reporting, and the expected date of completion for the proposed research.
- List the type, size, and quantity of specimens proposed for collection, sampling, captured, or handled. Detail any plans of removing specimens from the field site. Provide information on all applicable federal and state permits you are required to obtain for this research.

Products

- List any reports or publications expected to be a direct result of this proposed research.

- Describe any proposed disposing of collected specimens or materials or where these specimens will be housed for long-term storage and identify the institution that will be in charge of storage/disposing for these specimens.
- Describe all other products to be generated as a result of this research project. Other products can include photographs, models, maps, exhibits, presentations, software, pamphlets, raw data, videos, GIS layers, etc.
- Provide a copy, upon request, of materials (surveys, questionnaires, photographs) used for collecting data from the public.

References

- Include complete bibliographic citations for all reports, publications, and data referenced in the research proposal.

Qualifications

- Provide a curriculum vitae or summary of all investigators present in the project proposal.
- Identify investigators abilities to conduct pertinent activities during field and lab work.
- Describe any investigators relevant training and qualifications for this research project.
- List any previous work conducted on Fort Huachuca.

Support Documents and Special Concerns

- Attach copies of supporting documentation that will facilitate the review process, such as federal and state permits, peer reviews of the proposed research, documentation of funding, and certifications.
- Identify any expected ground disturbance as a result of the proposed research project. Describe the type, location, area, depth, quantity, and distribution of disturbances. Explain restoration plans for areas significantly affected by disturbances. Proposed projects with ground disturbance may require an archeological survey and special clearance prior to approval for the study.
- Explain any known potentially hazardous activities to be conducted by the investigators. This can include handling of wildlife, vehicle use, capturing of wildlife, etc.
- Describe the method and frequency of travel to and within the study site. Explain the need to access any restricted area and describe duration, number of investigators, and location of proposed activities.
- Identify the type, number and location of any field equipment being used. Also, if equipment is to be left in the field, explain the need for this and how long it will be at each location.
- List any hazardous or chemical materials to be used in the field, its purpose, method of application, and amount to be used. Give details on storage, transfer, and disposal plans for the materials. Describe steps to be taken if chemicals are accidentally released into the environment. Attach a copy of Material Safety Data Sheets.

- Include a photocopy of the study protocol, Institutional Animal Care and Use Committee (IACUC) review form, and the IACUC approval form for vertebrate species that require review by the IACUC according to the Animal Welfare Act.
- For vertebrate species that do not require review by the IACUC, describe your protocol for capturing, handling, tagging, and/or tissue sampling for these animals. Include any training or qualifications of investigators relevant to animal handling and care. Discuss alternate techniques considered and why they were not implemented. Describe any procedures to alleviate stress or pain for these animals and any emergency plans to be implemented in the event of accidental injury or death in handling wildlife.

3.0 CONDITIONS FOR SCIENTIFIC RESEARCH AND COLLECTING PERMITS

3.1 Authority

Privileges granted under scientific research and collecting permits to the permitted principle investigator are subject to the supervision of the ENRD and Fort Huachuca. The permitted principle investigator will comply with all applicable federal, state, and Fort regulations and laws. An ENRD staff member, or appointed subject matter expert, may accompany the permitted principle investigator into the field at any time to ensure compliance with these regulations.

3.2 Responsibility

The permitted principle investigator is responsible for guaranteeing that all personnel working on the project follow all permit conditions and Fort Huachuca regulations.

3.3 Providing False Information

False information provided by the permitted principle investigator to obtain a scientific research and collecting permit is prohibited, can result in the revocation of permits. Providing false information may also result in the execution of other penalties.

3.4 Specimen/Material Collection and Handling

No specimens or materials may be collected or handled unless authorized on the scientific research and collecting permit. Conditions for specimen and material collection and handling are:

- Collection and handling methodology will not cause unapproved damage, disturbance, or depletion to the natural and cultural resources of Fort Huachuca.
- A valid Federal Archeology Permit is required for collecting archeological materials.
- A valid USFWS endangered species permit is required for collection, handling, or any other type of disturbance to federally listed endangered or threatened species.
- Collected specimens or materials not consumed in the analysis remain the property of Fort Huachuca. The ENRD reserves the right to designate repositories for all specimens removed from the Fort. These specimens cannot be destroyed without ENRD consent.
- Collected specimens or components of specimens may only be used for scientific or educational purposes.

3.5 Reports

Investigator Annual Reports, Final Report, and publications are required to be submitted by the permitted principle investigator. The Final Report can either be a copy of a publication based on the permitted research or a separately written summary of the completed research. This Final Report should summarize the purpose, methods, findings, and conclusions/recommendations for the entire length of the scientific research permit.

The ENRD will also analyze research proposals to determine if copies of photos, maps, field notes, databases, or other materials are required for submittal. The principle investigator under the scientific research and collecting permit is responsible for the content of the information on all reports and data provided to ENRD. All reports, publications, or other materials produced from this research must be approved in concept during the application process and reviewed and approved by ENRD prior to publication or dispersal.

3.6 Confidentiality

The permitted principle investigator and his/her agents agrees to keep sensitive information of Fort Huachuca natural, military, and cultural resources confidential (to include but not limited general or specific location information). Sensitive resources can include threatened species, endangered species, rare species, fossil sites, sacred ceremonial sites, mineral deposits, caves, archeological sites, military installations, and commercially valuable resources. Sensitive information not for release will also include specific site or resource names.

3.7 Travel

Traveling within Fort Huachuca is restricted to methods used by the general public, unless identified otherwise within the permit.

3.8 Other Permits

The permitted principle investigator must obtain all other required permit(s) before submitting the application for research for review.

3.9 Insurance

If the ENRD requires you to have liability insurance while working on this project, then documentation demonstrating that the insurance has been acquired and is current must be presented to the ENRD before the permit is validated.

3.10 Project Participation by ENRD

Unless prior arrangements have been made and documented, Fort Huachuca shall not be assumed to provide either equipment or assistance for research activities.

3.11 Field and Permanent Marking Equipment

The ENRD will require the permitted principle investigator to remove all markers and/or equipment from the field after the study has been completed or by the expiration date of the

permit. All marking should be coded to reduce the amount of attention by non-research related individuals and to protect those species targeted by research activities. Any field equipment left unattended for more than one hour must be labeled and clearly identify a contact person and their contact information (e.g., phone or email).

3.12 Access to Fort Huachuca and Restricted Areas

Access to Fort Huachuca is contingent on the Fort being open to public access. Entry into restricted areas is prohibited unless authorized by a specific stipulation attached to the scientific research and collection permit.

3.13 Notification Prior to Working on Fort Huachuca

The permitted principle investigator is required to contact the ENRD one week prior to the initiation of any permitted field work at Fort Huachuca.

3.14 Expiration Date

All scientific research and collection permits expire on the permit expiration date. No clauses on the permit shall be interpreted as giving the principle investigator privileges to an automatic continuation, renewal, or extension to the current research or research under a new permit.

3.15 Other stipulations

All stipulations listed in the application materials are included in the permit. The permit may also include any stipulations attached to the document by the ENRD. Breaching any of the terms of this permit is grounds for revocation of the current permit and denial of future permits.

Appendix A
Scientific Research and Collection Permit Application

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Scientific Research and Collection Permit Application

Environmental and Natural Resources Division
Directorate of Public Works
U.S. Army Garrison
Fort Huachuca, Arizona



Principle Investigator Information (please print or type)			
Last Name	First	MI	Daytime Phone Number
Organizational Affiliation			Alternate Phone Number
Address			Fax Number
City	State	ZIP Code	E-Mail Address

Research Information

Project Title		
Study Start Date	Study End Date	Research Location(s) on Fort Huachuca

Purpose of Study

Scientific Qualifications of Principle Investigator

Name of Co-Applicants (first name, last name, office phone, office e-mail)

Federal Permit No. (if any)	Date Federal Permit Expires	In the past year has the principle investigator been convicted of any federal or Arizona fish and game laws? <input type="checkbox"/> YES If Yes, Explain: <input type="checkbox"/> NO
AZ State Permit No. (if any)	Date AZ State Permit Expires	

Collection/Capturing Information

Species, Age or Size Class, and Number of Specimens

Purpose of Collecting or Capturing of Specimens

Method(s) of Collecting or Capturing of Specimens—List Any Chemical Agents Used for Capture

Location Sites of Collecting or Capturing of Specimens

Dates of Collecting or Capturing Specimens

Location Where Specimens will be Kept for Study (if applicable). Include name, type of facility, and address

Detail Method of Final Disposition of Specimens

Certification

I certify that the information provided on this application is correct and true and that I will comply with all terms and conditions stipulated on this scientific research and collection permit. I understand that providing incorrect information may result in the revocation of the permit and additional penalties.

Applicant Signature

Date

Appendix B
Investigator's Annual Report Form

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Investigator's Annual Report Form

For Scientific Research and Collection Permits
Environmental and Natural Resources Division
Directorate of Public Works
U.S. Army Garrison
Fort Huachuca, Arizona



Permit Identification (please print or type)

Reporting Year	Fort Huachuca Assigned Permit No.		
Permit Start Date	Permit End Date	Scientific Research Start Date	Scientific Research Estimated End Date

Principle Investigator Information

Last Name	First	MI	Daytime Phone Number
Organizational Affiliation			Alternate Phone Number
Address			Fax Number
City	State	ZIP Code	E-Mail Address

Project Information

Project Title		
Status of Scientific Study	Subject and Discipline	Activity Type

For Research that is Completed, Check Each of the Following that Apply

- A final report has been submitted to the ENRD or will be provided within the next year
- Copies of field notes, maps, photos, data files, or other study materials have been submitted to the ENRD

Purpose of Scientific Research

Findings and Status of Scientific Study

During the Report Year, were Any Specimens Collected and Removed from Fort Huachuca?	Were Collected Specimens Destroyed After Analysis?	Was Any Wildlife Captured or Handled on Fort Huachuca During the Report Year?
--------------------------------------------------------------------------------------	----------------------------------------------------	-------------------------------------------------------------------------------

Report Any Accidental Injury or Deaths to Captured/Handled Wildlife During the Report Year

Funding (Type and Amount) Specifically Used During this Reporting Year on Fort Huachuca that was Provided by Fort Huachuca	Funding (Type and Amount) Specifically Used During this Reporting Year on Fort Huachuca that was Provided by Other Sources
----------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------

List All Other U.S. Government Agencies Funding this Study and the Funding (Type and Amount) they Provided for this Report Year

Certification

I certify that the information provided on this application is correct and true and that I will comply with all terms and conditions stipulated on this scientific research and collection permit. I understand that providing incorrect information may result in the revocation of the permit and additional penalties.

Principle Investigator's Signature	Date
------------------------------------	------

APPENDIX 4

MIGRATORY BIRD MANAGEMENT

Format Page

Presidential Documents

Title 3—

Executive Order 13186 of January 10, 2001

The President

Responsibilities of Federal Agencies To Protect Migratory Birds

By the authority vested in me as President by the Constitution and the laws of the United States of America, and in furtherance of the purposes of the migratory bird conventions, the Migratory Bird Treaty Act (16 U.S.C. 703–711), the Bald and Golden Eagle Protection Acts (16 U.S.C. 668–668d), the Fish and Wildlife Coordination Act (16 U.S.C. 661–666c), the Endangered Species Act of 1973 (16 U.S.C. 1531–1544), the National Environmental Policy Act of 1969 (42 U.S.C. 4321–4347), and other pertinent statutes, it is hereby ordered as follows:

Section 1. Policy. Migratory birds are of great ecological and economic value to this country and to other countries. They contribute to biological diversity and bring tremendous enjoyment to millions of Americans who study, watch, feed, or hunt these birds throughout the United States and other countries. The United States has recognized the critical importance of this shared resource by ratifying international, bilateral conventions for the conservation of migratory birds. Such conventions include the Convention for the Protection of Migratory Birds with Great Britain on behalf of Canada 1916, the Convention for the Protection of Migratory Birds and Game Mammals-Mexico 1936, the Convention for the Protection of Birds and Their Environment-Japan 1972, and the Convention for the Conservation of Migratory Birds and Their Environment-Union of Soviet Socialist Republics 1978.

These migratory bird conventions impose substantive obligations on the United States for the conservation of migratory birds and their habitats, and through the Migratory Bird Treaty Act (Act), the United States has implemented these migratory bird conventions with respect to the United States. This Executive Order directs executive departments and agencies to take certain actions to further implement the Act.

Sec. 2. Definitions. For purposes of this order:

(a) “Take” means take as defined in 50 C.F.R. 10.12, and includes both “intentional” and “unintentional” take.

(b) “Intentional take” means take that is the purpose of the activity in question.

(c) “Unintentional take” means take that results from, but is not the purpose of, the activity in question.

(d) “Migratory bird” means any bird listed in 50 C.F.R. 10.13.

(e) “Migratory bird resources” means migratory birds and the habitats upon which they depend.

(f) “Migratory bird convention” means, collectively, the bilateral conventions (with Great Britain/Canada, Mexico, Japan, and Russia) for the conservation of migratory bird resources.

(g) “Federal agency” means an executive department or agency, but does not include independent establishments as defined by 5 U.S.C. 104.

(h) “Action” means a program, activity, project, official policy (such as a rule or regulation), or formal plan directly carried out by a Federal agency. Each Federal agency will further define what the term “action” means with respect to its own authorities and what programs should be included

in the agency-specific Memoranda of Understanding required by this order. Actions delegated to or assumed by nonfederal entities, or carried out by nonfederal entities with Federal assistance, are not subject to this order. Such actions, however, continue to be subject to the Migratory Bird Treaty Act.

(i) "Species of concern" refers to those species listed in the periodic report "Migratory Nongame Birds of Management Concern in the United States," priority migratory bird species as documented by established plans (such as Bird Conservation Regions in the North American Bird Conservation Initiative or Partners in Flight physiographic areas), and those species listed in 50 C.F.R. 17.11.

Sec. 3. Federal Agency Responsibilities. (a) Each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement, within 2 years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) that shall promote the conservation of migratory bird populations.

(b) In coordination with affected Federal agencies, the Service shall develop a schedule for completion of the MOUs within 180 days of the date of this order. The schedule shall give priority to completing the MOUs with agencies having the most substantive impacts on migratory birds.

(c) Each MOU shall establish protocols for implementation of the MOU and for reporting accomplishments. These protocols may be incorporated into existing actions; however, the MOU shall recognize that the agency may not be able to implement some elements of the MOU until such time as the agency has successfully included them in each agency's formal planning processes (such as revision of agency land management plans, land use compatibility guidelines, integrated resource management plans, and fishery management plans), including public participation and NEPA analysis, as appropriate. This order and the MOUs to be developed by the agencies are intended to be implemented when new actions or renewal of contracts, permits, delegations, or other third party agreements are initiated as well as during the initiation of new, or revisions to, land management plans.

(d) Each MOU shall include an elevation process to resolve any dispute between the signatory agencies regarding a particular practice or activity.

(e) Pursuant to its MOU, each agency shall, to the extent permitted by law and subject to the availability of appropriations and within Administration budgetary limits, and in harmony with agency missions:

(1) support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions;

(2) restore and enhance the habitat of migratory birds, as practicable;

(3) prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable;

(4) design migratory bird habitat and population conservation principles, measures, and practices, into agency plans and planning processes (natural resource, land management, and environmental quality planning, including, but not limited to, forest and rangeland planning, coastal management planning, watershed planning, etc.) as practicable, and coordinate with other agencies and nonfederal partners in planning efforts;

(5) within established authorities and in conjunction with the adoption, amendment, or revision of agency management plans and guidance, ensure that agency plans and actions promote programs and recommendations of comprehensive migratory bird planning efforts such as Partners-in-Flight, U.S. National Shorebird Plan, North American Waterfowl Management Plan, North American Colonial Waterbird Plan, and other planning efforts, as well as guidance from other sources, including the Food and Agricultural

Organization's International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries;

(6) ensure that environmental analyses of Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern;

(7) provide notice to the Service in advance of conducting an action that is intended to take migratory birds, or annually report to the Service on the number of individuals of each species of migratory birds intentionally taken during the conduct of any agency action, including but not limited to banding or marking, scientific collecting, taxidermy, and depredation control;

(8) minimize the intentional take of species of concern by: (i) delineating standards and procedures for such take; and (ii) developing procedures for the review and evaluation of take actions. With respect to intentional take, the MOU shall be consistent with the appropriate sections of 50 C.F.R. parts 10, 21, and 22;

(9) identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. With respect to those actions so identified, the agency shall develop and use principles, standards, and practices that will lessen the amount of unintentional take, developing any such conservation efforts in cooperation with the Service. These principles, standards, and practices shall be regularly evaluated and revised to ensure that they are effective in lessening the detrimental effect of agency actions on migratory bird populations. The agency also shall inventory and monitor bird habitat and populations within the agency's capabilities and authorities to the extent feasible to facilitate decisions about the need for, and effectiveness of, conservation efforts;

(10) within the scope of its statutorily-designated authorities, control the import, export, and establishment in the wild of live exotic animals and plants that may be harmful to migratory bird resources;

(11) promote research and information exchange related to the conservation of migratory bird resources, including coordinated inventorying and monitoring and the collection and assessment of information on environmental contaminants and other physical or biological stressors having potential relevance to migratory bird conservation. Where such information is collected in the course of agency actions or supported through Federal financial assistance, reasonable efforts shall be made to share such information with the Service, the Biological Resources Division of the U.S. Geological Survey, and other appropriate repositories of such data (e.g. the Cornell Laboratory of Ornithology);

(12) provide training and information to appropriate employees on methods and means of avoiding or minimizing the take of migratory birds and conserving and restoring migratory bird habitat;

(13) promote migratory bird conservation in international activities and with other countries and international partners, in consultation with the Department of State, as appropriate or relevant to the agency's authorities;

(14) recognize and promote economic and recreational values of birds, as appropriate; and

(15) develop partnerships with non-Federal entities to further bird conservation.

(f) Notwithstanding the requirement to finalize an MOU within 2 years, each agency is encouraged to immediately begin implementing the conservation measures set forth above in subparagraphs (1) through (15) of this section, as appropriate and practicable.

(g) Each agency shall advise the public of the availability of its MOU through a notice published in the **Federal Register**.

Sec. 4. Council for the Conservation of Migratory Birds. (a) The Secretary of Interior shall establish an interagency Council for the Conservation of Migratory Birds (Council) to oversee the implementation of this order. The Council's duties shall include the following: (1) sharing the latest resource information to assist in the conservation and management of migratory birds; (2) developing an annual report of accomplishments and recommendations related to this order; (3) fostering partnerships to further the goals of this order; and (4) selecting an annual recipient of a Presidential Migratory Bird Federal Stewardship Award for contributions to the protection of migratory birds.

(b) The Council shall include representation, at the bureau director/administrator level, from the Departments of the Interior, State, Commerce, Agriculture, Transportation, Energy, Defense, and the Environmental Protection Agency and from such other agencies as appropriate.

Sec. 5. Application and Judicial Review. (a) This order and the MOU to be developed by the agencies do not require changes to current contracts, permits, or other third party agreements.

(b) This order is intended only to improve the internal management of the executive branch and does not create any right or benefit, substantive or procedural, separately enforceable at law or equity by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.



THE WHITE HOUSE,
January 10, 2001.



ENERGY,
INSTALLATIONS,
AND ENVIRONMENT

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

3400 DEFENSE PENTAGON
WASHINGTON, DC 20301-3400

FEB 06 2018

MEMORANDUM FOR DEPUTY ASSISTANT SECRETARY OF THE ARMY
(ENVIRONMENT, SAFETY AND OCCUPATIONAL HEALTH)
DEPUTY ASSISTANT SECRETARY OF THE NAVY
(ENVIRONMENT)
DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE
(ENVIRONMENT, SAFETY AND INFRASTRUCTURE)
DIRECTOR, DEFENSE LOGISTICS AGENCY (DSS-E)

SUBJECT: Incidental Take of Migratory Birds

On December 22, 2017, the U.S. Department of the Interior's Office of the Solicitor issued Solicitor's Opinion M-37050 issued the opinion that the Migratory Bird Treaty Act (MBTA) prohibition on the "taking" or "killing" of migratory birds applies only to deliberate acts intended to take a migratory birds, their nests, or their eggs. This opinion permanently withdraws and replaces Solicitor's Opinion M-37041 (issued January 10, 2017, and suspended pending review on February 6, 2017).

This opinion alone does not rescind the "military readiness rule" (50 C.F.R. §21.15), §315 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003, Executive Order 13186, or the resulting MOU with U.S. Fish and Wildlife Service. Neither does it address the split of opinions among the five Circuit Courts of Appeal that have addressed the question of whether the MBTA criminalizes some instances of incidental take, an issue that can be resolved only by U.S. Supreme Court review or congressional action. As a consequence, we advise that until further clarification is provided, the Military Departments should continue to follow existing Department of Defense guidance designed to minimize – to the extent practicable and without diminishing the effectiveness of military readiness activities – the incidental take of migratory birds.

My point of contact is Alison Dalsimer, 571-372-6893, alyn.a.dalsimer.civ@mail.mil.

Maureen Sullivan

Deputy Assistant Secretary of Defense
(Environment, Safety and Occupational Health)

Attachment:
None

Format Page

USEFUL TOOLS IN IMPLEMENTING MIGRATORY BIRD CONSERVATION BY THE DOD

The following is not an exhaustive list of tools available to help address migratory bird conservation but are excellent sources to start.

Partners in Flight (<http://www.partnersinflight.org>)

Partners in Flight is an umbrella network of which the DoD bird conservation program is a vital part. Partners in Flight was launched in 1990 in response to growing concerns about declines in the populations of many landbirds, and to address the conservation of birds not covered by existing conservation initiatives.

The PIF web site provides helpful information including links to regional plans that discuss bird conservation goals and objectives for individual species in a specific physiographic region.

DoD Partners in Flight (<http://www.dodpif.org/>)

The Management Strategy for DoD PIF is to promote and support a partnership role in the protection and conservation of birds and their habitats by protecting vital DoD lands and ecosystems, enhancing biodiversity, and maintaining healthy and productive natural systems consistent with the military mission. The DoD PIF web site provides a number of useful resources for addressing or learning more about migratory bird conservation, including fact sheets and a database of installation-specific information.

Installation Bird Checklist (<http://www.dodpif.org/>)

This is an ongoing effort to providing a list of birds known to occur on or in the vicinity of individual military bases in addition to seasonal occurrence records.

Species of Concern (<http://www.dodpif.org/>)

Although migratory bird conservation should address all migratory birds, the MOU places a priority on addressing the conservation of species of concern as resources are limited to effectively address all birds. Species of concern refers to those species listed in the periodic report FWS *Birds of Conservation Concern*; priority migratory bird species documented in the comprehensive bird conservation plans (North American Waterbird Conservation Plan, U.S. Shorebird Conservation Plan, Partners in Flight Bird Conservation Plans); species or populations of waterfowl identified as high, or moderately high, continental priority in the North American Waterfowl Management Plan; listed threatened and endangered bird species in 50 CFR. 17.11; and Migratory Bird Treat Act listed game birds below desired population sizes. To assist DoD staff in determining what species may be impacted by activities on military bases, DoD PIF is in the process of developing a list of species of concern for each military base in the continental U.S. Until these individual base lists are finalized, list of species of concern are available at the larger Bird Conservation Region (BCR) scale. BCRs are ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues.

The DoD Bird Conservation Database (Database) (<http://www.dodpif.org/projects/>)

This database was created to document, consolidate, and disseminate bird conservation efforts on or involving military lands and civil works projects and make that information available as a resource for planners, land managers and other professionals involved in bird conservation.

This database can provide a valuable resource for biologists to share natural resource management information on their base including species accounts, research and monitoring, bird surveys, etc. Base biologists are encouraged to insert abstracts on their natural resource projects into the database.

Conservation Measures (<http://www.partnersinflight.org/pubs/BMPs.htm>)

There is currently a lack of a single resource database that provides easy reference to migratory bird conservation measures that may be implemented for a diversity of species or habitat types. However, several efforts are underway and will be available in the future. One resource that is currently underdevelopment but readily available are Best Management Practices on the Partners in Flight web site.

DoD PIF-L List Serve (<http://www.dodpif.org/>).

This Listserve supports the natural resource managers at DoD sites to more effectively address migratory and resident bird issues, and incorporate bird habitat conservation plans into the INRMP process. The list should be used for items that will benefit natural resource managers with bird conservation issues, including as requests for information or assistance. See the web site for how to subscribe to the list.

US Shorebird Conservation Plan (<http://www.fws.gov/shorebirdplan/>) is an effort undertaken by a partnership of Federal and State government agencies, as well as non-governmental and private organizations to ensure that stable and self-sustaining populations of all shorebird species are restored and protected. Both the U.S. Plan and regional step down plans provide useful information regarding population goals and objectives for individual priority shorebird species.

North American Waterbird Conservation Plan

(<http://www.waterbirdconservation.org/>)

This partnership of Federal and State government agencies, non-governmental organizations, and private interests focuses on the conservation of waterbirds, primarily including marshbirds and inland, coastal, and pelagic colonial waterbirds). As with the Partners in Flight and Shorebird initiatives, waterbird conservation plans are available at both the continental and regional scale. These include population and habitat objectives for individual waterbird species and management recommendations.

FWS Course for DoD Natural Resource Managers: Migratory Bird Conservation – A Trust Responsibility

The FWS periodically offers a MBTA course specifically modified for DoD participants. FWS hopes to offer the course approximately once a year.

DoD Conservation Page (<http://www.denix.osd.mil/Conservation/>)

The Conservation Web page on DENIX offers a wide variety of bird conservation reports and other products. Of particular note are the sections on “Wildlife” and “Endangered Species.”

DoD Legacy Resource Management Program (<http://www.dodlegacy.org>)

The Legacy program funds efforts that preserve our nation’s natural and cultural heritage on DoD lands. Three principles guide the Legacy Program: *stewardship*, *leadership*, and *partnership*. Stewardship initiatives assist DoD in safeguarding its irreplaceable resources for future generations. By embracing a leadership role as part of the program, DoD serves as a model for respectful use of natural and cultural resources. Through partnerships, Legacy strives to access the knowledge and talents of individuals outside of DoD. The Legacy Web site describes proposal submittal guidelines, lists previously funded projects, and provides links to many products. Bird conservation is one of Legacy’s eleven areas of interest.

Strategic Environmental Research and Development Program (<http://www.serdp.org>)

SERDP is DoD’s environmental science and technology program, planned and executed in full partnership with the Department of Energy and the Environmental Protection Agency, with participation by numerous other federal and non-federal organizations. To address the highest priority issues confronting the Army, Navy, Air Force, and Marines, SERDP focuses on cross-service requirements and pursues high-risk/high-payoff solutions to the Department’s most intractable environmental problems. The development and application of innovative environmental technologies support the long-term sustainability of DoD’s training and testing ranges as well as significantly reduce current and future environmental liabilities. SERDP offers funding in the following four focus areas: Environmental Restoration, Munitions Management, Sustainable Infrastructure, and Weapons Systems and Platforms. Sustainable Infrastructure (SI) encompasses the technologies required to sustain training and testing ranges, as well as the installation infrastructure that supports those ranges and the deployed forces. SI is subdivided into natural resources, facilities, and cultural resources.

Environmental Security Technology Certification Program (<http://www.estcp.org>)

ESTCP is DoD’s environmental technology demonstration and validation program. The goal of ESTCP is to identify, demonstrate, and transfer technologies that address DoD’s highest priority environmental requirements. The Program promotes innovative, cost-effective environmental technologies through demonstrations at DoD facilities and sites. These technologies provide a return on investment through improved efficiency, reduced liability, and direct cost savings. ESTCP’s strategy is to select lab-proven technologies with broad DoD application and aggressively move them to the field for rigorous trials documenting their cost, performance, and market potential. ESTCP offers funding in the following four focus areas: Environmental Restoration, Munitions Management, Sustainable Infrastructure, and Weapons Systems and Platforms. Sustainable Infrastructure (SI) encompasses the technologies required to sustain training and testing

ranges, as well as the installation infrastructure that supports those ranges and the deployed forces. SI is subdivided into natural resources, facilities, and cultural resources.

North American Bird Conservation Initiative (NABCI)

The U.S. NABCI Committee is a forum of government agencies, non-profit organizations, and initiatives dedicated to advancing integrated bird conservation in North America. Its strategy is to foster coordination and collaboration among the bird conservation community on key issues of concern. Through annual work plans, NABCI focuses its efforts on advancing bird monitoring, conservation design, international conservation, and institutional support in state and federal agencies for bird habitat conservation.

DoD Coordinated Bird Monitoring Plan

A Coordinated Bird Monitoring (CBM) approach now is being followed in the United State and Canada by many public and private agencies. The CBM approach stresses clear specification of management issues that bird monitoring can help address, careful attention to quantitative issues, and coordination among the different bird initiatives and between these groups and managers who will use the information. DoD is undertaking a three-year project that will develop four products to help improve bird monitoring programs on DoD land -- a review of existing monitoring programs, guidelines for selected surveys, a plan for monitoring species of special concern on DoD land, and recommendations for DoD's role in continental bird monitoring programs.



Mission-Sensitive Species

Those species with highest potential to impact DoD missions if federally listed under ESA

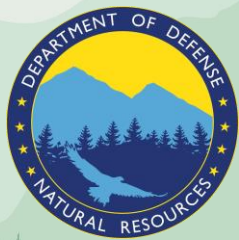
—Department of Defense Partners in Flight Mission-Sensitive Species Working Group

Department of Defense
Partners in Flight
CLEARED
For Open Publication

May 27, 2021

Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW
Our Mission

Providing expertise on the management and conservation of birds and their habitats to sustain and enhance the military mission



Background and Problem

Department of Defense (DoD) Partners in Flight (PIF) has identified, through a detailed technical analysis, 15 avian species occurring on DoD lands that may be at-risk of becoming listed under the federal Endangered Species Act (ESA) (Table 1). DoD PIF designated these as “Mission-sensitive Species” (MSS) due to their high potential to impact the military mission should ESA listing be warranted. The purpose of the MSS list is to help DoD Natural Resources Managers prioritize monitoring and management efforts of those species and their habitats to help reverse trends and/or prepare installations for potential listings. The DoD PIF MSS list provides recommendations based on best available science, and is not intended to supersede Military Service-specific monitoring, management, or funding priorities.



Least Tern (Sternula Antillarum antillarum), a PIF Mission-sensitive Species on Patrick Air Force Base, Florida. Photo by G. Fleming.

In 2008, DoD PIF Representatives from all regions (Southeast, Northeast, Midwest, West, Alaska, and Hawaii), representing all Military Services, each were tasked with providing a top ten list of migratory birds with the highest potential to impact military missions within their region of responsibility if those birds were ESA-listed. The original MSS list promoted by

DoD PIF in 2011 (excluding Hawai'i and the Pacific Islands) was a combined list from this input and included 67 species. That list was then vetted extensively with experts from American Bird Conservancy. Since then, several additional species have been considered as MSS based on input from installations with specific mission-impact concerns. In 2017, DoD PIF began re-evaluating species (excluding Hawai'i and the Pacific Islands Region), based in part on their declining status using a standardized assessment process based on numerical and regulatory factors or concerns. This exercise identified 15 of these species as MSS. Installation managers in Hawai'i and the Pacific Islands Region were queried for priority species separately, and those will be addressed in a separate effort.

Review Criteria

DoD PIF recently reviewed 93 migratory bird species for their potential to be categorized as MSS based on several migratory bird regional and national assessment databases, including:

- Breeding Bird Survey (BBS) trends
- National PIF overall population trend (% population change over the last 30 years)
- National PIF landbird population estimates database
- National PIF Continental Combined Score
- Associated Tri-National Concern status (Critical Needs (CR) or Immediate Needs (IM)).

DoD PIF also considered whether a species was an ESA Candidate, currently undergoing a 12-month status review for ESA listing, a U.S. Fish and Wildlife

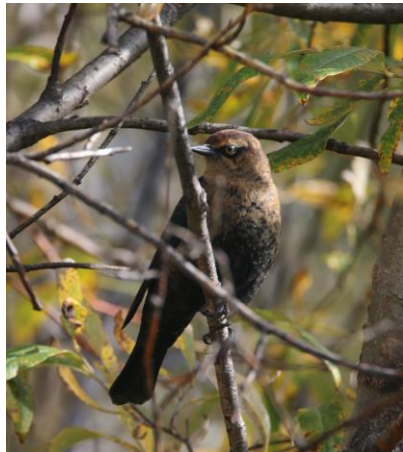
Contacts

Richard Fischer, Ph.D.
National Coordinator
Richard.A.Fischer@erdc.dren.mil

Elizabeth Neipert
Technical Coordinator
Elizabeth.S.Neipert@erdc.dren.mil

Mission-Sensitive Species

Service (USFWS) Focal species, a USFWS Bird of Conservation Concern, and/or Army Species At-Risk. Members of the DoD PIF MSS Working Group ranked each of the 93 Species (1 = Highest Priority; 2 = Moderate Priority; 3 = Low Priority) based on available assessment criteria and potential for mission impacts. Prior to assigning MSS designation, the Working Group placed specific emphasis on the frequency of species occurrences on military installations to evaluate their potential for mission impacts if federally listed. To assist this effort, the Working Group reviewed available monitoring data and the vast majority of DoD Integrated Natural Resources Management Plans for occurrence information; and also used the expertise of DoD PIF Representatives and installation Natural Resources Professionals to evaluate potential impacts of any future listings of MSS.



Rusty Blackbird (Euphagus carolinus), a PIF Mission-sensitive Species on Eielson Air Force Base, Alaska. Photo by E. Neipert.

In addition to the 15 MSS, DoD PIF also categorized 37 species as “Tier 2” species (Table 2). The majority of these species are experiencing long-term declines, and have some potential relevance to future mission impacts if federally listed, but are not considered highest priority based on DoD PIF’s current review criteria. Proactive monitoring and management of Tier 2 species is encouraged when and where appropriate.

Reviewing and Updating the MSS List

DoD PIF encourages and accepts input from the Military Services, to include military natural resources managers, on additions and deletions to the MSS list based on best available scientific information. We will identify any emerging needs annually and complete a thorough review of both MSS and Tier 2 species every five years.

Table 1. DoD PIF Mission-Sensitive Species	
Northern Bobwhite	Bendire's Thrasher
¹ Greater Sage-Grouse	Bachman's Sparrow
Greater Prairie-Chicken	¹ Henslow's Sparrow
Mountain Plover	Tricolored Blackbird
Least Tern (Atlantic Coast Pop)	¹ Rusty Blackbird
Burrowing Owl	² Golden-winged Warbler
Southeastern American Kestrel	Cerulean Warbler
Pinyon Jay	
¹ Army Species at Risk	
² Undergoing 12-month status review to determine if listing is warranted - no ESA status	

Table 2. DoD PIF Tier 2 Species	
Scripps's Murrelet	Prothonotary Warbler
Ashy Storm-Petrel	Allen's Hummingbird
Long-billed Curlew	Canada Warbler
Snowy Plover (Gulf Coast)	Virginia's Warbler
King Rail	Loggerhead Shrike
Elegant Tern	Gilded Flicker
Eastern Whip-poor-will	Red-headed Woodpecker
Black-billed Cuckoo	Lewis's Woodpecker
Flammulated Owl	Wood Thrush
Swallow-tailed Kite	Gray Vireo
Le Conte's Thrasher	Chestnut-collared Longspur
Golden Eagle	Yellow-billed Magpie
Greater Yellowlegs	Brown-capped Rosy-Finch
Grasshopper Sparrow	Prairie Warbler
Black-chinned Sparrow	Bell's Sparrow
Kentucky Warbler	Baird's Sparrow
Olive-sided Flycatcher	Lawrence's Goldfinch
Sprague's Pipit	
Tier 2 species are not listed as Army Species at Risk, undergoing 12-month status reviews, or proposed for ESA protection.	

APPENDIX 5

TIMELINE AND SCHEDULE

Format Page

Appendix 5		Biological Opinion & INRMP Requirements																			Reporting Requirements																
		Federal Status Species							Sensitive Species												USFWS & AGFD	DOD															
		T & E Species							CCA	PDMP	Fuels Management				Water Resource Management				Other				USFWS & AGFD	Plan Updates													
		Maintain HWU Proagation Material & Habitat MGMT	Conduct HWU Genetic Assessment	MSO PAC & Habitat Monitoring	MSO Genetic Assessment	Felid Monitoring	YBCU Monitoring as Required by Mission	Herpetofauna Monitoring (esp. STS, CLF and NMGS)	Implement Invasive Faunal Species Surveys & Management Projects	Huachuca Springsnail Monitoring	Bat Monitoring (esp. LLNB) & Habitat Monitoring/MGMT to include Cave & Road Closures	Implement Fuels Management (HEFT, RX, Invasive Flora MGMT, & Other forms of fuels reduction) Projects for Critical Habitat & Special Status Species	Rehabilitate Fire Breaks for Critical Habitat & Special Status Species	Rehabilitate Helpads for Wildfire Control	Implement Grassland Monitoring	Implement Habitat Restoration & Management, & Associated Monitoring Projects (e.g. HEFT Monitoring)	Funding for MOA with Forest Service	Monitor Stream Flow & Groundwater Recharge for Critical Habitat & Aquifer Protection	Water-Wise & Energy Smart Education & Audits	Implement Water Conservation & Recharge, Reclaim, & Reuse Projects	Support USPP Projects	Encroachment Reduction – ACUB Projects	Maintain Special Status Species Signs	Implement Erosion Control Projects to include Native Grass Seeding – Improve Watershed Conditions	Implement Ecosystem Management Projects – Management Actions Monitoring (Data Collection)	Implement DoD PIF Strategic Plan Requirements	Implement Non-Game Planning-Level Surveys & Game Species Survey Projects	Implement Recreation Management Projects to Protect Special Status Species	Annual PBO Report & Work Plan Reporting	INRMP Implementation Review / Reporting	Review ICRMP for Implementation & Update	Review IWfMP for Implementation & Update	Review WRMP for Implementation & Update	Review IPMP for Implementation & Update	Review RPMP for Implementation & Update	Update BWASH Plan	Review ESMPs & other Species Management Plans for Implementation, Update, & Development
Work Plan & Schedule	2021	October																																			
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 Project Duration

Appendix 5

Work Plan & Schedule		Biological Opinion & INRMP Requirements																		Reporting Requirements																		
		Federal Status Species						Sensitive Species												USFWS & AGFD	DOD																	
		T & E Species						CCA	PDMP	Fuels Management				Water Resource Management			Other					Plan Updates																
		Maintain HWU Pragation Material & Habitat MGMT	Monitoring of Transplanted & Naturally Occurring HWU	MSO PAC and Habitat Monitoring	Develop HEFT Implementation Plan - Phase 2 for MSO Habitat Protection in the face of Climate Change	Felid Monitoring	YBCU Monitoring as Required by Mission	Herpetofauna Monitoring (esp. STS, CLF and NMGS) & STS Genetic Assessment	Implement Invasive Faunal Species Surveys & Management Projects	Huachuca Springsnail & Invertebrate Monitoring	Bat Monitoring (esp. LLNB) & Habitat Monitoring/MGMT to include Cave & Road Closures	Implement Fuels Management (HEFT, RX, Invasive Flora MGMT, & Other forms of fuels reduction) Projects for Critical Habitat & Special Status Species	Rehabilitate Fire Breaks for Critical Habitat & Special Status Species	Rehabilitate Helipads for Wildfire Control	Implement Grassland Monitoring	Implement Habitat Restoration & Management, & Associated Monitoring Projects (e.g. HEFT Monitoring)	Funding for MOA with Forest Service	Monitor Stream Flow & Groundwater Recharge for Critical Habitat & Aquifer Protection	Water-Wise & Energy Smart Education & Audits	Implement Water Conservation & Recharge, Reclaim, & Reuse Projects	Support USPP Projects	Encroachment Reduction – ACUB Projects	Maintain Special Status Species Signs	Implement Erosion Control Projects to include Native Grass Seeding – Improve Watershed Conditions	Implement Ecosystem Management Projects – Management Actions Monitoring (Data Collection)	Implement DoD PIF Strategic Plan Requirements	Implement Non-Game Planning-Level Surveys & Game Species Survey Projects	Implement Recreation Management Projects to Protect Special Status Species	Annual PBO Report & Work Plan Reporting	INRMP Implementation Review / Reporting	Review ICRMP for Implementation & Update	Review IWFP for Implementation & Update	Update ERWMP	Review IPMP for Implementation & Update	Review RPMP for Implementation & Update	Review BWASH for Implementation & Update	Review ESMPs & other Species Management Plans for Implementation, Update, & Development	
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 Project Duration

Appendix 5

			Biological Opinion & INRMP Requirements														Reporting Requirements																					
			Federal Status Species					Sensitive Species									USFWS & AGFD	DOD																				
			T & E Species					CCA	PDMP	Fuels Management	Water Resource Management	Other				Plan Updates																						
			Maintain HWU Propagation Material & Habitat MGMT	MSO PAC and Habitat Monitoring	Develop HEFT Implementation Plan - Phase 2 for MSO Habitat Protection in the face of Climate Change	Field Monitoring	YBCU Monitoring as Required by Mission	Herpetofauna Monitoring (esp. STS, CLF and NMGS)	Implement Invasive Faunal Species Surveys & Management Projects			Huachuca Springsnail Monitoring	Bat Monitoring (esp. LLNB) & Habitat Monitoring/MGMT to include Cave & Road Closures	Pollinator Awareness Program	Implement Fuels Management (HEFT, RX, Invasive Flora MGMT, & Other forms of fuels reduction) Projects for Critical Habitat & Special Status Species	Rehabilitate Fire Breaks for Critical Habitat & Special Status Species	Rehabilitate Helipads for Wildfire Control	Implement Grassland Monitoring	Implement Habitat Restoration & Management, & Associated Monitoring Projects (e.g. HEFT Monitoring)	Funding for MOA with Forest Service	Monitor Stream Flow & Groundwater Recharge for Critical Habitat & Aquifer Protection	Water-Wise & Energy Smart Education & Audits	Implement Water Conservation & Recharge, Reclaim, & Reuse Projects	Support USPP Projects	Encroachment Reduction – ACUB Projects	Maintain Special Status Species Signs	Implement Erosion Control Projects to include Native Grass Seeding – Improve Watershed Conditions	Implement Ecosystem Management Projects – Management Actions Monitoring (Data Collection)	Implement DoD PIF Strategic Plan Requirements	Implement Non-Game Planning-Level Surveys & Game Species Survey Projects	Implement Recreation Management Projects to Protect Special Status Species	Annual PBO Report & Work Plan Reporting	INRMP Implementation Review / Reporting	Review ICRMP for Implementation & Update	Review IWFM for Implementation & Update	Review WRMP for Implementation & Update	Review IPMP for Implementation & Update	Review RPMP for Implementation & Update
Work Plan & Schedule	2023	October																																				
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Project Duration

Appendix 5

Work Plan & Schedule		Biological Opinion & INRMP Requirements																Reporting Requirements																							
		Federal Status Species						Sensitive Species										USFWS & AGFD	DOD																						
		T & E Species						CCA	PDMP	Fuels Management				Water Resource Management			Other			Plan Updates																					
		Maintain HWU Progotation Material & Habitat MGMT	MSO PAC and Habitat Monitoring	Develop HEFT Implementation Plan - Phase 2 for MSO Habitat Protection in the face of Climate Change	Felid Monitoring	YBCU Monitoring as Required by Mission	Herpetofauna Monitoring (esp. STS, CLF and NMGS)			Implement Invasive Faunal Species Surveys & Management Projects	Huachuca Springsnail Monitoring	Bat Monitoring (esp. LLNB) & Habitat Monitoring/MGMT to include Cave & Road Closures	Implement Fuels Management (HEFT, RX, Invasive Flora MGMT, & Other forms of fuels reduction) Projects for Critical Habitat & Special Status Species	Rehabilitate Fire Breaks for Critical Habitat & Special Status Species	Rehabilitate Helipads for Wildfire Control	Implement Grassland Monitoring	Implement Habitat Restoration & Management, & Associated Monitoring Projects (e.g. HEFT Monitoring)	Funding for MOA with Forest Service	Monitor Stream Flow & Groundwater Recharge for Critical Habitat & Aquifer Protection	Water-Wise & Energy Smart Education & Audits	Implement Water Conservation & Recharge, Reclaim, & Reuse Projects	Support USPP Projects	Encroachment Reduction – ACUB Projects	Maintain Special Status Species Signs	Implement Erosion Control Projects to include Native Grass Seeding – Improve Watershed Conditions	Implement Ecosystem Management Projects – Management - Actions Monitoring (Data Collection)	Implement DoD PIF Strategic Plan Requirements	Implement Non-Game Planning-Level Surveys & Game Species Survey Projects	Implement Recreation Management Projects to Protect Special Status Species	Annual PBO Report & Work Plan Reporting	INRMP Implementation Review / Reporting	Review ICRMP for Implementation & Update	Review IWFMP for Implementation & Update	Review WRMP for Implementation & Update	Review IPMP for Implementation & Update	Review RPMP for Implementation & Update	Review BWASH for Implementation & Update	Review ESMPs & other Species Management Plans for Implementation, Update, & Development			
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 Project Duration

Appendix 5

		Biological Opinion & INRMP Requirements																			Reporting Requirements																			
		Federal Status Species						Sensitive Species													USFWS & AGFD	DOD																		
		T & E Species						CCA	PDMP	Fuels Management				Water Resource Management			Other						Plan Updates																	
		Maintain HWU Progotation Material & Habitat MGMT	MSO PAC and Habitat Monitoring	Monitoring of Transplanted & Naturally Occurring HWU	Field Monitoring	YBCU Monitoring as Required by Mission	Herpetofauna Monitoring (esp. STS, CLF and NMGS)	Implement Invasive Faunal Species Surveys & Management Projects	Huachuca Springsnail & Invertebrate Monitoring	Lemmon Fleabane Monitoring	Bat Monitoring (esp. LLNB) & Habitat Monitoring/MGMT to include Cave & Road Closures	Implement Fuels Management (HEFT, RX, Invasive Flora MGMT, & Other forms of fuels reduction) Projects for Critical Habitat & Special Status Species	Rehabilitate Fire Breaks for Critical Habitat & Special Status Species	Rehabilitate Helpads for Wildfire Control	Implement Grassland Monitoring	Implement Habitat Restoration & Management, & Associated Monitoring Projects (e.g. HEFT Monitoring)	Funding for MOA with Forest Service	Monitor Stream Flow & Groundwater Recharge for Critical Habitat & Aquifer Protection	Water-Wise & Energy Smart Education & Audits	Implement Water Conservation & Recharge, Reclaim, & Reuse Projects	Support USPP Projects	Encroachment Reduction - ACUB Projects	Maintain Special Status Species Signs	Implement Erosion Control Projects to include Native Grass Seeding - Improve Watershed Conditions	Implement Ecosystem Management Projects - Management Actions Monitoring (Data Collection)	Implement DoD PIF Strategic Plan Requirements	Implement Non-Game Planning-Level Surveys & Game Species Survey Projects	Implement Recreation Management Projects to Protect Special Status Species	Annual PBO Report & Work Plan Reporting	INRMP Implementantion Review / Reporting	Review ICRMP for Implementation & Update	Review IWFMP for Implementation & Update	Review WRMP for Implementation & Update	Review IPMP for Implementation & Update	Review RPMP for Implementation & Update	Review BWASH for Implementation & Update	Review ESMPs & other Species Management Plans for Implementation, Update, & Development			
Work Plan & Schedule	2025	October																																						
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Project Duration

APPENDIX 6

**LISTING OF REGULATORY REQUIREMENTS, POLICIES, AND PLANNING AND
GUIDANCE DOCUMENTS**

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FORT HUACHUCA PROGRAMS AND REGULATORY REQUIREMENTS

	Program Elements	Special Status Species Management	Fish and Wildlife Management	Migratory Bird Management	Airport Wildlife and Bird Strike Hazard	Water Resource Management	Floodplain Management	Wetlands Management	Vegetation Management	Land Management	Forestry Management	Wildland Fire Management
	Regulatory Requirements											
Federal	Sikes Act Improvement Act	X	X	X	X	X	X	X	X	X	X	X
	Endangered Species Act	X	X	X	X			X	X	X		X
	Bald and Golden Eagle Protection Act	X	X	X	X							
	Fish and Wildlife Conservation Act		X	X								
	Migratory Bird Treaty Act	X	X	X	X			X				
	National Environmental Policy Act	X	X	X		X	X	X	X	X	X	X
	USFWS Biological Opinion, 2007	X	X			X			X	X	X	X
	National Historic Preservation Act											X
	Federal Noxious Weed Act								X	X	X	X
	Clean Water Act					X	X	X		X		
	Clean Air Act											X
	Federal Plant Pest Act											
	Lacey Act	X	X	X					X			
	EO 11988 Floodplains					X	X			X		
	EO 11990 Wetlands	X	X	X		X	X	X	X	X		
	EO 12902 Energy Efficiency and Water Conservation					X						
	EO 12962 (amended by 13474)		X									
	EO 13112 Invasive Species	X	X	X		X		X	X	X	X	X
	EO 13186 Migratory Birds	X	X	X	X			X	X	X	X	X
	EO 13352	X	X	X								X
	EO 13423					X						
	Title 7 USC 136		X									
	Title 10 USC 2671	X		X	X							
Title 10 USC 2688												
AR 200-1	X	X	X		X	X	X	X	X	X	X	
AR 405 Series Real Property									X			
AR 350-19 Sustainable Range Program									X		X	
DODD 4700.4	X	X							X	X		
DODI 4150.7												
DODI 4715.3	X	X	X		X	X	X	X	X	X	X	
ARS Title 3 Agriculture	X							X				
ARS Title 17 Game and Fish	X	X										
ARS Title 45 Waters					X	X						
ARS 49 Environment					X				X			

POLICIES

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List of Fort Huachuca Policies

- Fort Huachuca Hunting Policy
- Leash Policy
- Metal Detecting Policy
- Off-Highway Vehicle Operation Policy
- Wildlife Feeding Policy
- Water Conservation Policy
- Fort Huachuca Irrigation and Water Management

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DEPARTMENT OF THE ARMY
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10 AUG 2020

MEMORANDUM FOR ALL FORT HUACHUCA PERSONNEL

SUBJECT: POLICY 20-40, Fort Huachuca Hunting Policy

1. REFERENCES.

- a. Fort Huachuca (FH) Regulation 190-11, Registration, Possession, and Use of Privately Owned Weapons and Ammunition
- b. FH Policy 20-41, Fort Huachuca Wildlife Feeding Policy
- c. Fort Huachuca Hunting Information, Regulations, and Guidelines
- d. Interstate Wildlife Violator Compact Operations Manual

2. APPLICABILITY. This policy applies to all persons participating in any hunting related activities on Fort Huachuca.

3. All persons who hunt on FH must comply with Arizona Game and Fish Department (AGFD) Hunting Regulations and all applicable Federal, State, and Army requirements. This includes US Army Garrison FH Policy 20-41, Fort Huachuca Wildlife Feeding Policy; the FH Regulation 190-11, which outlines the registration, possession and use of privately owned weapons and ammunition on the installation; and the FH Hunting Information, Regulations, and Guidelines.

2. All persons who hunt on FH must have a current AGFD hunting license. Hunters can purchase hunting licenses online at www.azgfd.gov. For some species, hunters must also purchase a stamp or stamp privilege for the license to be valid. In addition, hunters will need a hunt permit-tag to hunt big game (Gould's turkey, deer, black bear, javelina, mountain lion, or pronghorn).

3. All persons who hunt on FH must have a current FH hunting permit. Hunting permits can be purchased using the iSportsman website at <https://fthuachuca.isportsman.net>.

4. Registration is required for all weapons coming onto the installation (even for temporary/one-time use) (FH Regulation 190-11). Weapons must be registered with the provost marshal's office prior to hunting. Weapons registration is located at the Van Deman Gate Visitor Center, Building 90890. DO NOT bring the un-registered weapon

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SUBJECT: POLICY 20-40, Fort Huachuca Hunting Policy

with you. Only the make, model, serial number, and owner information are required for weapons registration. Weapons must be re-registered every three years.

5. All persons having their hunting privileges suspended or revoked by any state game and fish agency that participates in the Interstate Wildlife Violator Compact (IWVC) will not be able to participate in any hunting related activities on FH for the duration of the suspension or revocation. These activities include, but are not limited to, hunting/fishing, scouting, guiding, assisting other hunters in the field, or transporting harvested wildlife.

6. IWVC suspension or revocation of an individual's hunting privileges make them ineligible to participate in any hunting activities on FH. This ineligible status will be extended to any hunter whose eligibility is dependent on that hunting sponsor, including spouses and children and/or guest hunters.

7. Blaze orange is the standardized, required color of the upper garment and hat that all hunters on FH training lands must wear during deer and javelina rifle seasons.

8. Tree stands and blinds may be used for hunting purposes under the following conditions. Tree stands and blinds must be identified/labeled with a tag that includes the owner's name, contact information, AGFD hunting license and FH hunting permit number, date installed, and game being hunted. Unlabeled tree stands, blinds, and related items will be removed when discovered, taken to the MP Station, and disposed of in accordance with applicable rules and regulations. Alteration of vegetation or landscape for the purposes of installing a tree stand or blind (i.e. limbing or cutting of trees, etc.) is prohibited. Tree stands and blinds may not be placed more than 7 days in advance of any hunt requiring a tag and must be removed not more than 7 days after the hunt. For hunts not requiring a tag (i.e. predator, waterfowl, small game, etc.), tree stands or blinds must be set up and removed the same day.

9. Any attempt to attract game to an area for the purpose of present or future hunting is prohibited (FH POLICY 20-029 - Fort Huachuca Wildlife Feeding Policy). This includes putting out bait; salt or mineral licks; powders; granules; urine; chemical or natural attractants; live or deceased animals; or improvement of the terrain to create water basins/catchments.

10. For security reasons, the use of unmanned aerial vehicles for the use of hunting is prohibited on the installation. In addition, the use of wildlife cameras is prohibited on the installation. The only exceptions are for the Directorate of Public Works Environmental and Natural Resources Division (ENRD) and the Directorate of Emergency Services when being used for official business. Federal and State Wildlife Management officials may be temporarily allowed to use wildlife cameras for game management and law enforcement purposes under a permit obtained through the ENRD office.

11. All hunters are expected to review and be familiar with the identification features of Mexican wolves, jaguars, and ocelots. Hunters must be aware that ocelots and jaguars

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SUBJECT: POLICY 20-40, Fort Huachuca Hunting Policy

have been documented in the Huachuca Mountains and are fully protected by state and federal laws.

12. All deer, pronghorn, mountain lion, bear, javelina, and turkey harvested on FH must be checked in at the Sportsman Center (building 15423) on the day harvested. Hunters must weigh animal on scales and fill out a self-check harvest form with a telephone number or electronic mail address.

13. Use of hunting dogs for the purpose of hunting mountain lion or black bear is strictly prohibited on FH. When using dogs to hunt for game birds on the installation, dogs must be kept under handler's voice command while in the field in such a manner to prevent them from becoming a nuisance to other persons, animals and property.

14. 'For-profit' guided hunts are prohibited on FH. 'For-profit' guides are defined as: any person who accepts compensation in any form in exchange for aiding, assisting, directing, leading, or instructing a person in the field for taking wildlife.

15. All hunters are required to sign-in to a hunting area and sign-out when done hunting for the day using the iSportsman website at <https://fthuachuca.isportsman.net>.

16. Failure to adhere to any part of this policy may result in suspension of Fort Huachuca hunting privileges.

17. This policy is punitive in nature, failure to abide by this policy is a violation of Article 92 of the Uniform of Military Justice. Any non-active duty person in violation of this policy may be subject to a bar from the installation under Title 18, United States Code, Section 1382.

18. This memorandum supersedes USAG, Policy 17-067, Fort Huachuca Hunting Policy.

19. The proponent for this Policy Memorandum is the Directorate of Public Works, Environmental and Natural Resources Division, IMHU-PWB, at 533-8763.


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7 Apr 2020

MEMORANDUM FOR RECORD

SUBJECT: Policy 20-68 Leash Policy

1. REFERENCE. Fort Huachuca (FH) Regulation 40-116, Control and Care of Pets, Horses, and Transient Animals, 10 JAN 20
2. APPLICABILITY. This policy applies to all persons living or working on Fort Huachuca and all visitors. Military Working Dogs and other dogs used in law enforcement are exempt from this policy.
3. This policy expands on the animal control requirements of FH Regulation 40-116. Animals are required to be on a leash when outside of a personal residence or vehicle on Fort Huachuca. When animals are on a leash, the leash will not exceed six (6) feet when fully extended.
4. Violation of this policy by military personnel is punitive and can be punished under the UCMJ. Further, violation of this policy may result in loss of post access and revocation of your pet privileges as well.
5. The proponent for this policy is USAG Fort Huachuca at (520) 533-1562.


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13 Oct 2020

MEMORANDUM FOR ALL FORT HUACHUCA PERSONNEL

SUBJECT: POLICY 20-43, Metal Detecting

1. **APPLICABILITY.** This policy applies to all persons living or working on Fort Huachuca (FH) and all visitors.
2. The use of metal detectors for recreational purposes, including treasure trove searches, is prohibited on FH. The exceptions to this policy include use by Army personnel for military purposes, or by a federal or state agency or a private research entity in association with official cultural resources management activities, or pursuant to a permit issued under the Archaeological Resource Protection Act (ARPA).
3. The installation has over 500 documented archaeological sites in areas that have been surveyed. Garden Canyon and the East Range in particular have a high density of cultural resources, including both prehistoric and historical period ranching and military sites. Historical period sites are known to have yielded metal artifacts such as military buttons and insignia, cartridge casings, coins, and other artifacts of interest. Therefore, there is a high probability of finding archaeological sites and artifacts when metal detecting on the Fort, and these resources are protected by Army and federal law. Any sighting of metal detecting on the Fort should be reported immediately to the Military Police at 533-3000 and to the Environmental and Natural Resources Division (ENRD) at 533-5215
4. The potential for surface and sub-surface Unexploded Ordnance (UXO) exists on all training areas at Fort Huachuca. The most common types are mortar rounds and rockets. Most UXO is very old and rusted and it is common to find UXO buried or partially buried from impact. If any UXO is discovered, or an unidentifiable object with the potential to be UXO, the procedure is as follows:
 - a. Do not touch or move the UXO or suspect object
 - b. Mark the area in some way (GPS, flagging, etc.) so that the UXO or suspect object can be relocated
 - c. If possible, without touching or disturbing it, photograph the object to assist military personnel and other professionals in assessing the potential UXO

IMHU-ZA
SUBJECT: POLICY 20-43, Metal Detecting

d. Notify Range Control during duty hours at 533-7093/1014/7102 and make yourself available to direct Range Control personnel to the site, or if after duty hours, contact the Military Police station at 533-3000.

5. Numerous Army regulations support the prohibition on metal detecting. Army Regulation (AR) 200 - 1 *Environmental Protection and Enhancement* (Section 6-4e), which references compliance with both the Archaeological and Historic Preservation Act (AHPA) and ARPA, states one of the program requirements of Cultural Resources is to "Prohibit searching for or collection of historic properties (including archaeological resources) on Army installations except when authorized by the Garrison Commander and pursuant to a permit issued under ARPA."

6. AR 405-80 *Management of Title and Granting Use of Real Property*, outlines guidelines for requests to search for treasure troves, including associated use of metal detectors. Specifically, AR 405-80 (para 4-15f) states "Metal detectors may not be used by individuals on a military installation unless the individual is in search of a lost personal item or unless a license or contract as discussed above has been granted." AR 405 (para 4 -15a – e) outlines the restrictive requirements to grant such a license or contract for treasure trove searches.

7. FH 385-8 *Range Regulation* (para 1-7b) expands this prohibition beyond metal detectors and states, "Collecting prehistoric or historic artifacts, fossils or old objects, or digging or destroying archeological or paleontological sites, is prohibited within the confines of FH. As part of the installation's Cultural Resources Management Program, archeological projects may be conducted by assigned Army staff or professionals with proper authorization."

8. This policy is punitive in nature, failure to abide by this policy is a violation of Article 92 of the Uniform of Military Justice, or appropriate State and Federal law. Any non-active duty person in violation of this policy may be subject to a bar from the installation under Title 18, United States Code, Section 1382.

9. The proponent for this Policy Memorandum is the Directorate of Public Works, Environmental and Natural Resources Division, IMHU-PWB, at 533-5215.


JARROD MORELAND
COL, MI
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13 Oct 2020

MEMORANDUM FOR ALL FORT HUACHUCA PERSONNEL

SUBJECT: POLICY 20-42, Off-Highway Vehicle Operation

1. **APPLICABILITY.** This policy applies to all persons living or working on Fort Huachuca and all visitors.
2. **Improper operation of Off-Highway Vehicles (OHV) has required closure of firing ranges and has the potential for serious impacts to natural and cultural resources. In addition to the potential impact on military training, OHV use can cause soil erosion, damage vegetation, and create noise and dust problems. Improper OHV operation can potentially impact endangered species or archeological and historic sites.**
3. **References:**
 - a. **Army Regulation (AR) 200-1**
 - b. **Fort Huachuca (FH) Regulation 190-5**
 - c. **FH Regulation 385-8**
 - d. **Most current Fort Huachuca Programmatic Biological Opinion that addresses OHV use.**
 - e. **Arizona Revised Statutes (ARS) 28-1174 and 28-1179**
 - f. **Most current Fort Huachuca Hunting Information, Regulations and Guidelines**
4. **The following definitions apply to Fort Huachuca's policy on OHV use:**
 - a. **Established Roadways:** These are roads improved or unimproved and intended for public use. Typical examples include asphalt-surfaced and dirt roads, such as Garden Canyon Road up to the cable gate near Sawmill Canyon, and Huachuca Canyon Road up to the upper picnic area.
 - b. **OHVs:** Two or four-wheeled vehicles that are designed to be operated off highways and derive their power from any source other than muscle or wind. Three-wheel OHVs are not permitted to operate on Fort Huachuca as stated in FH Regulation 190-5.

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SUBJECT: POLICY 20-42, Off-Highway Vehicle Operation

The definition for OHVs includes All Terrain Vehicles (ATVs), Utility Terrain Vehicles (UTVs) and Off-Road Vehicles (ORVs).

c. Firebreaks: Those areas cleared and graded for the purpose of preventing the spread of fire or providing access for fire suppression equipment.

d. Operation of the OHVs outside of the Cantonment is limited to established roadways and firebreaks. Maximum speed limits for OHVs and other wheeled vehicles, unless otherwise posted, is 25 miles per hour in accordance with FH Regulation 190-5.

e. Operation of OHVs is not permitted within ponds or basins, such as Tinker Pond.

f. OHVs operated on Fort Huachuca must be properly registered, licensed, and insured in accordance with (IAW) FH Regulation 190-5 and ARS 28-1179.

g. Operation of OHVs and other vehicles on closed roads is prohibited unless in conjunction with performance of official duties. Closed roads are identified by signs, fiberglass stakes, or boulders or other obstacles placed across them.

h. Cross-country driving of military and privately-owned vehicles (POVs) to include OHVs is prohibited except in case of emergency where no other mode of transportation is

i. Coordination should be made with Range Control or the Military Police Desk prior to OHV operation IAW FH Regulation 190-5 and 385-8. Persons desiring to participate in recreational activities on Fort Huachuca training lands are responsible for checking to ensure that military training is not taking place and that the areas they wish to access are not closed. Individuals or groups who fail to make such checks prior to entering such areas may not be able to successfully pursue a case of action, claim, or similar demand against the United States or its officers, agents, or employees, for any property loss or physical injury arising from their entry into or use of such areas.

j. Operators and passengers of OHV vehicles must wear the proper protective equipment as stated in FH Regulation 190-5.

k. During designated Fort Huachuca big game firearm hunting seasons, OHV operators and all other outdoor recreational users must wear the standardized Blaze Orange color for the upper garment and hat to ensure they are visible to hunters in the area.

l. It is prohibited to take (pursue, shoot, hunt, fish, trap, kill, capture, snare, or net) wildlife from a motorized vehicle. An OHV may be used only as a means of travel and not as a hunting aid. It is also unlawful to harass, molest, chase, rally, concentrate, herd, intercept, torment, or drive wildlife or livestock from any motorized ground vehicle. Citations can also be issued for damaging habitat or private property IAW FH

IMHU-ZA

SUBJECT: POLICY 20-42, Off-Highway Vehicle Operation

Regulation 190-5, ARS 28-1174 and Fort Huachuca Hunting Information, Regulations and Guidelines.

m. No one may operate OHVs or any other vehicles, to create excessive or unusual smoke or dust or drive carelessly or recklessly, or in a manner that damages facilities, staging areas, travel routes or roads or endangers or is likely to endanger any person or animal. FH Regulation 190-5 and ARS 28-1174.

n. All vehicle operators are restricted from driving while intoxicated or under the influence of drugs. FH Regulation 190-5.

o. Persons violating this OHV policy may be barred, along with their vehicles, from access to Fort Huachuca. Further action, as appropriate may subject the offender to administrative action or punishment under Title 18, United States Code (USC), Uniform Code of Military Justice, Section 13 or Title 40, USC, Section 318c, and appropriately assimilated Title 28, ARS.

5. The point of contact for OHV issues is Directorate of Public Works, Environmental and Natural Resources Division at 533-5701.



JARROD MORELAND
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13 Oct 2020

MEMORANDUM FOR ALL FORT HUACHUCA PERSONNEL

SUBJECT: POLICY 20-41, Wildlife Feeding

- 1. APPLICABILITY.** This policy applies to all persons living or working on Fort Huachuca and all visitors.
- 2.** It is prohibited for any person on Fort Huachuca to feed or attract wildlife, either intentionally or unintentionally, by placing water, garbage, refuse, human or animal food, or edibles in a place where a reasonable person would be aware of the potential presence of wildlife. The Huachuca Mountains support predator populations of bear, mountain lion, bobcat, coyote, ocelot, and jaguar. Feeding of wildlife has the potential to draw these predators to locations where people reside or troops train and is therefore prohibited anywhere on the installation. Any sighting of intentional or unintentional wildlife feeding must be reported immediately to the Directorate of Public Works, Environmental and Natural Resources Division (DPW, ENRD) at 520-678-8112.
- 3.** All food and refuse must be stored in hard-side buildings, enclosures, or containers such as connexes, sheds, or vehicles to avoid unintentional feeding of wildlife. Residential homes that have garages or hard-sided enclosures must store trash and recycling bins inside these structures at all times other than pick-up day and must adhere to the following requirements. Trash and recycling cans will be placed on the street no earlier than 0500 hours on the day of pick-up and put back in the garage or enclosure by 1700 hours on that same day.
- 4.** Any attempt to attract game to an area for the purpose of present or future hunting is prohibited. This includes putting out bait; salt or mineral licks; powders; granules; urine; chemical or natural attractants; live or deceased animals; or improvement of the terrain to create water basins/catchments.
- 5.** Bird feeders for small birds, including hummingbird feeders, are only permitted within the privatized housing on post. Small birds are defined for this policy as a bird no more than 10 inches in length from top of head to tip of tail. Bird feeders must be placed at least 6 feet off the ground to deter bear usage. Keep bird feeders clean to prevent disease transmission and clean areas around feeders to avoid attracting unwanted mammals. Bird droppings and soil contaminated by bird droppings may contain salmonella, trichomoniasis, and fungi such as histoplasmosis and cryptococcosis. Most of the time, the symptoms of exposure to these fungi are mild, but there can be serious

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SUBJECT: POLICY 20-41, Wildlife Feeding

health issues caused by them. Feeding Gould's turkey or other game birds is prohibited on the installation.

6. Indigenous raptors prey upon the animals that frequent bird feeders. Persons should use caution when selecting a small bird feeder location to protect the birds that feed upon it. Removal or relocation of a bird feeder may become necessary if predation becomes a problem.

7. The Huachuca Mountains host the lesser long-nosed bat, a nectar-feeding species. These bats visit hummingbird feeders at night and have been known to empty a feeder in the course of a night. Therefore, residents must bring hummingbird feeders indoors overnight. The droppings of bats potentially contain the same fungi mentioned above in paragraph 4.

8. If pets are *fed* outdoors, remove food bowls immediately after your pet has finished eating. Do not leave food or water outside if the pet is indoors.

9. The only exception to this policy is feeding conducted for wildlife research purposes when performed by a federal or state agency or a private research entity that possesses required federal and/or state permits and has coordinated the activity with the Garrison Commander.

10. This policy is punitive in nature, failure to abide by this policy is a violation of Article 92 of the Uniform of Military Justice or State or Federal law. Any non-active duty person in violation of this policy may be subject to a bar from the installation under Title 18, United States Code, Section 1382.

11. This memorandum supersedes USAG, Policy 15-062, Wildlife Feeding Policy.

12. The proponent for this Policy Memorandum is the Directorate of Public Works, Environmental and Natural Resources Division, IMHU-PWB, at 533-8763.


JARROD MORELAND
Colonel, MI
Commanding

Distribution: E



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON- FORT HUACHUCA
2837 BOYD AVENUE
FORT HUACHUCA, ARIZONA 85613-7000

AMIM-HUG-ZA (RN-420-1eee)

10 May 2021

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: POLICY 21-70 - Fort Huachuca Water Conservation

1. Fort Huachuca has an obligation to be a responsible steward of our desert environment by conserving water. Water conservation is mandated by Executive Orders 13423 and 13514, and constitutes part of the Fort's compliance with the Endangered Species Act. The purpose of this policy memorandum is to continue the long-standing water conservation policy for Fort Huachuca and support our community sustainment plan.

2. Landscape Watering Requirements:

a. The average rainfall in the cantonment area (developed area of the post) is about 14 inches per year but can vary from less than 10 inches to over 20 inches. The cantonment area occupies roughly 5,300 acres and largely contains Bermuda grass. Bermuda grass is a relatively drought-tolerant, sod-forming, non-native warm season grass dormant from approximately mid-October through mid-April when the soil temperature is below 65 °F and does not require supplemental water during that time. In the absence of supplemental watering (i.e., irrigation), Bermuda grass is green only during the summer rainy season portion of the warm season that typically starts in early July and extends through August.

3. Privatized Military Family Housing (PMFH) Areas:

a. Per lease agreements, PMFH residents are required to comply with the Mountain Vista Communities' "Resident Guidelines and Community Handbook" which is available at:

<http://www.mountainvistacommunities.com/>

b. This policy incorporates this handbook by reference. Some of the pertinent water conservation provisions in the handbook include:

(a) Attended, hand-held hoses to water trees, shrubs, gardens, and flowers may be used throughout the year at any time. Newly-seeded lawn areas may be watered with hand-held hoses only, except as otherwise allowed in paragraphs below.

AMIM-HUG-ZA (RN 420-1eee)
SUBJECT: POLICY 21-70- Fort Huachuca Water Conservation

Because of the prevalence of Bermuda grass within the cantonment area, seeding should be done using Bermuda grass with seeding timed to take advantage of summer rains.

(b) The University of Arizona, Cochise County Cooperative Extension has developed guidelines for the watering of Bermuda grass and other turf grasses available at:

<http://waterwise.arizona.edu>.

(c) During April, May, June, September, and October, residential watering is permitted. For Bonnie Blink Area Residents, watering with sprinklers may occur from 1600 hours on Wednesday to 0900 hours on Thursday and from 1600 hours on Sunday to 0900 hours on Monday. For the remainder of Family Housing Areas, watering with sprinklers may occur from 1600 hours on Tuesday to 0900 hours on Wednesday and from 1600 hours on Saturday to 0900 hours on Sunday. Residential watering is prohibited during the months of November through March and during July and August. Residential watering is prohibited anytime of the year between 0900 hours and 1600 hours.

(d) Timers may be used to activate sprinklers only within authorized hours on authorized days. Timers must be shut off when there is sufficient rainfall to meet the lawn's water requirements. Sprinklers may not be operated so as to cause ponding of water or runoff from the yard.

(e) Residents must provide sufficient watering with hand-held hoses to maintain the health of trees and shrubs in their yards, however, care must be taken to prevent water from running on to pavement or into the street. Plant watering guidelines are available at:

<https://waterwise.arizona.edu/low-water-landscaping>

4. All Other Facilities:

a. Most facilities at Fort Huachuca are landscaped with drought tolerant plants that are adapted to the variable rainfall conditions of this region. If shrubs and trees require supplemental watering during drought conditions, this will be done using attended, hand-held hoses only. Bermuda grass in common areas will not be irrigated. Exceptions to this rule may exist for some established turf areas used for recreation or quality-of-life enhancement. These areas must follow the lawn watering requirements identified in paragraph 3.b (b), if in doubt about the status of a turf area, contact the proponent of this policy identified in paragraph 9.

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SUBJECT: POLICY 21-70- Fort Huachuca Water Conservation

b. New landscapes and new plantings must be done with plants selected from Fort Huachuca's approved plant list. New turf areas or expansions of existing turf areas must be approved by the Environmental and Natural Resources Division (ENRD) and may not exceed 500 square feet total. New turf areas larger than 500 square feet will use artificial turf. For artificial turf, a work order must be submitted to DPW for review and approval.

5. Plumbing Fixture Requirements:

a. IMCOM has mandated all Army garrisons to implement the criteria contained in the IMCOM Energy and Water Conservation Design Guide for Sustainment, Restoration, and Modernization (SRM) Projects and Military Construction (MILCON). These criteria apply to all new construction and major repair projects except those in PMFH and privatized army lodging (PAL) areas. Design guide criteria will also be followed when replacing plumbing fixtures on post as part of repair and maintenance activities. Lavatory faucets and their accessories will have a maximum flow rate of 0.5 gallons per minute (GPM), and showerheads will have a maximum flow rate of 1.5 GPM. Tank-type toilets will be Environmental Protection Agency (EPA) Water Sense labeled with a maximum effective flush volume of 1.28 gallons per flush (GPF). Flushometer valve-type toilets will use no more than 1.6 GPF. Urinals will be waterless. The following website should be consulted for specific information on Federal water efficiency best management practices:

<https://www.energy.gov/eere/femp/best-management-practices-water-efficiency>

6. Non-Irrigation Exterior Water Use Practices:

a. Decorative water features, such as fish ponds and water fountains, are not authorized unless supplied by harvested rainwater.

b. Fund-raising car washes are not authorized anywhere on post. This prohibition is not just for water conservation but to eliminate non-point sources of pollution to natural drainages in accordance with state law. Examples of non-point sources of pollution are oils, greases, and sediments being released from places like land runoff, precipitation and wind. The effects of non-point source pollution are decreased water quality and the release of pollutants that can have harmful effects on drinking water supplies, recreation, fisheries and wildlife.

c. Car washing in family housing areas using a sponge and bucket is permissible. Hoses should only be used during rinsing activities and must be turned off during all other washing activities.

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SUBJECT: POLICY 21-70- Fort Huachuca Water Conservation

d. The use of power washers for car washing is not authorized anywhere on post. This prohibition is not just for water conservation, but to eliminate non-point sources of pollution to natural drainages in accordance with state law. Power washer use on government vehicles can be used at appropriate oil-water separators to prevent non-point sources of pollution to natural drainages in accordance with state law.

e. Mist cooling systems are prohibited from use at any facility on post.

f. Use of water for cleaning sidewalks, driveways, and other paved surfaces are prohibited.

7. General Water Use Practices:

a. Residents and employees must prevent water they are using from running into the street. No water is to run from unattended hoses. When water is emptied from wading pools or other collection devices, it will be released where it can be used by lawns and vegetation and not drained or permitted to drain into the streets.

b. Maintenance requirements or problems at all facilities, other than PMFH and PAL, that result in water leaks or water being wasted must be reported to the Directorate of Public Works (DPW) immediately by calling the Service Desk at (520) 533-3151. When placing a service order, specify that water is leaking, what it is leaking from (if known), the required repair, and information on the approximate size of the leak, such as steady drip, stream as wide as a pencil, or stream like a fire hose.

8. Enforcement of this Policy

a. Enforcement of this policy is a command responsibility. Commanders are responsible for ensuring that their personnel understand and comply with this policy. Enforcement for noncompliance with paragraphs 2 through 4 of this policy is as follows:

(a) Housing residents will be cited for violations of this policy per their lease agreement.

(b) Administrative areas will be referred for action through the chain of command.

9. Individuals and organizations with water saving suggestions, concerns about water waste at a specific facility or housing unit on the Fort, or with interest in additional information about improving their personal or unit water conservation efforts may contact the ENRD. Additional information on water conservation is available at:

<http://waterwise.arizona.edu>

AMIM-HUG-ZA (RN 420-1eee)

SUBJECT: POLICY 21-70- Fort Huachuca Water Conservation

10. Fort Huachuca has a great water conservation record. Your cooperation and on-the-spot help in educating everyone are necessary to meet our continuing reduction goals.

11. The proponent for this policy is the Directorate of Public Works, Environmental and Natural Resources Division (ENRD), at (520) 533-0206. This policy supersedes Fort Huachuca Irrigation and Water Management dated 06 January 2012.

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Colonel, MI
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PLANNING DOCUMENTS

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LIST OF ACTIVE PLANS FOR MANAGEMENT OF RESOURCES

ON FORT HUACHUCA

- Army Compatible Use Buffer Program
- Installation Design Guide
- Installation Pest Management Plan
- Integrated Cultural Resource Management Plan
- Hazardous Waste Management Plan
- Pollution Prevention Plan
- Site-specific Spill Contingency, Control and Countermeasures Plans
- Wildlife Aircraft Strike Hazard (WASH) Plan
- ITAM 5-Year Plan
- Outdoor Recreation Management Plan
- Integrated Wildland Fire Management Plan
- High Elevation Fuels Treatment Plan
- Cave Management Plan
- Agave Management Plan
- Endangered Species Management Component for the Mexican Spotted Owl (*Strix occidentalis lucida*)
- Endangered Species Management Component for the Huachuca Water Umbel (*Lilaeopsis schaffneriana* ssp. *recurva*)
- Draft Post-Delisting Monitoring Plan for the Lesser Long-Nosed Bat (*Leptonycteris yerbabuenae*).
- Bullfrog Management Plan
- Candidate Conservation Agreement for the Huachuca Springsnail (*Pyrgulopsis thompsoni*)
- Candidate Conservation Agreement for the Lemmon Fleabane (*Erigeron lemmonii*)
- Strategic Plan for Amphibian and Reptile Conservation and Management on DoD Lands

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APPENDIX 7

EASEMENTS AND AGREEMENTS

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EASEMENTS

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**Completed and Pending Land Protection Transactions
in the Fort Huachuca Buffer Area**

Tract Name	Size (acres)	Partner
<u>Completed</u>		
Clinton	960	TNC
Drijver	103	TNC
Douglass	161	TNC
Beth's Barn	87	TNC
Babacomari River Pasture 1&2	1,200	TNC
Cloudt Ranch	9,500	Malpai
Beth's Barn-Holt	136	TNC
Jelks Ranch	1,000	ALWT
Babacomari Phase 3 Lyle Pasture	620	TNC
Meigs	377	Cochise Co
Babacomari Phase 4 (O'Donnell)	1,527	TNC
Diamond C/Jelks Ranch - Phase 2	600	TNC
Mansker	285	TNC
River Stone Ranch	1,811	TNC
Bella Vista Ranch	2,984	TNC
Insalaca	480	Cochise Co
Mt View/RVR	396	ALWT
Rain Valley 401	401	ALWT

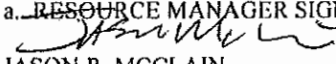
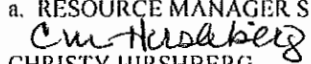
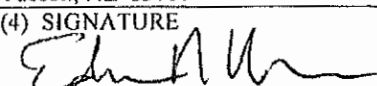
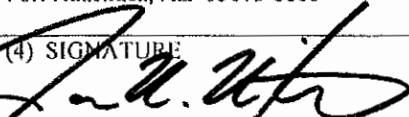
Tract Name	Size (acres)	Partner
Rain Valley 499	499	ALWT
Vera Earl	813	TNC
Vera Earl Phase 2	800	TNC
Emmerson 482	482	ALWT
Arizona City 5	104	TNC
Mustang Ranch	160	ALWT
Rain Valley Ph. 3	302	ALWT
Pacheco	1,988	ALWT
West Pacheco	500	ALWT
<u>In Progress</u>		
Rose Tree Ranch	1,150	ALWT
Vera Earl	5,000	ALWT
Rancho Nando	1,394	ALWT

LIST OF AGREEMENTS

- Wildland Fire Support Agreement with USFS, Coronado National Forest, Sierra Vista Ranger District
- Prescribed Fire and Fuels Assistance Agreement with Sierra Vista Ranger District, Coronado National Forest
- Urban Wildlife Conflict Support Agreement with USDA Animal and Plant Health Inspection Service
- Agreement (MOU) between DoD and DOI to Promote Effective Ecosystem and Species Conservation and Recovery initiatives to Reduce Need for Federal Protection and Regulation under the ESA
- Agreement (MOU) between DoD with U.S. Department of the Interior (DOI) to Promote the Conservation of Migratory Bird Populations (See Appendix 4)
- Agreement (MOU) between DoD and Pollinator Partnership to promote the conservation and management of pollinators, their habitats and associated ecosystems
- Cooperation and Coordination Agreement (MOU) between DoD and Various Agencies in achieving the objectives of the Partners in Amphibian and Reptile Conservation (PARC) Federal Steering Committee

Format Page

**FS# 16-IA-1103050-35
SUPPORT AGREEMENT**

1. AGREEMENT NO. FS# 16-IA-1103050-035 Mod 002		2. SUPERSEDED AGREEMENT NO. FS# 16-IA-1103050-035		3. EFFECTIVE DATE Jan 01, 2018		4. EXPIRATION DATE December 31, 2021	
5. SUPPLYING ACTIVITY: (ISA NR/EFF DATE/DODAAC FURNISHED BY SUPPLIER)				6. RECEIVING ACTIVITY (DODAAC): W91QUS			
a. NAME & ADDRESS: USDA, Forest Service Coronado National Forest 300 W Congress St Sierra Vista Ranger District Tucson, AZ 85701				a. NAME & ADDRESS: Commander US Army Garrison ATTN: IMHU-RMM 2854 Hungerford Ave, Building 41407 Fort Huachuca, Arizona 85613-7010			
b. MAJOR COMMAND:				b. MAJOR COMMAND: UIC: W6CFAA Installation Management Command			
7. SUPPORT PROVIDED BY SUPPLIER a. SUPPORT (Specify what, when, where, etc.)			b. BASIS FOR REIMBURSEMENT		c. ESTIMATED REIMBURSEMENT		
<ul style="list-style-type: none"> - Wildland Fire Management and Support. - Qualified Incident Management - Ground Wildland Incidents Resources - Wildland Fire Dispatch Services - Implementation based on Annual Financial and Operating Plan - Personnel Training and Certification - Lands Managed by Fort Huachuca, Sierra Vista, AZ - Annual funding based on availability of appropriations and approved MIPR (DD Form 1144) - Reimbursement of Costs (Financial Plan) <p>This is a NO-COST TIME EXTENSION Modification to the Expiration Date of the Agreement, and updated General Terms and Conditions of the Agreement.</p>			See Financial and Operating Plan, Exhibit A, and General Provision outlined below, and required MIPR (DD Form 1144 for reimbursement of cost		\$150,000.00 (PROJECTED COSTES BASED ON ESTIMATED RATES)		
<p>NOTE: This DD Form 1144 is not a financial document as the dollar amounts are estimates. This ISSA should not be used for obligation of funds. Fund Certifications will be provided with a DD Form 448 Military Interdepartmental Purchase Request (MIPR). Failure to negotiate an approved Support Agreement may result in loss of service.</p>							
ADDITIONAL SUPPORT REQUIREMENTS ATTACHED						<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
8. SUPPLY COMPONENT				9. RECEIVING COMPONENT			
a. RESOURCE MANAGER SIGNATURE  JASON R. MCCLAIN District Fire Management Officer, U.S. Forest Service		b. DATE SIGNED 12/17/17		a. RESOURCE MANAGER SIGNATURE  CHRISTY HIRSHBERG Director, Resource Management		b. DATE SIGNED 1/2/18	
c. APPROVING AUTHORITY (1) TYPED NAME KERWIN S. DEWBERRY Forest Supervisor, U.S. Forest Service				c. APPROVING AUTHORITY (1) TYPED NAME JAMES W. WRIGHT, COL, IN Commander, U.S. Army Garrison, Fort Huachuca			
(2) ORGANIZATION: Coronado National Forest 300 W. Congress St. Tucson, AZ 85701		(3) PHONE NO. 520-388-8306		(2) ORGANIZATION: U.S. Army Garrison Fort Huachuca Fort Huachuca, AZ 85613-6000		(3) PHONE NO. 520-533-2641 520-533-4574	
(4) SIGNATURE 		(5) DATE SIGNED 12/29/17		(4) SIGNATURE 		(5) DATE SIGNED 08 JAN 18	
10. TERMINATION (Complete only when agreement terminated prior to scheduled expiration date)							
a. APPROVING AUTH SIGNATURE		b. DATE SIGNED		c. APPROVING AUTH SIGNATURE		d. DATE SIGNED	

**FS# 16-IA-1103050-35
SUPPORT AGREEMENT**

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DD FORM 1144 Nov 01 (IMHU-RMM)

ADDITIONAL PROVISIONS (Use this space to continue general and/or specific provisions, as needed)

11. GENERAL PROVISIONS:

- a. The receiving component will provide the supplying component projections of requested support.
- b. All rates expressing the unit cost of services provided in this agreement are based on current rates which may be subject to change for uncontrollable reasons, such as legislation, U.S. Forest Service policies and directive, DOD directives, commercial utility rate increases, etc. The Receiver will be notified immediately of such rate changes that must be passed through to them.
- c. This agreement may be cancelled at any time by mutual consent of the parties concerned. This agreement may also be cancelled by either party upon giving at least 180 days written notice to the other party.
- d. **BILLING.** The maximum total cost to the Army for this agreement will be stated in the Financial and Operating Plan Exhibit A which is done annually. Overhead is assessed at 8 percent. Transfer of funds to the U.S. Forest Service must be through an Interagency Payment and Collection System (IPAC) billing. A detailed list of charges incurred must be made available upon request.

The IPAC billing document which U.S. Forest Service prepares must contain the following information:

BILLING DATA	REQUESTING AGENCY	U.S. FOREST SERVICE
Obligation Document Number		N/A
Agency Location Code (ALC)	00008522	12-40-1100
Treasury Account Symbol (TAS)	02162020	
Account/Cost Structure		
Budget Object Code (BOC)	25FB	0250
Document Agreement Number		
Data Universal Numbering System number (DUNS)	601634376	92-9332484
Common Agreement Number (CAN) – USDA Agencies Only		
Business Event Type Code (BETC)	DISB	COLL

e. **NOTICES.** Any communications affecting the operations covered by this agreement given by the U.S. Forest Service or the Department of Defense are sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax as follows:

- 1. To the U.S. Forest Service Program Manager at the address specified in the agreement.

**FS# 16-IA-1103050-35
SUPPORT AGREEMENT**

2. To the Department of the Army, Fort Huachuca Resource Manager at the address shown in the agreement or such other address designated with in the agreement.

Notices are effective when delivered in accordance with this provision, or on the effective dated of the notice, whichever is later.

f. ALTERNATE DISPUTE RESOLUTIONS – INTERAGENCY. The parties to this agreement shall settle any disputes that may arise under this agreement by following in the Treasury Financial Manual, Volume 1, Bulletin 2011-04, Section VII (“Resolving Intra-governmental Disputes and Major Differences”).

g. MODIFICATIONS. Modifications within the scope of this agreement must be made by mutual consent of the parties, by the issuance of a written modifications signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modifications should be made, in writing, at least 30 days prior to implementation of the requested change. The Department of the Army, Fort Huachuca is not obligated to fund any changes not properly approved in advance.

In case of extenuating or emergent circumstance, the U.S. Forest Service will be reimbursed by the Department of the Army, Fort Huachuca for costs associated with the dispatch of wildland firefighting management resources within 30 days of incident through a written modification, signed and agreed to by both parties.

h. PRINCIPAL CONTACTS. Individuals listed below are authorized to act in their respective areas for matters related to this agreement.

Principal Cooperator Contacts:

Cooperator Program Contact	Cooperator Administrative Contact
Name: Bradley S. Nicholson Chief, Fire & Emergency Services U.S. Army Garrison Address: Building 51028, IMHU-ESF Fort Huachuca, AZ 85615 Telephone: 520-533-8376 FAX: 520-533-3485 Email: bradley.s.nicholson.civ@mail.mil	Name: Aneesha Avalos Support Agreements Manager U.S. Army Garrison Fort Huachuca, AZ 85613 Telephone: 520-533-1300 FAX: 520-533-9640 Email: aneesha.j.avalos.civ@mail.mil

Principal U.S. Forest Service Contacts:

U.S. Forest Service Program Manager Contact	U.S. Forest Service Administrative Contact
Name: Jason McClain, District Fire Management Officer Address: 4070 S. Avendia Saracino City, State, Zip: Hereford, AZ 85615 Telephone: 520-378-0311 FAX: 520-378-0519 Email: jasonrmcclain@fs.fed.us	Name: Iris Almazan, Grants Mgmt. Specialist Address: 300 W. Congress City, State, Zip: Tucson, AZ 85701 Telephone: 520-388-8310 FAX: 520-388-8331 Email: ialmazan@fs.fed.us

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U.S. Forest Service District Ranger Contact	U.S. Forest Service Administrative Contact
Name: Celeste Kinsey, District Ranger Address: 4070 S. Avendia Saracino City, State, Zip: Hereford, AZ 85615 Telephone: 520-803-2805 FAX: 520-378-0519 Email: ckinsey@fs.fed.us	Name: Steven Miranda, Fire Staff Officer Address: 2646 E. Commerce Center Place City, State, Zip: Tucson, AZ 85706 Telephone: 520/202-2701 FAX: Email: smiranda@fs.fed.us

DD FORM 1144 Nov 01 (IMHU-RMM)

**FS# 16-IA-1103050-35
SUPPORT AGREEMENT**

ATTACHMENT 1

401) Fire & Emergency Response Services	See details below	Estimated Cost	\$150,000.00
No-Cost Time Extension Modification and updated General Terms and Conditions			Total \$150,000.00

Fire and Emergency Response Services (Common Level of Support 401) to be provided to US Army Garrison, Fort Huachuca, Arizona.

The U.S. Forest Service Shall:

1. Provide Wildland Fire Management and Support for initial attack of wildland fires with ground resources. Resources may include, but are not limited to an Incident Commander, engine crews, and other qualified resources, as needed.
2. Provide Wildland Fire Dispatch Services and coordination between Fort Huachuca Fire & Emergency Service and the Tucson Interagency Dispatch Center
3. Provide an Incident Commander, qualified to the complexity level of an incident, to implement Annual Financial and Operating Plan to effectively provide Wildland Fire Management and Support for fires occurring on Fort Huachuca.
4. PATROLS: The U.S. Forest Service when available, provide detection patrols when requested by Ft. Huachuca or as environmental conditions warrant.
5. TRAINING: The U.S. Forest Service will provide as needed, developmental, proficiency and Annual Fireline Safety Refresher (RT-130) training.
6. Provide a cost breakdown for each incident, as of Sep 15 of the operating fiscal year.

It is Mutually Agreed by and between Both Parties that:

1. AVAILABILITY FOR CONSULTATION. Both parties agree to be available at mutually agreeable times for consultation to discuss the conditions covered by this agreement and agree to actions essential to fulfill its purposes.

Both parties shall make a good faith effort to meet at a minimum semi-annually to coordinate, discuss, prepare and confirm the Annual Financial and Operating Plan(s) for Wildland Fire Management and Support occurring within the administrative boundary of Fort Huachuca. The complexity and elements of the plan will utilize National Wildfire Coordination Group (NWCG) standards ¹.

2. LANDS ACCESS. Employees of the U.S. Army, Fort Huachuca and the U.S. Forest Service will be authorized to enter upon each other's land (U.S. Army or U.S. Forest Service Lands) for any purpose related to preparing for or engaging or in wildland fire activities. The U.S. Army, Fort Huachuca will provide, as needed to select U.S. Forest Service personnel access to gates in remote locations.

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3. **COMMAND AND CONTROL.** Upon arrival, the U.S Forest Service, or their (NWCG) qualified agent will assume, and maintain command and control of incident regardless of jurisdiction; the U.S. army will provide a Liaison Officer (LNO) to serve as the U.S. Army, Fort Huachuca agency representative during the incident.

4. The parties shall cooperate on an interagency basis to provide the required level of training consistent with the National Interagency Incident Management System (NIMS) and the National Wildfire Coordinating Group (NWCG). The US Forest Service shall provide on the job training and mentorship to US Army Ft Huachuca personnel in accordance with NWCG standards. US Army Ft Huachuca will assume cost for their personnel during training assignments.

5. The parties will recognize the other's qualification standards but in no case will these qualifications be less than those defined by the NWCG. For positions that do not have NWCG standards, each party agrees to recognize the other agency's qualifications.

6. This Agreement shall not affect the right of either party to recover suppression costs as a result of the negligence, trespassing, criminal activity or willful act of a person causing the fire.

7. Any fire deemed a threat to the others common boundary will be considered as influencing the land of the other in which either party, upon notification of the other, may take action to suppress the fire.

8. Both parties will take appropriate suppression action occurring within their jurisdictions. When location is in doubt, or when requested by the other agency, the suppression action will be made by the agency with the closest available resources.

9. All fires regardless of jurisdictional origination or discovery by the other agencies personnel will be reported immediately to the Tucson Interagency Dispatch. The Tucson Interagency Dispatch will notify appropriate personnel for action and establish the appropriate incident/resource order.

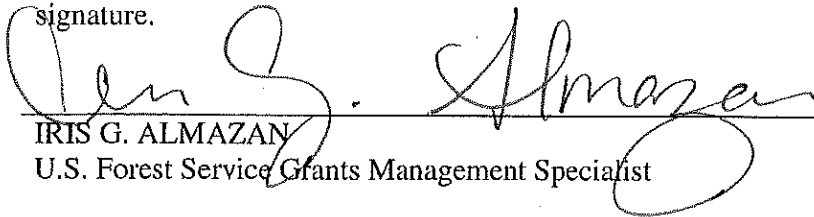
10. Cost recovered under this agreement by the U.S. Forest Service are limited to those expenditures outlined in this agreement. All additional resources will be ordered through the Resource Ordering and Status System and billing will be handled through Incident Management Finance. This includes, but is not limited to: air operations, additional engines, crews, etc.

11. Each party shall maintain complete responsibility and liability with respect to their employees, such as Office of Workmen's Compensation Program (OWCP) claims for personal injury.

¹ NWCG standards will be based on the Wildland Fire Qualifications Guide (PMS 310-1) found at <http://www.nwcg.gov/publications/310-1>.

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SUPPORT AGREEMENT**

The authority and format of this agreement have been reviewed and approved for signature.

 12/17/2017

IRIS G. ALMAZAN Date
U.S. Forest Service Grants Management Specialist

Forest Service Agreement # 16-IA-11030500-035 Mod 002 Cooperator Agreement #

Collection Agreement Financial Plan

Cooperator and FS Contributions

COST ELEMENTS and related data			Cooperator Contribution	FS Non-Cash Contribution	
Line Item Cost Subtotals			Subtotal	Subtotal	Combined Subtotals
PERSONNEL					
Resource Specialists (List all personnel):					
	# of Days	\$/Day			
Incident Commander (2 Individuals - \$353.30/Day)	38.00	\$706.60	\$26,850.80		\$26,850.80
Mid Level Supervision (2 Individuals - \$350.80/Day)	38.00	\$701.60	\$26,660.80		\$26,660.80
Unit Supervision (2 Individuals - \$315.80/Day)	38.00	\$631.60	\$24,000.80		\$24,000.80
Firefighter (4 Individuals - \$234.40/Day)	38.00	\$937.60	\$35,628.80		\$35,628.80
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
Subtotal, Personnel:	152.00		\$113,141.20	\$0.00	\$113,141.20
TRAVEL					
Explanation of trips: From Where/To Where/For Whom	Vehicle Mileage Cost or Airfare Cost	# of Trips	PerDiem and Lodging		
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
Subtotal, Travel:	\$0.00	0	\$0.00	\$0.00	\$0.00
SUPPLIES					
Name and Type of Supplies:	Unit Cost	Quantity			
					\$0.00
Motorized Fire Equipment - Maintenance/Repair/Replacement - (Chainsaws, Weed Eaters, Pumps, ATV's, UTV's, etc.)	\$15,000	1	\$14,973.48		

Non Motorized Fire Equipment and Supplies- (Hand Tools, Hose Fittings, Fire Packs, Flagging, Bladder Bags, etc.)			\$5,000	1	\$4,500.00		
PPE-(Nomex Pants, Nomex Shirts, Gloves, Eye Protection, Fire Shelters, etc.)			\$3,000	1	\$3,000.00		
Perishable Goods-(Water, Gatorade, MRE's, etc.)			\$2,000	1	\$2,000.00		
Subtotal, Supplies:			\$0.00	0	\$24,473.48	\$0.00	\$0.00
CONTRACTUAL							
Describe Contracts that will most likely result from this project:							
							\$0.00
							\$0.00
							\$0.00
Subtotal, Contractual:			\$0.00		\$0.00	\$0.00	\$0.00
OTHER							
Describe Other Costs of the Project:							
							\$0.00
							\$0.00
							\$0.00
Subtotal, Other:			\$0.00		\$0.00	\$0.00	\$0.00
TOTAL DIRECT CHARGES					\$137,614.68	\$0.00	\$113,141.20
OVERHEAD ASSESSMENT (If applicable, see FSH 1909.13)	Insert Rate Here:		9.0%		\$12,385.32		
Total Party Costs					\$150,000.00	\$0.00	\$150,000.00
COST ELEMENTS SUBJECT TO NATIONAL PASS-THROUGH RATES					Cooperator Contribution		
TOTAL CHARGES							
							\$0.00
OVERHEAD ASSESSMENT (If applicable, see FSH 1909.13)	Insert Rate Here:						\$0.00
Total Pass-Through Costs							\$0.00
TOTAL PROJECT COSTS							\$150,000.00

Burden Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0217. The time required to complete this information collection is estimated to average 45 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

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Forest Service

Coronado National Forest
Supervisor's Office

300 West Congress St.
Tucson, AZ 85701
520-388-8300
Fax: 520-388-8305

File Code: 1230 **Date:** January 9, 2017
Route To:
Subject: Delegation of Authority for Acting Forest Supervisor - CY 2017
To: Forest Leadership Team

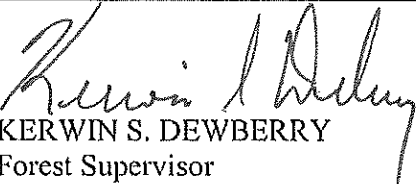
The Forest Staff Officers identified below are delegated to serve as the Acting Forest Supervisor when the Forest Supervisor and Deputy Forest Supervisor are absent from the Forest or otherwise unavailable. If the scheduled Acting Forest Supervisor is not available, it is the assigned Staff responsibility to arrange for one of the other listed Staff Officers to fulfill the Acting Forest Supervisor duties. While serving as Acting Forest Supervisor, the individuals are granted full delegation of authority to sign all correspondence that is general in nature. This authority does not extend to internal policy, closure orders, monetary awards, or personnel actions.

The Acting Forest Supervisor is responsible to initiate and run the Monday Staff Meeting and host the monthly Family Meeting that corresponds to their assigned months.

The Acting Forest Supervisor is also responsible to co-sponsor the Forest Leadership Team (FLT) Meeting that corresponds to their assigned month.

Calendar Year 2017 Acting Forest Supervisor Assignments

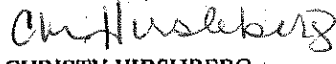
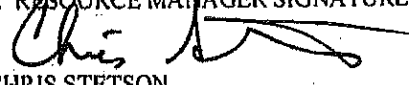

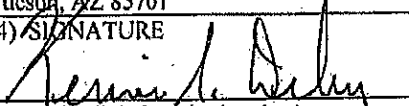
Month	Forest Staff	Program Areas Represented	FLT Meeting Dates
January	Heidi Schewel	Public Affairs/Communication	w/ Nogales RD, January 18-19, 2017
February	Heidi Schewel	Public Affairs/Communication	
March	Chris Thiel	Natural Resources	w/ Santa Catalina RD, March 15-16, 2017
April	Chris Thiel	Natural Resources	
May	Craig Fleischer	Administration	w/ Safford RD, May 17-18, 2017
June	Craig Fleischer	Administration	
July	Ed Monin	Engineering/ Minerals	w/ Douglas RD, July 12-13, 2017
August	Ed Monin	Engineering/ Minerals	
September	Joe Winfield	Recreation/Heritage/Special Uses	w/ Sierra Vista RD, September 13-14, 2017
October	Joe Winfield	Recreation/Heritage/Special Uses	
November	TBD	Fire Management and Aviation	w/ Santa Catalina RD, November 15-16, 2017
December	TBD	Fire Management and Aviation	


KERWIN S. DEWBERRY
Forest Supervisor



Format Page

**FS16 16A-1A-11030500-008
SUPPORT AGREEMENT**

1. AGREEMENT NO. 16-1A-11030500-008 Mod 004		2. SUPERSEDED AGREEMENT NO. 16-1A-11030500-008 Mod 003		3. EFFECTIVE DATE JANUARY 1, 2016		4. EXPIRATION DATE DECEMBER 31, 2020	
5. SUPPLYING ACTIVITY: (ISA NR/EFF DATE/DODAAC FURNISHED BY SUPPLIER)				6. RECEIVING ACTIVITY (DODAAC): W91QUS			
a. NAME & ADDRESS: USDA Forest Service ATTN: Chris Stetson Coronado National Forest 300 W. Congress St. Tucson, AZ 85701				a. NAME & ADDRESS: US Army Garrison, Fort Huachuca ATTN: IMHU-RMM 2854 Hungerford Ave, Building 41407 Fort Huachuca, Arizona 85613-7010			
b. MAJOR COMMAND:				b. MAJOR COMMAND: UIC: W6CFAA Installation Management Command			
7. SUPPORT PROVIDED BY SUPPLIER a. SUPPORT			b. BASIS FOR REIMBURSEMENT		c. ESTIMATED REIMBURSEMENT		
Fuels Reduction and Management Support – Project(s) will be mutually agreed to by the Parties during Annual Plan of Work meeting(s) <ul style="list-style-type: none"> - Fuels Reduction – Prescribed Burn Project (FY 2020) - Implementation based on Burn Plan - Lands managed by Fort Huachuca, Sierra Vista, AZ - Annual funding based on availability of appropriations and approved MIPR (DD Form 1144) - Reimbursement of Costs (Financial Plan) 			See Support Details and General Provisions outlined below, and required MIPR (DD Form 1144) for reimbursement of costs.		\$90,000.00 (PROJECTED COSTS BASED ON ESTIMATED RATES)		
NOTE: This DD Form 1144 is not a financial document as the dollar amounts are estimates. This ISSA should not be used for obligation of funds. Fund Certifications will be provided with a DD Form 448 Military Interdepartmental Purchase Request (MIPR). Failure to negotiate an approved Support Agreement may result in loss of service.							
ADDITIONAL SUPPORT REQUIREMENTS ATTACHED						<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
8. SUPPLY COMPONENT				9. RECEIVING COMPONENT			
a. RESOURCE MANAGER SIGNATURE  CHRISTY HIRSHBERG Director, Resource Management		b. DATE SIGNED 9/26/19		a. RESOURCE MANAGER SIGNATURE  CHRIS STETSON Fuels Program Manager, US Forest Service		b. DATE SIGNED 9/23/19	
c. APPROVING AUTHORITY				c. APPROVING AUTHORITY			
(1) TYPED NAME CHAD O. RAMBO, COL, MI Commander, U.S. Army Garrison Fort Huachuca				(1) TYPED NAME KERWIN S. DEWBERRY Forest Supervisor, Coronado National Forest			
(2) ORGANIZATION: US Army Garrison Fort Huachuca Fort Huachuca, AZ 85613-6000		(3) PHONE NO. DSN: 821-1562 (520)-533-1562		(2) ORGANIZATION: Coronado National Forest 300 W. Congress St. Tucson, AZ 85701		(3) PHONE NO. 520-388-8306	
(4) SIGNATURE 		(5) DATE SIGNED 1 OCT 19		(4) SIGNATURE 		(5) DATE SIGNED 9/19/2019	
10. TERMINATION (Complete only when agreement terminated prior to scheduled expiration date)							
a. APPROVING AUTH SIGNATURE		b. DATE SIGNED		c. APPROVING AUTH SIGNATURE		d. DATE SIGNED	

DD FORM 1144 Nov 01 (IMHU-RMM)

**FS16 16A-1A-11030500-008
SUPPORT AGREEMENT**

ADDITIONAL PROVISIONS (Use this space to continue general and/or specific provisions, as needed)

11. GENERAL PROVISIONS:

- a. The Receiving Component will provide the Supply Component projections of requested support.
- b. All rates expressing the unit cost of services associated with this agreement are based on current rates which may be subject to change due to uncontrollable reasons. The Receiving Component will be notified immediately by the Supply Component of any rate changes. Additional funding is based on the Receiving Component's funds availability and prior approval (see MODIFICATIONS below).
- c. This agreement may be cancelled at any time by mutual consent of the parties concerned. This agreement may also be cancelled by either party upon giving at least 180 days written notice to the other party.
- d. BILLING. The maximum total cost to Department of the Army, Fort Huachuca for FY 2020 is \$90,000. Overhead is assessed at 10 percent. Transfer of funds to the U.S. Forest Service must be through an Interagency Payment and Collection System (IPAC) billing. A detailed list of charges incurred must be made available upon request.

The IPAC billing document which U.S. Forest Service prepares must contain the following information:

BILLING DATA	REQUESTING AGENCY	U.S. FOREST SERVICE
Obligation Document Number		N/A
Agency Location Code (ALC)		12-40-1100
Account/Cost Structure		
Budget Object Code (BOC)		0250
Document Agreement Number		16-1A-11030500-008
Data Universal Numbering System number (DUNS)		92-9332484
Business Event Type Code (BETC)	DISB	COLL

- e. NOTICES. Any communications affecting the operations covered by this agreement given by the U.S. Forest Service or the Department are sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax, as follows:
 1. To the U.S. Forest Service Program Manager, at the address specified in the agreement.
 2. To Department of the Army, Fort Huachuca Resource Manager, at the address shown in the agreement or such other address designated within the agreement.

Notices are effective when delivered in accordance with this provision, or on the effective date of the notice, whichever is later.

**FS16 16A-1A-11030500-008
SUPPORT AGREEMENT**

f. ALTERNATE DISPUTE RESOLUTION – INTERAGENCY. The parties to this agreement shall settle any disputes that may arise under this agreement by following direction in the Treasury Financial Manual, Volume 1, Bulletin 2011-04, Section VII (“Resolving Intra-governmental Disputes and Major Differences”).

g. MODIFICATIONS. Modifications within the scope of this agreement must be made by mutual consent of the parties, by the issuance of a written modification signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modification should be made, in writing, at least 30 days prior to implementation of the requested change. The Department of the Army, Fort Huachuca is not obligated to fund any changes not properly approved in advance.

U.S. Forest Service review:

The authority and format of this instrument has been reviewed and approved for signature.

Eddie W Bell Jr
Eddie W Bell Jr CGMS

Grants Management Specialist

EDDIE BELL
c=US, o=U.S. Government, ou=Department of Agriculture, cn=EDDIE BELL,
0.9.2342.19200300.100.1.1=f2001001757931
2019.09.19 10:40:36 -0700

Date

**FS16 16A-1A-11030500-008
SUPPORT AGREEMENT**

h. **PRINCIPAL CONTACTS.** Individuals listed below are authorized to act in their respective areas for matters related to this instrument.

Principal Cooperator Contacts:

Cooperator Program Contact	Cooperator Administrative Contact
Shane Hall, Forester Fort Huachuca IMHU-PWB 3040 Butler Rd., Bldg 22526 Fort Huachuca, AZ 85613-7010 Telephone: 520.533.5701 FAX: 520-533-0940 Email: shane.h.hall.civ@mail.mil	Aneesha Avalos, Support Agreement Manager 2854 Boyd Ave, Bldg 41407 U.S. Army Garrison Fort Huachuca, AZ 85613 Telephone: 520.533.1300 FAX: 520-533-0940 Email: aneesha.j.avalos.civ@mail.mil

Principal U.S. Forest Service Contacts:

U.S. Forest Service Program Manager Contact	U.S. Forest Service Administrative Contact
Chris Stetson, Fuels Program Manager Coronado National Forest 300 W. Congress Tucson, AZ 85701 Telephone: (520) 388-8360 FAX: (520) 388-8305 Email: christopher.stetson@usda.gov	Telephone: FAX: Email:
U.S. Forest Service Program Manager Contact (Liaison)	U.S. Forest Service Contact (Liaison)
Beau Cartwright, District Fuels Specialist Sierra Vista Ranger District 4070 S. Avenida Saracino Hereford, AZ 85615 Telephone: (970) 846-7628 FAX: (520) 378-0519 Email: beau.cartwright@usda.gov	Celeste Kinsey, District Ranger Sierra Vista Ranger District 4070 S. Avenida Saracino Hereford, AZ 85615 Telephone: (520) 803-2805 FAX: (520) 378-0519 Email: celeste.kinsey@usda.gov

**FS16 16A-1A-11030500-008
SUPPORT AGREEMENT**

ATTACHMENT 2

505) Compliance Services Prescribed Fire Support & Management	See details below	Estimated Cost	\$90,000.00
			Total \$90,000.00

Common Level of Support 505 Services to be provided to US Army Garrison, Fort Huachuca, Arizona.

1. Develop an Annual Operating Plan (Exhibit A) for planning, coordination, and funding purposes.
2. Prepare a burn plan for prescribed fires to occur within the administrative boundary of Fort Huachuca. The complexity and elements of the burn plan will utilize National Wildfire Coordination Group (NWCG) standards¹ and templates from the NWCG Interagency Prescribed Fire Planning and Implementation Guide. If a conflict regarding treatment implementation arises between the Burn Plan and this agreement, the Plan prevails.
3. Provide a Prescribed Fire Burn Boss, qualified to the complexity level of the burn, to implement prescribed fires within the administrative boundary of Fort Huachuca.
4. Complete prescribed burns scheduled in the Annual Work Plan within the prescriptions outlined in approved burn plans.
5. Complete appropriate long-term planning as necessary to insure compliance as required in the Biological Opinion.
6. Provide qualified overhead, personnel, supplies and equipment to prepare and implement activity on vegetation treatment and prescribed fire units.
7. Request access to Department of the Army, lands managed by Fort Huachuca which will be included in the prescribed burn area prior to implementation of approved project(s). For prescribed burns, Supply Component will provide a minimum 24 hour advance notice.

¹ NWCG standards will be based on the Wildland Fire Qualifications Guide (PMS 310-1) found at <http://www.nwcg.gov/publications/310-1>.

Exhibit A
Annual Operating Plan 2020
Fuels Reduction and Vegetation Management Support

This operating plan outlines the scope of work for the 2020 Fort Huachuca, AZ prescribed fire (Rx) support and vegetation management treatment cycle.

THE U.S. FOREST SERVICE SHALL PROVIDE THE FOLLOWING SERVICES AND TECHNICAL ASSISTANCE:

1. Complete prescribed burns scheduled in the 2020 planning year within the prescriptions outlined in the approved burn plan. This year's planned target is 2,814 broadcast acres, as shown on attached map (Attachment A) and 420 acres of piles in Huachuca and Garden Canyons.
2. Conduct pre-planning and preparation in accordance with Fort Huachuca's Biological Opinion.
3. Provide qualified oversight and personnel to conduct the prescribed fire (Rx), including pre-work consisting of fuels treatment(s), cutting, and piling, in accordance with NWCG standards and the agreed burn plan.
4. Provide technical assistance through training of Fort Huachuca Fire Department personnel prior to, and during, fuels activity (prescribed burning).

THE DEPARTMENT OF ARMY, FORT HUACHUCA SHALL:

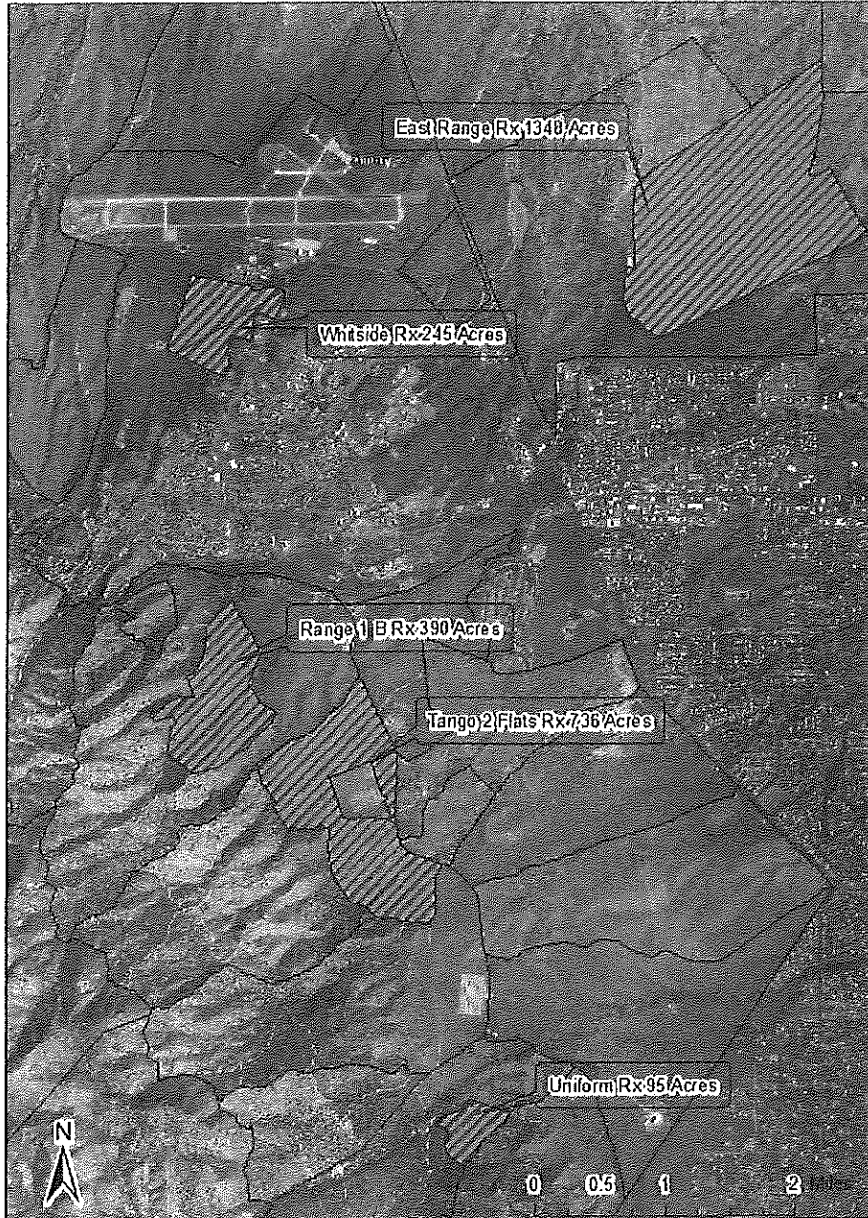
1. Reimburse the U.S. Forest Service \$90,000, which will cover labor and project costs (\$81,818.18) for the FY2020 prescribed fire (Rx) plan, and the established overhead rate of 10% (\$8,181.82), as stated in the Financial Plan (Exhibit B).
2. Through the Environmental and Natural Resources Division, provide necessary oversight and direction on the fuel reduction projects.
3. Provide all necessary information to the Fuels team to complete the burn plans.

IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

1. **INDEMNIFICATION/LIABILITIES:** Each party shall be responsible, to the extent required by law, only for the acts, omissions and negligence of its own officers, employees, or agents.
2. The Receiving Component will be notified immediately by the Supplying Component of rate changes and/or additional funding requirements. Any additional costs shall be approved by The Department of the Army, Fort Huachuca, prior to commencement and completion of work as stated under the General Terms, and Conditions, Section(s) 11. b. and g. **MODIFICATIONS,** of the Agreement (16-IA-11030500-008)

ATTACHMENT A

FY 20 Fort Huachuca Rx 2814 Acres



Forest Service Agreement # 16-IA-11030500-008

Cooperator Agreement # W91QUS-10000-001

Collection Agreement Financial Plan

Cooperator and FS Contributions

COST ELEMENTS and related data				Cooperator Contribution	FS Non-Cash Contribution	
Line Item Cost Subtotals				Subtotal	Subtotal	Combined Subtotal
PERSONNEL						
Resource Specialists (List all personnel):		# of Days	\$/Day			
Fuels Specialist - Cartwright (GS-9)		130.00	\$348.00	\$45,240.00		\$45,240.00
Field - Matt Ciccarrella (GS-3)		20.00	\$117.00	\$2,340.00		\$2,340.00
Field - Kevin Cooper (GS-5)		20.00	\$143.00	\$2,860.00		\$2,860.00
Field- Andrew Frazier (GS-4)		20.00	\$129.00	\$2,580.00		\$2,580.00
Field - Sean Sours (GS-3)		20.00	\$117.00	\$2,340.00		\$2,340.00
Field - Curt Cebula (GS-3)		20.00	\$117.00	\$2,340.00		\$2,340.00
Field- Joshua Metzger (GS-4)		20.00	\$129.00	\$2,580.00		\$2,580.00
Field - Cody Larimer (GS-4)		20.00	\$129.00	\$2,580.00		\$2,580.00
Field -Kyle Rose (GS-4)		20.00	\$129.00	\$2,580.00		\$2,580.00
Field- Chandler Tuscany (GS-4)		20.00	\$129.00	\$2,580.00		\$2,580.00
Field - GS-4		20.00	\$129.00	\$2,580.00		\$2,580.00
				\$0.00		\$0.00
					\$0.00	\$0.00
					\$0.00	\$0.00
					\$0.00	\$0.00
					\$0.00	\$0.00
					\$0.00	\$0.00
Subtotal, Personnel:		330.00		\$70,600.00	\$0.00	\$70,600.00
TRAVEL						
Explanation of trips: From Where/To Where/For Whom		Vehicle Mileage Cost or Airfare Cost	# of Trips	PerDiem and Lodging		
					\$0.00	\$0.00
					\$0.00	\$0.00
					\$0.00	\$0.00
Subtotal, Travel:		\$0.00	0	\$0.00	\$0.00	\$0.00
EQUIPMENT						
Name and Type of Equipment:		Unit Cost	Quantity			
Equipment Maintenance (saws, weed and atv)				\$2,000.00		\$2,000.00
				\$0.00		\$0.00
					\$0.00	\$0.00
Subtotal, Equipment:		\$0.00	0	\$2,000.00	\$0.00	\$2,000.00

SUPPLIES					
Name and Type of Supplies:	Unit	Quantity			
Slash Fuel 400 Gallons (burn Fuel)			\$1,000.00		\$1,000.00
Mans/IAP			\$652.18		
Saw/ weed eater supplies (chain, weed eater line)			\$300.00		\$300.00
				\$0.00	\$0.00
Subtotal, Supplies:	\$0.00	0	\$1,952.18	\$0.00	\$1,300.00

CONTRACTUAL			
Describe Contracts that will most likely result from this project:			
			\$0.00
			\$0.00
			\$0.00
Subtotal, Contractual:	\$0.00	\$0.00	\$0.00
OTHER			
Describe Other Costs of the Project:			
Vehicle Mileage (hours/miles)	\$2,766.00		\$2,766.00
Overtime	\$4,500.00		\$4,500.00
			\$0.00
Subtotal, Other:	\$7,266.00	\$0.00	\$7,266.00
TOTAL DIRECT CHARGES	\$81,818.18	\$0.00	\$81,166.00
OVERHEAD ASSESSMENT (if applicable, see FSH 1909.13)	Insert Rate Here:	10.0%	\$8,181.82
Total Party Costs	\$90,000.00	\$0.00	\$90,000.00
COST ELEMENTS SUBJECT TO NATIONAL PASS-THROUGH RATES		Cooperator Contribution	
TOTAL CHARGES			
			\$0.00
OVERHEAD ASSESSMENT (if applicable, see FSH 1909.13)	Insert Rate Here:		\$0.00
Total Pass-Through Costs			\$0.00
TOTAL PROJECT COSTS			\$90,000.00

Burden Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0217. The time required to complete this information collection is estimated to average 45 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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APHIS SALES ORDER REQUEST FORM

State Office:

Date:

Agreement Number:

Amendment:

Number

Cooperator Name:

FMMI

Customer #

Billing Address:

Category:

Sales Order Type:

Budget Period:

FMMI PO (if a USDA Agency):

WBS Element:

TAS:

Agreement Performance Period:

Amount of This SO Request:

Total Amount to Date:

Overhead Rate:

WS Pooled Job Costs:

Frequency of Billing :

Previously on OSEC Report?

OSEC Date:

Species :

Additional Comments:

For WRO Use Only:

Received in WRO

OSEC Report

Overhead Calc.

Mail Distribution Date

ACMS

Agr.Spec.

No. & State

MIPR

Agreement

CSA

WFP

7600

Mod

Waiver

DEOB

Check

Attached

MRP

SHC

Scan Date:

Sent to:

**INTERAGENCY AGREEMENT
FY21 WORK AND FINANCIAL PLAN
BETWEEN
U.S. ARMY GARRISON, FORT HUACHUCA
AND
UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES**

This Interagency Agreement between the U.S. Army Garrison, Fort Huachuca (Fort) and the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (APHIS-WS), defines the goals, plan of action, resources and budget for work to be conducted from October 1, 2020 through September 30, 2021. This Agreement was entered into under authority of the Economy Act 31 U.S.C. 1535.

1. References:

- a. Title 32, CFR Part 651 is the Army's National Environmental Policy Act (NEPA) regulation.
- b. AR 200-1, Environmental Protection and Enhancement, 13 Dec 2007.
- c. 16 USC Section 1531-1544, Endangered Species Act.
- d. 16 USC Section 703-712, Migratory Bird Treaty Act.
- e. DoD Instruction 4000.19, Support Agreements, 25 April 2013.
- f. AR 40-5, Preventive Medicine, 12 May 2020.
- g. DA PAM 40-11, Preventive Medicine, 18 May 2020.
- h. Fort Huachuca Regulation 40-116, Control and Care of Pets, Horses, and Transient Animals, 10 January 2020.
- i. Arizona's State Wildlife Action Plan 2012-2022, Arizona Game & Fish, 16 May 2012.

2. Goals

- a. Conduct wildlife management operations on Fort Huachuca Military Installation, to include the populated cantonment area of Fort Huachuca, Black Tower complex, and Libby Army Air Field for damage caused by wildlife and feral/free ranging animals including the potential spread of zoonotic diseases.

b. Coordination for activities involving wild animals and stray cats and dogs will be with the Directorate of Public Works (DPW)/Environmental and Natural Resource Division (ENRD) personnel.

c. In accordance with this agreement, APHIS-WS will respond to any immediate threats to Human Health and Safety pertaining to wildlife and/or feral/free ranging animals.

3. Definitions

a. Immediate dangers to life, health and safety include, but are not limited to, wildlife-human conflicts or incidents that are judged to be an **immediate threat to public safety or health** because:

(1) The wildlife is known to have caused a human injury or exposure to life-threatening disease (to public or an employee); or

(2) The wildlife displays aggressive behavior; or

(3) Any wildlife known to have been previously captured or relocated as a result of a previous human-wildlife conflict and continues to cause human-wildlife conflicts or

b. Nuisance/Problem wildlife include wildlife conflicts that are judged to be a nuisance, but are not judged to be either an immediate or potential threat to public safety because:

(1) The wildlife is not normally considered a threat to public health or safety; or

(2) The wildlife has no known history of being previously captured or relocated; or

(3) The wildlife has only been sighted or reported and does not exhibit unacceptable behavior; and

(4) The wildlife has not remained in or near human occupied areas.

c. Populated areas: The populated cantonment area of Fort Huachuca, Black Tower complex, and Libby Army Air Field.

4. Plan of Action

a. In accordance with this agreement, APHIS-WS will assign 2 fulltime Wildlife Specialists who will respond to nuisance wildlife, stray cats and dogs when requested on Fort Huachuca. APHIS-WS will provide a vehicle, supplies, and equipment for the project. APHIS-WS personnel will be on-call to respond to nuisance wildlife during nights, weekends, and holidays, as requested by ENRD. APHIS-WS will provide a written monthly personnel work schedule to ENRD.

b. Euthanization of wildlife, which do not pose immediate danger to human health or safety, and/or are not suffering, must be approved by ENRD prior to implementation. In addition, any use of pesticides must be approved by ENRD prior to implementation. Chemical inventory and copies of all Safety Data Sheets (SDS) must be provided to ENRD at the time this agreement is signed by all parties. APHIS-WS Wildlife Specialists assigned to Fort Huachuca will have applicable Federal and State training and/or certifications, to include, but not limited to:

(1) Defensive Driver training.

(2) NRA Firearms training and firearms certifications.

(3) Immobilization and Euthanasia Training.

(4) Arizona Department of Agriculture Commercial Applicator Certification.

(5) Arizona Department of Agriculture, Office of Pest Management Applicator Certification.

(6) National Animal Control Association training as identified for the proper capture, handling, and disposition of those wildlife and feral/free ranging animals listed in this agreement.

c. Use of firearms by APHIS-WS personnel in the main cantonment area will be coordinated with the Military Police Desk prior to use, except in cases where there is an imminent threat to human health and safety and there is insufficient time to coordinate in advance of the situation. In those instances, immediate post-coordination efforts will take place. All shots will be directed at a positively identified target with a definite and safe backdrop.

d. Coordination with the Arizona Game and Fish Department will be conducted by ENRD in coordination with USDA, except in those cases of immediate life, health, and safety issues.

5. Calls for Service Procedures

a. USDA receives a call for service from ENRD. If USDA receives a call from the MP Desk, DES, or installation personnel, they must coordinate with ENRD. USDA is responsible for the removal of domestic/feral/stray cats and dogs and will respond to wildlife calls as outlined in paragraph 7 or upon request from ENRD.

b. Prior to taking action that deviates from the general species protocol as outlined in paragraph 7, USDA will contact ENRD. ENRD will be available to respond to such calls 24/7 on the wildlife cell phone (520-678-8112).

ENRD will determine the appropriate management response to the wildlife call. If ENRD personnel cannot be reached, leave a message, and take appropriate action as prescribed in paragraph 7 of this agreement.

c. A report of incident will be sent in accordance with paragraph 8 of this agreement.

6. Domestic. Coordination for activities involving stray cats and dogs will be with ENRD personnel. Requirements for pet registration, rabies vaccine, quarantine requirements, authorized pets, etc. are covered in FH 40-116.

a. Feral/Free Ranging Dogs will be trapped using any approved, legal and humane cage or traps, collarum canine capture device, and hand capture. Trapping efforts may take place 24 hours per day / 7 days a week and equipment will be placed in locations to avoid conflicts with the general public. Captured dogs will be transported to the stray animal facility/USDA office to verify if it is an abandoned pet or feral. If USDA is unable to determine ownership, the dog will be kept for 3 days. After the third day, the animal may be turned over to the Sierra Vista Animal Shelter, as determined by ENRD. Animals that are sick or injured shall be taken to the Fort Huachuca veterinarian, or an off-post vet if after normal work hours, and they will determine the best course of medical treatment. Along with trapping, other control methods used may include shooting with suppressed rifles and/or shotguns, net guns, and immobilization.

b. Feral/Free Ranging Cats will be trapped using any approved, legal and humane cage or traps. Trapping efforts may take place 24 hours per day / 7 days per week and equipment will be placed in locations that will avoid conflicts with the general public. Captured cats will be transported to the stray animal facility/USDA office to verify if it is an abandoned pet or feral. If USDA is unable to determine ownership, the cat will be kept for 3 days. After the third day, the animal may be turned over to the Sierra Vista Animal Shelter, as determined by ENRD. Animals that are sick or injured shall be taken to the Fort Huachuca veterinarian, or an off-post vet if after normal working hours, and they will determine the best course of medical treatment. Along with trapping, other control methods used may include shooting with suppressed rifles, air rifles, shotguns, net guns, immobilization, or nets.

7. Wildlife Methods and Protocol

a. General methods and protocol for ENRD and USDA in handling wildlife-human interactions on Fort Huachuca are outlined below. Wildlife management efforts may take place 24 hours per day / 7 days per week. ENRD/USDA equipment is placed in locations that will avoid conflicts with the general public.

b. General species.

(1) Determine whether humans are providing a food source for wildlife.

(1) Coordinate with ENRD to remove food and containers from the area.

(2) Educate proponents of laws, regulations, and fines against feeding wildlife. This is completed by handing out an educational brochure provided by ENRD. Notify ENRD when more handouts are needed.

(3) Report to ENRD.

(4) Determine if a rabies vaccination is necessary.

c. Process

(1) Assess the situation

(2) Determine the appropriate action

(3) Wildlife or human management options as follows:

a. Leave animal in place.

b. Coordinate with ENRD to exclude human access to animal or area. ENRD will provide cones or signage to cordon off an area.

c. Coordinate with ENRD to remove any food or water source. ENRD may grant USDA authority to act immediately in an effort to prevent further damage/safety issues.

d. Remove animal.

d. Animals with Young

(1) Identify if young are present by: mother with swollen nipples, adult animal repeatedly leaving and entering area with food, noises associated with young, incidents in relation to birth seasons.

(2) Do not remove unless emergency or there is an immediate threat to human health and safety. Coordinate with ENRD to exclude human access to the area. ENRD will provide cones or signage to cordon off area.

(3) If an emergency (high use area that is dangerous for both humans and animals)

a. Mammals: Goal of trapping all family members to release in same area.

b. Avian: Goal of placing young back in original nest.

e. Injured Animals

(1) If non-life threatening injury, USDA coordinates with ENRD for transport to a wildlife rehabilitation center. USDA or ENRD will transport depending on mission requirements.

(2) If life threatening injury, euthanize.

f. Dead Animals

(1) ALL rabies vector species will be tested for rabies if viable. USDA will conduct other opportunistic testing based on species of animal and testing availability (plague, tularemia, CWD, AI, etc).

(2) If on roadway, relocate at least 50 feet off road or dispose of in an area away from humans for use by scavengers. All vehicle-struck deer and javelina should be reported to ENRD with the following information: coordinates of incident, species of wildlife, and sex.

g. Determination for rabies or additional testing

(1) If the animal is acting abnormally (e.g., foaming at the mouth, erratic, hyperactive or lethargic behavior without cause, or paralyzed) the animal will be euthanized and tested for rabies in accordance with established procedures.

(2) If the animal has excessive wounds/cuts and is determined to not be eligible for rehabilitation, the animal will be euthanized and tested for rabies. Special effort an attention will be placed on vector species.

(3) Specific guidance for bats:

- a. Bats who have come into direct physical contact with humans or household pets will be tested.
- b. For bats captured in sleep quarters, USDA will coordinate with ENRD to determine final disposition.
- c. Until further notice, face masks shall be worn while handling bats to protect against potential transmission of COVID 19 to bats.

(4) Results of rabies testing will be disclosed to ENRD, DES, and Preventive Medicine.

(5) If animal is found dead from unknown causes, contact ENRD prior to disposal to determine if additional testing is required (i.e., poisoning, other disease, etc.)

8. Wildlife

a. Coordination for activities involving wildlife will be with ENRD personnel. The approved methods for capturing wildlife are outlined below. Coordination is made with ENRD for placement of all traps/capture devices.

b. Live traps should be used when trapping wildlife, with the exception of rodents and gophers. These methods include but are not limited to padded-jaw foothold traps, collarum capture device, culvert traps, various snare devices, and trailing hounds. Trapping efforts may take place 24 hours per day/7 days per week and equipment will be placed in locations that will avoid conflicts with the general public.

c. As the situation dictates, every effort should be made to trap, vaccinate (rabies), and release wildlife on the Installation.

d. All vector species are required to be vaccinated prior to release subject to available resources or amount of rabies vaccinations on hand.

Skunks: Along with live trapping, other control methods used may include shooting with suppressed rifles, air rifles, and/or shotguns. Skunks live captured will be relocated to a suitable habitat. Refer to paragraph 6(g) above for guidance on euthanasia and rabies testing.

Raccoon: Along with live trapping, other control methods used may include shooting with suppressed rifles, and/or shotguns. Raccoons live captured will be relocated to a suitable habitat. Refer to paragraph 6(g) above for guidance on euthanasia and rabies testing.

Grey Fox: Along with live trapping, other control methods used may include shooting with suppressed rifles, and/or shotguns. Grey Fox captured will be relocated to a suitable habitat. Refer to paragraph 6(g) above for guidance on euthanasia and rabies testing.

Coyotes: May be hazed by the use of rubber bullets, bean bags, and/or paint balls. If hazing is determined ineffective, other control methods used may include shooting with suppressed rifles, and/or shotguns. If trapping is required, trap using any approved, legal and humane traps. All captured coyotes will be euthanized at site of capture. Refer to paragraph 6(g) above for guidance on rabies testing.

Black Bears: May be hazed by the use of rubber bullets, bean bags, and/or paint balls. Black bears will be trapped using culvert traps or any approved, legal and humane cage or traps. The disposition of all captured black bears will be decided by Arizona Game and Fish Department (AGFD) and ENRD, in coordination USDA. Along with trapping, other control methods used may include shooting with suppressed rifles, shotguns, and/or immobilization.

Mountain Lions: May be hazed by the use of rubber bullets, bean bags, and/or paint balls.

If hazing is determined ineffective, other control methods used may include shooting with suppressed rifles, and/or shotguns. If trapping is required, appropriate live traps to include foot snares may be used. Coordination is made with ENRD for placement of all traps/capture devices.

Javelina/Ringtail Cats/Bobcats/Coatis/Badgers: May be hazed by the use of rubber bullets, beanbags, and/or paint balls. Will be controlled by the use of appropriate live traps, capture devices, and hand captures dependent upon the species. If hazing/trapping is determined ineffective, other control methods used may include shooting with suppressed rifles, and/or shotguns. Captured mammals will be relocated to a suitable habitat. Refer to paragraph 6(g) above for guidance on euthanasia and rabies testing.

Bats: Will be controlled by the use of appropriate live traps, capture devices, nets, and hand. Captured bats will be relocated to a suitable habitat or euthanized in accordance with paragraph 6(g) above. Along with trapping, other control methods used may include shooting with air rifles and/or shotguns.

Squirrels/Gophers/Other small ground-burrowing mammals: Will be trapped using appropriate traps for each animal. Squirrels/Gophers/Other small ground-burrowing mammals live captured will be relocated to a suitable habitat or euthanized in accordance with paragraph 6(g) above. Along with trapping, other control methods used may include shooting with air rifles, suppressed rifles, and/or shotguns.

Deer: May be hazed or trapped with the use of clover traps, drop nets, and shooting. The disposition of all captured deer will be decided by AGFD and ENRD, in coordination with USDA. Along with trapping, other control methods used may include shooting with suppressed rifles, and/or shotguns especially in the airfield area where it poses an immediate threat to life, health, and safety of personnel or equipment. If found dead, refer to paragraph 6(f) above for disposition and testing.

Other Avifauna/Birds (non-waterfowl): Avifauna in populated areas may be managed using trapping, pesticides, and shooting. Trapping efforts will take place during day light hours and will be placed in locations to avoid conflicts with the general public, they include but are not limited to live traps, nest traps, and hand capture. Pre-baiting may be conducted to enhance acceptance of treated bait. All treated bait will be used in accordance with the pesticide labels. DRC 1339 is authorized for use on birds. Along with trapping, other control methods used may include shooting with air rifles and shotgun.

Birds (waterfowl): Will be removed in populated areas by use of drive traps, nest traps, hand capture, and shooting. Along with trapping, other control methods used may include shooting with air rifles, suppressed rifles, and/or shotguns, when approved by Fort Huachuca. Waterfowl captured alive will be relocated to a suitable habitat or euthanized if relocation is not possible. Domestic waterfowl captured will be transferred to a wildlife rehabilitator or euthanized if rehabilitation fails. Control efforts will take place during day light hours and every effort will be made to avoid conflicts with the general public.

Snakes: Snakes will be live captured and relocated to a suitable habitat or euthanized if unable to catch and it poses a threat to human health and safety.

9. Reports

a. APHIS-WS will provide a monthly report of activities for all wildlife and feral/free ranging animal activities that includes species managed, methods used, dispositions, disease samples, and pesticide use to ENRD.

b. USDA will notify ENRD personnel, in writing, of final disposition of all wildlife responses as soon as feasibly possible after the incident.

c. USDA will notify the Public Health Nursing Office, at 520-533-5318 or 520-533-9139 for notification on bites or positive rabies tests.

10. Environmental Compliance

a. Any use of pesticides must be approved by ENRD prior to implementation. Chemical inventory and copies of SDSs must be provided to ENRD at the time this agreement is signed by all parties.

b. USDA activities are covered by the 2014 Biological Opinion issued by the U.S. Fish and Wildlife Service. Therefore, USDA shall maintain compliance with the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and other environmental compliance laws for the specific projects and actions Wildlife Services performs under this agreement. USDA shall provide a copy of their NEPA document covering activities specific to Fort Huachuca to ENRD.

c. For the purposes of this agreement USDA shall follow all Fort Huachuca's procedures and requirements for wildlife management and shall comply with the installation's Integrated Natural Resource Management Plan, the installation's Biological Opinion, Arizona Revised Statute Title 17, the Migratory Bird treaty Act, and applicable other State and Federal laws and regulations. On Fort Huachuca, its government employees, contractors, and other partners shall ensure that all Federal and State protected species, to include all species of bat and specific species of reptiles, are handled and managed as protected species in accordance with the Endangered Species Act, Arizona Game and Fish Department (AGFD) regulations, and AGFD recommendations (to include the State's listed Species of Greatest Conservation Need as identified in 2012-2022 Arizona State Wildlife Action Plan.

11. Cost Estimate for Services

a. Fort Huachuca will reimburse APHIS-WS for actual expenses incurred, not to exceed **\$142,916 for FY 2021 (1 Oct 2020 – 30 Sep 2021)**. Such costs include, but are not limited to, salary/benefits, transportation, and travel.

b. An itemized estimate of these expenses is listed below; however, funds may be distributed between itemized categories at the discretion of APHIS-WS if required. Per this agreement, Fort Huachuca agrees to a 2% inflation rate for each fiscal year.

c. APHIS-WS will provide a monthly report of activities for all wildlife and feral/ free ranging animal activities that includes species managed, methods used, dispositions, disease samples, and pesticide use to the Directorate of Resource Management.

12. Effective Date / Termination.

a. This Inter-Agency agreement is effective on the date of final signature by all parties and will remain in effect for 1 year. The parties agree to review this Inter-Agency agreement annually.

b. This Inter-Agency agreement is subject to review/termination upon written request by either party. Under normal circumstances, prior notice of 180 days will be provided if the agreement is to be modified or terminated.

Salary/Benefits	\$94,035
Sunday/Night Differential Pay	\$4,000
Vehicle	\$6,600
Travel	\$ 3,765
Supplies/Telecommunication	4,000
Subtotal	\$112,400
APHIS Overhead 16.15%	18,152
Pooled Cost 11.00%	12,364
Total	\$142,916

OSJA REVIEW: The Office of the Staff Judge Advocate has reviewed this agreement and found it to be legally sufficient.

Daniel D. Haws II
DANIEL D. HAWS II

3 August 2020
(Date)

APPROVED BY:

Commander
U.S. ARMY GARRISON
FORT HUACHUCA
2837 Boyd Ave, Bldg. 41402
Fort Huachuca, AZ 85613-7010
520-553-1562
Tax Identification Number: Duns #: 601634376



JARROD MORELAND
Colonel, MI
Commanding

19 AUG 2020


(Date)

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES
Tax Identification Number: 41-0696271

DAVID BERGMAN  Digitally signed by DAVID BERGMAN
Date: 2020.08.25 08:08:46 -07'00'

DAVID BERGMAN
State Director, Arizona

(Date)

MICHAEL YEARY  Digitally signed by MICHAEL YEARY
DN: c=US, o=U.S. Government, ou=Department of Agriculture,
cn=MICHAEL YEARY, 0.9.2342.19200300.100.1.1=12001000003710
Date: 2020.08.25 10:18:50 -06'00'

Director, Western Region

(Date)



**Memorandum of Understanding
Between
The Department of Defense
and
The Department of the Interior
Establishing a
Recovery and Sustainment Partnership Initiative**

I. Purpose

This is a Memorandum of Understanding (MOU) between the United States Department of Defense (DoD) and the United States Department of the Interior (DOI) (collectively, the “Parties”). The purpose of this MOU is to establish a mutually beneficial partnership among the Parties to develop and promote effective ecosystem and species conservation and recovery initiatives that will reduce or eliminate the need for Federal protection and regulation under the Endangered Species Act (ESA) and provide for increased flexibility for military mission activities.

II. Background

The DoD manages for over 450 species listed as either threatened or endangered under the ESA. The DoD also manages hundreds more “species at-risk” which may warrant Federal protection in the future. The DoD continues to be committed to the conservation of ecosystems on which these species depend, and the provision of conditions compatible to conducting military training, testing, and operational missions. Over the past 40 years of balancing military mission needs with the conservation of threatened and endangered species, the Parties, working in coordination and partnership with numerous other Federal, State, and private partners, have achieved major conservation successes. However, in certain circumstances, species habitats or military missions have grown to the point where access to military ranges and training areas or the realism or effectiveness of testing or training activities are diminished.

The Administration’s National Defense Strategy has identified as primary goals the need to restore the readiness and enhance the lethality of our Nation’s Armed Forces. The Administration is also committed to the productive use of our Nation’s natural resources to promote American prosperity and strength. Both can be achieved by a continued partnership of the parties to collaborate on achieving our mutual goals. Through the Recovery and Sustainment Partnership Initiative (Initiative), the Parties will build on past successes to promote species recovery while enhancing military effectiveness.

III. Authority

This MOU is entered into under the authority of the Endangered Species Act, 16 U.S.C. 1531 et seq., the Fish and Wildlife Coordination Act, 16 U.S.C. 661 et seq., and other applicable statutory authority.

IV. Goals

The Initiative will seek to facilitate decision making for species review and down/de-listing where warranted through existing regulatory processes; identify and establish collaborative conservation initiatives to move species towards recovery and/or preclude the need to list additional species; and develop innovative regulatory approaches and tools for achieving ESA objectives in a manner consistent with military mission needs and objectives.

V. Establishment of a Recovery and Sustainment Coordinating Committee

There is established a Recovery and Sustainment Coordinating Committee (Coordinating Committee) to facilitate interaction among the Parties. The Coordinating Committee shall be comprised of one or more senior-level officials representing each of the Parties.

VI. Objectives of the Coordinating Committee

The objectives of the Coordinating Committee are to do the following:

- A. Identify certain species to be reviewed based on DOD mission impacts, risks, and costs.
- B. Assess which of those mission-priority species has been recommended for down/de-listing through existing processes, are currently under review or planned for review, or may be warranted for review.
- C. Clarify the DoD mission benefits and any ongoing requirements/actions that would be required for down/de-listed species.
- D. Develop a prioritized work plan for moving forward through existing regulatory processes to take appropriate action regarding changes to the status of listed species.
- E. Identify opportunities and develop collaborative conservation initiatives for priority species that have the potential for conservation actions to move species towards recovery, preclude the need to list "at-risk species", or otherwise achieve ESA conservation objectives in a manner consistent with military mission needs and objectives.
- F. Coordinate resources, expertise, research, and activities towards supporting these collaborative conservation initiatives and engage additional Federal, State, academic, and private partners.
- G. Develop innovative regulatory approaches and tools that provide greater mission flexibility and streamline consultation processes while enhancing conservation outcomes for listed and "at risk" species.
- H. Develop national policy options to facilitate adoption and implementation of the innovative initiatives, approaches, and tools.

VII. Commencement and Termination

This MOU shall take effect beginning on the date the last Party signs. Either Party may terminate this MOU at any time by providing 30 days written notice to the other Party. Unless so terminated, this MOU will remain in effect until 5 years after its effective date. This MOU may be extended or amended upon written request of either Party and subsequent written concurrence of the other.

VIII. Responsibilities of the Parties

The Parties shall manage their own activities and use their own resources, including the expenditure of their own funds, in pursuing the goals and objectives of this MOU. This MOU is not intended to, and does not create, any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity, by a party against the United States, its agencies, its officers, or its employees.

IX. Principal Contacts

The principal contacts for this MOU are:

Department of Defense:	Ryan Orndorff Director - Natural Resource Program Office of the Assistant Secretary of Defense/Energy, Installations and Environment
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Department of the Interior:	Gary Frazer Assistant Director - Ecological Services US Fish and Wildlife Service
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The Coordinating Committee members for this MOU are:

Department of Defense:	Jim VanNess Office of General Counsel
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	John McDonagh Office of General Counsel
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US Air Force:	Kevin Porteck Air Force Civil Engineer Center
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US Army:	Steven Sekscienski Office of the Assistant Chief of Staff Installation Management
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US Marine Corps:

Jacqueline Rice
Headquarters Marine Corps/Marine Corps
Installations Command

US Navy:

Kelly Ebert
Chief of Naval Operations, (N45) Energy &
Environmental Readiness Division

US Fish and Wildlife Service:

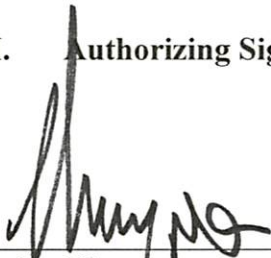
Jeff Newman
Chief, Division of Recovery and Restoration

Lisa Ellis
Chief, Branch of Recovery, Conservation Planning,
and Communication

X. Non-Fund Obligating Document

Nothing in this MOU shall obligate the Parties to obligate or transfer any funds. Specific work projects or activities that involve the transfer of funds, services, or property between any of the Parties will require execution of separate agreements and shall be contingent upon the availability of funds. Such activities must be independently authorized by appropriate statutory authority; this MOU does not provide such authority. Negotiation, execution, and administration of each such agreement must comply with all applicable statutes and regulations.

XI. Authorizing Signatures and Dates



Lucian Niemeyer
Assistant Secretary of Defense
(Energy, Installations, and Environment)
Department of Defense



Susan Combs
Senior Advisor to the Secretary
Exercising the Authority of the
Assistant Secretary for Fish and
Wildlife and Parks
Department of the Interior

Date: **JUNE 25, 2018**

Date: *June 22, 2018*

MEMORANDUM OF UNDERSTANDING
between the
Department of Defense
and the
Pollinator Partnership

This Memorandum of Understanding (MOU) is entered into by and between the Department of Defense, hereinafter written as DoD, and the Pollinator Partnership (the "Parties").

ARTICLE I – BACKGROUND AND OBJECTIVES

The objective of this MOU is to establish a framework for cooperative programs that promote the conservation and management of pollinators, their habitats and associated ecosystems.

The DoD has a long history of commitment to protecting the environment and the natural resources that have been entrusted to its care, while at the same time accomplishing its primary mission of national defense.

Through federal law and regulations, DoD is responsible for the conservation and management of natural and cultural resources, ecological processes, and threatened, endangered and sensitive or rare plant and animal species and their habitats. Cooperative relationships are essential to the effectiveness of resource management on and off military owned lands.

The Pollinator Partnership's mission is to act as a catalyst for stewardship, working to improve the health and survival of all species by promoting the health of pollinating animals, and by protecting and restoring their habitats. The Pollinator Partnership coordinates the North American Pollinator Protection Campaign (NAPPC), a unique, tri-national collaboration working to promote awareness and scientific understanding of pollinators; to gather, organize and disseminate information about pollinators; to provide a forum to identify and discuss pollinator issues; and to promote projects, initiatives and activities that enhance pollinators and their habitats.

It is the goal of both Parties to cooperate with each other in matters relating to the management and conservation of pollinators and the ecosystems they depend upon. The framework for cooperation and coordination is especially important to ensure that pollinator management activities are incorporated, where practicable, into installation integrated natural resource management plans (INRMPs) and practices.

ARTICLE II – AUTHORITIES

This MOU is made and entered into pursuant to the provisions of the Sikes Act (16 U.S.C. 670a-670o, as amended), and supports the Presidential Memorandum *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators* (June 2014). In addition, requirements under other applicable laws, regulations, and specific DoD directives and guidance also apply.

ARTICLE III – RESPONSIBILITIES

A. DoD will, subject to the availability of resources and under the terms of separately funded sub-agreements to this MOU, and consistent with requirements and activities described in its INRMPs, undertake such tasks as:

1. Support and, as feasible, undertake activities that help, conserve, protect, and restore pollinators and their habitats in accordance with DoD mission and policies.
2. Conserve and manage pollinators and their habitats in accordance with applicable federal laws and regulations to foster conservation.
3. Enter into supplemental sub-agreements with the Pollinator Partnership, including but not limited to special use permits, research permits, cooperative agreements, or contracts to accomplish work projects agreed upon by both Parties.
4. Provide unclassified/publicly releasable information on DoD mission requirements and constraints that will assist the understanding of for Pollinator Partnership personnel performing activities on DoD lands.
5. Meet annually, or as necessary, to identify projects and activities of mutual benefit and to plan and implement agreed to projects.
6. Work with the INRMP signatories to identify pollinator management activities in support of the Presidential Memorandum.

B. The Pollinator Partnership will:

1. Cooperate with DoD to implement actions that both Parties have agreed upon.
2. Provide DoD with expertise to implement agreed upon projects.
3. Enter into appropriate sub-agreements with DoD to accomplish specific projects agreed upon by both Parties.

4. Meet annually, or as necessary, to identify projects/activities of mutual benefit and to plan and implement agreed upon projects.
5. Help implement specific projects on DoD lands that support both Parties' missions while conserving pollinators and their habitats in accordance with DoD policies.
6. Inform the general public about DoD pollinator conservation projects.
7. Help train DoD personnel about pollinators and pollinator habitat conservation and management.

ARTICLE IV – DELEGATION

- A. Authorized representatives of NAPPC and the DoD may execute special use authorizations, and enter into supplemental sub-agreements within the scope of this MOU.
- B. Any supplemental sub-agreement negotiated under the authority of this MOU will remain in full force and effect, unless and until modified or terminated by local signatory Parties, per the terms of said supplemental sub-agreements.

ARTICLE V – TERMS OF AGREEMENT

This MOU will remain in effect from the date of final signature until it is terminated pursuant to Article VII.

ARTICLE VI – KEY OFFICIALS

Key officials are essential to ensure maximum coordination and communication among the Parties regarding the work being performed. The designated officials are:

Department of Defense	Pollinator Partnership
L. Peter Boice	Laurie Davies Adams
Deputy Director, Natural Resources Program	Executive Director
Office of the Assistant Secretary of Defense (Energy, Installation & Environment)	Pollinator Partnership
4800 Mark Center Drive, 16G14	423 Washington Street, 5 th Floor
Alexandria, VA 22350-0001	San Francisco, CA 94111-2339
Phone: 571-372-6905	Phone: 415-362-1137
Fax: 703-607-4237	FAX: 415-362-3070
E-mail: L.P.Boice.civ@mail.mil	E-mail: LDA@pollinator.org

ARTICLE VII – MODIFICATION AND TERMINATION

- A. This MOU will remain in effect until one of the Parties executes item B or C under this article.
- B. This MOU may be amended upon written request of either the DoD or the Pollinator Partnership, and the subsequent written concurrence of the other.
- C. Either Party may terminate this MOU by providing the other Party with sixty (60) days advance written notice.

ARTICLE VIII – STANDARD CLAUSES

A. Public Information Release

1. The Pollinator Partnership will not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, pictures, still and motion pictures, articles, manuscripts, or other publications) that states or implies federal government, departmental, bureau, or federal government employee endorsement of a product, service or position that the Pollinator Partnership represents. No release of information relating to this MOU may state or imply that the federal government approves of the work product of the Pollinator Partnership or considers the Pollinator Partnership's work product to be superior to other products or services.
2. The Pollinator Partnership will ensure that all information submitted for publication or other public releases of information regarding this project will carry the following disclaimer:

“The views and conclusions contained in this document are those of the authors, and should not be interpreted as representing the opinions or policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.”
3. The Pollinator Partnership will obtain prior DoD approval from the key DoD official for this MOU for any DoD-wide public information release that refers to DoD, the Military Services, offices, programs, or employee (by name or title), or to this MOU. For specific installation information, the Pollinator Partnership will obtain prior approval from that installation's public affairs office. The specific text, layout, photographs, etc., of the proposed release must be submitted to the MOU's technical representative, who will forward such materials to the public affairs office, along with the request for approval, or from the specific DoD installation public affairs office.

4. The Pollinator Partnership agrees to include the above provisions of this Article in any sub-award, except for a sub-award to a state government, a local government, or to a federally recognized Indian tribal government.
- B. **Freedom of Information Act (FOIA).** Any information furnished to DoD under this MOU is subject to the Freedom of Information Act (5 U.S.C. 552).
- C. **Participation in Similar Activities.** This MOU in no way restricts DoD or the Pollinator Partnership from participating in similar activities with other public or private agencies, organizations, or individuals.
- D. **Non-Fund Obligating Document.** Nothing in this MOU shall require either DoD or the Pollinator Partnership to obligate, expend, or transfer any funds. Specific work projects or activities that involve the transfer of funds, services or property among the various agencies and offices of DoD and the Pollinator Partnership will require execution of separate agreements and be contingent upon the availability of appropriated funds. Such activities must be independently authorized by appropriate statutory authority. This MOU does not provide such authority. Negotiation, execution and administration of each such agreement must comply with all applicable statutes and regulations.
- E. **Establishment of Responsibility** This MOU is not intended to, nor does it, create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity, by a Party against the United States, its agencies, its officers, or any person.
- F. **Authorized Representatives.** By signing below, the individuals listed in this document certify that they are representatives of their organizations, and are authorized to act in their respective areas for matters related to this MOU.

THE PARTIES HERETO have executed this MOU:

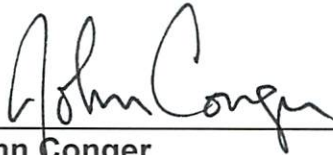
POLLINATOR PARTNERSHIP



Laurie Davies Adams
Executive Director
Pollinator Partnership

02/09/15
Date

DEPARTMENT OF DEFENSE



John Conger
Performing the Duties of the Assistant Secretary of Defense
(Energy, Installations & Environment)
Department of Defense

1/28/2015
Date

STRATEGIC PLAN FOR AMPHIBIAN AND REPTILE CONSERVATION AND MANAGEMENT ON DEPARTMENT OF DEFENSE LANDS





ENERGY,
INSTALLATIONS
AND ENVIRONMENT

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

3400 DEFENSE PENTAGON
WASHINGTON, DC 20301-3400

FEB 19 2015

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,
ENERGY AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY (ENERGY,
INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS, ENVIRONMENT AND ENERGY)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Strategic Plan for Amphibian and Reptile Conservation and Management on Department
of Defense Lands

The Department of Defense's core responsibility is to defend our Nation and care for our Service personnel and their families. Consistent with this objective, the American public also expects us to protect and conserve the land, sea, and airspace we require for military operations. *The Strategic Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands* document is intended to help natural resource managers better address the conservation and protection of amphibians and reptiles and their habitats; to help Commanders comply with the Endangered Species Act and the National Environmental Policy Act; and to help both Commanders and resource managers achieve their mission objectives by providing relevant technical guidance on priorities such as:

- implementing proactive, habitat-based management strategies that maintain healthy landscapes and training lands in ways that sustain and enable DoD's mission activities;
- promoting proven conservation partnerships to help leverage financial and human resources to achieve common goals, such as preventing species from becoming listed as threatened or endangered; and
- minimizing environmental encroachment, which continues to impact the military's ability to conduct operations in once-remote areas.

This document provides a framework for our natural resources managers to use as they update, revise, and implement Integrated Natural Resources Management Plans to ensure that we are supporting Commanders by meeting environmental requirements and mission readiness. In updating this Strategic Plan, we worked closely with many of your staff, I appreciate the time and effort they invested, and wholeheartedly support this endeavor. I ask that you join me in its advocacy and distribute this document as widely as possible.

My lead for amphibian and reptile conservation and management activities is Mr. L. Peter Boice, at (571) 372-6905 or by email at l.p.boice.civ@mail.mil.

John Conger

Performing the Duties of the Assistant Secretary of Defense
(Energy, Installations and Environment)

Attachment:
As stated

ABOUT THE COVER

The Timber Rattlesnake (*Crotalus horridus*) was chosen to reflect the long-standing relationship DoD and the Military Services have with protecting both our nation and its resources. This species first appeared on military colors on the original **Gadsden flag image which served as ‘an emblem of vigilance... of magnanimity and true courage.’ Ultimately, the use of this species on the cover is meant to represent how DoD protects the natural resources with which it has been entrusted, and how those resources in turn provide for and protect the military’s ability to prepare for its warfighting and peacekeeping duties.**

ACKNOWLEDGEMENTS

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CREDITS

Front Cover Photo: Timber Rattlesnake (*Crotalus horridus*), Chris Taylor

Back Cover Photo: Common Chameleon (*Chamaeleo chameleon*), Paul Block

Page 2 Photo: Eastern Box Turtle (*Terrapene carolina*), Paul Block

Page 3 Photos: Green Treefrog (*Hyla cinerea*); American Alligator (*Alligator mississippiensis*), Paul Block

DOCUMENT PURPOSE

The purpose of this document is to summarize current reptile and amphibian related challenges and concerns on Department of Defense (DoD) lands, and to highlight reptile and amphibian **strategies and priorities that can inform and enhance DoD's** natural resource conservation and management activities. Success will be achieved by implementing proactive, habitat-based management strategies that maintain healthy landscapes **and training lands in ways that sustain and enable DoD's** testing, training, operations, and safety mission.

“A COUNTRY WORTH
DEFENDING IS A COUNTRY
WORTH PRESERVING.”

—MAJOR GENERAL MICHAEL R. LEHNERT,
UNITED STATES MARINE CORPS (RET.)



Long-nosed Snake (*Rhinocheilus lecontei*)



Desert Tortoise (*Gopherus agassizii*)

© Tim Burr



Rough Greensnake (*Opheodrys aestivus*)

© Seth Berry



Gila Monster (*Heloderma suspectum*)

© James Aiki



Northwestern Salamander (*Ambystoma gracile*)

© Bradford Hollingsworth



Barred Anole (*Anolis stratulus*)

© Paul Block

OVERVIEW

The DoD’s primary responsibility is to ensure that our soldiers, sailors, marines, and air personnel have the operational and logistical flexibility they need to test and train to the fullest extent possible. To meet these objectives, the Military Services frequently require the use of large expanses of undeveloped land, much of which contains ecologically significant natural resources. DoD recognizes that protecting and conserving its lands and waters is necessary both to ensure a sustainable training platform and to minimize the potential for regulatory and statutory restrictions. As a result of DoD’s environmental protection efforts, some of America’s highest-quality wetlands, prairies, forests, and other unique natural areas occur on DoD lands.

Approximately 32 percent of the world’s amphibians are known to be threatened or extinct.¹ Reptiles also are in decline, and one in five of the world’s reptile species may soon be extinct, including over 40 percent of all turtle species.² In the United States, nearly all native amphibians inhabit only a portion of their historic range. Six of 34 amphibian species³ and 18 of the 40 reptile species⁴ listed by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered under the Endangered Species Act (ESA) occur on DoD lands, and dozens of amphibian and reptile species managed by DoD are “at-risk” of requiring this protection.⁵

To address these declines, a broad coalition of partners joined together to form the National Partners in Amphibian and Reptile Conservation (PARC) Program.⁶ Formed in 1999, National PARC is an inclusive partnership dedicated to the conservation of herpetofauna – reptiles and amphibians – and their habitats. Federal and state agencies, tribes, non-governmental organizations, and industry groups agreed, by signing the Memorandum of Understanding (MOU) Among Federal Agencies for Achieving Objectives of the PARC, “to conserve amphibians, reptiles, and their habitats as integral parts of our ecosystem and culture through proactive and coordinated public/private partnerships.” DoD became a signatory to the PARC MOU in 2007 and signed an updated MOU in 2011. DoD has convened subject matter experts and regional workshops to identify efficiencies and inefficiencies in amphibian and reptile management that have helped inform development of this strategic plan.

¹ The IUCN Red List of Threatened Species (www.iucnredlist.org).
² Turtle Taxonomy Working Group [van Dijk, P.P., Iverson, J.B., Rhodin, A.G.J., Shaffer, H.B., and Bour, R.]. 2014.
³ http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?groups=D&listingType=L&mapstatus=1.
⁴ http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?groups=C&listingType=L&mapstatus=1
⁵ FY2013 DoD annual environmental management review data.
⁶ <http://parcplace.org>.

AMPHIBIANS AND REPTILES ON DEPARTMENT OF DEFENSE LANDS

Although DoD manages only 3 percent of U.S. federal landholdings, it is steward to more rare, threatened, and endangered species per acre than any other federal land managing agency. Amphibians and reptiles are essential components of the habitats they live in, functioning as both predators and prey. They are excellent indicators of environmental health, and when these species are threatened, DoD must – by law – fund recovery efforts that take resources away from other needs. More importantly, DoD can lose its ability to train personnel and test the equipment needed to keep our nation secure.

From 1991-2013, DoD spent more than \$142 million on the conservation and management of listed reptile species and an additional \$17 million on listed amphibian species – expenditures on the desert tortoise alone neared \$110 million. On the benefit side of the equation, by investing funds to manage these species, DoD has been able to maintain much of its training flexibility and capabilities. And, because herpetofauna occupy a wide array of habitats, these expenditures often have benefit to multiple species as well as to personnel who live and recreate on the base. That is, protecting the lands needed to train also creates open and natural areas that personnel can use for game hunting/fishing, wildlife viewing, hiking, etc.



© Richard Whittle

Flat-tailed Horned Lizard (*Phrynosoma mcallii*)

To address herpetofauna management and mission-related issues in a coordinated and proactive way, installation natural resources managers work through their Military Service chains of command to communicate about issues related to species conservation, inventories, research, and monitoring, as well as education, outreach, and training. Effectively managing amphibians and reptiles at the installation level via the Integrated Natural Resource Management Plan (INRMP) and beyond the installation fence line directly enables the Military Services to focus on their primary responsibility of ensuring that DoD has the operational and logistical flexibility necessary for testing and training exercises.

For example, by proactively managing at-risk species and their habitats, DoD can help prevent species from becoming federally listed, as was the case with the Flat-tailed Horned Lizard, which was not listed – in part – as a result of DoD's efforts. Similarly, the Island Night Lizard was delisted from the ESA in May 2014 in large part because of the successful management and recovery efforts on Navy's San Nicolas and San Clemente Islands, while the Arroyo Toad is proposed for down-listing from "Endangered" to "Threatened" status under the ESA, again in large part as a result of the management actions and strategies in place at Marine Corps Base Camp Pendleton, Naval Base Coronado, Naval Weapons Station Seal Beach Detachment Fallbrook, and Fort Hunter Liggett.



© Rob Lovich

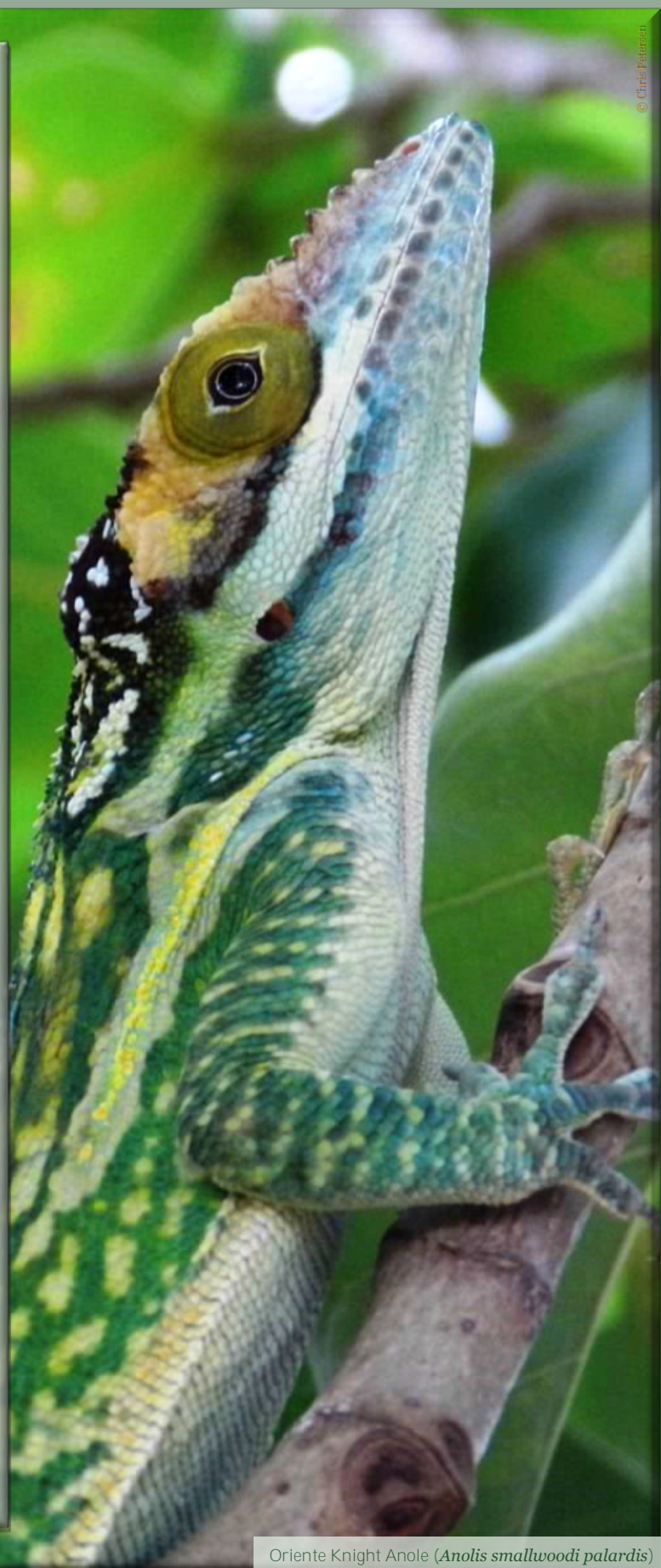
Arroyo Toad (*Anaxyrus californicus*)

THREATS TO AMPHIBIAN AND REPTILE HABITATS AND POPULATIONS

- ◆ **Habitat degradation and loss** are the primary causes of species decline. When the lands and waters amphibians and reptiles need to breed, disperse, migrate, feed, and rest are fragmented (i.e., patchy or disconnected), these animals can experience declines in diversity and increased mortality.
- ◆ **Climate change** has enormous potential to affect amphibians and reptiles. Increasing temperatures mean altered moisture and precipitation, salt water intrusion into fresh water areas, higher intensity coastal storm surges, changing temperature patterns and growing seasons, increased threats from non-native species and diseases, and changes to the quality and temperature of rivers, lakes, ponds, streams, swamps, wetlands, bogs, vernal pools, and other water habitats that are critical to the survival of many herpetofauna species.
- ◆ **Invasive non-native species** may degrade and reduce viable habitat for native species. By definition, invasive non-native species adversely affect habitats and bioregions economically, environmentally, and/or ecologically. When people release non-native species into the environment, they can devastate native wildlife and plants (e.g., Burmese Python in the Everglades, Tamarisk in the American Southwest).
- ◆ **Feral and nuisance animal species**, whether domesticated or wild, can threaten herpetofauna populations via resource competition, predation, and habitat degradation. Feral cats, for example, eat large numbers of native and sometimes endangered wildlife, including those on military installations.
- ◆ **Diseases** that affect amphibians and reptiles are on the rise. In the last decade, the growth and spread of harmful pathogens and diseases has resulted in population reductions, range contractions, regional extirpations, and even extinctions. Some of these diseases are made worse by climate change.⁷
- ◆ **Wildlife Trade/Harvest** is a multibillion-dollar international industry that commonly targets amphibians and reptiles. The persistent lure of profit from trade in exotic species, both legal and illegal, has resulted in very harmful collection practices, especially by the traders who over-collect species and destroy habitats. DoD personnel, especially when deployed overseas, receive training so they do not accidentally purchase items made from CITES-protected species.⁸

⁷ <http://amphibiaweb.org/declines/ClimateChange.html>

⁸ CITES: the Convention on International Trade in Endangered Species (www.cites.org).



© Chris Peterson

Oriente Knight Anole (*Anolis smallwoodi palardis*)

OBJECTIVES

The following strategic objectives serve to guide DoD conservation activities in ways that help ensure compliance with the Sikes Act; support Secretary of Defense and DoD Natural Resource Program priorities; and promote communications, **coordination, and other efficiencies when managing DoD's amphibians and reptiles and the resources they need to survive and thrive.**

- ◆ Develop and maintain an amphibian and reptile species inventory (e.g., spreadsheets) for DoD installations with an INRMP, based on information requested through the designated Military Service headquarters points of contact with OSD.
- ◆ Maintain and make available up-to-date biological information relevant to the management of listed, at-risk, and **common species (e.g., natural history, species' range on and off installation) so installations can determine which** amphibian and reptile species have the greatest potential to affect mission activities, and develop strategies and guidance to incorporate into their INRMPs to manage those species.
- ◆ Develop training and education materials specific to DoD, as requested by designated Military Service headquarters points of contact.
- ◆ Identify opportunities and/or partners to promote regional conservation and cost-sharing, for both on- and off-installation efforts.
- ◆ Establish and maintain regular communications with OSD and the Military Services through monthly updates to the Conservation Committee.

© Chris Petersen



Eastern Cottonmouth (*Agkistrodon piscivorus piscivorus*)

ROLES AND RESPONSIBILITIES

The following Roles and Responsibilities will help achieve the objectives outlined above.

Organization	Roles and Responsibilities
OASD (EI&E)	<ul style="list-style-type: none"> ◆ Cooperate and coordinate with other federal agencies to conserve amphibians, reptiles, and their habitats through proactive and coordinated public/private partnerships. ◆ Disseminate and promote the <i>DoD Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands</i> to designated Military Service headquarters points of contact. ◆ Disseminate and promote the MOU between DoD and other federal agencies regarding the PARC Federal Agencies Steering Committee to designated Military Service headquarters points of contact. ◆ Ensure that the Military Service headquarters points of contact incorporate sound reptile and amphibian management into their conservation programs. ◆ Develop policy and guidance in full cooperation with designated Military Service headquarters points of contact to support the management of amphibians and reptiles on DoD lands, if needed. ◆ Maintain regular communication with the Military Services headquarters points of contact.
Military Service Natural Resources Headquarters Designated Points of Contact	<ul style="list-style-type: none"> ◆ Designate Military Service headquarters points of contact. ◆ Disseminate through their respective chains of command the <i>DoD Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands</i>. ◆ Disseminate through their respective chains of command the MOU between DoD and other federal agencies regarding the PARC Federal Agencies Steering Committee. ◆ Develop Military Service-specific policy and guidance to support the management of amphibians and reptiles on DoD lands, if needed. ◆ Cooperate and coordinate with other federal agencies to conserve amphibians, reptiles, and their habitats through proactive and coordinated public/private partnerships as appropriate. ◆ Ensure Military Service programs incorporate appropriate reptile and amphibian management into their natural resource programs and Integrated Natural Resources Management Plans with special emphasis on proposed, listed, and candidate species. ◆ Maintain regular communication with OASD (EI&E).

Harlequin Coralsnake (*Micrurus fulvius*)



© J.D. Wilson

Ornate Chorus Frog (*Pseudacris ornate*)





Yellow-backed Spiny Lizard (*Sceloporus uniformis*)

CONCLUSION

Amphibians and reptiles face ever-increasing challenges to their survival. From habitat loss and expanding human populations to rise in disease and impacts from climate change, our Nation's herpetofauna are experiencing unprecedented declines. This plan provides a framework for accomplishing DoD-wide conservation objectives related to the protection of amphibians, reptiles, and their habitats as part of a comprehensive effort to manage natural resources in ways that preclude mission conflicts and loss of training capabilities that can result from conservation-based regulatory restrictions.

Ultimately, the success of DoD's herpetofauna conservation efforts will be measured in terms of their impact to readiness and operational freedom, as well as to reptile and amphibian conservation. DoD is committed to working collaboratively with all stakeholders to achieve the goals and objectives outlined in this plan.

APPENDIX I

ACRONYMS AND ABBREVIATIONS

CITES	Convention on International Trade in Endangered Species
DoD	Department of Defense
ESA	Endangered Species Act
INRMP	Integrated Natural Resources Management Plan
MOU	Memorandum of Understanding
OASD (EI&E)	Office of the Assistant Secretary of Defense (Energy, Installations & Environment)
OSD	Office of the Secretary of Defense
PARC	Partners in Amphibian and Reptile Conservation
POC	Point of Contact
USFWS	U.S. Fish and Wildlife Service

© Ralph Pace



Green Sea Turtle (*Chelonia mydas*)

APPENDIX II

ESA Listed Amphibian and Reptile Species That Occur on DoD Lands (FY2013)⁹

Common Name	Scientific Name	Group
Reticulated Flatwoods Salamander	<i>Ambystoma bishopi</i>	amphibians
California Tiger Salamander	<i>Ambystoma californiense</i>	amphibians
Frosted Flatwoods Salamander	<i>Ambystoma cingulatum</i>	amphibians
Sonoran Tiger Salamander	<i>Ambystoma mavortium stebbinsi</i>	amphibians
Arroyo Toad	<i>Anaxyrus californicus</i>	amphibians
Houston Toad	<i>Anaxyrus houstonensis</i>	amphibians
California Red-legged Frog	<i>Rana draytonii</i>	amphibians
Sierra Nevada Yellow-legged Frog	<i>Rana sierrae</i>	amphibians
American Alligator	<i>Alligator mississippiensis</i>	reptiles
Loggerhead Sea Turtle	<i>Caretta caretta</i>	reptiles
Green Sea Turtle	<i>Chelonia mydas</i>	reptiles
American crocodile	<i>Crocodylus acutus</i>	reptiles
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	reptiles
Eastern Indigo Snake	<i>Drymarchon couperi</i>	reptiles
Bog Turtle	<i>Glyptemys muhlenbergii</i>	reptiles
Puerto Rican Boa	<i>Epicrates inornatus</i>	reptiles
Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	reptiles
Mohave Desert Tortoise	<i>Gopherus agassizii</i>	reptiles
Gopher Tortoise	<i>Gopherus polyphemus</i>	reptiles
Ringed Map Turtle	<i>Graptemys oculifera</i>	reptiles
Kemp's Ridley Sea Turtle	<i>Lepidochelys kempii</i>	reptiles
Olive Ridley Sea Turtle	<i>Lepidochelys olivacea</i>	reptiles
Florida Sand Skink	<i>Plestiodon reynoldsi</i>	reptiles
Giant Garter Snake	<i>Thamnophis gigas</i>	reptiles

⁹ Names based on Crother, B. I. (ed.). 2012. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, With Comments Regarding Confidence in Our Understanding. SSAR Herpetological Circular 39:1-92.

APPENDIX III

RESOURCES

Amphibian and Reptile Conservancy: www.amphibianandreptileconservancy.org

Amphibian and Reptile Species Database: www.denix.osd.mil/nr/FishandWildlife/TerrestrialAnimals.cfm

Armed Forces Pest Management Board: www.afpmb.org/

Convention on International Trade in Endangered Species (CITES): www.cites.org

Department of Defense Natural Resources Program: www.dodnaturalresources.net

- ◆ DoD Partners in Amphibian and Reptile Conservation (PARC): www.dodnaturalresources.net/DoD-PARC.html
- ◆ DoD PARC Photo Website: <https://dodparcphotolibrary.shutterfly.com/>
- ◆ DoD Partners in Flight: www.DoDPIF.org
- ◆ DoD Legacy Resource Management Program: www.dodlegacy.org/legacy/index.aspx

Endangered Species Act (ESA), Section 1531 of title 16 United States Code: www.fws.gov/laws/lawsdigest/esact.html

Environmental Security Technology Certification Program: www.serdp-estcp.org

Habitat Management Guidelines for Amphibians and Reptiles series: www.parcplace.org/parcplace/publications/habitat-management-guidelines.html

Inventory and Monitoring Guide:
www.parcplace.org/parcplace/publications/inventory-and-monitoring-guide.html

National Environmental Policy Act, Sections 4321 et seq. of title 42 United States Code: www.epa.gov/compliance/nepa

National Military Fish and Wildlife Association: www.nmfwa.net

National Partners in Amphibian and Reptile Conservation: www.parcplace.org

National Reptile & Amphibian Advisory Council, Reptile & Amphibian Law Support Center: <http://nraac.org/laws>

PARC 2014 Year of the Salamander: www.parcplace.org/parcplace/news-a-events/2014-year-of-the-salamander.html

PARC 2013 Year of the Snake: www.parcplace.org/parcplace/news-a-events/2013-year-of-the-snake.html

PARC 2012 Year of the Lizard: www.parcplace.org/parcplace/news-a-events/year-of-the-lizard.html

PARC 2011 Year of the Turtle: www.parcplace.org/parcplace/news-a-events/year-of-the-turtle.html

Priority Amphibian and Reptile Conservation Areas (PARCAS): www.parcplace.org/parcplace/publications/parcas-priority-amphibian-and-reptile-conservation-areas.html

Sikes Act, Sections 670a-670o of Title 16 United States Code, as amended: <http://www.gpo.gov/fdsys/pkg/USCODE-2011-title16/html/USCODE-2011-title16-chap5C.htm>

State Wildlife Action Plans: www.teaming.com/state-wildlife-action-plans-swaps

Strategic Environmental Research and Development Program: www.serdp-estcp.org

USFWS Endangered Species Program: www.fws.gov/endangered/species/us-species.html

USFWS Federally Listed Amphibian and Reptile Species: http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?groups=C&listingType=L&mapstatus=1

© Paul Block



Ensatina (*Ensatina eschscholtzii*)



APPENDIX 8

INRMP BENEFITS FOR ENDANGERED SPECIES

Format Page

Section 4(a) (3) of the Endangered Species Act (16 U.S.C. 1533(a) (3)) precludes the designation of critical habitat on DoD lands if the Secretary of the Interior determines that the installation's Integrated Natural Resource Management Plan provides a benefit to the species for which critical habitat is proposed for designation.

There are numerous benefits that have been discussed throughout this INRMP for current or future federally listed species. In an attempt to focus on specific benefits, Fort Huachuca natural resources staff have listed species in this appendix that are either most likely to be federally listed in the foreseeable future or currently listed species that may be found on the installation in the future. Fort Huachuca's approach to natural resources management, as identified in this INRMP, is based on conserving the ecosystem rather than single species management. The INRMP reflects this, as many of the management actions cited in Appendix 3 are broad in scope and benefit multiple species.

1. Jaguar (*Panthera onca*)

The jaguar was listed as federally endangered in the United States in a 22 July 1997 listing rule (62 FR 39147). Critical habitat was proposed for the Jaguar on 20 August 2012 (77 FR 50214), and revised on 1 July 2013 (78 FR 39237), to include lands owned and managed by Fort Huachuca. Approximately 15,850 acres of Fort Huachuca is identified as proposed critical habitat as defined by the revised Proposed Rule.

The jaguar is specifically addressed in Section 2.3.2 *Common Fauna* on page 69 and Section 2.3.4. *Threatened and Endangered Species and Species of Concern* on page 86 of the INRMP; however, management actions specific to the jaguar are not called-out in Appendix 3 of the INRMP as they are broad in scope and benefit multiple species. These management actions also benefit and protect the Primary Constituent Elements (PCE) of the jaguar.

The revised Proposed Rule for Designation of Critical Habitat for the Jaguar identifies the Primary Constituent Elements (PCE) specific to jaguars as expansive open spaces in the southwestern United States of at least 100 square kilometers (km) [(38.6 square miles (mi))] in size that:

1. Provide connectivity to Mexico;
2. Contain adequate levels of native prey species (large prey such as deer and javelina, as well as medium-sized prey such as coatis, skunks, raccoons, or jackrabbits);
3. Include surface water sources within 20 km (12.4 mi) of one another;
4. Contain from greater than 1 to 50% canopy cover within Madrean evergreen woodland, generally recognized by a mixture of oak, juniper, and pine trees on the landscape, or semidesert grassland vegetation communities, usually characterized by *Pleuraphis mutica* (tobosagrass) or *Bouteloua eriopoda* (black grama) along with other grasses;
5. Are characterized by intermediately, moderately, or highly rugged terrain;
6. Are characterized by minimal to no human population density, no major roads, or no stable nighttime lighting over any 1-square-km (0.4-square-mi) area; and
7. Are below 2,000 meters (6,562 feet) in elevation.

The following paragraphs describe how the current INRMP provides a benefit to the jaguar for each PCE.

Provide Connectivity to Mexico

Fort Huachuca is bounded by a perimeter barbed wire fence that is permeable to wildlife, while generally excluding domestic livestock. This boundary maintains connectivity with adjoining federal lands including those managed by the Forest Service and Bureau of Land Management for movement of jaguars throughout the landscape. The Fort has no plans to alter this perimeter fence in any way that would hinder jaguar movement.

Within the Fort's boundary, the Huachuca Mountains and semi-arid grasslands that provide connectivity to adjoining lands are managed for the protection of threatened and endangered species and mission activities. Access to the mountains is limited by rugged topography and single lane four-wheel drive dirt roads of varying condition. Mission requirements are effectively conducted elsewhere; therefore, limited training and testing occur in the mountains. No construction activities are proposed in the mountains on the Fort.

Section 3.1.2 on pages 102 to 104 of the INRMP describes Fort Huachuca's partnerships which have made possible the protection of land and natural resources beyond the installation and across administrative boundaries. These partnerships affect water conservation, regional wildland fire planning, wildlife planning, and protection of adjoining lands from fragmentation and development. Through the Army Compatible Use Buffer (ACUB) Program, the Fort has obtained conservation easements on native grassland and agricultural land that protect the military mission as well as enhance endangered species recovery through conserving habitat and extending potential dispersal corridors and affecting groundwater management programs in the Sierra Vista Subwatershed. Since 2000, approximately 9,000 acres of agricultural lands adjacent to the San Pedro National Conservation Area (SPRNCA) and semi-arid grasslands adjacent to the western and northern boundaries of the Fort adjacent to and including the Babocomari River have been protected through these conservation easements. These existing, funded and pending, and future conservation easements will benefit the jaguar by providing protected travel corridors, protecting future surface flow of the San Pedro River, and protecting connectivity to Mexico.

Contain Adequate Levels of Native Prey Species

The Huachuca Mountains are exceptionally biologically diverse and contain a higher abundance of native prey species than the surrounding lowlands. This diversity is explained by the complex topography with a wide range of elevations; the diversity of geological substrates; the presence of surface water from springs, cienegas, and flowing streams; the presence of a large component of subtropical vegetation; and protection from substantial exploitation. The Proposed Rule identifies javelina and deer as the mainstays in the diet of the U.S.-Mexico borderlands jaguars but notes that jaguar are known to feed on a variety of prey species across its range including medium-sized prey such as coati, skunk, raccoon, jackrabbit and various other reptiles, birds, and fish. Based on this INRMP, the Fort manages its natural resources including land and wildlife using an ecosystem management approach.

Section 3.1.3 on pages 105 to 108 of the INRMP describes the ecosystem management approach and adaptive management framework the Fort employs in its management of ecosystems and native wildlife. Ecosystem management, rather than single species management benefits all native species including the jaguar.

Section 4.1 through 4.20 on pages 109 to 121 of the INRMP describe the Fort's natural resources management goals and objectives that support sound and realistic tactical training while protecting sensitive species and their habitat. A specific goal, Goal A-2 on page 110, is to "manage for ecosystem integrity... moving beyond single species conservation to improve the native biodiversity, sustainability, and resilience of ecosystems".

Section 2.3.2 on pages 66 to 70 of the INRMP describes the significant diversity of wildlife within the installation's boundary including the many large and medium-sized mammal species that constitute prey species for the jaguar.

Section 2.1.4 on pages 37 to 39 of the INRMP describes the Fort's hunting program. This program specifically limits the number of deer and javelina permits issued to ensure adequate prey are available for the top predators known to occur on the installation. Hunting seasons and bag limits on the Fort are set in coordination with the Arizona Game and Fish Department indicating numbers of game (large mammal prey) are abundant enough to support harvest. The hunting program currently supports the prey base for puma and therefore supports the prey base for the jaguar. Section 2.3.2 also identifies game management plans developed by the Fort.

Include Surface Water Sources within 20 Kilometers (12.4 Miles) of One Another

Section 2.2.5 on page 61 of the INRMP identifies approximately 4.5 miles of perennial streams spread over about 4 miles of canyon bottom. Approximately 3.5 miles occur in Garden Canyon and another 0.75 miles occur in Huachuca Canyon. Minor lengths of perennial reaches also occur in McClure and Blacktail Canyons. There are fifteen ponds with about 32 acres of surface area, depending on annual precipitation, on the installation. Most ponds only retain water during heavy rains. Golf Course Pond, Gravel Pit Pond, Woodcutters Pond, Officer's Club Pond, and Sycamore Ponds 1 and 2 are situated relatively close to the cantonment area and are the most reliable ponds. There are 39 known springs on the installation. Springs were at one time the sole source of water for Fort Huachuca. Wildlife water tanks are installed across the installation to supplement game water resources with approximately 22 guzzlers maintained for game and wildlife. In addition to these water resources, the Babocomari River lies just north of the Fort while the San Pedro River lies to the east.

Section 2.3.3 on pages 70 and 71 of the INRMP describes wetland habitat occurring on the Fort as 64 acres of wetlands and 770 acres of riparian habitat. All water resources on the installation are protected for threatened and endangered species.

Pond restoration projects, as identified in Appendix 9 of the INRMP, have been funded and projects initiated to restore and manage pond habitat for water permanency and invasive species management.

Contain from greater than 1 to 50% Canopy Cover within Madrean Evergreen Woodland, Generally Recognized by a Mixture of Oak, Juniper, and Pine Trees on the Landscape, or Semidesert Grassland Vegetation Communities, Usually Characterized by *Pleuraphis mutica* (tobosagrass) or *Bouteloua eriopoda* (black grama) Along with Other Grasses

The Proposed Rule identifies thornscrub, desertscrub, lowland desert, mesquite grassland, Madrean oak woodland, and pine-oak woodland communities as important for borderlands jaguars. Approximately 15,850 acres of Fort Huachuca is identified as proposed critical habitat.

Section 2.3.1 on pages 62 to 66 of the INRMP describes the vegetation and flora of the installation, which range from shrublands, open grasslands, and mesquite-grass savannas of the lowlands, through the oak-grass savannas and oak woodlands of the foothills, to the pinyon-juniper and pine woodland of upper elevations.

Vegetation type	Total	Percent
	Acres	
Shrubland	10,414	14
Open Grassland	8,355	12
Shrub-Grassland	12,295	17
Mesquite Woodland	1,108	2
Mesquite-Grass	14,182	19
Oak-Grass Savanna	1,903	3
Oak Woodland	11,509	16
Mixed Woodland	2,969	4
Pine Woodland	1,827	2
Deciduous Woodland	1,007	1
Mahogany Woodland	1,351	2
Pinyon-Juniper	502	1
Urban and Built Land	5,270	7
TOTAL	73,142	100

Open grassland and mesquite-grass savanna occur at elevations from approximately 4,200 to 5,100 foot above mean sea level (amsl). Woodlands dominate the higher elevations of the mountains between 5,200 and 7,200 foot amsl. Pine woodlands covering approximately 1,800 acres occur between elevations of 6,000 and 8,600 foot amsl. Madrean oak woodland and pine-oak woodland communities are managed for a number of threatened and endangered species.

The Proposed Rule notes that some climate models predict warmer temperatures and increased frequency of extreme weather events such as heat waves, droughts, and floods. The recent fires in the Southwest U.S., including the Monument Fire, have exhibited extreme fire conditions and may become the norm unless substantial fuels management occurs within the mountains. Effective management of the Fort's forest resources in the face of climate change is imperative to the protection of future habitat for the threatened and endangered species for which the Fort presently manages. The Fort maintains an interagency agreement with the USDA Forest Service that covers all fire management activities, and the Fort has adopted the regional fire plan of the Huachuca Area Fire Partners (HAFP) as identified in the Fort's 2006 Integrated Wildland Fire Management Plan (IWFMP).

Section 4.1.0 – 4.1.1 on pages 115 to 116 of the INRMP describes wildland fire management on the Fort and identifies goals to move toward restoring natural fire regimes and manage for natural resources. To this end, the Fort partners with the Coronado National Forest and the National Park Service in the FireScope program with a long-term goal of creating landscapes that are able to survive wildfire with biodiversity intact. The Fort's commitment to fire prevention, fuels management, prescribed burning, and fire suppression procedures as a cooperative agency of the Huachuca FireScope project and outlined in the IWFMP, particularly in wooded habitat, reduces the potential for fire to adversely affect the jaguar and alter potential habitat.

The Fort recently awarded a project, identified as Potential Future Research in the INRMP (Appendix 5), that models wildfire risk in the Huachuca Mountains based on the work of Finney et. al. (2007). Finney's work has shown that fuel treatment effects on the growth and behavior of large wildland fires depend on the spatial arrangements of individual treatment units. The goal of this project is to develop a fuel treatment plan based on landscape fire simulation and fuel treatment optimization to allow the Fort to treat minimum area for maximum benefit and produce forest structure and fuel characteristics that reduce the likelihood that wildfires will cause large, rapid changes in biophysical conditions to protect threatened and endangered species habitat. Protecting forest structure for the future will benefit the jaguar. The Fort is currently working with the Service on this project and will reinitiate consultation with the Service prior to implementation of the resulting plan, as a number of potentially substantive changes have occurred since the April 2, 2009 biological opinion on the FireScape program (File number 22410-2008-F-0451).

The Proposed Rule also notes that, relative to climate change, dramatic changes in Southwestern vegetation communities are expected as wildfires carried by nonnative plants potentially become more frequent, promoting presence of exotic species over native species.

Section 4.12 on page 117 of the INRMP identifies the Fort's goals and objectives relative to invasive species. A specific goal identified in the plan, Goal K-1, is to control and eradicate noxious invasive, non-indigenous plants and non-indigenous animal species. Achievements of this goal will promote sustained ecosystem function, favor native species biodiversity, and support the military mission. An invasive plant survey and mapping project was initiated in 2006 with additional effort conducted in 2007 and 2009. In 2010, the Fort was selected and participated as a Department of Defense test installation for a U.S. Army Research Office funded project conducted by the University of Redlands to develop a Spatial Decision Modeling Support Tool for invasive species, in part because of the Fort's intensive invasive mapping project. In 2011 and 2012 the Fort implemented mechanical treatment of invasive plant species within critical habitat of the Huachuca water umbel. In 2012 and 2013 the Fort implemented mechanical and chemical control along a test segment of a major travel corridor on the West Range. Additionally, the Fort has been conducting invasive faunal surveys and mechanical treatments for the American bullfrog (*Rana catesbeiana*) in 2012 and 2013. The Fort continues to focus efforts, to the extent practicable, to implement invasive species management to protect threatened and endangered species and critical habitat.

Are characterized by Intermediately, Moderately, or Highly Rugged Terrain

The terrain of the Huachuca Mountains within the Fort's boundary varies from moderately to highly rugged topography, including canyons and ridges, with rocky hills that provide jaguar den and rest areas. Vehicle mounted activity, excepting limited equipment testing along roadsides, does not occur in the mountains. Occasionally, a Special Forces unit will request to conduct training in the mountains but are provided environmental awareness training. No activities occur or are planned to occur in the mountains that would affect or alter the terrain.

Are characterized by Minimal to No Human Population Density, No Major Roads, or No Stable Nighttime Lighting over any 1-square-km (0.4-square-mi) Area

The developed areas of the Fort cover approximately 6,140 acres or approximately twelve percent of the installation, contain the highest human population density, and lie with relatively level terrain to include the cantonment and Black Tower Area.

Section 2.1.3 on pages 21 to 24 and Section 2.1.4 on pages 24 to 54 of the INRMP identify the Fort's land use and mission activities to include equipment training and testing, field training exercises, live fire qualification and training, and recreation activities as well as actions taken to protect threatened and endangered species and their food sources (e.g., agave) during training activities. The remaining 67,002 acres (92 percent of the installation) is divided into the South, West, and East Ranges where relatively few structures occur and human population density is reduced (excluding the Blacktower area on the West Range).

The South and West Ranges contain the entirety of the Huachuca Mountain complex and are managed for a variety of threatened and endangered species. Field training exercise areas and bivouac areas occur in Training Areas Mike, Papa, Uniform, Victor, and Whiskey within level to lightly rugged terrain of the South Range and Training Area Lima of the West Range. Live fire activities take place on weapons qualification ranges in Training Area Tango of the South Range and in Training Area Zulu of the East Range and occur within level to lightly rugged terrain. Weapons safety fans on the South Range advance into moderately to highly rugged terrain. Although these ranges are in open semi-arid grassland (Tango) and Chihuahuan desert scrub (Zulu) and are not expected to pose a threat to potential jaguar, Fort Huachuca's Range Control provides a range safety briefing to troops. This training provides information on potential special status species to include the jaguar.

All canyons within the Huachuca Mountains are closed between sunset and sunrise except for authorized activity for natural resource surveys and research, hunting, border patrol, or military police which further reduces the potential of collisions or disturbance. Recreational use of the canyons is prohibited between these hours.

Roads may impact jaguar movement, fragment habitat, cause disturbance, cause mortality, and affect prey numbers or distribution. The Fort contains no major roads. Roads on the Fort consist as one to two lane asphalt or dirt roads. Roads within the cantonment area and to peripheral buildings on the West Range are asphalt. The remainder of the roads on the East and West Range are dirt, and all roads accessing the more rugged terrain of the Huachuca's are dirt and receive relatively low levels of travel. The speed limit on the Fort ranges from 25 to 45 mph. All roads within the mountains have a 25 mph speed limit that greatly reduces the threat of military or recreational vehicle collisions with jaguar.

Nighttime lighting occurs within the cantonment area and within compounds dedicated to unmanned aerial systems and forward operating bases on the West Range. Limited lighting occurs on top of cell phone towers on Telegraph Hill in Huachuca Canyon and on wind turbines, other data towers, and signs on the West Range. The Fort partially shields all outdoor light fixtures except incandescent fixtures of 150 watts or less and other sources of 70 watts or less as required by Arizona state policy and Cochise County Light Pollution Code. Mountainous areas within the Fort's boundary are not lighted except the site Papa and Uniform training areas.

Lighting from the cantonment area, Black Tower and the municipal areas of Huachuca City, Sierra Vista, and Benson outside the installation provide a notable glow when looking out from high elevations of the canyons. The Fort is required to comply with the Cochise County Light Pollution Code.

Additional Ongoing Activities That Provide Benefits to the Jaguar

In addition to the specific projects listed in Appendix 3 of the INRMP, the following ongoing activities also provide a benefit to the jaguar:

- Cooperative relationship with the University of Arizona's Wild Cat Research and Conservation Center to permit surveying and monitoring for the jaguar on the installation,
- Threatened and endangered species awareness training to troops in safety briefings,
- Control of human activity and road/infrastructure development in potential jaguar habitat,
- Game management plans,
- Prescribed fire and fuel management in the Huachuca Mountains in coordination with the regional Huachuca FireScape project and as specified in the IWFMP,
- Invasive species management to protect natural resources and critical habitat for threatened and endangered species,
- Natural resources management at the ecosystem level using an adaptive management framework,
- Pond and spring habitat management on the installation, especially where habitat has been degraded or lost or where potential exists for improving habitat,
- Conservation easements obtained through the Army Compatible Use Buffer Program,
- Installation and maintenance of all-weather signs within Huachuca and Garden Canyons, and their tributary canyons with trails that inform visitors that the Canyon is home to sensitive species and require visitors to stay on trails and be as quiet and unobtrusive as possible,
- Ensure that no seeding/planting of nonnative grasses or other plants will occur on the installation that may alter fire frequencies in the wildland areas, and
- Ensure that low-level helicopter flights are minimized within canyons containing active Mexican spotted owl nests and which also provide high grade habitat for jaguar by avoiding helicopter and UAS flights over the Huachuca Mountains at altitudes below 500 feet above ground level, except for life, health and safety purposes.

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